

Supplemental Remedial Investigation Work Plan

**Clove and Maple Avenues Former Manufactured Gas Plant Site
Haverstraw, New York**

For

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CLOVE AND MAPLE AVENUES FORMER MANUFACTURED GAS PLANT SITE
HAVERSTRAW, NEW YORK**

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1.0 INTRODUCTION

1.1 Project Background

CMX, Inc. (CMX) has prepared this Work Plan (WP) for Orange and Rockland Utilities, Inc. (O&R) to conduct a Supplemental Remedial Investigation (SRI) of the Clove and Maple Avenues Former Manufactured Gas Plant (MGP) Site and adjacent parcels in Haverstraw, New York (Figure 1/Plate 1).

The RI is being performed in accordance with the Administrative Order on Consent (AOC), dated July 1998, Index #D3-0001-98-03, between O&R and the New York State Department of Environmental Conservation (NYSDEC).

The O&R property where the MGP was located is a 0.92-acre rectangular parcel referred to on the tax map as Section 27.62, Block 1, Lot #9. It is bordered to the northwest by two residential properties, to the northeast by Maple Avenue, to the southeast by a day care facility, and to the southwest by Clove Avenue. The property is sloped with Clove Avenue running along the uphill side of the site and Maple Avenue running along the downhill side. The area of the site is zoned as light industrial; however, both light industrial and residential land uses are found nearby.

Throughout this report, the Clove and Maple Avenues Former MGP Site is referred to as “the Site” and includes the apartment complex parcels to the northeast, across Maple Avenue, and the embayment of the Hudson River northeast of West Street (Plate 1). “On-site” refers to the former MGP parcel and “off-site” refers to the balance of the Site. This description distinguishes it from another Haverstraw MGP site (referred to as the 93B Maple Avenue MGP site) that is located northwest of the Clove and Maple Avenues site on the opposite side of Maple Avenue. Plate 1 presents a detailed site location and illustration to distinguish between the 93B Maple Avenue former MGP and associated properties (where Interim Remedial Measures [IRMs] have been completed) and the properties addressed by the SRI described herein.

1.2 Project Objectives

The overall objectives of the SRI are as follows:

- Determine the nature and extent of MGP residuals that may be present at the site
- Delineate the horizontal and vertical extent of site related soil and groundwater impacts
- Determine whether constituents identified at the site constitute a significant threat to human health or the environment
- Obtain data to provide the basis for a feasibility study of remedial actions for the site

- Evaluate potential migration pathways including vapor intrusion for any MGP residues and/or chemical constituents related to the operations of the former MGP
- Characterize site-specific geologic and hydrogeologic conditions at offsite locations.

These goals are consistent with those of the NYSDEC's comprehensive remedial investigation process.

1.3 Work Plan Organization

The remainder of this SRIWP further describes the site history, and the sampling objectives and methodologies that will be used, and is formatted as follows: Section 2.0 presents the site history and description including the results of investigations completed to date; Section 3.0 outlines the proposed Scope of Work and field program; Section 4.0 outlines the project management and organization; Section 5.0 provides a list of references and Section 6.0 identifies the acronyms and abbreviations used in this document. A site-specific Quality Assurance Project Plan (QAPP), Field Sampling Plan (FSP), Health and Safety Plan (HASP), and Community Air Monitoring Plan (CAMP) are provided as Appendices A, B, C, and D, respectively.

2.0 SITE HISTORY AND DESCRIPTION

This subsection presents information relating to the history of the MGP, the current site description and use, surrounding land use, environmental setting and previous investigations.

2.1 Site MGP History

According to historic records reviewed, the MGP on Clove and Maple Avenues operated from approximately 1887 until 1935, at which time natural gas was introduced into the area and the MGP operation was closed. The general configuration of the MGP did not substantially change over the operating period. Figure 2 depicts the gas works at its known greatest extent based on review of Sanborn Fire Insurance (Sanborn) maps.

Following is a chronological history of the Clove and Maple Avenues Former MGP site based on review of the Sanborn maps for 1896 through 1946, and reported gas company operating statistics from *Brown's Directory of American Gas Companies (Brown's Directory)*.

- The first listing for the site is in the 1887 edition of *Brown's Directory* citing gas production utilizing an oil gas method. At that time, the company was referred to as the Haverstraw Gas Works.
- In 1893, *Brown's Directory* lists the gas manufacturing process as Hanlon, and then in 1899, the process is listed as Boecklin. The Boecklin process existed at the site for at least 35 years.
- An 1896 Sanborn map (the earliest known map) shows a gas plant at the site with a 50,000-cubic foot (cf) gas holder, a 30,000-gallon oil tank, and a coke shed. The 1909 *Brown's Directory* confirms the gas holder capacity as 60,000 cubic feet, which does not change through the early 1930s.
- A 1921 plant utility drawing (Peck, 1921) shows a horizontal high pressure gas storage vessel located near Clove Avenue. Review also indicates that the coke storage shed was removed that year and that a tar well was located between the 60,000-cf gas holder and the oil tank as shown in Figure 2.
- A 1931 Sanborn map shows that a coal shed was added to the eastern end of the plant building.

- According to *Brown's Directory*, natural gas was distributed as of July 1, 1935 in place of manufactured gas.
- According to O&R's records, the gas plant structures were demolished in the 1960s.

Table 1 presents a summary of the site ownership records for the Clove and Maple site. A record of gas production is shown in Table 2.

Figure 3 presents a composite historical drawing of streets and waterways, based on an 1876 Atlas Map, an 1887 Sanborn Map, an 1891 Beers Atlas Map, and 1896 and 1903 Sanborn Maps. The historical composite depicts a small stream that flowed past the 93B Maple Avenue MGP site, and roughly parallel to Maple Avenue to a point where it discharged into a former pond. The former pond apparently discharged to a small stream that emptied into the Hudson River embayment, which was the location of a marina, parking lot, and oil storage facility. The oil storage facility is historic as is the marina. Current use is a parking lot for the ferry terminal.

2.2 Current Site Description and Land Use

The Clove and Maple Avenues Former MGP site is located between Clove and Maple Avenues in the village of Haverstraw, Rockland County, New York (Plate 1/Figure 4). The site is an approximate 1-acre rectangular-shaped parcel identified as Section 27.62, Block 1, Lot # 9. The site is currently owned by O&R and a retired gas regulator station exists on the property. There are numerous abandoned gas pipelines in the ground on the site. The site is currently unoccupied and consists mostly of a grassed area with a hedgerow of trees located along Maple Avenue. Along the northern boundary of the site, there exists a drainage swale that intermittently directs stormwater runoff to a storm culvert under Maple Avenue. The site is fenced with a locked gate located on Clove Avenue. A landscape contractor maintains the grassed areas.

2.3 Surrounding Land Use

The surrounding land use is primarily residential. The properties, which are adjacent to the site, and their respective tax map numbers follow (refer to Plate 1).

- To the northwest are two residential properties (Lots 8 and 44)
- To the northeast is Maple Avenue; residential apartment buildings (Lot 17.4) are located opposite Maple Avenue

- To the southwest is Clove Avenue; residential properties (Lots 27 to 33) are located opposite the O&R property on Clove Avenue
- To the southeast is property owned by Head Start of Rockland (the site of the former Doig Nail Corporation; Lot 10). The site has been developed as a day care facility that began operation in September 2000.

2.4 Previous Investigations

Previous investigations at the site include an initial Hazard Assessment performed by Retec (RETEC, 1996), a Preliminary Site Assessment (PSA) performed by Retec (RETEC, 1997), a Surface-Soil Investigation and Risk Assessment performed by Retec (RETEC, 1997) and Remedial Investigations performed by GEI Consultants (GEI 1998-2006). Locations of sampling points from the PSA and the surface-soil investigation are found on Plate 2. The results of these investigations are summarized in this section. Throughout this section, analytical results are compared to Standards, Criteria and Guidance (SCGs) in accordance with NYSDEC Division of Environmental Remediation document DER-10).

2.4.1 Hazard Assessment

At the request of O&R, an assessment of the Clove and Maple Former MGP site was performed using the ASTM Risk Based Corrective Action (RBCA) classification scheme to determine whether existing conditions could be considered an immediate threat to human health. RETEC performed the assessment and concluded the following.

- Explosive vapors are not an issue on site because there are no buildings present; they are unlikely off site due to the distance of buildings from the site.
- Explosive vapors in subsurface utilities are unlikely because no odors were noted in adjacent sewers.
- Minor tar was noted at the ground surface, but no impact was observed in the storm sewer or surface runoff swale. Contact with surface contamination is possible. Because exposed tar is weathered, acute risks due to exposure are minimal. Although there is an increased health risk associated with chronic direct contact exposures to site-related contaminants (tar) present in surface soil, the potential for long-term exposure to contaminants in on-site soil is unlikely due to current site restrictions.

- Exposure to site-related contaminants in drinking water is not expected as there are no active water supply wells on or near the site, and homes and businesses in the vicinity of the site are provided with public water. In addition, based on the proximity of the site to the Hudson River and the groundwater flow direction toward the river, no potential for future impact is expected.

2.4.2 Preliminary Site Assessment

The objectives of the PSA were to identify the nature and extent of constituents of interest, to determine if the constituents pose a significant threat to human health or the environment, and to determine whether IRMs were appropriate at the site. The PSA included soil gas field screening, laboratory analysis of eight soil gas samples, surface-soil sampling and analysis (nine samples), eight (8) Geoprobe® borings in and around historic MGP structures, field and laboratory testing of subsurface-soil samples, installation of three (3) monitoring wells, groundwater sampling and analysis, hydraulic conductivity testing (two wells), and a site instrument survey.

Surface Soils

The results of the analyses of samples from the PSA indicate that no benzene, toluene, ethylbenzene, or xylenes (BTEX) were detected in any of the samples. Analytical results are included in Table 3. Concentrations of individual polynuclear aromatic hydrocarbon (PAH) compounds exceeding the NYSDEC-recommended soil cleanup objectives (RSCOs) were found at each of the nine (9) PSA surface-soil locations. Metals were detected at concentrations greater than the RSCOs in all but two samples. Total cyanide was detected in seven (7) of nine (9) surface-soil samples.

Soil Gas

During the PSA, a truck-mounted Geoprobe® rig was used to obtain soil gas samples and to complete subsurface-soil borings at the nine (9) locations shown on Plate 2. The results of the field screening indicated that the greatest concentrations of soil gas were found within the footprint of the former 60,000-cf gas holder.

Former MGP Structures

Four areas that contained buildings or subsurface structures from the former MGP were identified as a result of the PSA. Remnants of the gas holder foundation are still present at the site (Figure 4). The holder foundation appears to be the 60-foot diameter slab-on-grade concrete slab that still exists on the northern portion of the site. A boring was advanced through the slab and there was no

evidence of a subsurface tank. Tar contamination was observed beneath the slab in thin sand lenses. Water table elevation within the footprint of the holder was close to that outside the slab, indicating continuity.

Three (3) Geoprobe® borings were advanced near the former tar well. No below-grade structures (floors) were encountered and the area was underlain by 7 feet of fill. Some hydrocarbon staining was observed and tar-like nodules were recovered, but there was no significant source encountered.

No subsurface structures were located in the area of the former 30,000-gallon oil tank and only hydrocarbon odors were detected in retrieved samples. During the installation of monitoring well MW-02 just north of this former tank location, hydrocarbon odors and visible hydrocarbon product were observed in soil samples. During groundwater sampling activities at this monitoring well, a two-foot thick layer of dense non-aqueous phase liquid (DNAPL) was identified.

During the installation of two (2) Geoprobe® soil borings near the former generator and purifier buildings (Figure 2/Plate 2), accumulations of a tar-like material were observed at the ground surface in a small area adjacent to the existing regulator station. At the time of the investigation, the station was active. It has subsequently been retired. This material was black, highly viscous, and had a strong hydrocarbon odor.

Subsurface-Soil Samples

During the PSA, three (3) subsurface-soil samples were collected and analyzed from the monitoring wells/borings (one upgradient and two downgradient). Subsurface-soil samples were collected for field characterization and screening from the Geoprobe® borings. Analytical results are included in Table 3. BTEX compounds were detected in soil at concentrations greater than the RSCOs in borings SB2 and SB3. PAH compounds were detected in all three locations. For samples collected in the downgradient areas (from borings SB2 and SB3), 14 of the 16 PAH compounds were detected in concentrations greater than the cleanup objectives. Only benzo(a)pyrene was found to exceed the RSCOs in upgradient boring sample SB1 (20'-22'). Cyanide was not detected for any of the three (3) subsurface-soil samples.

Groundwater

Three (3) monitoring wells were installed and groundwater samples were collected for analysis. The downgradient groundwater samples (MW-2 and MW-3) exhibited volatile organic compounds (VOCs) and PAHs in concentrations greater than the NYSDEC AWQS. Concentrations of iron, magnesium, manganese, and sodium were detected in concentrations exceeding the groundwater standards, although none of these are typical MGP contaminants. Total cyanide was detected in one downgradient groundwater sample (MW-2) at a concentration above the NYSDEC standard.

A NAPL sample was collected from MW-02 near the location of the former oil tank (MW-02) and was analyzed for physical properties to obtain information regarding its potential mobility. The results confirmed field observations that the sample was a carbureted water gas tar. The NAPL also exhibited hazardous characteristics because it exceeded the regulatory level for benzene, arsenic, and selenium.

2.4.3 Interim Remedial Measure

As a result of the PSA, a small area of surface soil found to be impacted by tar near the former gas generator building was capped with gravel to prevent direct contact by persons who may visit or work at the site. In addition, soil pathways into the site were also covered with gravel and a fence was installed around the property to restrict access. No other IRM was recommended.

2.4.4 Surface-Soil Investigation and Risk Assessment

Recommendations in the PSA included additional surface-soil sampling, which was performed shortly after completion of the PSA. Sixty-two (62) surface soil samples were collected and analyzed for PAHs and metals. Six (6) surface soil samples were collected from background locations. These samples were analyzed for target analyte list (TAL) metals. The surface soil results from the PSA were combined with the results of these samples, and a risk assessment (RETEC, 1997) was generated.

The risk assessment for surface soils concluded that excess cancer risks for utility workers, groundskeepers, and local residents were at levels generally considered acceptable by the United States Environmental Protection Agency (USEPA) (below 10^{-6}). For recreational users, the cancer risks were within a range (10^{-6} to 10^{-4}) that is often considered acceptable by the USEPA.

2.5 Remedial Investigation Summary

The RI was performed by GEI from 1998 through 2006 and was designed to build on the previous site investigations in order to provide a sufficient characterization to determine the nature and extent of impacts from the former MGP. Of particular note, the RI targeted the potential source areas (i.e., tar well, iron oil tank, and the gas holder foundation) shown in Figure 4. Visibly impacted soil, groundwater, and/or DNAPL were found in these areas during the PSA. For completeness, other locations (i.e., former garage, high-pressure holder, the downgradient property line, and the southern property line) were investigated. Samples were also collected on the adjacent properties to the

south and east and from the embayment to the Hudson River. The rationale for each test pit, soil boring, and sediment sample location is presented in Table 4. All RI field activities were conducted according to the approved RI Work Plans. This section of the report presents the results of the investigation, and an interpretation of the extent of contamination at the site. BTEX, PAHs, cyanide, and some metals are contaminants commonly associated with MGP residuals; therefore, this section discusses the analytical results by these constituent groupings.

2.5.1 Surface Soils

Six background surface soil samples were collected from 0- to 2-inches below ground surface (bgs) as part of the RI. The samples were collected from locations within the Village of Haverstraw as far away as Bowline Point Park, 4,000 feet northeast of the site, and analyzed for BTEX, PAHs, and total cyanide. The locations of these samples were approved by NYSDEC following a site meeting to select sampling locations for the SRI. Six additional background surface soil samples were collected during the PSA from locations along Clove and Maple Avenues, Hudson Avenue, and Bowline Point Park and analyzed for TAL metals. The sample locations are presented in Figure 5. Table 3 presents the analytical results.

No VOCs were detected in the background samples. Numerous PAHs were detected in the background samples with concentrations ranging from 31.6 mg/kg total PAHs (HA-BSS01-5, 70 Hudson Avenue) to 10.9 mg/kg total PAHs (HA-BSS01-6, Bowline Point Park). Concentrations of benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, and dibenzo(a,h)anthracene were detected in all samples and exceeded the NYSDEC RSCOs in four samples.

Metals were detected at concentrations that exceed the RSCOs for beryllium, chromium, copper, iron, mercury, nickel, and zinc in several background samples. In addition, elevated concentrations of aluminum, calcium, magnesium, and manganese were detected in the background samples. Total cyanide was not detected in any of the background samples.

No additional surface soil samples were collected during the RI. Surface soil samples were not collected at the apartment complex. Surface soil impacts related to the MGP were considered unlikely due to distance from the site, and lack of risk at 146 Maple Avenue.

The surface soil data collected during the PSA and the subsequent surface soil investigation have been incorporated into the database of samples (see Table 3).

2.5.2 Subsurface Soils

This subsection describes and discusses the findings of subsurface soil investigations at the site. Subsurface soils at the site were evaluated through observations made during the excavation of test pits and the installation of soil borings, and through the chemical analysis of subsurface soil samples.

2.5.2.1 Physical Observations

Subsurface soil impacts were observed at the site during the RI. These impacts included tar, sheens, and tar and petroleum odors. Impacts were observed in and near former MGP structures, along the edge of the site at Maple Avenue and across Maple Avenue extending behind the Apartment Complex parcel. The observed impacts are illustrated on Figure 6 and the geologic cross-sections presented in Plates 3 and 4.

For purposes of this report, the term *residual* tar is considered synonymous with the following descriptions of discrete NAPL tar impacts: blebs, lenses, nodules, streaks, and sheen. *Non-residual* NAPL tar has generally been described as tar-saturated soil matrix, and was observed only at limited areas on site. Observations of odors and soil staining alone are not considered to be evidence of the presence of NAPL tar.

Evidence of residual tar was found at the site at boring locations SB/MW-02, SB/MW-03, SB/MW-04, SB/MW-05, SG-2, SG-3, SG-7, SG-12, SG-14, SB-02D, SB-14, SB-16, SB-17, and SB-18 as shown on Figure E and Plate C. The tar was predominantly noted as residual tar and tar nodules in sand lenses within clayey soils and in the sand and gravel layers found above the till at the site.

Evidence of residual tar was also found off site to the northeast at various depths at borings SB/MW-20D, SB/MW-20S, SB-28S/D, SB/MW-29S, SB-30S, SB/MW-31S/D, SB/MW-32S/I, SB-45, SB-48, SB-49, SB-58, SB-59, and SB/MW-60. The impacts at and behind the apartment complex reflect migration from the MGP parcel (to the front of the apartments) and are also consistent with the presence of a former stream channel (from the 93B Maple Avenue former MGP site) and former pond. MGP residuals migrated from the 93B site and settled in the former pond (Figure 3). The lateral extent of residual tar has not been determined.

Significant, non-residual tar (flowable DNAPL or tar-saturated soil) was observed at five locations, SB/MW-02, SG-2, SG-3, SB-14, and SB-45 (near the apartments across Maple Avenue). During drilling of SB/MW-02, soils were observed containing hydrocarbon product (probable tar) from approximately 13 feet to 18 feet bgs. In March 1999, a 1.6-foot-thick layer of DNAPL was found in

MW-02 during groundwater sampling. In December 2001, a 2.7-foot-thick layer of DNAPL was present in MW-02 during groundwater sampling. In 2005, 5.0 feet of tar was present in MW-02. Testing of the tar accumulated in MW-02 identified the tar as carbureted water gas tar. A sand lens encountered at 8 to 10 feet bgs in borings SG-2, and SB-14 contained tar. These borings were completed within the footprint of the former holder. The sand and gravel layer between 4 and 10 feet bgs in boring SG-3, which was completed in the former tar tank location, was saturated with tar. A tar saturated sand lens was also present at SB-45.

Tar was not observed in the till in borings SB/MW-07, SB-02D, SB-16, or MW-11 which were completed 22 feet, 5.5 feet, 10 feet, and 4 feet into the till, respectively.

Clay pipes containing tar, water, and silt were observed in both test pits TP-02 and TP-03 at depths from 4 to 6 feet bgs.

Evidence of residual tar impacts was also noted as sheens in several of the borings: SG-9, SG-12, SB/MW-04, SB/MW-05, SB-14, SB-17, SB-18, MW-18, SB/MW-29S, SB-48, and MW-55 and at test pits TP-01 and TP-02 at the site as shown in Figure 6. These impacts were predominantly found in sand lenses within clayey soils and within sand and gravel layers at the site.

Borings that exhibited only hydrocarbon, naphthalene-like or tar-like odors included: SG-1, SG-4, SG-5, SG-6, SG-8, SB/MW-09, SG-10, and SG-13.

A faint odor similar to purifier material (i.e., sulfur odor) was noted in soil from 7.0 to 12.3 feet bgs at MW-09, just southeast of the location of the former purifier room. This was the only indication of purifier material on the site.

Petroleum odors were noted in SB/MW-08 at 10 to 12 feet bgs and in SB/MW-09 at 20 to 21 feet bgs. Petroleum odors were also apparent in subsurface soils at borings SB/MW-28S, SB/MW-31S/D and SB/MW-32S/I. No petroleum odors were observed in the till layer at the site.

No visual or olfactory evidence of MGP impacts was observed in the upgradient borings SB/MW-01 and SB/MW-10, or in test pits TP-04 and TP-05. Boring SB/MW-01 was completed in the sand and gravel layer at a depth of 28 feet bgs and SB/MW-10 was completed in the till at a depth of 38 feet bgs.

No visual or olfactory impacts of MGP residuals were observed in the borings completed on the Head Start parcel (SB/MW-11, SG15/SB-12, SG16/SB-13, SB-22, SB-23, and MW-24) located on the property southeast of the site. Boring SB/MW-11 was completed 4 feet into the till at a depth of 24 feet bgs. Borings SG-15 and SG-16 were completed in the clayey silt layer at depths of 20 and 24

feet bgs, respectively. Borings SB-22, SB-23, and MW-24 were completed at the till surface at depths of 22, 26, and 20 feet bgs, respectively.

No visual or olfactory impacts were observed in SB-21S or in the well location MW-29D located at the Apartment Complex parcel located northeast of the site. MW-29D was completed to the till surface at a depth of 29 feet bgs. However, immediately adjacent at well MW-29S an MGP odor and heavy sheen was present in the 8 foot to 12-foot bgs interval.

2.5.2.2 Subsurface Soil Analytical Results

Analytical results for the RI samples are presented in Table 5. This table includes a column for the RSCOs. Detected compounds are in bold face. Analytical results exceeding the RSCOs are bold and shaded. BTEX and PAH exceedances are also shown on Plates 5 and 6.

BTEX, PAHs, and metals were found in the majority of the samples at the site and in several locations in excess of the RSCOs. Cyanide was not detected in any of the samples.

Former MGP Parcel

The highest BTEX and PAH concentrations detected at the site were found in samples collected adjacent to former MGP structures (former gas holder and former iron oil tank).

The former gas holder was characterized by SB/MW-03, SB-14, and SB/MW-18. BTEX and PAH concentrations exceeded the RSCOs in all soil samples at depths ranging from 10 to 18 feet bgs. The highest BTEX concentrations in the area were found in SB/MW-03 (Plate 5), at 10 to 12 feet bgs, located near the eastern edge of the former gas holder. This sample was collected from a sand lens in which a strong odor and black hydrocarbon staining were noted. BTEX concentrations were either not detected or were detected below the RSCOs in all samples at depths ranging from 18 to 36 feet bgs. Only a few individual PAH compounds exceeded the RSCOs in deeper samples (22 to 30 feet bgs) and were not detected at a depth of 36 feet bgs.

Soil boring SB-16 was completed between the former tar well (near TP-01) and the former gas holder to determine if tar was migrating from the former tar well location toward the northern portion of the site. Boring SB-16 was advanced to a depth 9 feet below the top of the till. Residual tar (blebs, sheen, staining, and odors) was observed at this location above the top of till. Impacts were not observed within the till. BTEX and PAH were detected at concentrations exceeding the RSCOs at a depth of 18 feet bgs (Plates 5 and 6).

The gas regulator area was characterized by SB-17 and SB-17A. BTEX and PAH concentrations exceeded the RSCOs (Plates 5 and 6) in the soil samples collected at the northern corner of the gas regulator at depths ranging from 4 to 12 feet bgs (SB-17). The sample was collected at depths

where odors and sheen were noted. BTEX did not exceed the RSCOs and only a few individual PAH compounds exceeded the RSCOs at a depth of 14 feet bgs (Plate 6). No BTEX and PAH concentrations were detected in SB-17A, located northwest of the gas regulator at a depth of 28 feet bgs.

The northeastern edge of the site along Maple Avenue was characterized by SB/MW-04, SB/MW-05, and SB/MW-06. Only benzene exceeded the RSCO at a depth of 5.25 feet bgs (SB/MW-06). Samples from SB/MW-04 and SB/MW-05 were collected from the most impacted intervals, which were in the sand and gravel unit beneath the fill. Evidence of trace tar was noted in both SB/MW-04 and SB/MW-05 at these intervals although no RSCO exceedances were detected for BTEX or PAHs.

The southwestern portion of the site was characterized by SB/MW-01 and SB/MW-10. A few individual PAH compounds exceeded the RSCOs at a depth of 21 feet bgs in SB/MW-01 (Plate 6). No BTEX was detected in SB/MW-01. BTEX and PAH concentrations were not detected in SB/MW-10.

The southeastern portion of the site was characterized by borings SB/MW-08 and SB/MW-09. In these borings, a sample was collected from depths of 8 to 10 and 10 to 12 feet bgs where odors were noted. Individual PAHs exceeded the RSCOs in both of these samples.

The second soil sample from SB/MW-08 was collected from beneath the impacted layer at a depth of 14 to 16 feet bgs. No PAHs were detected in this sample. BTEX was detected in this sample; however, none of the concentrations exceeded the RSCOs. The second sample from SB/MW-09 was collected from the groundwater interface, which was in a sand layer beneath the fill. BTEX did not exceed the RSCOs. A few individual PAH compounds exceeded the RSCOs at a depth of 8 to 14 feet bgs.

MW-02 was completed north of the former iron oil tank. This sample exhibited total BTEX at a concentration of 94 mg/kg. The sample from SB/MW-02 was collected from the sand lens that was saturated with material described as hydrocarbon product.

146 Maple Avenue

The 146 Maple Avenue (Head Start) parcel, located south/southeast of the Clove and Maple site, was characterized by borings SG-15, SG-16, SB\MW-11, SB-22, SB-23 and MW-24. A few individual PAH compounds exceeding the RSCOs were found in SG-16 at a depth of 23 feet bgs. All other PAH compounds and BTEX concentrations were either not detected or were detected below the RSCO in all other soil samples

Apartment Complex

The Apartment Complex parcel, located across Maple Avenue east of the site, is characterized by SB/MW-20S/D, SB-21, MW-21, MW-28D, MW-29S/D, SB-30S, MW-31S/D, MW-32S/I, SB-45, SB-48, SB-49, MW-55, SB-56, SB-58, SB-59, and SB-60.

BTEX or PAH concentrations that exceeded at least one RSCO value were present in all sampled borings except MW-29D, SB-48, SB-56, and SB-57 (Plates 5 and 6). The highest BTEX concentrations off site were found in SB-46 at 10.5 feet bgs., directly across Maple Avenue, downgradient of the on-site gas holder. The highest PAH concentrations were detected at SB-49 at 7.5 feet bgs, directly behind the apartment complex.

2.5.2.3 Summary of Subsurface Soil Impacts

Subsurface soils within the study area have been impacted by residual tar. Non-residual tar (NAPL) is present in soils on the Clove and Maple former MGP site. NAPL was also present in soil boring SB-45, on the apartment complex side of Maple Avenue, downgradient from the former gas holder. The extent of this NAPL has not been delineated.

Several BTEX and PAH compounds exceeded their respective RSCOs in subsurface soil samples. Cyanide was not detected in the subsurface soils. The majority of observed tar impacts on and off site were residual in nature (blebs, lenses, sheen). The residual tar impacts observed likely represent a combination of historic releases from the operations of both the Clove and Maple MGP and the 93B Maple Avenue former MGP.

The till unit is vertically confining for DNAPL and no impacts have been observed in the till. The till surface dips to the north and northeast. NAPL released in the vicinity of the tar well, iron oil tank, or the former holder appears to have migrated vertically to the till surface and moved northerly along the confining till surface. Residual tar also appears to have migrated northeasterly through sand lenses within the clay unit (above the till) to the Apartment Complex parcel. Based on observations from borings along Maple Avenue, and across Maple Avenue on the Apartment Complex parcel, it appears that most tar (except at SB-45), which previously migrated in a non-residual state toward and across Maple Avenue to the northeast is now in a residual state consisting only of isolated tar blebs, lenses, and/or sheen. The same is true for tar that migrated from the 93B Maple Avenue site to settle in the former pond: it exists primarily as residual tar. The extent of this residual tar has not been delineated.

No physical evidence of contamination was observed in subsurface soils southeast of the site on the 146 Maple Avenue (Head Start) parcel. However, PAHs were detected at relatively low concentrations. The western corner of the site, where test pits TP-04 and TP-05 are located, also

appears to be free of visible impacts. No physical evidence of contamination was observed in subsurface soils southwest of the site; however, limited PAH impacts were found in SB/MW-01.

2.5.3 Soil Gas and Indoor Air

In February 2001, soil gas samples were collected from around the 146 Maple Avenue Head Start building by GEI. The results indicated that VOCs are not present at concentrations that could adversely affect indoor air quality.

RETEC collected soil gas, outdoor (ambient) air, and indoor air samples beneath, outside of, and within the apartment complex residences during 2004 and 2005. RETEC concluded that there was no evidence indicating intrusion of MGP-related vapors into the apartment complex residences.

2.5.4 Groundwater

The table below summarizes well sampling events. In general, prior to the 2004 sampling event, monitoring wells were sampled for VOCs, SVOCs, total or dissolved metals, and WAD or total cyanide. By 2004, chemical characterization of groundwater was adequate for SVOCs, metals, and WAD cyanide. As such, in 2004 the groundwater parameters were reduced to BTEX, PAHs, and total cyanide.

Well ID	June 1997	March 1999	December 2001	August 2004
MW-01	x	X	x	x
MW-02	x	X		x
MW-03	x	X	x	x
MW-04		X	x	x
MW-05		X	x	x
MW-06		X	x	x
MW-07		X	x	x
MW-08		X	x	x
MW-09		X	x	x
MW-10		X	x	x
MW-11		X	x	x
MW-18			x	
MW-20S			x	x
MW-20D				x
MW-21			x	x
MW-24			x	x
MW-28S				x
MW-28D			x	x
MW-29S				x
MW-29D			x	x
MW-31S				x
MW-31D				x
MW-32S				x
MW-32I				x
MW-55				x
MW-60				x
x – well sampled				

Figure 7 presents a summary of groundwater analytical results.

Prior to sampling, all monitoring wells were screened for the presence of light nonaqueous phase liquid (LNAPL) and/or DNAPL. One well, MW-02, contained approximately 1.6 feet of DNAPL in 1999 and 2.7 feet of DNAPL in 2001. In 2004, 5.0 feet of DNAPL was present in MW-02. No LNAPL was observed in the study area. Analytical results are presented in Table 6. The results are compared to the New York State Water Quality Standards (NYSWQS), which are included in a column in Table 6. In Table 6, detected compounds are bolded and sample concentrations exceeding the NYSWQS are

bolded and shaded. Figure 7 presents a summary of the BTEX, total PAH, and total cyanide concentrations.

Groundwater flow direction at the site is generally to the east-northeast (Figure 7), consistent with the site topography and groundwater flowing toward the discharge location of the culverted former stream behind the Apartment Complex. Therefore, monitoring wells MW-01 and MW-10 are located upgradient of the operating footprint of the former MGP. In 2001, concentrations less than the NYSWQS for BTEX and chloroform were detected in MW-10. Numerous inorganic compounds were detected in groundwater from both upgradient monitoring wells. Cyanide was not detected in groundwater from either monitoring well.

VOCs were not detected in monitoring wells MW-01, MW-06, MW-07, MW-11, MW-24 or MW-21, MW-29D, MW-31D, MW-55, or MW-60 during the RI. PAHs were not detected in well MW-01, MW-07, or MW-31D during the RI.

The majority of MGP-related groundwater impacts were detected in samples from monitoring wells MW-02, MW-03, MW-04, MW-08, MW-09, MW-18, MW-20S, and MW-29S where MGP impacts were observed during drilling activities. The highest concentration of total BTEX was detected in the 2001 groundwater sample collected at MW-18 (20,720 ug/l), where NAPL was likely entrained in the sample. The 2004 sample from this well exhibited a BTEX concentration of 4.4 ug/l. Groundwater samples from MW-03 exhibited high concentrations of BTEX that were more consistent over time. MW-03 is located next to the former gas holder.

All BTEX constituents exceeded the NYSWQS in groundwater samples from MW-02, MW-03, MW-04, MW-20D, and MW-32S. Benzene was detected at 1 ug/l (equal to the NYSWQS) in the groundwater sample from well MW-5. Benzene, ethylbenzene, and xylene exceeded the NYSWQS in groundwater samples from MW-20S, MW-28S, and MW-29S.

The highest concentration of total PAHs (15,996 ug/l) detected during the RI was in the sample from MW-02 collected in 1999, which is adjacent to the former iron oil tank; however, based on the high concentrations of heavier PAHs, it is likely that DNAPL was entrained in this sample and the concentrations are not truly reflective of dissolved-phase groundwater conditions. High concentrations of total PAHs were also detected in the samples from MW-03 and MW-04 adjacent to and downgradient of the holder pad. Naphthalene (generally more soluble and mobile than the other PAHs) was detected at concentrations in excess of the NYSWQS in groundwater samples from fifteen monitoring wells, MW-02, MW-03, MW-04, MW-08, MW-09, MW-11, MW-18, MW-20S, MW-20D, MW-28S, MW-28D, MW-29S, MW-31S, MW-32S, and MW-32I. Other PAHs were also detected in excess of the NYSWQS in monitoring wells MW-02, MW-03, MW-04, MW-09, MW-18, MW-20S, MW-20D, MW-28S, MW-28D, MW-29S, MW-31S, MW-32S, and MW-32I.

The presence of BTEX and PAHs in groundwater in front, beneath, and behind the apartment complex parcel demonstrates that impacted groundwater is migrating from the Clove and Maple site.

During the RI and PSA, both dissolved (filtered) and total (unfiltered) samples were analyzed for inorganics. Numerous inorganic compounds, many of which are naturally present, were detected during both the PSA and the RI. Iron, magnesium, manganese, and sodium, which frequently exceeded their respective standards, are naturally occurring elements commonly found in groundwater at elevated concentrations. The lack of dissolved phase exceedances where total inorganic exceedances were observed indicates that the exceedances are likely the result of suspended sediments in the samples. This was the case for aluminum, iron, and manganese in MW-01, cobalt, lead, and vanadium in MW-2, iron and manganese in MW-6, aluminum and iron in MW-7 and MW-8, cobalt and aluminum in MW-9, aluminum and iron in MW-10, and manganese in MW-11.

Cyanide was detected in groundwater samples from MW-02 and MW-03 during the PSA, in groundwater samples from MW-08, MW-09, and MW-11 during the 1999 RI sampling event, and in groundwater samples from MW-03, MW-08, MW-09, MW-11, and MW-24 during the 2001 RI sampling event. Cyanide was detected during the 2004 event in monitoring wells MW-02, MW-03, MW-06, MW-08, MW-09, MW-11, MW-20S, MW-24, MW-29S, MW-31S, and MW-55. The highest concentration of cyanide detected during the PSA was in the sample from MW-2 (129 ug/l). During the RI, the highest concentration was detected in MW-09 (169 ug/l) in August 2004. All cyanide concentrations detected during the PSA and RI were less than the NYSWQS of 200 ug/l.

2.5.5 Stormwater

Two stormwater samples and a blind duplicate (SW-01, SW-03 and SW-02) sample were collected in March 1999 and four stormwater samples and a blind duplicate (SW013102-1, SW013102-5, SW013102-6, SWOUT013002-1, and SW-013102-8) were collected in January 2002 from the storm drainage system near the site to evaluate the site's potential impact on stormwater. Figure 8 depicts the sampling locations and a summary of results. Detailed sample results are presented in Table 7. Stormwater sample results were compared to the New York State Ambient Groundwater Criteria for regulatory compliance, which are more inclusive than the New York State Groundwater Effluent Limitations. Both sampling events were performed immediately following a rain event. Previous attempts to collect samples 48 hours after a rain event (as originally described in the RI Work Plan) were unsuccessful because of insufficient flow.

During two separate occasions in December 2001 and January 2002, stormwater flow was not present in the catch basins along Maple Avenue because the catch basins do not intercept the groundwater table. Therefore, stormwater samples were only collected from the catch basins associated with the culverted stream beneath the alleyway.

Two samples were collected from locations upstream or topographically upgradient to represent conditions upgradient of the site. Sample SW-03 was collected topographically upgradient of the site in a drainage swale between Clove and Hudson Avenues, the nearest accessible upstream point where a sample could be obtained (Plate 2). At the time of sampling, a variety of debris was present throughout the swale, including rusted barrels, empty motor-oil containers, and other household trash. Sample SW013102-1 was collected at a manhole located along Tor Avenue upstream of the Clove and Maple site (Plate 2) in January 2002. At the time of sampling, the manhole was clear of debris and no surface flow was present along Tor Avenue.

One sample (SW-01) and a blind duplicate (SW-02) were collected at a catch basin in Maple Avenue near the eastern corner of the site in March 1999. At the time of sampling stormwater flow in Maple Avenue was carrying hydrocarbon impacts from the street into the catch basin, as indicated by visible sheens in the water as it entered the catch basin from the road surface. Automobiles were parked on the street throughout the field investigation and, from time to time, people were observed performing maintenance on these vehicles.

Two downstream samples (SW013102-5, SW013102-6) were collected at catch basins located in the rear parking lot of the Apartment Complex buildings located across Maple Avenue (Plate 2/Figure 8). One sample location (SW013101-5) is located northeast of the site. The second sample (SW013102-6) is located at the downstream confluence of the drainage systems for Maple Avenue and the Apartment Complex. At the time of sampling, both catch basins contained decaying organic matter (leaves, etc.). Automobiles were parked in this area throughout the investigation, including two abandoned, severely damaged vehicles near the SW013102-5 sample location. These samples were also collected in January 2002. During RI activities, a naphthalene-like odor was observed from the catch basin where SW013102-6 was collected.

One downstream sample (SWOUT013002-1) was collected in January 2002 at the outfall location at the embayment of the Hudson River. A naphthalene-like odor was observed in the area of the outfall during sample collection.

No VOCs or PAHs were detected in the upgradient stormwater sample, SW-03, collected in March 1999. However, various VOCs and PAHs were detected in the upstream stormwater sample, SW013102-1, collected in January 2002, including toluene (2 ug/l), tetrachloroethylene (PCE) (0.6 ug/l) and 7 ug/l total PAHs (5 ug/l non-carcinogenic, 2 ug/l carcinogenic).

Total BTEX concentrations in downstream samples ranged from 10 ug/l (SW013102-6) to 2 ug/l (SW013102-5). Benzene exceeded its NYSWQS in sample SW013102-6 and SWOUT013102-1, at concentrations of 5 ug/l and 4 ug/l, respectively. Benzene, ethylbenzene, and xylene were detected in downstream samples near the outfall; however, only toluene was detected in the sample collected

immediately downstream of the site (SW-01). Several PAHs were detected in downstream samples. Total PAH concentrations ranged from 26 ug/l (SW013102-6) to 3 ug/l (SW-01).

Two samples (SW013102-1 and SW-01) exhibited detectable concentrations of total cyanide. Upstream sample SW013102-1, collected in 2002, exhibited a concentration of 29.4 ug/l total cyanide. Downstream sample SW-01, collected in 1999, exhibited concentrations of 135 ug/l total cyanide and 23.8 ug/l WAD cyanide.

Based on the shallow depth of the Maple Avenue storm sewer system, it is likely that groundwater impacted with BTEX compounds and PAHs originating from the Clove and Maple site, flows under the Maple Avenue drainage system and intersects the stormwater drainage system to the rear of the apartments (culverted stream).

Although stormwater is impacted with VOCs, PAHs, and cyanide, the impacts do not appear to be solely related to the site. The stormwater sampled is also storm drainage that receives runoff from streets and other properties in the area. The drainage swale itself contains trash and other debris. Urban runoff may include petroleum products and residuals from automobile leaks and maintenance activities. Generally, organic compounds were detected in the water sample from the downstream location at higher concentrations than at the upgradient location; however, the concentrations in all samples vary only slightly, and most detected VOCs are not solely associated with former MGP operations. In addition, cyanide and carcinogenic PAHs were detected in an upstream location. The hydrocarbon sheens in stormwater entering the catch basin during sampling indicate that other sources contribute to the detected compounds.

2.5.6 Storm Sewer Sediments

Two sediment samples and one blind duplicate sample were collected at the same locations as the stormwater samples collected in 1999, and four sediment samples were collected from catch basins along Maple Avenue and to the northeast of the Apartment Complex in 2002. The 1999 round of samples collected were located up- and downstream of the site. The 2002 round of samples were collected at locations adjacent to and downstream of the site.

The locations and a summary of results are provided in Figure 8. Detailed sample results are provided in Table 8. During the 1999 sampling event, the Haverstraw Department of Public Works (DPW) indicated that they had cleaned out the catch basin approximately two weeks earlier. As such, there was only a small amount of sediment within the basin.

Downstream samples (CMSED01, SD013102-3, and SD013102-4) exhibited detectable concentrations of VOCs. Toluene (0.9 ug/kg) was detected in sample SD013102-3 located adjacent

to the eastern corner of the site. Both 2-butanone and 4-methyl-2-pentanone were detected further downstream in sample CMSED01 (at 5 and 8 ug/kg, respectively.) Toluene and PCE were detected downstream of sample CMSED01 in sample SD013102-4 (at 0.6 ug/kg and 11 ug/kg, respectively).

Numerous PAHs were detected in all up- and downgradient samples (CMSED01, CMSED03, SD013102-2, SD013102-3, and SD013102-4), ranging from less than 6 mg/kg total PAHs upgradient in sample CMSED03 to approximately 53 mg/kg total PAHs (27.9 mg/kg non-carcinogenic and 25 mg/kg carcinogenic) in sample SD013102-3, located adjacent to the eastern corner of the property.

Three samples (CMSED01, SD013102-2, and SD013102-4) exhibited detectable concentrations of total cyanide. Samples SD013102-2 and SD013102-4 collected in 2002 and CMSED01 collected in 1999 exhibited concentrations of 1.54 mg/kg, 2.74 mg/kg, and 1.9 mg/kg, respectively.

One sample (SD013102-6) was collected at the catch basin connecting the Maple Avenue drainage system to the culverted stream behind the apartment complex. The sample collected from this location exhibited 80 ug/kg BTEX. This sample also exhibited 72 mg/kg total PAHs (71 mg/kg non-carcinogenic, 1 mg/kg carcinogenic).

The sediments in the drainage system are impacted by VOCs, PAHs and cyanide; however, the impacts do not appear to be solely related to the site. As with the stormwater samples, the drainage system receives runoff from streets and other properties in the area. In addition, the drainage swale itself contains trash and other debris. Urban runoff may include petroleum products and residuals from automobile leaks and maintenance activities. It is likely that organic compounds in runoff from Maple Avenue and the rear of the Apartment Complex contributed to the concentrations detected in the storm sewer sediments.

2.5.7 Hudson River Sediments

Sediment samples were collected at six locations in the embayment of the Hudson River where the stormwater drainage system discharges. Samples for laboratory analysis were collected in locations identified as potentially impacted during the sediment probing study. The locations of samples and a summary of the results are provided on Figure 9. Detailed sample results are included in Table 9.

One sample (VC-04-3-5, 3'-5' bgs) exhibited the only detected VOCs. Acetone, a common laboratory contaminant, was detected in this sample at 170 ug/kg. Cyanides were not detected in any samples collected from the embayment.

Numerous PAHs were detected in all of the sample locations. Total PAH concentrations range from 35 mg/kg (20 mg/kg non-carcinogenic and 15 mg/kg carcinogenic) in sample VC-05A (0-2' bgs) to 189 mg/kg (105 mg/kg non-carcinogenic and 84 mg/kg carcinogenic) in sample VC-04 (0-2' bgs). The majority of PAHs appear to be limited to the first few feet of sediments. One sample collected at sample location VC-04 from a depth of 3 to 5 feet bgs exhibited lower concentrations of total PAHs than those detected in the sample collected from 0 to 2 feet bgs (48.7 mg/kg total PAHs versus 189 mg/kg total PAHs).

The sediments in the embayment of the Hudson River are impacted by PAHs; however, the impacts do not appear to be solely related to the site. Physical observations during the probing and sediment sampling activities showed no MGP-related impacts at any location except VC-01, immediately adjacent to the stormwater outfall. The outfall from the local storm sewer drainage system is located at the head of the embayment. Surface water runoff from the surrounding area containing motor oils, asphalts, and other PAH source materials are discharged to the embayment both directly and through the storm sewer system. In addition, a boat marina was located within the embayment, and a former oil terminal operated on the southern side of the embayment. The property immediately adjacent to the embayment is currently occupied by a ferry terminal. As with the stormwater and sewer sediment samples, it is likely that numerous sources have contributed to the concentrations detected in the river sediments.

3.0 SCOPE OF WORK

3.1 Summary of Site Environmental Conditions

The following areas of potential environmental concern have been identified based on the investigations completed to date. The scope of work to address these areas is described in Section 3.2.

3.1.1 Surface Soil

BTEX compounds and cyanide were not detected in surface soils above the SCGs. A number of PAHs were detected at concentrations exceeding SCGs in surface soils on the O&R parcel; however, the extent of these exceedances is limited to the former MGP. The majority of the parcel is grass covered and an IRM was undertaken to cover the area of highest surface-soil PAH concentrations with gravel. A complete exposure pathway to BTEX and PAH compounds in surface soils exists for those receptors involved in potential excavation activities at the Site; the O&R utility worker and future construction worker. Because O&R currently controls the former MGP parcel and the O&R workers are aware of the subsurface conditions, any excavation activities undertaken by O&R would be done using appropriate health and safety precautions, thereby minimizing the potential for exposure. The expected transport pathway of contaminants from the former MGP toward the Apartment Complex parcel is through subsurface soils and groundwater rather than through surface soils. In addition, the apartment complex is separated from the former MGP by Maple Avenue. Surface soils at the adjacent Head Start Facility have exhibited no exceedances of SCGs. Therefore, no additional surface soil investigation is proposed at this time.

3.1.2 Subsurface Soil

Observed MGP impacts (NAPL, tar blebs, sheens) as well as BTEX and PAH compounds at concentrations exceeding SCGs have been identified in subsurface soils. A complete exposure pathway to BTEX and PAH compounds in subsurface soils exists for those receptors involved in potential excavation activities at the Site; the O&R utility worker and future construction worker. Because O&R currently controls the former MGP parcel and the O&R workers are aware of the subsurface conditions, any excavation activities undertaken by O&R would be done using the proper health and safety precautions, thereby minimizing the potential for exposure. The extent of observed MGP impacts and contaminated subsurface soils has not been completely delineated on-site or off site. Therefore, additional subsurface soil investigations are proposed in Section 3.2.

3.1.3 Groundwater

BTEX and PAH compounds have been detected at concentrations exceeding SCGs in groundwater samples from on-site and off site monitoring wells. Similar to subsurface soils, a complete exposure pathway to BTEX and PAH compounds in groundwater exists for the utility workers, construction

workers, and residents involved in shallow and deep excavation activities. Because O&R currently controls the site and the O&R workers are aware of the subsurface conditions, any excavation activities undertaken by O&R would be performed in accordance with appropriate health and safety measures, minimizing the potential for exposure. The extent of site-related groundwater contamination has not been delineated to the northeast. Therefore, additional groundwater investigation is proposed in Section 3.2

3.1.4 Soil Vapor

There are currently no buildings on the former MGP parcel; therefore the potential for BTEX vapors to accumulate and cause an inhalation exposure is not likely. The potential for MGP-related vapors accumulating in indoor air at the apartment complex has been evaluated by RETEC on behalf of O&R via soil gas and indoor air sampling events. These evaluations included both soil gas and indoor air at nearby locations within several buildings on these parcels. RETEC concluded that MGP-impacts do not appear to be affecting air quality. In addition, soil gas samples collected adjacent to the 146 Maple Avenue (Head Start) building in 2001 indicated that VOCs are not present at concentrations that could adversely affect indoor air quality. Due to the time elapsed since these investigations, additional investigation is proposed in Section 3.2. To confirm the results of the previous soil vapor investigations, O&R will conduct a supplemental soil gas survey along the eastern property boundary of the MGP site to evaluate the potential migration of BTEX vapors onto the adjacent Head Start property.

3.1.5 Storm Sewer System and Hudson River Embayment Sediments

Stormwater and sediment samples collected from the storm drainage system exhibited concentrations of several chemical constituents at concentrations exceeding their respective SCGs.. Dissolved phase BTEX and PAHs related to MGP impacts may be transported through the storm sewer system; however, the general urban nature of the area has also contributed similar concentrations to the storm sewer system. This relationship was demonstrated by the upstream stormwater sample, which exhibited elevated concentrations of PAH compounds. An evaluation of the sediments in the embayment of the Hudson River has demonstrated that, except for the area immediately adjacent to the storm sewer outfall location, sediment quality has not been impacted within the embayment. As with the stormwater and sewer sediment samples, it is likely that numerous sources have contributed to the concentrations detected in the river sediments. Therefore, no additional investigations are proposed at this time.

3.2 Scope of Work

The scope of work presented below focuses on satisfying the objectives of the SRI outlined in Section 1 for the environmental conditions noted in Section 2. Based on current site conditions, the proposed site characterization includes investigation and sampling of subsurface soil, groundwater and vapors. The SRI includes the activities listed below:

1. Coordinating Offsite Access/Field Mobilization/Utility Clearance
2. Air Monitoring
3. Soil Gas
4. Soil Borings
5. Soil Sampling and Analysis
6. Monitoring Well Installation and Development
7. Site Survey
8. Water Level Gauging
9. Groundwater Sampling and Analysis
10. Management of Investigation-Derived Waste
11. Equipment Decontamination
12. Data Management
13. Summary Report Preparation

The sampling locations proposed as part of this SRI are shown on Plate 7. Additionally, Table 10 provides a summary of the sample location rationale, estimated boring/well depths, and sample analysis. Due to site-specific factors, modifications to sampling locations and/or drilling methods may be required. Any deviation from the proposed work plan scope of work will be discussed with and approved by the O&R Project Manager and the NYSDEC representative prior to implementation.

The following sections describe the scope of work. Detailed field sampling procedures and protocols to be followed during the field program are provided in the FSP found in Appendix B.

3.2.1 Coordinating Offsite Access/Field Mobilization/Utility Clearance

Prior to mobilizing to the site, O&R will arrange for offsite access required to advance soil borings at the off-site locations depicted on Plate 7. Prior to implementing any intrusive activities, a utility clearance will be conducted following the Utility Clearance Procedure provided in Appendix C, the Health and Safety Plan.

The procedure entails utility mark-outs through the Code 753, obtaining and reviewing available utility drawings and a field reconnaissance to verify, to the extent possible, the location of utilities relative to the planned intrusive locations. As an added precaution, and as indicated in the Health and Safety Plan, the upper 5 feet will be excavated using non-mechanical methods to confirm the absence of utilities at each soil boring and monitoring well location.

A Code 753 utility mark-out will be completed pursuant to the New York State Code Rule (NYSCR) Part 753. Consistent with the One-Call (also called Dig Safely New York) criteria, a request will be made at least 2 days and no more than 10 days prior to initiating fieldwork (not counting weekends and holidays). The Dig Safely New York One-Call Center will be contacted by telephone (1-800-962-

7962) or through the *i-notice* system. Confirmations that the utilities have been marked out, as per Code 753 requirements, which are received from the participating utilities by facsimile or telephone, will be documented on the Utility Clearance Checklist that is included in the project HASP (see Appendix C). The hard-copy confirmations will also be available in the field during the intrusive operations. If the utility markings become faint or obscure they will be refreshed as needed. Con Edison's updated procedure for proper underground utility clearance is included in the HASP in Appendix C.

All utility clearance procedures shall be in accordance with Con Edison's Utility Clearance Process for Intrusive Activities.

If necessary, a private utility mark-out contractor may be used to support utility clearance activities.

3.2.2 Air Monitoring

Air in the vicinity of intrusive work will be monitored for organic vapors and dust in accordance with the New York State Department of Health (NYSDOH) generic CAMP presented in Appendix D.

Monitoring for organic vapors and dust in air will be conducted during soil boring and monitoring well installation. At the start of work, air-monitoring stations will be established upwind of the work activities and at the downwind perimeter of the work zone. Wind direction will be determined using a wind sock or equivalent device. Accordingly, the perimeter of the work zone will be monitored on a real-time basis.

3.2.1.1 Organic Vapor Monitoring

Organic vapors will be continuously monitored using an organic vapor meter equipped with a photoionization detector (PID). The PID will be capable of calculating 15- minute running average concentrations and equipped with an audible alarm to indicate the exceedance of an action level. Monitoring for organic vapors at the upwind station will be conducted at the start of each workday and when the primary wind direction changes to establish background conditions. Monitoring for organic vapors at the downwind station will be conducted continuously during soil boring and monitoring well installation activities. Workspace air will also be monitored on a regular basis. Measurements of organic vapors in air will be available on-site for review. The organic vapors action levels and required responses are presented in the HASP provided in Appendix C.

3.2.2.2 Dust Particulate Monitoring

Air monitoring for dust particulates will be conducted using a real time particulate monitor that measures the concentration of airborne respirable particulates less than 10 micrometers in size (PM₁₀). The monitor will be capable of calculating 15-minute running average concentrations and equipped with an audible alarm to indicate exceedance of action levels. Monitoring for particulates

at the upwind location will be conducted at the start of each workday and when the primary wind direction changes to establish background conditions.

Monitoring at the downwind station will be conducted continuously. Measurements of dust in air will be recorded in the project logbook, which will be available on-site for NYSDEC/ NYSDOH review. The action levels for dust in air and the required responses are presented in the HASP provided in Appendix C.

3.2.3 Soil Vapor Investigation

Four (4) soil vapor samples (SV-01 through SV-04) are proposed to be collected on the Clove Avenue site along the fence line separating the former MGP and the 146 Maple Avenue property (Figure 10, Table 10). Previous soil gas investigations on the 146 Maple Avenue property indicated no concerns; however, updated guidance on soil vapor intrusion is now available and groundwater impacts near the fence line have been observed. Semi-permanent soil vapor probes will be installed using the Geoprobe® direct push method in accordance with the New York State Department of Health's Guidance for Evaluating Soil Vapor Intrusion in New York State (Guidance) and as described in the Field Sampling Plan (Appendix B). Samples will be collected using Summa canisters and analyzed for volatile organic compounds (VOCs) by USEPA method TO-15. Groundwater samples will be collected from nearby monitoring wells MW-8, MW-9, MW-11 and MW-24 on the same day soil vapor samples are collected for comparison purposes. Groundwater sampling is described in Section 3.2.9. Analytical results will be evaluated in accordance with the Guidance immediately upon receipt. If impacts are identified, the data will be evaluated and in consultation with the Department of Health, additional soil vapor sampling may be proposed on the 146 Maple Avenue property.

Seven (7) soil vapor samples (SV-67, SV-71, SV-76, SV-80, SV-84, SV-88 and SV-92) are proposed to be collected from the rear of the residential properties fronting West Street in conjunction with the soil boring investigation (Plate 7, Table 10). O&R will present the results of the soil vapor investigations to property owners in accordance with the New York Environmental Conservation Law Section 27-2403. Preliminary (not validated) data will be transmitted to NYSDEC and NYSDOH upon receipt. Once final validated data are available, a results transmittal letter will be drafted for NYSDEC and NYSDOH review and approval. The letter will be transmitted to property owners within 30 days of receipt of final validated results.

3.2.4 Soil Borings

Soil boring investigations are proposed both on the former MGP and at off-site locations in order to delineate subsurface soil impacts, obtain a better understanding of site stratigraphy, and to collect soil samples for laboratory analysis. Based on the assumed maximum depth of soil borings and changing subsurface soil types, CMX is proposing that on-site soil borings be advanced using a

hollow stem auger (HSA) drill rig with samples collected using split-spoons (Section 3.2.4.1) and that off-site borings be advanced using a direct push drill rig (geoprobe). On-site subsurface soils have been largely characterized by coarse grained sand and gravels which have the potential to affect sample recovery using direct push sample collection techniques. Subsurface soils located beneath the apartment complex site are characterized by fill materials overlying a pervasive clay layer overlying the till formation that represents the vertical limit of investigation in the study area. As a result of this soil stratigraphy, direct push drilling techniques will be suitable for this phase of the investigation.

3.2.4.1 On-Site Soil Borings

Twelve (12) soil borings will be advanced on-site in areas where investigation was not completed during the previous RI. Borings SB-108, SB-109 and SB-110 will be located in the vicinity of the former MGP purifying room as depicted on Plate 7. The purpose of these soil borings is to attempt to identify the source of purifier waste odors observed when soil boring/monitoring well SB/MW-9 was installed during the previous RI. In addition, groundwater samples from monitoring wells MW-9 and MW-24 exhibited concentrations of cyanide above background concentrations but below NYSWQS. Borings SB-111 and SB-112 will be located in the vicinity of RI test pits TP-2 and TP-3 where tar was observed in clay pipes. Borings SB-113 and SB-114 will be located in the vicinity of the former tar well where previous geoprobe borings identified tar saturated soils. Five (5) additional borings (SB-115 through SB-119) will be located on-site for areal coverage to delineate the extent of on-site impacts. Specifically, a boring will be located upgradient of test pit TP-5 where BTEX compounds were detected during the previous RI. This boring will also provide control for the evaluation of site geology as no information on the depth to till in this portion of the site is currently available. Three (3) of the borings will be located between boring SB-17 and test pit TP-04 and one (1) boring will be located roughly between the holder pad and soil boring/monitoring well SB/MW-05. The proposed locations are approximate and the actual location of each boring will be determined in the field based on equipment access and utility clearance.

As summarized on Table 10, the onsite soil borings (SB-108 to SB-119) will be completed to the top of the till unit estimated to be approximately up to 35 feet bgs across the MGP site. A hollow stem auger (HSA) drill rig will be used to advance the on-site borings. If refusal is encountered at a soil boring location and the boring needs to be offset, the O&R Project Manager and the NYSDEC representative will be consulted to ensure that the alternative boring location will yield the desired data according to the sampling rationale. Any deviation from the work plan will be approved by O&R and the NYSDEC representative prior to implementation. During the completion of the HSA soil borings, soil samples will be collected on a continuous basis using a conventional split-spoon sampler, which is 2 feet long and 2 inches in diameter, to be driven ahead of the auger. The soil samples will be described by the field representative in accordance with the Unified Soil

Classification System. The field geologist will note the presence or absence of evidence of impacts (e.g., oil-like or tar-like NAPL, staining, sheens, and/or odors) and screen the soil for organic vapors using a PID.

3.2.4.2 Off-Site Soil Borings/TarGOST Investigation

Forty-seven (47) soil borings will be advanced off site along a series of ten transects perpendicular to Maple Avenue as shown on Plate 7. The purpose of these borings is to evaluate MGP impacts in off-site areas and to delineate the extent of MGP impacts previously identified. The soil borings will be advanced at the aforementioned locations to delineate areas of PAH and BTEX soil impact identified in previous investigations and to provide further delineation of the physical indicators of MGP impact. In addition to the delineation of impacted areas, geologic information obtained from the soil borings will allow the development of a more comprehensive conceptual geologic and hydrogeologic model required to evaluate migration pathways and develop an appropriate remedial strategy for the site. Certain boring locations will be offset from the transects to provide specific areal coverage, to eliminate borings where previous data exists or to avoid physical constraints such as subsurface utilities.

Seven (7) of the proposed soil borings (SB-67, SB-71, SB-76, SB-80, SB-84, SB-88, and SB092) will be located on six residential properties that front on West Street. At these locations, collocated semi-permanent soil vapor probes will be installed for soil vapor sample collection as described in Section 3.2.3. In addition, temporary well points will be also be installed at these locations for groundwater sample collection as described in Section 3.2.9. The proposed locations are approximate and the actual location of each boring will be determined in the field based on equipment access and utility clearance.

The borings will be advanced using the Geoprobe® direct push method and will be completed to a depth corresponding with the till layer, expected to be encountered at a maximum depth ranging from 20 to 30 feet bgs). Review of existing boring logs and cross-sections indicates that this portion of the site is underlain by a gray clay unit that starts at approximately ten feet bgs and extends to depths of up to 25 feet where it is in contact with the underlying sands and till deposits. CMX will utilize the TarGOST system to delineate the extent of NAPL at the site. The TarGOST system developed by Dakota Technologies sends excitation light through fiber optic cable strung within rods. The light exits through a window in the side of the probe. As the probe is advanced, the soil is exposed to the excitation light. If fluorescent compounds exist (i.e. contaminants), light is emitted. The "signal" light is transmitted through a fiber, back up hole to be analyzed. Responses are indicated in real-time on a graph of signal vs. depth.

Unless significant MGP related impact is identified above the clay unit, soil borings will be advanced through this clay unit to evaluate potential MGP related impact in the underlying deposits. If conditions including significant MGP related impact are encountered above the clay unit, the O&R and NYSDEC representatives will be consulted to determine whether to advance the boring deeper through the confining unit.

If refusal is encountered at a soil boring location and the boring needs to be offset, the O&R Project Manager and the NYSDEC representative will be consulted to ensure that the alternative boring location will yield the desired data according to the sampling rationale. Any deviation from the work plan will be approved by O&R and the NYSDEC representative prior to implementation.

CMX will conduct validation/confirmation sampling of 10% of the TarGOST locations to confirm the body of evidence generated with TarGOST. CMX will also conduct side-by-side tests of TarGOST for site heterogeneity assessment. The following general assumptions are made regarding the implementation of TarGOST:

- TarGOST production is expected to average between 300 and 500 ft/day, depending on subsurface conditions and difficulty in positioning the push platform over the desired location
- The TarGOST investigation will start in known source areas to calibrate the responsiveness of the system to the site's NAPL
- CMX in consultation with O&R and NYSDEC will adapt the transects and boring locations as necessary as TarGOST logs are reviewed

3.2.5 Soil Sampling and Analyses

Soil samples that will be collected for analysis from the on-site borings will be selected based on the following criteria:

- One sample will be collected from the zone with the highest PID readings or visual impacts. An additional sample will be collected immediately below the impacted zone to define the vertical extent of impacts at that location. If no visual impacts or elevated PID readings are observed, a sample will be collected from the discrete 6-inch soil interval directly above the soil - water table interface. Additionally, soil samples may be collected at contacts between soil units of contrasting permeabilities, (low permeability clay and basal till units) that are believed to limit vertical migration of contaminants. A minimum of one (1) soil sample and a maximum of three (3) soil samples from each boring are expected.

Validation/confirmation sampling of 10% of the TarGOST locations will be performed. CMX will also conduct side-by-side tests of TarGOST for site heterogeneity assessment. During the completion of

the soil borings, soil samples will be collected on a continuous basis using a four-foot long, 2-inch diameter geoprobe sleeve during soil boring advancement. The soil samples will be described by the field geologist in accordance with the Unified Soil Classification System. The field geologist will note the presence or absence of evidence of impacts (e.g., oil-like or tar-like NAPL, staining, sheens, and/or odors) and screen the soil for organic vapors using a PID. Validation/confirmation sample locations will be selected as follows:

- One (1) soil sample will be collected from of the seven (7) proposed soil borings (SB-67, SB-71, SB-76, SB-80, SB-84, SB-88, and SB092) located on the six residential properties that front on West Street. If Tar GOST identifies impacts, the sample will be collected from the zone with the highest PID readings or visual impacts. If TarGOST identified no impacts, a sample will be collected from the discrete 6-inch soil interval directly above the soil - water table interface.
- Soil samples will be collected from up to ten (10) of the remaining off-site boring locations. for confirmation purposes including up to three (3) side-by-side test for site heterogeneity. If Tar GOST identifies impacts, the sample will be collected from the zone with the highest PID readings or visual impacts. If TarGOST identified no impacts, a sample will be collected from the discrete 6-inch soil interval directly above the soil - water table interface.

Soil samples will be submitted to an independent New York State ELAP Certified laboratory for analysis of Target Compound List (TCL) volatile organic compounds (VOCs), and TCL Polynuclear Aromatic Hydrocarbons (PAHs).

For the purpose of waste pre-characterization, additional soil samples (approximately 10 percent) may be collected from the most impacted soil horizon. These samples will be analyzed for Resource Conservation and Recovery Act (RCRA) VOCs, SVOCs, and metals by Toxicity Characteristic Leaching Procedure (TCLP), total polychlorinated biphenyls (PCB), reactivity, corrosivity, ignitability and Total Petroleum Hydrocarbons. Results from these analyses will be used to expedite acceptance of investigation-derived waste at a disposal facility and to evaluate potential treatment and disposal options in the Feasibility Study.

Sampling equipment (e.g., augers and split-spoon samplers) will be decontaminated between sampling locations. Decontamination will be conducted in accordance with the FSP (Appendix B). Drill cuttings will be containerized in Department of Transportation (DOT)-approved 55-gallon drums or roll-off containers and handled as described in Section 3.2.10. Each boring will be grouted with bentonite-cement slurry upon completion. Soil boring locations will be staked or otherwise marked for identification during follow-up survey work. Locations outside of areas currently used for work, storage or traffic will be marked with wooden stakes. Locations in work, storage or traffic areas will

be marked with a steel pin or rod that is set flush to grade. The locations of each boring will be surveyed for documentation in the Supplemental Remedial Investigation Report (SRI Report).

3.2.6 Temporary Well Points/Groundwater Monitoring Wells

A total of seven (7) groundwater monitoring wells and seven temporary well points will be installed at offsite locations depicted on Plate 7 to obtain additional groundwater quality, flow information, and determine the presence/absence of NAPL in groundwater at these off-site locations. The temporary well points (TWP-67, TWP-71, TWP-76, TWP-80, TWP-84, TWP-88, and TWP-92) will be installed in the northern portion of the study area at representative locations in the rear of the residential properties that front on West Street. If site conditions change during the investigation, the selected locations will be modified in consultation with O&R and NYSDEC. Plate 7 depicts the proposed location of four groundwater monitoring wells (MW-61, MW-63, MW-85, and MW-107). The final three monitoring well locations will be determined based on the results of groundwater sampling conducted in conjunction with the temporary well point installation. Note that while the proposed location of each well is shown on Plate 7, the exact location and number of wells may be modified during field activities, based on the results of utility clearance and soil boring field screening, or soil sample analytical data that may be available before commencement of this phase of work. Locations may also be modified in response to on-site conditions, limited access by drilling equipment and presence of utilities.

Based on the current understanding of site hydrogeology, as well as the fate and transport of MGP residuals within the subsurface environment, it is anticipated that the planned monitoring wells will be installed in overburden deposits. Review of existing site monitoring data identified two potential source areas on the subject site that have the potential for offsite migration of MGP related constituents. The source areas located in the northeast and northwest corners of the site in conjunction with the hydrogeologic conditions at the site have the potential to result in the migration of MGP related constituents to the northeast towards the adjacent apartment complex. A third investigation area is in the rear of the apartment complex where several existing monitoring wells continue to display elevated BTEX and PAH concentrations. CMX proposes the installation of one overburden monitoring well adjacent to the northwest property boundary of the apartment complex to determine if impacts identified in this portion of the study area are associated with the former 93B MGP site located adjacent to the western property boundary of the apartment complex.

Detailed procedures for the installation of the monitoring wells are included in the FSP located in Appendix B. It should be noted that in response to the request of the apartment complex management, monitoring wells which are proposed for installation in the grass portion of the apartment complex (MW-61, MW-85, and MW-107) will be installed with water tight locking manholes slightly below grade to allow grass to cover each location.

3.2.6.1 Overburden Monitoring Well Construction

Overburden wells will be installed using 6.25-inch outside diameter HSAs and a truck-mounted drill rig. The water table wells will be constructed of 2-inch inside diameter polyvinyl chloride (PVC) with 5 to 10 feet of 0.02-inch slotted screens. The screens will be set with 1 to 3 feet of screen above and 4 to 7 feet of screen below the water table. The proposed 2-inch diameter is considered sufficient for water level monitoring and groundwater sample collection. The annular space around the well screen will be backfilled with clean sand filter pack extending from the bottom of the well to 1 to 2 feet above the screen. The annular space around the well riser will be sealed with bentonite pellets extending 1 to 2 feet above the sand filter pack and completed with a cement mixture to approximately 1 foot below grade. Each well will be completed at grade with a flush-mounted manhole set in concrete and a locking cap. The locations and thicknesses of the annular materials will be adjusted as necessary if the water table is too close to grade. A monitoring well construction detail for an overburden monitoring well is provided in the FSP (see Appendix B).

3.2.6.2 Monitoring Well Development

Following installation, each monitoring well will be developed by surging and pumping. The water purged from the well during development will be monitored for turbidity and other water quality indicators (i.e., pH, dissolved oxygen, oxidation-reduction potential, temperature and specific conductivity). These parameters will be measured at approximately 5-minute intervals. At a minimum, three well volumes will be purged from the well during development.

Additionally, well development will be continued until turbidity measurements of less than 50 nephelometric turbidity units (NTU) are obtained or until water quality indicators have stabilized. The criteria for stabilization will be water measurements of pH, temperature and specific conductivity within 10 percent of each other for three successive readings.

3.2.6.3 Temporary Well Point Installation and Sampling

Groundwater samples will be obtained from a series of passively placed narrow diameter temporary well points (TWP) installed at locations depicted on Plate 7. If field conditions warrant, these locations may be altered to accommodate such conditions. The TWPs will be installed in conjunction with the completion of the soil and soil gas sampling program proposed for the rear of the properties that front on West Street. Boreholes will be advanced using direct push techniques to a depth corresponding with the highest PID readings measured during the soil boring or a minimum of three feet below groundwater. The installation will utilize a retractable screen that is attached to a miniature drive point that extends beyond the base of the boring. The screen section is connected to Teflon tubing, which allows the collection

of the groundwater sample. With the screen section and tubing remaining in the outer casing, borings can be advanced through areas of soil impact with limited potential for cross contamination.

Samples will be collected from each point using a peristaltic pump connected to the sample tubing. Samples collected from the temporary well point will be submitted to a certified laboratory for volatile organic compound analysis.

Subsequent to the acquisition of a groundwater sample, each TWP will be removed and the borehole grouted to grade.

3.2.7 Site Survey

At the completion of installation activities, the location and elevation of the soil borings and monitoring wells will be surveyed by a New York State-licensed surveyor for production of a composite base map. Two elevation measurements will be recorded at each monitoring well location: the elevation on the rim of the flush-mounted manhole and the elevation of the top of the PVC well casing at a point marked on the casing. The elevations will be surveyed to an accuracy of 0.01 foot above the National Geodetic Vertical Datum of 1929 (an approximation of mean sea level).

3.2.8 Water Level Gauging

Water level gauging will be performed immediately prior to the groundwater sampling event (see Section 3.2.9). A second round of water levels will be collected approximately one month after the initial round.

During each water level gauging event, the depth to groundwater and light non-aqueous phase liquid (LNAPL), if present, will be measured in the wells using an electronic oil/water interface probe attached to a measuring tape accurate to 0.01 foot. The probe will then be lowered to the bottom of each well to check for the presence of DNAPL. Should DNAPL be identified, a weighted bailer will be placed in the well and retrieved to verify the presence of DNAPL and to estimate its depth and thickness in the well.

3.2.9 Groundwater Sampling and Analysis

Groundwater samples will be collected in three (3) rounds. An initial round of groundwater samples will be collected from four (4) monitoring wells (MW-08, MW-09, MW-11 and MW-24) located on the former MGP and the 146 Maple Avenue property. These samples will be collected on the same day as the soil vapor samples (Section 3.2.3) so that results may be compared. The second round will include the collection of groundwater samples from a series of TWPs (Section 3.2.6.3). The third round of groundwater sample collection will include sampling of groundwater from approximately 37

existing and newly installed monitoring wells. Groundwater sampling will be performed a minimum of seven days after the development of the new monitoring wells.

The water level data, well diameter, and depth will be used to calculate the volume of water in each well. The wells will then be purged using low-flow purging techniques as described in the FSP (Appendix B). Groundwater samples will be collected using a bladder pump equipped with clean, disposable tubing and transferred from the tubing on the outlet of the pump directly into clean laboratory-supplied sample bottles containing appropriate preserving agents. The samples will be submitted for laboratory analysis for TCL VOCs, TCL SVOCs, total cyanide and available cyanide (OIA-1677).

Because groundwater samples collected from wells containing separate phase LNAPL or DNAPL will not provide accurate dissolved-phase concentrations for the targeted organic compounds, groundwater samples will not be collected from wells identified as containing LNAPL or DNAPL.

Non-dedicated sampling equipment (e.g., submersible pumps and oil/water interface probe) will be decontaminated between sampling locations in accordance with the FSP (Appendix B). Spent decontamination water will be containerized in 55-gallon drums and handled as described in Section 3.2.10.

3.2.10 Management of Investigation Derived Waste

Investigation-derived waste (IDW) will be containerized in DOT-approved 55-gallon drums. The drums will be sealed at the end of each workday and labeled with the date, the well or boring number(s), the type of waste (i.e., drill cuttings, development water or purge water) and the name of a point-of-contact. Drums will be labeled as Non Hazardous Waste unless sample data indicates that the containerized wastes are Hazardous. In the event that IDW is classified as hazardous, properly completed Hazardous Waste labels will be placed on the drums. Drums will be moved as necessary and stored on the former MGP parcel inside the fence. No drums will be left unsecured on any of the off site properties. Soil samples collected from soil borings will be used for waste characterization of soils, since such data would be biased towards areas that are expected to be most impacted. Notwithstanding, additional waste characterization soil samples will be collected, if warranted. Grab samples will be collected from drums containing well development and purge water for waste characterization of liquids. The samples will be analyzed for TCLP VOCs, TCLP SVOCs, TCLP metals, PCBs, TPH, ignitability, corrosivity, reactivity, and total cyanide. The drums will be labeled "pending analysis" until laboratory data are available. The IDW will be disposed of or treated according to applicable local, state and federal regulations.

O&R's requirements for the management of IDW will be followed. This includes storing drums on pallets in a bermed or secondarily contained area lined with a minimum of 6-mil plastic sheeting. The

drums will be stored in a secured, roped-off area with appropriate signage and labeling. In addition, only O&R-approved transporters and disposal facilities will be used.

3.2.11 Equipment Decontamination

Down-hole sampling equipment will be decontaminated between monitoring well locations by pressure washing, steam cleaning or manual washing using a non-phosphate detergent solution followed by a rinse of potable water. Decontamination will be conducted in accordance with the procedures outlined in the FSP (Appendix B). The following procedures will be used to decontaminate equipment used during the site characterization activities.

- Drilling equipment, including the drilling rig, augers, bits, rods, tools, split-spoon samplers and tremie pipe, will be decontaminated before beginning work.
- Tools, drill rods and augers will be placed on sawhorses or polyethylene plastic sheets following steam cleaning. Direct contact with the ground will be avoided.
- All augers, rods and tools will be decontaminated between each drilling location according to the above procedures.
- The back of the drill rig and down-hole tools, augers and rods will be decontaminated at the completion of the work and prior to leaving the site.

Decontamination procedures for sampling equipment are described in Appendix A (QAPP) and Appendix B (FSP).

3.2.12 Data Management

Data validation will be performed in accordance with the U.S. Environmental Protection Agency (USEPA) Region I validation guidelines for organic and inorganic data review. These validation guidelines are regional modifications to the National Functional Guidelines for organic and inorganic data review. Specific data reduction, validation and reporting procedures are described in the Quality Assurance Project Plan (Appendix A). Validation will include the following:

- Verification of 100% of the QC sample results (both qualitative and quantitative);
- Verification of the identification of 100 percent of the sample results including positive detections and results that are below the detection limits;
- Recalculation of 10% of the investigative sample results; and
- Preparation of a Data Usability Summary Report (DUSR).

3.2.13 Remedial Investigation Report Preparation

The Remedial Investigation Report (RIR) will be prepared following completion of the field program and receipt of laboratory analytical results. The general outline of the report will be as follows:

- Section 1 (Introduction) will include a site overview, history, and a summary of the results of all previous investigations at the site;
- Section 2 (Remedial Investigation Activities) will describe the investigation activities completed and any deviations from this work plan;
- Section 3 (Physical Characteristics) will discuss the physical characteristics of the study area from both a regional and site-specific perspective;
- Section 4 (Nature and Extent of Impacts) will present and discuss the results of the investigation, including the extent of MGP-related contamination;
- Section 5 (Constituent Fate and Transport/Conceptual Site Model) will provide an analysis and discussion of the data presented in previous sections including an interpretation of the interaction of the physical and chemical processes associated with impacts at the Site. This section will culminate in the development of a conceptual site model for the Site;
- Section 6 (Qualitative Human Health Exposure Assessment) will address the qualitative risks posed to human receptors by constituents of concern that are present in media in excess of NYSDEC SCG values provided by NYSDEC and other sources. This section will identify complete exposure pathways which describe the means by which a potential receptor may be exposed to constituents originating from the Site; and
- Section 7 (Conclusions and Recommendations) will summarize the results of the investigation and present conclusions and recommendations for future remediation, if warranted.

4.0 PROJECT MANAGEMENT

4.1 Organization

The CMX Program Manager is responsible for the overall quality of all work performed by CMX for O&R. The Program Manager monitors the progress of each work assignment to ensure adequate resources are available. The Program Manager's review will concentrate on the technical quality, schedule, and cost for this work assignment.

The Project Manager (PM) is responsible for development of project plans and budgets, managing costs and manpower resources, and coordinating subcontractors. The PM will also be the Technical Lead for this project and will be supported by technical staff.

4.2 Project Schedule

The project schedule is shown in Figure 11. The schedule assumes O&R will allow CMX to implement subcontractor procurement prior to Notice to Proceed. The initial schedule covers a timeframe from mobilization of personnel, materials and equipment to delivery of the draft SRI Report. Comments from O&R on the draft SRI Report will be included in the final SRI Report.

4.3 Health and Safety Information

CMX has prepared a site-specific Health and Safety Plan (HASP) for the Clove and Maple Avenues Former MGP Site included as Appendix C. The HASP is developed in accordance with OSHA 29 CFR 1910.120 requirements, USEPA Standard Operating Safety Guides, and CMX Health and Safety guidelines and project requirements. The HASP addresses the activities associated with the field investigation. The contents of the HASP may be revised based on additional information, monitoring results, or changes in the technical scope of work. Any revision must be reviewed by the Site Health and Safety Officer (SHSO) and is subject to approval by the O&R Project Manager and the CMX Corporate Health and Safety Manager (CHSM). The site-specific HASP will be available on-site during all field activities.

4.3 Quality Assurance Project Plan

CMX has prepared a site-specific Quality Assurance Project Plan (QAPP) for the Clove and Maple Avenues Former MGP Site included as Appendix A. The QAPP provides the details of the quality assurance/quality control measures to be implemented for the Supplemental Remedial Investigation. These measures will be implemented to ensure that data collection activities will provide data of known and acceptable quality. The QAPP will be kept on-site during the field activities.

Major elements of the QAPP include:

- Project Organization and Responsibilities;
- QA Objectives for Measurement Data;
- Sampling Program;
- Sample Tracking and Custody;
- Calibration Procedures;
- Analytical Procedures;
- Data Validation, Reduction and Reporting;
- Internal Quality Control Checks;
- Performance and Systems Audits;
- Preventive Maintenance;
- Corrective Action; and
- References.

5.0 REFERENCES

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6.0 ACRONYMS AND ABBREVIATIONS

bgs	below the ground surface	NYSDOH	New York State Department of Health
CAMP	Community Air Monitoring Plan	PCBs	Polychlorinated biphenyls
DNAPL	Dense non-aqueous phase liquid	PID	Photoionization detector
DOT	Department of Transportation	PM10	Airborne respirable particulates less than 10 micrometers
DUSR	Data Usability Report	PVC	Polyvinyl chloride
FSP	Field Sampling Plan	QAPP	Quality Assurance Project Plan
ft²	Square feet	RCRA	Resource Conservation and Recovery Act
gpm	Gallons per minute	SVOC	Semivolatile organic compound
HASP	Health and Safety Plan	TAL	Target Analyte List
HSA	Hollow-stem auger	TCL	Target Compound List
ID	Inside diameter	TCLP	Toxicity Characteristic Leaching Procedure
IDW	Investigative Derived Waste	TPH	Total Petroleum Hydrocarbons
LNAPL	Light non-aqueous phase liquid	USEPA	United States Environmental Protection Agency
MGP	Manufactured gas plant	UST	Underground storage tank
NAPL	Non-aqueous phase liquid NAPL	VOC	Volatile organic compound
NTU	Nephelometric turbidity unit		
NYSDEC	New York State Department of Environmental Conservation		

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APPENDIX A

QUALITY ASSURANCE PROJECT PLAN

APPENDIX B

FIELD SAMPLING PLAN

APPENDIX C

HEALTH AND SAFETY PLAN

APPENDIX D

COMMUNITY AIR MONITORING PLAN

Table 1
Site Ownership Information
Clove and Maple Former MGP Site – Remedial Investigation
Haverstraw, New York

Property Owner	Years	Comments
Ira M. Hedges and wife	¹ -1894	Deed recorded May 23, 1884
Haverstraw Light and Fuel Gas Company	1894-1905	Deed recorded April 5, 1905, in Liber 219 at page 249
Charles M. Jesup	1905-1906	The West Shore Gas Company filed a Certificate of Incorporation on December 19, 1905
Henry J. White	1906-1906	Deed recorded July 26, 1906
West Shore Gas Company	1906-1935	Deed recorded October 29, 1935
Rockland Gas Company, Incorporated	1935-1953	
Rockland Light and Power Co.	1953-1954	
Orange and Rockland Utilities, Inc.	1954-present	

Note

¹ - transaction date not available

This site ownership history is based on a combination of sources and is for general information purposes only. It should not be used for legal purposes without further verification.

Table 2
Gas Production Record
Clove and Maple Former MGP Site – Remedial Investigation
Haverstraw, New York

Site	Year	Process	Gas Output (cf)	Gas Holder Capacity (1,000 cf)
Haverstraw Light & Fuel Gas Company	1900	Boecklin	6.5 mm	
Haverstraw Light & Fuel Gas Company	1901	No Record		
Haverstraw Light & Fuel Gas Company	1902	No Record		
Haverstraw Light & Fuel Gas Company	1903	No Record		
Haverstraw Light & Fuel Gas Company	1904	Boecklin	15 mm	
Haverstraw Light & Fuel Gas Company	1905	Boecklin		
Haverstraw Light & Fuel Gas Company	1906	Boecklin		
West Shore Gas Company	1907	Boecklin	12 mm	
West Shore Gas Company	1908	Boecklin	12 mm	
West Shore Gas Company	1909	Boecklin	12 mm	60
West Shore Gas Company	1910	Boecklin	7 mm	60
West Shore Gas Company	1911	Boecklin	7 mm	60
West Shore Gas Company	1912	Boecklin	10 mm	60
West Shore Gas Company	1913	Boecklin	10 mm	60
West Shore Gas Company	1914	Boecklin	14 mm	60
West Shore Gas Company	1915	Lowe (Boecklin)	11 mm	60
West Shore Gas Company	1916	Lowe (Boecklin)	11 mm	60
West Shore Gas Company	1917	Lowe (Boecklin)	11.5 mm	60
West Shore Gas Company	1918	Lowe (Boecklin)	11.5 mm	60
West Shore Gas Company	1919	Lowe (Boecklin)	11.5 mm	120
West Shore Gas Company	1920	No Record		
West Shore Gas Company	1921	Lowe (Boecklin)	11.5 mm	60
West Shore Gas Company	1922	Lowe (Boecklin)	12 mm	56
West Shore Gas Company	1923	Boecklin/WG	10.167 mm	50
West Shore Gas Company	1924	Boecklin/WG	10.167 mm	50
West Shore Gas Company	1925	Boecklin/WG	10.167 mm	50
West Shore Gas Company	1926	No Record		
West Shore Gas Company	1927	Boecklin/WG	10.167 mm	50
West Shore Gas Company	1928	Boecklin/WG	19.9 mm	50
West Shore Gas Company	1929	Boecklin/WG	21.1 mm	18
West Shore Gas Company	1930	Boecklin/WG		18
West Shore Gas Company	1931	No Record		
West Shore Gas Company	1932	Boecklin/WG	20.3 mm	51.5
Subsidiary of General Water Gas & Electric of Dover, DE	1933	Boecklin/WG	14 mm	51.5
Subsidiary of General Water Gas & Electric of Dover, DE	1934	Boecklin/WG	5.574 mm	50
Subsidiary of General Water Gas & Electric of Dover, DE	1935	Boecklin/WG	14.926 mm	50
Notes: WG – water gas mm - million				

Table 3
Surface Soil Analytical Results
Clove and Maple Avenue Former MGP Site - Remedial Investigation
Haverstraw, New York

Analyte	NYSDEC Soil Cleanup Objectives	Sample ID / Date Collected						
		Background Surface Soils						
		BSS1 07/15/97	BSS2 07/15/97	BSS3 07/15/97	BSS4 07/15/97	BSS5 07/15/97	BSS6 07/15/97	HA-BSS01-1 12/03/01
BTEX by NYSASP Method 95-1 (mg/kg)								
Benzene	0.06	NA	NA	NA	NA	NA	NA	0.005 U
Toluene	1.5	NA	NA	NA	NA	NA	NA	0.005 U
Xylene, Total	1.2	NA	NA	NA	NA	NA	NA	0.005 U
Total BTEX		NA	NA	NA	NA	NA	NA	ND
Other VOCs by NYSASP Method 95-1 (mg/kg)								
Acetone	0.2	NA	NA	NA	NA	NA	NA	NA
PAHs (Non-carcinogenic) by NYSASP Method 95-2 (mg/kg)								
Acenaphthene	50.0	NA	NA	NA	NA	NA	NA	0.077 J
Acenaphthylene	41.0	NA	NA	NA	NA	NA	NA	0.19 J
Anthracene	50.0	NA	NA	NA	NA	NA	NA	0.4 J
Benzo[g,h,i]perylene	50.0	NA	NA	NA	NA	NA	NA	1.6
Fluoranthene	50.0	NA	NA	NA	NA	NA	NA	2.5
Fluorene	50.0	NA	NA	NA	NA	NA	NA	0.11 J
Methylnaphthalene,2-	36.4	NA	NA	NA	NA	NA	NA	0.048 J
Naphthalene	13.0	NA	NA	NA	NA	NA	NA	0.062 J
Phenanthrene	50.0	NA	NA	NA	NA	NA	NA	1.4
Pyrene	50.0	NA	NA	NA	NA	NA	NA	2.6
Total PAHs (Non-carc.)		NA	NA	NA	NA	NA	NA	9.0
PAHs (Carcinogenic) by NYSASP Method 95-2 (mg/kg)								
Benz[a]anthracene	0.224	NA	NA	NA	NA	NA	NA	1.4
Benzo[a]pyrene	0.061	NA	NA	NA	NA	NA	NA	1.3
Benzo[b]fluoranthene	1.1	NA	NA	NA	NA	NA	NA	1.1
Benzo[k]fluoranthene	1.1	NA	NA	NA	NA	NA	NA	1
Chrysene	0.4	NA	NA	NA	NA	NA	NA	1.6
Dibenz[a,h]anthracene	0.014	NA	NA	NA	NA	NA	NA	0.44 J
Indeno[1,2,3-cd]pyrene	3.2	NA	NA	NA	NA	NA	NA	1.4
total PAHs (Carcinogenic)		NA	NA	NA	NA	NA	NA	8
Other SVOCs by NYSASP Method 95-2 (mg/kg)								
Biphenyl,1,1-	NS	NA	NA	NA	NA	NA	NA	0.72 U
Bis(2-ethylhexyl)phthalate	50.0	NA	NA	NA	NA	NA	NA	0.72 U
Butyl benzyl phthalate	50.0	NA	NA	NA	NA	NA	NA	0.72 U
Carbazole	NS	NA	NA	NA	NA	NA	NA	0.11 J
Dibenzofuran	6.2	NA	NA	NA	NA	NA	NA	0.037 J
Di-n-butyl phthalate	8.1	NA	NA	NA	NA	NA	NA	0.72 U
Di-n-octyl phthalate	50.0	NA	NA	NA	NA	NA	NA	0.72 U
PCBs by NYSASP Method PCBs								
PCBs	NS	NA	NA	NA	NA	NA	NA	NA

Table 3
Surface Soil Analytical Results
Clove and Maple Avenue Former MGP Site - Remedial Investigation
Haverstraw, New York

Analyte	NYSDEC Soil Cleanup Objectives	Sample ID / Date Collected						
		Background Surface Soils						
		BSS1 07/15/97	BSS2 07/15/97	BSS3 07/15/97	BSS4 07/15/97	BSS5 07/15/97	BSS6 07/15/97	HA-BSS01-1 12/03/01
Pesticides by NYSASP Method Pesticides								
DDT,4,4'-	NS	NA	NA	NA	NA	NA	NA	NA
Metals Analysis by NYSASP Methods 6010/7471/7740 (mg/kg)								
Aluminum	NS	8430	7810	8060	7110	9950	7640	NA
Antimony	NS	1.7 R	1.7 R	1.8 R	1.7 R	1.8 R	1.8 R	NA
Arsenic	7.5	4	5.5	5.4	2.9	4.2	2.3	NA
Barium	300	84.2	73.4	81.6	50	61.9	38.9 B	NA
Beryllium	0.16	0.42 B	0.43 B	0.49 B	0.38 B	0.47 B	0.38 B	NA
Cadmium	1	0.55 B	0.96 B	0.79 B	0.72 B	0.47 B	0.33 B	NA
Calcium	NS	1490	10900	2800	2500	2990	14600	NA
chromium	10	12	8.9	8.8	12.2	12.1	6.8	NA
Cobalt	30	5.4 B	6.4 B	6 B	6.3 B	8 B	6.1 B	NA
Copper	25	18.9	47.3	48	32.9	27.6	25.2	NA
Iron	2000	15700	15900	16000	15900	18700	15700	NA
Lead	500	145	163	187	219	38.2	11.8	NA
Magnesium	NS	2410	6360	1970	2650	3400	9340	NA
Manganese	NS	443	376	310	322	400	440	NA
Mercury	0.1	0.11	0.16	0.14	0.19	0.07 B	0.05 U	NA
Nickel	13	10.6	14	12.2	14	12.6	9.2	NA
Potassium	NS	699 B	698 B	673 B	1210	758 B	708 B	NA
Selenium	2	0.65 U	0.65 U	0.87 B	0.62 U	0.67 U	0.66 U	NA
Silver	NS	0.43 U	0.44 U	0.46 U	0.41 U	0.45 U	0.44 U	NA
Sodium	NS	109 U	110 U	725 B	336 B	401 B	116 B	NA
Thallium	NS	1.3 U	1.3 U	1.4 U	1.2 U	1.3 U	1.3 U	NA
Vanadium	150	18.6	26.2	24.2	22.8	20.2	13	NA
Zinc	20	94.6 E	135 E	123 E	101 E	67.3 E	41 E	NA
Cyanides by CLP Methods (mg/kg)								
Cyanide, Total	1600 (a)	NA	NA	NA	NA	NA	NA	0.52 U
Geochemical Analyses by Various Methods (mg/kg)								
Residue, Total	NS	NA	NA	NA	NA	NA	NA	NA

Table 3
Surface Soil Analytical Results
Clove and Maple Avenue Former MGP Site - Remedial Investigation
Haverstraw, New York

Analyte	NYSDEC Soil Cleanup Objectives	Sample ID / Date Collected						
		Background Surface Soils					Clove and Maple Avenue	
		HA-BSS01-2 12/03/01	HA-BSS01-3 12/03/01	HA-BSS01-4 12/03/01	HA-BSS01-5 12/03/01	HA-BSS01-6 12/03/01	SS1 05/14/97	SS1A 07/14/97
BTEX by NYSASP Method 95-1 (mg/kg)								
Benzene	0.06	0.005 U	0.005 U	0.005 U	0.006 U	0.006 U	0.012 U	NA
Toluene	1.5	0.005 U	0.005 U	0.005 U	0.006 U	0.006 U	0.012 U	NA
Xylene, Total	1.2	0.005 U	0.005 U	0.005 U	0.006 U	0.006 U	0.012 U	NA
Total BTEX		ND	ND	ND	ND	ND	ND	NA
Other VOCs by NYSASP Method 95-1 (mg/kg)								
Acetone	0.2	NA	NA	NA	NA	NA	NA	NA
PAHs (Non-carcinogenic) by NYSASP Method 95-2 (mg/kg)								
Acenaphthene	50.0	0.17 J	0.17 J	0.4 J	0.44 J	0.035 J	0.22 J	0.39 J
Acenaphthylene	41.0	0.19 J	0.07 J	0.075 J	0.11 J	0.17 J	1 J	0.12 J
Anthracene	50.0	0.58 J	0.46 J	0.5 J	1	0.34 J	0.68 J	0.74 J
Benzo[g,h,i]perylene	50.0	1.8	0.94	0.93	1.8	0.87	1.8 B	4.5
Fluoranthene	50.0	3.7	3.7	4.2	4.6	1.8	5.8	9.2
Fluorene	50.0	0.24 J	0.18 J	0.32 J	0.44 J	0.077 J	0.24 J	0.33 J
Methylnaphthalene,2-	36.4	0.059 J	0.043 J	0.32 J	0.11 J	0.089 J		
Naphthalene	13.0	0.07 J	0.058 J	0.38 J	0.13 J	0.038 J	1.1 J	1 U
Phenanthrene	50.0	2.4	2.4	2.9	4.1	0.96	3.3	5.1
Pyrene	50.0	3.6 J	3.6	4.2	5	1.5	5.8 B	9.5
Total PAHs (Non-carc.)		12.8	11.6	14.2	18	5.9	20	29.88
PAHs (Carcinogenic) by NYSASP Method 95-2 (mg/kg)								
Benz[a]anthracene	0.224	2.2	1.9	2.2	2.6	0.82	3.8	4
Benzo[a]pyrene	0.061	1.8	1.7	1.8	2.1	0.86	2.8 B	4.3
Benzo[b]fluoranthene	1.1	1.4	1.7	1.6	1.8	0.7	10	4
Benzo[k]fluoranthene	1.1	1.7	1.6 J	2.2 J	2.1 J	0.72	3.1	4
Chrysene	0.4	2.3	2.1	2.3	2.7	0.96	7.5	5
Dibenz[a,h]anthracene	0.014	0.64 J	0.35 J	0.4 J	0.57 J	0.28 J	1.4 J	1.5
Indeno[1,2,3-cd]pyrene	3.2	2	1.2	1.3	1.7	1	3.7 B	3.4
otal PAHs (Carcinogenic)		12	10.6	11.8	13.6	5	32	26
Other SVOCs by NYSASP Method 95-2 (mg/kg)								
Biphenyl,1,1-	NS	0.73 U	0.71 U	0.039 J	0.04 J	0.026 J	NA	NA
Bis(2-ethylhexyl)phthalate	50.0	0.73 U	0.71 U	1.1 U	0.71 U	0.59 U	NA	NA
Butyl benzyl phthalate	50.0	0.73 U	0.71 U	0.1 J	0.71 U	0.052 J	NA	NA
Carbazole	NS	0.23 J	0.23 J	0.28 J	0.54 J	0.11 J	NA	NA
Dibenzofuran	6.2	0.073 J	0.088 J	0.1 J	0.31 J	0.022 J	NA	NA
Di-n-butyl phthalate	8.1	0.73 U	0.018 J	0.018 J	0.02 J	0.02 J	NA	NA
Di-n-octyl phthalate	50.0	0.73 U	0.71 U	0.71 U	0.71 U	0.03 J	NA	NA
PCBs by NYSASP Method PCBs								
PCBs	NS	NA	NA	NA	NA	NA	NA	NA

Table 3
Surface Soil Analytical Results
Clove and Maple Avenue Former MGP Site - Remedial Investigation
Haverstraw, New York

Analyte	NYSDEC Soil Cleanup Objectives	Sample ID / Date Collected						
		Background Surface Soils					Clove and Maple Avenue	
		HA-BSS01-2 12/03/01	HA-BSS01-3 12/03/01	HA-BSS01-4 12/03/01	HA-BSS01-5 12/03/01	HA-BSS01-6 12/03/01	SS1 05/14/97	SS1A 07/14/97
Pesticides by NYSASP Method Pesticides								
DDT,4,4'-	NS	NA	NA	NA	NA	NA	NA	NA
Metals Analysis by NYSASP Methods 6010/7471/7740 (mg/kg)								
Aluminum	NS	NA	NA	NA	NA	NA	6130	8340
Antimony	NS	NA	NA	NA	NA	NA	4.8 B	1.7 R
Arsenic	7.5	NA	NA	NA	NA	NA	21	4.7
Barium	300	NA	NA	NA	NA	NA	72.6	55.1
Beryllium	0.16	NA	NA	NA	NA	NA	0.25 B	0.49 B
Cadmium	1	NA	NA	NA	NA	NA	0.16 U	0.49 B
Calcium	NS	NA	NA	NA	NA	NA	826 B	5300 *
chromium	10	NA	NA	NA	NA	NA	14 *	10.3
Cobalt	30	NA	NA	NA	NA	NA	10.6 B	7 B
Copper	25	NA	NA	NA	NA	NA	153	30.6
Iron	2000	NA	NA	NA	NA	NA	72600 *	15300
Lead	500	NA	NA	NA	NA	NA	281	53.2
Magnesium	NS	NA	NA	NA	NA	NA	1780	3530
Manganese	NS	NA	NA	NA	NA	NA	322 N*	356 N
Mercury	0.1	NA	NA	NA	NA	NA	3.3 N*	0.17
Nickel	13	NA	NA	NA	NA	NA	24.2	13.3
Potassium	NS	NA	NA	NA	NA	NA	709 B	679 B
Selenium	2	NA	NA	NA	NA	NA	4.5	0.65 U
Silver	NS	NA	NA	NA	NA	NA	0.53 B	0.43 U
Sodium	NS	NA	NA	NA	NA	NA	171 B	109 U
Thallium	NS	NA	NA	NA	NA	NA	2.2 U	1.3 U
Vanadium	150	NA	NA	NA	NA	NA	46.6	21.7
Zinc	20	NA	NA	NA	NA	NA	66.4	77.3 E
Cyanides by CLP Methods (mg/kg)								
Cyanide, Total	1600 (a)	0.53 U	0.53 U	0.52 U	0.62 U	0.59 U	NA	NA
Geochemical Analyses by Various Methods (mg/kg)								
Residue, Total	NS	NA	NA	NA	NA	NA	NA	NA

Table 3
Surface Soil Analytical Results
Clove and Maple Avenue Former MGP Site - Remedial Investigation
Haverstraw, New York

Analyte	NYSDEC Soil Cleanup Objectives	Sample ID / Date Collected						
		Clove and Maple Avenue						
		SS10 05/14/97	SS11 07/15/97	SS12 07/15/97	SS13 07/15/97	SS14 07/15/97	SS15 07/15/97	SS16 07/14/97
BTEX by NYSASP Method 95-1 (mg/kg)								
Benzene	0.06	0.012 U	NA	NA	NA	NA	NA	NA
Toluene	1.5	0.001	NA	NA	NA	NA	NA	NA
Xylene, Total	1.2	0.012 U	NA	NA	NA	NA	NA	NA
Total BTEX		0.001	NA	NA	NA	NA	NA	NA
Other VOCs by NYSASP Method 95-1 (mg/kg)								
Acetone	0.2	NA	NA	NA	NA	NA	NA	NA
PAHs (Non-carcinogenic) by NYSASP Method 95-2 (mg/kg)								
Acenaphthene	50.0	0.18 J	0.34 U	0.27 J	0.19 J	0.34 U	0.054 J	0.35 U
Acenaphthylene	41.0	0.88 J	0.34 U	0.065 J	0.054 J	0.34 U	0.045 J	0.35 U
Anthracene	50.0	0.6 J	0.09 J	0.53	0.45	0.34 U	0.13 J	0.075 J
Benzo[g,h,i]perylene	50.0	1.9 B	0.71	2.1	4.7	0.17 J	1.3	0.81
Fluoranthene	50.0	4.7	1.9	7.1 D	11 D	0.6	2	1.1
Fluorene	50.0	0.2 J	0.078 J	0.4	0.39	0.34 U	0.08 J	0.041 J
Methylnaphthalene,2-	36.4							
Naphthalene	13.0	1 J	0.34 U	0.32 J	0.046 J	0.34 U	0.035 J	0.35 U
Phenanthrene	50.0	2.4	1.1	4.3	4.9	0.25 J	1.3	0.67
Pyrene	50.0	5.3 B	2.2	7.2 D	12 D	0.58	2.1	1.6
Total PAHs (Non-carc.)		17	6.1	22.3	33.7	1.6	7	4.3
PAHs (Carcinogenic) by NYSASP Method 95-2 (mg/kg)								
Benz[a]anthracene	0.224	3.5	0.7	2.4	3.6	0.22 J	0.87	0.5
Benzo[a]pyrene	0.061	2.6 B	0.81	2.6	4.2	0.27 J	1	0.68
Benzo[b]fluoranthene	1.1	8.9	0.78	2.7	3.6	0.31 J	0.86	0.72
Benzo[k]fluoranthene	1.1	3.4	0.85	2.4	4.3	0.27 J	1.2	0.66
Chrysene	0.4	6.6	0.95	3.1	4.5	0.35	1.2	0.71
Dibenz[a,h]anthracene	0.014	1.2 J	0.16 J	0.77	1.4	0.34 U	0.38	0.24 J
Indeno[1,2,3-cd]pyrene	3.2	3.2 B	0.62	1.9	4	0.17 J	1.1	0.67
total PAHs (Carcinogenic)		29.4	4.9	15.9	26	1.93	7	4.2
Other SVOCs by NYSASP Method 95-2 (mg/kg)								
Biphenyl,1,1-	NS	NA	NA	NA	NA	NA	NA	NA
Bis(2-ethylhexyl)phthalate	50.0	NA	NA	NA	NA	NA	NA	NA
Butyl benzyl phthalate	50.0	NA	NA	NA	NA	NA	NA	NA
Carbazole	NS	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	6.2	NA	NA	NA	NA	NA	NA	NA
Di-n-butyl phthalate	8.1	NA	NA	NA	NA	NA	NA	NA
Di-n-octyl phthalate	50.0	NA	NA	NA	NA	NA	NA	NA
PCBs by NYSASP Method PCBs								
PCBs	NS	NA	NA	NA	NA	NA	NA	NA

Table 3
Surface Soil Analytical Results
Clove and Maple Avenue Former MGP Site - Remedial Investigation
Haverstraw, New York

Analyte	NYSDEC Soil Cleanup Objectives	Sample ID / Date Collected Clove and Maple Avenue						
		SS10 05/14/97	SS11 07/15/97	SS12 07/15/97	SS13 07/15/97	SS14 07/15/97	SS15 07/15/97	SS16 07/14/97
		Pesticides by NYSASP Method Pesticides						
DDT,4,4'-	NS	NA	NA	NA	NA	NA	NA	NA
Metals Analysis by NYSASP Methods 6010/7471/7740 (mg/kg)								
Aluminum	NS	7370	8040	9690	8370	7720	9390	9570
Antimony	NS	4.5 B	1.7 R	1.7 R	1.8 R	1.7 R	1.7 R	1.7 R
Arsenic	7.5	19.2	3.3	6.6	7.1	6.5	4.5	3.3
Barium	300	71.9	58.6	67	62.5	60.5	69	67.6
Beryllium	0.16	0.28 B	0.41 B	0.5 B	0.43 B	0.42 B	0.63 B	0.55 B
Cadmium	1	0.16 U	0.35 B	0.63 B	0.54 B	0.55 B	0.39 B	0.42 B
Calcium	NS	911 B	1100	1730	2080	4410	1240 *	1910 *
chromium	10	14.1 *	10.3	14.6	9.9	9.7	9.9	11.3
Cobalt	30	10.3 B	6.3 B	6.7 B	6.1 B	5.8 B	5.6 B	6.7 B
Copper	25	138	15.4	24.7	26.3	26.3	18.2	17.2
Iron	2000	68400 *	13000	16300	16100	15000	15700	15300
Lead	500	246	26	185	88.9	89.6	50.7	47.8
Magnesium	NS	2350	1940	2340	2380	3550	2160	2370
Manganese	NS	345 *	391	444	392	378	394 N	391 N
Mercury	0.1	3.2 *	0.1 B	0.39	0.49	0.21	1.3	0.21
Nickel	13	24	11	13	11.8	10.8	11.4	13.3
Potassium	NS	1140 B	610 B	624 B	566 B	481 B	695 B	642 B
Selenium	2	4.5	0.64 U	0.63 U	1 B	0.64 U	0.65 U	0.64 U
Silver	NS	0.42 B	0.43 U	0.42 U	0.44 U	0.42 U	0.43 U	0.43 U
Sodium	NS	216 B	107 U	106 U	112 U	107 U	110 U	108 U
Thallium	NS	2.2 U	1.3 U	1.3 U	1.03 U	1.3 U	2.6 U	1.3 U
Vanadium	150	44.4	19	24.7	22.6	21.9	19.1	21.4
Zinc	20	143	36.6 E	68.5 E	77.7 E	75.7 E	62.7 E	61.3 E
Cyanides by CLP Methods (mg/kg)								
Cyanide, Total	1600 (a)	NA	NA	NA	NA	NA	NA	NA
Geochemical Analyses by Various Methods (mg/kg)								
Residue, Total	NS	NA	NA	NA	NA	NA	NA	NA

Table 3
Surface Soil Analytical Results
Clove and Maple Avenue Former MGP Site - Remedial Investigation
Haverstraw, New York

Analyte	NYSDEC Soil Cleanup Objectives	Sample ID / Date Collected						
		Clove and Maple Avenue						
		SS17 07/14/97	SS18 07/14/97	SS19 07/14/97	SS2 05/14/97	SS2A 07/14/97	SS20 07/14/97	SS22 07/14/97
BTEX by NYSASP Method 95-1 (mg/kg)								
Benzene	0.06	NA	NA	NA	0.001 J	NA	NA	NA
Toluene	1.5	NA	NA	NA	0.013 U	NA	NA	NA
Xylene, Total	1.2	NA	NA	NA	0.013 U	NA	NA	NA
Total BTEX		NA	NA	NA	0.001	NA	NA	NA
Other VOCs by NYSASP Method 95-1 (mg/kg)								
Acetone	0.2	NA	NA	NA	NA	NA	NA	NA
PAHs (Non-carcinogenic) by NYSASP Method 95-2 (mg/kg)								
Acenaphthene	50.0	0.047 J	0.16 J	0.36 U	0.054 J	0.073 J	0.97 J	0.34 U
Acenaphthylene	41.0	0.35 U	0.09 J	0.36 U	1.2	0.37 U	0.64 J	0.34 U
Anthracene	50.0	0.12 J	0.43 J	0.047 J	1.3	0.21 J	2.4 J	0.036 J
Benzo[g,h,i]perylene	50.0	2	5	0.57	9.3 DB	2.1	11	0.44
Fluoranthene	50.0	2.8	7.6	0.98	10 D	3.1	10	0.59
Fluorene	50.0	0.078 J	0.25 J	0.036 J	0.19 J	0.18 J	2.4 J	0.34 U
Methylnaphthalene,2-	36.4							
Naphthalene	13.0	0.35 U	0.72 U	0.36 U	0.47	0.047 J	150 D	0.34 U
Phenanthrene	50.0	1.5	3.7	0.54	1.2	2.2	15	0.3 J
Pyrene	50.0	4.8	7.9	1	17 DB	3.6	22	0.98
Total PAHs (Non-carc.)		11	25	3	40.7	11.5	214	2.3
PAHs (Carcinogenic) by NYSASP Method 95-2 (mg/kg)								
Benz[a]anthracene	0.224	1.2	3.5	0.4	6.9 D	1.4	8.4	0.27 J
Benzo[a]pyrene	0.061	1.9	4.3	0.46	6.4 DB	1.5	5.6	0.49
Benzo[b]fluoranthene	1.1	1.5	3.2	0.5	9.8 D	1.2	9.8	0.37
Benzo[k]fluoranthene	1.1	1.6	4.6	0.49	3	1.5	11	0.33 J
Chrysene	0.4	2	4.9	0.54	7.5 D	2	16	0.49
Dibenz[a,h]anthracene	0.014	0.53	1.7	0.18 J	1.6	0.7	2.9 J	0.095 J
Indeno[1,2,3-cd]pyrene	3.2	1.6	4	0.41	7.7 DB	1.7	8.7	0.32 J
otal PAHs (Carcinogenic)		10	26	3.0	43	10	62	2.37
Other SVOCs by NYSASP Method 95-2 (mg/kg)								
Biphenyl,1,1-	NS	NA	NA	NA	NA	NA	NA	NA
Bis(2-ethylhexyl)phthalate	50.0	NA	NA	NA	NA	NA	NA	NA
Butyl benzyl phthalate	50.0	NA	NA	NA	NA	NA	NA	NA
Carbazole	NS	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	6.2	NA	NA	NA	NA	NA	NA	NA
Di-n-butyl phthalate	8.1	NA	NA	NA	NA	NA	NA	NA
Di-n-octyl phthalate	50.0	NA	NA	NA	NA	NA	NA	NA
PCBs by NYSASP Method PCBs								
PCBs	NS	NA	NA	NA	NA	NA	NA	NA

Table 3
Surface Soil Analytical Results
Clove and Maple Avenue Former MGP Site - Remedial Investigation
Haverstraw, New York

Analyte	NYSDEC Soil Cleanup Objectives	Sample ID / Date Collected Clove and Maple Avenue						
		SS17 07/14/97	SS18 07/14/97	SS19 07/14/97	SS2 05/14/97	SS2A 07/14/97	SS20 07/14/97	SS22 07/14/97
Pesticides by NYSASP Method Pesticides								
DDT,4,4'-	NS	NA	NA	NA	NA	NA	NA	NA
Metals Analysis by NYSASP Methods 6010/7471/7740 (mg/kg)								
Aluminum	NS	8630	8810	8950	6410	8390	5840	7750
Antimony	NS	1.7 R	1.7 R	1.8 R	1.2 U	1.8 R	4.1 BN	1.7 R
Arsenic	7.5	4.3	3.3	3.5	8.1	2.9	18	58.7
Barium	300	41.8 B	54.3	54.8	46 B	40.8 B	46.2	83.6
Beryllium	0.16	0.41 B	0.49 B	0.51 B	0.52 B	0.4 B	0.35 B	0.55 B
Cadmium	1	0.38 B	0.4 B	0.39 B	0.16 U	0.71 B	1.4	0.79 B
Calcium	NS	2440 *	2080 *	1200 *	2230	15500 *	1370 *	2540 *
chromium	10	8.3	10.1	11.9	7.3 *	8.4	14.5	10.2
Cobalt	30	7.7 B	7.2 B	6.1 B	7 B	8.5 B	10.8 B	5.8 B
Copper	25	50.4	27.1	17.7	34.6	74.7	140	74.6
Iron	2000	16800	15300	15000	8930 *	20700	95400	30100
Lead	500	29.2	62	25.4	34.1	35.7	121	121
Magnesium	NS	2630	2340	2180	1920	8870	2200	2630
Manganese	NS	303 N	366 N	330 N	150 N*	291 N	333 N	288 N
Mercury	0.1	0.41	0.08 B	0.12	0.1 N*	0.11	1.8	17.6
Nickel	13	11.6	14.3	12.9	20	17.8	25.1	12.1
Potassium	NS	657 B	551 B	660 B	771 B	713 B	850 B	1020 B
Selenium	2	0.64 U	0.66 U	0.66 U	1.3 B	0.67 U	0.66 U	0.63 U
Silver	NS	0.43 U	0.44 U	0.44 U	0.28 U	0.45 U	0.44 U	0.42 U
Sodium	NS	120 B	110 U	112 U	61.5 B	474 B	111 U	107 U
Thallium	NS	1.3 U	1.3 U	1.3 U	2.3 U	1.3 U	2.6 U	1.3 U
Vanadium	150	20.8	22.7	20.6	19.2	30	42.5	21.9
Zinc	20	54.3 E	56.1 E	40.7 E	34.9	70 E	51.7 E	94.3 E
Cyanides by CLP Methods (mg/kg)								
Cyanide, Total	1600 (a)	NA	NA	NA	NA	NA	NA	NA
Geochemical Analyses by Various Methods (mg/kg)								
Residue, Total	NS	NA	NA	NA	NA	NA	NA	NA

Table 3
Surface Soil Analytical Results
Clove and Maple Avenue Former MGP Site - Remedial Investigation
Haverstraw, New York

Analyte	NYSDEC Soil Cleanup Objectives	Sample ID / Date Collected						
		Clove and Maple Avenue						
		SS23 07/15/97	SS24 07/15/97	SS25 07/15/97	SS26 07/15/97	SS27 07/15/97	SS28 07/15/97	SS29 07/15/97
BTEX by NYSASP Method 95-1 (mg/kg)								
Benzene	0.06	NA	NA	NA	NA	NA	NA	NA
Toluene	1.5	NA	NA	NA	NA	NA	NA	NA
Xylene, Total	1.2	NA	NA	NA	NA	NA	NA	NA
Total BTEX		NA	NA	NA	NA	NA	NA	NA
Other VOCs by NYSASP Method 95-1 (mg/kg)								
Acetone	0.2	NA	NA	NA	NA	NA	NA	NA
PAHs (Non-carcinogenic) by NYSASP Method 95-2 (mg/kg)								
Acenaphthene	50.0	0.34 U	0.34 U	0.35 U	0.069 J	0.089 J	0.26 J	0.35 U
Acenaphthylene	41.0	0.34 U	0.34 U	0.35 U	0.34 U	0.036 J	0.36 U	0.35 U
Anthracene	50.0	0.34 U	0.34 U	0.044 J	0.13 J	0.24 J	0.61	0.064 J
Benzo[g,h,i]perylene	50.0	0.27 J	0.36	0.42	0.89	2.1	0.99	0.57
Fluoranthene	50.0	0.71	1.2	1.5	2.8	4.2	3.2	1.5
Fluorene	50.0	0.34 U	0.34 U	0.35 U	0.096 J	0.19 J	0.32 J	0.062 J
Methylnaphthalene,2-	36.4							
Naphthalene	13.0	0.34 U	0.34 U	0.069 J	0.083 J	0.036 J	0.36 U	0.039 J
Phenanthrene	50.0	0.36	0.44	0.6	1.4	2.6	2.8	0.84
Pyrene	50.0	0.62	1.1	1.4	2.9	4.6	3.5	1.5
Total PAHs (Non-carc.)		1.96	3.1	4.0	8.4	14.1	11.7	4.6
PAHs (Carcinogenic) by NYSASP Method 95-2 (mg/kg)								
Benz[a]anthracene	0.224	0.28 J	0.38	0.51	1	1.6	1.6	0.5
Benzo[a]pyrene	0.061	0.33 J	0.51	0.59	1.2	2.1	1.6	0.62
Benzo[b]fluoranthene	1.1	0.36	0.54	0.66	1.2	2	1.4	0.68
Benzo[k]fluoranthene	1.1	0.32 J	0.6	0.7	1.3	1.8	1.4	0.45
Chrysene	0.4	0.38	0.62	0.84	1.4	2.1	1.6	0.7
Dibenz[a,h]anthracene	0.014	0.035 J	0.067 J	0.12 J	0.32 J	0.65	0.46	0.19 J
Indeno[1,2,3-cd]pyrene	3.2	0.2 J	0.32 J	0.42	0.78	1.7	0.94	0.46
otal PAHs (Carcinogenic)		1.9	3.0	3.8	7	12	9.0	3.6
Other SVOCs by NYSASP Method 95-2 (mg/kg)								
Biphenyl,1,1-	NS	NA	NA	NA	NA	NA	NA	NA
Bis(2-ethylhexyl)phthalate	50.0	NA	NA	NA	NA	NA	NA	NA
Butyl benzyl phthalate	50.0	NA	NA	NA	NA	NA	NA	NA
Carbazole	NS	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	6.2	NA	NA	NA	NA	NA	NA	NA
Di-n-butyl phthalate	8.1	NA	NA	NA	NA	NA	NA	NA
Di-n-octyl phthalate	50.0	NA	NA	NA	NA	NA	NA	NA
PCBs by NYSASP Method PCBs								
PCBs	NS	NA	NA	NA	NA	NA	NA	NA

Table 3
Surface Soil Analytical Results
Clove and Maple Avenue Former MGP Site - Remedial Investigation
Haverstraw, New York

Analyte	NYSDEC Soil Cleanup Objectives	Sample ID / Date Collected Clove and Maple Avenue						
		SS23 07/15/97	SS24 07/15/97	SS25 07/15/97	SS26 07/15/97	SS27 07/15/97	SS28 07/15/97	SS29 07/15/97
Pesticides by NYSASP Method Pesticides								
DDT,4,4'-	NS	NA	NA	NA	NA	NA	NA	NA
Metals Analysis by NYSASP Methods 6010/7471/7740 (mg/kg)								
Aluminum	NS	9050	5670	6450	7070	7490	4660	8010
Antimony	NS	1.7 R	1.6 R	1.7 R	1.6 R	1.8 R	1.7 R	1.7 R
Arsenic	7.5	10	2.5	3.7	4	3.5	3.7	2.3
Barium	300	70.3	29.2 B	54.4	51.3	60.6	43.9	61.9
Beryllium	0.16	0.46 B	0.3 B	0.36 B	0.39 B	0.36 B	0.24 B	0.44 B
Cadmium	1	0.53 B	0.31 B	0.54 B	0.4 B	0.83 B	0.58 B	0.22 B
Calcium	NS	2090	859 B	1160	1160	3170	11400	1100
chromium	10	11.2	6.3	9	9.1	10.4	8	9.5
Cobalt	30	6.8 B	4 B	4.8 B	5.3 B	5.6 B	5.6 B	6.4 B
Copper	25	34.9	11.1	19.5	16.1	29.5	37.8	15
Iron	2000	18300	11300	13600	13500	13000	13900	13400
Lead	500	56.1	25	85.4	83.4	85.6	69.6	40.6
Magnesium	NS	2970	2060	1970	2170	2230	7310	2000
Manganese	NS	409	234	354	397	297	295	408
Mercury	0.1	1	0.05 U	0.18	0.11	0.33	0.06 B	0.1 B
Nickel	13	12.3	7.7 B	9.5	10.6	11.9	10	10.8
Potassium	NS	890 B	591 B	541 B	546 B	648 B	516 B	450 B
Selenium	2	0.92 B	0.61 U	0.63 U	0.61 U	0.66 U	0.65 UN	0.63 UN
Silver	NS	0.42 U	0.41 U	0.42 U	0.41 U	0.44 U	0.44 U	0.42 U
Sodium	NS	106 U	103 U	106 U	104 U	129 B	110 U	107 U
Thallium	NS	1.3 U	1.2 U	1.3 U	1.2 U	1.3 U	1.3 U	1.3 U
Vanadium	150	18.4	12.6	15	16.6	17.5	12.3	18.4
Zinc	20	71 E	34.6 E	59.2 E	57.6 E	96.6 E	214 E	45 E
Cyanides by CLP Methods (mg/kg)								
Cyanide, Total	1600 (a)	NA	NA	NA	NA	NA	NA	NA
Geochemical Analyses by Various Methods (mg/kg)								
Residue, Total	NS	NA	NA	NA	NA	NA	NA	NA

Table 3
Surface Soil Analytical Results
Clove and Maple Avenue Former MGP Site - Remedial Investigation
Haverstraw, New York

Analyte	NYSDEC Soil Cleanup Objectives	Sample ID / Date Collected						
		Clove and Maple Avenue						
		SS3 05/14/97	SS3A 07/14/97	SS30 07/15/97	SS31 07/15/97	SS32 07/15/97	SS33 07/14/97	SS35A 07/14/97
BTEX by NYSASP Method 95-1 (mg/kg)								
Benzene	0.06	0.012 U	NA	NA	NA	NA	NA	NA
Toluene	1.5	0.012 U	NA	NA	NA	NA	NA	NA
Xylene, Total	1.2	0.012 U	NA	NA	NA	NA	NA	NA
Total BTEX		ND	NA	NA	NA	NA	NA	NA
Other VOCs by NYSASP Method 95-1 (mg/kg)								
Acetone	0.2	NA	NA	NA	NA	NA	NA	NA
PAHs (Non-carcinogenic) by NYSASP Method 95-2 (mg/kg)								
Acenaphthene	50.0	0.81 J	0.056 J	0.35 U	0.34 U	0.35 U	0.34 U	2.1 J
Acenaphthylene	41.0	7.4	0.06 J	0.35 U	0.34 U	0.35 U	0.34 U	1.8 J
Anthracene	50.0	15	0.17 J	0.036 J	0.036 J	0.35 U	0.042 J	10
Benzo[g,h,i]perylene	50.0	24 B	3.2	0.45	0.48	0.43	0.59	22
Fluoranthene	50.0	100 D	3.4	1.3	1.2	0.94	1.1	53
Fluorene	50.0	4.7	0.086 J	0.35 U	0.035 J	0.35 U	0.34 U	3.1 J
Methylnaphthalene,2-	36.4							
Naphthalene	13.0	1.4 J	0.35 U	0.35 U	0.34 U	0.35 U	0.34 U	8.6 U
Phenanthrene	50.0	69 D	1.5	0.61	0.66	0.46	0.52	28
Pyrene	50.0	120 DB	3.8	1.3	1.3	1.1	1.6	58 J
Total PAHs (Non-carc.)		342	12.3	3.7	3.7	3.3	3.9	178
PAHs (Carcinogenic) by NYSASP Method 95-2 (mg/kg)								
Benz[a]anthracene	0.224	46 D	1.8	0.38	0.38	0.33 J	0.44	27
Benzo[a]pyrene	0.061	43 DB	2.3	0.53	0.52	0.42	0.56	27
Benzo[b]fluoranthene	1.1	55 D	1.9	0.49	0.54	0.46	0.62	21
Benzo[k]fluoranthene	1.1	15	2.6	0.52	0.56	0.43	0.63	22
Chrysene	0.4	48 D	2.7	0.58	0.58	0.53	0.85	29
Dibenz[a,h]anthracene	0.014	7	0.94	0.13 J	0.12 J	0.1 J	0.16 J	4.8 J
Indeno[1,2,3-cd]pyrene	3.2	31 B	2.5	0.37	0.39	0.34 J	0.5	16
otal PAHs (Carcinogenic)		245	14.7	3.00	2.77	2.6	3.8	147
Other SVOCs by NYSASP Method 95-2 (mg/kg)								
Biphenyl,1,1-	NS	NA	NA	NA	NA	NA	NA	NA
Bis(2-ethylhexyl)phthalate	50.0	NA	NA	NA	NA	NA	NA	NA
Butyl benzyl phthalate	50.0	NA	NA	NA	NA	NA	NA	NA
Carbazole	NS	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	6.2	NA	NA	NA	NA	NA	NA	NA
Di-n-butyl phthalate	8.1	NA	NA	NA	NA	NA	NA	NA
Di-n-octyl phthalate	50.0	NA	NA	NA	NA	NA	NA	NA
PCBs by NYSASP Method PCBs								
PCBs	NS	NA	NA	NA	NA	NA	NA	NA

Table 3
Surface Soil Analytical Results
Clove and Maple Avenue Former MGP Site - Remedial Investigation
Haverstraw, New York

Analyte	NYSDEC Soil Cleanup Objectives	Sample ID / Date Collected						
		Clove and Maple Avenue						
		SS3 05/14/97	SS3A 07/14/97	SS30 07/15/97	SS31 07/15/97	SS32 07/15/97	SS33 07/14/97	SS35A 07/14/97
Pesticides by NYSASP Method Pesticides								
DDT,4,4'-	NS	NA	NA	NA	NA	NA	NA	NA
Metals Analysis by NYSASP Methods 6010/7471/7740 (mg/kg)								
Aluminum	NS	11300	7410	10200	8040	8230	7830	8070
Antimony	NS	3.5 B	1.7 R	1.7 R	1.7 R	1.7 R	1.7 R	1.7 R
Arsenic	7.5	18.8	3.9	2.8	4.1	15.4	31.2	19.6
Barium	300	105	35.6 B	70.2	51.3	108	89.3	91.8
Beryllium	0.16	0.41 B	0.45 B	0.58 B	0.44 B	0.5 B	0.47 B	0.5 B
Cadmium	1	0.16 U	0.41 B	0.25 B	0.3 B	0.53 B	0.67 B	1 B
Calcium	NS	1850	4920 *	790 B	2360	2960	1960 *	4420 *
chromium	10	23.4 *	8.8	9.3	9.1	11.7	9.9	15.9
Cobalt	30	8.1 B	6.6 B	5.9 B	5.3 B	9.6 B	5.6 B	6.9 B
Copper	25	62.8	26.9	12.8	15.7	43.1	33	67.6
Iron	2000	36500 *	15900	15000	14000	21100	23700	29100
Lead	500	267	39.6	33.9	53.1	73.8	108	193
Magnesium	NS	3040	3480	2120	2810	3220	2320	3850
Manganese	NS	363 *	351 N	640	392	789	298 N	319 N
Mercury	0.1	0.9 *	0.09 B	0.11	0.13	0.33	1.7	6.3
Nickel	13	29.7	13.7	11.9	13.3	14.3	12.4	25.6
Potassium	NS	1170 B	801 B	387 B	633 B	929 B	943 B	1040 B
Selenium	2	2.9	0.74 B	0.63 UN	0.64 UN	0.96 BN	2.1	1.8
Silver	NS	0.52 B	0.44 U	0.42 U	0.43 U	0.42 U	0.42 U	0.42 U
Sodium	NS	176 B	128 B	107 U	107 U	107 U	106 U	107 U
Thallium	NS	2.2 U	2.6 U	1.3 U	1.3 U	1.3 U	1.3 U	2.5 U
Vanadium	150	40.1	14.3	17.5	19.3	20	21.2	27.5
Zinc	20	180	57.1 E	47.3 E	61.3 E	87.5 E	95.2 E	206 E
Cyanides by CLP Methods (mg/kg)								
Cyanide, Total	1600 (a)	NA	NA	NA	NA	NA	NA	NA
Geochemical Analyses by Various Methods (mg/kg)								
Residue, Total	NS	NA	NA	NA	NA	NA	NA	NA

Table 3
Surface Soil Analytical Results
Clove and Maple Avenue Former MGP Site - Remedial Investigation
Haverstraw, New York

Analyte	NYSDEC Soil Cleanup Objectives	Sample ID / Date Collected						
		Clove and Maple Avenue						
		SS35B 07/14/97	SS36 07/14/97	SS37 07/14/97	SS38 07/14/97	SS39 07/14/97	SS4 05/13/97	SS4A 07/14/97
BTEX by NYSASP Method 95-1 (mg/kg)								
Benzene	0.06	NA	NA	NA	NA	NA	0.013 U	NA
Toluene	1.5	NA	NA	NA	NA	NA	0.013 U	NA
Xylene, Total	1.2	NA	NA	NA	NA	NA	0.013 U	NA
Total BTEX		NA	NA	NA	NA	NA	ND	NA
Other VOCs by NYSASP Method 95-1 (mg/kg)								
Acetone	0.2	NA	NA	NA	NA	NA	NA	NA
PAHs (Non-carcinogenic) by NYSASP Method 95-2 (mg/kg)								
Acenaphthene	50.0	0.73 U	0.75 U	0.71 U	0.71 U	0.36 U	0.42 U	0.094 J
Acenaphthylene	41.0	0.73 U	0.12 J	0.26 J	0.32 J	0.1 J	0.25 J	0.11 J
Anthracene	50.0	0.3 J	0.24 J	0.29 J	0.41 J	0.12 J	0.12 J	0.42 J
Benzo[g,h,i]perylene	50.0	2.7 J	4.5	9.4	5.3	1.8	1 B	3.1
Fluoranthene	50.0	3.3	2.8	3.4	3.9	1.6	0.92	5
Fluorene	50.0	0.15 J	0.75 U	0.13 J	0.12 J	0.062 J	0.048 J	0.19 J
Methylnaphthalene,2-	36.4							
Naphthalene	13.0	0.73 U	0.75 U	0.25 J	0.14 J	0.095 J	0.12 J	0.095 J
Phenanthrene	50.0	2.6	1.5	2.1	2	0.91	0.59	2.5
Pyrene	50.0	6 J	6.1	8	7.5	2.7	1.3 B	5.7
Total PAHs (Non-carc.)		15.05	15.3	24	20	7.4	4	17
PAHs (Carcinogenic) by NYSASP Method 95-2 (mg/kg)								
Benz[a]anthracene	0.224	1.5 J	1.8	3	3	0.92	0.61	2.5
Benzo[a]pyrene	0.061	2 J	2.1	2.5	2.7	0.99	0.92 B	2.7
Benzo[b]fluoranthene	1.1	1.9 J	1.9	5.6	3	1.1	1.3	2.8
Benzo[k]fluoranthene	1.1	1.5 J	2.5	5.3	3.2	1.1	0.46	2.2
Chrysene	0.4	2.3 J	3.1	5.3	4.1	1.5	0.89	3
Dibenz[a,h]anthracene	0.014	0.76 J	1.1	2.4	1.4	0.49	0.24 J	1
Indeno[1,2,3-cd]pyrene	3.2	1.9 J	3.2	6.5	3.5	1.3	0.96 B	2.5
otal PAHs (Carcinogenic)		12	15.7	31	21	7.4	5.4	17
Other SVOCs by NYSASP Method 95-2 (mg/kg)								
Biphenyl,1,1-	NS	NA	NA	NA	NA	NA	NA	NA
Bis(2-ethylhexyl)phthalate	50.0	NA	NA	NA	NA	NA	NA	NA
Butyl benzyl phthalate	50.0	NA	NA	NA	NA	NA	NA	NA
Carbazole	NS	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	6.2	NA	NA	NA	NA	NA	NA	NA
Di-n-butyl phthalate	8.1	NA	NA	NA	NA	NA	NA	NA
Di-n-octyl phthalate	50.0	NA	NA	NA	NA	NA	NA	NA
PCBs by NYSASP Method PCBs								
PCBs	NS	NA	NA	NA	NA	NA	NA	NA

Table 3
Surface Soil Analytical Results
Clove and Maple Avenue Former MGP Site - Remedial Investigation
Haverstraw, New York

Analyte	NYSDEC Soil Cleanup Objectives	Sample ID / Date Collected Clove and Maple Avenue						
		SS35B 07/14/97	SS36 07/14/97	SS37 07/14/97	SS38 07/14/97	SS39 07/14/97	SS4 05/13/97	SS4A 07/14/97
Pesticides by NYSASP Method Pesticides								
DDT,4,4'-	NS	NA	NA	NA	NA	NA	NA	NA
Metals Analysis by NYSASP Methods 6010/7471/7740 (mg/kg)								
Aluminum	NS	7910	10800	6690	7690	8980	10500	6620
Antimony	NS	1.8 R	1.8 R	1.9 BN	1.7 R	1.7 R	2.1 B	1.7 R
Arsenic	7.5	13.6	9.2	20.3 N	24.2 N	11.5 N	13.4	2.3
Barium	300	67.5	88.5	130	97.2	73.3	92.5	46.9
Beryllium	0.16	0.44 B	0.6 B	0.41 B	0.44 B	0.49 B	0.53 B	0.44 B
Cadmium	1	1 B	0.86 B	1.1 B	1.1	0.84 B	0.16 U	0.29 B
Calcium	NS	5110 *	4240 *	2680 *	3600 *	2540 *	4070	3190 *
chromium	10	12.2	17.1	22.5	13.9	12.8	22.7 *	8.3
Cobalt	30	6.1 B	6.4 B	6.3 B	7.2 B	8 B	9.2 B	5.4 B
Copper	25	52.1	37.6	86.1	97.5	49.7	49.4	17.3
Iron	2000	23800	24500	35300	28800	25400	30600 *	13100
Lead	500	146	108	213	149	99.9	93.2	49.8
Magnesium	NS	4600	3630	2490 *	2820 *	2950 *	3910	2530
Manganese	NS	308 N	425 N	285 *	329 *	440 *	478 *	293 N
Mercury	0.1	1.2	2.3	1.3 *	5.3 *	2.2 *	0.9 *	0.2
Nickel	13	16.7	27.9	33.6	21.9	16.3	19.8	10.1
Potassium	NS	750 B	1080 B	934 B	859 B	956 B	1090 B	530 B
Selenium	2	0.67 U	0.68 U	1.6	0.65 U	0.65 U	1.9	0.64 U
Silver	NS	0.45 U	0.45 U	0.44 U	0.43 U	0.43 U	0.28 U	0.43 U
Sodium	NS	119 B	261 B	111 U	109 U	110 U	158 B	108 U
Thallium	NS	1.3 U	1.4 U	1.3 U	1.3 U	1.3 U	2.3 U	1.3 U
Vanadium	150	26.6	26.7	34.3	28.7	24.6	24.9	17.3
Zinc	20	268 E	126 E	150 E	181 E	116 E	216	48 E
Cyanides by CLP Methods (mg/kg)								
Cyanide, Total	1600 (a)	NA	NA	NA	NA	NA	NA	NA
Geochemical Analyses by Various Methods (mg/kg)								
Residue, Total	NS	NA	NA	NA	NA	NA	NA	NA

Table 3
Surface Soil Analytical Results
Clove and Maple Avenue Former MGP Site - Remedial Investigation
Haverstraw, New York

Analyte	NYSDEC Soil Cleanup Objectives	Sample ID / Date Collected						
		Clove and Maple Avenue						
		SS41 07/15/97	SS42 07/15/97	SS43 07/15/97	SS44 07/15/97	SS46 07/15/97	SS49 07/15/97	SS5 05/13/97
BTEX by NYSASP Method 95-1 (mg/kg)								
Benzene	0.06	NA	NA	NA	NA	NA	NA	0.011 U
Toluene	1.5	NA	NA	NA	NA	NA	NA	0.011 U
Xylene, Total	1.2	NA	NA	NA	NA	NA	NA	0.011 U
Total BTEX		NA	NA	NA	NA	NA	NA	ND
Other VOCs by NYSASP Method 95-1 (mg/kg)								
Acetone	0.2	NA	NA	NA	NA	NA	NA	NA
PAHs (Non-carcinogenic) by NYSASP Method 95-2 (mg/kg)								
Acenaphthene	50.0	0.039 J	1.7 U	0.04 J	0.077 J	0.34 U	8.8 U	35 J
Acenaphthylene	41.0	0.45	1.1 J	0.18 J	0.09 J	0.34 U	16	77
Anthracene	50.0	0.14 J	0.45 J	0.15 J	0.18 J	0.064 J	3.6 J	520 D
Benzo[g,h,i]perylene	50.0	3.3	5.3	1.8	1.4	0.34	84	230 B
Fluoranthene	50.0	2.5	8	3	4	0.99	34	940 D
Fluorene	50.0	0.11 J	0.34 J	0.12 J	0.14 J	0.05 J	8.8 U	92
Methylnaphthalene,2-	36.4							
Naphthalene	13.0	0.16 J	0.25 J	0.071 J	0.074 J	0.34 U	3.6 J	19 J
Phenanthrene	50.0	1.2	4.1	1.9	2	0.64	12	790 D
Pyrene	50.0	4.4	14	4.4	3.1	1.1	110	1200 DB
Total PAHs (Non-carc.)		12.3	34	12	11	2.9	281	3903
PAHs (Carcinogenic) by NYSASP Method 95-2 (mg/kg)								
Benz[a]anthracene	0.224	1.4	4.8	1.5	1.5	0.5	44	520 D
Benzo[a]pyrene	0.061	3.4	5.9	2	1.5	0.49	87	460 DB
Benzo[b]fluoranthene	1.1	2.7	5.2	2.1	1.4	0.45	58	450 D
Benzo[k]fluoranthene	1.1	2.9	5.1	1.8	1.5	0.51	74	120
Chrysene	0.4	2.3	6.7	2.4	2.1	0.58	63	530 D
Dibenz[a,h]anthracene	0.014	1	1.6 J	0.57	0.42	0.14 J	24	58
Indeno[1,2,3-cd]pyrene	3.2	2.6	4.2	1.5	1.2	0.3 J	60	240 B
otal PAHs (Carcinogenic)		16	33.5	12	9.6	3.0	410	2378
Other SVOCs by NYSASP Method 95-2 (mg/kg)								
Biphenyl,1,1-	NS	NA	NA	NA	NA	NA	NA	NA
Bis(2-ethylhexyl)phthalate	50.0	NA	NA	NA	NA	NA	NA	NA
Butyl benzyl phthalate	50.0	NA	NA	NA	NA	NA	NA	NA
Carbazole	NS	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	6.2	NA	NA	NA	NA	NA	NA	NA
Di-n-butyl phthalate	8.1	NA	NA	NA	NA	NA	NA	NA
Di-n-octyl phthalate	50.0	NA	NA	NA	NA	NA	NA	NA
PCBs by NYSASP Method PCBs								
PCBs	NS	NA	NA	NA	NA	NA	NA	NA

Table 3
Surface Soil Analytical Results
Clove and Maple Avenue Former MGP Site - Remedial Investigation
Haverstraw, New York

Analyte	NYSDEC Soil Cleanup Objectives	Sample ID / Date Collected						
		Clove and Maple Avenue						
		SS41 07/15/97	SS42 07/15/97	SS43 07/15/97	SS44 07/15/97	SS46 07/15/97	SS49 07/15/97	SS5 05/13/97
Pesticides by NYSASP Method Pesticides								
DDT,4,4'-	NS	NA	NA	NA	NA	NA	NA	NA
Metals Analysis by NYSASP Methods 6010/7471/7740 (mg/kg)								
Aluminum	NS	10400	5260	8380	7960	5640	7510	7270
Antimony	NS	1.8 R	1.7 R	1.7 R	1.6 R	1.6 R	1.7 R	3.6 B
Arsenic	7.5	5.5	6.3	4.8	5.7	2.7	21.9	37.8
Barium	300	90.7	92.9	68.9	99.5	45.3	114	134
Beryllium	0.16	0.63 B	0.36 B	0.47 B	0.53 B	0.97 B	0.46 B	0.36 B
Cadmium	1	0.67 B	0.58 B	0.4 B	0.53 B	0.49 B	0.77 B	0.42 B
Calcium	NS	2260	5450	1180	1380	5320	2090	3520
chromium	10	15.6	7.9	12.5	11.2	16.5	15.3	19.9 *
Cobalt	30	9 B	5.1 B	7 B	7.3 B	7.1 B	6.4 B	8.9 B
Copper	25	27.6	34.1	20.3	22.4	53.6	29.5	118
Iron	2000	24200	16500	18000	14600	21900	26500	44100 *
Lead	500	147	188	106	83.5	63.6	463	309
Magnesium	NS	3400	3740	2800	2090	4350	2570	3130
Manganese	NS	492	262	428	526	272	365	358 *
Mercury	0.1	0.24	2.5	0.35	0.19	0.06 B	0.29	3.1 *
Nickel	13	19.5	10.8	14.4	13.6	21.8	15.5	34.6
Potassium	NS	1050 B	590 B	700 B	457 B	647 B	809 B	1120 B
Selenium	2	0.67 UN	0.64 UN	0.65 UN	0.62 UN	0.62 UN	0.64 UN	4.7
Silver	NS	0.44 U	0.43 U	0.43 U	0.41 U	0.41 U	0.43 U	0.54 B
Sodium	NS	112 U	108 U	109 U	104 U	149 B	107 U	226 B
Thallium	NS	1.3 U	1.3 U	1.3 U	1.2 U	1.2 U	1.3 U	2 U
Vanadium	150	23.9	17.8	20.1	24.7	15	22.7	37.5
Zinc	20	150 E	139 E	88.8 E	130 E	325 E	154 E	337
Cyanides by CLP Methods (mg/kg)								
Cyanide, Total	1600 (a)	NA	NA	NA	NA	NA	NA	NA
Geochemical Analyses by Various Methods (mg/kg)								
Residue, Total	NS	NA	NA	NA	NA	NA	NA	NA

Table 3
Surface Soil Analytical Results
Clove and Maple Avenue Former MGP Site - Remedial Investigation
Haverstraw, New York

Analyte	NYSDEC Soil Cleanup Objectives	Sample ID / Date Collected						
		Clove and Maple Avenue						
		SS5A 07/15/97	SS50 07/15/97	SS51 07/14/97	SS52 07/14/97	SS53 07/14/97	SS54 07/14/97	SS55 07/14/97
BTEX by NYSASP Method 95-1 (mg/kg)								
Benzene	0.06	NA	NA	NA	NA	NA	NA	NA
Toluene	1.5	NA	NA	NA	NA	NA	NA	NA
Xylene, Total	1.2	NA	NA	NA	NA	NA	NA	NA
Total BTEX		NA	NA	NA	NA	NA	NA	NA
Other VOCs by NYSASP Method 95-1 (mg/kg)								
Acetone	0.2	NA	NA	NA	NA	NA	NA	NA
PAHs (Non-carcinogenic) by NYSASP Method 95-2 (mg/kg)								
Acenaphthene	50.0	0.35 U	0.36 U	0.71 U	0.12 J	0.038 J	0.66 U	0.33 U
Acenaphthylene	41.0	0.35 U	0.05 J	1.9	0.19 J	0.2 J	0.23 J	0.13 J
Anthracene	50.0	0.35 U	0.038 J	0.44 J	0.27 J	0.2 J	0.23 J	0.15 J
Benzo[g,h,i]perylene	50.0	0.2 J	0.7	7.9 D	3.1	4.8	7.3	1.3
Fluoranthene	50.0	0.45	1.1	3.1	5.1	2.3	3.6	1.4
Fluorene	50.0	0.35 U	0.36 U	0.31 J	0.12 J	0.11 J	0.14 J	0.065 J
Methylnaphthalene,2-	36.4							
Naphthalene	13.0	0.35 U	0.055 J	0.7 J	0.09 J	0.098 J	0.15 J	0.33 U
Phenanthrene	50.0	0.18 J	0.52	1.2	2	1.4	2.1	0.73
Pyrene	50.0	0.37	1.4	10	5.8	3.9	8.5	2.3
Total PAHs (Non-carc.)		1.2	3.9	26	17	13.0	22.3	6.1
PAHs (Carcinogenic) by NYSASP Method 95-2 (mg/kg)								
Benz[a]anthracene	0.224	0.14 J	0.41	3.8	2.3	1.9	2.9	0.84
Benzo[a]pyrene	0.061	0.17 J	0.63	9.9	3	1.6	2.3	0.91
Benzo[b]fluoranthene	1.1	0.21 J	0.62	7	2.8	1.6	4.2	0.66
Benzo[k]fluoranthene	1.1	0.18 J	0.67	7.5	3	2.8	4.6	0.99
Chrysene	0.4	0.22 J	0.63	5.3	3.3	3	5.1	1.1
Dibenz[a,h]anthracene	0.014	0.35 U	0.19 J	3.7	1.1	1.2	1.8	0.34
Indeno[1,2,3-cd]pyrene	3.2	0.13 J	0.56	10	2.7	3.2	4.8	1
otal PAHs (Carcinogenic)		1.40	3.71	47	18	15	25.7	6
Other SVOCs by NYSASP Method 95-2 (mg/kg)								
Biphenyl,1,1-	NS	NA	NA	NA	NA	NA	NA	NA
Bis(2-ethylhexyl)phthalate	50.0	NA	NA	NA	NA	NA	NA	NA
Butyl benzyl phthalate	50.0	NA	NA	NA	NA	NA	NA	NA
Carbazole	NS	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	6.2	NA	NA	NA	NA	NA	NA	NA
Di-n-butyl phthalate	8.1	NA	NA	NA	NA	NA	NA	NA
Di-n-octyl phthalate	50.0	NA	NA	NA	NA	NA	NA	NA
PCBs by NYSASP Method PCBs								
PCBs	NS	NA	NA	NA	NA	NA	NA	NA

Table 3
Surface Soil Analytical Results
Clove and Maple Avenue Former MGP Site - Remedial Investigation
Haverstraw, New York

Analyte	NYSDEC Soil Cleanup Objectives	Sample ID / Date Collected Clove and Maple Avenue						
		SS5A	SS50	SS51	SS52	SS53	SS54	SS55
		07/15/97	07/15/97	07/14/97	07/14/97	07/14/97	07/14/97	07/14/97
Pesticides by NYSASP Method Pesticides								
DDT,4,4'-	NS	NA	NA	NA	NA	NA	NA	NA
Metals Analysis by NYSASP Methods 6010/7471/7740 (mg/kg)								
Aluminum	NS	7910	7740	8990	8430	7640	6480	8400
Antimony	NS	1.7 R	1.7 R	1.7 R	1.7 R	1.7 R	1.7 R	1.7 R
Arsenic	7.5	2.6	3.5	7.1	5 N	10.3 N	18.1 N	3.7 N
Barium	300	60.2	35.3 B	82.2	44.3	75.7	95.7	41.3 B
Beryllium	0.16	0.41 B	0.39 B	0.54 B	0.43 B	0.44 B	0.39 B	0.4 B
Cadmium	1	0.3 B	0.28 B	0.44 B	0.45 B	0.73 B	0.96 B	0.29 B
Calcium	NS	1070	1120	2610	1170 *	2630 *	2330 *	925 B*
chromium	10	9.9	10.7	10.7	10.8	13	17.2	12.6
Cobalt	30	6.2 B	7 B	6.7 B	7.2 B	5.8 B	7 B	6.6 B
Copper	25	14.2	17.9	24.3	25.2	37.3	77.8	17.2
Iron	2000	12800	18000	18300	18400	22300	31200	17000
Lead	500	15.9	31.3	119	50.3	85.6	171	23.4
Magnesium	NS	1980	2820	2920	2760 *	2990 *	2520 *	2590 *
Manganese	NS	382	417	467	471 *	800 *	292 *	394 *
Mercury	0.1	0.06 B	0.1 B	0.19	0.21 *	0.76 *	0.74 *	0.09 B*
Nickel	13	10.3	14.8	14.5	14.3	22.3	24.9	13.4
Potassium	NS	644 B	780 B	660 B	869 B	707 B	821 B	657 B
Selenium	2	0.63 U	0.65 UN	0.88 BN	0.62 U	0.63 U	0.85 B	0.62 U
Silver	NS	0.42 U	0.43 U	0.43 U	0.41 U	0.42 U	0.42 U	0.41 U
Sodium	NS	105 U	109 U	108 U	105 U	105 U	106 U	105 U
Thallium	NS	1.3 U	1.3 U	1.3 U	1.2 U	1.3 U	1.3 U	1.2 U
Vanadium	150	19	17	19.9	19.3	21.1	26.7	15.7
Zinc	20	30.9 E	53.2 E	81.8 E	66.6 E	98.1 E	160 E	50.2 E
Cyanides by CLP Methods (mg/kg)								
Cyanide, Total	1600 (a)	NA	NA	NA	NA	NA	NA	NA
Geochemical Analyses by Various Methods (mg/kg)								
Residue, Total	NS	NA	NA	NA	NA	NA	NA	NA

Table 3
Surface Soil Analytical Results
Clove and Maple Avenue Former MGP Site - Remedial Investigation
Haverstraw, New York

Analyte	NYSDEC Soil Cleanup Objectives	Sample ID / Date Collected						
		Clove and Maple Avenue						
		SS56 07/14/97	SS57 07/14/97	SS58 07/14/97	SS59 07/15/97	SS6 05/14/97	SS6A 07/15/97	SS60 07/15/97
BTEX by NYSASP Method 95-1 (mg/kg)								
Benzene	0.06	NA	NA	NA	NA	0.011 U	NA	NA
Toluene	1.5	NA	NA	NA	NA	0.011 U	NA	NA
Xylene, Total	1.2	NA	NA	NA	NA	0.011 U	NA	NA
Total BTEX		NA	NA	NA	NA	ND	NA	NA
Other VOCs by NYSASP Method 95-1 (mg/kg)								
Acetone	0.2	NA	NA	NA	NA	NA	NA	NA
PAHs (Non-carcinogenic) by NYSASP Method 95-2 (mg/kg)								
Acenaphthene	50.0	0.34 U	0.057 J	0.34 U	0.35 U	0.58 J	0.6 J	0.27 J
Acenaphthylene	41.0	0.34 U	0.039 J	0.097 J	0.099 J	5.7	0.44 J	2.3
Anthracene	50.0	0.34 U	0.2 J	0.083 J	0.14 J	4	2.6	1.7 J
Benzo[g,h,i]perylene	50.0	0.29 J	0.92	0.96	1.1	8.5 B	17	9.8
Fluoranthene	50.0	1.2	2	1.1	1.7	46 D	33 D	20
Fluorene	50.0	0.34 U	0.064 J	0.038 J	0.084 J	2.8	1.7	1.6 J
Methylnaphthalene,2-	36.4							
Naphthalene	13.0	0.34 U	0.35 U	0.34 U	0.089 J	0.51 J	0.22 J	0.29 J
Phenanthrene	50.0	0.4	0.94	0.52	1.4	50 D	20	22
Pyrene	50.0	1	2	1.3	3.4	67 DB	44 D	33 D
Total PAHs (Non-carc.)		3	6	3.6	8.0	185	120	91
PAHs (Carcinogenic) by NYSASP Method 95-2 (mg/kg)								
Benz[a]anthracene	0.224	0.34	0.96	0.56	1	23 D	14	12
Benzo[a]pyrene	0.061	0.4	1.1	0.77	1.2	24 DB	16	14
Benzo[b]fluoranthene	1.1	0.49	0.81	0.61	0.99	34 D	12	11
Benzo[k]fluoranthene	1.1	0.35	1	0.81	1.3	6.9	16	15
Chrysene	0.4	0.56	1.3	0.82	1.4	37 D	18	19
Dibenz[a,h]anthracene	0.014	0.34 U	0.32 J	0.27 J	0.35	4.3	5.8	3.3
Indeno[1,2,3-cd]pyrene	3.2	0.24 J	0.86	0.74	0.9	14 B	14	8.7
otal PAHs (Carcinogenic)		2.7	6	4.58	7	143	96	83
Other SVOCs by NYSASP Method 95-2 (mg/kg)								
Biphenyl,1,1-	NS	NA	NA	NA	NA	NA	NA	NA
Bis(2-ethylhexyl)phthalate	50.0	NA	NA	NA	NA	NA	NA	NA
Butyl benzyl phthalate	50.0	NA	NA	NA	NA	NA	NA	NA
Carbazole	NS	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	6.2	NA	NA	NA	NA	NA	NA	NA
Di-n-butyl phthalate	8.1	NA	NA	NA	NA	NA	NA	NA
Di-n-octyl phthalate	50.0	NA	NA	NA	NA	NA	NA	NA
PCBs by NYSASP Method PCBs								
PCBs	NS	NA	NA	NA	NA	NA	NA	NA

Table 3
Surface Soil Analytical Results
Clove and Maple Avenue Former MGP Site - Remedial Investigation
Haverstraw, New York

Analyte	NYSDEC Soil Cleanup Objectives	Sample ID / Date Collected						
		Clove and Maple Avenue						
		SS56 07/14/97	SS57 07/14/97	SS58 07/14/97	SS59 07/15/97	SS6 05/14/97	SS6A 07/15/97	SS60 07/15/97
Pesticides by NYSASP Method Pesticides								
DDT,4,4'-	NS	NA	NA	NA	NA	NA	NA	NA
Metals Analysis by NYSASP Methods 6010/7471/7740 (mg/kg)								
Aluminum	NS	6970	6590	8280	7600	10800	6360	9530
Antimony	NS	1.7 R	1.7 R	1.7 R	1.7 R	1.3 B	1.7 R	1.8 R
Arsenic	7.5	3.3 N	2.5 N	2.9 N	3.8	6.6	7.3	10.3
Barium	300	33.3 B	39.5 B	51.7	48.4	73.9	37.5 B	242
Beryllium	0.16	0.38 B	0.37 B	0.43 B	0.41 B	0.47 B	0.27 B	0.54 B
Cadmium	1	0.31 B	2	0.51 B	0.33 B	0.15 U	0.56 B	0.56 B
Calcium	NS	1010 B*	2410 *	1120 *	1360	1060 B	18400	4180
chromium	10	10.7	8.2	9.9	10.6	17 *	7.3	36
Cobalt	30	6.3 B	5.6 B	5.9 B	6.4 B	7.9 B	8.4 B	6.5 B
Copper	25	15.5	18.6	16.1	18.2	21	55	21.8
Iron	2000	16200	14500	15900	17900	19400 *	18700	18700
Lead	500	23.8	53.4	32.3	51.1	174	94.5	582
Magnesium	NS	2430 *	3140 *	2200 *	2410	2940	11600	2640
Manganese	NS	469 *	364 *	416 *	466	548 *	195	561
Mercury	0.1	0.09 B*	0.1 *	0.11 B*	0.09 B	0.1 B	0.26	0.18
Nickel	13	12.5	10.9	12	13.4	14.9	11.6	14.4
Potassium	NS	564 B	584 B	552 B	629 B	790 B	755 B	819 B
Selenium	2	0.63 U	0.63 U	0.64 U	0.64 UN	1.3	0.62 U	0.66 UN
Silver	NS	0.42 U	0.42 U	0.43 U	0.43 U	0.25 U	0.41 U	0.44 U
Sodium	NS	105 U	105 U	108 U	108 U	65.6 B	104 U	111 U
Thallium	NS	1.3 U	1.3 U	1.3 U	1.3 U	2 U	1.2 U	1.3 U
Vanadium	150	14.3	13.1	17.2	17.5	23.3	25.6	22.8
Zinc	20	48.4 E	47.8 E	49.3 E	56 E	70.8	79.2 E	129 E
Cyanides by CLP Methods (mg/kg)								
Cyanide, Total	1600 (a)	NA	NA	NA	NA	NA	NA	NA
Geochemical Analyses by Various Methods (mg/kg)								
Residue, Total	NS	NA	NA	NA	NA	NA	NA	NA

Table 3
Surface Soil Analytical Results
Clove and Maple Avenue Former MGP Site - Remedial Investigation
Haverstraw, New York

Analyte	NYSDEC Soil Cleanup Objectives	Sample ID / Date Collected						
		Clove and Maple Avenue						
		SS64 07/15/97	SS65 07/15/97	SS66 07/15/97	SS67 07/15/97	SS68 07/15/97	SS7 05/14/97	SS7A 07/15/97
BTEX by NYSASP Method 95-1 (mg/kg)								
Benzene	0.06	NA	NA	NA	NA	NA	0.013 U	NA
Toluene	1.5	NA	NA	NA	NA	NA	0.013 U	NA
Xylene, Total	1.2	NA	NA	NA	NA	NA	0.013 U	NA
Total BTEX		NA	NA	NA	NA	NA	ND	NA
Other VOCs by NYSASP Method 95-1 (mg/kg)								
Acetone	0.2	NA	NA	NA	NA	NA	NA	NA
PAHs (Non-carcinogenic) by NYSASP Method 95-2 (mg/kg)								
Acenaphthene	50.0	0.33 U	0.29 J	0.15 J	0.092 J	0.13 J	0.13 J	0.31 J
Acenaphthylene	41.0	0.2 J	1.6	0.55	0.31 J	0.35 J	0.31 J	0.13 J
Anthracene	50.0	0.11 J	1.3	0.55	0.23 J	0.41	0.29 J	0.9
Benzo[g,h,i]perylene	50.0	2.4	7.6 D	6.5 D	3.4	4.3	1.4 B	6.6
Fluoranthene	50.0	2.8	16 D	9.7 D	4	4.9	2	16 D
Fluorene	50.0	0.11 J	0.99	0.43	0.29 J	0.22 J	0.19 J	0.57 J
Methylnaphthalene,2-	36.4							
Naphthalene	13.0	0.051 J	0.29 J	0.26 J	0.075 J	0.17 J	0.088 J	0.69 U
Phenanthrene	50.0	1.5	14 D	5.9 D	3.5	3.1	1.6	7.2
Pyrene	50.0	4.9 D	36 D	10 D	5.9 D	6.7 D	2.4 B	18 D
Total PAHs (Non-carc.)		12.4	78.1	34	18	20.3	8	50
PAHs (Carcinogenic) by NYSASP Method 95-2 (mg/kg)								
Benz[a]anthracene	0.224	2	10	4.4	2.4	3.3	1.2	5.7
Benzo[a]pyrene	0.061	2.4	11	5	2.6	3.9	1.4 B	6.4
Benzo[b]fluoranthene	1.1	2.3	11	5.2	2.5	3.7	1.9	4.7
Benzo[k]fluoranthene	1.1	2.1	10	5	3.2	3.5	0.75	7.2
Chrysene	0.4	2.9	15 D	6.8 D	4	4.4	1.4	6.9
Dibenz[a,h]anthracene	0.014	0.74	4.5	2.1	1	1.5	0.37 J	2.2
Indeno[1,2,3-cd]pyrene	3.2	1.7	11	5	2.6	3.5	1.3 B	5.6
otal PAHs (Carcinogenic)		14	58	34	18	23.8	8.3	38.7
Other SVOCs by NYSASP Method 95-2 (mg/kg)								
Biphenyl,1,1-	NS	NA	NA	NA	NA	NA	NA	NA
Bis(2-ethylhexyl)phthalate	50.0	NA	NA	NA	NA	NA	NA	NA
Butyl benzyl phthalate	50.0	NA	NA	NA	NA	NA	NA	NA
Carbazole	NS	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	6.2	NA	NA	NA	NA	NA	NA	NA
Di-n-butyl phthalate	8.1	NA	NA	NA	NA	NA	NA	NA
Di-n-octyl phthalate	50.0	NA	NA	NA	NA	NA	NA	NA
PCBs by NYSASP Method PCBs								
PCBs	NS	NA	NA	NA	NA	NA	NA	NA

Table 3
Surface Soil Analytical Results
Clove and Maple Avenue Former MGP Site - Remedial Investigation
Haverstraw, New York

Analyte	NYSDEC Soil Cleanup Objectives	Sample ID / Date Collected Clove and Maple Avenue						
		SS64 07/15/97	SS65 07/15/97	SS66 07/15/97	SS67 07/15/97	SS68 07/15/97	SS7 05/14/97	SS7A 07/15/97
		Pesticides by NYSASP Method Pesticides						
DDT,4,4'-	NS	NA	NA	NA	NA	NA	NA	NA
Metals Analysis by NYSASP Methods 6010/7471/7740 (mg/kg)								
Aluminum	NS	8390	9790	9350	8220	7960	12800	9910
Antimony	NS	1.7 R	1.8 R	1.7 R	1.6 R	1.8 R	1.6 B	1.7 R
Arsenic	7.5	4.9	7	4.7	5.8	5.2	10.8	4.5
Barium	300	68.8	89.9	92.9	94.9	70.1	192	57.9
Beryllium	0.16	0.51 B	0.5 B	0.48 B	0.28 B	0.44 B	1 B	0.44 B
Cadmium	1	0.28 B	0.58 B	0.52 B	0.34 B	1.3	0.38 B	0.5 B
Calcium	NS	1680	2820	1180	436 B	5270	3650	2710
chromium	10	9.5	21.4	18.7	23	10.3	16.9 *	10.6
Cobalt	30	7.4 B	6.9 B	7.1 B	4.1 B	7.3 B	10.5 B	7.7 B
Copper	25	19.9	28.9	22	15.3	36.5	59.6	29.7
Iron	2000	14600	21300	19500	22700	17400	16500 *	18000
Lead	500	106	413	214	372	164	726	81.8
Magnesium	NS	2580	2440	2590	2240	3550	3000	3320
Manganese	NS	330	484	510	166	495	382 N*	485
Mercury	0.1	0.17	0.2	0.15	0.13	0.26	0.15 N*	0.16
Nickel	13	10.9	17	15.9	9.6	15.1	22.5	13.8
Potassium	NS	655 B	564 B	726 B	701 B	804 B	1250 B	778 B
Selenium	2	0.62 UN	0.67 UN	0.63 UN	0.62 UN	0.71 BN	1.7	0.86 B
Silver	NS	0.41 U	0.44 U	0.42 U	0.41 U	0.44 U	0.33 B	0.43 U
Sodium	NS	123 B	112 U	107 U	104 U	111 U	464 B	132 B
Thallium	NS	1.2 U	1.3 U	1.3 U	1.2 U	1.3 U	2.4 U	1.3 U
Vanadium	150	14.8	32.4	25.4	29.2	24.4	42.4	23.9
Zinc	20	114 E	117 E	85.7 E	60.3 E	147 E	272	78.1 E
Cyanides by CLP Methods (mg/kg)								
Cyanide, Total	1600 (a)	NA	NA	NA	NA	NA	NA	NA
Geochemical Analyses by Various Methods (mg/kg)								
Residue, Total	NS	NA	NA	NA	NA	NA	NA	NA

Table 3
Surface Soil Analytical Results
Clove and Maple Avenue Former MGP Site - Remedial Investigation
Haverstraw, New York

Analyte	NYSDEC Soil Cleanup Objectives	Sample ID / Date Collected					
		Clove and Maple Avenue					
		SS70 07/14/97	SS71 07/14/97	SS8 05/14/97	SS8A 07/15/97	SS9 05/14/97	SS9A 07/15/97
BTEX by NYSASP Method 95-1 (mg/kg)							
Benzene	0.06	NA	NA	0.011 U	NA	0.011 U	NA
Toluene	1.5	NA	NA	0.011 U	NA	0.011 U	NA
Xylene, Total	1.2	NA	NA	0.011 U	NA	0.011 U	NA
Total BTEX		NA	NA	ND	NA	ND	NA
Other VOCs by NYSASP Method 95-1 (mg/kg)							
Acetone	0.2	NA	NA	NA	NA	NA	NA
PAHs (Non-carcinogenic) by NYSASP Method 95-2 (mg/kg)							
Acenaphthene	50.0	0.061 J	0.037 J	0.07 J	0.65 J	0.71 U	0.45 J
Acenaphthylene	41.0	0.065 J	0.2 J	0.12 J	0.33 J	1.3	0.16 J
Anthracene	50.0	0.2 J	0.21 J	0.23 J	1.8	0.35 J	1.8
Benzo[g,h,i]perylene	50.0	3.2	2.7	0.63 B	16	3.2 B	12
Fluoranthene	50.0	1.2	2.3	2.3	36 D	0.99	33 D
Fluorene	50.0	0.049 J	0.097 J	0.16 J	1.4 J	0.11 J	1.9
Methylnaphthalene,2-	36.4						
Naphthalene	13.0	0.08 J	0.087 J	0.066 J	1.8 U	0.2 J	0.21 J
Phenanthrene	50.0	0.82	1.4	1.5	20	0.31 J	22 D
Pyrene	50.0	1.9	4.2	2.7 B	39 D	2.2 B	34 D
Total PAHs (Non-carc.)		7.6	0.1	7.8	115	8.7	106
PAHs (Carcinogenic) by NYSASP Method 95-2 (mg/kg)							
Benz[a]anthracene	0.224	1.2	1.6	1.2	13	1.3	10
Benzo[a]pyrene	0.061	2.1	1.8	1.4 B	15	2 B	11
Benzo[b]fluoranthene	1.1	1.5	1.2	2.1	15	3.9	9.7
Benzo[k]fluoranthene	1.1	1.5	2	0.79	11	1.7	9.6
Chrysene	0.4	1.6	2.2	1.5	17	1.8	12
Dibenz[a,h]anthracene	0.014	1	0.68	0.33 J	4.9	0.87	3.5
Indeno[1,2,3-cd]pyrene	3.2	2.4	1.8	1.3 B	13	3.1 B	10
otal PAHs (Carcinogenic)		11	11	6.5	89	15	66
Other SVOCs by NYSASP Method 95-2 (mg/kg)							
Biphenyl,1,1-	NS	NA	NA	NA	NA	NA	NA
Bis(2-ethylhexyl)phthalate	50.0	NA	NA	NA	NA	NA	NA
Butyl benzyl phthalate	50.0	NA	NA	NA	NA	NA	NA
Carbazole	NS	NA	NA	NA	NA	NA	NA
Dibenzofuran	6.2	NA	NA	NA	NA	NA	NA
Di-n-butyl phthalate	8.1	NA	NA	NA	NA	NA	NA
Di-n-octyl phthalate	50.0	NA	NA	NA	NA	NA	NA
PCBs by NYSASP Method PCBs							
PCBs	NS	NA	NA	NA	NA	NA	NA

Table 3
Surface Soil Analytical Results
Clove and Maple Avenue Former MGP Site - Remedial Investigation
Haverstraw, New York

Analyte	NYSDEC Soil Cleanup Objectives	Sample ID / Date Collected Clove and Maple Avenue					
		SS70 07/14/97	SS71 07/14/97	SS8 05/14/97	SS8A 07/15/97	SS9 05/14/97	SS9A 07/15/97
		<i>Pesticides by NYSASP Method Pesticides</i>					
DDT,4,4'-	NS	NA	NA	NA	NA	NA	NA
<i>Metals Analysis by NYSASP Methods 6010/7471/7740 (mg/kg)</i>							
Aluminum	NS	5090	7420	9330	8600	9980	7140
Antimony	NS	1.7 R	1.7 R	1.2 B	1.7 R	1.1 B	1.8 R
Arsenic	7.5	13.7 N	4 N	4.1	4.3	4	2.6
Barium	300	65.3	63.1	78.1	60.2	39.1 B	54.5
Beryllium	0.16	0.55 B	0.5 B	0.35 B	0.45 B	0.36 B	0.38 B
Cadmium	1	0.51 B	0.49 B	0.3 B	0.62 B	0.14 U	0.63 B
Calcium	NS	2360 *	1600 *	1890	2480	859 B	3220
chromium	10	6.5	9.2	12.2 *	9.5	11.9 *	9.6
Cobalt	30	6.9 B	5.4 B	6.3 B	6.1 B	7.3 B	5.5 B
Copper	25	34.1	21.5	29.9	26.3	19.1	24.5
Iron	2000	11200	14300	15500 *	15800	19100 *	13100
Lead	500	171	73.7	75.8	109	23.5	92.4
Magnesium	NS	3960 *	1800 *	2950	3010	3120	2170
Manganese	NS	331 *	370 *	526 N*	268	443 N*	282
Mercury	0.1	0.17 *	0.15 *	0.2 N*	0.14	0.036 B	0.43
Nickel	13	23.6	13.3	14.3	13.3	15.6	12.7
Potassium	NS	469 B	435 B	1060 B	683 B	1110	779 B
Selenium	2	0.64 U	0.64 U	0.87 B	0.64 U	1 B	0.69 U
Silver	NS	0.42 U	0.43 U	0.25 U	0.43 U	0.24 U	0.46 U
Sodium	NS	107 U	108 U	103 B	146 B	80.4 B	116 U
Thallium	NS	1.3 U	1.3 U	2 U	1.3 U	1.9 U	1.4 U
Vanadium	150	15.2	18.1	19.5	18.7	17.9	17.7
Zinc	20	138 E	68.7 E	133	103 E	52.3	123 E
<i>Cyanides by CLP Methods (mg/kg)</i>							
Cyanide, Total	1600 (a)	NA	NA	NA	NA	NA	NA
<i>Geochemical Analyses by Various Methods (mg/kg)</i>							
Residue, Total	NS	NA	NA	NA	NA	NA	NA

Table 3
Surface Soil Analytical Results
Clove and Maple Avenue Former MGP Site - Remedial Investigation
Haverstraw, New York

Analyte	NYSDEC Soil Cleanup Objectives	Sample ID / Date Collected				
		146 Maple Avenue				
		CM146SS1 5/18/2000	CM146SS2 5/18/2000	CM146SS3 5/18/2000	CM146SS4 5/18/2000	CM146SS5 5/18/2000
BTEX by NYSASP Method 95-1 (mg/kg)						
Benzene	0.06	0.013 U	0.016 U	0.016 U	0.012 U	0.013 U
Toluene	1.5	0.013 U	0.016 U	0.016 U	0.012 U	0.013 U
Xylene, Total	1.2	0.013 U	0.016 U	0.016 U	0.012 U	0.013 U
Total BTEX		ND	ND	ND	ND	ND
Other VOCs by NYSASP Method 95-1 (mg/kg)						
Acetone	0.2	0.004 J	0.006 J	0.008 J	0.003 J	0.012 J
PAHs (Non-carcinogenic) by NYSASP Method 95-2 (mg/kg)						
Acenaphthene	50.0	0.06 J	0.052 J	0.55 U	0.41 U	0.047 J
Acenaphthylene	41.0	0.44 U	0.52 U	0.55 U	0.41 U	0.44 U
Anthracene	50.0	0.14 J	0.11 J	0.12 J	0.067 J	0.09 J
Benzo[g,h,i]perylene	50.0	0.49	0.39 J	0.38 J	0.21 J	0.3 J
Fluoranthene	50.0	1.9	1.9	2.2	1.3	1.7
Fluorene	50.0	0.073 J	0.082 J	0.086 J	0.051 J	0.07 J
Methylnaphthalene,2-	36.4	0.44 U	0.074 J	0.55 U	0.41 U	0.44 U
Naphthalene	13.0	0.059 J	0.4 J	0.55 U	0.41 U	0.44 U
Phenanthrene	50.0	0.93	1.1	1.2	0.75	0.97
Pyrene	50.0	1.9	1.8	1.9	1.2	1.8
Total PAHs (Non-carc.)		5.6	5.9	5.9	3.6	5.0
PAHs (Carcinogenic) by NYSASP Method 95-2 (mg/kg)						
Benz[a]anthracene	0.224	0.94	0.71	0.73	0.44	0.62
Benzo[a]pyrene	0.061	1.10	0.87	0.90	0.54	0.72
Benzo[b]fluoranthene	1.1	1.30	1.20	1.30	0.72	1.20
Benzo[k]fluoranthene	1.1	0.50	0.37 J	0.4 J	0.32 J	0.39 J
Chrysene	0.4	1.00	0.86	0.88	0.53	0.75
Dibenz[a,h]anthracene	0.014	0.14 J	0.1 J	0.11 J	0.062 J	0.085 J
Indeno[1,2,3-cd]pyrene	3.2	0.44	0.4 J	0.4 J	0.23 J	0.31 J
otal PAHs (Carcinogenic)		5.42	4.5	4.7	2.84	4.08
Other SVOCs by NYSASP Method 95-2 (mg/kg)						
Biphenyl,1,1-	NS	NA	NA	NA	NA	NA
Bis(2-ethylhexyl)phthalate	50.0	0.24 J	0.41 J	0.45 J	0.25 J	0.59
Butyl benzyl phthalate	50.0	0.44 U	0.52 U	0.55 U	0.41 U	0.066 J
Carbazole	NS	0.11 J	0.13 J	0.15 J	0.089 J	0.11 J
Dibenzofuran	6.2	0.44 U	0.52 U	0.55 U	0.41 U	0.44 U
Di-n-butyl phthalate	8.1	0.44 U	0.52 U	0.55 U	0.41 U	0.44 U
Di-n-octyl phthalate	50.0	0.44 U	0.52 U	0.55 U	0.41 U	0.44 U
PCBs by NYSASP Method PCBs						
PCBs	NS	ND	ND	ND	ND	ND

Table 3
Surface Soil Analytical Results
Clove and Maple Avenue Former MGP Site - Remedial Investigation
Haverstraw, New York

Analyte	NYSDEC Soil Cleanup Objectives	Sample ID / Date Collected				
		146 Maple Avenue				
		CM146SS1 5/18/2000	CM146SS2 5/18/2000	CM146SS3 5/18/2000	CM146SS4 5/18/2000	CM146SS5 5/18/2000
Pesticides by NYSASP Method Pesticides						
DDT,4,4'-	NS	0.004 J	0.0052 U	0.0055 U	0.0041 U	0.0044 U
Metals Analysis by NYSASP Methods 6010/7471/7740 (mg/kg)						
Aluminum	NS	7980	4270	6400	7270	5910
Antimony	NS	0.91 UN	1.1 UN	1.1 UN	0.83 UN	0.9 UN
Arsenic	7.5	4	2.1 B	3.7	3.7	2.8
Barium	300	50 B	47.9 B	59.1 B	31.7 B	58.1
Beryllium	0.16	0.43 B	0.22 B	0.31 B	0.31 B	0.27 B
Cadmium	1	0.9 B	0.55 B	0.49 B	0.31 B	0.44 B
Calcium	NS	2830 *	3360 *	2960 *	775 B*	4010 *
chromium	10	10.7	6.8	10.3	9.9	10.9
Cobalt	30	7.5 B	4.9 B	6.5 B	4.7 B	5.3 B
Copper	25	25.9	22.5	24.4	15	21.8
Iron	2000	14600	8630	13200	11500	10000
Lead	500	54.6	62.8	65.6	47	61.5
Magnesium	NS	3200 *	1780 *	2460 *	2120 *	1990 *
Manganese	NS	459	463	489	246	469
Mercury	0.1	0.18	0.37	0.37	0.14	0.54
Nickel	13	18.9	16.1	19.7	10.8	17.7
Potassium	NS	1020 B	877 B	1190 B	539 B	591 B
Selenium	2	1 U	0.5 UW	0.53 UW	0.39 UW	0.42 UW
Silver	NS	1.2 BN	0.5 UN	0.71 BN	0.39 UN	0.42 UN
Sodium	NS	106 B	106 B	118 B	66 B	86.6 B
Thallium	NS	1.2 B	1.8 B	0.76 U	0.56 U	0.61 U
Vanadium	150	23.3	18.7	31.7	23.9	24.8
Zinc	20	104	68.4	74.4	38.9	74.2
Cyanides by CLP Methods (mg/kg)						
Cyanide, Total	1600 (a)	1.3 U	1.6 U	1.6 U	1.2 U	1.3 U
Geochemical Analyses by Various Methods (mg/kg)						
Residue, Total	NS	74.9	63.8	60.8	82.2	75.9

Notes:

(a) - EPA Region III RBC criteria for residential exposures

U - Analyte not detected

B - Analyte detected in associated blank

* - Duplicate analysis outside control limits

W - Post digest spike recovery furnace outside 85-115% control limit, while sample absorbance less than 50% of spike absorbance

E - Exceeds calibration range

J - Estimated value

D - Dilution result

NA - Not available

NS - No standard

ND - Not Detected

Table 4
Sample Location Rationale
Clove and Maple Former MGP Site
Haverstraw, New York

Sample Type and Designation	Sample Analysis	Sample Depth	Rationale
Former Tar Well Location			
Soil Borings			
SG9	Field Characterization	0 to 12 feet bgs	To further delineate hydrocarbon product of former tar well location.
SG10	Field Characterization	0 to 12 feet bgs	To further delineate hydrocarbon product of former tar well location.
SB5/MW5	MGP Indicators	18 to 20 feet bgs	Shallow soil boring for monitoring well installation of former tar well.
Test Pit			
TP1	Field Characterization	0 to 12 feet bgs	To further delineate MGP residuals and to further investigate the location, if any, of subsurface structures.
Monitoring Well			
MW5	MGP Indicators	Water Table Groundwater Sample	To test groundwater downgradient of former tar well location.
Iron Oil Tank			
Soil Borings			
SG11	Field Characterization	0 to 12 feet bgs	To further delineate MGP residuals found in soil and groundwater downgradient of Iron Oil tank location.
SG12	Field Characterization	0 to 12 feet bgs	To further delineate MGP residuals found in soil and groundwater downgradient of iron oil tank location.
SB6/MW6	MGP Indicators	5 to 5.5 feet bgs 16.5 to 17 feet bgs	Shallow soil boring to further delineate MGP residuals downgradient of iron oil tank location.
SB7/MW7	Field Characterization		Deep boring for monitoring well installation, to document groundwater quality within till.
Test Pit			
TP2	MGP Indicators	12 to 13 feet bgs	To evaluate potential impacts near the former oil tank.
TP3	Field Characterization	0 to 12 feet bgs	To evaluate potential impacts near the former oil tank.
Monitoring Wells			
MW6	MGP Indicators	Water Table Groundwater Sample	To sample groundwater quality downgradient of the iron oil tank location.
MW7	MGP Indicators	Deep Aquifer Groundwater Sample	To determine the depths of groundwater impacts downgradient of the iron oil tank.
Former Gas Holder Location			
Soil Borings			
SG13	Field Characterization	0 to 12 feet bgs	To investigate soil and groundwater quality downgradient of the gas holder foundation

Table 4
Sample Location Rationale
Clove and Maple Former MGP Site
Haverstraw, New York

Sample Type and Designation	Sample Analysis	Sample Depth	Rationale
			requested by NYSDEC [NYSDEC Comments, 1997c, pg.4]
SG14	Field Characterization	0 to 12 feet bgs	To investigate soil and groundwater quality downgradient of the gas holder foundation requested by NYSDEC [NYSDEC Comments, 1997c, pg.4]
SB4/MW4	MGP Indicators	16 to 18 feet bgs	Soil boring for monitoring well installation to further investigate impacts downgradient of MW3.
SB14	MGP Indicators	8 to 10 feet bgs and 22 to 24 feet bgs	To evaluate potential release from holder. Comments on Supplemental Remedial Investigation Work Plan, April 5, 2001.
SB16	MGP Indicators	18 feet bgs and 30 feet bgs	To define extent of MGP residue between the holder and the tar well along the till surface. Comments on Supplemental Remedial Investigation Work Plan, April 5, 2001.
SB18	MGP Indicators	11.5 feet bgs and 31 feet bgs	To determine if MGP residue are present at the northern corner of the holder. Comments on Supplemental Remedial Investigation Work Plan, April 5, 2001.
Monitoring Well			
MW4	MGP Indicators - Groundwater	Water Table Groundwater Sample	To determine if MGP residuals have impacted downgradient groundwater in the vicinity of the former gas holder requested by NYSDEC [NYSDEC, 1997c, pg.3]
MW18	MGP Indicators	Water Table Groundwater Sample	To determine if MGP residuals have impacted groundwater at northern corner of the holder. Comments on Supplemental Remedial Investigation Work Plan, April 5, 2001.
Regulator Station			
SB17	MGP Indicators	4 feet bgs, 12 feet bgs, and 14 feet bgs	To further delineate MGP residuals adjacent to the regulator station. Comments on Supplemental Remedial Investigation Work Plan, April 5, 2001.
SB17A	MGP Indicators	28 feet bgs	To further delineate MGP residuals adjacent to the regulator station. Comments on Supplemental Remedial Investigation Work Plan, April 5, 2001.
Monitoring Wells - South Property Boundary			
SB8/MW8	MGP Indicators - Soil and Groundwater	Water Table Groundwater Sample; Soil	To determine if impacted groundwater is present at site property boundary. Scope of work added by O&R.

Table 4
Sample Location Rationale
Clove and Maple Former MGP Site
Haverstraw, New York

Sample Type and Designation	Sample Analysis	Sample Depth	Rationale
		Samples - 10 to 12 feet bgs and 14 to 16 feet bgs	
SB9/MW9	MGP Indicators - Soil and Groundwater	Water Table Groundwater Sample; Soil Samples - 8 to 10 feet bgs and 12 to 14 feet bgs	To determine if impacted groundwater is present at site property boundary. Scope of work added by O&R.
SB10/MW10	MGP Indicators - Soil and Groundwater	Water Table Groundwater Sample; Soil Samples 22 to 24 feet bgs and 36 to 36 feet bgs	To determine if impacted groundwater is present at site property boundary. Scope of work added by O&R.
Boring and Monitoring Wells - Adjacent Property (Head Start Parcel)			
SB11/MW11	MGP Indicators - Soil and Groundwater	Water Table Groundwater Sample; Soil Samples - 12 to 14 feet bgs and 20 to 22 feet bgs	To determine if MGP residues are present in adjacent property requested by NYSDEC, 1998, p. 2. Comments on the Remedial Investigation Work Plan for Suffern, Middletown (Fulton and Canal Streets) and Haverstraw MGP Sites.
SB12	MGP Indicators - Soil	Water Table and Most Impacted Soil Sample	To determine if MGP residues are present in adjacent property requested by NYSDEC, 1998, p. 2. Comments on the Remedial Investigation Work Plan for Suffern, Middletown (Fulton and Canal Streets) and Haverstraw MGP Sites.
SB13	MGP Indicators - Soil	Water Table and Most Impacted Soil Sample	To determine if MGP residues are present in adjacent property requested by NYSDEC, 1998, p. 2. Comments on the Remedial Investigation Work Plan for Suffern, Middletown (Fulton and Canal Streets) and Haverstraw MGP Sites.
SB22	MGP Indicators	12 feet bgs and 20 feet bgs	To determine the extent of MGP residues across the southern property line. Comments on the Supplemental Remedial Investigation Work Plan, April 5, 2001.
SB23	MGP Indicators	22 feet bgs	To determine the extent of MGP residues across the southern property line. Comments on the Supplemental Remedial Investigation Work Plan, April 5, 2001.

Table 4
Sample Location Rationale
Clove and Maple Former MGP Site
Haverstraw, New York

Sample Type and Designation	Sample Analysis	Sample Depth	Rationale
SB/MW24	MGP Indicators	18 feet bgs	Refine groundwater flow direction relative to Head Start Building, determine if MGP residuals exist atop hill. Comments on the Supplemental Remedial Investigation Work Plan, April 5, 2001.
Boring and Monitoring Well - Adjacent Property (Apartments Parcel)			
MW20	MGP Indicators	10 feet bgs and 25.5 feet bgs	Evaluate downgradient and down-till slope extent of MGP residuals across Maple Avenue. Comments on the Supplemental Remedial Investigation Work Plan, April 5, 2001.
MW21	MGP Indicators	8 to 10 feet bgs and 20 to 22 feet bgs	Evaluate downgradient and down-till slope extent of MGP residuals across Maple Avenue. Comments on the Supplemental Remedial Investigation Work Plan, April 5, 2001.
MW28	MGP Indicators	8 to 10 feet bgs and 30 feet bgs	Borings to evaluate potential historic MGP residuals to former pond, advance to till interface, aid in evaluation of groundwater flow direction, and groundwater quality downgradient. Comments on Supplemental Remedial Investigation Work Plan, April 5, 2001.
MW29	MGP Indicators	29 feet bgs	Borings to evaluate potential historic MGP residuals to former pond, advance to till interface, aid in evaluation of groundwater flow direction, and groundwater quality downgradient. Comments on Supplemental Remedial Investigation Work Plan, April 5, 2001.
SB-45	MGP Indicators	10 to 11 feet bgs 11 to 12 feet bgs 24 to 25 feet bgs 27 to 28 feet bgs	To delineate MGP-related impacts extending from the Clove and Maple site
SB-46	MGP Indicators e	10 to 11 feet bgs 14 to 15 feet bgs	To delineate MGP-related impacts extending from the Clove and Maple site
SB-48	MGP Indicators	14 to 15 feet bgs	To delineate MGP-related impacts extending from the Clove and Maple site
SB-49	MGP Indicators	7 to 8 feet bgs 13.5 to 14.5 feet bgs	To delineate MGP-related impacts extending from the Clove and Maple site
SB/MW-20S/D	MGP Indicators	11.5 to 12 feet bgs 13 to 15 feet bgs	To delineate MGP-related impacts extending from the Clove and Maple site
SB/MW-21 and	MGP Indicators	8 to 9 feet bgs	To delineate MGP-related impacts extending

Table 4
Sample Location Rationale
Clove and Maple Former MGP Site
Haverstraw, New York

Sample Type and Designation	Sample Analysis	Sample Depth	Rationale
21S			from the Clove and Maple site
SB/MW-28S/D	MGP Indicators	ND	To delineate MGP-related impacts extending from the Clove and Maple site
SB/MW-29S/D	MGP Indicators	10 to 11 feet bgs	To delineate MGP-related impacts extending from the Clove and Maple site
SB/MW-30S	MGP Indicators	6.5 to 7 feet bgs 15 to 16 feet bgs	To delineate MGP-related impacts extending from the Clove and Maple site
SB/MW-31S/D	MGP Indicators	8 to 10 feet bgs 33 to 34 feet bgs	To delineate MGP-related impacts extending from the Clove and Maple site
SB/MW-32S/I	MGP Indicators	10 to 11 feet bgs 34 to 36 feet bgs	To delineate MGP-related impacts extending from the Clove and Maple site
SB/MW-55	MGP Indicators	10 to 12 feet bgs	To further delineate MGP-related impacts at the apartment complex.
SB-56	MGP Indicators	14 to 16 feet bgs	To further delineate MGP-related impacts at the apartment complex.
SB-57	MGP Indicators	7 to 8 feet bgs	To further delineate MGP-related impacts at the apartment complex.
SB-58	MGP Indicators	8 to 9 feet bgs 16 to 18 feet bgs	To further delineate MGP-related impacts at the apartment complex.
SB-59	MGP Indicators	15.5 to 16 feet bgs 18 to 19 feet bgs	To further delineate MGP-related impacts at the apartment complex.
SB/MW-60	MGP Indicators	8 to 9 feet bgs 13 to 14 feet bgs	To further delineate MGP-related impacts at the apartment complex.
Existing Monitoring Wells			
MW1 to MW3	MGP Indicators	Water Table Groundwater Samples	Resample existing monitoring wells for MGP indicators to confirm PSA results.
Stormwater/Sediment Samples			
SED-03/SW-03 SW013102-1	MGP Indicators	NA	Sediment and surface water samples collected upgradient of the site within storm sewer system - requested by NYSDEC [NYSDEC, 1997, pg. 3] and comments on Supplemental Remedial Investigation Work Plan, April 5, 2001.
SED-01/SW-01 SED-02/SW-02 SD013102-2 SD013102-3 SD013102-4 SW013102-5	MGP Indicators	NA	Sediment and stormwater samples and duplicates collected downgradient of the site within storm sewer system - requested by NYSDEC [NYSDEC, 1997, pg. 3] and comments on Supplemental Remedial Investigation Work Plan, April 5, 2001.

Table 4
Sample Location Rationale
Clove and Maple Former MGP Site
Haverstraw, New York

Sample Type and Designation	Sample Analysis	Sample Depth	Rationale
SD013102-6 SW013102-6 SWOUT01300-1			
Garage			
TP4	Field Characterization	0 to 12 feet bgs	Test pit excavation to investigate environmental condition in vicinity of the former garage. Scope of work added by O&R.
High Pressure Holder			
TP5	Field Characterization	0 to 12 feet bgs	Test pit excavation to investigate environmental condition in vicinity of the former aboveground high pressure holder. Scope of work added by O&R.
Notes: MGP Indicators include: VOCs by 95-1, PAHs by 95-2, total cyanide by CLP-M, TAL metals by CLP-M and weak acid dissociable cyanide by 4500 CNI. Field Characterization includes: visual characterization- Unified Soil Classification System, visual and olfactory observations regarding the presence of MGP impacts and jar headspace screening with a photoionization detector. BTEX-Benzene, Toluene, Ethylbenzene, and Xylene by NYSASP CLP Method 95-1. PAHs-Polycyclic Aromatic Hydrocarbons by NYSASP CLP Method 95-2. bgs-below grade surface ND-no data			

Table 5
Subsurface Soil Analytical Results
Clove and Maple Avenue Former MGP Site - Remedial Investigation
Haverstraw, New York

Sample Location: Depth Interval in feet: Sample ID: Date Collected:		MW01 20 - 22 SB1 (20-22) 5/14/1997	MW02 12 - 14 SB2 (12-14) 5/15/1997	MW03 10 - 12 SB3 (10-12) 5/15/1997	MW04 16 - 18 CMSB04(16-18) 12/15/1998	MW05 18 - 20 CMSB05(18-20) 12/15/1998	MW06 5 - 5.5 CMSB06A 3/2/1999	MW06 16.5 - 17 CMSB06B 3/2/1999	MW08 10 - 12 CMSB08A 12/11/1998	MW08 14 - 16 CMSB08B 12/11/1998	MW09 8 - 10 CMSB09A 12/10/1998
BTEX (mg/kg)											
Benzene	0.06	0.011 U	4.7	62 D	0.056	0.054 U	0.85 D	0.011 U	NA	0.021	0.055 U
Toluene	1.5	0.011 U	1.7	140 D	0.081	0.054 U	0.016	0.011 U	NA	0.013 UJ	0.006 J
Ethylbenzene	5.5	0.011 U	26	65 D	0.093	0.054 U	0.056	0.011 U	NA	0.013 UJ	0.21
Xylene, Total	1.2	0.011 U	62	360 D	0.58	0.054 U	0.11	0.011 U	NA	0.013 UJ	0.28
Total BTEX	NS	ND	94.4	627	0.81	ND	1.032	ND	NA	0.021	0.496
Other VOCs (mg/kg)											
Acetone	0.2	NA	NA	NA	0.035 J	0.032 J	0.013 U	0.011 U	NA	0.013 U	0.055 U
Bromodichloromethane	NS	NA	NA	NA	0.056 U	0.054 U	0.013 U	0.011 U	NA	0.013 U	0.055 U
Bromoform	NS	NA	NA	NA	0.056 U	0.054 U	0.013 U	0.011 U	NA	0.013 U	0.055 U
Chlorobenzene	1.7	NA	NA	NA	0.056 U	0.054 U	0.013 U	0.011 U	NA	0.013 UJ	0.055 U
Chloroform	0.3	NA	NA	NA	0.056 U	0.054 U	0.013 U	0.011 U	NA	0.013 U	0.055 U
Dichloroethane, 1,2-	0.1	NA	NA	NA	0.056 U	0.054 U	0.016	0.011 U	NA	0.013 U	0.055 U
Methylene chloride	0.1	NA	NA	NA	0.056 U	0.054 U	0.013 U	0.011 U	NA	0.013 U	0.055 U
Styrene	NS	NA	NA	NA	0.2	0.054 U	0.013 U	0.011 U	NA	0.013 UJ	0.055 U
Tetrachloroethene	1.4	NA	NA	NA	0.056 U	0.054 U	0.013 U	0.011 U	NA	0.013 UJ	0.055 U
Trichloroethene	0.7	NA	NA	NA	0.056 U	0.054 U	0.013 U	0.011 U	NA	0.013 U	0.055 U
Trimethylbenzene, 1,2,4-	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Noncarcinogenic PAHs (mg/kg)											
Acenaphthene	50	0.35 U	55	12	0.37 U	0.37 U	0.44 U	0.38 U	0.55	0.42 U	29 DB
Acenaphthylene	41	0.35 U	38	23	0.044 J	0.081 J	0.44 U	0.38 U	0.35 J	0.42 U	1.4
Anthracene	50	0.35 U	66	58 J D	0.37 U	0.05 J	0.44 U	0.38 U	1.7	0.42 U	16 D
Benzo[g,h,i]perylene	50	0.35 U	12 B	8.2 B	0.37 U	0.37 U	0.44 U	0.38 U	0.49	0.42 U	0.97
Fluoranthene	50	0.11 J	66	88 J D	0.042 J	0.098 J	0.44 U	0.38 U	2.8	0.42 U	19 DB
Fluorene	50	0.35 U	84	83 J D	0.045 J	0.055 J	0.44 U	0.38 U	2.5	0.42 U	23 D
Methylnaphthalene, 1-	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methylnaphthalene, 2-	36.4	NA	NA	NA	0.062 J	0.097 J	0.44 U	0.38 U	19 D	0.42 U	36 DB
Naphthalene	13	0.35 U	560 D	580 D	0.31 J	0.13 J	0.26 J	0.38 U	30 EJ	0.42 U	24 JBE
Perylene	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	50	0.042 J	330 D	220 D	0.15 J	0.23 J	0.44 U	0.38 U	6.5 EJ	0.42 U	58 DB
Pyrene	50	0.13 J B	140 DB	120 DB	0.067 J	0.16 J	0.44 U	0.38 U	3.7 EJ	0.42 U	29 DB
Carcinogenic PAHs (mg/kg)											
Benz[a]anthracene	0.224	0.051 J	37	30	0.37 U	0.045 J	0.44 U	0.38 U	1.4	0.42 U	8 DJ
Benzo[a]pyrene	0.061	0.07 J B	30 B	28 B	0.37 U	0.043 J	0.44 U	0.38 U	1.3	0.42 U	5.5 DJ
Benzo[b]fluoranthene	1.1	0.12 J	22	22	0.37 U	0.039 J	0.44 U	0.38 U	0.99	0.42 U	4.3 DJ
Benzo[e]pyrene	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo[k]fluoranthene	1.1	0.048 J	9.3 J	7.6	0.37 U	0.37 U	0.44 U	0.38 U	0.25 J	0.42 U	1.1
Chrysene	0.4	0.08 J	34	28	0.37 U	0.044 J	0.44 U	0.38 U	1.4	0.42 U	6.9 DJ

Table 5
Subsurface Soil Analytical Results
Clove and Maple Avenue Former MGP Site - Remedial Investigation
Haverstraw, New York

Sample Location: Depth Interval in feet: Sample ID: Date Collected:		MW01 20 - 22 SB1 (20-22) 5/14/1997	MW02 12 - 14 SB2 (12-14) 5/15/1997	MW03 10 - 12 SB3 (10-12) 5/15/1997	MW04 16 - 18 CMSB04(16-18) 12/15/1998	MW05 18 - 20 CMSB05(18-20) 12/15/1998	MW06 5 - 5.5 CMSB06A 3/2/1999	MW06 16.5 - 17 CMSB06B 3/2/1999	MW08 10 - 12 CMSB08A 12/11/1998	MW08 14 - 16 CMSB08B 12/11/1998	MW09 8 - 10 CMSB09A 12/10/1998
Dibenz[a,h]anthracene	0.014	0.35 U	3.7 J	3.9 J	0.37 U	0.37 U	0.44 U	0.38 U	0.14 J	0.42 U	0.36 J
Indeno[1,2,3-cd]pyrene	3.2	0.066 J B	12 B	14 B	0.37 U	0.37 U	0.44 U	0.38 U	0.5	0.42 U	1.1
Total PAHs (mg/kg)											
Total PAHs	NS	0.717	1499	1325.7	0.72	1.072	0.26	ND	73.57	ND	263.63
Other SVOCs (mg/kg)											
Biphenyl,1,1-	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bis(2-ethylhexyl)phthalate	50	NA	NA	NA	0.37 U	0.37 U	NA	NA	0.43 U	0.42 U	0.37 U
Carbazole	NS	NA	NA	NA	0.37 U	0.37 U	NA	NA	0.16 J	0.42 U	0.37 U
Dibenzofuran	6.2	NA	NA	NA	0.37 U	0.37 U	NA	NA	0.6	0.42 U	1.8
Metals (mg/Kg)											
Aluminum	NS	NA	NA	NA	3620	4440	13100	6660	18100 EJ	13700 EJ	7580 EJ
Antimony	NS	NA	NA	NA	0.6 UBN	0.5 UN	0.6 U	0.6 UB	0.8 U	1.4 B	0.4 U
Arsenic	7.5	NA	NA	NA	1.9 UB	2.1 UB	6.3 UJ	4.9 U	9.2	6	3.5
Barium	300	NA	NA	NA	41 B	59.9	89.8	69.4	145 EJ	107 EJ	84 EJ
Beryllium	0.16	NA	NA	NA	0.2 B	0.2 B	0.8 B	0.3 B	0.8 B	0.7 B	0.4 B
Cadmium	1	NA	NA	NA	0.2 B	0.3 B	0.9 BJ	0.5 UB	0.9 B	0.7 B	0.6 B
Calcium	NS	NA	NA	NA	990 B*	11300 *	20700	14600	8220 EJ	14600 EJ	1160 EJ
Chromium	10	NA	NA	NA	4.8	5.9	19.9	13.3	27.2 EJ	19.1 EJ	9.6 EJ
Cobalt	30	NA	NA	NA	3.8 JBE	4.1 JBE	13.2	7.3 B	17 JBE	12.8 JBE	5.9 JBE
Copper	25	NA	NA	NA	7.9	9.4	29	15	33.2 EJ	25.3 EJ	15.8 EJ
Iron	2000	NA	NA	NA	8380	10100	27000	14900	34800 EJ	26800 EJ	15800 EJ
Lead	500	NA	NA	NA	2.4	3.8	13.6 J	6.9	14.4	11.4	4.6
Magnesium	NS	NA	NA	NA	1860	3320	10300	4890	8970 EJ	9140 EJ	2830 EJ
Manganese	NS	NA	NA	NA	173	218	588	344	759 EJ	485 EJ	170 EJ
Mercury	0.1	NA	NA	NA	0.11 UN	0.1 UN	0.1 U	0.1 U	0.1 UN	0.1 U	0.1 U
Nickel	13	NA	NA	NA	6 B	7.8 B	24.8 B	13.2	32.2 EJ	25.3 EJ	11.1 EJ
Potassium	NS	NA	NA	NA	847 JBE	1290 J	2070	1150	3460	3060	1710 *
Selenium	2	NA	NA	NA	0.74 U	0.72 U	2.1 UJW	0.4 UJW	0.8 U	0.8 UJW	0.7 U
Silver	NS	NA	NA	NA	0.4 UB	0.5 UBJ	1.1 UB	0.7 UB	1.9 UB	1.4 UB	0.9 UB
Sodium	NS	NA	NA	NA	485 B	514 B	682 UB	606 UB	630 B	690 B	416 B
Thallium	NS	NA	NA	NA	1.2 B	0.2 U	0.3 U	2.1 UB	0.8 U	0.8 U	0.3 U
Vanadium	150	NA	NA	NA	7.1 B	9 B	21.8	12.9	30.5 EJ	22.2 JBE	14.1 EJ
Zinc	20	NA	NA	NA	24.6	26.1	69.3 EJ	37.9 EJ	93.5 EJ	66.4 EJ	71.3 EJ
Total Cyanide (mg/Kg)											
Cyanide, Total	1600 (a)	0.27 U	0.32 U	0.31 U	1.1 U	1.1 U	1.3 UJN	1.1 UJN	1.3 U	1.3 U	1.1 U

Table 5
Subsurface Soil Analytical Results
Clove and Maple Avenue Former MGP Site - Remedial Investigation
Haverstraw, New York

Sample Location:		MW09	MW10	MW10	MW11	MW11	SB14	SB14	SB14 (DUP)
Depth Interval in feet:		12 - 14	22 - 24	36 - 38	12 - 14	20 - 22	10 - 10	22 - 22	22 - 22
Sample ID:	NYS	CMSB09B	CMSB10(22-24)	CMSB10(36-38)	CMSB11(12-14)	CMSB11(20-22)	HA-SB14-10	HA-SB14-22	HA-SB44-22
Date Collected:	RSCO	12/10/1998	12/16/1998	12/17/1998	12/17/1998	12/18/1998	6/19/2001	6/19/2001	6/19/2001
BTEX (mg/kg)									
Benzene	0.06	0.011 U	0.011 U	0.012 U	0.013 U	0.011 U	15	0.011 U	0.016
Toluene	1.5	0.011 U	0.011 U	0.012 U	0.013 U	0.011 U	47	0.011 U	0.011 J
Ethylbenzene	5.5	0.011 U	0.011 U	0.012 U	0.013 U	0.011 U	12	0.011 U	0.002 J
Xylene, Total	1.2	0.011 U	0.011 U	0.012 U	0.013 U	0.011 U	67	0.011 U	0.011 J
Total BTEX	NS	ND	ND	ND	ND	ND	141	ND	0.04
Other VOCs (mg/kg)									
Acetone	0.2	0.011 U	0.004 J	0.002 J	0.004 J	0.006 J	2.3 UJ	0.011 U	0.012 U
Bromodichloromethane	NS	0.011 U	0.011 U	0.012 U	0.013 U	0.011 U	2.3 U	0.011 U	0.012 U
Bromoform	NS	0.011 U	0.011 U	0.012 U	0.013 U	0.011 U	2.3 U	0.011 U	0.012 U
Chlorobenzene	1.7	0.011 U	0.011 U	0.012 U	0.013 U	0.011 U	2.3 U	0.011 U	0.012 U
Chloroform	0.3	0.011 U	0.011 U	0.012 U	0.013 U	0.011 U	2.3 U	0.011 U	0.012 U
Dichloroethane, 1,2-	0.1	0.011 U	0.011 U	0.012 U	0.013 U	0.011 U	2.3 U	0.011 U	0.012 U
Methylene chloride	0.1	0.011 U	0.011 U	0.012 U	0.013 U	0.011 U	2.3 U	0.011 U	0.02 U
Styrene	NS	0.011 U	0.011 U	0.012 U	0.013 U	0.011 U	10	0.011 U	0.012 U
Tetrachloroethene	1.4	0.011 U	0.002 J	0.001 J	0.013 U	0.011 U	2.3 U	0.011 U	0.012 U
Trichloroethene	0.7	0.011 U	0.011 U	0.012 U	0.013 U	0.011 U	2.3 U	0.011 U	0.003 J
Trimethylbenzene, 1,2,4-	NS	NA	NA	NA	NA	NA	NA	NA	NA
Noncarcinogenic PAHs (mg/kg)									
Acenaphthene	50	0.37 U	0.37 U	0.39 U	0.44 U	0.38 U	3.7 J	0.36 U	0.4 U
Acenaphthylene	41	0.071 J	0.37 U	0.39 U	0.44 U	0.38 U	20 J	0.016 J	0.008 J
Anthracene	50	0.094 J	0.37 U	0.39 U	0.44 U	0.38 U	18 J	0.028 J	0.025 J
Benzo[g,h,i]perylene	50	0.37 U	0.37 U	0.39 U	0.44 U	0.38 U	4.8 J	0.014 J	0.012 J
Fluoranthene	50	0.37 U	0.37 U	0.39 U	0.44 U	0.38 U	22 J	0.051 J	0.036 J
Fluorene	50	0.12 J	0.37 U	0.39 U	0.44 U	0.38 U	20 J	0.016 J	0.009 J
Methylnaphthalene, 1-	NS	NA	NA	NA	NA	NA	NA	NA	NA
Methylnaphthalene, 2-	36.4	0.37 U	0.37 U	0.39 U	0.44 U	0.38 U	68	0.02 J	0.01 J
Naphthalene	13	0.37 U	0.037 J	0.39 U	0.054 J	0.041 J	190	0.042 J	0.022 J
Perylene	NS	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	50	0.44 U	0.37 U	0.39 U	0.064 J	0.38 U	70	0.1 J	0.072 J
Pyrene	50	0.37 U	0.37 U	0.39 U	0.051 J	0.38 U	30 J	0.067 J	0.065 J
Carcinogenic PAHs (mg/kg)									
Benz[a]anthracene	0.224	0.069 J	0.37 U	0.39 U	0.44 U	0.38 U	9.8 J	0.023 J	0.019 J
Benzo[a]pyrene	0.061	0.058 J	0.37 U	0.39 U	0.44 U	0.38 U	8 J	0.02 J	0.015 J
Benzo[b]fluoranthene	1.1	0.039 J	0.37 U	0.39 U	0.44 U	0.38 U	3.7 J	0.01 J	0.008 J
Benzo[e]pyrene	NS	NA	NA	NA	NA	NA	NA	NA	NA
Benzo[k]fluoranthene	1.1	0.37 U	0.37 U	0.39 U	0.44 U	0.38 U	6.5 J	0.013 J	0.011 J
Chrysene	0.4	0.06 J	0.37 U	0.39 U	0.44 U	0.38 U	9.6 J	0.023 J	0.019 J

Table 5
Subsurface Soil Analytical Results
Clove and Maple Avenue Former MGP Site - Remedial Investigation
Haverstraw, New York

Sample Location: Depth Interval in feet: Sample ID: Date Collected:		MW09 12 - 14 CMSB09B 12/10/1998	MW10 22 - 24 CMSB10(22-24) 12/16/1998	MW10 36 - 38 CMSB10(36-38) 12/17/1998	MW11 12 - 14 CMSB11(12-14) 12/17/1998	MW11 20 - 22 CMSB11(20-22) 12/18/1998	SB14 10 - 10 HA-SB14-10 6/19/2001	SB14 22 - 22 HA-SB14-22 6/19/2001	SB14 (DUP) 22 - 22 HA-SB44-22 6/19/2001
Dibenz[a,h]anthracene	0.014	0.37 U	0.37 U	0.39 U	0.44 U	0.38 U	1.4 J	0.36 U	0.4 U
Indeno[1,2,3-cd]pyrene	3.2	0.37 U	0.37 U	0.39 U	0.44 U	0.38 U	3.7 J	0.01 J	0.008 J
Total PAHs (mg/kg)									
Total PAHs	NS	0.511	0.037	ND	0.169	0.041	489.2	0.453	0.339
Other SVOCs (mg/kg)									
Biphenyl,1,1-	NS	NA	NA	NA	NA	NA	NA	NA	NA
Bis(2-ethylhexyl)phthalate	50	0.37 U	0.37 U	0.39 U	0.44 U	0.38 U	43 U	0.36 U	0.4 U
Carbazole	NS	0.37 U	0.37 U	0.39 U	0.44 U	0.38 U	43 U	0.36 U	0.4 U
Dibenzofuran	6.2	0.37 U	0.37 U	0.39 U	0.44 U	0.38 U	2.9 J	0.36 U	0.4 U
Metals (mg/Kg)									
Aluminum	NS	5540 EJ	4810	4390	16900	5810	16200	4980	4680
Antimony	NS	0.4 U	0.4 UN	0.4 UN	0.9 UN	0.9 UBN	1.0 UJ	0.89 UJ	0.99 UJ
Arsenic	7.5	3.3	2.2 UB	1 UB	8.9	1.3 UB	6.2	2.4	2.3
Barium	300	53.7 EJ	71.9	61.2	136	79.2	160.	75.8	86.4
Beryllium	0.16	0.3 B	0.2 B	0.3 B	0.8 B	0.4 B	0.97	0.10 U	0.11 U
Cadmium	1	0.4 B	0.3 B	0.2 B	0.9 B	0.2 B	0.68 J	0.18 U	0.20 U
Calcium	NS	1250 EJ	1220 *	18800 *	11700 *	37500 *	2520	1690	2160
Chromium	10	7 EJ	6.8	4.8	23.5	6.8	21.6	7.4	9.7
Cobalt	30	6.4 JBE	4.5 JBE	4.2 JBE	17.4 JBE	4.9 JBE	13.0	4.1	4.9
Copper	25	11.8 EJ	10.3	4.5 B	32	6.6	30.9	11.0	13.2
Iron	2000	11200 EJ	11700	5610	32900	7470	33100	12700	12400
Lead	500	3.7	4.2	3.6	15.4	5.1	14.7	2.8	2.8
Magnesium	NS	2680 EJ	2220	3360	8890	6940	7140	2930	2830
Manganese	NS	283 EJ	270	252	780	369	691.	206.	238.
Mercury	0.1	0.1 U	0.11 UN	0.11 UN	0.12 UN	0.11 UN	0.0061	0.0029	0.0037
Nickel	13	13 EJ	8.1 B	9 B	31.7	11.6	30.9	8.7	11.1
Potassium	NS	1200	1380 EJ	1560 EJ	3590 EJ	2430 EJ	3070	1220	1110
Selenium	2	0.7 U	0.74 U	0.78 UJW	0.88 UJW	0.75 UJW	1.1 U	0.99 U	1.1 U
Silver	NS	0.8 UB	0.6 UBJ	0.6 UBJ	1.2 UBJ	1.1 UBJ	0.23 U	0.20 U	0.22 U
Sodium	NS	390 B	444 B	711 B	624 B	775 B	4.5 UJ	4.0 U	4.4 U
Thallium	NS	1.3 UB	0.3 U	0.4 UB	0.8 U	0.3 U	2.1 UJ	1.8 U	2.0 U
Vanadium	150	10.6 JBE	11.4	8.1 B	27	11.2 B	25.3	12.7	13.0
Zinc	20	71 EJ	33.7	24.8	81.3	27.4	74.1	32.7	27.5
Total Cyanide (mg/Kg)									
Cyanide, Total	1600 (a)	1.1 U	1.1 U	1.2 U	1.3 U	1.1 U	.6 U	.56 U	.64 U

Table 5
Subsurface Soil Analytical Results
Clove and Maple Avenue Former MGP Site - Remedial Investigation
Haverstraw, New York

Sample Location: Depth Interval in feet: Sample ID: Date Collected:	NYS RSCO	SG15 8 - 8.5 CMSG15(8-8.5) 10/21/1998	SG15 19 - 20 CMSG15(19-20) 10/21/1998	SG16 12 - 13 CMSG16(12-13) 10/21/1998	SG16 23.5 - 24 CMSG16(23.5-24) 10/21/1998	SB16 18 - 18 HA-SB16-18 6/20/2001	SB16 30 - 30 HA-SB16-30 6/20/2001	SB16 36 - 36 HA-SB16-36 6/20/2001	SB17 4 - 4 HA-SB17-4 6/18/2001
BTEX (mg/kg)									
Benzene	0.06	0.011 U	0.011 U	0.011 U	0.011 U	5.5 J	0.038 U	0.009 U	1.3 J
Toluene	1.5	0.011 U	0.011 U	0.011 U	0.011 U	59	0.051	0.009 U	3
Ethylbenzene	5.5	0.011 U	0.011 U	0.011 U	0.011 U	15	0.014 J	0.009 U	29
Xylene, Total	1.2	0.011 U	0.011 U	0.011 U	0.011 U	110	0.1	0.009 U	35
Total BTEX	NS	ND	ND	ND	ND	189.5	0.165	ND	68.3
Other VOCs (mg/kg)									
Acetone	0.2	0.011 UJ	0.011 U	0.011 U	0.011 UJ	5.7 UJ	0.045 J	0.008 J	2.2 UJ
Bromodichloromethane	NS	0.011 U	0.011 U	0.011 U	0.011 U	6 U	0.038 U	0.009 U	0.087 J
Bromoform	NS	0.011 U	0.011 U	0.011 U	0.011 U	6 U	0.038 U	0.009 U	0.1 J
Chlorobenzene	1.7	0.011 U	0.011 U	0.011 U	0.011 U	6 U	0.038 U	0.009 U	0.16 J
Chloroform	0.3	0.011 U	0.011 U	0.011 U	0.011 U	6 U	0.038 U	0.009 U	2.2 U
Dichloroethane,1,2-	0.1	0.011 U	0.011 U	0.011 U	0.011 U	6 U	0.038 U	0.009 U	2.2 U
Methylene chloride	0.1	0.011 U	0.011 U	0.011 U	0.011 U	6 U	0.043 U	0.022 U	2.2 U
Styrene	NS	0.011 U	0.011 U	0.011 U	0.011 U	38	0.045	0.009 U	0.71 J
Tetrachloroethene	1.4	0.011 U	0.011 U	0.011 U	0.011 U	6 U	0.038 U	0.009 U	2.2 U
Trichloroethene	0.7	0.011 U	0.011 U	0.011 U	0.011 U	6 U	0.038 U	0.009 U	2.2 U
Trimethylbenzene,1,2,4-	NS	NA	NA	NA	NA	NA	NA	NA	NA
Noncarcinogenic PAHs (mg/kg)									
Acenaphthene	50	0.38 U	0.37 U	0.38 U	0.37 U	1.6 J	0.61 J	0.36 UJ	47
Acenaphthylene	41	0.38 U	0.37 U	0.38 U	0.055 J	11	3.9	0.36 UJ	16 J
Anthracene	50	0.38 U	0.37 U	0.38 U	0.047 J	8.2	2.9	0.36 UJ	24 J
Benzo[g,h,i]perylene	50	0.38 U	0.37 U	0.38 U	0.1 J	12 J	1.5 J	0.36 UJ	15 J
Fluoranthene	50	0.38 U	0.37 U	0.38 U	0.63	13	4.1	0.36 UJ	42
Fluorene	50	0.38 U	0.37 U	0.38 U	0.37 U	6.5 J	2.7	0.36 UJ	27 J
Methylnaphthalene,1-	NS	NA	NA	NA	NA	NA	NA	NA	NA
Methylnaphthalene,2-	36.4	0.043 J	0.37 U	0.38 U	0.1 J	27	7.4	0.36 UJ	110
Naphthalene	13	0.38 U	0.37 U	0.38 U	0.37 U	53	9.4	0.36 UJ	210
Perylene	NS	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	50	0.06 J	0.37 U	0.38 U	0.66	25	9.9	0.36 UJ	81
Pyrene	50	0.043 J	0.37 U	0.38 U	1.6	21	6.6	0.36 UJ	64
Carcinogenic PAHs (mg/kg)									
Benz[a]anthracene	0.224	0.38 U	0.37 U	0.38 U	0.37	10	2.4	0.36 UJ	21 J
Benzo[a]pyrene	0.061	0.38 U	0.37 U	0.38 U	0.093 J	12	2	0.36 UJ	23 J
Benzo[b]fluoranthene	1.1	0.38 U	0.37 U	0.38 U	0.29 J	5.8 J	0.9 J	0.36 UJ	11 J
Benzo[e]pyrene	NS	NA	NA	NA	NA	NA	NA	NA	NA
Benzo[k]fluoranthene	1.1	0.38 U	0.37 U	0.38 U	0.084 J	8.6	1.3 J	0.36 UJ	18 J
Chrysene	0.4	0.38 U	0.37 U	0.38 U	0.47	11	2.3	0.36 UJ	23 J

Table 5
Subsurface Soil Analytical Results
Clove and Maple Avenue Former MGP Site - Remedial Investigation
Haverstraw, New York

Sample Location: Depth Interval in feet: Sample ID: Date Collected:	NYS RSCO	SG15 8 - 8.5 CMSG15(8-8.5) 10/21/1998	SG15 19 - 20 CMSG15(19-20) 10/21/1998	SG16 12 - 13 CMSG16(12-13) 10/21/1998	SG16 23.5 - 24 CMSG16(23.5-24) 10/21/1998	SB16 18 - 18 HA-SB16-18 6/20/2001	SB16 30 - 30 HA-SB16-30 6/20/2001	SB16 36 - 36 HA-SB16-36 6/20/2001	SB17 4 - 4 HA-SB17-4 6/18/2001
Dibenz[a,h]anthracene	0.014	0.38 U	0.37 U	0.38 U	0.37 U	2 J	0.28 J	0.36 UJ	3.5 J
Indeno[1,2,3-cd]pyrene	3.2	0.38 U	0.37 U	0.38 U	0.1 J	7.9 J	1 J	0.36 UJ	11 J
Total PAHs (mg/kg)									
Total PAHs	NS	0.146	ND	ND	4.599	235.6	59.19	ND	746.5
Other SVOCs (mg/kg)									
Biphenyl,1,1-	NS	NA	NA	NA	NA	NA	NA	NA	NA
Bis(2-ethylhexyl)phthalate	50	NA	NA	NA	NA	7.6 U	3.8 U	0.36 UJ	38 U
Carbazole	NS	NA	NA	NA	NA	0.26 J	0.11 J	0.36 UJ	0.63 J
Dibenzofuran	6.2	NA	NA	NA	NA	1 J	0.4 J	0.36 UJ	3.7 J
Metals (mg/Kg)									
Aluminum	NS	8040 J	4930 J	5740 J	5470 J	3990	3720	4420	12200
Antimony	NS	R	R	R	R	0.96 UJ	0.86 UJ	0.74 UJ	0.98 UJ
Arsenic	7.5	4.9	1.6 UB	2.7	1.1 UB	1.3 J	0.98 J	0.90 J	7.6
Barium	300	55.9 EJ	88.6 EJ	67.9 EJ	119 EJ	40.2	59.2	47.9	93.2
Beryllium	0.16	0.4 UB	0.4 UB	0.3 UB	0.3 UB	0.11 U	0.098 U	0.084 U	0.70
Cadmium	1	0.6 B	0.4 B	0.5 B	0.3 B	0.20 U	0.18 U	0.18 J	0.54 J
Calcium	NS	1310 EJ*	20800 EJ*	1190 EJ*	19000 EJ	6500	3900	17300	1380
Chromium	10	10.1	7.3	7.3	6.2	6.6	5.2	7.2	15.7
Cobalt	30	6.1 JBE	6.2 JBE	6.2 JBE	4.5 JBE	3.3	3.9	3.9	8.5
Copper	25	17.6	6.9	13.1	5 B	7.3	9.1	4.7	21.2
Iron	2000	15600 EJ	7210 EJ	12700 EJ	6830 EJ	9270	9620	9710	23000
Lead	500	6.8	4.4	4.9	4	3.4	2.9	4.9	39.9
Magnesium	NS	3730 EJ	3650 EJ	2880 EJ	4380 EJ	2750	2410	3250	4000
Manganese	NS	256 EJ	352 EJ	358 EJ	292 EJ	232.	188.	339.	257.
Mercury	0.1	0.11 U	0.11 U	0.11 U	0.11 U	0.0039	0.0037	0.0034 U	0.20
Nickel	13	14.5 EJ	11.7 EJ	11 EJ	10.2 EJ	7.8	7.6	10.1	17.7
Potassium	NS	1210	1700	1030 B	1780	854.	881.	1400	1630
Selenium	2	0.75 UJW	0.74 UJW	0.75 UJW	0.74 UJW	1.1 U	0.96 U	0.82 U	1.1 U
Silver	NS	0.6 UB	0.6 UB	0.7 UB	0.6 UB	0.22 U	0.20 U	0.17 U	0.22 U
Sodium	NS	544 B	579 B	480 B	696 B	4.3 U	3.9 U	3.3 U	4.4 UJ
Thallium	NS	1.4 UB	1.3 UB	0.9 UB	0.6 UB	2.0 U	1.8 U	1.5 U	2.0 UJ
Vanadium	150	14.1	14.1	11 B	10.2 B	7.9	8.4	10.6	21.6
Zinc	20	57	24.7	41.1	25.1	21.7	20.4	21.6	140.
Total Cyanide (mg/Kg)									
Cyanide, Total	1600 (a)	1.1 U	1.1 U	1.1 U	1.1 U	.61 U	.55 U	.52 U	.59 U

Table 5
Subsurface Soil Analytical Results
Clove and Maple Avenue Former MPG Site - Remedial Investigation
Haverstraw, New York

Sample Location: Depth Interval in feet: Sample ID: Date Collected:	NYS RSCO	SB17 12 - 12 HA-SB17-12 6/18/2001	SB17 14 - 14 HA-SB17-14 6/18/2001	SB17A 28 - 28 HA-SB17A-28 6/22/2001	SB18 11.5 - 11.5 HA-SB18-11.5 6/19/2001	SB18 31 - 31 HA-SB18-31 6/19/2001	SB/MW-20S 11.5 - 12 SB/MW-20S(11.5-12) 7/2/2004	SB/MW-20S 13 - 15 SB/MW-20S(13-15) 7/2/2004	MW-20D 10 - 10 MW-20-10 11/28/2001
BTEX (mg/kg)									
Benzene	0.06	1.2 J	0.011 U	0.009 U	3.4	0.026	0.11 U	0.15 J	14 U
Toluene	1.5	24	0.011 U	0.009 U	44	0.019 B	0.11 U	0.012 J	14 U
Ethylbenzene	5.5	39	0.001 J	0.009 U	9.9	0.002 J	0.53	0.025 J	22
Xylene, Total	1.2	140	0.002 J	0.009 U	80	0.022	0.27	0.045 J	15
Total BTEX	NS	204.2	0.003	ND	137.3	0.069	0.8	0.232	37
Other VOCs (mg/kg)									
Acetone	0.2	5.7 UJ	0.023 J	0.009 U	2 UJ	0.011 U	NA	NA	14 U
Bromodichloromethane	NS	5.7 U	0.011 U	0.009 U	2 U	0.011 U	NA	NA	14 U
Bromoform	NS	5.7 U	0.011 U	0.009 U	2 U	0.011 U	NA	NA	14 U
Chlorobenzene	1.7	5.7 U	0.011 U	0.009 U	2 U	0.011 U	NA	NA	14 U
Chloroform	0.3	5.7 U	0.011 U	0.009 U	2 U	0.011 U	NA	NA	14 U
Dichloroethane, 1,2-	0.1	5.7 U	0.011 U	0.009 U	2 U	0.011 U	NA	NA	14 U
Methylene chloride	0.1	5.7 U	0.018 U	0.035 U	2 U	0.036 U	NA	NA	14 U
Styrene	NS	46	0.011 U	0.009 U	7.3	0.002 J	NA	NA	14 U
Tetrachloroethene	1.4	5.7 U	0.011 U	0.009 U	2 U	0.011 U	NA	NA	14 U
Trichloroethene	0.7	5.7 U	0.002 J	0.001 J	2 U	0.011 U	NA	NA	14 U
Trimethylbenzene, 1,2,4-	NS	NA	NA	NA	NA	NA	NA	NA	NA
Noncarcinogenic PAHs (mg/kg)									
Acenaphthene	50	9.9 J	0.28 J	0.39 U	1.7 J	0.38 U	57	0.42 J	40
Acenaphthylene	41	26 J	0.23 J	0.39 U	1.6 J	0.012 J	6.5 J	0.084 J	2.4 J
Anthracene	50	12 J	0.37 J	0.39 U	6.3 J	0.043 J	26	0.18 J	12 J
Benzo[g,h,i]perylene	50	2.6 J	0.13 J	0.39 UJ	1.9 J	0.049 J	6.4 J	0.52 UJ	20 U
Fluoranthene	50	14 J	0.49	0.39 U	10	0.1 J	40	0.26 J	9 J
Fluorene	50	16 J	0.29 J	0.39 U	8.4	0.031 J	31	0.22 J	23
Methylnaphthalene, 1-	NS	NA	NA	NA	NA	NA	NA	NA	NA
Methylnaphthalene, 2-	36.4	91	0.87	0.39 U	29	0.057 J	53	0.38 J	84
Naphthalene	13	150	0.88	0.39 U	52	0.097 J	49	0.39 J	130
Perylene	NS	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	50	51	1.4	0.39 U	28	0.2 J	110	0.65 J	36
Pyrene	50	22 J	0.95	0.39 U	15	0.16 J	59	0.38 J	16 J
Carcinogenic PAHs (mg/kg)									
Benz[a]anthracene	0.224	6.9 J	0.26 J	0.39 U	5 J	0.059 J	17	0.11 J	6.2 J
Benzo[a]pyrene	0.061	5 J	0.21 J	0.39 U	4.5 J	0.067 J	17	0.084 J	3.4 J
Benzo[b]fluoranthene	1.1	2.2 J	0.1 J	0.39 U	1.9 J	0.038 J	17	0.1 J	1.8 J
Benzo[e]pyrene	NS	NA	NA	NA	NA	NA	NA	NA	NA
Benzo[k]fluoranthene	1.1	3.6 J	0.14 J	0.39 U	2.9 J	0.051 J	14 U	0.52 UJ	2.3 J
Chrysene	0.4	7.1 J	0.26 J	0.39 U	4.8 J	0.064 J	17	0.11 J	6.2 J

Table 5
Subsurface Soil Analytical Results
Clove and Maple Avenue Former MPG Site - Remedial Investigation
Haverstraw, New York

Sample Location: Depth Interval in feet: Sample ID: Date Collected:		SB17 12 - 12 HA-SB17-12 6/18/2001	SB17 14 - 14 HA-SB17-14 6/18/2001	SB17A 28 - 28 HA-SB17A-28 6/22/2001	SB18 11.5 - 11.5 HA-SB18-11.5 6/19/2001	SB18 31 - 31 HA-SB18-31 6/19/2001	SB/MW-20S 11.5 - 12 SB/MW-20S(11.5-12) 7/2/2004	SB/MW-20S 13 - 15 SB/MW-20S(13-15) 7/2/2004	MW-20D 10 - 10 MW-20-10 11/28/2001
Dibenz[a,h]anthracene	0.014	1.2 J	0.035 J	0.39 UJ	0.44 J	0.38 UJ	14 U	0.52 UJ	20 U
Indeno[1,2,3-cd]pyrene	3.2	2.2 J	0.098 J	0.39 UJ	1.4 J	0.036 J	5.8 J	0.52 UJ	1 J
Total PAHs (mg/kg)									
Total PAHs	NS	422.7	6.993	ND	174.84	1.064	511.7	3.368	373.3
Other SVOCs (mg/kg)									
Biphenyl,1,1-	NS	NA	NA	NA	NA	NA	NA	NA	7.5 J
Bis(2-ethylhexyl)phthalate	50	38 U	0.38 U	1 U	6.9 U	0.57 U	14 U	0.52 UJ	20 U
Carbazole	NS	38 U	0.012 J	0.39 U	0.2 J	0.38 U	14 U	0.52 UJ	20 U
Dibenzofuran	6.2	2.8 J	0.044 J	0.39 U	1 J	0.38 U	3.2 J	0.52 UJ	20 U
Metals (mg/Kg)									
Aluminum	NS	6180	3720	4260	6490	3950	NA	NA	15800
Antimony	NS	0.84 UJ	0.82 UJ	0.96 UJ	0.90 UJ	0.86 UJ	NA	NA	0.98 UJ
Arsenic	7.5	1.2 J	1.2 J	1.4 J	3.4	1.7	NA	NA	3.0
Barium	300	58.2	43.0	60.5	62.5	48.1	NA	NA	84.1
Beryllium	0.16	0.095 U	0.093 U	0.11 U	0.10 U	0.098 U	NA	NA	0.11 U
Cadmium	1	0.24 J	0.17 U	0.20 U	0.18 U	0.18 U	NA	NA	0.17 UJ
Calcium	NS	1420	1270	11100	1780	3110	NA	NA	879.
Chromium	10	11.2	6.1	8.1	9.0	5.8	NA	NA	15.2
Cobalt	30	4.3	3.2	3.6	5.8	4.3	NA	NA	6.6
Copper	25	11.1	7.1	9.5	15.8	9.0	NA	NA	11.2
Iron	2000	14600	9510	11500	15100	10600	NA	NA	23200
Lead	500	3.5	2.5	2.6	7.2	3.0	NA	NA	8.3 J
Magnesium	NS	2560	1860	3850	2640	2130	NA	NA	3960
Manganese	NS	380.	243.	207.	284.	152.	NA	NA	185. J
Mercury	0.1	0.0051	0.0025 U	0.0022 U	0.0039	0.0062	NA	NA	0.010
Nickel	13	9.2	7.2	8.2	13.2	7.7	NA	NA	16.4
Potassium	NS	1280	661.	935.	1260	798.	NA	NA	1300 J
Selenium	2	0.93 U	0.91 U	1.1 U	1.0 U	0.96 U	NA	NA	1.0 U
Silver	NS	0.19 U	0.18 U	0.22 U	0.20 U	0.20 U	NA	NA	0.21 U
Sodium	NS	3.8 U	3.7 U	4.3 U	4.0 U	3.9 U	NA	NA	150.
Thallium	NS	1.7 U	1.7 U	2.0 U	1.9 U	1.8 U	NA	NA	2.1 UJ
Vanadium	150	12.0	7.7	9.9	13.9	9.9	NA	NA	21.0
Zinc	20	30.9	20.6	24.6	38.2	21.8	NA	NA	50.0
Total Cyanide (mg/Kg)									
Cyanide, Total	1600 (a)	.6 U	.53 U	.58 U	.52 UJ	.55 UJ	0.55 U	0.79 U	.58 U

Table 5
Subsurface Soil Analytical Results
Clove and Maple Avenue Former MGP Site - Remedial Investigation
Haverstraw, New York

Sample Location: Depth Interval in feet: Sample ID: Date Collected:	NYS RSCO	MW-20D 25.5 - 25.5 MW-20-25.5 11/28/2001	MW-21 8 - 10 MW-21-8-10 11/28/2001	MW-21 20 - 22 MW-21-20-22 11/28/2001	SB-21S 8 - 9 SB-21S(8-9) 7/12/2004	SB22 12 - 12 HA-SB22-12 6/18/2001	SB22 20 - 20 HA-SB22-20 6/18/2001	SB23 22 - 22 HA-SB23-22 6/21/2001	MW-24 18 - 18 HA-MW24-18 6/22/2001	MW-28D 8 - 10 MW-28-8-10 11/29/2001
BTEX (mg/kg)										
Benzene	0.06	0.001 J	0.005 J	0.011 U	0.013 U	0.034	0.011 U	0.011 U	0.012 U	4.3 J
Toluene	1.5	0.012 U	0.003 J	0.011 U	0.013 U	0.011 U	0.011 U	0.011 U	0.012 U	13 J
Ethylbenzene	5.5	0.012 U	0.065	0.011 U	0.013 U	0.011 U	0.011 U	0.011 U	0.012 U	94
Xylene, Total	1.2	0.004 J	0.046	0.011 U	0.013 U	0.002 J	0.011 U	0.011 U	0.012 U	160
Total BTEX	NS	0.005	0.119	ND	ND	0.036	ND	ND	ND	271.3
Other VOCs (mg/kg)										
Acetone	0.2	0.012 UJ	0.014 UJ	0.011 UJ	0.011 JB	0.045 J	0.039 J	0.011 U	0.012 U	44
Bromodichloromethane	NS	0.012 U	0.014 U	0.011 U	0.013 U	0.011 U	0.011 U	0.011 U	0.012 U	37 U
Bromoform	NS	0.012 U	0.014 U	0.011 U	0.013 U	0.011 U	0.011 U	0.011 U	0.012 U	37 U
Chlorobenzene	1.7	0.012 U	0.014 U	0.011 U	0.013 U	0.011 U	0.011 U	0.011 U	0.012 U	37 U
Chloroform	0.3	0.012 U	0.014 U	0.011 U	0.013 U	0.011 U	0.011 U	0.011 U	0.002 J	37 U
Dichloroethane,1,2-	0.1	0.012 U	0.014 U	0.011 U	0.013 U	0.011 U	0.011 U	0.011 U	0.012 U	37 U
Methylene chloride	0.1	0.012 UJ	0.014 UJ	0.011 UJ	0.004 JB	0.022 U	0.028 U	0.035 U	0.031 U	12 J
Styrene	NS	0.0008 J	0.014 U	0.011 U	0.013 U	0.011 U	0.011 U	0.011 U	0.012 U	37 U
Tetrachloroethene	1.4	0.012 U	0.014 U	0.011 U	0.013 U	0.011 U	0.011 U	0.011 U	0.012 U	37 U
Trichloroethene	0.7	0.012 U	0.014 U	0.011 U	0.013 U	0.002 J	0.006 J	0.011 U	0.012 U	37 U
Trimethylbenzene,1,2,4-	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA
Noncarcinogenic PAHs (mg/kg)										
Acenaphthene	50	0.36 U	0.052 J	0.37 U	0.25 J	0.016 J	0.39 U	0.34 U	0.39 U	390
Acenaphthylene	41	0.36 U	0.062 J	0.37 U	0.29 J	0.006 J	0.39 U	0.34 U	0.39 U	50 J
Anthracene	50	0.36 U	0.2 J	0.37 U	0.26 J	0.008 J	0.39 U	0.34 U	0.008 J	340
Benzo[g,h,i]perylene	50	0.021 J	0.1 J	0.37 U	0.13 J	0.089 J	0.39 U	0.34 UJ	0.39 UJ	71 J
Fluoranthene	50	0.36 U	0.29 J	0.37 U	0.8	0.016 J	0.39 U	0.34 U	0.021 J	370
Fluorene	50	0.36 U	0.095 J	0.37 U	0.49	0.37 U	0.39 U	0.34 U	0.39 U	360
Methylnaphthalene,1-	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methylnaphthalene,2-	36.4	0.36 U	0.058 J	0.37 U	0.062 J	0.37 U	0.39 U	0.34 U	0.016 J	820 J
Naphthalene	13	0.041 J	0.94	0.013 J	0.083 J	0.006 J	0.39 U	0.34 U	0.023 J	1200 J
Perylene	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	50	0.013 J	0.63	0.37 U	0.52	0.032 J	0.39 U	0.34 U	0.038 J	940 J
Pyrene	50	0.36 U	0.49	0.37 U	1.8	0.037 J	0.39 U	0.34 U	0.02 J	590 J
Carcinogenic PAHs (mg/kg)										
Benz[a]anthracene	0.224	0.36 U	0.24 J	0.37 U	0.51	0.008 J	0.39 U	0.34 U	0.39 U	250
Benzo[a]pyrene	0.061	0.36 U	0.097 J	0.37 U	0.36 J	0.041 J	0.39 U	0.34 U	0.39 U	180 J
Benzo[b]fluoranthene	1.1	0.36 U	0.052 J	0.37 U	0.38 JM	0.008 J	0.39 U	0.34 U	0.39 U	88 J
Benzo[e]pyrene	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo[k]fluoranthene	1.1	0.36 U	0.071 J	0.37 U	0.43 U	0.01 J	0.39 U	0.34 U	0.39 U	140 J
Chrysene	0.4	0.36 U	0.25 J	0.37 U	0.61	0.011 J	0.39 U	0.34 U	0.39 U	220

Table 5
Subsurface Soil Analytical Results
Clove and Maple Avenue Former MGP Site - Remedial Investigation
Haverstraw, New York

Sample Location: Depth Interval in feet: Sample ID: Date Collected:	NYS RSCO	MW-20D 25.5 - 25.5 MW-20-25.5 11/28/2001	MW-21 8 - 10 MW-21-8-10 11/28/2001	MW-21 20 - 22 MW-21-20-22 11/28/2001	SB-21S 8 - 9 SB-21S(8-9) 7/12/2004	SB22 12 - 12 HA-SB22-12 6/18/2001	SB22 20 - 20 HA-SB22-20 6/18/2001	SB23 22 - 22 HA-SB23-22 6/21/2001	MW-24 18 - 18 HA-MW24-18 6/22/2001	MW-28D 8 - 10 MW-28-8-10 11/29/2001
Dibenz[a,h]anthracene	0.014	0.36 U	0.48 U	0.37 U	0.43 U	0.37 U	0.39 U	0.34 UJ	0.39 UJ	34 J
Indeno[1,2,3-cd]pyrene	3.2	0.36 U	0.48 U	0.37 U	0.11 JH	0.029 J	0.39 U	0.34 UJ	0.39 UJ	68 J
Total PAHs (mg/kg)										
Total PAHs	NS	0.075	3.627	0.013	6.655	0.317	ND	ND	0.126	6111
Other SVOCs (mg/kg)										
Biphenyl,1,1-	NS	0.36 U	0.035 J	0.37 U	NA	NA	NA	NA	NA	150 J
Bis(2-ethylhexyl)phthalate	50	0.36 U	0.48 U	0.37 U	0.43 UB	0.37 U	0.39 U	0.34 U	0.39 U	200 U
Carbazole	NS	0.36 U	0.48 U	0.37 U	0.43 U	0.37 U	0.39 U	0.34 U	0.39 U	44 J
Dibenzofuran	6.2	0.36 U	0.48 U	0.37 U	0.43 U	0.37 U	0.39 U	0.34 U	0.007 J	110 J
Metals (mg/Kg)										
Aluminum	NS	5850	19200	8370	NA	6060	4090	4650	6170	19900 J
Antimony	NS	1.0 UJ	0.99 UJ	0.82 UJ	NA	0.95 UJ	0.90 UJ	0.94 UJ	1.0 UJ	1.3 UJ
Arsenic	7.5	2.3	10.3	2.8	NA	2.3	1.7 J	3.1	1.9 J	6.6
Barium	300	64.2	150.	56.9	NA	43.9	48.6	80.8	66.2	213. J
Beryllium	0.16	0.11 U	0.11 U	0.089 U	NA	0.11 U	0.10 U	0.11 U	0.11 U	0.14 U
Cadmium	1	0.17 UJ	0.17 UJ	0.14 UJ	NA	0.24 J	0.18 U	0.19 U	0.21 J	0.23 UJ
Calcium	NS	16100	17400	18000	NA	10200	12900	14300	12100	4800
Chromium	10	8.8	24.6	12.1	NA	9.5	8.2	7.2	12.3	24.0
Cobalt	30	4.7	13.5	6.1	NA	4.8	4.5	4.3	4.7	9.7
Copper	25	11.2	33.6	16.6	NA	11.2	9.6	9.5	10.7	30.1
Iron	2000	14200	34900	18000	NA	14500	10300	11300	13700	28400
Lead	500	5.0 J	15.1 J	6.4 J	NA	4.7	2.9	4.2	4.4	173. J
Magnesium	NS	5180	11000	6050	NA	3630	3110	3770	4030	6400
Manganese	NS	251. J	627. J	344. J	NA	226.	196.	250.	294.	416. J
Mercury	0.1	0.0022 U	0.028	0.0072	NA	0.0045	0.0023	0.0059	0.0021 U	0.44 J
Nickel	13	11.1	30.9	14.7	NA	9.4	7.7	9.7	11.5	23.4
Potassium	NS	1520 J	5430 J	2350 J	NA	1490	948.	1020	1390	2840 J
Selenium	2	1.1 U	1.0 U	0.88 U	NA	1.1 U	1.0 U	1.0 U	1.1 U	2.0 J
Silver	NS	0.22 U	0.21 U	0.18 U	NA	0.22 U	0.20 U	0.21 U	0.23 U	0.29 U
Sodium	NS	122.	207.	133.	NA	4.3 U	4.1 U	4.2 U	4.5 U	169.
Thallium	NS	2.2 U	2.1 UJ	1.8 UJ	NA	2.0 U	1.9 U	1.9 U	2.1 U	2.9 UJ
Vanadium	150	13.2	28.6	17.9	NA	13.1	10.0	11.7	14.6	31.5
Zinc	20	29.1	82.9	48.3	NA	32.6	22.3	25.5	30.7	130.
Total Cyanide (mg/Kg)										
Cyanide, Total	1600 (a)	.59 U	.64 U	.55 U	0.63 U	.55 U	.59 U	.57 U	.61 U	.77 U

Table 5
Subsurface Soil Analytical Results
Clove and Maple Avenue Former MGP Site - Remedial Investigation
Haverstraw, New York

Sample Location: Depth Interval in feet: Sample ID: Date Collected:	NYS RSCO	MW-28D (DUP) 8 - 10 MW-38-18-20 11/29/2001	MW-28D 30 - 30 MW-28-30 11/29/2001	MW-29D 29 - 29 MW-29-29 11/29/2001	SB/MW-29S 10 - 11 SB/MW-29S(10-11) 7/1/2004	SB/MW-30S 6.5 - 7 SB/MW-30S(6.5-7) 7/1/2004	SB/MW-30S 15 - 16 SB/MW-30S(15-16) 7/1/2004	SB/MW-31 8 - 10 SB/MW-31 8-10 7/1/2004
BTEX (mg/kg)								
Benzene	0.06	34 U	0.0009 J	0.001 J	1.3 J	0.002 J	0.012 U	0.79 J
Toluene	1.5	6.7 J	0.012 U	0.012 U	0.35 J	0.002 J	0.012 U	2.3 J
Ethylbenzene	5.5	64	0.012 U	0.012 U	19	0.16	0.003 J	39
Xylene, Total	1.2	100	0.012 U	0.012 U	11	0.2	0.011 J	60
Total BTEX	NS	170.7	0.0009	0.001	31.65	0.364	0.014	102.09
Other VOCs (mg/kg)								
Acetone	0.2	34 U	0.012 UJ	0.012 UJ	NA	NA	NA	NA
Bromodichloromethane	NS	34 U	0.012 U	0.012 U	NA	NA	NA	NA
Bromoform	NS	34 U	0.012 U	0.012 U	NA	NA	NA	NA
Chlorobenzene	1.7	34 U	0.012 U	0.012 U	NA	NA	NA	NA
Chloroform	0.3	34 U	0.012 U	0.012 U	NA	NA	NA	NA
Dichloroethane,1,2-	0.1	34 U	0.012 U	0.012 U	NA	NA	NA	NA
Methylene chloride	0.1	34 U	0.012 UJ	0.012 UJ	NA	NA	NA	NA
Styrene	NS	34 U	0.012 U	0.012 U	NA	NA	NA	NA
Tetrachloroethene	1.4	34 U	0.012 U	0.012 U	NA	NA	NA	NA
Trichloroethene	0.7	34 U	0.012 U	0.012 U	NA	NA	NA	NA
Trimethylbenzene,1,2,4-	NS	NA	NA	NA	NA	NA	NA	NA
Noncarcinogenic PAHs (mg/kg)								
Acenaphthene	50	240	0.38 U	0.4 U	170	62 J	0.21 J	97
Acenaphthylene	41	30 J	0.38 U	0.4 U	16 J	4.5 J	0.14 J	14 J
Anthracene	50	190	0.016 J	0.4 U	100	35	0.068 J	78
Benzo[g,h,i]perylene	50	37 J	0.38 U	0.04 J	23 J	8.2 J	0.38 U	16 J
Fluoranthene	50	280	0.034 J	0.4 U	120	53	0.1 J	64
Fluorene	50	220	0.38 U	0.4 U	88	31	0.2 J	64
Methylnaphthalene,1-	NS	NA	NA	NA	NA	NA	NA	NA
Methylnaphthalene,2-	36.4	430 J	0.38 U	0.017 J	140	37	0.33 J	220
Naphthalene	13	710 J	0.013 J	0.034 J	260	5 J	0.65	160
Perylene	NS	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	50	520 J	0.052 J	0.015 J	310	130	0.31 J	230
Pyrene	50	310 J	0.04 J	0.014 J	170	82 J	0.13 J	160
Carcinogenic PAHs (mg/kg)								
Benz[a]anthracene	0.224	160	0.018 J	0.4 U	47 J	25	0.048 J	52
Benzo[a]pyrene	0.061	100	0.38 U	0.4 U	40 J	20	0.38 U	37 J
Benzo[b]fluoranthene	1.1	61 J	0.38 U	0.4 U	47 J	22	0.38 U	30 J
Benzo[e]pyrene	NS	NA	NA	NA	NA	NA	NA	NA
Benzo[k]fluoranthene	1.1	110 J	0.38 U	0.4 U	75 U	17 U	0.38 U	50 U
Chrysene	0.4	140	0.019 J	0.4 U	55 J	25	0.056 J	48 J

Table 5
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Sample Location: Depth Interval in feet: Sample ID: Date Collected:		MW-28D (DUP) 8 - 10 MW-38-18-20 11/29/2001	MW-28D 30 - 30 MW-28-30 11/29/2001	MW-29D 29 - 29 MW-29-29 11/29/2001	SB/MW-29S 10 - 11 SB/MW-29S(10-11) 7/1/2004	SB/MW-30S 6.5 - 7 SB/MW-30S(6.5-7) 7/1/2004	SB/MW-30S 15 - 16 SB/MW-30S(15-16) 7/1/2004	SB/MW-31 8 - 10 SB/MW-31 8-10 7/1/2004
	NYS RSCO							
Dibenz[a,h]anthracene	0.014	14 J	0.38 U	0.4 U	75 U	17 U	0.38 U	50 U
Indeno[1,2,3-cd]pyrene	3.2	42 J	0.38 U	0.4 U	18 J	6.8 J	0.38 U	10 J
Total PAHs (mg/kg)								
Total PAHs	NS	3594	0.192	0.12	1604	546.5	2.242	1280
Other SVOCs (mg/kg)								
Biphenyl,1,1-	NS	68 J	0.38 U	0.4 U	NA	NA	NA	NA
Bis(2-ethylhexyl)phthalate	50	95 U	0.38 U	0.4 U	75 U	17 U	0.38 U	50 U
Carbazole	NS	46 J	0.38 U	0.4 U	75 U	17 U	0.38 U	50 U
Dibenzofuran	6.2	120	0.38 U	0.4 U	9.6 J	2.5 J	0.38 U	50 U
Metals (mg/Kg)								
Aluminum	NS	11700 J	6400	3850	NA	NA	NA	NA
Antimony	NS	1.1 UJ	0.84 UJ	0.92 UJ	NA	NA	NA	NA
Arsenic	7.5	5.2	1.9	1.6 J	NA	NA	NA	NA
Barium	300	124. J	50.7	27.3	NA	NA	NA	NA
Beryllium	0.16	0.12 U	0.092 U	0.10 U	NA	NA	NA	NA
Cadmium	1	0.18 UJ	0.15 UJ	0.16 UJ	NA	NA	NA	NA
Calcium	NS	4280	15100	18600	NA	NA	NA	NA
Chromium	10	15.0	9.4	7.3	NA	NA	NA	NA
Cobalt	30	5.9	5.1	3.5	NA	NA	NA	NA
Copper	25	21.2	7.8	7.8	NA	NA	NA	NA
Iron	2000	19400	14300	10900	NA	NA	NA	NA
Lead	500	152. J	5.8 J	3.8 J	NA	NA	NA	NA
Magnesium	NS	4320	4870	4110	NA	NA	NA	NA
Manganese	NS	278. J	286. J	202. J	NA	NA	NA	NA
Mercury	0.1	0.92 J	0.25	0.0034 U	NA	NA	NA	NA
Nickel	13	14.8	12.6	7.4	NA	NA	NA	NA
Potassium	NS	1740 J	2080 J	995. J	NA	NA	NA	NA
Selenium	2	1.7 J	0.90 U	0.98 U	NA	NA	NA	NA
Silver	NS	0.23 U	0.18 U	0.20 U	NA	NA	NA	NA
Sodium	NS	128.	128.	115.	NA	NA	NA	NA
Thallium	NS	2.3 UJ	1.8 U	1.8 U	NA	NA	NA	NA
Vanadium	150	20.4	15.2	12.2	NA	NA	NA	NA
Zinc	20	89.8	30.2	21.7	NA	NA	NA	NA
Total Cyanide (mg/Kg)								
Cyanide, Total	1600 (a)	.7 U	.57 U	.6 U	0.56 U	0.62 U	0.56 U	0.76 U

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Subsurface Soil Analytical Results
Clove and Maple Avenue Former MGP Site - Remedial Investigation
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Sample Location: Depth Interval in feet: Sample ID: Date Collected:	NYS RSCO	SB/MW-31 33 - 34 SB/MW-31 33-34 7/1/2004	SB/MW-32 10 - 11 SB/MW-32 10-11 7/1/2004	SB/MW-32 34 - 36 SB/MW-32 34-36 7/1/2004	SB-45 10 - 11 SB-45(10-11) 7/2/2004	SB-45 10 - 11 SB-XX(8-9) 7/2/2004	SB-45 11 - 12 SB-45(11-12) 7/2/2004	SB-45 24 - 25 SB-45(24-25) 7/15/2004	SB-45 24 - 25 SB-XX(18-20) 7/15/2004
BTEX (mg/kg)									
Benzene	0.06	0.012 U	0.2 J	0.012 U	0.6 J	0.2 J	0.003 J	0.012 U	0.012 U
Toluene	1.5	0.012 U	0.71 J	0.012 U	1.4 U	1.5 U	0.015 U	0.012 U	0.012 U
Ethylbenzene	5.5	0.012 U	22	0.012 U	3.6 J	7.4 J	0.004 J	0.012 U	0.012 U
Xylene, Total	1.2	0.012 U	24	0.012 U	1.6 J	4.3 J	0.001 J	0.012 U	0.012 U
Total BTEX	NS	ND	46.91	ND	5.8	11.9	0.008	ND	ND
Other VOCs (mg/kg)									
Acetone	0.2	NA	NA	NA	NA	NA	NA	NA	NA
Bromodichloromethane	NS	NA	NA	NA	NA	NA	NA	NA	NA
Bromoform	NS	NA	NA	NA	NA	NA	NA	NA	NA
Chlorobenzene	1.7	NA	NA	NA	NA	NA	NA	NA	NA
Chloroform	0.3	NA	NA	NA	NA	NA	NA	NA	NA
Dichloroethane, 1,2-	0.1	NA	NA	NA	NA	NA	NA	NA	NA
Methylene chloride	0.1	NA	NA	NA	NA	NA	NA	NA	NA
Styrene	NS	NA	NA	NA	NA	NA	NA	NA	NA
Tetrachloroethene	1.4	NA	NA	NA	NA	NA	NA	NA	NA
Trichloroethene	0.7	NA	NA	NA	NA	NA	NA	NA	NA
Trimethylbenzene, 1,2,4-	NS	NA	NA	NA	NA	NA	NA	NA	NA
Noncarcinogenic PAHs (mg/kg)									
Acenaphthene	50	0.39 U	110	R	150 J	66 J	0.36 J	0.16 J	0.17 J
Acenaphthylene	41	0.39 U	18 J	R	12 J	5.6 J	0.055 J	1.1	1.1
Anthracene	50	0.39 U	92	R	48	21	0.19 J	2.8	3
Benzo[g,h,i]perylene	50	0.39 U	27 J	R	9.9 J	4.3 J	0.48 U	0.55 J	0.93
Fluoranthene	50	0.39 U	85	R	70 J	33 J	0.48 J	2.8	2.5
Fluorene	50	0.39 U	78	R	58	28	0.25 J	0.85	0.87
Methylnaphthalene, 1-	NS	NA	NA	NA	NA	NA	NA	NA	NA
Methylnaphthalene, 2-	36.4	0.39 U	190	R	220 J	89 J	0.24 J	0.25 J	0.2 J
Naphthalene	13	0.073 J	170	R	310 J	98 J	0.21 J	0.75 U	0.75 U
Perylene	NS	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	50	0.39 U	280	0.13 J	170 J	82 J	0.99	4	3.5
Pyrene	50	0.39 U	210	R	100 J	47 J	0.55	4.8	4.2
Carcinogenic PAHs (mg/kg)									
Benz[a]anthracene	0.224	0.39 U	64	R	30 J	13 J	0.12 J	1.8	1.6
Benzo[a]pyrene	0.061	0.39 U	55 J	R	30 J	12 J	0.11 J	1.8	1.6
Benzo[b]fluoranthene	1.1	0.39 U	44 J	R	31 J	14 J	0.076 J	1.9 J	1.7 J
Benzo[e]pyrene	NS	NA	NA	NA	NA	NA	NA	NA	NA
Benzo[k]fluoranthene	1.1	0.39 U	61 U	R	38 U	16 U	0.073 J	0.75 UJ	0.75 UJ
Chrysene	0.4	0.39 U	63	R	33 J	15 J	0.13 J	1.9	1.6

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Dibenz[a,h]anthracene	0.014	0.39 U	61 U	R	38 U	16 U	0.48 U	0.75 U	0.21 J
Indeno[1,2,3-cd]pyrene	3.2	0.39 U	17 J	R	8.9 J	3.9 J	0.48 U	0.66 J	0.6 J
Total PAHs (mg/kg)									
Total PAHs	NS	0.073	1503	0.13	1280.8	531.8	3.834	25.37	23.78
Other SVOCs (mg/kg)									
Biphenyl,1,1-	NS	NA	NA	NA	NA	NA	NA	NA	NA
Bis(2-ethylhexyl)phthalate	50	0.39 U	61 U	R	38 U	16 U	0.83	0.75 U	0.75 U
Carbazole	NS	0.39 U	61 U	R	38 U	16 U	0.48 U	0.75 U	0.75 U
Dibenzofuran	6.2	0.39 U	61 U	R	7.2 J	3.2 J	0.48 U	0.095 J	0.1 J
Metals (mg/Kg)									
Aluminum	NS	NA	NA	NA	NA	NA	NA	NA	NA
Antimony	NS	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	7.5	NA	NA	NA	NA	NA	NA	NA	NA
Barium	300	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium	0.16	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	1	NA	NA	NA	NA	NA	NA	NA	NA
Calcium	NS	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	10	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt	30	NA	NA	NA	NA	NA	NA	NA	NA
Copper	25	NA	NA	NA	NA	NA	NA	NA	NA
Iron	2000	NA	NA	NA	NA	NA	NA	NA	NA
Lead	500	NA	NA	NA	NA	NA	NA	NA	NA
Magnesium	NS	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	NS	NA	NA	NA	NA	NA	NA	NA	NA
Mercury	0.1	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	13	NA	NA	NA	NA	NA	NA	NA	NA
Potassium	NS	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	2	NA	NA	NA	NA	NA	NA	NA	NA
Silver	NS	NA	NA	NA	NA	NA	NA	NA	NA
Sodium	NS	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	NS	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	150	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	20	NA	NA	NA	NA	NA	NA	NA	NA
Total Cyanide (mg/Kg)									
Cyanide, Total	1600 (a)	0.59 U	0.56 U	0.61 U	0.57 U	0.61 U	0.73 U	0.55 U	0.57 U

Table 5
Subsurface Soil Analytical Results
Clove and Maple Avenue Former MGP Site - Remedial Investigation
Haverstraw, New York

Sample Location: Depth Interval in feet: Sample ID: Date Collected:	NYS RSCO	SB-45 27 - 28 SB-45(27-28) 7/15/2004	SB-46 10 - 11 SB-46 10-11 7/2/2004	SB-46 14 - 15 SB-46 14-15 7/2/2004	SB-48 14 - 15 SB-48 14-15 7/1/2004	SB-49 7 - 8 SB-49 7-8 7/1/2004	SB-49 13.5 - 14.5 SB-49 13.5-14.5 7/1/2004	SB/MW-55 10 - 12 SB/MW-55(10-12) 7/12/2004	SB-56 14 - 16 SB-56(14-16) 7/12/2004	SB-57 7 - 8 SB-57(7-8) 7/12/2004
BTEX (mg/kg)										
Benzene	0.06	0.012 U	21	0.021 UJ	0.013 UJ	19	0.049 J	0.003 J	0.014 U	0.012 U
Toluene	1.5	0.012 U	6.7 J	R	R	8.6	R	0.002 J	0.014 U	0.012 U
Ethylbenzene	5.5	0.012 U	250	R	R	47	R	0.001 J	0.014 U	0.012 U
Xylene, Total	1.2	0.012 U	180	R	R	41	R	0.006 J	0.014 U	0.012 U
Total BTEX	NS	ND	457.7	ND	ND	115.6	0.049	0.012	ND	ND
Other VOCs (mg/kg)										
Acetone	0.2	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromodichloromethane	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromoform	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chlorobenzene	1.7	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloroform	0.3	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dichloroethane,1,2-	0.1	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methylene chloride	0.1	NA	NA	NA	NA	NA	NA	NA	NA	NA
Styrene	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tetrachloroethene	1.4	NA	NA	NA	NA	NA	NA	NA	NA	NA
Trichloroethene	0.7	NA	NA	NA	NA	NA	NA	NA	NA	NA
Trimethylbenzene,1,2,4-	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA
Noncarcinogenic PAHs (mg/kg)										
Acenaphthene	50	0.37 U	2700	0.36 J	0.046 J	4400	0.51	1.1 J	0.45 U	0.39 U
Acenaphthylene	41	0.15 J	210 J	0.67 U	0.43 U	830 J	0.061 J	1.2 J	0.45 UM	0.39 U
Anthracene	50	0.22 J	1400	0.18 J	0.067 J	3000	0.48	3.6	0.45 U	0.39 U
Benzo[g,h,i]perylene	50	0.075 J	400 J	0.67 U	0.43 U	420 J	2.1	2.5 J	0.45 U	0.39 U
Fluoranthene	50	0.36 J	3100	0.18 J	0.082 J	3000	0.76	17	0.45 U	0.066 J
Fluorene	50	0.13 J	1300	0.17 J	0.43 U	2400	0.36 J	1.9 J	0.45 UM	0.39 U
Methylnaphthalene,1-	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methylnaphthalene,2-	36.4	0.07 J	810 J	0.27 J	0.045 J	4700	0.62	0.34 J	0.45 U	0.39 U
Naphthalene	13	0.37 U	1700	0.52 J	0.054 J	8100	0.45 J	0.54 JM	0.45 U	0.046 J
Perylene	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	50	0.67	5600	0.68	0.22 J	8500	1.7	6.6	0.058 J	0.048 J
Pyrene	50	0.57	3900	0.27 J	0.17 J	4400	2.2	20	0.05 J	0.11 J
Carcinogenic PAHs (mg/kg)										
Benz[a]anthracene	0.224	0.2 J	1200	0.67 U	0.055 J	1400 J	0.5	10	0.45 U	0.39 U
Benzo[a]pyrene	0.061	0.18 J	1000	0.67 U	0.43 U	1100 J	1.1	8.1	0.45 U	0.39 U
Benzo[b]fluoranthene	1.1	0.21 J	1100	0.67 U	0.43 U	480 J	0.4 J	12 M	0.45 U	0.39 U
Benzo[e]pyrene	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo[k]fluoranthene	1.1	0.37 UJ	960 U	0.67 U	0.43 U	610 J	0.46 U	3.3 U	0.45 U	0.39 U
Chrysene	0.4	0.19 J	1100	0.072 J	0.062 J	1300 J	0.46	9.9	0.45 U	0.068 J

Table 5
Subsurface Soil Analytical Results
Clove and Maple Avenue Former MGP Site - Remedial Investigation
Haverstraw, New York

Sample Location: Depth Interval in feet: Sample ID: Date Collected:	NYS RSCO	SB-45 27 - 28 SB-45(27-28) 7/15/2004	SB-46 10 - 11 SB-46 10-11 7/2/2004	SB-46 14 - 15 SB-46 14-15 7/2/2004	SB-48 14 - 15 SB-48 14-15 7/1/2004	SB-49 7 - 8 SB-49 7-8 7/1/2004	SB-49 13.5 - 14.5 SB-49 13.5-14.5 7/1/2004	SB/MW-55 10 - 12 SB/MW-55(10-12) 7/12/2004	SB-56 14 - 16 SB-56(14-16) 7/12/2004	SB-57 7 - 8 SB-57(7-8) 7/12/2004
Dibenz[a,h]anthracene	0.014	0.37 U	960 U	0.67 U	0.43 U	2000 U	0.46 U	1.6 J	0.45 U	0.39 U
Indeno[1,2,3-cd]pyrene	3.2	0.066 J	330 J	0.67 U	0.43 U	300 J	0.24 J	3.4 H	0.45 U	0.39 U
Total PAHs (mg/kg)										
Total PAHs	NS	3.091	25850	2.702	0.801	44940	11.941	99.78	0.180	0.338
Other SVOCs (mg/kg)										
Biphenyl,1,1-	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bis(2-ethylhexyl)phthalate	50	0.37 U	960 U	0.67 U	0.18 J	2000 U	0.24 J	3.3 UB	0.45 UB	0.39 U
Carbazole	NS	0.37 U	960 U	0.67 U	0.43 U	2000 U	0.46 U	3.3 U	0.45 U	0.39 U
Dibenzofuran	6.2	0.37 U	130 J	0.67 U	0.43 U	260 J	0.46 U	0.47 J	0.45 UM	0.39 U
Metals (mg/Kg)										
Aluminum	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA
Antimony	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	7.5	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium	300	NA	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium	0.16	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	1	NA	NA	NA	NA	NA	NA	NA	NA	NA
Calcium	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	10	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt	30	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper	25	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iron	2000	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	500	NA	NA	NA	NA	NA	NA	NA	NA	NA
Magnesium	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mercury	0.1	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	13	NA	NA	NA	NA	NA	NA	NA	NA	NA
Potassium	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	2	NA	NA	NA	NA	NA	NA	NA	NA	NA
Silver	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sodium	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	150	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	20	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Cyanide (mg/Kg)										
Cyanide, Total	1600 (a)	0.56 U	0.71 U	1.0 UJ	0.64 U	0.32 J	0.66 U	0.64 U	0.65 U	0.57 U

Table 5 Subsurface Soil Analytical Results Clove and Maple Avenue Former MGP Site - Remedial Investigation Haverstraw, New York								
Sample Location: Depth Interval in feet: Sample ID: Date Collected:	NYS RSCO	SB-58 8 - 9 SB-58(8-9) 7/12/2004	SB-58 16 - 18 SB-58(16-18) 7/12/2004	SB-59 15.5 - 16 SB-59(15.5-16) 7/12/2004	SB-59 18 - 19 SB-59(18-19) 7/12/2004	SB/MW-60 8 - 9 SB/MW-60(8-9) 7/13/2004	SB/MW-60 13 - 14 SB/MW-60(13-14) 7/13/2004	TP05 12 - 13 C&MTP-05(12-13) 10/18/1998
BTEX (mg/kg)								
Benzene	0.06	11 J	0.8	2.13 UB	0.013 UJ	2.1 U	0.013 UJ	1.5 U
Toluene	1.5	1.9 J	0.07 U	2.13 UB	R	0.27 J	R	1.5 U
Ethylbenzene	5.5	130	0.25	17.9	R	0.82 J	R	4.7
Xylene, Total	1.2	110	0.17	17.2	R	1.3 J	R	9.8
Total BTEX	NS	252.9	1.22	35.1	ND	2.39	ND	14.5
Other VOCs (mg/kg)								
Acetone	0.2	NA	NA	NA	NA	NA	NA	1.5 UJ
Bromodichloromethane	NS	NA	NA	NA	NA	NA	NA	1.5 U
Bromoform	NS	NA	NA	NA	NA	NA	NA	1.5 U
Chlorobenzene	1.7	NA	NA	NA	NA	NA	NA	1.5 U
Chloroform	0.3	NA	NA	NA	NA	NA	NA	1.5 U
Dichloroethane,1,2-	0.1	NA	NA	NA	NA	NA	NA	1.5 U
Methylene chloride	0.1	NA	NA	NA	NA	NA	NA	2
Styrene	NS	NA	NA	5.1	NA	NA	NA	1.5 U
Tetrachloroethene	1.4	NA	NA	NA	NA	NA	NA	1.5 U
Trichloroethene	0.7	NA	NA	NA	NA	NA	NA	1.5 U
Trimethylbenzene,1,2,4-	NS	NA	NA	24.0	NA	NA	NA	NA
Noncarcinogenic PAHs (mg/kg)								
Acenaphthene	50	1200	0.25 J	521.0	0.43 U	560	0.43 UJ	NA
Acenaphthylene	41	87 J	0.46 U	73.6	0.43 U	94 J	0.43 UJ	NA
Anthracene	50	570	0.099 J	227.0	0.43 U	500	0.43 UJ	NA
Benzo[g,h,i]perylene	50	400 U	0.46 U	78.4 B	0.43 U	460 U	0.43 UJ	NA
Fluoranthene	50	690	0.14 J	455.0	0.061 J	910	0.43 UJ	NA
Fluorene	50	550	0.14 J	320.0	0.43 U	370 J	0.43 UJ	NA
Methylnaphthalene,1-	NS	NA	NA	367.0	NA	NA	NA	NA
Methylnaphthalene,2-	36.4	1200	0.29 J	532.0	0.43 U	510	0.43 UJ	NA
Naphthalene	13	3000	3.1	760.0	0.046 J	450 J	0.43 UJ	NA
Perylene	NS	NA	NA	26.1	NA	NA	NA	NA
Phenanthrene	50	1900	0.36 J	1040.0	0.13 J	1900	0.43 UJ	NA
Pyrene	50	920	0.16 J	609.0	0.092 J	1300	0.045 J	NA
Carcinogenic PAHs (mg/kg)								
Benz[a]anthracene	0.224	260 J	0.065 J	203.0	0.43 U	460	0.43 UJ	NA
Benzo[a]pyrene	0.061	180 J	0.46 U	178.0	0.43 U	310 J	0.43 UJ	NA
Benzo[b]fluoranthene	1.1	91 J	0.46 U	128.0	0.43 U	180 J	0.43 UJ	NA
Benzo[e]pyrene	NS	NA	NA	92.1	NA	NA	NA	NA
Benzo[k]fluoranthene	1.1	130 J	0.46 U	50.5	0.43 U	230 J	0.43 UJ	NA
Chrysene	0.4	280 J	0.063 J	182.0	0.43 U	560	0.43 UJ	NA

Table 5 Subsurface Soil Analytical Results Clove and Maple Avenue Former MGP Site - Remedial Investigation Haverstraw, New York								
Sample Location: Depth Interval in feet: Sample ID: Date Collected:	NYS RSCO	SB-58 8 - 9 SB-58(8-9) 7/12/2004	SB-58 16 - 18 SB-58(16-18) 7/12/2004	SB-59 15.5 - 16 SB-59(15.5-16) 7/12/2004	SB-59 18 - 19 SB-59(18-19) 7/12/2004	SB/MW-60 8 - 9 SB/MW-60(8-9) 7/13/2004	SB/MW-60 13 - 14 SB/MW-60(13-14) 7/13/2004	TP05 12 - 13 C&MTP-05(12-13) 10/18/1998
Dibenz[a,h]anthracene	0.014	400 U	0.46 U	18.9	0.43 U	460 U	0.43 UJ	NA
Indeno[1,2,3-cd]pyrene	3.2	60 J	0.46 U	67.5	0.43 U	130 J	0.43 UJ	NA
Total PAHs (mg/kg)								
Total PAHs	NS	11118	0.128	5930	0.329	8464	0.045	NA
Other SVOCs (mg/kg)								
Biphenyl,1,1-	NS	NA	NA	NA	NA	NA	NA	NA
Bis(2-ethylhexyl)phthalate	50	400 U	0.15 J	NA	0.87 U	460 UB	0.43 UJ	NA
Carbazole	NS	400 U	0.46 U	NA	0.43 U	460 U	0.43 UJ	NA
Dibenzofuran	6.2	54 J	0.46 U	31.5	0.43 U	460 U	0.43 UJ	NA
Metals (mg/Kg)								
Aluminum	NS	NA	NA	NA	NA	NA	NA	16200
Antimony	NS	NA	NA	NA	NA	NA	NA	R
Arsenic	7.5	NA	NA	NA	NA	NA	NA	9 J
Barium	300	NA	NA	NA	NA	NA	NA	136
Beryllium	0.16	NA	NA	NA	NA	NA	NA	0.8 BJ
Cadmium	1	NA	NA	NA	NA	NA	NA	1.1 BJ
Calcium	NS	NA	NA	NA	NA	NA	NA	30900 J*
Chromium	10	NA	NA	NA	NA	NA	NA	25.3
Cobalt	30	NA	NA	NA	NA	NA	NA	15.3 BJ
Copper	25	NA	NA	NA	NA	NA	NA	31.1
Iron	2000	NA	NA	NA	NA	NA	NA	31700 EJ
Lead	500	NA	NA	NA	NA	NA	NA	14.4 J
Magnesium	NS	NA	NA	NA	NA	NA	NA	7950
Manganese	NS	NA	NA	NA	NA	NA	NA	598 EJ
Mercury	0.1	NA	NA	NA	NA	NA	NA	0.09 U
Nickel	13	NA	NA	NA	NA	NA	NA	29.7
Potassium	NS	NA	NA	NA	NA	NA	NA	3290
Selenium	2	NA	NA	NA	NA	NA	NA	0.82 UJN
Silver	NS	NA	NA	NA	NA	NA	NA	1.19 BJ
Sodium	NS	NA	NA	NA	NA	NA	NA	484 B
Thallium	NS	NA	NA	NA	NA	NA	NA	0.7 U
Vanadium	150	NA	NA	NA	NA	NA	NA	29.1
Zinc	20	NA	NA	NA	NA	NA	NA	77.7
Total Cyanide (mg/Kg)								
Cyanide, Total	1600 (a)	0.62 U	0.67 U	NA	0.66 U	0.073 B	0.63 U	1.2 U

Table 6
Groundwater Analytical Results
Clove and Maple Avenue Former MGP Site - Remedial Investigation
Haverstraw, New York

Site Location:	NY	146 MAPLE	146 MAPLE	146 MAPLE	146 MAPLE	146 MAPLE	APTS	APTS
Sample Location:	Ambient	MW11	MW11	MW11	MW-24	MW-24	MW-20D	MW-20D
Sample ID:	GW	CMMW11-01	MW-11	MW-11	MW-24	MW-24	MW-20	MW-20D
Date Collected:	Limits	2/2/1999	12/19/2001	8/2/2004	12/18/2001	8/2/2004	12/17/2001	8/4/2004
BTEX (ug/l)								
Benzene	1.0	10 U	10 U	10 U	10 U	10 U	15	10 U
Ethylbenzene	5	10 U	10 U	10 U	10 U	10 U	11	10 U
Toluene	5	10 U	10 U	10 U	10 U	10 U	10	10 U
Xylene, Total	5	10 U	10 U	10 U	10 U	10 U	22	10 U
Total BTEX	NS	ND	ND	ND	ND	ND	58	ND
Other VOCs (ug/l)								
Acetone	NS	10 U	10 UB	NA	10 UB	NA	10 UJ	NA
Butanone,2- (MEK)	NS	10 U	10 UJ	NA	10 UJ	NA	10 U	NA
Chloroform	7	10 U	10 U	NA	10 U	NA	0.5 J	NA
Dichloropropene, trans-1,3	5	10 U	10 U	NA	10 U	NA	10 U	NA
Methyl-2-pentanone,4-	NS	10 U	10 UJ	NA	10 UJ	NA	10 UJ	NA
Methylene chloride	5	10 U	10 U	NA	10 U	NA	10 U	NA
Styrene	5	10 U	10 U	NA	10 U	NA	3 J	NA
Tetrachloroethane,1,1,2,2-	5	10 U	10 U	NA	10 U	NA	10 U	NA
Trichloroethane,1,1,1-	5	10 U	10 U	NA	10 U	NA	10 U	NA
Trichloroethane,1,1,2-	1	10 U	10 U	NA	10 U	NA	10 U	NA
Noncarcinogenic PAHs (ug/l)								
Acenaphthene	20	10 U	10 U	11 U	10 U	10 U	18 J	10 U
Acenaphthylene	50	10 U	10 U	11 U	10 U	10 U	20 U	10 U
Anthracene	50	10 U	10 U	11 U	10 U	10 U	20 U	10 U
Benzo[g,h,i]perylene	NS	10 U	10 U	11 U	10 U	10 U	20 U	10 U
Fluoranthene	50	10 U	10 U	11 U	10 U	10 U	20 U	10 U
Fluorene	50	10 U	10 U	11 U	10 U	10 U	4 J	10 U
Methylnaphthalene,2-	NS	1 J	10 U	11 U	10 U	10 U	16 J	10 U
Naphthalene	10	16	10 U	11 U	10 U	10 U	92	10 U
Phenanthrene	50	10 U	10 U	11 U	10 U	10 U	3 J	10 U
Pyrene	50	10 U	10 U	11 U	10 U	10 U	20 U	10 U
Carcinogenic PAHs (ug/l)								
Benz[a]anthracene	0.002	10 U	10 U	11 U	10 U	10 U	20 U	10 U
Benzo[a]pyrene	0.002	10 U	10 U	11 U	10 U	10 U	20 U	10 U
Benzo[b]fluoranthene	0.002	10 U	10 U	11 U	10 U	10 U	20 U	10 U
Benzo[k]fluoranthene	0.002	10 U	10 U	11 U	10 U	10 U	20 U	10 U
Chrysene	0.002	10 U	10 U	11 U	10 U	10 U	20 U	10 U
Dibenz[a,h]anthracene	NS	10 U	10 U	11 U	10 U	10 U	20 U	10 U
Indeno[1,2,3-cd]pyrene	0.002	10 U	10 U	11 U	10 U	10 U	20 U	10 U
Total PAHs (ug/L)								
Total PAHs	NS	17	ND	ND	10	ND	213	10
Other SVOCs (ug/L)								
Benzaldehyde	NS	NA	10 U	NA	10 U	NA	20 U	NA
Biphenyl,1,1-	NS	NA	10 U	NA	10 U	NA	20 U	NA
Bis(2-ethylhexyl)phthalate	5	10 U	10 U	11 U	10 U	10 U	20 U	10 U
Carbazole	NS	10 UJ	10 U	11 U	10 U	10 U	20 U	10 U
Dibenzofuran	NS	10 U	10 U	11 U	10 U	10 U	20 U	10 U
Diethyl phthalate	50	10 U	10 U	11 U	10 U	10 U	20 U	10 U
Dimethylphenol, 2,4-	1	10 U	10 UJ	11 UJ	10 UJ	10 UJ	20 U	10 U
Di-n-butyl phthalate	50	10 U	10 U	11 U	10 U	10 U	20 U	10 U
Methylphenol, 4-	1	10 U	10 UJ	11 U	10 UJ	10 U	20 U	10 U
N-Nitrosodiphenylamine	50	10 U	10 U	11 U	10 U	10 U	20 U	10 U
Phenol	1	10 U	10 U	11 U	10 U	10 U	20 U	10 U

Table 6
Groundwater Analytical Results
Clove and Maple Avenue Former MGP Site - Remedial Investigation
Haverstraw, New York

Site Location:	NY	146 MAPLE	146 MAPLE	146 MAPLE	146 MAPLE	146 MAPLE	APTS	APTS
Sample Location:	Ambient	MW11	MW11	MW11	MW-24	MW-24	MW-20D	MW-20D
Sample ID:	GW	CMMW11-01	MW-11	MW-11	MW-24	MW-24	MW-20	MW-20D
Date Collected:	Limits	2/2/1999	12/19/2001	8/2/2004	12/18/2001	8/2/2004	12/17/2001	8/4/2004
Dissolved Metals (ug/l)								
Aluminum	100	NA	NA	NA	NA	NA	NA	NA
Arsenic	25	NA	NA	NA	NA	NA	NA	NA
Barium	1000	NA	NA	NA	NA	NA	NA	NA
Beryllium	3	NA	NA	NA	NA	NA	NA	NA
Calcium	NS	NA	NA	NA	NA	NA	NA	NA
Chromium	50	NA	NA	NA	NA	NA	NA	NA
Cobalt	5	NA	NA	NA	NA	NA	NA	NA
Copper	200	NA	NA	NA	NA	NA	NA	NA
Iron	300	NA	NA	NA	NA	NA	NA	NA
Lead	25	NA	NA	NA	NA	NA	NA	NA
Magnesium	35000	NA	NA	NA	NA	NA	NA	NA
Manganese	300	NA	NA	NA	NA	NA	NA	NA
Mercury	0.7	NA	NA	NA	NA	NA	NA	NA
Nickel	100	NA	NA	NA	NA	NA	NA	NA
Potassium	NS	NA	NA	NA	NA	NA	NA	NA
Selenium	10	NA	NA	NA	NA	NA	NA	NA
Sodium	20000	NA	NA	NA	NA	NA	NA	NA
Thallium	0.5	NA	NA	NA	NA	NA	NA	NA
Vanadium	14	NA	NA	NA	NA	NA	NA	NA
Zinc	2000	NA	NA	NA	NA	NA	NA	NA
Total Metals (ug/l)								
Aluminum	100	110 BJ	NA	NA	NA	NA	NA	NA
Arsenic	25	1.2 U	NA	NA	NA	NA	NA	NA
Barium	1000	68 B	NA	NA	NA	NA	NA	NA
Beryllium	3	0.1 U	NA	NA	NA	NA	NA	NA
Calcium	NS	116000	NA	NA	NA	NA	NA	NA
Chromium	50	0.6 U	NA	NA	NA	NA	NA	NA
Cobalt	5	1.4 B	NA	NA	NA	NA	NA	NA
Copper	200	2.7 UB	NA	NA	NA	NA	NA	NA
Iron	300	197	NA	NA	NA	NA	NA	NA
Lead	25	2.8 UBJ	NA	NA	NA	NA	NA	NA
Magnesium	35000	31400	NA	NA	NA	NA	NA	NA
Manganese	300	566	NA	NA	NA	NA	NA	NA
Mercury	0.7	0.2 U	NA	NA	NA	NA	NA	NA
Nickel	100	1.1 UB	NA	NA	NA	NA	NA	NA
Potassium	NS	4120 JBE	NA	NA	NA	NA	NA	NA
Selenium	10	1.6 U	NA	NA	NA	NA	NA	NA
Sodium	20000	22700 EJ	NA	NA	NA	NA	NA	NA
Thallium	0.5	1.1 U	NA	NA	NA	NA	NA	NA
Vanadium	14	1.2 U	NA	NA	NA	NA	NA	NA
Zinc	2000	7.7 UBJ	NA	NA	NA	NA	NA	NA
Cyanides (ug/L)								
Cyanide, Total	200	NA	11.6	19.4	58.5	54.8	3 U	10 U
Cyanide, Weak Acid Dissociable	NS	NA	3.2 J	NA	5.5 J	NA	3 UJ	NA

Table 6
Groundwater Analytical Results
Clove and Maple Avenue Former MGP Site - Remedial Investigaiton
Haverstraw, New York

Site Location: Sample Location: Sample ID: Date Collected:	NY Ambient GW Limits	APTS MW-20S MW-20S 8/4/2004	APTS MW-21 MW-21 12/17/2001	APTS MW-21 MW-21 8/4/2004	APTS MW-28D MW-28 12/18/2001	APTS MW-28D MW-28D 8/5/2004	APTS MW-28S MW-28S 8/5/2004	APTS MW-29D MW-29 12/18/2001	APTS MW-29D MW-29D 8/5/2004
BTEX (ug/l)									
Benzene	1.0	64	10 U	10 U	0.4 J	10 U	51	10 U	10 U
Ethylbenzene	5	140	10 U	10 U	0.5 J	10 U	65	10 U	10 U
Toluene	5	1 J	10 U	10 U	0.2 J	10 U	3 J	10 U	10 U
Xylene, Total	5	50	10 U	10 U	0.4 J	10 U	94	10 U	10 U
Total BTEX	NS	255	ND	ND	1.5	ND	213	ND	ND
Other VOCs (ug/l)									
Acetone	NS	NA	10 U	NA	10 UJ	NA	NA	10 U	NA
Butanone,2- (MEK)	NS	NA	10 U	NA	10 U	NA	NA	10 U	NA
Chloroform	7	NA	10 U	NA	10 U	NA	NA	0.3 J	NA
Dichloropropene, trans-1,3	5	NA	10 U	NA	10 U	NA	NA	10 U	NA
Methyl-2-pentanone,4-	NS	NA	10 UJ	NA	10 UJ	NA	NA	10 UJ	NA
Methylene chloride	5	NA	10 U	NA	10 U	NA	NA	10 U	NA
Styrene	5	NA	10 U	NA	10 U	NA	NA	10 U	NA
Tetrachloroethane,1,1,2,2-	5	NA	10 U	NA	10 U	NA	NA	10 U	NA
Trichloroethane,1,1,1-	5	NA	10 U	NA	10 U	NA	NA	10 U	NA
Trichloroethane,1,1,2-	1	NA	10 U	NA	10 U	NA	NA	10 U	NA
Noncarcinogenic PAHs (ug/l)									
Acenaphthene	20	330 J	10 U	10 U	8 J	2 J	65	10 U	11 U
Acenaphthylene	50	520 U	10 U	10 U	37	21	40 U	10 U	11 U
Anthracene	50	520 U	10 U	10 U	10 U	10 U	6 J	10 U	11 U
Benzo[g,h,i]perylene	NS	520 U	10 UJ	10 U	10 UJ	10 U	40 U	10 UJ	11 U
Fluoranthene	50	520 U	10 U	10 U	10 U	10 U	40 U	10 U	11 U
Fluorene	50	110 J	10 U	10 U	1 J	10 U	38 J	10 U	11 U
Methylnaphthalene,2-	NS	590	10 U	10 U	3 J	10 U	130	10 U	11 U
Naphthalene	10	2700	10 U	10 U	21	10 U	280	10 U	11 U
Phenanthrene	50	110 J	10 U	10 U	7 J	10 U	32 J	10 U	11 U
Pyrene	50	520 U	10 U	10 U	10 U	10 U	40 U	10 U	11 U
Carcinogenic PAHs (ug/l)									
Benz[a]anthracene	0.002	520 U	10 U	10 U	10 U	10 U	40 U	10 U	11 U
Benzo[a]pyrene	0.002	520 U	10 U	10 U	10 U	10 U	40 U	10 U	11 U
Benzo[b]fluoranthene	0.002	520 U	10 U	10 U	10 U	10 U	40 U	10 U	11 U
Benzo[k]fluoranthene	0.002	520 U	10 U	10 U	10 U	10 U	40 U	10 U	11 U
Chrysene	0.002	520 U	10 UJ	10 U	10 UJ	10 U	40 U	10 UJ	11 U
Dibenz[a,h]anthracene	NS	520 U	10 U	10 U	10 U	10 U	40 U	10 U	11 U
Indeno[1,2,3-cd]pyrene	0.002	520 U	10 UJ	10 U	10 UJ	10 U	40 U	10 UJ	11 U
Total PAHs (ug/L)									
Total PAHs	NS	3840	10	ND	107	23	551	60	ND
Other SVOCs (ug/L)									
Benzaldehyde	NS	NA	10 U	NA	10 U	NA	NA	10 U	NA
Biphenyl,1,1-	NS	NA	10 U	NA	10	NA	NA	10 U	NA
Bis(2-ethylhexyl)phthalate	5	520 U	10 U	10 U	10 U	10 U	40 U	10 U	11 U
Carbazole	NS	520 U	10 U	10 U	1 J	10 U	34 J	10 U	11 U
Dibenzofuran	NS	520 U	10 U	10 U	2 J	10 U	33 J	10 U	11 U
Diethyl phthalate	50	520 U	10 U	10 U	10 U	10 U	40 U	10 U	11 U
Dimethylphenol, 2,4-	1	520 U	10 U	10 U	10 U	10 UJ	40 UJ	10 U	11 UJ
Di-n-butyl phthalate	50	520 U	10 U	10 U	10 U	10 U	40 U	10 U	11 U
Methylphenol, 4-	1	520 U	10 U	10 U	10 U	10 U	40 U	10 U	11 U
N-Nitrosodiphenylamine	50	520 U	10 U	10 U	10 U	10 U	40 U	10 U	11 U
Phenol	1	520 U	10 U	10 U	10 U	10 U	40 U	10 U	11 U

Table 6
Groundwater Analytical Results
Clove and Maple Avenue Former MGP Site - Remedial Investigaiton
Haverstraw, New York

Site Location: Sample Location: Sample ID: Date Collected:	NY Ambient GW Limits	APTS MW-20S MW-20S 8/4/2004	APTS MW-21 MW-21 12/17/2001	APTS MW-21 MW-21 8/4/2004	APTS MW-28D MW-28 12/18/2001	APTS MW-28D MW-28D 8/5/2004	APTS MW-28S MW-28S 8/5/2004	APTS MW-29D MW-29 12/18/2001	APTS MW-29D MW-29D 8/5/2004
Dissolved Metals (ug/l)									
Aluminum	100	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	25	NA	NA	NA	NA	NA	NA	NA	NA
Barium	1000	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium	3	NA	NA	NA	NA	NA	NA	NA	NA
Calcium	NS	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	50	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt	5	NA	NA	NA	NA	NA	NA	NA	NA
Copper	200	NA	NA	NA	NA	NA	NA	NA	NA
Iron	300	NA	NA	NA	NA	NA	NA	NA	NA
Lead	25	NA	NA	NA	NA	NA	NA	NA	NA
Magnesium	35000	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	300	NA	NA	NA	NA	NA	NA	NA	NA
Mercury	0.7	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	100	NA	NA	NA	NA	NA	NA	NA	NA
Potassium	NS	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	10	NA	NA	NA	NA	NA	NA	NA	NA
Sodium	20000	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	0.5	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	14	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	2000	NA	NA	NA	NA	NA	NA	NA	NA
Total Metals (ug/l)									
Aluminum	100	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	25	NA	NA	NA	NA	NA	NA	NA	NA
Barium	1000	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium	3	NA	NA	NA	NA	NA	NA	NA	NA
Calcium	NS	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	50	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt	5	NA	NA	NA	NA	NA	NA	NA	NA
Copper	200	NA	NA	NA	NA	NA	NA	NA	NA
Iron	300	NA	NA	NA	NA	NA	NA	NA	NA
Lead	25	NA	NA	NA	NA	NA	NA	NA	NA
Magnesium	35000	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	300	NA	NA	NA	NA	NA	NA	NA	NA
Mercury	0.7	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	100	NA	NA	NA	NA	NA	NA	NA	NA
Potassium	NS	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	10	NA	NA	NA	NA	NA	NA	NA	NA
Sodium	20000	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	0.5	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	14	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	2000	NA	NA	NA	NA	NA	NA	NA	NA
Cyanides (ug/L)									
Cyanide, Total	200	2.4 J	3 U	10 UJ	3 U	10 UJ	0.73 UJ	3 U	10 UJ
Cyanide, Weak Acid Dissociable	NS	NA	3 UJ	NA	3 UJ	NA	NA	3 UJ	NA

Table 6
Groundwater Analytical Results
Clove and Maple Avenue Former MGP Site - Remedial Investigation
Haverstraw, New York

Site Location: Sample Location: Sample ID: Date Collected:	NY Ambient GW Limits	APTS MW-29S MW-29S 8/5/2004	APTS MW-31D MW-31D 8/5/2004	APTS MW-31D MW-XX 8/5/2004	APTS MW-31S MW-31S 8/4/2004	APTS MW-32I MW-32I 8/4/2004	APTS MW-32S MW-32S 8/4/2004	APTS MW-55 MW-55 8/4/2004
BTEX (ug/l)								
Benzene	1.0	240	10 U	10 U	0.9 J	4 J	20	10 U
Ethylbenzene	5	210	10 U	10 U	30	2 J	120	10 U
Toluene	5	4 J	10 U	10 U	4 J	10 U	6 J	10 U
Xylene, Total	5	160	10 U	10 U	47	4 J	110	10 U
Total BTEX	NS	614	ND	ND	81.9	10	256	ND
Other VOCs (ug/l)								
Acetone	NS	NA	NA	NA	NA	NA	NA	NA
Butanone,2- (MEK)	NS	NA	NA	NA	NA	NA	NA	NA
Chloroform	7	NA	NA	NA	NA	NA	NA	NA
Dichloropropene, trans-1,3	5	NA	NA	NA	NA	NA	NA	NA
Methyl-2-pentanone,4-	NS	NA	NA	NA	NA	NA	NA	NA
Methylene chloride	5	NA	NA	NA	NA	NA	NA	NA
Styrene	5	NA	NA	NA	NA	NA	NA	NA
Tetrachloroethane,1,1,2,2-	5	NA	NA	NA	NA	NA	NA	NA
Trichloroethane,1,1,1-	5	NA	NA	NA	NA	NA	NA	NA
Trichloroethane,1,1,2-	1	NA	NA	NA	NA	NA	NA	NA
Noncarcinogenic PAHs (ug/l)								
Acenaphthene	20	250	11 U	11 U	2 J	31	60	2 J
Acenaphthylene	50	220 U	11 U	11 U	11 UJ	100	3 J	10 U
Anthracene	50	220 U	11 U	11 U	11 UJ	20 U	6 J	10 U
Benzo[g,h,i]perylene	NS	220 U	11 U	11 U	11 UJ	20 U	10 U	10 U
Fluoranthene	50	220 U	11 U	11 U	11 UJ	20 U	5 J	10 U
Fluorene	50	64 J	11 U	11 U	11 UJ	20 U	35	10 U
Methylnaphthalene,2-	NS	210 J	11 U	11 U	8 J	3 J	13	10 U
Naphthalene	10	1300	11 U	11 U	17 J	19 J	27	10 U
Phenanthrene	50	74 J	11 U	11 U	2 J	19 J	35	1 J
Pyrene	50	220 U	11 U	11 U	11 UJ	20 U	9 J	1 J
Carcinogenic PAHs (ug/l)								
Benz[a]anthracene	0.002	220 U	11 U	11 U	11 UJ	20 U	10 U	10 U
Benzo[a]pyrene	0.002	220 U	11 U	11 U	11 UJ	20 U	10 U	10 U
Benzo[b]fluoranthene	0.002	220 U	11 U	11 U	11 UJ	20 U	10 U	10 U
Benzo[k]fluoranthene	0.002	220 U	11 U	11 U	11 UJ	20 U	10 U	10 U
Chrysene	0.002	220 U	11 U	11 U	11 UJ	20 U	10 U	10 U
Dibenz[a,h]anthracene	NS	220 U	11 U	11 U	11 UJ	20 U	10 U	10 U
Indeno[1,2,3-cd]pyrene	0.002	220 U	11 U	11 U	11 UJ	20 U	10 U	10 U
Total PAHs (ug/L)								
Total PAHs	NS	1898	ND	ND	29	172	193	4
Other SVOCs (ug/L)								
Benzaldehyde	NS	NA	NA	NA	NA	NA	NA	NA
Biphenyl,1,1-	NS	NA	NA	NA	NA	NA	NA	NA
Bis(2-ethylhexyl)phthalate	5	220 U	11 U	6 J	11 J	20 U	10 U	10 U
Carbazole	NS	220 U	11 U	11 U	11 UJ	3 J	10 U	10 U
Dibenzofuran	NS	220 U	11 U	11 U	11 UJ	4 J	4 J	10 U
Diethyl phthalate	50	220 U	11 U	11 U	11 UJ	20 U	10 U	10 U
Dimethylphenol, 2,4-	1	220 UJ	11 UJ	11 UJ	11 UJ	20 UJ	1 J	10 U
Di-n-butyl phthalate	50	220 U	11 U	11 U	11 UJ	20 U	10 U	10 U
Methylphenol, 4-	1	220 U	11 U	11 U	2 J	20 U	10 U	10 U
N-Nitrosodiphenylamine	50	220 U	11 U	11 U	11 UJ	20 U	10 U	10 U
Phenol	1	220 U	11 U	11 U	11 UJ	20 U	10 U	10 U

Table 6
Groundwater Analytical Results
Clove and Maple Avenue Former MGP Site - Remedial Investigation
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Site Location: Sample Location: Sample ID: Date Collected:	NY Ambient GW Limits	APTS MW-29S MW-29S 8/5/2004	APTS MW-31D MW-31D 8/5/2004	APTS MW-31D MW-XX 8/5/2004	APTS MW-31S MW-31S 8/4/2004	APTS MW-32I MW-32I 8/4/2004	APTS MW-32S MW-32S 8/4/2004	APTS MW-55 MW-55 8/4/2004
Dissolved Metals (ug/l)								
Aluminum	100	NA	NA	NA	NA	NA	NA	NA
Arsenic	25	NA	NA	NA	NA	NA	NA	NA
Barium	1000	NA	NA	NA	NA	NA	NA	NA
Beryllium	3	NA	NA	NA	NA	NA	NA	NA
Calcium	NS	NA	NA	NA	NA	NA	NA	NA
Chromium	50	NA	NA	NA	NA	NA	NA	NA
Cobalt	5	NA	NA	NA	NA	NA	NA	NA
Copper	200	NA	NA	NA	NA	NA	NA	NA
Iron	300	NA	NA	NA	NA	NA	NA	NA
Lead	25	NA	NA	NA	NA	NA	NA	NA
Magnesium	35000	NA	NA	NA	NA	NA	NA	NA
Manganese	300	NA	NA	NA	NA	NA	NA	NA
Mercury	0.7	NA	NA	NA	NA	NA	NA	NA
Nickel	100	NA	NA	NA	NA	NA	NA	NA
Potassium	NS	NA	NA	NA	NA	NA	NA	NA
Selenium	10	NA	NA	NA	NA	NA	NA	NA
Sodium	20000	NA	NA	NA	NA	NA	NA	NA
Thallium	0.5	NA	NA	NA	NA	NA	NA	NA
Vanadium	14	NA	NA	NA	NA	NA	NA	NA
Zinc	2000	NA	NA	NA	NA	NA	NA	NA
Total Metals (ug/l)								
Aluminum	100	NA	NA	NA	NA	NA	NA	NA
Arsenic	25	NA	NA	NA	NA	NA	NA	NA
Barium	1000	NA	NA	NA	NA	NA	NA	NA
Beryllium	3	NA	NA	NA	NA	NA	NA	NA
Calcium	NS	NA	NA	NA	NA	NA	NA	NA
Chromium	50	NA	NA	NA	NA	NA	NA	NA
Cobalt	5	NA	NA	NA	NA	NA	NA	NA
Copper	200	NA	NA	NA	NA	NA	NA	NA
Iron	300	NA	NA	NA	NA	NA	NA	NA
Lead	25	NA	NA	NA	NA	NA	NA	NA
Magnesium	35000	NA	NA	NA	NA	NA	NA	NA
Manganese	300	NA	NA	NA	NA	NA	NA	NA
Mercury	0.7	NA	NA	NA	NA	NA	NA	NA
Nickel	100	NA	NA	NA	NA	NA	NA	NA
Potassium	NS	NA	NA	NA	NA	NA	NA	NA
Selenium	10	NA	NA	NA	NA	NA	NA	NA
Sodium	20000	NA	NA	NA	NA	NA	NA	NA
Thallium	0.5	NA	NA	NA	NA	NA	NA	NA
Vanadium	14	NA	NA	NA	NA	NA	NA	NA
Zinc	2000	NA	NA	NA	NA	NA	NA	NA
Cyanides (ug/L)								
Cyanide, Total	200	5.7 J	10 UJ	10 UJ	1.5 J	10 UJ	10 UJ	2.3 J
Cyanide, Weak Acid Dissociable	NS	NA	NA	NA	NA	NA	NA	NA

Table 6 Groundwater Analytical Results Clove and Maple Avenue Former MGP Site - Remedial Investigation Haverstraw, New York						
Site Location: Sample Location: Sample ID: Date Collected:	NY Ambient GW Limits	APTS MW-60 MW-60 8/4/2004	C&M MW01 MW1 6/3/1997	C&M MW01 MW1-F 6/3/1997	C&M MW01 CMMW01-01 2/1/1999	C&M MW01 MW-01-CM 12/19/2001
BTEX (ug/l)						
Benzene	1.0	10 U	10 U	NA	10 U	10 U
Ethylbenzene	5	10 U	10 U	NA	10 U	10 U
Toluene	5	10 U	10 U	NA	10 U	10 U
Xylene, Total	5	10 U	10 U	NA	10 U	10 U
Total BTEX	NS	ND	ND	NA	ND	ND
Other VOCs (ug/l)						
Acetone	NS	NA	10 U	NA	10 U	10 UB
Butanone,2- (MEK)	NS	NA	10 U	NA	10 U	10 UJ
Chloroform	7	NA	10 U	NA	10 U	10 U
Dichloropropene, trans-1,3	5	NA	10 U	NA	10 U	10 U
Methyl-2-pentanone,4-	NS	NA	10 U	NA	10 U	10 UJ
Methylene chloride	5	NA	10 U	NA	10 U	10 U
Styrene	5	NA	10 U	NA	10 U	10 U
Tetrachloroethane,1,1,2,2-	5	NA	10 U	NA	10 U	10 U
Trichloroethane,1,1,1-	5	NA	10 U	NA	10 U	10 U
Trichloroethane,1,1,2-	1	NA	10 U	NA	10 U	10 U
Noncarcinogenic PAHs (ug/l)						
Acenaphthene	20	10 J	9 U	NA	10 U	10 U
Acenaphthylene	50	10 U	9 U	NA	10 U	10 U
Anthracene	50	2 J	9 U	NA	10 U	10 U
Benzo[g,h,i]perylene	NS	10 U	9 U	NA	10 U	10 U
Fluoranthene	50	2 J	9 U	NA	10 U	10 U
Fluorene	50	5 J	9 U	NA	10 U	10 U
Methylnaphthalene,2-	NS	5 J	NA	NA	10 U	10 U
Naphthalene	10	6 J	9 U	NA	10 U	10 U
Phenanthrene	50	12	9 U	NA	10 U	10 U
Pyrene	50	3 J	9 U	NA	10 U	10 U
Carcinogenic PAHs (ug/l)						
Benz[a]anthracene	0.002	10 U	9 U	NA	10 U	10 U
Benzo[a]pyrene	0.002	10 U	9 U	NA	10 U	10 U
Benzo[b]fluoranthene	0.002	10 U	9 U	NA	10 U	10 U
Benzo[k]fluoranthene	0.002	10 U	9 U	NA	10 U	10 U
Chrysene	0.002	10 U	9 U	NA	10 U	10 U
Dibenz[a,h]anthracene	NS	10 U	9 U	NA	10 U	10 U
Indeno[1,2,3-cd]pyrene	0.002	10 U	9 U	NA	10 U	10 U
Total PAHs (ug/L)						
Total PAHs	NS	45	ND	NA	ND	ND
Other SVOCs (ug/L)						
Benzaldehyde	NS	NA	NA	NA	NA	10 U
Biphenyl,1,1-	NS	NA	NA	NA	NA	10 U
Bis(2-ethylhexyl)phthalate	5	10 U	NA	NA	10 U	10 U
Carbazole	NS	10 U	NA	NA	10 UJ	10 U
Dibenzofuran	NS	10 U	NA	NA	10 U	10 U
Diethyl phthalate	50	10 U	NA	NA	10 U	10 U
Dimethylphenol, 2,4-	1	10 U	NA	NA	10 U	10 UJ
Di-n-butyl phthalate	50	10 U	NA	NA	10 U	10 U
Methylphenol, 4-	1	10 U	NA	NA	10 U	10 UJ
N-Nitrosodiphenylamine	50	10 U	NA	NA	10 U	10 U
Phenol	1	10 U	NA	NA	10 U	10 U

Table 6 Groundwater Analytical Results Clove and Maple Avenue Former MGP Site - Remedial Investigation Haverstraw, New York						
Site Location:						
Sample Location:	NY	APTS	C&M	C&M	C&M	C&M
Sample ID:	Ambient	MW-60	MW01	MW01	MW01	MW01
Date Collected:	GW Limits	MW-60	MW1	MW1-F	CMMW01-01	MW-01-CM
		8/4/2004	6/3/1997	6/3/1997	2/1/1999	12/19/2001
Dissolved Metals (ug/l)						
Aluminum	100	NA	NA	20.1 U	NA	NA
Arsenic	25	NA	NA	5.1 U	NA	NA
Barium	1000	NA	NA	204	NA	NA
Beryllium	3	NA	NA	0.98 U	NA	NA
Calcium	NS	NA	NA	52600	NA	NA
Chromium	50	NA	NA	1.1 U	NA	NA
Cobalt	5	NA	NA	1.3 U	NA	NA
Copper	200	NA	NA	1.8 U	NA	NA
Iron	300	NA	NA	25 U	NA	NA
Lead	25	NA	NA	2.1 U	NA	NA
Magnesium	35000	NA	NA	15400	NA	NA
Manganese	300	NA	NA	18.4	NA	NA
Mercury	0.7	NA	NA	0.09 B	NA	NA
Nickel	100	NA	NA	1.8 U	NA	NA
Potassium	NS	NA	NA	3110 B	NA	NA
Selenium	10	NA	NA	3.7 U	NA	NA
Sodium	20000	NA	NA	82700	NA	NA
Thallium	0.5	NA	NA	5.2 U	NA	NA
Vanadium	14	NA	NA	0.7 U	NA	NA
Zinc	2000	NA	NA	4.2 B	NA	NA
Total Metals (ug/l)						
Aluminum	100	NA	1860	NA	75.7 UB	NA
Arsenic	25	NA	5.1 U	NA	10.6 U	NA
Barium	1000	NA	231	NA	145 B	NA
Beryllium	3	NA	0.98 U	NA	1 UB	NA
Calcium	NS	NA	52400	NA	48600	NA
Chromium	50	NA	2.3 B	NA	0.6 U	NA
Cobalt	5	NA	2 B	NA	1.2 UB	NA
Copper	200	NA	4.3 B	NA	4 UB	NA
Iron	300	NA	3080 N *	NA	78.9 UB	NA
Lead	25	NA	3.2	NA	1.6 JB	NA
Magnesium	35000	NA	15900	NA	12400	NA
Manganese	300	NA	152	NA	5 B	NA
Mercury	0.7	NA	0.083 B	NA	0.2 U	NA
Nickel	100	NA	3.6 B	NA	2.4 UB	NA
Potassium	NS	NA	3610 B	NA	2530 JBE	NA
Selenium	10	NA	3.7 U	NA	8 UW	NA
Sodium	20000	NA	83500	NA	45500	NA
Thallium	0.5	NA	5.2 U	NA	1.1 UJ	NA
Vanadium	14	NA	5 B	NA	1.5 B	NA
Zinc	2000	NA	10.9 B	NA	18 UB	NA
Cyanides (ug/L)						
Cyanide, Total	200	10 UJ	NA	NA	NA	3 U
Cyanide, Weak Acid Dissociable	NS	NA	NA	NA	NA	3 UJ

Table 6
Groundwater Analytical Results
Clove and Maple Avenue Former MGP Site - Remedial Investigation
Haverstraw, New York

Site Location: Sample Location: Sample ID: Date Collected:	NY Ambient GW Limits	C&M MW01 MW-01 8/3/2004	C&M MW02 MW2 6/3/1997	C&M MW02 MW2-F 6/3/1997	C&M MW02 CMMW02-01 2/1/1999	C&M MW02 MW-02 8/4/2004	C&M MW03 MW3 6/3/1997
BTEX (ug/l)							
Benzene	1.0	10 U	5700 D	NA	18	650	2200 D
Ethylbenzene	5	10 U	680	NA	34	140	700
Toluene	5	10 U	490	NA	18	120	2800 D
Xylene, Total	5	10 U	1000	NA	59	430	2800 D
Total BTEX	NS	ND	7870	NA	129	1340	8500
Other VOCs (ug/l)							
Acetone	NS	NA	100 U	NA	18	NA	200
Butanone,2- (MEK)	NS	NA	100 U	NA	10 U	NA	22 J
Chloroform	7	NA	100 U	NA	10 U	NA	40 U
Dichloropropene, trans-1,3	5	NA	100 U	NA	10 U	NA	40 U
Methyl-2-pentanone,4-	NS	NA	100 U	NA	10 U	NA	84
Methylene chloride	5	NA	100 U	NA	10 U	NA	40 U
Styrene	5	NA	100 U	NA	10 U	NA	1000 D
Tetrachloroethane,1,1,2,2-	5	NA	100 U	NA	10 U	NA	40 U
Trichloroethane,1,1,1-	5	NA	100 U	NA	10 U	NA	40 U
Trichloroethane,1,1,2-	1	NA	100 U	NA	10 U	NA	40 U
Noncarcinogenic PAHs (ug/l)							
Acenaphthene	20	10 U	39	NA	320 DJ	1100	590 U
Acenaphthylene	50	10 U	290 J D	NA	1200 D	420 J	320 J
Anthracene	50	10 U	13	NA	920 D	540 J	590 U
Benzo[g,h,i]perylene	NS	10 U	12 U	NA	24	63 J	590 U
Fluoranthene	50	10 U	7 J	NA	1100 D	570 J	590 U
Fluorene	50	10 U	52	NA	1100 D	890	65 J
Methylnaphthalene,2-	NS	10 U	NA	NA	1600 D	2600	NA
Naphthalene	10	10 U	3400 D	NA	3300 D	4400	10000 D
Phenanthrene	50	10 U	60	NA	3400 D	2000	71 J
Pyrene	50	10 U	9 J	NA	1600 D	800	590 U
Carcinogenic PAHs (ug/l)							
Benz[a]anthracene	0.002	10 U	2 J	NA	430 DJ	240 J	590 U
Benzo[a]pyrene	0.002	10 U	2 J	NA	320 DJ	170 J	590 U
Benzo[b]fluoranthene	0.002	10 U	1 J	NA	240 DJ	190 J	590 U
Benzo[k]fluoranthene	0.002	10 U	12 U	NA	24	580 U	590 U
Chrysene	0.002	10 U	2 J	NA	380 DJ	210 J	590 U
Dibenz[a,h]anthracene	NS	10 U	12 U	NA	9 J	580 U	590 U
Indeno[1,2,3-cd]pyrene	0.002	10 U	12 U	NA	29	580 U	590 U
Total PAHs (ug/L)							
Total PAHs	NS	ND	3877	NA	15996	14193	10456
Other SVOCs (ug/L)							
Benzaldehyde	NS	NA	NA	NA	NA	NA	NA
Biphenyl,1,1-	NS	NA	NA	NA	NA	NA	NA
Bis(2-ethylhexyl)phthalate	5	10 U	NA	NA	28	580 U	NA
Carbazole	NS	10 U	NA	NA	10 UJ	580 U	NA
Dibenzofuran	NS	10 U	NA	NA	45	120 J	NA
Diethyl phthalate	50	10 U	NA	NA	10 U	580 U	NA
Dimethylphenol, 2,4-	1	10 U	NA	NA	10 U	580 UJ	NA
Di-n-butyl phthalate	50	10 U	NA	NA	10 U	580 U	NA
Methylphenol, 4-	1	10 U	NA	NA	10 U	580 U	NA
N-Nitrosodiphenylamine	50	10 U	NA	NA	10 U	580 U	NA
Phenol	1	10 U	NA	NA	10 U	120 J	NA

Table 6
Groundwater Analytical Results
Clove and Maple Avenue Former MGP Site - Remedial Investigation
Haverstraw, New York

Site Location:	NY	C&M	C&M	C&M	C&M	C&M	C&M
Sample Location:	Ambient	MW01	MW02	MW02	MW02	MW02	MW03
Sample ID:	GW Limits	MW-01	MW2	MW2-F	CMMW02-01	MW-02	MW3
Date Collected:	8/3/2004	6/3/1997	6/3/1997	6/3/1997	2/1/1999	8/4/2004	6/3/1997
Dissolved Metals (ug/l)							
Aluminum	100	NA	NA	869	NA	NA	NA
Arsenic	25	NA	NA	5.1 U	NA	NA	NA
Barium	1000	NA	NA	197 B	NA	NA	NA
Beryllium	3	NA	NA	0.98 U	NA	NA	NA
Calcium	NS	NA	NA	135000	NA	NA	NA
Chromium	50	NA	NA	1.1 U	NA	NA	NA
Cobalt	5	NA	NA	2.7 B	NA	NA	NA
Copper	200	NA	NA	1.9 B	NA	NA	NA
Iron	300	NA	NA	1250 N *	NA	NA	NA
Lead	25	NA	NA	2.1 U	NA	NA	NA
Magnesium	35000	NA	NA	42500	NA	NA	NA
Manganese	300	NA	NA	2940	NA	NA	NA
Mercury	0.7	NA	NA	0.065 B	NA	NA	NA
Nickel	100	NA	NA	3.9 B	NA	NA	NA
Potassium	NS	NA	NA	2570 B	NA	NA	NA
Selenium	10	NA	NA	3.7 U	NA	NA	NA
Sodium	20000	NA	NA	13200	NA	NA	NA
Thallium	0.5	NA	NA	5.2 U	NA	NA	NA
Vanadium	14	NA	NA	2.3 B	NA	NA	NA
Zinc	2000	NA	NA	7.7 B	NA	NA	NA
Total Metals (ug/l)							
Aluminum	100	NA	3150	NA	23600	NA	1180
Arsenic	25	NA	5.1 U	NA	15 U	NA	5.1 U
Barium	1000	NA	216	NA	213	NA	91.1 B
Beryllium	3	NA	0.98 U	NA	1 UB	NA	0.98 U
Calcium	NS	NA	133000	NA	22700 J	NA	40100
Chromium	50	NA	4 B	NA	30.4	NA	1.9 B
Cobalt	5	NA	4.6 B	NA	15.6 B	NA	3.6 B
Copper	200	NA	5.9 B	NA	59.7 U	NA	4.4 B
Iron	300	NA	4680 N *	NA	30800	NA	2290 N *
Lead	25	NA	3.9	NA	64.6	NA	2.1 U
Magnesium	35000	NA	42600	NA	12400	NA	10000
Manganese	300	NA	2900	NA	731	NA	4310
Mercury	0.7	NA	0.081 B	NA	0.2 U	NA	0.09 B
Nickel	100	NA	7.6 B	NA	37 B	NA	3.4 B
Potassium	NS	NA	3170 B	NA	4950 JBE	NA	2150 B
Selenium	10	NA	3.7 U	NA	8 UW	NA	3.7 U
Sodium	20000	NA	12800	NA	14300 J	NA	17100
Thallium	0.5	NA	5.2 U	NA	1.1 UJ	NA	5.2 U
Vanadium	14	NA	5.9 B	NA	38.5 B	NA	2.2 B
Zinc	2000	NA	14.8 B	NA	259	NA	7.7 B
Cyanides (ug/L)							
Cyanide, Total	200	10 U	NA	NA	NA	40.8 J	NA
Cyanide, Weak Acid Dissociable	NS	NA	NA	NA	NA	NA	NA

Table 6
Groundwater Analytical Results
Clove and Maple Avenue Former MGP Site - Remedial Investigation
Haverstraw, New York

Site Location: Sample Location: Sample ID: Date Collected:	NY Ambient GW Limits	C&M MW03 MW3-F 6/3/1997	C&M MW03 CMMW03-01 2/2/1999	C&M MW03 MW-03-CM 12/19/2001	C&M MW03 MW-03 8/3/2004	C&M MW04 CMMW04-01 2/3/1999	C&M MW04 MW-04 12/19/2001
BTEX (ug/l)							
Benzene	1.0	NA	1300 D	1800	1300	320 D	120
Ethylbenzene	5	NA	360 D	780 J	540	65	37
Toluene	5	NA	930 D	1600	1300	190	76
Xylene, Total	5	NA	1500 D	2200 J	1500	430	300
Total BTEX	NS	NA	4090	6380	4640	1005	533
Other VOCs (ug/l)							
Acetone	NS	NA	9 J	100 U	NA	10 U	10 UB
Butanone,2- (MEK)	NS	NA	10 U	100 U	NA	10 U	10 UJ
Chloroform	7	NA	10 U	100 U	NA	10 U	10 U
Dichloropropene, trans-1,3	5	NA	10 U	31 J	NA	10 U	10 U
Methyl-2-pentanone,4-	NS	NA	10 U	100 U	NA	10 U	10 UJ
Methylene chloride	5	NA	2 J	100 U	NA	10 U	10 U
Styrene	5	NA	520 D	730 J	NA	160	65
Tetrachloroethane,1,1,2,2-	5	NA	10 U	100 U	NA	10 U	10 U
Trichloroethane,1,1,1-	5	NA	10 U	100 U	NA	10 U	10 U
Trichloroethane,1,1,2-	1	NA	10 U	38 J	NA	10 U	10 U
Noncarcinogenic PAHs (ug/l)							
Acenaphthene	20	NA	8 J	2000 U	1000 U	21	400 U
Acenaphthylene	50	NA	71	270 J	150 J	290 DJ	400 U
Anthracene	50	NA	4 J	2000 U	1000 U	16	400 U
Benzo[g,h,i]perylene	NS	NA	10 U	2000 U	1000 U	10 U	400 U
Fluoranthene	50	NA	1 J	2000 U	1000 U	6 J	400 U
Fluorene	50	NA	19	2000 U	1000 U	69	400 U
Methylnaphthalene,2-	NS	NA	210 DJ	930 J	590 J	360 DJ	62 J
Naphthalene	10	NA	2500 D	9100	5100	3100 D	2200 J
Phenanthrene	50	NA	22	2000 U	1000 U	85 DJ	400 U
Pyrene	50	NA	1 J	2000 U	1000 U	7 J	400 U
Carcinogenic PAHs (ug/l)							
Benz[a]anthracene	0.002	NA	10 U	2000 U	1000 U	10 U	400 U
Benzo[a]pyrene	0.002	NA	10 U	2000 U	1000 U	10 U	400 U
Benzo[b]fluoranthene	0.002	NA	10 U	2000 U	1000 U	10 U	400 U
Benzo[k]fluoranthene	0.002	NA	10 U	2000 U	1000 U	10 U	400 U
Chrysene	0.002	NA	10 U	2000 U	1000 U	10 U	400 U
Dibenz[a,h]anthracene	NS	NA	10 U	2000 U	1000 U	10 U	400 U
Indeno[1,2,3-cd]pyrene	0.002	NA	10 U	2000 U	1000 U	10 U	400 U
Total PAHs (ug/L)							
Total PAHs	NS	NA	2836	12300	5840	3954	2262
Other SVOCs (ug/L)							
Benzaldehyde	NS	NA	NA	2000 U	NA	NA	400 U
Biphenyl,1,1-	NS	NA	NA	2000 U	NA	NA	400 U
Bis(2-ethylhexyl)phthalate	5	NA	10 U	2000 U	1000 U	6 J	400 U
Carbazole	NS	NA	21 J	2000 U	1000 U	28 J	400 U
Dibenzofuran	NS	NA	3 J	2000 U	1000 U	11	400 U
Diethyl phthalate	50	NA	10 U	2000 U	1000 U	10 U	400 U
Dimethylphenol, 2,4-	1	NA	10 U	2000 UJ	1000 UJ	10 U	400 UJ
Di-n-butyl phthalate	50	NA	10 U	2000 U	1000 U	1 J	400 U
Methylphenol, 4-	1	NA	10 U	2000 UJ	1000 U	10 U	400 UJ
N-Nitrosodiphenylamine	50	NA	10 U	2000 U	1000 U	10 U	400 U
Phenol	1	NA	10 U	2000 U	1000 U	10 U	110 J

Table 6
Groundwater Analytical Results
Clove and Maple Avenue Former MGP Site - Remedial Investigation
Haverstraw, New York

Site Location: Sample Location: Sample ID: Date Collected:	NY Ambient GW Limits	C&M MW03 MW3-F 6/3/1997	C&M MW03 CMMW03-01 2/2/1999	C&M MW03 MW-03-CM 12/19/2001	C&M MW03 MW-03 8/3/2004	C&M MW04 CMMW04-01 2/3/1999	C&M MW04 MW-04 12/19/2001
Dissolved Metals (ug/l)							
Aluminum	100	20.1 U	NA	NA	NA	NA	NA
Arsenic	25	5.1 U	NA	NA	NA	NA	NA
Barium	1000	81 B	NA	NA	NA	NA	NA
Beryllium	3	0.98 U	NA	NA	NA	NA	NA
Calcium	NS	39700	NA	NA	NA	NA	NA
Chromium	50	1.1 U	NA	NA	NA	NA	NA
Cobalt	5	3.1 B	NA	NA	NA	NA	NA
Copper	200	1.8 U	NA	NA	NA	NA	NA
Iron	300	513 N *	NA	NA	NA	NA	NA
Lead	25	2.4 B	NA	NA	NA	NA	NA
Magnesium	35000	9640	NA	NA	NA	NA	NA
Manganese	300	4450	NA	NA	NA	NA	NA
Mercury	0.7	0.069 B	NA	NA	NA	NA	NA
Nickel	100	1.9 B	NA	NA	NA	NA	NA
Potassium	NS	1840 B	NA	NA	NA	NA	NA
Selenium	10	3.7 U	NA	NA	NA	NA	NA
Sodium	20000	17200	NA	NA	NA	NA	NA
Thallium	0.5	5.2 U	NA	NA	NA	NA	NA
Vanadium	14	0.7 U	NA	NA	NA	NA	NA
Zinc	2000	5.5 B	NA	NA	NA	NA	NA
Total Metals (ug/l)							
Aluminum	100	NA	497	NA	NA	11.8 UB	NA
Arsenic	25	NA	5 UB	NA	NA	1.8 UB	NA
Barium	1000	NA	97.2 B	NA	NA	104 B	NA
Beryllium	3	NA	0.42 UB	NA	NA	0.1 U	NA
Calcium	NS	NA	46400	NA	NA	41900	NA
Chromium	50	NA	0.6 U	NA	NA	0.6 U	NA
Cobalt	5	NA	2.6 B	NA	NA	0.88 B	NA
Copper	200	NA	4.6 B	NA	NA	2.7 UB	NA
Iron	300	NA	872	NA	NA	384	NA
Lead	25	NA	3.1 UJ	NA	NA	1.1 UJ	NA
Magnesium	35000	NA	18400	NA	NA	8290	NA
Manganese	300	NA	1340	NA	NA	1390	NA
Mercury	0.7	NA	0.2 U	NA	NA	0.2 UN	NA
Nickel	100	NA	3 UB	NA	NA	1.1 UB	NA
Potassium	NS	NA	6050 EJ	NA	NA	1500 B	NA
Selenium	10	NA	1.6 U	NA	NA	2.4 BJW	NA
Sodium	20000	NA	23500 EJ	NA	NA	46700	NA
Thallium	0.5	NA	1.1 U	NA	NA	1.1 U	NA
Vanadium	14	NA	1.2 U	NA	NA	1.2 U	NA
Zinc	2000	NA	13.9 UBJ	NA	NA	17 UB	NA
Cyanides (ug/L)							
Cyanide, Total	200	NA	NA	5 J	5.7 J	NA	3 U
Cyanide, Weak Acid Dissociable	NS	NA	NA	3 UJ	NA	NA	3 UJ

Table 6
Groundwater Analytical Results
Clove and Maple Avenue Former MGP Site - Remedial Investigation
Haverstraw, New York

Site Location: Sample Location: Sample ID: Date Collected:	NY Ambient GW Limits	C&M MW04 MW-44 12/19/2001	C&M MW04 MW-04 8/2/2004	C&M MW05 CMMW05-01 2/3/1999	C&M MW05 CMMW05-01F 2/3/1999	C&M MW05 MW-05 12/19/2001	C&M MW05 MW-05 8/2/2004
BTEX (ug/l)							
Benzene	1.0	120	30	1 J	NA	10 U	10 U
Ethylbenzene	5	35	19	10 U	NA	10 U	10 U
Toluene	5	73 H	26	10 U	NA	10 U	10 U
Xylene, Total	5	310	110	10 U	NA	10 U	10 U
Total BTEX	NS	538	185	1	NA	ND	ND
Other VOCs (ug/l)							
Acetone	NS	10 UB	NA	10 U	NA	10 UB	NA
Butanone,2- (MEK)	NS	10 UJ	NA	10 U	NA	10 UJ	NA
Chloroform	7	10 U	NA	10 U	NA	0.2 J	NA
Dichloropropene, trans-1,3	5	10 U	NA	10 U	NA	10 U	NA
Methyl-2-pentanone,4-	NS	10 UJ	NA	10 U	NA	10 UJ	NA
Methylene chloride	5	10 U	NA	10 U	NA	10 U	NA
Styrene	5	68	NA	10 U	NA	10 U	NA
Tetrachloroethane,1,1,2,2-	5	10 U	NA	10 U	NA	10 U	NA
Trichloroethane,1,1,1-	5	10 U	NA	10 U	NA	10 U	NA
Trichloroethane,1,1,2-	1	10 U	NA	10 U	NA	10 U	NA
Noncarcinogenic PAHs (ug/l)							
Acenaphthene	20	500 U	500 U	3 J	NA	10 U	10 U
Acenaphthylene	50	310 J	310 J	20	NA	6 J	31
Anthracene	50	500 U	500 U	10 U	NA	10 U	10 U
Benzo[g,h,i]perylene	NS	500 U	500 U	10 U	NA	10 U	10 U
Fluoranthene	50	500 U	500 U	10 U	NA	10 U	10 U
Fluorene	50	53 J	500 U	10 U	NA	10 U	10 U
Methylnaphthalene,2-	NS	290 J	310	1 J	NA	10 U	10 U
Naphthalene	10	3100 J	3000	5 J	NA	10 U	10 UJ
Phenanthrene	50	110 J	110 J	3 J	NA	10 U	1 J
Pyrene	50	500 U	500 U	10 U	NA	10 U	10 U
Carcinogenic PAHs (ug/l)							
Benz[a]anthracene	0.002	500 U	500 U	10 U	NA	10 U	10 U
Benzo[a]pyrene	0.002	500 U	500 U	10 U	NA	10 U	10 U
Benzo[b]fluoranthene	0.002	500 U	500 U	10 U	NA	10 U	10 U
Benzo[k]fluoranthene	0.002	500 U	500 U	10 U	NA	10 U	10 U
Chrysene	0.002	500 U	500 U	10 U	NA	10 U	10 U
Dibenz[a,h]anthracene	NS	500 U	500 U	10 U	NA	10 U	10 U
Indeno[1,2,3-cd]pyrene	0.002	500 U	500 U	10 U	NA	10 U	10 U
Total PAHs (ug/L)							
Total PAHs	NS	4863	3730	32	NA	36	52
Other SVOCs (ug/L)							
Benzaldehyde	NS	500 U	NA	NA	NA	10 U	NA
Biphenyl,1,1-	NS	65 J	NA	NA	NA	1 J	NA
Bis(2-ethylhexyl)phthalate	5	500 U	500 U	10 U	NA	10 U	3 J
Carbazole	NS	500 U	500 U	10 UJ	NA	10 U	10 U
Dibenzofuran	NS	500 U	500 U	10 U	NA	10 U	10 U
Diethyl phthalate	50	500 U	500 U	10 U	NA	10 U	10 U
Dimethylphenol, 2,4-	1	500 UJ	500 UJ	10 U	NA	10 UJ	10 UJ
Di-n-butyl phthalate	50	500 U	500 U	2 J	NA	10 U	10 U
Methylphenol, 4-	1	500 UJ	500 U	10 U	NA	10 UJ	10 U
N-Nitrosodiphenylamine	50	500 U	500 U	10 U	NA	10 U	10 U
Phenol	1	500 U	500 U	10 U	NA	10 U	10 U

Table 6
Groundwater Analytical Results
Clove and Maple Avenue Former MGP Site - Remedial Investigation
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Site Location: Sample Location: Sample ID: Date Collected:	NY Ambient GW Limits	C&M MW04 MW-44 12/19/2001	C&M MW04 MW-04 8/2/2004	C&M MW05 CMMW05-01 2/3/1999	C&M MW05 CMMW05-01F 2/3/1999	C&M MW05 MW-05 12/19/2001	C&M MW05 MW-05 8/2/2004
Dissolved Metals (ug/l)							
Aluminum	100	NA	NA	NA	25.7 UB	NA	NA
Arsenic	25	NA	NA	NA	1.2 U	NA	NA
Barium	1000	NA	NA	NA	140 B	NA	NA
Beryllium	3	NA	NA	NA	0.1 U	NA	NA
Calcium	NS	NA	NA	NA	85000	NA	NA
Chromium	50	NA	NA	NA	0.6 U	NA	NA
Cobalt	5	NA	NA	NA	0.6 U	NA	NA
Copper	200	NA	NA	NA	3.2 UB	NA	NA
Iron	300	NA	NA	NA	22.3 B	NA	NA
Lead	25	NA	NA	NA	1.9 UBJ	NA	NA
Magnesium	35000	NA	NA	NA	17100	NA	NA
Manganese	300	NA	NA	NA	521	NA	NA
Mercury	0.7	NA	NA	NA	0.2 UN	NA	NA
Nickel	100	NA	NA	NA	0.6 U	NA	NA
Potassium	NS	NA	NA	NA	1880 B	NA	NA
Selenium	10	NA	NA	NA	1.6 UJW	NA	NA
Sodium	20000	NA	NA	NA	44200	NA	NA
Thallium	0.5	NA	NA	NA	1.1 U	NA	NA
Vanadium	14	NA	NA	NA	1.2 U	NA	NA
Zinc	2000	NA	NA	NA	30.1 U	NA	NA
Total Metals (ug/l)							
Aluminum	100	NA	NA	54.3 UB	NA	NA	NA
Arsenic	25	NA	NA	1.2 U	NA	NA	NA
Barium	1000	NA	NA	142 B	NA	NA	NA
Beryllium	3	NA	NA	0.1 U	NA	NA	NA
Calcium	NS	NA	NA	84000	NA	NA	NA
Chromium	50	NA	NA	0.6 U	NA	NA	NA
Cobalt	5	NA	NA	0.6 U	NA	NA	NA
Copper	200	NA	NA	3 UB	NA	NA	NA
Iron	300	NA	NA	42.6 B	NA	NA	NA
Lead	25	NA	NA	2.8 UBJ	NA	NA	NA
Magnesium	35000	NA	NA	17000	NA	NA	NA
Manganese	300	NA	NA	522	NA	NA	NA
Mercury	0.7	NA	NA	0.2 UN	NA	NA	NA
Nickel	100	NA	NA	0.6 U	NA	NA	NA
Potassium	NS	NA	NA	1970 B	NA	NA	NA
Selenium	10	NA	NA	1.6 UJW	NA	NA	NA
Sodium	20000	NA	NA	44000	NA	NA	NA
Thallium	0.5	NA	NA	1.1 U	NA	NA	NA
Vanadium	14	NA	NA	1.2 U	NA	NA	NA
Zinc	2000	NA	NA	14.8 UB	NA	NA	NA
Cyanides (ug/L)							
Cyanide, Total	200	3 U	0.52 U	NA	NA	3 U	0.75 U
Cyanide, Weak Acid Dissociable	NS	3 UJ	NA	NA	NA	3 UJ	NA

Table 6
Groundwater Analytical Results
Clove and Maple Avenue Former MGP Site - Remedial Investigation
Haverstraw, New York

Site Location: Sample Location: Sample ID: Date Collected:	NY Ambient GW Limits	C&M MW06 CMMW06-01 3/26/1999	C&M MW06 MW-06 12/19/2001	C&M MW06 MW-06 8/2/2004	C&M MW07 CMMW07-01 3/26/1999	C&M MW07 MW-07 12/19/2001	C&M MW07 MW-07 8/2/2004
BTEX (ug/l)							
Benzene	1.0	10 U	10 U	10 U	10 U	10 U	10 U
Ethylbenzene	5	10 U	10 U	10 U	10 U	10 U	10 U
Toluene	5	10 U	10 U	10 U	10 U	10 U	10 U
Xylene, Total	5	10 U	10 U	10 U	10 U	10 U	10 U
Total BTEX	NS	ND	ND	ND	ND	ND	ND
Other VOCs (ug/l)							
Acetone	NS	10 U	10 UB	NA	10 U	10 UB	NA
Butanone,2- (MEK)	NS	10 U	10 UJ	NA	10 U	10 UJ	NA
Chloroform	7	10 U	10 U	NA	10 U	10 U	NA
Dichloropropene, trans-1,3	5	10 U	10 U	NA	10 U	10 U	NA
Methyl-2-pentanone,4-	NS	10 U	10 UJ	NA	10 U	10 UJ	NA
Methylene chloride	5	10 U	10 U	NA	10 U	10 U	NA
Styrene	5	10 U	10 U	NA	10 U	10 U	NA
Tetrachloroethane,1,1,2,2-	5	10 U	10 U	NA	10 U	10 U	NA
Trichloroethane,1,1,1-	5	10 U	10 U	NA	10 U	10 U	NA
Trichloroethane,1,1,2-	1	10 U	10 U	NA	10 U	10 U	NA
Noncarcinogenic PAHs (ug/l)							
Acenaphthene	20	10 UJ	10 U	11 U	10 UJ	10 U	10 U
Acenaphthylene	50	10 U	10 U	11 U	10 U	10 U	10 U
Anthracene	50	10 U	10 U	11 U	10 U	10 U	10 U
Benzo[g,h,i]perylene	NS	10 U	10 U	11 U	10 U	10 U	10 U
Fluoranthene	50	2 J	10 U	11 U	10 U	10 U	10 U
Fluorene	50	10 U	10 U	11 U	10 U	10 U	10 U
Methylnaphthalene,2-	NS	10 U	10 U	11 U	10 U	10 U	10 U
Naphthalene	10	10 U	10 U	11 U	10 U	10 U	10 U
Phenanthrene	50	10 U	10 U	11 U	10 U	10 U	10 U
Pyrene	50	6 J	10 U	11 U	10 U	10 U	10 U
Carcinogenic PAHs (ug/l)							
Benz[a]anthracene	0.002	10 U	10 U	11 U	10 U	10 U	10 U
Benzo[a]pyrene	0.002	10 U	10 U	11 U	10 U	10 U	10 U
Benzo[b]fluoranthene	0.002	10 U	10 U	11 U	10 U	10 U	10 U
Benzo[k]fluoranthene	0.002	10 U	10 U	11 U	10 U	10 U	10 U
Chrysene	0.002	10 U	10 U	11 U	10 U	10 U	10 U
Dibenz[a,h]anthracene	NS	10 U	10 U	11 U	10 U	10 U	10 U
Indeno[1,2,3-cd]pyrene	0.002	10 U	10 U	11 U	10 U	10 U	10 U
Total PAHs (ug/L)							
Total PAHs	NS	8	ND	ND	ND	ND	ND
Other SVOCs (ug/L)							
Benzaldehyde	NS	NA	10 U	NA	NA	10 U	NA
Biphenyl,1,1-	NS	NA	10 U	NA	NA	10 U	NA
Bis(2-ethylhexyl)phthalate	5	3500 DB	10 U	11 U	10 U	10 U	10 U
Carbazole	NS	10 U	10 U	11 U	10 U	10 U	10 U
Dibenzofuran	NS	10 U	10 U	11 U	10 U	10 U	10 U
Diethyl phthalate	50	4 J	10 U	11 U	10 U	10 U	10 U
Dimethylphenol, 2,4-	1	10 U	10 UJ	11 UJ	10 U	10 UJ	10 UJ
Di-n-butyl phthalate	50	81	10 U	11 U	3 J	10 U	10 U
Methylphenol, 4-	1	10 U	10 UJ	11 U	10 U	10 UJ	10 U
N-Nitrosodiphenylamine	50	5 J	10 U	11 U	10 U	10 U	10 U
Phenol	1	10 U	10 U	11 U	10 U	10 U	10 U

Table 6
Groundwater Analytical Results
Clove and Maple Avenue Former MGP Site - Remedial Investigation
Haverstraw, New York

Site Location: Sample Location: Sample ID: Date Collected:	NY Ambient GW Limits	C&M MW06 CMMW06-01 3/26/1999	C&M MW06 MW-06 12/19/2001	C&M MW06 MW-06 8/2/2004	C&M MW07 CMMW07-01 3/26/1999	C&M MW07 MW-07 12/19/2001	C&M MW07 MW-07 8/2/2004
Dissolved Metals (ug/l)							
Aluminum	100	NA	NA	NA	NA	NA	NA
Arsenic	25	NA	NA	NA	NA	NA	NA
Barium	1000	NA	NA	NA	NA	NA	NA
Beryllium	3	NA	NA	NA	NA	NA	NA
Calcium	NS	NA	NA	NA	NA	NA	NA
Chromium	50	NA	NA	NA	NA	NA	NA
Cobalt	5	NA	NA	NA	NA	NA	NA
Copper	200	NA	NA	NA	NA	NA	NA
Iron	300	NA	NA	NA	NA	NA	NA
Lead	25	NA	NA	NA	NA	NA	NA
Magnesium	35000	NA	NA	NA	NA	NA	NA
Manganese	300	NA	NA	NA	NA	NA	NA
Mercury	0.7	NA	NA	NA	NA	NA	NA
Nickel	100	NA	NA	NA	NA	NA	NA
Potassium	NS	NA	NA	NA	NA	NA	NA
Selenium	10	NA	NA	NA	NA	NA	NA
Sodium	20000	NA	NA	NA	NA	NA	NA
Thallium	0.5	NA	NA	NA	NA	NA	NA
Vanadium	14	NA	NA	NA	NA	NA	NA
Zinc	2000	NA	NA	NA	NA	NA	NA
Total Metals (ug/l)							
Aluminum	100	3500	NA	NA	578	NA	NA
Arsenic	25	1.6 BJ	NA	NA	3.8 BJ	NA	NA
Barium	1000	143	NA	NA	82.6 B	NA	NA
Beryllium	3	0.16 B	NA	NA	0.47 B	NA	NA
Calcium	NS	91800	NA	NA	58400	NA	NA
Chromium	50	2.9 B	NA	NA	0.6 U	NA	NA
Cobalt	5	3.0 B	NA	NA	0.6 U	NA	NA
Copper	200	7.3 B	NA	NA	3.1 B	NA	NA
Iron	300	5450	NA	NA	395	NA	NA
Lead	25	5.5 U	NA	NA	2.9 UB	NA	NA
Magnesium	35000	24400	NA	NA	23900	NA	NA
Manganese	300	388	NA	NA	11.3 B	NA	NA
Mercury	0.7	0.2 U	NA	NA	0.2 U	NA	NA
Nickel	100	5.6 B	NA	NA	1.0 B	NA	NA
Potassium	NS	3240	NA	NA	1210	NA	NA
Selenium	10	8.0 UJW	NA	NA	8.0 UJW	NA	NA
Sodium	20000	36300	NA	NA	14700	NA	NA
Thallium	0.5	1.1 UJ	NA	NA	1.1 UJ	NA	NA
Vanadium	14	6.4 B	NA	NA	49.2 B	NA	NA
Zinc	2000	22.2 U	NA	NA	6.4 U	NA	NA
Cyanides (ug/L)							
Cyanide, Total	200	NA	3 U	5.5 J	NA	3 U	10 U
Cyanide, Weak Acid Dissociable	NS	NA	3 UJ	NA	NA	3 UJ	NA

Table 6 Groundwater Analytical Results Clove and Maple Avenue Former MGP Site - Remedial Investigation Haverstraw, New York						
Site Location: Sample Location: Sample ID: Date Collected:	NY Ambient GW Limits	C&M MW07 MW-XX 8/2/2004	C&M MW08 CMMW08-01 2/1/1999	C&M MW08 MW-08 12/19/2001	C&M MW08 MW-08 8/3/2004	C&M MW09 CMMW09-01 2/1/1999
BTEX (ug/l)						
Benzene	1.0	10 U	29 J	1 J	180	1 J
Ethylbenzene	5	10 U	10 U	10 U	14	33
Toluene	5	10 U	10 U	10 U	3 J	2 J
Xylene, Total	5	10 U	3 J	10 U	14	31
Total BTEX	NS	ND	32	1	211	67
Other VOCs (ug/l)						
Acetone	NS	NA	15	10 UB	NA	8 J
Butanone,2- (MEK)	NS	NA	10 U	10 UJ	NA	7 J
Chloroform	7	NA	10 U	10 U	NA	10 U
Dichloropropene, trans-1,3	5	NA	10 U	10 U	NA	10 U
Methyl-2-pentanone,4-	NS	NA	10 U	10 UJ	NA	10 U
Methylene chloride	5	NA	10 U	10 U	NA	10 U
Styrene	5	NA	10 U	10 U	NA	10 U
Tetrachloroethane,1,1,2,2-	5	NA	10 U	10 U	NA	10 U
Trichloroethane,1,1,1-	5	NA	10 U	10 U	NA	10 U
Trichloroethane,1,1,2-	1	NA	10 U	10 U	NA	10 U
Noncarcinogenic PAHs (ug/l)						
Acenaphthene	20	11 U	11	10 U	11 U	70
Acenaphthylene	50	11 U	3 J	10 U	11 U	5 J
Anthracene	50	11 U	10 U	10 U	11 U	9 J
Benzo[g,h,i]perylene	NS	11 U	10 U	10 U	11 U	10 U
Fluoranthene	50	11 U	10 U	10 U	11 U	6 J
Fluorene	50	11 U	10 U	10 U	11 U	31
Methylnaphthalene,2-	NS	11 U	1 J	10 U	11 U	16
Naphthalene	10	11 U	17	10 U	11 U	60
Phenanthrene	50	11 U	2 J	10 U	11 U	16
Pyrene	50	11 U	10 U	10 U	11 U	7 J
Carcinogenic PAHs (ug/l)						
Benz[a]anthracene	0.002	11 U	10 U	10 U	11 U	10 U
Benzo[a]pyrene	0.002	11 U	10 U	10 U	11 U	10 U
Benzo[b]fluoranthene	0.002	11 U	10 U	10 U	11 U	10 U
Benzo[k]fluoranthene	0.002	11 U	10 U	10 U	11 U	10 U
Chrysene	0.002	11 U	10 U	10 U	11 U	10 U
Dibenz[a,h]anthracene	NS	11 U	10 U	10 U	11 U	10 U
Indeno[1,2,3-cd]pyrene	0.002	11 U	10 U	10 U	11 U	10 U
Total PAHs (ug/L)						
Total PAHs	NS	ND	34	ND	ND	220
Other SVOCs (ug/L)						
Benzaldehyde	NS	NA	NA	10 U	NA	NA
Biphenyl,1,1'-	NS	NA	NA	10 U	NA	NA
Bis(2-ethylhexyl)phthalate	5	11 U	1 J	10 U	11 U	10 U
Carbazole	NS	11 U	2 J	10 U	11 U	4 J
Dibenzofuran	NS	11 U	10 U	10 U	11 U	5 J
Diethyl phthalate	50	11 U	10 U	10 U	11 U	10 U
Dimethylphenol, 2,4-	1	11 UJ	10 U	10 UJ	11 UJ	2 J
Di-n-butyl phthalate	50	11 U	10 U	10 U	11 U	1 J
Methylphenol, 4-	1	11 U	10 U	10 UJ	11 U	10 U
N-Nitrosodiphenylamine	50	11 U	10 U	10 U	11 U	10 U
Phenol	1	11 U	1 J	10 U	11 U	2 J

Table 6 Groundwater Analytical Results Clove and Maple Avenue Former MGP Site - Remedial Investigation Haverstraw, New York						
Site Location: Sample Location: Sample ID: Date Collected:	NY Ambient GW Limits	C&M MW07 MW-XX 8/2/2004	C&M MW08 CMMW08-01 2/1/1999	C&M MW08 MW-08 12/19/2001	C&M MW08 MW-08 8/3/2004	C&M MW09 CMMW09-01 2/1/1999
Dissolved Metals (ug/l)						
Aluminum	100	NA	NA	NA	NA	NA
Arsenic	25	NA	NA	NA	NA	NA
Barium	1000	NA	NA	NA	NA	NA
Beryllium	3	NA	NA	NA	NA	NA
Calcium	NS	NA	NA	NA	NA	NA
Chromium	50	NA	NA	NA	NA	NA
Cobalt	5	NA	NA	NA	NA	NA
Copper	200	NA	NA	NA	NA	NA
Iron	300	NA	NA	NA	NA	NA
Lead	25	NA	NA	NA	NA	NA
Magnesium	35000	NA	NA	NA	NA	NA
Manganese	300	NA	NA	NA	NA	NA
Mercury	0.7	NA	NA	NA	NA	NA
Nickel	100	NA	NA	NA	NA	NA
Potassium	NS	NA	NA	NA	NA	NA
Selenium	10	NA	NA	NA	NA	NA
Sodium	20000	NA	NA	NA	NA	NA
Thallium	0.5	NA	NA	NA	NA	NA
Vanadium	14	NA	NA	NA	NA	NA
Zinc	2000	NA	NA	NA	NA	NA
Total Metals (ug/l)						
Aluminum	100	NA	2400	NA	NA	842
Arsenic	25	NA	4.3 UB	NA	NA	1.2 U
Barium	1000	NA	219	NA	NA	141
Beryllium	3	NA	0.1 U	NA	NA	0.1 U
Calcium	NS	NA	80700	NA	NA	83900
Chromium	50	NA	1.5 B	NA	NA	0.6 U
Cobalt	5	NA	2.3 UB	NA	NA	5.2 B
Copper	200	NA	7.8 UB	NA	NA	3.6 UB
Iron	300	NA	3670	NA	NA	5750
Lead	25	NA	4.8 J	NA	NA	2.1 JB
Magnesium	35000	NA	26400	NA	NA	44100
Manganese	300	NA	665	NA	NA	7850
Mercury	0.7	NA	0.2 U	NA	NA	0.2 U
Nickel	100	NA	43.8	NA	NA	8.4 B
Potassium	NS	NA	4150 JBE	NA	NA	3520 JBE
Selenium	10	NA	8 U	NA	NA	8 UW
Sodium	20000	NA	23300	NA	NA	16800
Thallium	0.5	NA	1.1 UJ	NA	NA	8.1 JB
Vanadium	14	NA	4.5 B	NA	NA	1.5 B
Zinc	2000	NA	134	NA	NA	28 U
Cyanides (ug/L)						
Cyanide, Total	200	10 U	NA	3.8 J	5.8 J	NA
Cyanide, Weak Acid Dissociable	NS	NA	NA	3 UJ	NA	NA

Table 6
Groundwater Analytical Results
Clove and Maple Avenue Former MGP Site - Remedial Investigation
Haverstraw, New York

Site Location: Sample Location: Sample ID: Date Collected:	NY Ambient GW Limits	C&M MW09 MW-09 12/19/2001	C&M MW09 MW-09 8/3/2004	C&M MW10 CMMW10-01 2/1/1999	C&M MW10 MW-10 12/19/2001	C&M MW10 MW-10 8/3/2004	C&M MW-18 MW-18 12/20/2001	C&M MW-18 MW-18 8/3/2004
BTEX (ug/l)								
Benzene	1.0	2 J	4 J	10 U	0.7 J	10 U	16000	10 U
Ethylbenzene	5	19	41	10 U	10 U	10 U	370 J	0.4 J
Toluene	5	1 J	1 J	10 U	0.9 J	10 U	950 J	10 U
Xylene, Total	5	19	27	10 U	0.6 J	10 U	3400	4 J
Total BTEX	NS	41	73	ND	2.2	ND	20720	4.4
Other VOCs (ug/l)								
Acetone	NS	10 U	NA	10 U	10 U	NA	20 U	NA
Butanone,2- (MEK)	NS	10 U	NA	10 U	10 U	NA	20 U	NA
Chloroform	7	10 U	NA	2 J	10 U	NA	20 U	NA
Dichloropropene, trans-1,3	5	10 U	NA	10 U	10 U	NA	20 U	NA
Methyl-2-pentanone,4-	NS	10 U	NA	10 U	10 U	NA	20 U	NA
Methylene chloride	5	10 U	NA	10 U	10 U	NA	20 U	NA
Styrene	5	10 U	NA	10 U	10 U	NA	20 U	NA
Tetrachloroethane,1,1,2,2-	5	10 U	NA	10 U	10 U	NA	0.3 J	NA
Trichloroethane,1,1,1-	5	10 U	NA	10 U	10 U	NA	0.5 J	NA
Trichloroethane,1,1,2-	1	10 U	NA	10 U	10 U	NA	20 U	NA
Noncarcinogenic PAHs (ug/l)								
Acenaphthene	20	180	250	10 U	10 U	10 U	270 U	10 U
Acenaphthylene	50	40 U	44 U	10 U	10 U	10 U	270 U	10 U
Anthracene	50	14 J	18 J	10 U	10 U	10 U	270 U	10 U
Benzo[g,h,i]perylene	NS	40 U	44 U	10 U	10 UJ	10 U	270 U	10 U
Fluoranthene	50	40 U	5 J	10 U	10 U	10 U	270 U	10 U
Fluorene	50	59	87	10 U	10 U	10 U	270 U	10 U
Methylnaphthalene,2-	NS	40 U	44 U	10 U	10 U	10 U	68 J	10 U
Naphthalene	10	12 J	44 U	10 U	10 U	10 U	2200	10 U
Phenanthrene	50	65	73	10 U	10 U	10 U	270 U	10 U
Pyrene	50	7 J	6 J	10 U	10 U	10 U	270 U	10 U
Carcinogenic PAHs (ug/l)								
Benz[a]anthracene	0.002	40 U	44 U	10 U	10 U	10 U	270 U	10 U
Benzo[a]pyrene	0.002	40 U	44 U	10 U	10 U	10 U	270 U	10 U
Benzo[b]fluoranthene	0.002	40 U	44 U	10 U	10 U	10 U	270 U	10 U
Benzo[k]fluoranthene	0.002	40 U	44 U	10 U	10 U	10 U	270 U	10 U
Chrysene	0.002	40 U	44 U	10 U	10 UJ	10 U	270 U	10 U
Dibenz[a,h]anthracene	NS	40 U	44 U	10 U	10 U	10 U	270 U	10 U
Indeno[1,2,3-cd]pyrene	0.002	40 U	44 U	10 U	10 UJ	10 U	270 U	10 U
Total PAHs (ug/L)								
Total PAHs	NS	377	483	ND	ND	ND	2268	ND
Other SVOCs (ug/L)								
Benzaldehyde	NS	9 J	NA	NA	10 U	NA	270 U	NA
Biphenyl,1,1-	NS	41	NA	NA	10 U	NA	270 U	NA
Bis(2-ethylhexyl)phthalate	5	40 U	44 U	10 U	10 U	12	270 U	10 U
Carbazole	NS	40 U	44 U	10 U	10 U	10 U	270 U	10 U
Dibenzofuran	NS	12 J	14 J	10 U	10 U	10 U	270 U	10 U
Diethyl phthalate	50	40 U	44 U	10 U	10 U	10 U	270 U	10 U
Dimethylphenol, 2,4-	1	40 U	44 U	10 U	10 U	10 U	270 U	10 UJ
Di-n-butyl phthalate	50	40 U	44 U	10 U	10 U	10 U	270 U	10 U
Methylphenol, 4-	1	40 U	44 U	10 U	10 U	10 U	270 U	10 U
N-Nitrosodiphenylamine	50	40 U	44 U	10 U	10 U	10 U	270 U	10 U
Phenol	1	40 U	44 U	10 U	10 U	10 U	120 J	10 U

Table 6
Groundwater Analytical Results
Clove and Maple Avenue Former MGP Site - Remedial Investigation
Haverstraw, New York

Site Location: Sample Location: Sample ID: Date Collected:	NY Ambient GW Limits	C&M MW09 MW-09 12/19/2001	C&M MW09 MW-09 8/3/2004	C&M MW10 CMMW10-01 2/1/1999	C&M MW10 MW-10 12/19/2001	C&M MW10 MW-10 8/3/2004	C&M MW-18 MW-18 12/20/2001	C&M MW-18 MW-18 8/3/2004
Dissolved Metals (ug/l)								
Aluminum	100	NA	NA	NA	NA	NA	NA	NA
Arsenic	25	NA	NA	NA	NA	NA	NA	NA
Barium	1000	NA	NA	NA	NA	NA	NA	NA
Beryllium	3	NA	NA	NA	NA	NA	NA	NA
Calcium	NS	NA	NA	NA	NA	NA	NA	NA
Chromium	50	NA	NA	NA	NA	NA	NA	NA
Cobalt	5	NA	NA	NA	NA	NA	NA	NA
Copper	200	NA	NA	NA	NA	NA	NA	NA
Iron	300	NA	NA	NA	NA	NA	NA	NA
Lead	25	NA	NA	NA	NA	NA	NA	NA
Magnesium	35000	NA	NA	NA	NA	NA	NA	NA
Manganese	300	NA	NA	NA	NA	NA	NA	NA
Mercury	0.7	NA	NA	NA	NA	NA	NA	NA
Nickel	100	NA	NA	NA	NA	NA	NA	NA
Potassium	NS	NA	NA	NA	NA	NA	NA	NA
Selenium	10	NA	NA	NA	NA	NA	NA	NA
Sodium	20000	NA	NA	NA	NA	NA	NA	NA
Thallium	0.5	NA	NA	NA	NA	NA	NA	NA
Vanadium	14	NA	NA	NA	NA	NA	NA	NA
Zinc	2000	NA	NA	NA	NA	NA	NA	NA
Total Metals (ug/l)								
Aluminum	100	NA	NA	1440	NA	NA	NA	NA
Arsenic	25	NA	NA	2.1 UB	NA	NA	NA	NA
Barium	1000	NA	NA	134 B	NA	NA	NA	NA
Beryllium	3	NA	NA	0.1 U	NA	NA	NA	NA
Calcium	NS	NA	NA	71200	NA	NA	NA	NA
Chromium	50	NA	NA	0.7 B	NA	NA	NA	NA
Cobalt	5	NA	NA	1.2 UB	NA	NA	NA	NA
Copper	200	NA	NA	4.1 UB	NA	NA	NA	NA
Iron	300	NA	NA	2160	NA	NA	NA	NA
Lead	25	NA	NA	1.1 UJ	NA	NA	NA	NA
Magnesium	35000	NA	NA	18600	NA	NA	NA	NA
Manganese	300	NA	NA	249	NA	NA	NA	NA
Mercury	0.7	NA	NA	0.2 U	NA	NA	NA	NA
Nickel	100	NA	NA	2 UB	NA	NA	NA	NA
Potassium	NS	NA	NA	3070 JBE	NA	NA	NA	NA
Selenium	10	NA	NA	8 UW	NA	NA	NA	NA
Sodium	20000	NA	NA	46300	NA	NA	NA	NA
Thallium	0.5	NA	NA	1.1 U	NA	NA	NA	NA
Vanadium	14	NA	NA	3 B	NA	NA	NA	NA
Zinc	2000	NA	NA	22.9 U	NA	NA	NA	NA
Cyanides (ug/L)								
Cyanide, Total	200	102	169	NA	3 U	10 U	3 U	10 U
Cyanide, Weak Acid Dissociable	NS	3	NA	NA	3 U	NA	3 U	NA

Table 7
Stormwater Analytical Results
Clove and Maple Former MGP Site - Remedial Investigation
Haverstraw, New York

Analyte	NYSDEC Ambient Groundwater Limits (GA)	Sample ID / Date Collected / Sample Type						
		6 TOR	Clove and Maple		Apartments			Hudson
		SW013102-1 1/31/2002 Primary	CMSW-01 3/4/1999 Primary	CMSW03 3/4/1999 Primary	SW013102-5 1/31/2002 Primary	SW013102-6 1/31/2002 Primary	SW013102-8 1/31/2002 Duplicate	SWOUT013002-1 1/30/2002
BTEX by NYSASP Method 95-1 (ug/L)								
Benzene	1.0	10 U	10 U	NA	0.5 J	5 J	5 J	4 J
Toluene	5	2 J	4 J	NA	10 U	10 UJ	10 UJ	10 UJ
Ethylbenzene	5	10 U	10 U	NA	1 J	3 J	3 J	2J
Xylene, Total	5	10 U	10 U	NA	0.7 J	2 J	2 J	1J
Total BTEX		2	4	ND	2	10	10	7
Other VOCs by NYSASP Method 95-1 (ug/L)								
Butanone,2- (MEK)	NS	9 J	10 U	NA	10 U	10 UJ	10 UJ	10 UJ
Chloroform	7	0.5 J	10 U	NA	10 U	10 UJ	10 UJ	10 UJ
Dichloroethene,1,2- (Total)	5	0.5 J	10 U	NA	10 U	10 UJ	10 UJ	10 UJ
Methyl-2-pentanone,4-	NS	6 J	10 U	NA	1 J	10 UJ	10 UJ	10 UJ
Methylene chloride	5	10 U	1 J	NA	10 U	10 UJ	10 UJ	10 UJ
Tetrachloroethene	5	0.6 J	10 U	NA	10 U	10 UJ	10 UJ	10 UJ
PAHs (Non-carcinogenic) by NYSASP Method 95-2 (ug/L)								
Acenaphthene	20	10 U	10 U	10 U	4 J	11 J	9 J	9 J
Anthracene	50	10 U	10 U	10 U	10 U	1 J	11 U	10 U
Fluoranthene	50	2 J	1 J	10 U	10 U	2 J	1 J	10 U
Fluorene	50	10 U	10 U	10 U	1 J	4 J	3 J	3 J
Methylnaphthalene,2-	NS	10 U	10 U	10 U	1 J	12 U	11 U	2 J
Naphthalene	10	10 U	10 U	10 U	4 J	12 U	11 U	5 J
Phenanthrene	50	1 J	10 U	10 U	1 J	6 J	4 J	2 J
Pyrene	50	2 J	2 J	10 U	10 U	2 J	2 J	10 U
Total PAHs (Non-carc.)		5	3	ND	11	26	19	21
PAHs (Carcinogenic) by NYSASP Method 95-2 (ug/L)								
Chrysene	0.002	1 J	10 U	10 U	10 U	12 U	11 U	10 U
Dibenz[a,h]anthracene	NS	10 U	10 U	10 U	10 U	12 U	11 U	10 U
Indeno[1,2,3-cd]pyrene	0.002	1 J	10 U	10 U	10 U	12 U	11 U	10 U
Total PAHs (Carc.)		2	ND	ND	ND	ND	ND	ND
Other SVOCs by NYSASP Method 95-2 (ug/L)								
Benzaldehyde	NS	1 J	10 U	10 U	10 UJ	12 UJ	11 UJ	10 UJ
Butyl benzyl phthalate	50	2 J	10 U	10 U	10 U	12 U	11 U	10 U
Diethyl phthalate	50	1 J	25 U	25 U	10 U	12 U	11 U	10 U
Dinitrotoluene,2,6-	5	10 U	10 U	10 U	10 U	12 U	11 U	10
Methylphenol,2-	1	1 J	25 U	25 U	10 UJ	12 UJ	11 UJ	10 UJ
Nitrophenol,4-	1	3 J	10 U	10 U	25 U	29 U	28 U	25 U
Phenol	1	4 J	25 U	25 U	10 U	12 U	11 U	10 U
Trichlorophenol,2,4,6-	1	10 U			10 U	12 U	11 U	10 U
Metals by 200.7 (ug/L)								
Aluminum	100	NA	1510 EJ	953 EJ	NA	NA	NA	NA
Antimony	3	NA	8.0 UB	2.3 U	NA	NA	NA	NA
Arsenic	25	NA	6.9 UB	1.2 U	NA	NA	NA	NA
Barium	1000	NA	57.8 B	23.4 B	NA	NA	NA	NA
Beryllium	3	NA	0.6 B	0.10 U	NA	NA	NA	NA
Cadmium	5	NA	0.2 UJ	0.2 UJ	NA	NA	NA	NA
Calcium	NS	NA	79500	15400	NA	NA	NA	NA
chromium	50	NA	16.2	1.1 UB	NA	NA	NA	NA
Cobalt	5	NA	2.6 B	0.6 U	NA	NA	NA	NA
Copper	200	NA	31.8 EJ	14.2 JBE	NA	NA	NA	NA
Iron	300	NA	2530	1050	NA	NA	NA	NA
Lead	25	NA	37.9	9	NA	NA	NA	NA
Magnesium	35000	NA	21100	3840 B	NA	NA	NA	NA
Manganese	300	NA	54.5	33.4	NA	NA	NA	NA
Mercury	0.7	NA	0.2 U	0.2 U	NA	NA	NA	NA
Nickel	100	NA	6.7 B	3.3 UB	NA	NA	NA	NA
Potassium	NS	NA	7270 EJ	3130 JBE	NA	NA	NA	NA
Selenium	10	NA	8.0 U	1.6 U	NA	NA	NA	NA
Silver	50	NA	1.2 U	1.2 U	NA	NA	NA	NA
Sodium	20000	NA	15000	81900	NA	NA	NA	NA
Thallium	0.5	NA	1.1 UJ	1.1 UJ	NA	NA	NA	NA
Vanadium	14	NA	6.4 B	2.0 B	NA	NA	NA	NA
Zinc	2000	NA	78.1 EJ	43.3 EJ	NA	NA	NA	NA
Cyanides by CLP Methods (4500CNI and ILM04.0) (ug/L)								
Cyanide, Weak Acid Dissociable	NS	3 U	135 J	10.0 U	4.7 U	3 U	3 U	3 U
Cyanide, Total	200	29.4	23.8 J*	10.0 U*	3 U	3 U	3 U	3 U
Geochemical Analyses by Various Methods								
pH	NS	7.31	NA	NA	7.47	7.37	7.41	7.38 J
Hardness	NS	206	NA	NA	332	346	336	346

Notes:

U - Analyte not detected
B - Analyte detected in associated blank
* - Duplicate analysis outside control limits
W - Post digest spike recovery furnace outside 85-115% control limit,
while sample absorbance less than 50% of spike absorbance
E - Exceeds calibration range
E - Exceeds calibration range
J - Estimated value
D - Dilution result
NA - Not available
NS - No standard
ND - Not Detected

Table 8
Storm Sewer Sediments Analytical Results
Clove and Maple Avenue Former MGP Site - Remedial Investigation
Haverstraw, New York

Analyte	RSCO or Risk-Based Criteria	Sample ID/ Date Collected					
		Clove and Maple Avenue				146 Maple Avenue	Apartments
		CMSED01 3/4/1999	CMSED03 3/4/1999	SD013102-2 1/31/2002	SD013102-3 1/31/2002	SD013102-4 1/31/2002	SD013102-6 1/31/2002
BTEX by NYSASP Method 95-1 (mg/kg)							
Benzene	12 (a)	0.014 U	0.013 U	0.012 U	0.013 U	0.011 U	0.008 J
Toluene	6300 (a)	0.014 U	0.013 U	0.012 U	0.0009 J	0.0006 J	0.001 J
Ethylbenzene	7800 (a)	0.014 U	0.013 U	0.012 U	0.013 U	0.011 U	0.043
Xylene, Total	16000 (a)	0.014 U	0.013 U	0.012 U	0.013 U	0.011 U	0.027
Total BTEX		ND	ND	ND	0.0009	0.0006	0.08
Other VOCs by NYSASP Method 95-1 and 91-1 (mg/kg)							
Butanone,2- (MEK)	47000 (a)	0.006 J	0.013 U	0.012 U	0.013 U	0.011 U	0.014 U
Methyl-2-pentanone,4-	NA	0.008 J	0.013 U	0.012 U	0.013 U	0.011 U	0.014 U
Tetrachloroethene	1.2 (a)	0.014 U	0.013 U	0.012 U	0.013 U	0.011 J	0.014 U
PAHs (Non-carcinogenic) by NYSASP Methods 91-2 and 95-2 (mg/kg)							
Acenaphthene	50 (b)	0.079 J	0.42 U	0.072 J	1.6 U	0.37 U	14
Acenaphthylene	41 (b)	0.47 U	0.048 J	0.19 J	1.1 J	0.18 J	4.4 U
Anthracene	50 (b)	0.47 U	0.11 J	0.24 J	1.2 J	0.32 J	3.6 J
Benzo[g,h,i]perylene	50 (b)	0.25 J	0.18 J	0.49	6.5	0.58	0.46 J
Fluoranthene	50 (b)	1.1	1	1.6	7.1	1.7	3.9 J
Fluorene	50 (b)	0.47 U	0.057 J	0.058 J	0.28 J	0.37 U	5.7
Methylnaphthalene,2-	50 (b)	0.47 U	0.42 U	0.039 J	1.6 U	0.37 U	6.4
Naphthalene	50 (b)	0.47 U	0.42 U	0.38 U	1.6 U	0.37 U	6.9
Phenanthrene	50 (b)	0.44 J	0.6	0.79	3.9	0.65	24
Pyrene	50 (b)	1.1	0.92	1.5	7.8	1.2	6.7
Total PAHs (Non-carcinogenic)	500	3.0	3	5.0	27.9	4.63	72
PAHs (Carcinogenic) by NYSASP Methods 91-2 and 95-2 (mg/kg)							
Benzo[a]anthracene	0.224 (b)	0.5	0.42 J	1.3	3.4	0.85	0.51 J
Benzo[a]pyrene	0.061 (b)	0.56	0.44	1.2	4	1	4.4 U
Benzo[b]fluoranthene	0.87 (b)	0.86	0.69	1.1	2.8	0.86	4.4 U
Benzo[k]fluoranthene	8.7 (b)	0.3 J	0.18 J	1	3.7	0.8	4.4 U
Chrysene	50 (b)	0.63	0.48	1.4	4.5	1	0.5 J
Dibenz[a,h]anthracene	0.014 (b)	0.069 J	0.058 J	0.21 J	1.4 J	0.18 J	4.4 U
Indeno[1,2,3-cd]pyrene	0.87 (a)	0.25 J	0.22 J	0.56	4.7	0.61	4.4 U
Total PAHs (Carcinogenic)	500	3.2	2.49	7	25	5.3	1.0
Other SVOCs by NYSASP Methods 91-2 and 95-2 (mg/kg)							
Biphenyl,1,1-	3900 (a)	NA	NA	0.38 U	1.6 U	0.37 U	1.5 J
Bis(2-ethylhexyl)phthalate	50 (b)	0.37 U	0.37 U	0.8	1.6 U	1.1	4.4 U
Butyl benzyl phthalate	50 (b)	0.37 U	0.37 U	0.046 J	1.6 U	0.31 J	4.4 U
Carbazole	NA	0.37 U	0.37 U	0.041 J	0.37 J	0.37 U	4.4 U
Dibenzofuran	6.2 (b)	0.37 U	0.37 U	0.38 U	1.6 U	0.37 U	0.69 J
TAL Metals by CLP Method 6010 (mg/kg)							
Aluminum	NA	6200	5750	NA	NA	NA	NA
Arsenic	0.43 (a)	3.6 J	4.5	NA	NA	NA	NA
Barium	16000 (a)	39.5 B	38.8 B	NA	NA	NA	NA
Beryllium	160 (a)	0.3 B	0.2 B	NA	NA	NA	NA
Chromium	230 (a)	30.2 *	7.1 *	NA	NA	NA	NA
Cobalt	NA	8.2 B	8.6 B	NA	NA	NA	NA
Copper	3100 (a)	88	42.9	NA	NA	NA	NA
Iron	23000 (a)	37100 J*	14100 J*	NA	NA	NA	NA
Lead	NA	195 J	52.6 J	NA	NA	NA	NA
Manganese	1600 (a)	137	382	NA	NA	NA	NA
Nickel	1600 (a)	16 EJ	11.5 EJ	NA	NA	NA	NA
Vanadium	78 (a)	28.7	15.4	NA	NA	NA	NA
Zinc	23000 (a)	406	208	NA	NA	NA	NA
CLP Methods (ILM04.0 and 4500CNI) (mg/kg)							
Cyanide, Total	1600 (a)	1.9 J	1.3 UJ	1.54	0.555 U	2.74	0.19 U
Cyanide, Weak Acid Dissociable	1600 (a)	1.4 U	1.3 U	0.111 U	0.123 U	NA	0.132 U
Inorganic Analyses by CLP Methods (various units)							
Hardness (mg/kg)		NA	NA	32700	35500	8	7.13
pH (pH units)		NA	NA	8.12	8.24	42900	5170
TOC Average Quads (mg/kg)		NA	NA	7290	46900	109000	70700

Notes:

(a) EPA Region III Risk-Based Concentration Table

(b) NYSDEC TAGM 4046 RSCO, limit of 50 mg/kg for individual semi-VOC used for RSCO that is not risk-based (e.g. naphthalene, 2-methylnaphthalene, chrysene)

U - Analyte Not detected

J - Estimated value

NS - No standard

ND - Not Detected

NA - Not Analyzed

Table 9
Hudson River Sediment Analytical Results
Clove and Maple Avenue Former MGP Site - Remedial Investigation
Haverstraw, New York

Analyte	RSCO or Risk-Based Criteria	Sample ID/ Date Collected/ Depth to Sample (ft bgs)							
		VC-01 7/24/2001 (0-2)	VC-21 (Dup) 7/24/2001 (0-2)	VC-02 7/24/2001 (0-2)	VC-03 7/24/2001 (0-2)	VC-04 7/24/2001 (0-2)	VC-04 7/24/2001 (3-5)	VC-05 7/24/2001 (0-2)	VC-05A 7/24/2001 (0-2)
BTEX by NYSASP Method 95-1 (mg/kg)									
Total BTEX		ND	ND	ND	ND	ND	ND	ND	ND
Other VOCs by NYSASP Method 95-1 (mg/kg)									
Acetone	70000 (a)	0.014 U	0.015 U	0.021 U	0.021 U	0.16 B	0.17 J	0.029 U	0.068 UJ
PAHs (Non-carcinogenic) by NYSASP Method 95-2 (mg/kg)									
Acenaphthene	50 (b)	0.42 J	0.7 J	1.4 J	0.83	1 J	0.68 J	0.27 J	0.27 J
Acenaphthylene	41 (b)	0.35 J	0.52 J	0.43 J	0.25 J	1.3 J	1.1 J	0.48 J	0.33 J
Anthracene	50 (b)	0.88	2.6 J	1.7	0.93	3.2 J	1.4	2 J	0.76 J
Benzo[g,h,i]perylene	50 (b)	2.6 J	5.5 J	5.5 J	2.2 J	13 J	3.7 J	1.2 J	2 J
Fluoranthene	50 (b)	5.8 J	19 J	12	5.6	36 J	6.1	5.8 J	5.4 J
Fluorene	50 (b)	0.5 J	1.8 J	1.2 J	0.38 J	1.8 J	0.49 J	0.38 J	0.21 J
Methylnaphthalene,2-	50 (b)	0.78 U	3.6 U	1.5 U	0.15 J	6 UJ	0.26 J	0.11 J	0.048 J
Naphthalene	50 (b)	0.083 J	3.6 UJ	0.19 J	0.079 J	6 UJ	0.3 J	0.1 J	0.059 J
Phenanthrene	50 (b)	4 J	15 J	8.7	3.5	17 J	3.4	3.1 J	2.4 J
Pyrene	50 (b)	5.5 J	18 J	12	5.4 J	32 J	8.3	6.1 J	5.6 J
Total PAHs (Non-carc.)	500	20	63	43	19.3	105	25.7	20	17
PAHs (Carcinogenic) by NYSASP Method 95-2 (mg/kg)									
Benzo[a]anthracene	0.224 (b)	2.6 J	8 J	5.5	2.9	14 J	4.1	3.5 J	3 J
Benzo[a]pyrene	0.061 (b)	2.3 J	7.1 J	5	2.3	13 J	4	2.8 J	3.1 J
Benzo[b]fluoranthene	0.87 (b)	2 J	6 J	3.6	2	13 J	2.7	2.2 J	2.8 J
Benzo[k]fluoranthene	8.7 (b)	1.6 J	5.9 J	3.6	1.5	11 J	2.5	2.3 J	2.1 J
Chrysene	50 (b)	2.9 J	8 J	5.8	3.1	16 J	5.2	3.8 J	3.4 J
Dibenz[a,h]anthracene	0.014 (b)	0.84 J	1.8 J	1.5	0.88	3.8 J	1.2 J	0.77 J	0.74 J
Indeno[1,2,3-cd]pyrene	0.87 (a)	2.7 J	5.6 J	4.9	2.5	13 J	3.6	2.2 J	2.5 J
Total PAHs (Carcinogenic)	500	15	42	30	15	84	23	17.6	18
Other SVOCs by NYSASP Method 95-2 (mg/kg)									
Acetophenone	7800 (a)	0.78 U	3.6 U	1.5 U	0.77 U	6 UJ	1.3 U	0.079 J	0.058 J
Biphenyl,1,1-	3900 (a)	0.78 U	3.6 U	1.5 U	0.77 U	6 UJ	1.3 U	0.057 J	0.034 J
Bis(2-ethylhexyl)phthalate	50 (b)	0.78 U	3.6 U	1.5 U	1.1 U	6.8 UJ	1.3 U	2.6 UJ	2.2 J
Butyl benzyl phthalate	50 (b)	0.78 U	0.74 J	1.5 U	0.52 J	6 UJ	1.3 U	0.33 J	0.31 J
Carbazole	NA	0.34 J	0.95 J	0.64 J	0.26 J	1.7 J	0.18 J	0.49 J	0.24 J
Dibenzofuran	6.2 (b)	0.17 J	0.65 J	0.39 J	0.11 J	6 UJ	0.16 J	0.14 J	0.067 J
Di-n-butyl phthalate	7800 (a)	0.78 U	3.6 U	1.5 U	0.079 J	6 UJ	1.3 U	0.061 J	0.04 J
TAL Metals by CLP Method ILMO 4.1 (mg/kg)									
Aluminum	NA	6680	7910	8290	7760	19100 J	17400	13300	19500 J
Arsenic	0.43 (a)	2.9	3.8	2.3	3	9.6 J	12.7	9.3	7.7 J
Barium	16000 (a)	27.8	45.8	35.5	33.6	94.2 J	93.9	90.6	77.6 J
Beryllium	160 (a)	0.21	0.24	0.26	0.24	0.87 J	0.75	0.49	0.72 J
Cadmium	78 (a)	0.44 J	0.48 J	0.40 J	0.32 J	2.3 J	1.6 J	3.9 J	1.7 J
Chromium	230 (a)	9.9 J	11.6 J	10.7 J	10.0 J	81.4 J	71.4 J	51.0 J	66.5 J
Cobalt	NA	5.7 J	7.3 J	6.6	6.2	14.6 J	13	11	14.5 J
Copper	3100 (a)	71.4	83.4	54.6	55.1	128 J	104	85.3	103 J
Iron	23000 (a)	20400	28100	22000	21100	38300 J	44000	30500	37300 J
Lead	NA	132 J	108 J	96.5 J	242 J	278 J	197 J	150 J	133 J
Manganese	1600 (a)	204	228	197	185	542 J	483	335	564 J
Mercury	7.8 (a)	0.058 J	0.081 J	0.034 J	0.056 J	0.91 J	1.0 J	0.42 J	0.91 J
Nickel	1600 (a)	16	15.9	15.7	15.3	38.2 J	31.6	28.7	36.3 J
Selenium	390 (a)	0.93 U	1.1 J	1.0 U	0.87 U	1.6 J	1.8 U	1.7 J	2.2 UJ
Silver	390 (a)	0.19 U	0.18 U	0.21 U	0.18 U	1.8 J	1.2	0.86	1.4 J
Vanadium	78 (a)	28.5	28.2	24.9	28.2	46.1 J	35.4	30.5	38.2 J
Zinc	23000 (a)	158	141	135	131	281 J	283	219	299 J
Cyanides by CLP Methods (mg/kg)									
Cyanide, Total	1600 (a)	ND	ND	ND	ND	ND	ND	ND	ND
Inorganic Analyses by CLP Methods									
Hardness (mg/kg)		79000	69600	52200	52000	104000 J	51800	37700	54600 J
pH (Standard Units)		7.19	7.73	8.83	8.22	7.4 J	7.24	7.56	7.71 J
Total Organic Carbon (mg/ka)		28500 J	5140 J	14500 J	13600	37800 J	36000	34000	35000 J

Notes:

- (a) EPA Region III Risk-Based Concentration Table for residential exposures
- (b) NYSDC TAGM 4046 RSCO, limit of 50 mg/kg for individual semi-VOC used for RSCO that is not risk-based (e.g. naphthalene, 2-methylnaphthalene, chrysene)
- U - Not Detected
- J - Estimated Value
- B - Analyte Detected in Association with Method Blank
- D - Dilution Result
- E - Exceeds Calibration Range

Table 10
Proposed Investigation Summary and Objectives
Clove and Maple Avenues Former MGP Site
Haverstraw, New York

Sample Location	Matrix	Sample Depth	Analytical Parameters	Sampling Method	Rationale	Sample Number
SB-67, SB-71, SB-76, SB-80, SB-84, SB-88, SB-92	Soil	To the top of till (up to 35 feet bgs)	VOC, PAH	Geoprobe / TarGOST	Identify/delineate observed MGP impacts; delineate extent of concentrations > SCGs; obtain additional geologic information.	Lab analysis, one per boring (7 samples); TarGOST on all Borings
SB-61 to SB-66; SB-68 to SB-70; SB-72 to SB-75; SB-77 to SB-79; SB-81 to SB-83; SB-85 to SB-87; SB-89 to SB-91; SB-93 to SB-107	Soil	To the top of till (up to 35 feet bgs)	VOC, PAH	Geoprobe / TarGOST	Identify/delineate observed MGP impacts; delineate extent of concentrations > SCGs; obtain additional geologic information.	Lab analysis, one sample from 10% of all borings (10 total); TarGOST on all Borings
SV-01 through SV-04; SV-67, SV-71, SV-76, SV-80, SV-84, SV-88, SV-92	Soil Vapor	NA	VOC	Summa canister	Evaluate potential for vapor migration to offsite locations/buildings	11 samples
SB-108 through SB-110	Soil	To the top of till (approximately 35 feet bgs)	VOC, PAH, TAL Metals, and Cyanide	Hollow stem auger	Identify the source of purifier waste odors observed as soil boring/monitoring well SB/MW-9	Up to 12 samples
SB-111, SB-112	Soil	To the top of till (approximately 35 feet bgs)	VOC, PAH, TAL Metals and Cyanide	Hollow stem auger	Identify/delineate tar observed in clay pipes near TP-2 and TP-3	Up to 8 samples
SB-113, SB-114	Soil	To the top of till (approximately 35 feet bgs)	VOC, PAH, TAL Metals and Cyanide	Hollow stem auger	Identify/delineate extent of tar saturated soils in the vicinity of the former tar well	Up to 8 samples
SB-115 through SB-119	Soil	To the top of till (approximately 35 feet bgs)	VOC, PAH, TAL Metals and Cyanide	Hollow stem auger	Areal coverage to delineate the extent of on-site impacts	Up to 20 samples

Table 10
Proposed Investigation Summary and Objectives
Clove and Maple Avenues Former MGP Site
Haverstraw, New York

Sample Location	Matrix	Sample Depth	Analytical Parameters	Sampling Method	Rationale	Sample Number
MW-8, MW-9, MW-11 and MW-24	Aqueous	Not applicable	VOCs, PAHs, Cyanide	Bladder pump	Provide groundwater quality data for comparison to soil vapor data collected on the same day	4 samples
TWP-67, TWP-71, TWP-76, TWP-80, TWP-84, TWP-88, TWP-92	Aqueous	Not applicable	VOCs	Peristaltic pump	Provide initial groundwater quality data in this area; determine locations for up to three (3) monitoring wells.	7 samples
MW-1 through MW-107 (up to 37 wells)	Aqueous	Not applicable	VOC, PAH, Cyanide	Bladder pump	Delineate downgradient groundwater contaminant migration	Up to 37 samples during the second round

Notes:

1. bgs – below ground surface
2. VOC – Volatile organic compound
3. PAH – Polynuclear aromatic hydrocarbon
4. SCG – NYSDEC Standards, Criteria and Guidance

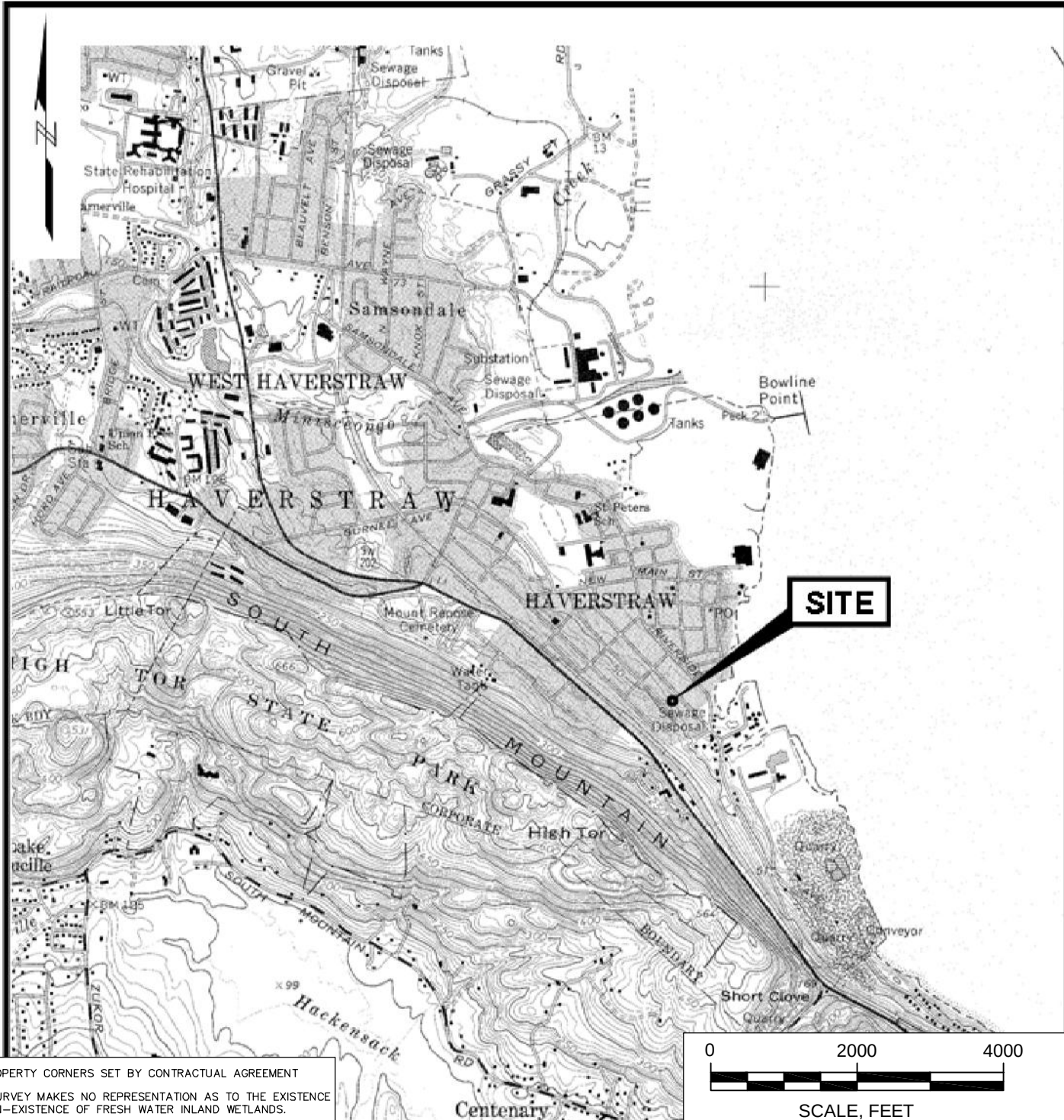


FIGURE 1
REMEDIAL INVESTIGATION
HAVERSTRAW FORMER MGP SITES
HAVERSTRAW, ORANGE COUNTY, NEW YORK

SITE LOCATION MAP

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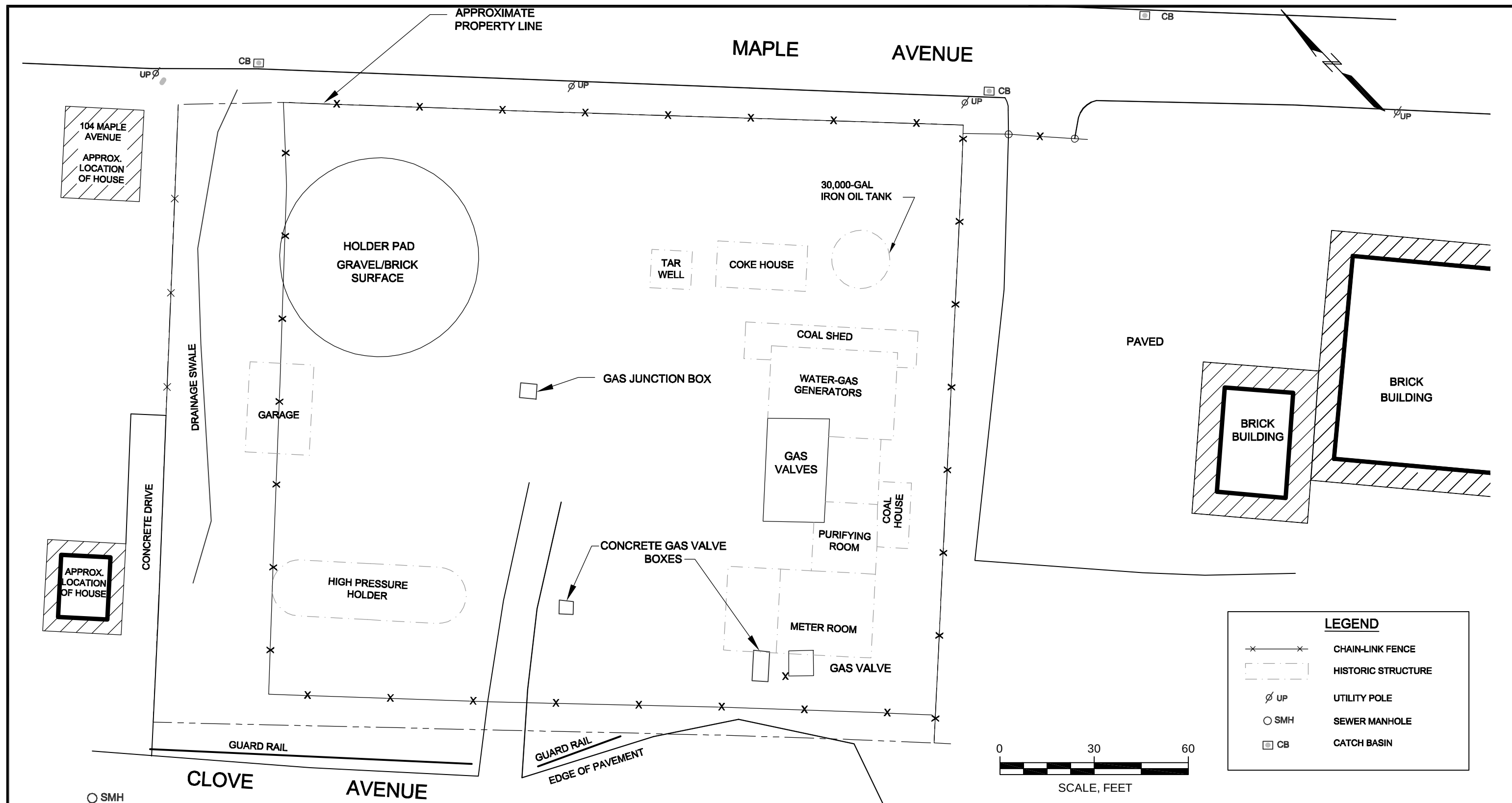
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FIGURE 2
HISTORICAL STRUCTURES
REMEDIAL INVESTIGATION HAVERSTRAW FORMER MGP SITE

HAVERSTRAW, ORANGE COUNTY, NEW YORK

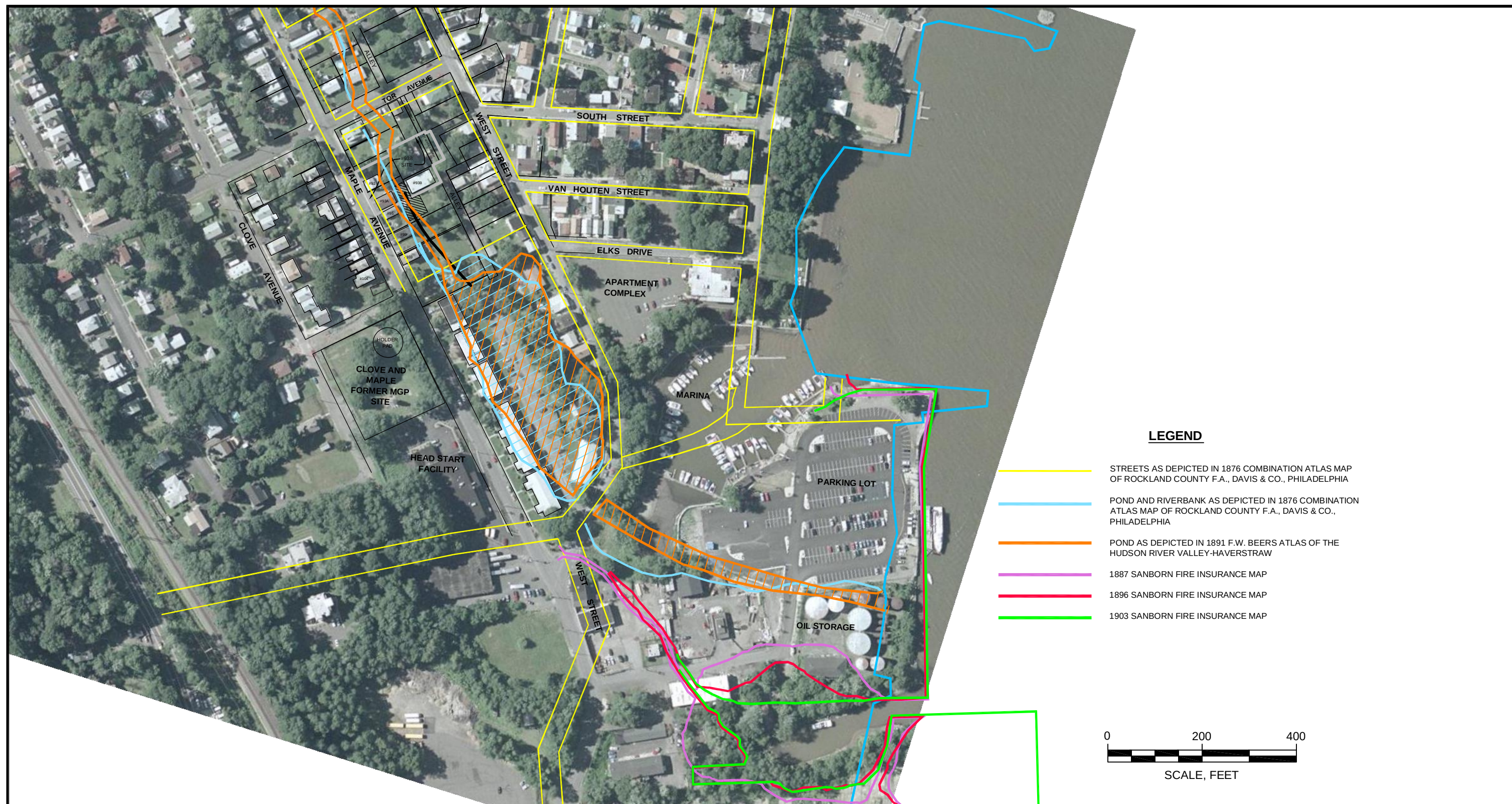
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FIGURE 3

HISTORICAL COMPOSITE STREETS AND WATERWAYS

REMEDIAL INVESTIGATION HAVERSTRAW FORMER MGP SITE

HAVERSTRAW, ORANGE COUNTY, NEW YORK

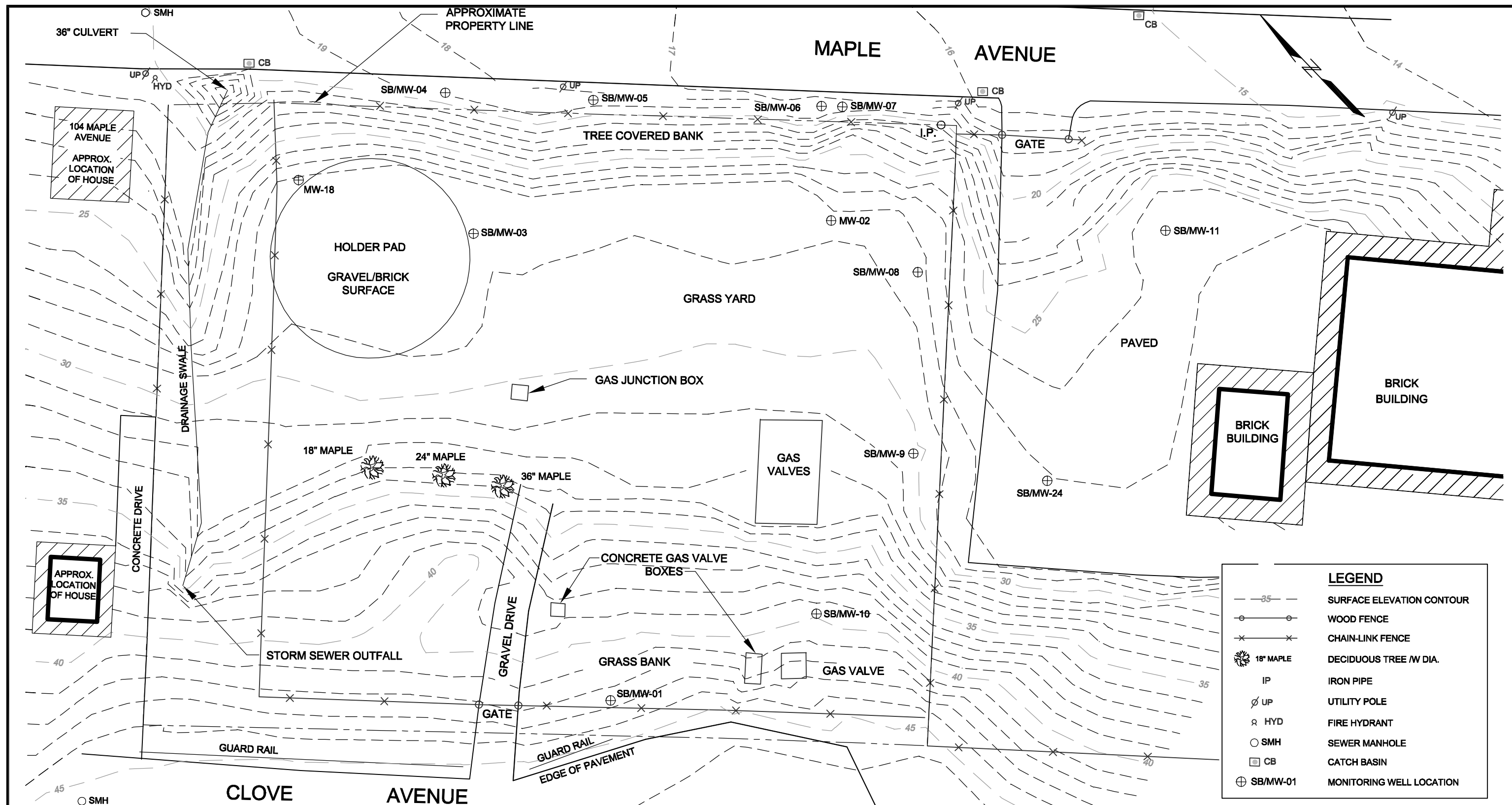
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FIGURE 4

CURRENT SITE CONFIGURATION

REMEDIAL INVESTIGATION HAVERSTRAW FORMER MGP SITES

HAVERSTRAW, ORANGE COUNTY, NEW YORK

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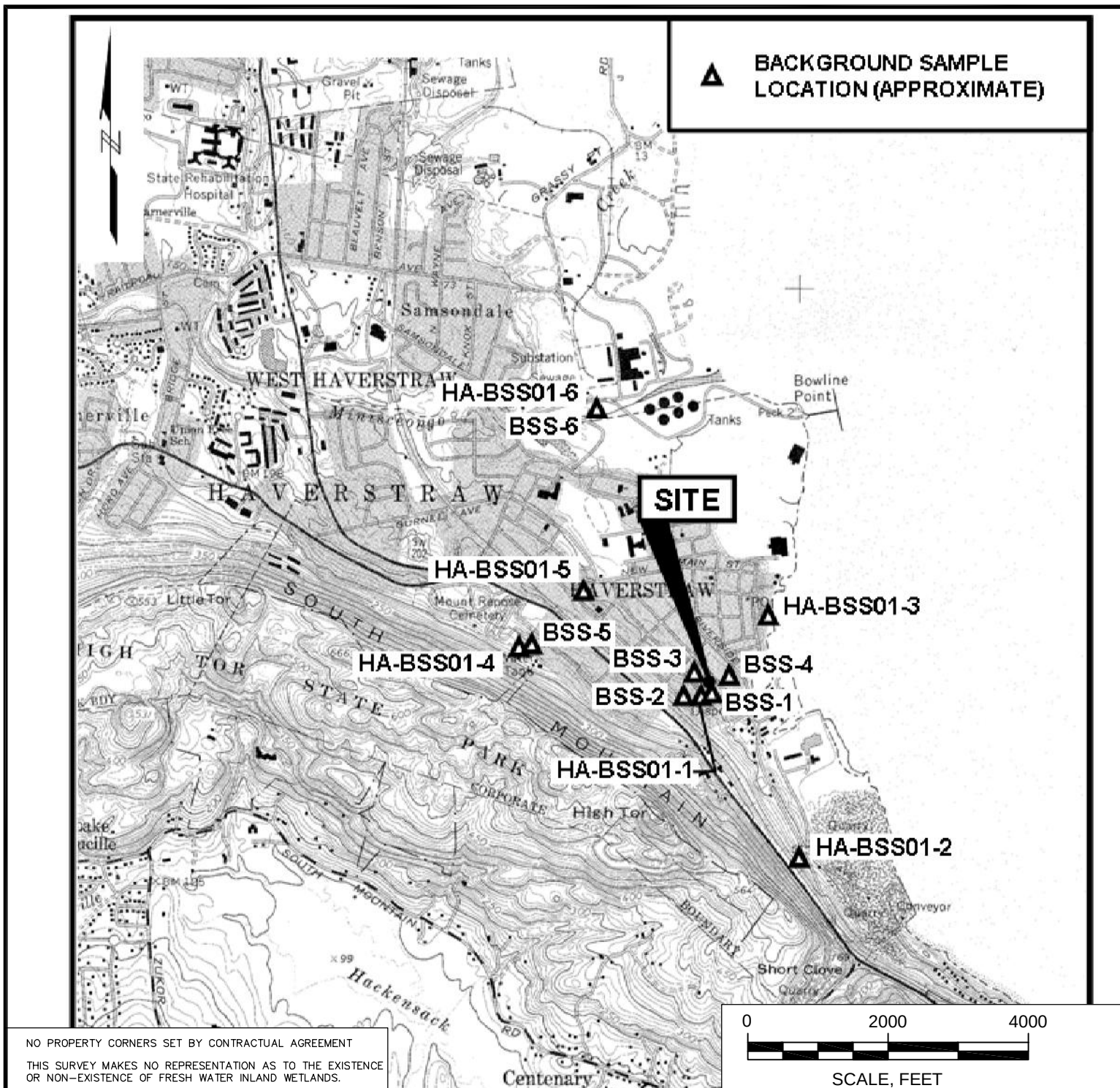


FIGURE 5

REMEDIAL INVESTIGATION

HAVERSTRAW FORMER MGP SITES
HAVERSTRAW, ORANGE COUNTY, NEW YORK

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BACKGROUND SURFACE SOIL SAMPLE LOCATIONS



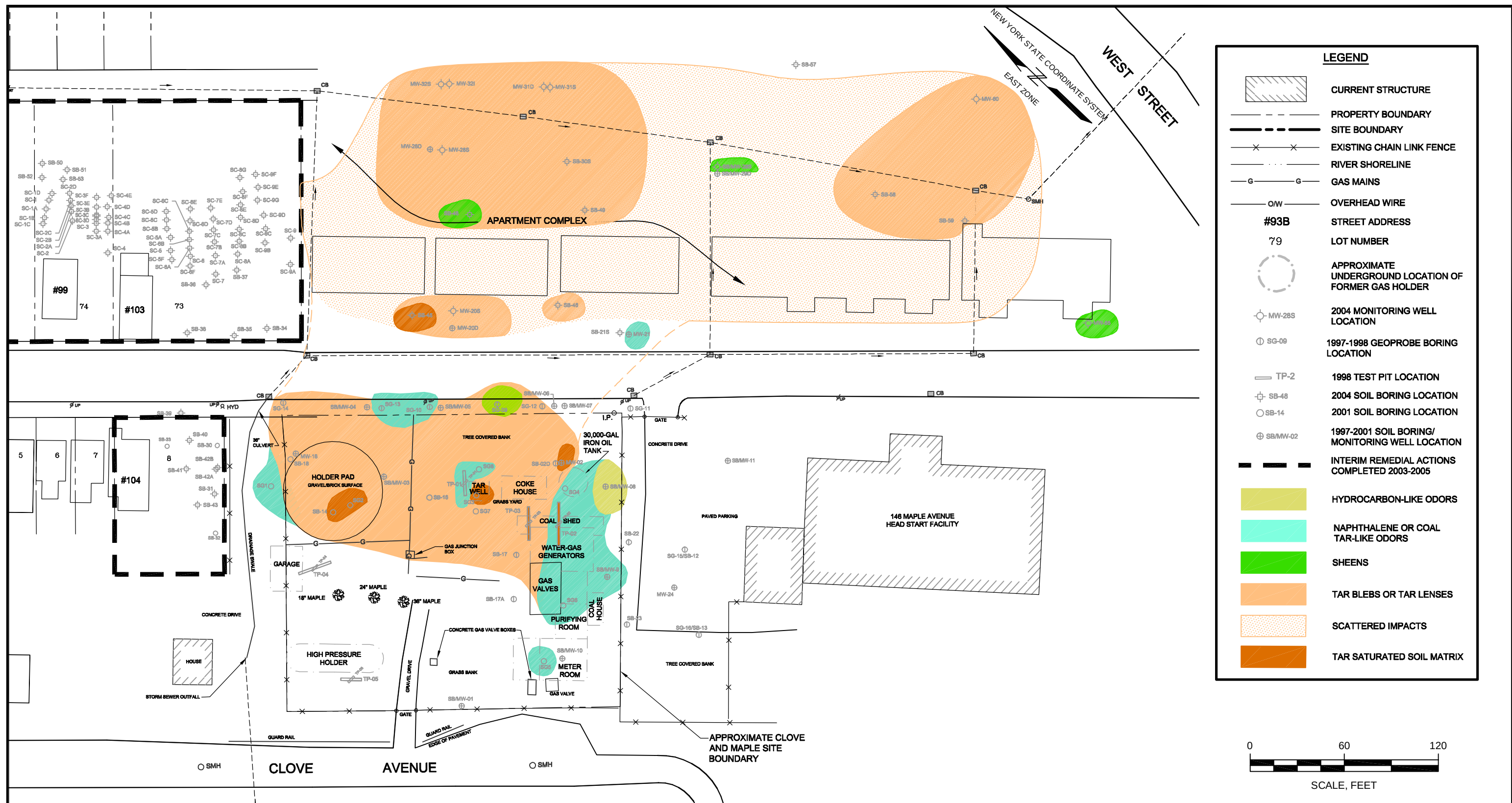
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FIGURE 6

LATERAL EXTENT OF PHYSICAL IMPACTS

REMEDIATION INVESTIGATION HAVERSTRAW FORMER MGP SITE

HAVERSTRAW, ORANGE COUNTY, NEW YORK

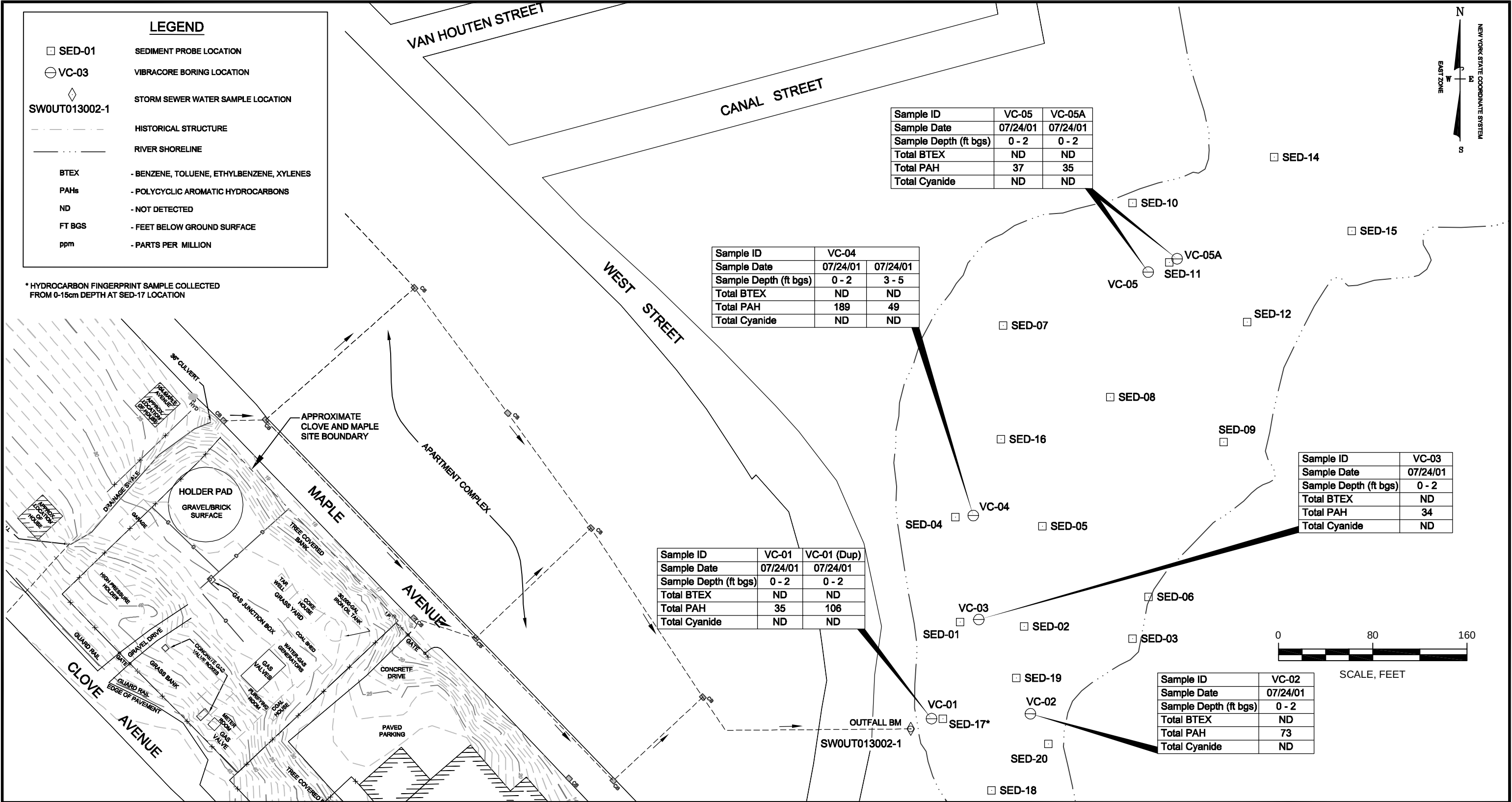
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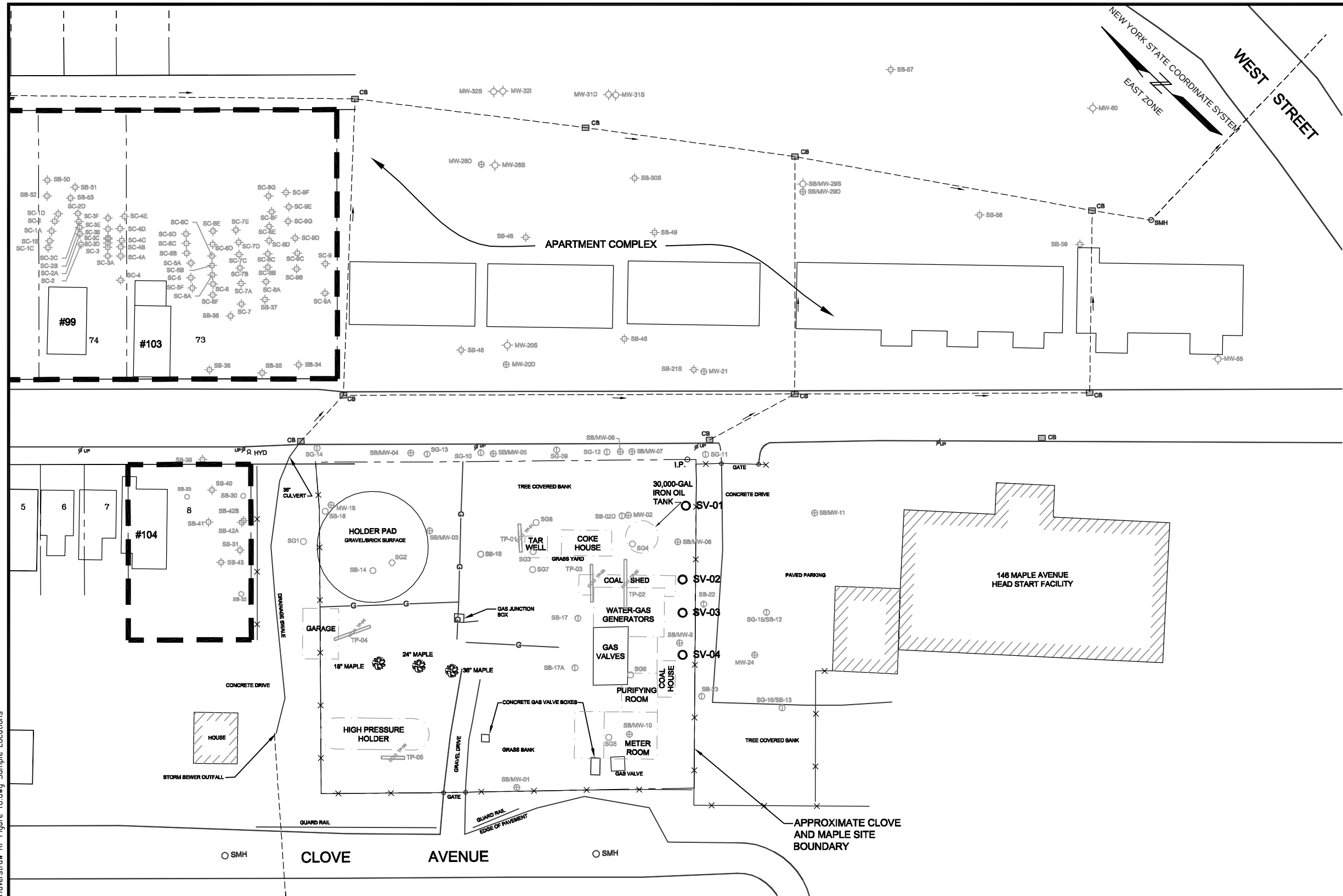
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FIGURE 9
VIBRACORE SEDIMENT SAMPLE ANALYTICAL RESULTS (ppm)
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HAVERSTRAW, ORANGE COUNTY, NEW YORK

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LEGEND

CURRENT STRUCTURE

PROPERTY BOUNDARY

SITE BOUNDARY

EXISTING CHAIN LINK FENCE

RIVER SHORELINE

GAS MAINS

OVERHEAD WIRE

STREET ADDRESS

LOT NUMBER

APPROXIMATE UNDERGROUND LOCATION OF FORMER GAS HOLDER

MW-28S

2004 MONITORING WELL LOCATION

SG-09

1997-1998 GEOPROBE BORING LOCATION

TP-2

1998 TEST PIT LOCATION

SB-48

2004 SOIL BORING LOCATION

SB-14

2001 SOIL BORING LOCATION

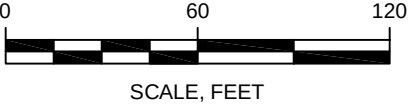
SB/MW-02

1997-2001 SOIL BORING/ MONITORING WELL LOCATION

INTERIM REMEDIAL ACTIONS COMPLETED 2003-2005

SV-01

PROPOSED SOIL VAPOR



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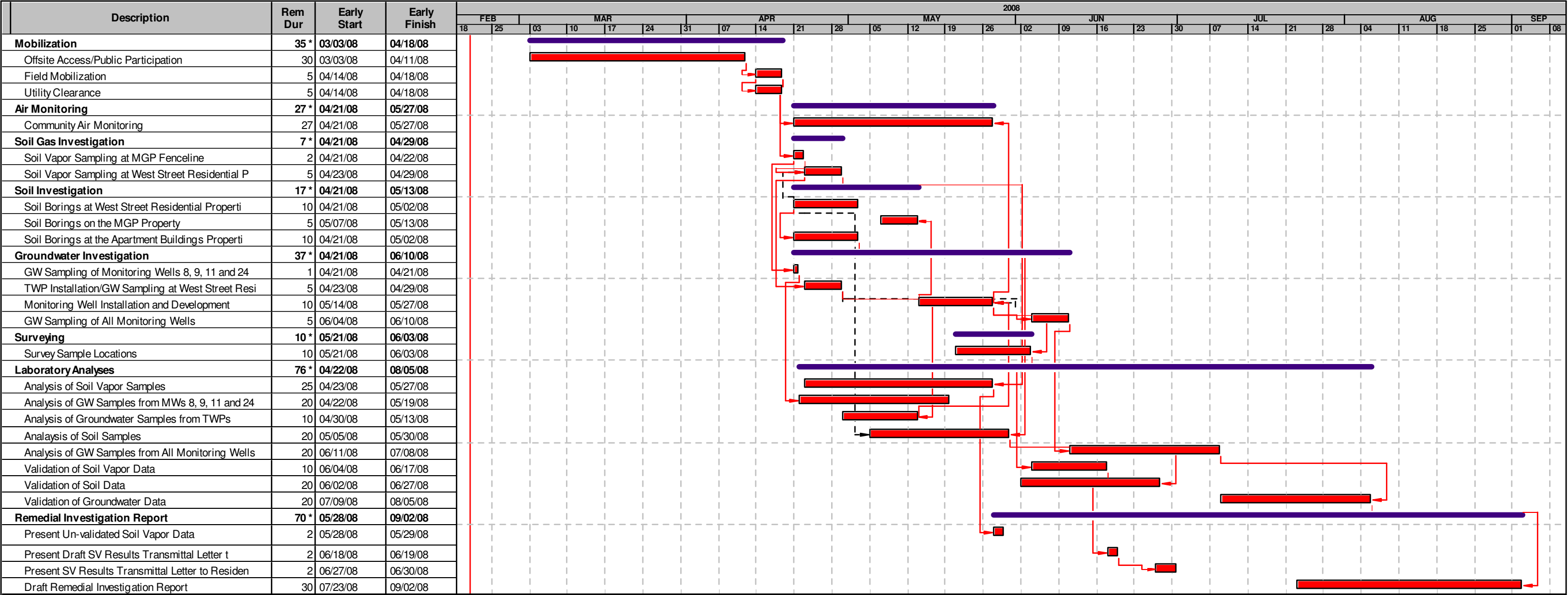
FIGURE 10

PROPOSED INDOOR AIR AND SOIL VAPOR SAMPLE LOCATIONS

REMEDIAL INVESTIGATION HAVERSTRAW FORMER MGP SITE

HAVERSTRAW, ORANGE COUNTY, NEW YORK

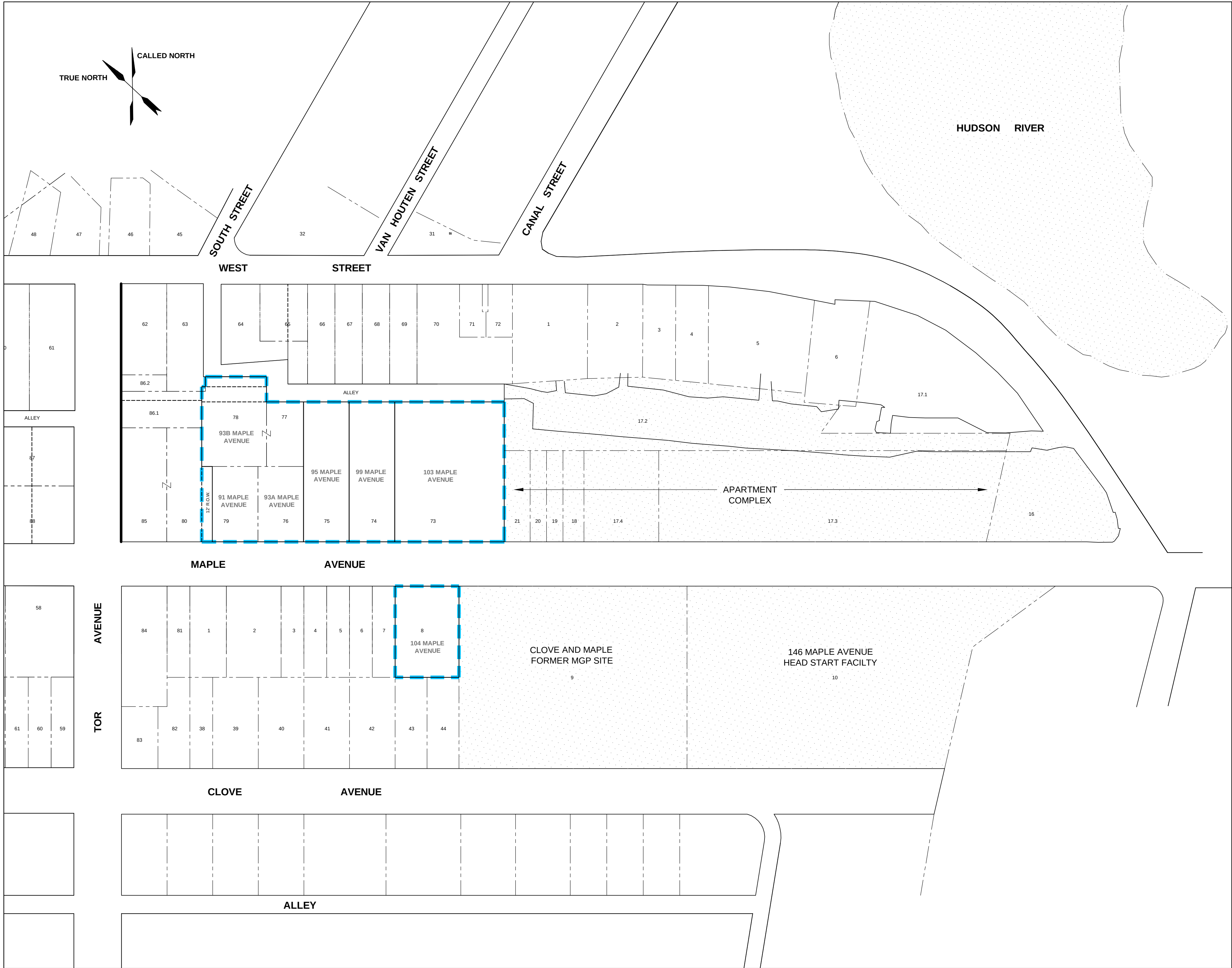
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Start date	01/07/08 10:00AM
Finish date	09/02/08 4:59PM
Data date	02/21/08 12:00AM
Run date	02/22/08 1:00PM
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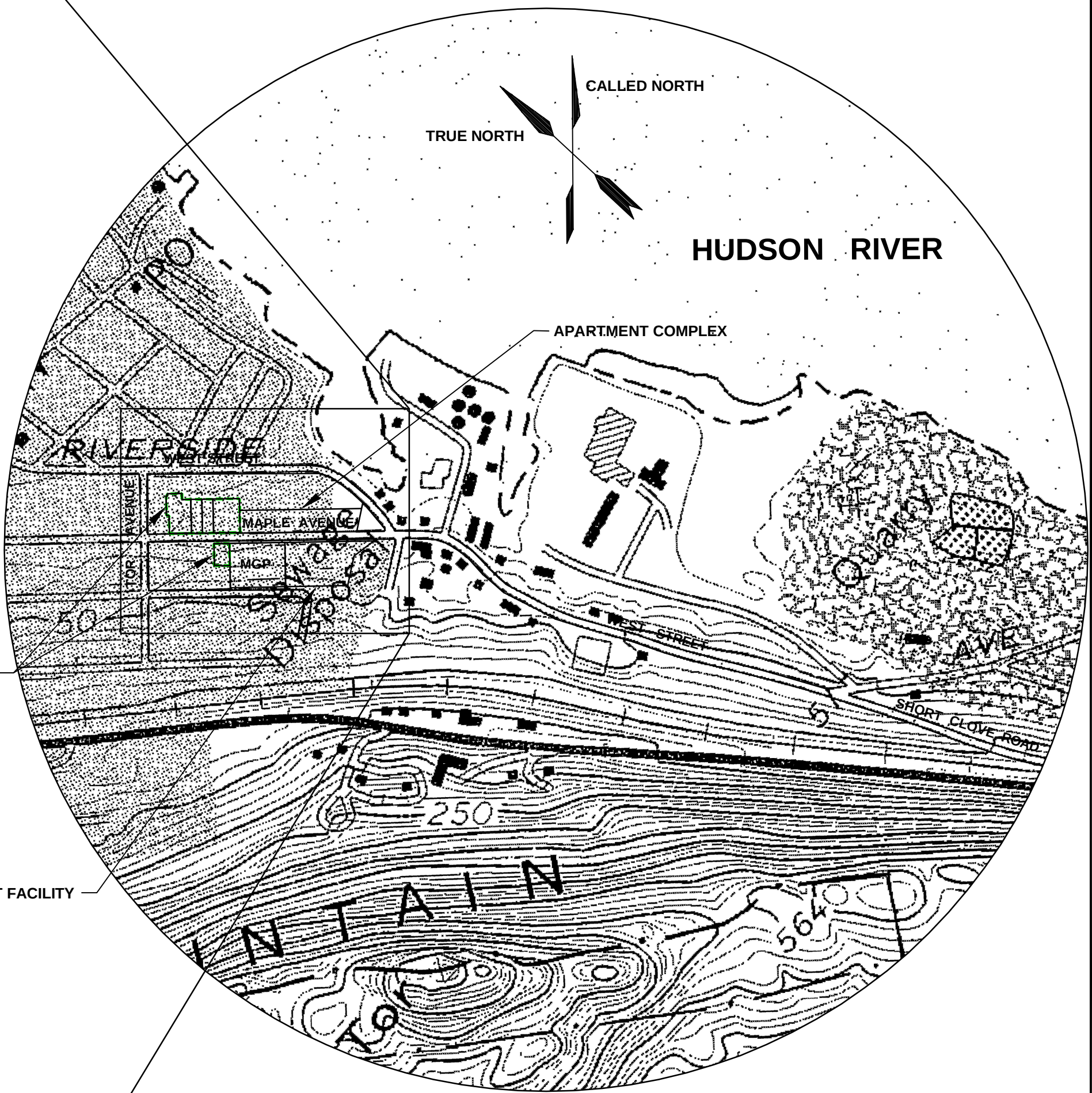
Figure 11
Clove & Maple Aves Former MGP Site
Project Schedule

- Early bar
- Progress bar
- Critical bar
- Summary bar
- Progress point
- Critical point
- Summary point
- Start milestone point
- Finish milestone point

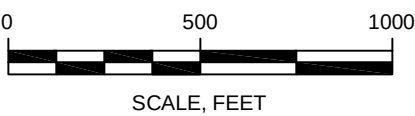


INTERIM REMEDIAL
MEASURES
COMPLETED 2003-2005

HEAD START FACILITY



INDEX MAP
SCALE: 1"=500'



LEGEND

- PROPERTY BOUNDARY
- 8 ASSESSOR'S LOT NUMBER
- #104 STREET ADDRESS
- INTERIM REMEDIAL MEASURES COMPLETED BETWEEN 2003 AND 2005
- CLOVE AND MAPLE RI AREAS

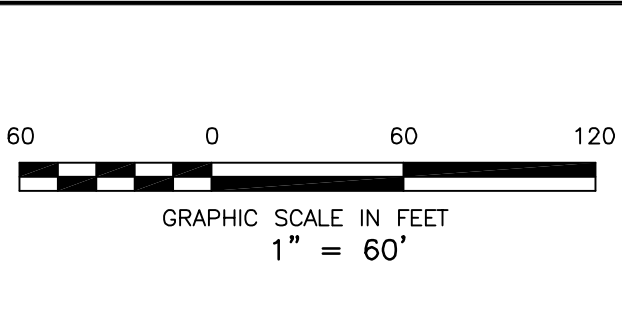
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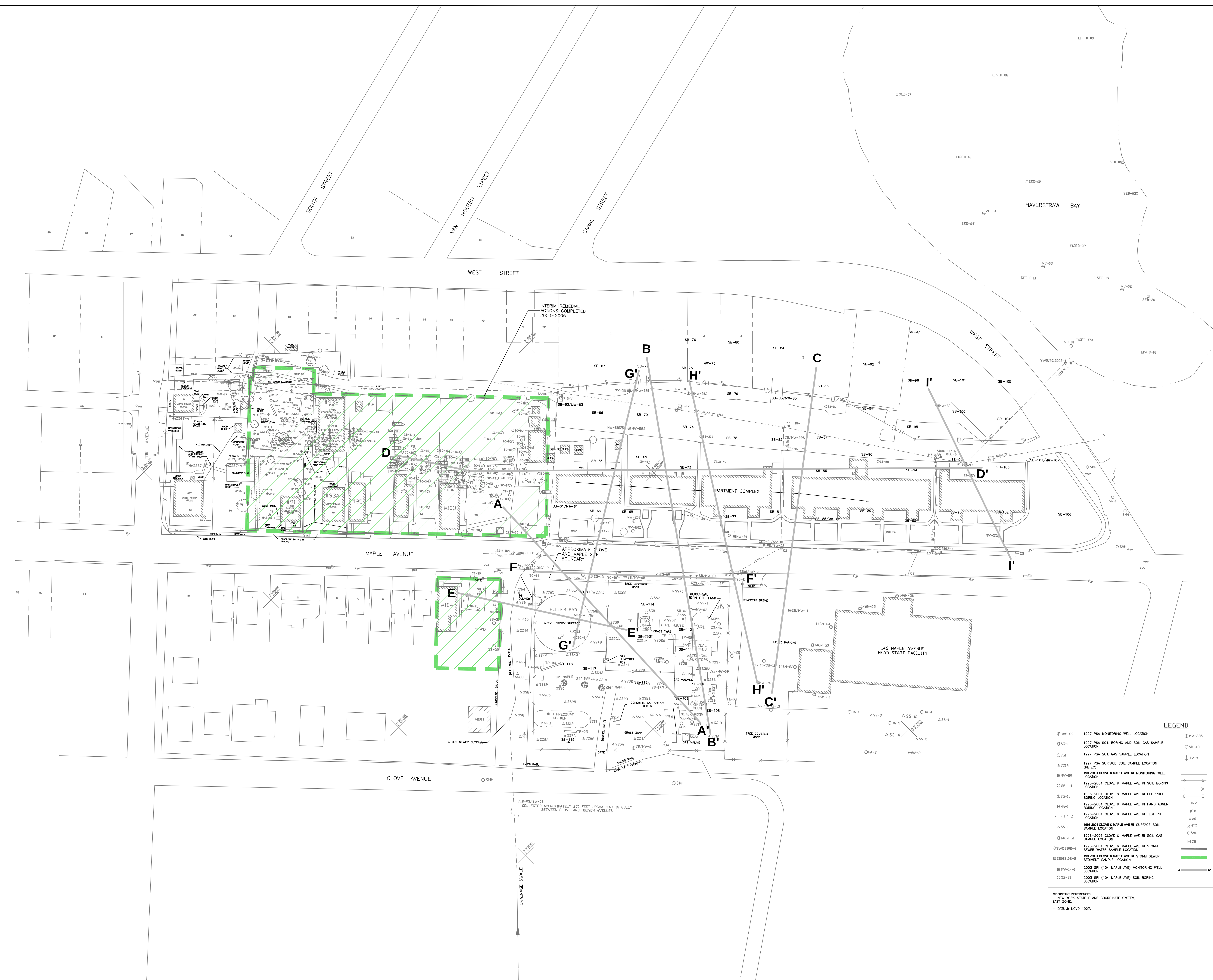
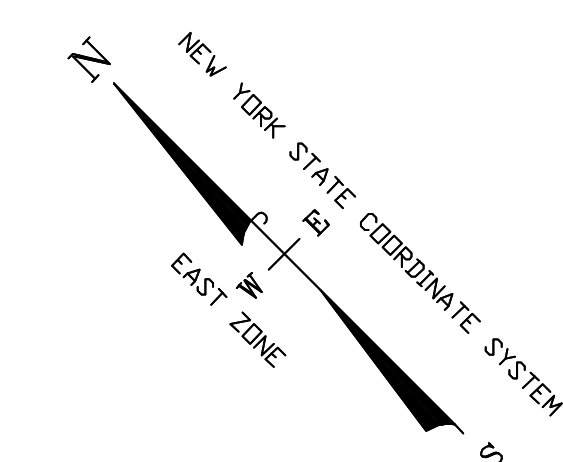
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HAVERSTRAW

**PLATE 1
SITE LOCATION PLAN
CLOVE AND MAPLE**
FORMER MGP SITE—REMEDIAL INVESTIGATION
ORANGE COUNTY

NEW YORK

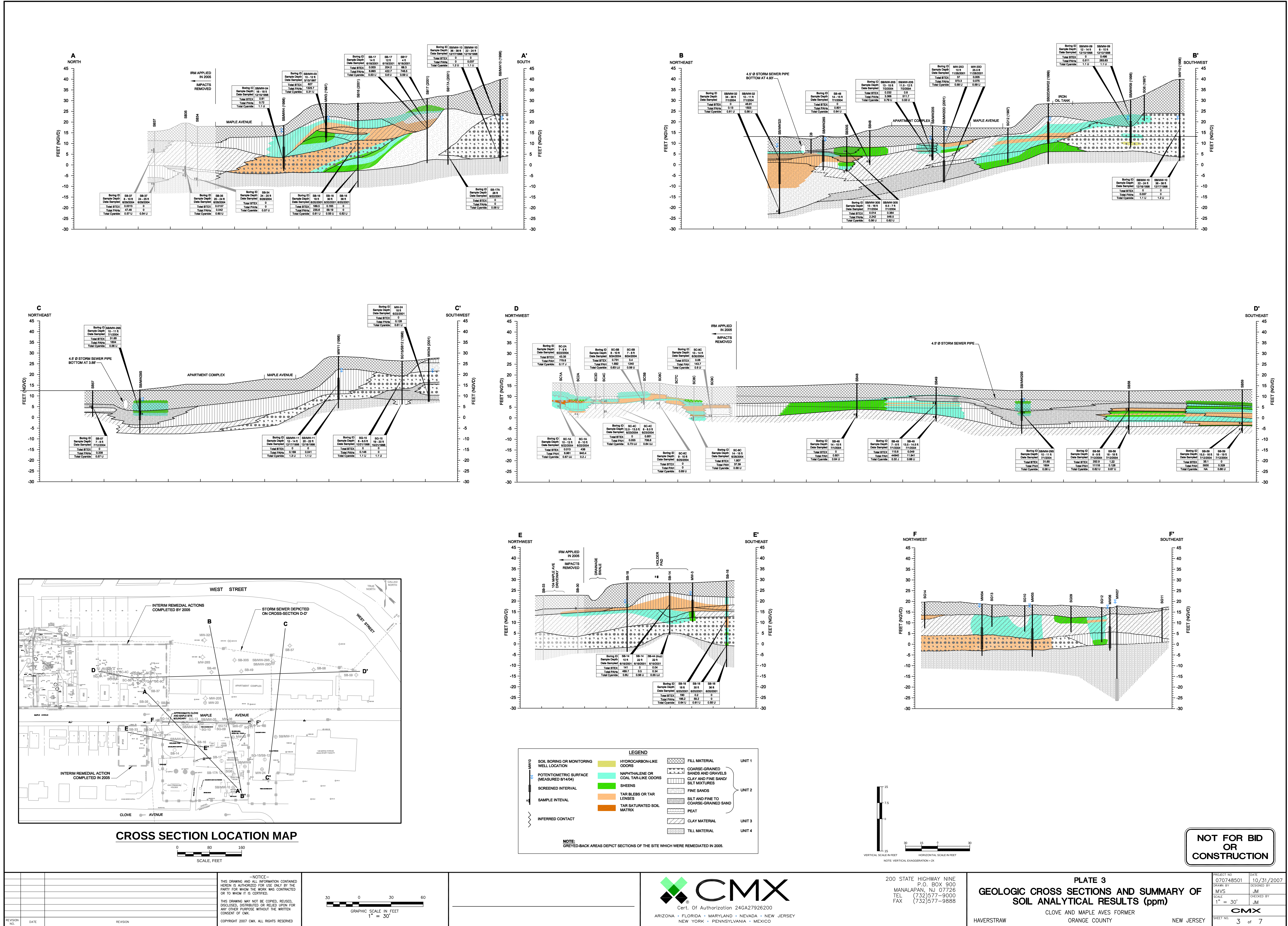
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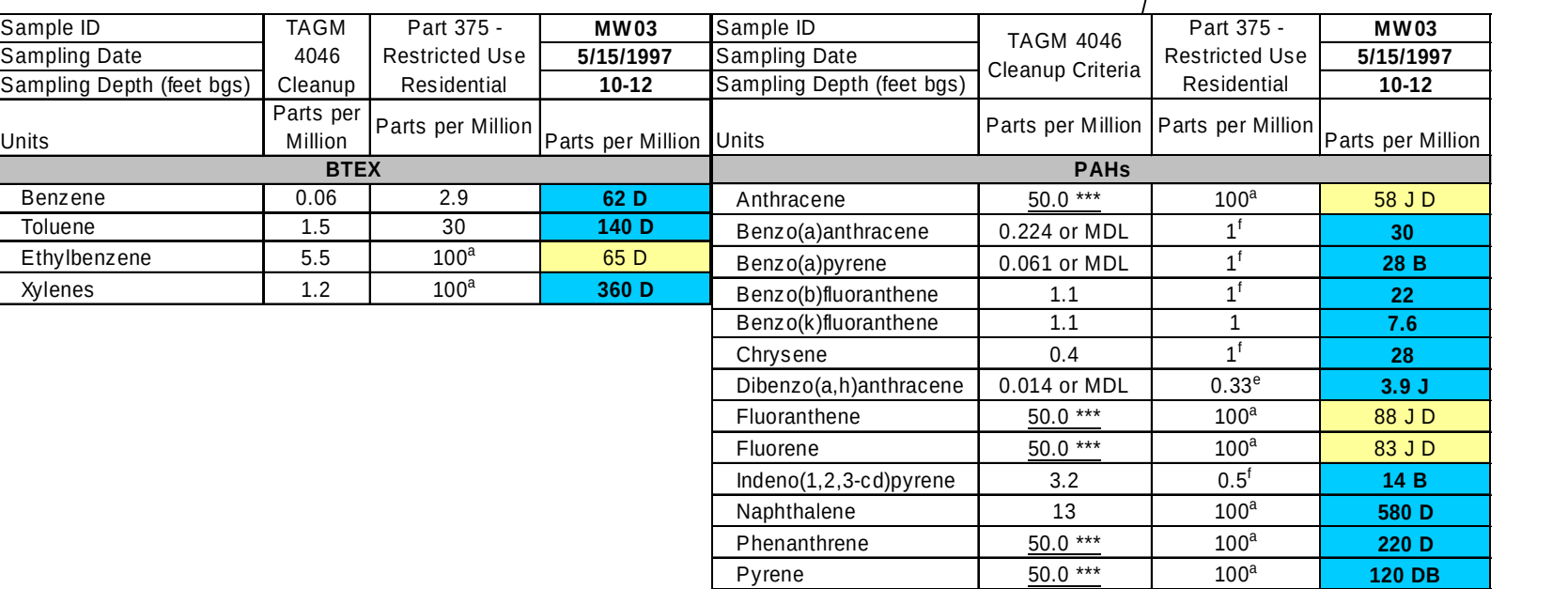


LEGEND	
⊙ MW-02	1997 PSA MONITORING WELL LOCATION
⊙ SG-1	1997 PSA SOIL BORING AND SOIL GAS SAMPLE LOCATION
⊙ SG1	1997 PSA SOIL GAS SAMPLE LOCATION
⊙ MV-20	1997 PSA SURFACE SOIL SAMPLE LOCATION
⊙ SB-14	1998-2001 CLOVE & MAPLE AVE RI MONITORING WELL LOCATION
⊙ SG-11	1998-2001 CLOVE & MAPLE AVE RI GEOPROBE BORING LOCATION
⊙ HA-1	1998-2001 CLOVE & MAPLE AVE RI HAND AUGER BORING LOCATION
TP-2	1998-2001 CLOVE & MAPLE AVE RI TEST PIT LOCATION
Δ SS-1	1998-2001 CLOVE & MAPLE AVE RI SURFACE SOIL SAMPLE LOCATION
⊙ 146H-G1	1998-2001 CLOVE & MAPLE AVE RI SOIL GAS SAMPLE LOCATION
⊙ SV013102-6	1998-2001 CLOVE & MAPLE AVE RI STORM SEWER WATER SAMPLE LOCATION
⊙ SV013102-2	1998-2001 CLOVE & MAPLE AVE RI STORM SEWER WATER SAMPLE LOCATION
⊙ MV-14-1	2003 SB (104 MAPLE AVE) MONITORING WELL LOCATION
⊙ SB-31	2003 SB (104 MAPLE AVE) SOIL BORING LOCATION
⊙ MW-285	2004 SB (99, 103, 104 & APARTMENT COMPLEX MAPLE AVE) MONITORING WELL LOCATION
⊙ SB-48	2004 SB (99, 103, 104 & APARTMENT COMPLEX MAPLE AVE) SOIL BORING LOCATION
⊙ IV-9	2004 SUPPLEMENTAL IWM (938 MAPLE AVE) PNEUMATION WELL LOCATION
—	HISTORICAL STRUCTURE (RETEC)
—	RIVER SHORELINE
—	WOOD FENCE
—	CHAIN-LINK FENCE
—	GAS MAIN
—	OVERHEAD WIRE
⊙	UTILITY POLE
⊙	WATER GATE VALVE
⊙	FIRE HYDRANT
⊙	SEWER MANHOLE
⊙	CATCH BASIN
—	INVESTIGATION AREA
—	INTERIM REMEDIAL ACTIONS COMPLETED 2003-2005
—	CROSS SECTION LOCATION

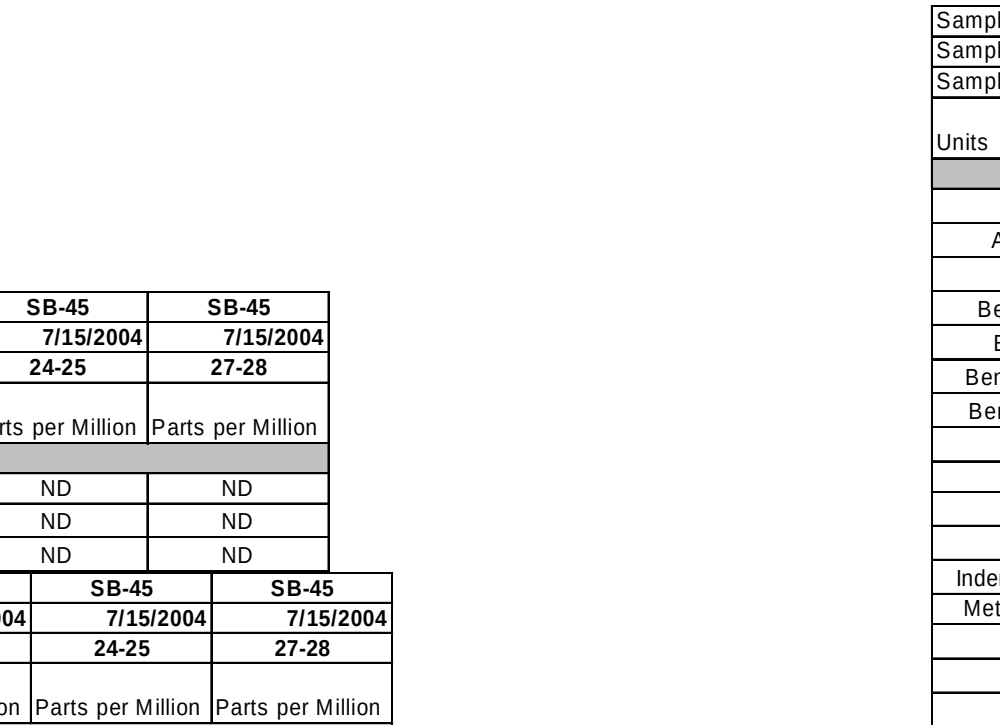
GEODETIC REFERENCES:
= NEW YORK STATE PLANE COORDINATE SYSTEM,
EAST ZONE.
- DATUM: NAD 83.

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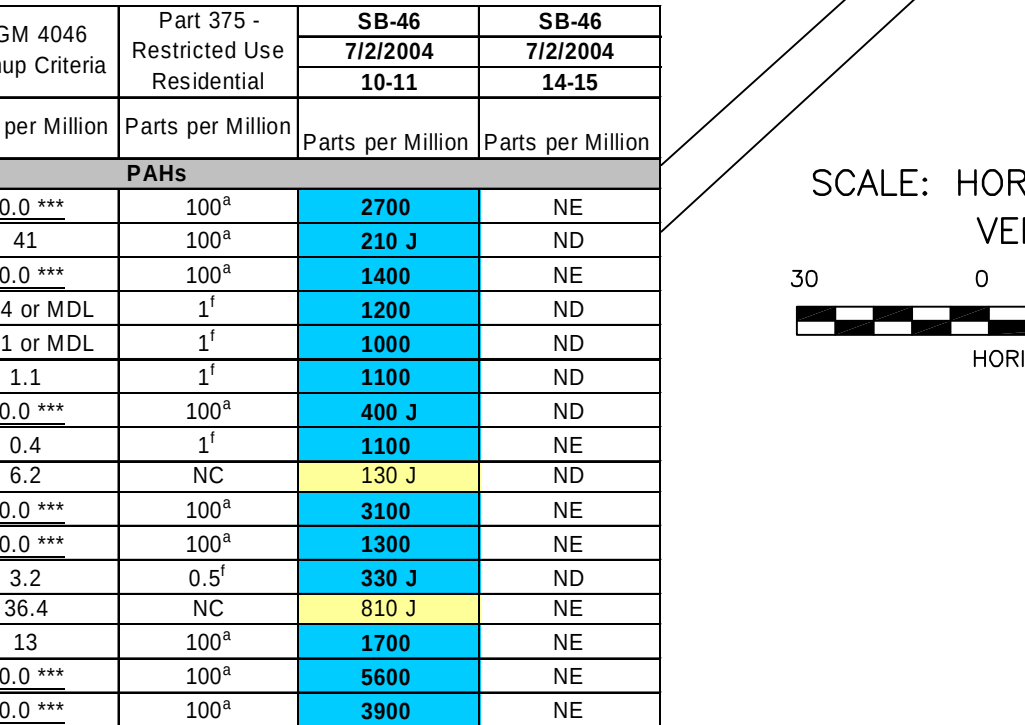


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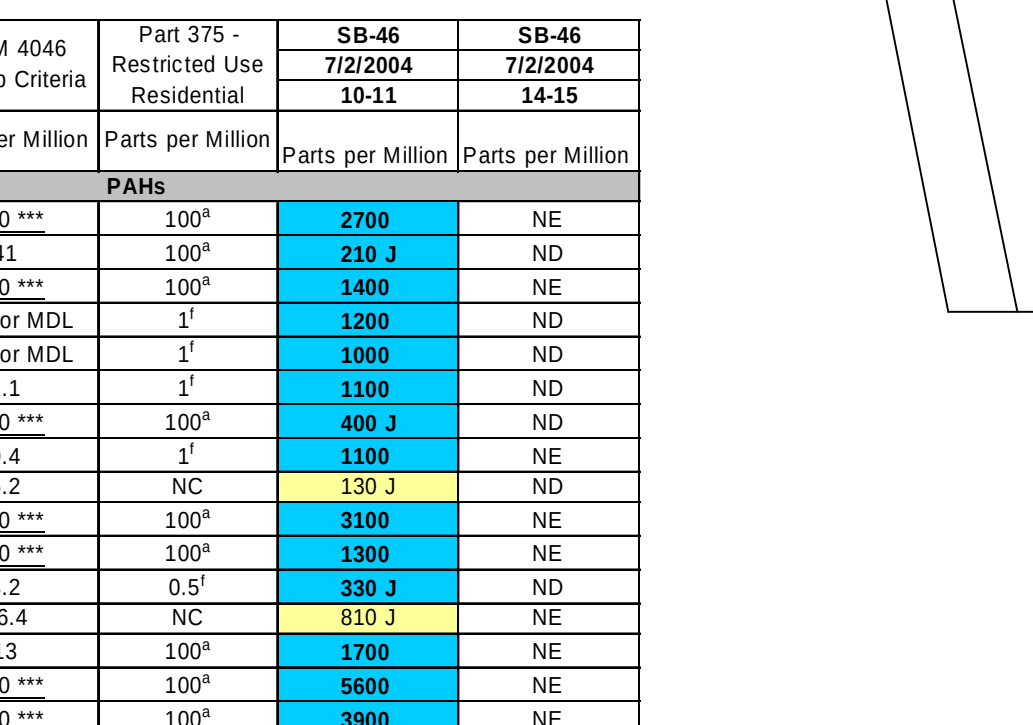
Sample ID	TAGM	Part 375 -	MW-24
Sampling Date	4046	Restricted Use	6/22/2001
Sampling Depth (feet bgs)	Cleanup	Residential	18-18
Units	Parts per Million	Parts per Million	Parts per Million
BTEX			
No detections			
PAHs No Exceedances			



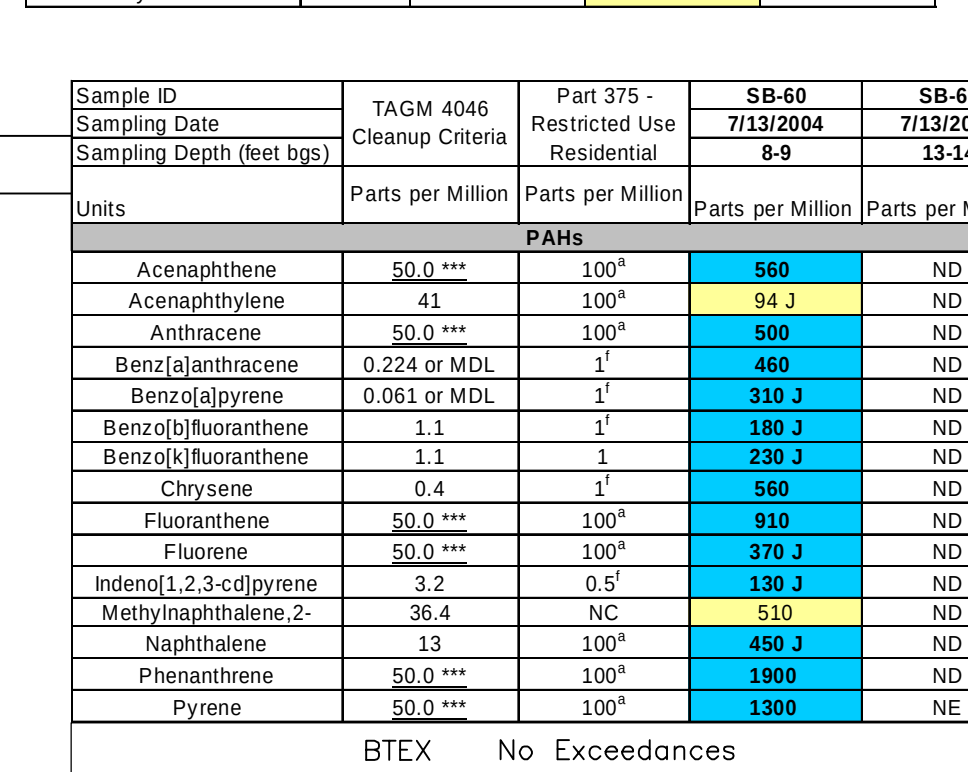
Sample ID	TAGM 4046	Part 375 -	MW21	MW21
Sampling Date	Cleanup Criteria	Restricted Use	11/28/2001	11/28/2001
Sampling Depth (feet bgs)		Residential	8-10	20-22
Units	Parts per Million	Parts per Million	Parts per Million	Parts per Million
		PAHs		
Benz[a]anthracene	0.224 or MDL	1'	0.24 J	ND
Benzo[a]pyrene	0.094 or MDL	1'	0.097 J	ND
		BTEX	No Exceedances	



Sample ID	TAGM 4066	Part 375 -	SB1W-305	SB1W-304
Sampling Date	Cleanup Criteria	Restricted Use	7/17/2004	7/17/2004
Sampling Depth (feet logs)		Residential	6.5-7	15-16
Units	Parts per Million	Parts per Million	Parts per Million	Parts per Million
PAHS				
Acenaphthene	50.0 ***	100 ⁰	62.3	NE
Benzo[a]anthracene	0.224 or MCL	1 ¹	25	NE
Benzo[a]pyrene	0.061 or MCL	1 ¹	20	ND
Benzo[b]fluoranthene	0.181 or MCL	1 ¹	23	ND
Chrysene	50.0 ***	100 ⁰	82.3	NE
Fluoranthene	50.0 ***	100 ⁰	53	NE
Methylphenanthrenes, 1,2,3,4	50.0 ***	100 ⁰	37	NE
Phenanthrene	50.0 ***	100 ⁰	139	NE
Pyrene	50.0 ***	100 ⁰	82.3	NE
BTEX				
No Exceedances				

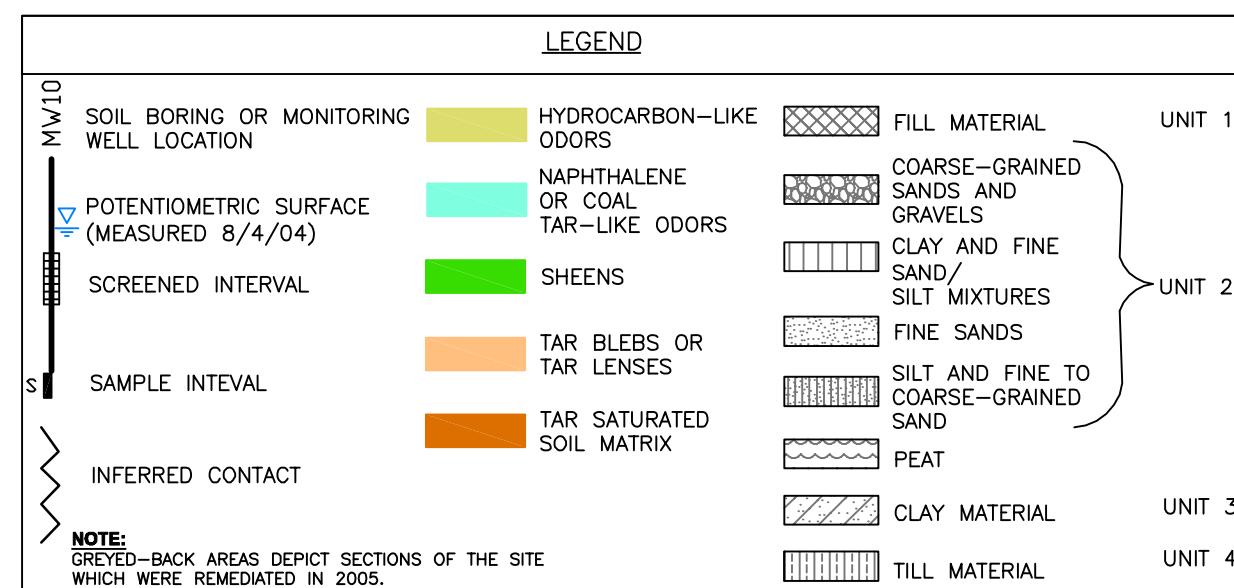
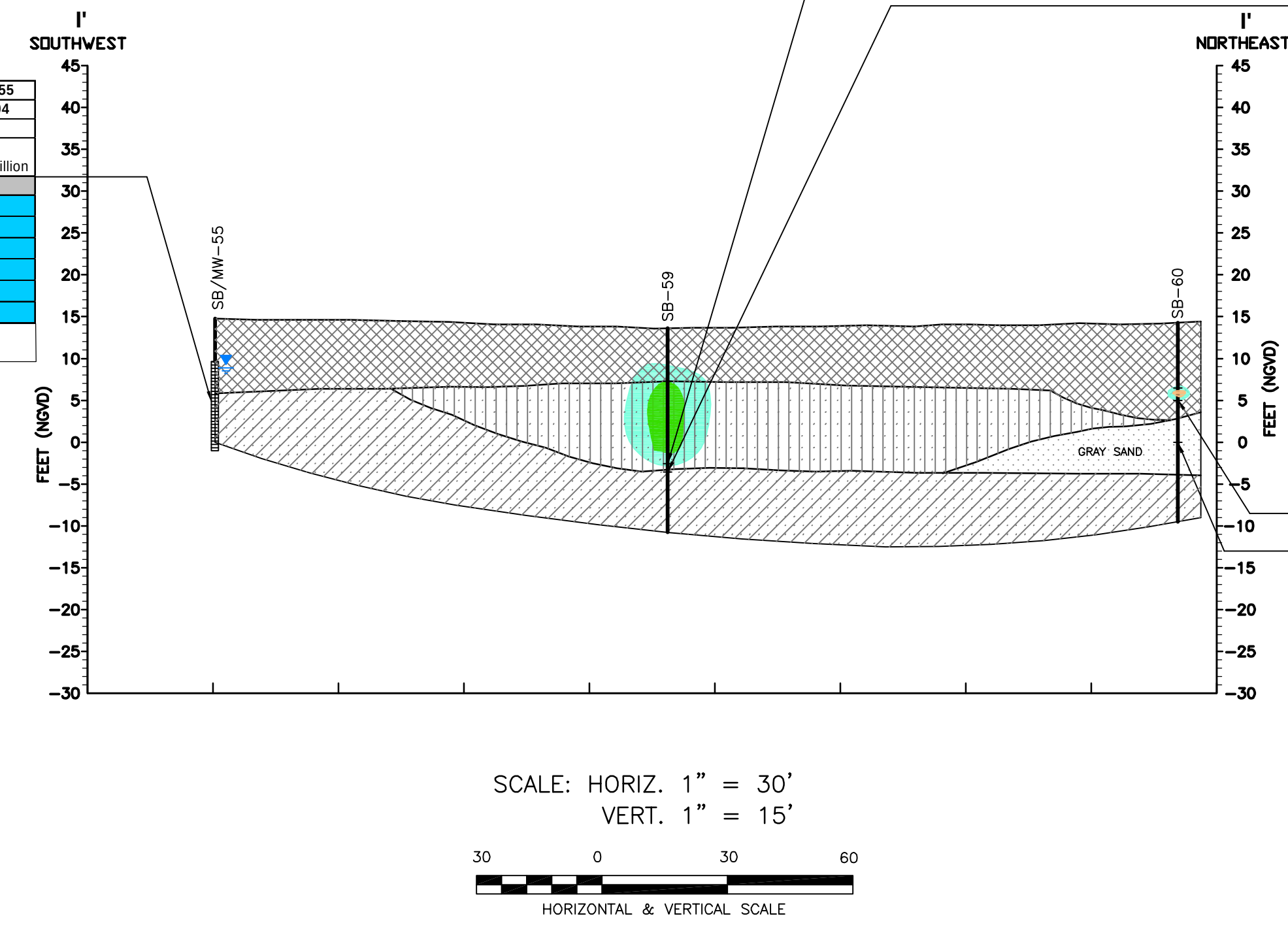


Sample ID	TAGM 4046	Part 375 - Resstricted Use	S8-59	S8-59
Dumping Date	Cleanup Criteria	Residential	7/12/2004	7/12/2004
Dumping Depth (feet bgs)		Residential	15-5.16	19-19
Units	Parts per Million	Parts per Million	Parts per Million	Parts per Million
PAHs				
Acenaphthene	50.0 ¹	100 ¹	521	ND
Acenaphthylene	41	100 ¹	73.6	ND
Anthracene	50.0 ¹	100 ¹	227	ND
Benz[<i>a</i>]anthracene	0.224 or MDL	1 ¹	203	ND
Benzo[<i>b</i>]fluoranthene	0.061 or MDL	1 ¹	178	ND
Benzo[<i>k</i>]fluoranthene	1.1	1 ¹	129	ND
Benzo[<i>a</i>]pyrene	50.0 ¹	100 ¹	79.4	15
Benzo[<i>b</i>]fluoranthene	1.1	1 ¹	50.5	ND
Chrysene	50.0 ¹	100 ¹	188	ND
Dibenz[<i>a,h</i>]anthracene	0.010 or MDL	0.23	227	ND
Dibenzofuran	6.2	NC	31.5	ND
Fluoranthene	50.0 ¹	100 ¹	435	NE
Fluorene	50.0 ¹	100 ¹	320	ND
Indeno[1,2,3- <i>cd</i>]pyrene	0.5	0.5 ¹	6.2	ND
Methylanthracene, 2-	36.4	NC	532	ND
Naphthalene	13	100 ¹	706	NE
Phenanthrene	50.0 ¹	100 ¹	1040	NE
Pyrene	50.0 ¹	100 ¹	609	NE
Sample ID	TAGM 4046	Part 375 - Resstricted Use	S8-59	S8-59
Dumping Date	Cleanup Criteria	Residential	7/12/2004	7/12/2004
Dumping Depth (feet bgs)		Residential	15-5.16	19-19
Units	Parts per Million	Parts per Million	Parts per Million	Parts per Million
BTXET				
Ethylbenzene	5.5	100 ¹	17.9	R

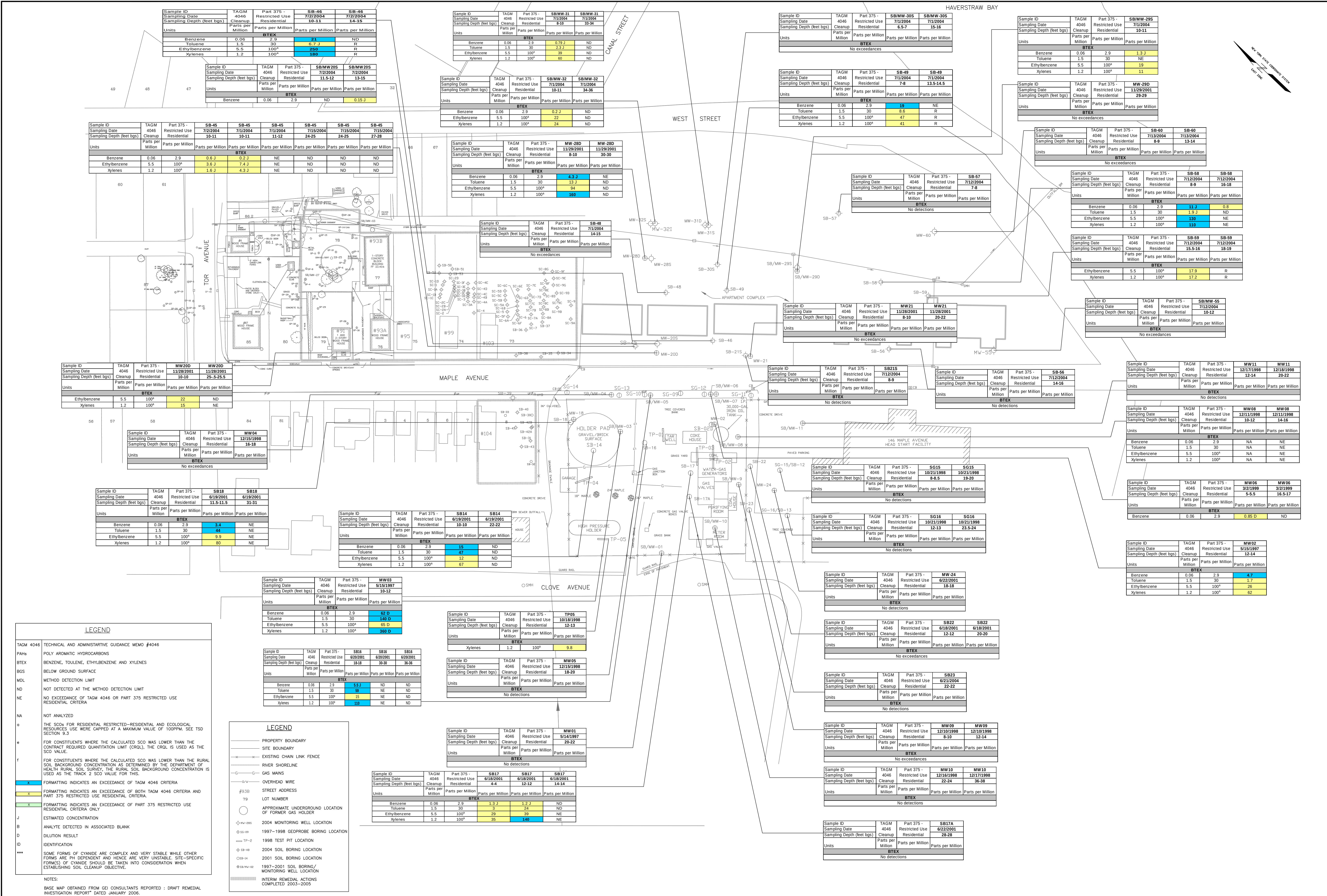


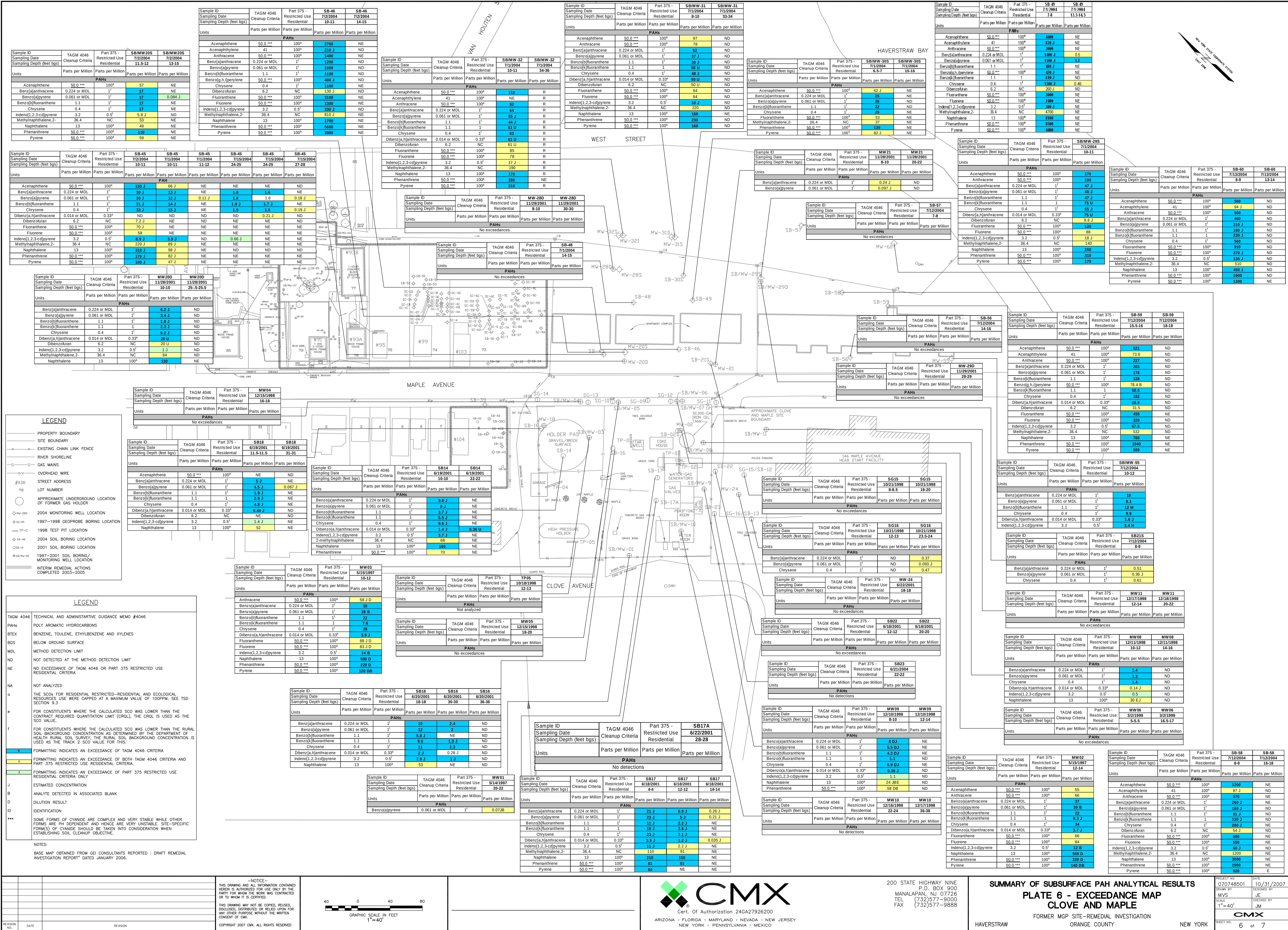
Sample ID	TAGM 4048	Part 375	SB-60	SB-62
Sampling Date	Cuecan Creek	Restricted Use	7/13/2004	7/13/2004
Sampling Depth (feet bgs)		Residence	8-9	13-14
Units	Parts per Million	Parts per Million	Parts per Million	Parts per Million
PAHs				
Acenaphthene	50.0 ^{nm}	100 ³	560	ND
Acenaphthylene	41.1 ^{nm}	100 ³	94.3	ND
Anthracene	50.0 ^{nm}	100 ³	560	ND
Benzo(a)anthracene	0.254 ^{nm} MDL	1 ³	409	ND
Benzo(a)fluoranthene	0.061 ^{nm} MDL	1 ³	310.3	ND
Benzo(b)fluoranthene	1.1 ^{nm}	1 ³	189.9	ND
Benzo(k)fluoranthene	1.1 ^{nm}	1	239.3	ND
Chrysene	0.4 ^{nm}	1 ³	56.0	ND
Fluorenone	50.0 ^{nm}	100 ³	910	ND
Fluoranthene	50.0 ^{nm}	100 ³	570.3	ND
Indeno(1,2,3-cd)pyrene	0.5 ^{nm}	3.2	130.3	ND
Methylanthracene, 2-	36.4	NC	510	ND
Naphthalene	16.1	NC	450.3	ND
Phenanthrene	50.0 ^{nm}	100 ³	1100	ND
Pyrene	50.0 ^{nm}	100 ³	1300	NE

BTEX No Exceedences



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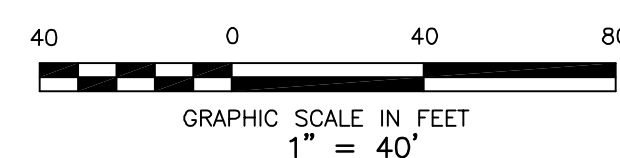






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PLATE 7-REMEDIAL INVESTIGATION
PROPOSED SOIL BORING LOCATIONS
CLOVE AND MAPLE FORMER MGP SITE

PROJECT NO	DATE
070748501	11/13/2007
DESIGNED BY	DESIGNED BY
JS	JS
CHECKED BY	CHECKED BY
JM	JM

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APPENDIX B

FIELD SAMPLING PLAN



**Field Sampling Plan
Clove and Maple Avenues Former Manufactured Gas Plant Site
Haverstraw, New York**

For

Orange and Rockland Utilities
390 West Route 59
Spring Valley, NY 10977-5300

Prepared by:

CMX
Justin Corporate Center
200 State Highway Nine
P.O. Box 900
Manalapan, New Jersey 07726-0900

October 2007

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SECTION 1 INTRODUCTION

This Field Sampling Plan (FSP) is intended to define the methods and procedures to be used for conducting the Supplemental remedial Investigation (SRI) at the Clove and Maple Avenues Former Manufactured Gas Plant (MGP) Site.

1.1 Overview of Field Activities

The following field activities will be performed as part of the site investigation:

- Soil Vapor Investigation - Four (4) soil vapor samples are proposed to be collected along the fence line separating the former MGP and the 146 Maple Avenue property. Seven (7) soil vapor samples are proposed to be collected from the rear of the residential properties fronting West Street. Samples will be collected using Summa canisters and analyzed for volatile organic compounds (VOCs) by USEPA method TO-15.
- Soil Borings – 59 soil borings will be advanced to identify and characterize MGP residues, if any, which may pose a threat to human health and the environment. Soil borings will also be advanced to further develop and confirm the geologic conceptual model developed for the site. Offsite soil borings will be screened real time using the TarGOST system developed by Dakota Technologies. Soil samples collected from the onsite borings will be analyzed for VOC, PAH, TAL metals and cyanide. Soil samples will be collected from 10% of the offsite and analyzed for VOC and PAH.
- Temporary Well Points – A total of seven temporary well points will be installed at offsite locations, co-located with soil borings to determine the presence/absence of NAPL in groundwater at the site.
- Monitoring Well Installation - A total of seven groundwater monitoring wells will be installed in order to obtain groundwater quality and flow information and to determine the presence/absence of NAPL in groundwater at the site.
- Groundwater Sampling- Groundwater samples will be collected from the monitoring wells and will be analyzed for TCL VOCs, TCL SVOCs, total cyanide and amenable cyanide.
- Surveying - The locations of the sampling points will be surveyed. The location and elevation of the well casings will be determined to support assessment of groundwater flow direction. Two elevation measurements will be recorded at each well location: the elevation on the rim

of the flush-mounted manhole or protective casing and the elevation of the top of PVC well casing.

SECTION 2 GENERAL FIELD GUIDELINES

2.1 Site Hazards

Potential on-site surface hazards, such as sharp objects, overhead power lines, energized areas, and building hazards will be identified prior to initiation of fieldwork. Generally, such hazards will be identified during a site visit prior to the first day of fieldwork.

2.2 Underground Utilities

All underground utilities, including electric lines, sewer, water, steam and/or communication lines in the immediate vicinity of each area where intrusive activities will be performed, will be identified and located prior to initiation of drilling and other subsurface work.

All utility clearance activities will be conducted in accordance with Con Edison's Utility Clearance Process for Intrusive Activities. This process includes acquisition and review of utility maps/drawings from city and state agencies and utility companies by CMX, Code 753 utility mark-outs, site reconnaissance, hand digging at each sampling location (e.g., soil boring, monitoring well. etc.). Other key activities are outlined below.

- On-site underground gas and electric utilities in the vicinity of proposed drilling locations will be located in cooperation with O&R.
- Spot excavation by non-mechanical means (e.g., hand auger, shovel, post hole digger. etc.) at each drilling location will be completed to clear subsurface utilities to a minimum depth of 5 feet or to a depth specified by O&R personnel.
- Any off-site underground utilities in the vicinity of proposed drilling locations will be located and marked by a representative of the One Call Center at (800) 272-4480 as required by New York Code 753. New York State law requires that Dig Safely New York be notified at least 2 working days, and not more than 10 working days, before subsurface work is conducted. (See also, Con Edison's updated utility clearance procedures.)

2.3 Field Log Books

All field activities will be carefully documented in field log books. Entries will be of sufficient detail that a complete daily record of significant events, observations, and measurements is obtained. The field log book will provide a legal record of the activities conducted at the site and accordingly:

- Field books will be assigned a unique identification number.

- Field books will be bound with consecutively numbered pages.
- Field books will be controlled by the Field Team Leader while field work is in progress.
- Entries will be written with waterproof ink.
- Entries will be signed and dated at the conclusion of each day of fieldwork.
- Erroneous entries made while fieldwork is in progress will be corrected by the person that made the entries. Corrections will be made by drawing a line through the error, entering the correct information, and initialing the correction.
- Corrections made after departing the field will be made by the person who made the original entries. Corrections will be made by drawing a line through the error, entering the correct information, and initiating and dating the time of the correction.

At a minimum, daily field book entries will include the following information:

- Location of field activity;
- Date and time of entry;
- Names and titles of field team members;
- Names and titles of any site visitors and site contacts;
- Dates and times visitors arrive at and leave the site;
- Weather information, such as: temperature, cloud coverage, wind speed and direction;
- Purpose of field activity;
- A detailed description of the field work conducted;
- Sample media (soil, sediment, groundwater. etc.);
- Sample collection method;

- Number and volume of sample(s) taken;
- Description of sampling point(s):
- Volume of groundwater removed during development and before sampling;
- Preservatives used;
- Analytical parameters;
- Date and time collection;
- Sample identification number(s);
- Sample distribution (e.g., laboratory);
- Field observations;
- Any field measurements made, such as pH, temperature, conductivity, and water levels;
- References for all maps and photographs of the sampling site(s), and;
- Information pertaining to sample documentation such as:
 - Bottle lot numbers;
 - Dates and method of sample shipments;
 - Chain-of-Custody Record numbers; and
 - Federal Express Air Bill Numbers.

SECTION 3 FIELD EQUIPMENT DECONTAMINATION AND MANAGEMENT OF IDW

3.1 Decontamination Area

A temporary decontamination area lined with polyethylene sheeting will be constructed for steam cleaning the drilling equipment. The location of the decontamination area will be selected in coordination with O&R. Drilling equipment may be decontaminated using the sampling equipment methods described in Section 3.2.1. Water that collects during steam-cleaning activities will be pumped into closed-top Department of Transportation (DOT)-approved 55-gallon drums or holding tank and managed as described in Section 3.3.

3.2 Equipment Decontamination

The following procedures will be used to decontaminate equipment used during the Site Characterization activities.

- All drilling equipment including the drilling rig, augers, bits, rods, tools, split-spoon samplers and tremie pipe will be cleaned with a high-pressure steam cleaning unit before beginning work.
- Tools, drill rods and augers will be placed on sawhorses or polyethylene plastic sheets following steam cleaning. Direct contact with the ground will be avoided.
- All augers, rods and tools will be decontaminated between each drilling location according to the above procedures.
- The back of the drill rig and all tools, augers and rods will be decontaminated at the completion of the work and prior to leaving the site.

3.2.1 Sampling Equipment Decontamination

Suggested Materials

- Potable water;
- Non-phosphate detergent (e.g. Alconox™);
- Distilled water;
- Aluminum foil;
- Plastic/polyethylene sheeting;
- Plastic buckets and brushes, and;
- Personal protective equipment in accordance with the HASP.

Procedures

- Prior to sampling, all non-dedicated sampling equipment (bowls, spoons, interface probes, etc.) will be either steam cleaned or washed with potable water and a phosphate-free detergent (e.g. Alconox TM). Decontamination may take place at the sampling location as long as all liquids are contained in pails, buckets, etc.
- The sampling equipment will then be rinsed with potable water followed by a deionized water rinse.
- Between rinses, equipment will be placed on polyethylene sheets or aluminum foil if necessary. At no time will washed equipment be placed directly on the ground.
- Equipment will be wrapped in polyethylene plastic or aluminum foil for storage or transportation from the designated decontamination area to the sampling location.

3.3 Management of Investigation Derived Wastes

3.3.1 Decontamination Fluids

Steam cleaning and decontamination fluids will be collected in DOT-approved 55-gallon drums. The drums will be labeled as investigation derived wastewater and temporarily stored in a secured area of the property on wooden pallets in a secure plastic-lined containment area pending characterization and proper disposal. If a secure area is unavailable, then a portable containment unit (e.g. “clamshell”) will be used for drum storage.

3.3.2 Drill Cuttings

Drill cuttings will be contained in DOT-approved 55-gallon drums or a roll-off container. The soils will be segregated by drill location as practical. The drums will be labeled as investigation derived waste soils from the corresponding boring or source area and temporarily stored in a secured area of the property on wooden pallets in a plastic-lined containment area (or in a clamshell) pending characterization and proper disposal.

3.3.3 Development and Purge Water

All development and purge water will be contained in closed-top DOT-approved 55-gallon drums or holding tank. The drums will be labeled as investigation derived wastewater from the corresponding well and temporarily stored in a secured area of the property on wooden pallets in a plastic-lined contaminant area or in a clamshell pending characterization and proper disposal.

3.3.4 Personal Protective Equipment

All personal protective equipment (PPE) will be placed in DOT-approved 55-gallon drums or roll-off containers for proper disposal.

3.3.5 Dedicated Sampling Equipment

All dedicated disposable soil sampling equipment (Macrocore™ sampler liners and catchers) and groundwater sampling equipment (dedicated disposable polyethylene bailer and dedicated polypropylene line) will be placed in DOT-approved 55-gallon drums or a roll-off container for disposal.

SECTION 4 DRILLING/SOIL SAMPLING PROCEDURES

4.1 Introduction

Intrusive activities to be conducted at the Clove and Maple Avenues Former MGP Site consist of:

- Soil borings, and;
- Monitoring well installations.

These procedures are described in the following section. Equipment decontamination procedures are described in Section 3.0.

4.2 Soil Borings and Subsurface Soil Sampling

59 soil borings are proposed to be completed in order to characterize subsurface soil, obtain a better understanding of site stratigraphy and to collect soil samples for laboratory analysis. 12 soil borings will be completed within the former MGP and 47 borings will be completed offsite to assess the potential presence of residuals associated with the former MGP operations and provide supplemental geologic information required for the development of a representative conceptual site model. Note that all boring locations are approximate and the exact location of each boring will be determined in the field. Boring placement may be dependent on a number of factors discussed earlier including: property access, equipment access and utility clearance.

Suggested Equipment

- Field book
- Project plans
- PPE in accordance with the HASP
- Metal detector
- Stakes and flagging
- One pint containers for lithology samples
- Tape measure
- Decontamination supplies
- Electronic oil/water indicator
- Photoionization detector (PID)
- Camera
- Clear tape, duct tape
- Aluminum foil
- Laboratory sample bottles
- Coolers and ice

- Shipping supplies

4.2.1 Overburden Drilling and Geologic Logging Method

- It is anticipated that the proposed soil borings will be successfully completed using a truck mounted hollow-stem auger (HSA) drill rig or a direct push probe. The borings will be completed to a till layer that may range anywhere from 10 to 35 feet below grade.
- Advancement of borings may be terminated if a confining layer is encountered with an overlying impacted zone. If this condition is encountered, the O&R and NYSDEC representatives will be consulted in the field to determine whether to advance the boring deeper through the confining unit.
- If non-bedrock refusal is met at a soil boring location and the boring needs to be offset, the O&R Project Manager and the NYSDEC representative will be consulted to ensure that the new boring location will yield the desired data according to the sampling rationale.
- Offset boring locations will be designated with a letter suffix (e.g. the first offset from soil boring SB-01, if necessary, will be designated SB-01A) and the distance and direction from the original location will be recorded.
- During the completion of the soil borings, soil samples will be collected on a continuous basis using a conventional 2-foot long, 2-inch diameter split-spoon soil sampler (during HSA drilling) or a 4-foot long, 2-inch diameter MacroCore™ sampler or equivalent (during direct-push drilling).
- Onsite soil borings will be screened with the TarGOST system, developed by Dakota Technologies, to delineate the extent of NAPL at the site. The TarGOST system sends excitation light through fiber optic cable strung within Geoprobe rods. The light exits through a window in the side of the probe. As the probe is advanced, the soil is exposed to the excitation light. If fluorescent compounds exist (i.e. contaminants), light is emitted. The “signal” light is transmitted through a fiber, back up hole to be analyzed. Responses are indicated in real-time on a graph of signal vs. depth.
- When collected, soil samples retrieved from the borehole will be described in accordance with the Unified Soil Classification System (USCS). Descriptions will included:
 - Percent recovery;
 - Soil type;

- Color;
 - Moisture content;
 - Texture;
 - Grain size and shape;
 - Consistency;
 - Presence or absence of non-aqueous phase liquids (NAPL) or sheens
 - Presence or absence of staining/discoloration;
 - Presence or absence of noticeable odors¹, and;
 - Other observations.
- As soon as practical after the sampling device is opened, the soil samples will be screened for the organic vapors using a PID. Organic vapor readings will be recorded at 6-inch intervals across the recovered sample, at lithologic contacts and zones that exhibit visible evidence of contamination.
 - Soil samples that will be collected for analysis from the borings will be selected based on the following criteria:
 - Unsaturated Zone: One sample will be collected from the zone with the highest PID readings or visual impacts. An additional sample will be collected below the impacted zone to define the vertical extent of impacts at that location. If no visual impacts or elevated PID readings are observed, a sample will be collected from directly above the water table.
 - Saturated Zone: if contamination is observed in the saturated zone, one soil sample will be collected from the most impacted interval and an additional sample will be collected from a clean soil interval below the impacts. If no impacts are encountered in the saturated zone, one soil sample will be collected from the bottom of the boring.
 - Selected soil samples for the onsite samples will be submitted for laboratory analysis for TCL VOCs, PAHs, TAL Metals, and cyanide. Selected soil samples for the offsite samples will be submitted for laboratory analysis for TCL VOCs and PAHs.
 - For the purpose of waste characterization an appropriate portion of the waste classification samples will be collected from drummed materials and analyzed for RCRA characteristics TCLP VOCs, TCLP SVOCs, TCLP metals, PCBs, reactivity, corrosivity, ignitability, and TPH.

¹ Odors will be noted in the breathing zone only as health and safety conditions allow. Field personnel will not inhale vapors directly from the sampling equipment.

- Remaining soil will be disposed of in accordance with methods specified in Section 3.3.
- The borings will be sealed with bentonite or cement/bentonite grout following completion.
- The drill cuttings will be containerized in DOT-approved 55-gallon drums or roll-off containers and handled as described in Section 3.3.
- Soil boring locations shall be staked/marked for identification during follow-up survey work.
- The drilling equipment will be decontaminated between each boring in accordance with methods specified in Section 3.2.
- The designated field representative will log borehole geology and headspace measurements directly on the drilling log shown in Figure 4-1, or a similar form.

4.2.2 Soil Sampling

- The number and frequency of samples to be collected from each boring and the associated analytical parameters are summarized on Table 4-1 of the Quality Assurance Project Plan (Appendix A).
- Samples for VOC analyses will be collected directly from the hand auger or split spoon soil sampler, placed into appropriate containers, and compacted to minimize head space, and pore space. The remaining sample volume will be homogenized, and placed in appropriate containers for the other analyses.
- The sample containers will be sealed, labeled, placed in a laboratory-supplied cooler and packed on ice (to maintain a temperature of 4°C). The coolers will be shipped to the laboratory overnight or in an appropriate period to ensure that the holding time for the sample analysis will be achieved.

Figure 4-1 Log of Soil Boring

[illegible]

- Chain-of-custody procedures will be followed as outlined in the QAPP.
- The sampling equipment will be decontaminated between samples in accordance with procedures described in Section 3.2.
- Excess soil remaining after sampling will be contained in accordance with methods specified in Section 3.3.
- The sample locations, descriptions, and depths will be recorded in the field book.

4.2.3 TarGOST Implementation

The TarGOST system will be used to delineate the extent of NAPL at the site. The TarGOST system developed by Dakota Technologies sends excitation light through fiber optic cable strung within rods. The light exits through a window in the side of the probe. As the probe is advanced, the soil is exposed to the excitation light. If fluorescent compounds exist (i.e. contaminants) light is emitted. The "signal" light is transmitted through a fiber, back up hole to be analyzed. Responses are indicated in real-time on a graph of signal vs. depth.

The logging procedure is presented below. When the system arrives, it is powered up and tested for proper function. The TarGOST system is integrated into the Geoprobe contractors rig and proper data flow connections are made. Once the system is warmed up and tested for proper function, the actual logging can begin.

Once the location has been cleared for utilities, the fluorescence emitting reference material (RE) is put on the cleaned window, any necessary adjustments are made to the TarGOST, and an RE waveform is acquired. The probe is then positioned in the push platform for advancement into the soil. In the case of Geoprobe, the window is approximately 8 inches above the tip of the probe. The log is initiated when the window is at the ground surface. The software automatically corrects for the window position and all logs are depth correct.

A unique name for the current log location is entered into the control computer and logging is started (probe advance begins). As the probe is pushed into the ground (at ~2cm/sec) the laser fires continuously, generating waveform after waveform on the detection system oscilloscope as the probe advances. Waveforms are averaged over every 1-2 inches, depending on the probe speed and laser repetition rate. The averaged waveforms are downloaded from the oscilloscope every second or two by the control software. These waveforms are immediately 'tagged' with the current depth, which

is continuously sent to the TarGOST system by depth monitoring systems built into the Geoprobe. All the averaged waveforms from the logging event are stored to the hard-drive for later viewing and presentation if necessary or desired. The scatter and fluorescence areas are calculated and these are normalized to the RE waveform's areas. The fluorescence response is plotted vs. depth in real time as the probe is advanced.

The TarGOST technician then uses the TarGOST software to highlight the waveforms at “depths of interest” for display in the print out. These waveforms contain the qualitative information and are often chosen from depths with peak signal, signal changes, or other zones of interest along the log's depth axis. The technician immediately prints a hard copy, which is usually printed out before the probe is completely retrieved from the subsurface. The technician also saves an electronic image of the printed log in JPG format. Once the rods are all up and out of the hole, the hole is grouted (if necessary) and the probe tip and sapphire window are wiped clean in preparation for the next RE calibration. CMX will conduct validation/confirmation sampling of 10% of the TarGOST locations to confirm the body of evidence generated with TarGOST. CMX will also conduct side-by-side tests of TarGOST for site heterogeneity assessment. The following general assumptions are made regarding the implementation of TarGOST:

- TarGOST production is expected to average between 300 and 500 ft/day, depending to on subsurface conditions and difficulty in positioning the push platform over the desired location
- The TarGOST investigation will start in known source areas to calibrate the responsiveness of the system to the site's NAPL
- CMX in consultation with O&R and NYSDEC will adapt the transects and boring locations as necessary as TarGOST logs are reviewed

4.3 Monitoring Well Installation and Development

A total of seven groundwater monitoring wells are to be installed in order to obtain groundwater quality and flow information. In addition, the wells will be used to determine the presence/absence of NAPL in groundwater at the site. Note that while the proposed location of each well is shown in the Site Characterization Study Work Plan, the exact location and number of wells may be modified during field activities, based on the results of the soil boring field screening, or soil sample analytical data that may be available before commencement of this phase of work. Locations may also be modified due to property access agreements, equipment access and utility clearance. Such modifications will be done in consultation with the on-site NYSDEC representative.

Based on the current understanding of site hydrogeology, as well as the fate and transport of MGP residuals within the subsurface environment, it is anticipated that all planned monitoring wells will be installed in unconsolidated sediments (overburden) and will be set so that the well screen

intercepts the water table. However, if based on findings of the soil boring program, subsurface conditions indicate the need for monitoring of groundwater zones below the water table, additional deep overburden wells may be considered. Examples of where deep overburden monitoring wells may be considered include:

1. A zone of DNAPL is discovered at a depth where a shallow water table well will not be able to monitor the DNAPL.
2. A substantial confining unit is discovered on-site where the shallow water table groundwater zone is hydraulically isolated from a deeper “confined” groundwater zone.

If it is determined that a location warrants the installation of a deep overburden well, a shallow water table well will also be completed in this area (as a shallow deep well cluster) in order to define vertical hydraulic and chemical gradients.

The following methods will be used for drilling, installing, and developing the monitoring wells.

Suggested Equipment

- Field book;
- Project plans;
- PPE in accordance with the HASP;
- Metal detector;
- One pint containers for lithology samples;
- Tape measure;
- Decontamination supplies;
- Electronic oil/water interface probe;
- PID;
- Camera;
- Clear tape, duct tape;
- Aluminum foil;
- Laboratory sample bottles;
- Coolers and ice;
- Shipping supplies;
- Polyethylene disposable bailers (development);
- Polypropylene rope (development);
- Purge pump (development);

- Stainless steel or glass beakers (development);
- Turbidity meter (development), and;
- Temperature, conductivity, pH meter (development).

Overburden Monitoring Well Construction

Overburden wells will be installed using 6.25-inch outside diameter HSAs and a truck-mounted drill rig. The water table wells will be constructed of 2-inch inside diameter polyvinyl chloride (PVC) with 5 to 10 feet of 0.02-inch slotted screens. The screens will be set with 1 to 3 feet of screen above and 4 to 7 feet of screen below the water table. The proposed 2-inch diameter is considered sufficient for water level monitoring and groundwater sample collection. The annular space around the well screen will be backfilled with clean sand filter pack extending from the bottom of the well to 1 to 2 feet above the screen. The annular space around the well riser will be sealed with bentonite pellets extending 1 to 2 feet above the sand filter pack and completed with a cement mixture to approximately 1 foot below grade. Each well will be completed at grade with a flush-mounted manhole set in concrete and a locking cap. The locations and thicknesses of the annular materials will be adjusted as necessary if the water table is too close to grade. A monitoring well construction detail for an overburden monitoring well is provided as Figure 4-2.

Figure 4-2. Overburden Monitoring Well Construction

CONSTRUCTION OF OVERBURDEN MONITORING WELL _____											
PROJECT NAME		CLIENT/AUTHORIZATION NO.		DATE/TIME STARTED		DATE/TIME COMPLETES		WELL PERMIT NUMBER			
SCHOOL/DEPALMA PROJECT NO.		NDR/MS PROJECT NO.		WELL LOCATION (Description)							
WELL LOCATION (Address)				DRILLING METHOD			DRILLING CONTRACTOR				
				BORING DIAMETER		DRILLER NAME		INSPECTOR			
				TOTAL DEPTH (ft)		DRILLING EQUIPMENT					
				GROUNDWATER OBSERVATIONS		Date	Time	Depth (ft)	Comments		
				Saturated Soil							
				Water in open borehole							
				Immediately following well installation							
				Other							
				SURVEYOR:		Latitude or		Longitude or		Ground	
				Horizontal Datum:		Northing		Easting		Elevation	
				Vertical Datum:						Tip of Inner Casing Elevation	
DATE DEVELOPED		DEVELOPMENT METHOD:									
TIME DEVELOPMENT BEGAN		TIME DEVELOPMENT COMPLETE				DEVELOPMENT DURATION					
DEPTH TO WATER		DEPTH TO WATER				VOLUME REMOVED (GAL)					
COMMENTS:											
WELL CONSTRUCTION											
Top of Outer Casing Ground Surface Top of Inner Casing Top of Seal Top of Filter Pack Top of Screen				OUTER CASING TYPE: OUTER CASING DIAMETER: _____ inches INNER CASING TYPE: INNER CASING DIAMETER: _____ inches GROUT TYPE: GROUT PLACEMENT METHOD: SIGNAL MATERIAL: SIGNAL PLACEMENT METHOD: FILTER PACK TYPE: FILTER PLACEMENT METHOD: WELL SCREEN MATERIAL: WELL SCREEN SLOT SIZE: _____ inches SCREEN INSIDE DIAMETER: _____ inches REMARKS:							
Bottom of Screen Bottom of Well Bottom of Filter Pack Bottom of Boring				LOWER BORING BACKFILLED WITH:							

Monitoring Well Development

- Following installation, each monitoring well will be developed via surging and pumping.
- Water levels will be measured in each well to the nearest 0.01 foot prior to development.
- The extracted water stream will be monitored for turbidity and water quality indicators (i.e., pH, dissolved oxygen, oxidation-reduction potential, temperature, and specific conductivity) with measurements collected approximately every 5 minutes.
- Development will continue until turbidity is less than 50 nephelometric turbidity units (NTUs) for three successive readings and until water quality indicators have stabilized. The criteria for stabilization will be three successive readings within 10 % for pH, temperature and specific conductivity.
- At a minimum, three well volumes will be purged during development.
- Development water will be contained in accordance with methods specified in Section 3.3.
- Following development, wells will be allowed to recover for at least seven days after development before they are sampled. All monitoring well development will be overseen by a field geologist and recorded in the field book.

Temporary Well Point Installation and Sampling

Groundwater samples will be obtained from either a series of passively placed narrow diameter temporary well points (TWP) or through Geoprobe hydropunch wells installed at locations depicted on Plate 7. The TWPs will be installed in conjunction with the completion of the soil and soil gas sampling program proposed for the rear of the properties that front on West Street. Boreholes will be advanced using direct push techniques to a depth corresponding with the highest PID readings measured during the soil boring or a minimum of three feet below groundwater. The installation will utilize a retractable screen that is attached to a miniature drive point that extends beyond the base of the boring. The screen section is connected to Teflon tubing, which allows the collection of the groundwater sample. With the screen section and tubing remaining in the outer casing, borings can be advanced through areas of soil impact with limited potential for cross contamination.

Samples will be collected from each point using a peristaltic pump connected to the sample tubing. Samples collected from the temporary well point will be submitted to a certified laboratory for volatile organic compound analysis.

Subsequent to the acquisition of a groundwater sample, each TWP will be removed and the borehole grouted to grade.

SECTION 5 SOIL VAPOR SAMPLING PROCEDURES

5.1 Soil Vapor

Soil vapor probe installations will be semi-permanent to ensure outdoor air filtration does not occur. Soil vapor probes will be constructed in the same manner at all sampling locations to minimize possible discrepancies. The following procedures will be followed:

- Probes should be installed using a Geoprobe;
- Porous, inert backfill material (glass beads, washed # 1 crushed stone, etc.) should be used to create a sampling zone 1 to 2 feet in length;
- Probes should be fitted with inert tubing (polyethylene, stainless steel, nylon, Teflon, etc.) of the appropriate size (typically 1/8 inch to 1/4 inch diameter) and of laboratory or food grade quality to the surface;
- Soil vapor probes should be sealed above the sampling zone with a bentonite slurry for a minimum distance of 3 feet to prevent outdoor air filtration and the remainder of the borehole backfilled with clean material;
- Steps should be taken to minimize infiltration of water or outdoor air and to prevent accidental damage.

To obtain representative samples and to minimize possible discrepancies, soil vapor samples will be collected as follows in all locations:

- Shortly after the installation of semi-permanent probes, one to three implant volumes (the volume of the probe and the tube) should be purged prior to collecting the samples.
- Flow rates for both purging and collecting should not exceed 0.2 liters per minute to minimize outdoor air filtration during sampling.
- Samples should be collected using summa canisters consistent with the sampling and analytical methods and certified clean by the laboratory.
- Sample size depends on the volume of that will achieve minimum reporting limits and will be determined in consultation with the selected laboratory..

Weather conditions will be monitored to prevent condensation formation in the tube during sample collection. If necessary, tube warmers will be used if samples are collected during winter months.

The following information will be recorded during the sampling event:

- Sample identification;

- Date and time of sample collection;
- Sample depth;
- Sampler name;
- Sampling method and devices used;
- Purge volumes;
- Volume of soil vapor extracted;
- If canisters are used, the volume before and after sample collection;
- Apparent moisture content of the sampling zone (dry, moist, saturated);
- Surrounding activity;
- Weather conditions;
- Odor observations, if any;
- Field readings; and
- Chain of custody protocols and records used to track samples from sampling point to analysis.

SECTION 6 GROUNDWATER SAMPLING PROCEDURES

6.1 Introduction

The objective of this written procedure is to establish guidelines for the sampling of groundwater monitoring wells utilizing non-dedicated bladder pumps and low flow/low volume purging and sampling methods.

6.2 Equipment

- Geotech Model 0710 Bladder Pump or Equivalent;
- 12-Volt Deep Cycle Battery;
- Disposable polyethylene discharge line;
- Horiba U-22 or equivalent water quality meter (with pH, temperature, conductivity, dissolved oxygen probes);
- Horiba or equivalent flow through cell and discharge lines;
- Solinst Model P2 Water Level Indicator or equivalent;
- Cooler with ice and thermometer;
- Waterproof field notebook and Groundwater Sampling Log sheets;
- Chain-of-custody forms;
- Black ballpoint pens;
- Calculator;
- Disposable, powder-free vinyl gloves;
- Plastic bags (including sealable bags for samples);
- Paper towels;
- Non-phosphate laboratory grade detergent (e.g. Alconox™);
- Distilled water;
- Monitoring well key;
- PPE (as required by the project Health and Safety Plan);
- Sample containers (per project Sampling and Analysis Plan);
- Sample container labels, and;
- Calibrated buckets.

6.3 Procedures

Before initiating groundwater sampling a complete round of synoptic water levels should be obtained for the site. Record depths to water in the available monitoring wells and other water level gauging

stations, as applicable. Synoptic water level data should be recorded on the Monitoring Well Gauging Form.

1. The number and frequency of groundwater samples to be collected and the associated analytical parameters are summarized in Table 10 of the SRIR. This procedure does not apply to the collection of light or dense non-aqueous phase liquids (LNAPL or DNAPL) samples.
2. Groundwater sampling following this procedure shall be performed using non-dedicated bladder pumps fitted with polyethylene discharge tubing.
3. The sample pump intake shall be positioned within the well's screened section. For wells screened across the water table, the pump should be set in the lower one-third of the screened interval.
4. Disposable, powder-free gloves shall be worn by personnel during any contact with compressor, generator or associated fuel.
5. Clean, disposable gloves shall be worn when handling any dedicated or decontaminated sampling equipment, sample containers, and during the collection of samples.
6. All non-dedicated sampling and measuring equipment must be decontaminated before use. At a minimum, equipment should be disassembled (when appropriate) and scrubbed in a non-phosphate, laboratory grade detergent and distilled water solution, then rinsed with copious amounts of distilled water.
7. All sample vials and containers shall be stored in a clean carrying case. Remove the sample containers only when needed.
8. Purge water shall be contained in accordance with methods specified in Section 3.3.
9. Field analysis equipment (pH, conductivity, temperature, turbidity and dissolved oxygen probes) shall be calibrated in accordance with the manufacturer's procedures. All calibration methods, procedures and results shall be documented in the calibration log and field notebook.
10. Document the date, well identification and unusual occurrences in the field logbook and on the Groundwater Sampling Record. Document all field measurements on the Groundwater Sampling Record.

11. Inspect the protective casing and general well condition and document any items of concern in the appropriate area on the Groundwater Sampling Record.
12. Unlock the protective casing. Refer to the appropriate Health and Safety Plan for air monitoring or other health and safety requirements.
13. Measure the depth to water (DTW) from the measuring point (MP) located on the well (inner) casing using an electronic measuring device. Record the DTW from the MP (DTWMP) measurement on the Groundwater Sampling Record. As required, the water level measuring device can be left in the well for additional measurements during well purging.
14. Purge Volume Determination:

- a. Minimum Purge Volume: A minimum of two times the volume of the discharge tubing shall be purged prior to the sampling of the well. The calculation for determining this volume of water to be removed from the pump and tubing is as follows:

$$PV_{min} = (TL \times TF) \times 2$$

where:

PV_{min} = The minimum volume of water to be purged from a well.

TL = Tubing Length

TF = Tubing Factor which is 0.0102 gal/ft (39 ml/ft for tubing diameter of 3/8 inch) or 0.0159 gal/ft (60 ml/ft for tubing diameter of 5/8 inch).

- b. Maximum Purge Volume: The maximum purge volume from most wells will be 0.25 (1/4) of one well casing volume. For some shallow wells, the PV_{min} may be greater than 0.25 casing volume, in these cases, the PV_{min} shall be purged followed by the measurement of field water quality parameters and collection of samples. The maximum purge volume (PV_{max}) is calculated as follows:

$$PV_{max} = (DTBLS - DTWLS) F_c \times 0.25$$

where:

PV_{max} = One quarter of one well casing volume (gal).

DTBLS = Depth to Bottom from Land Surface (feet)

DTWLS = Depth to Water from Land Surface (feet)

F_c = Casing factor (gal/ft)

15. Begin purging the well according to the manufacturer's instructions for operating the pump. The purge rate should be kept to a minimum, no greater than 500 milliliters per minute. Variation in the purge rate should be minimized.
16. Following the removal of the minimum purge volume, begin monitoring the field water quality indicator parameters (i.e., temperature, specific conductance, pH, dissolved oxygen and turbidity). It is recommended that the water quality meter be attached to a flow-through cell to allow for continuous readings. Monitor the indicator parameters approximately once every 5 minutes and record the results on the Groundwater Sampling Record. (Note: A minimum of 500 ml of purge water is required to fully exchange the water in the flow-through cell between measurements.) The well shall be considered stabilized and ready for sample collection when the indicator parameters have stabilized for three consecutive readings.

If one or more key indicator parameters fail to stabilize after purging 0.25 well casing volume (the maximum purge volume), purging will be discontinued, and sampling will be initiated. In cases where the calculated minimum purge volume is greater than 0.25 casing volume, monitor the indicator parameters following the removal of PV_{min} approximately every two minutes (approximately every 0.5 gal.) for a maximum of six minutes (i.e., three sets of readings). Any parameters that fail to achieve stabilization should be noted on the Groundwater Sampling Record.
17. Turn pump off and disconnect the flow-through cell. Turn pump on and reduce the pump discharge rate to between 100 and 250 milliliters per minute. Collect the appropriate samples from the pump discharge hose. Label all sample containers and immediately place samples in a laboratory-supplied cooler with bagged ice sufficient to cool samples to 4 °C.
18. Upon the completion of sampling, decontaminate all non-dedicated sampling and measuring equipment. Properly discard all non-cleanable materials such as gloves, hoses and rope.
19. Secure and lock the well.
20. Deliver samples to the appropriate analytical Laboratory. Record all final field water quality data on the Field Data Summary Sheet. A copy of the COC and the Field Data Summary Sheet should be sent to the Environmental Information Management System.
21. Chain-of-custody procedures will be followed as outlined in the QAPP.

22. Well sampling data will be recorded in the field logbook and on the Monitoring Well Sample Data Form.

SECTION 7 AIR MONITORING

7.1 Breathing Zone Air Monitoring During Excavation, Drilling and Sampling

Air monitoring of the breathing zone will be conducted periodically during all intrusive activities to assure proper health and safety protection for the team and nearby occupants and workers.

- A Rae Systems© MiniRae 2000 photoionization detector (PID) or equivalent will be used to monitor for organic vapors in the breathing zone and borehole, and to screen the samples.
- Additional air monitoring is described in the site-specific health and safety plan and the Community Air Monitoring Plan discussed below.

The PID readings will be recorded in the field logbook during drilling activities and later transferred to the boring log form. The procedure for the PID operation and calibration is included in Section 7.0.

7.2 Community Air Monitoring Plan (CAMP)

In accordance with NYSDEC and NYSDOH requirements, a Community Air Monitoring Plan (CAMP) will be implemented at the site during each phase of the remedial investigation field activities. The objective of the CAMP is to provide a measure of protection for the downwind community (i.e., off-site receptors, including residences and businesses and on-site workers not involved with RI activities) from potential airborne contaminant releases as a direct result of RI activities. Two air monitoring stations will be set up on-site. Volatile organic compounds (VOCs) and respirable particulates (PM-10) will be monitored at the downwind perimeter of the immediate work area on a continuous basis. Wind direction will be determined using a wind sock(s) and/or flagging poles installed on-site. Upwind concentration of VOCs and particulates in air will also be measured to establish background conditions. VOC vapors will be monitored using a PID. Particulate dust will be monitored using a MiniRAM™ pDR particulate meter. Fifteen-minute running average concentrations will be collected from each of the two air monitoring stations during work activities. The action levels for VOCs and dust in air and the required response are presented in the Site-Specific Health and Safety Plan provided in Appendix C of the SRIWP.

SECTION 8 FIELD INSTRUMENTS AND CALIBRATION

All field analytical equipment will be calibrated immediately prior to each day's use and more frequently, if required. The calibration procedures will conform to manufacturer's standard instructions. This calibration will ensure that the equipment is functioning within the allowable tolerances established by the manufacturer and required by the project. All instrument calibrations will be documented in the project field logbook and in an instrument calibration log. Records of all instrument calibration will be maintained by the Field Team Leader and will be subject to audit by the Project Quality Assurance Manager (PQAM). Copies of all of the instrument manuals and/or instruction sheets will be maintained on-site by the Field Team Leader.

The following field instruments will be used during the investigation:

- PID;
- Dust meter (optional);
- Water quality meter or combination of meters capable of measuring:
 - pH;
 - Reduction-oxidation potential (Redox);
 - Dissolved oxygen;
 - Specific Conductivity;
 - Temperature, and;
 - Turbidity.

The following field instruments may be used depending on field conditions:

- Dust Meter
- Combustible Gas Indicator

8.1 Portable Photoionization Detector

The photoionization detector will be a Rae Systems© MiniRae 2000 (or equivalent), equipped with a 10.6 electron volt (eV) lamp. The MiniRae is capable of ionizing and detecting compounds with an ionization potential of less than 10.6 eV.

- Calibration must be performed at the beginning and end of each day of use with a standard calibration gas having an approximate concentration of 100 parts per million of isobutylene. If the unit experiences abnormal or erratic readings, additional calibration will be required.

- All calibration data must be recorded in field logbooks and on calibration log sheets to be maintained on-site.
- A battery check must be completed at the beginning and end of each working day.

8.2 Dust Meter

- The operator shall ensure that the instruments respond properly to the substances that they are designed to monitor. Real time aerosol monitors, such as the MiniRAM, must be zeroed at the beginning of each sampling period. The specific instructions for calibration and maintenance provided for each instrument should be followed.
- All calibration data must be recorded in field logbooks and/or calibration log sheets to be maintained on-site.
- A battery check must be completed at the beginning and end of each working day.

8.3 Water Quality Indicator

8.3.1 pH Meter

- Calibration of the pH meter must be performed at the start of each day of use and after very high or low readings, as required by this plan, according to manufacturer's instructions.
- National Institute of Standards and Technology - traceable standard buffer solutions which bracket the expected pH range will be used. The standards will be pH of 4.0, 7.0 and 10.0 standard units.
- The use of the pH calibration must be used to set the meter to display the value of the standard being checked.
- The calibration data must be recorded on calibration sheets maintained on-site or with the piece of equipment.

8.3.2 Specific Conductivity Meter and Temperature Probe

- Calibration checks using the conductivity standard must be performed at the start of each day of use, after five to ten readings or after very high or low readings, as required by this plan, according to manufacturer's instructions.
- The portable conductivity meter must be calibrated using a reference solution of 200 $\mu\text{ohms/cm}$ on a daily basis. Readings must be within 5 percent to be acceptable.
- The thermometer of the meter must be calibrated against the field thermometer on a weekly basis.

8.3.3 Turbidity Meter

- The turbidity meter must be checked at the start of each day of use and at the end of the day according to manufacturer's instructions.

SECTION 9 FIELD SAMPLE IDENTIFICATION AND CUSTODY

9.1 Sample Location Numbering System

- Subsurface soil borings will be numbered consecutively beginning with SB-01. Individual samples will also be designated with a depth code (see below).
- Monitoring wells will be numbered consecutively beginning with MW-01.

9.2 Sample Identification

Each sample will be given a unique alphanumeric identifier in accordance with the following classification system identified on Table 9-1. Each sample container will be labeled prior to packing for shipment. The sample identifier, site name, date and time of sampling, and analytical parameters will be written on the label in waterproof ink and recorded in the field logbook.

9.3 Chain-of-Custody

Field chain-of-custody procedures will be as follows:

- A Chain-of-Custody (COC) record will accompany the sample containers during selection and preparation at the laboratory, during shipment to the field and during return shipment to the laboratory. A sample COC record is presented in the QAPP.
- The COC will identify each sample container and the analytical parameters for each, and will list the field personnel that collected the samples, the project name and number, the name of the analytical laboratory that will receive the samples and the method of sample shipment.
- If samples are split and sent to different laboratories, a copy of the COC record will be sent with each sample shipment.
- The COC will be completed by field personnel as samples are collected and packed for shipment.
- Erroneous markings will be crossed-out with a single line and initialed by the author.

Table 9-1. Sample Identification

Matrix ^(a)	Solid ^(b)	Water	Air	Quality Control	Other
Sample Type	SB: Soil Boring	MW: Monitoring Well	SV: Soil vapor IA: Indoor Air AMB: Ambient Air	TB: Trip Blank FB: Field Blank DUP: Laboratory-blind field duplicate MS: Matrix Spike MSD: Matrix Spike duplicate	WC: Waste Classification.
Sample Location	Two- or three-digit numeric designation referencing the map location of the sample point (e.g. 01, 10, etc...) ^(c)	Two- or three-digit numeric designation referencing the map location of the sample point (e.g. 01, 10, etc...)	Two-digit numeric designation referencing the map location of the sample point (e.g. 01, 10, etc...).	Not applicable for TB and FB samples. For DUP, MS and MSD use same designation as associated field sample.	Two digit numeric designation referenced to separate inventory of stored investigation-derived waste
Sample Depth Interval	Depth to top and bottom of sample interval to the nearest 0.1 foot, separated by a hyphen. (e.g. 1.5-2.0)	Sample depth to the nearest 0.1 foot below fixed reference. For samples from monitoring wells the reference is the top of the inner casing. For other water samples the reference is grade. ^(d)	For soil gas samples, indicate depth of sample below ground surface or floor, as applicable. For indoor air samples For indoor and outdoor air samples, indicate the height of sampler in feet above the floor or ground surface, as applicable.	Not applicable	Not applicable
Matrix code	Not applicable	Not applicable	Not applicable	SO: Solid samples (Field Blank only) AQ: Aqueous samples (Field Blank only)	SO: Solid waste LQ: Liquid waste

Table 9-1. Sample Identification

Notes:

- (a) Not all sample types indicated may apply to this project.
- (b) Use solid designations for soil samples and free product, if encountered.
- (c) Offset locations, if necessary due to refusal or other field conditions, will be designated with a letter suffix (i.e., if soil boring SB-01 encounters refusal, the first offset location will be designated SB-01A.)
- (d) For groundwater samples obtained from monitoring wells using low-flow sampling methods, depth interval is the depth to the pump intake. For groundwater samples obtained using conventional sampling methods, the top of the sample interval is the depth to water if the screen extends above the water table or the top of the well screen if below the water table. The bottom of the sample interval is the depth to the bottom of the well screen.

- The “COMMENTS” space will be used to indicate if the sample is a matrix spike, matrix spike duplicate or matrix duplicate.
- Trip and field blank samples will be listed on separate rows.
- After the samples have been collected and sample information has been listed on the COC form, the method of shipment, the shipping cooler identification number(s) and the shipper air-bill number will be entered on the COC.
- A second member of the field team will review the COC for completeness and accuracy whenever possible.
- Finally, a member of the sampling team will write his/her signature, the date and time on the first “RELINQUISHED BY” space. Duplicate copies of each COC must be completed.
- One copy of the COC will be retained by sampling personnel. Blind duplicate samples will be identified on the copy retained by the sampling crew. The other copy and the original will be sealed in a plastic bag and taped inside the lid of the shipping cooler without the additional identification of blind duplicate samples.
- Sample shipments will be preserved at $4^{\circ}\text{C} \pm 2^{\circ}\text{C}$, typically by packing with ice, to preserve the samples during shipment.
- After the shipping cooler is closed, custody seals provided by the laboratory will be affixed to the latch and across the front and back of the cooler lid and signed by the person relinquishing the samples to the shipper.
- The seal will be covered with clear tape and the cooler lid will be secured by wrapping with packing tape.
- The cooler will be relinquished to the shipper, typically an overnight carrier.
- The COC seal must be broken to open the container. Breakage of the seals before receipt at the laboratory may indicate tampering. If tampering is apparent, the laboratory will contact the Project Manager and the samples will not be analyzed.
- The samples must be delivered to the laboratory within 48 hours of collection.

9.4 Sample Documentation

The field team leader will retain a copy of the COC and, in addition, the field team leader will ensure that the following information about each sample is recorded in the field book:

- Sample identifier;
- Identification of sampled media (e.g. soil, sediment, groundwater);
- Sample location with respect to known reference point;
- Physical description of sample location;
- Field measurements, (e.g. pH, temperature, conductivity, and water levels);
- Date and time of collection;
- Sample collection method;
- Volume of groundwater purged before sampling;
- Number of sample containers;
- Analytical parameters;
- Preservatives used; and
- Shipping information including:
 - Dates and method of sample shipments;
 - Chain-of-Custody Record numbers;
 - Federal Express Air Bill numbers;
 - Sample recipient (e.g., laboratory name).