Department of Environmental Conservation

Division of Environmental Remediation

Record of Decision

General Electric Main Plant Site
Operable Units No. 03 and 04
City of Schenectady/Town of Rotterdam
Schenectady County, New York
Site Number 4-47-004

March 2005

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

DECLARATION STATEMENT - RECORD OF DECISION

GENERAL ELECTRIC MAIN PLANT
Inactive Hazardous Waste Disposal Site

Operable Units No. 03 and 04
City of Schenectady/Town of Rotterdam
Schenectady County, New York
Site No. 4-47-004

Statement of Purpose and Basis

The Record of Decision (ROD) presents the selected remedy for Operable Units No. 03 and 04 of the General Electric Main Plant site, a Class 2 inactive hazardous waste disposal site. The selected remedial program was chosen in accordance with the New York State Environmental Conservation Law and is not inconsistent with the National Oil and Hazardous Substances Pollution Contingency Plan of March 8, 1990 (40CFR300), as amended.

This decision is based on the Administrative Record of the New York State Department of Environmental Conservation (NYSDEC) for Operable Units No. 03 and 04 of the General Electric Main Plant inactive hazardous waste disposal site, and the public's input to the Proposed Remedial Action Plan (PRAP) presented by the NYSDEC. A listing of the documents included as a part of the Administrative Record is included in Appendix B of the ROD.

Assessment of the Site

Actual or threatened releases of hazardous waste constituents from this site, if not addressed by implementing the response action selected in this ROD, presents a current or potential significant threat to public health and/or the environment.

Description of Selected Remedy

Based on the results of the Remedial Investigation and Feasibility Study (RI/FS) for the General Electric Main Plant site and the criteria identified for evaluation of alternatives, the NYSDEC has selected a comprehensive site-wide remedy. The components of the remedy are as follows:

- Remedial design program to provide the details necessary for the construction, operation, maintenance, and monitoring of the proposed remedy at the site.
- Completed or operating Interim Remedial Measures (IRMs) and systems will be incorporated into the proposed remedy.

- Excavation and off-site disposal of PCB-contaminated surface and subsurface soil at various locations in the manufacturing areas and former landfills.
- Soil or asphalt covers over surface soils in portions of the manufacturing area.
- Agronomic cover system for closure of the former East and West Landfills.
- Seep collection and treatment systems for the seeps along the former East Landfill.
- Shallow groundwater treatment using air sparging technology for select areas between the former East Landfill and the Poentic Kill.
- Bioremediation of groundwater contamination source areas at three locations.
- Comprehensive *Site Management Plan* to guide future activities at the site.
- Institutional controls and environmental easements, including access controls and restrictions on the future use of the site property and groundwater.
- Comprehensive post-remedial monitoring program to evaluate the effectiveness of the remedy.
- Periodic review of the effectiveness of the completed remedial actions.

New York State Department of Health Acceptance

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

Declaration

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

MAR 30 2005

Date

Dale A. Desnoyers, Director
Division of Environmental Remediation

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City of Schenectady/Town of Rotterdam
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SECTION 1: <u>SUMMARY OF THE RECORD OF DECISION</u>

The New York State Department of Environmental Conservation (NYSDEC), in consultation with the New York State Department of Health (NYSDOH), has selected this remedy for Operable Units No. 03 and 04 at the General Electric Main Plant site. The presence of hazardous waste has created significant threats to human health and/or the environment that are addressed by this remedy. As more fully described in Sections 3 and 5 of this document, active manufacturing operations, landfilling, product and waste storage, and spills have resulted in the disposal of hazardous wastes, including volatile and semi-volatile organics, petroleum products, polychlorinated biphenyls, and heavy metals. These wastes have contaminated the surface and subsurface soil, sediment, and groundwater at the site, and have resulted in:

- a significant threat to human health associated with potential exposure to contaminated surface and subsurface soil, sediment, and groundwater.
- a significant environmental threat associated with the potential impacts of contaminants to groundwater, surface waters, sediments, and biota.

To eliminate or mitigate these threats, the NYSDEC has selected the following remedy:

- Remedial design program to provide the details necessary for the construction, operation, maintenance, and monitoring of the proposed remedy at the site.
- Completed or operating Interim Remedial Measures (IRMs) and systems will be incorporated into the proposed remedy.
- Excavation and off-site disposal of PCB-contaminated surface and subsurface soil at various locations in the manufacturing areas and former landfills.
- Soil or asphalt covers over surface soils in portions of the manufacturing area.

- Agronomic cover system for closure of the former East and West Landfills.
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- Shallow groundwater treatment using air sparging technology for select areas between the former East Landfill and the Poentic Kill.
- Bioremediation of groundwater contamination source areas at three locations.
- Comprehensive *Site Management Plan* to guide future activities at the site.
- Institutional controls and environmental easements, including access controls and restrictions on the future use of the site property and groundwater.
- Comprehensive post-remedial monitoring program to evaluate the effectiveness of the remedy.
- Periodic review of the effectiveness of the completed remedial actions.

The selected remedy, discussed in detail in Section 8, is intended to attain the remediation goals identified for this site in Section 6. The remedy must conform with officially promulgated standards and criteria that are directly applicable, or that are relevant and appropriate. The selection of a remedy must also take into consideration guidance, as appropriate. Standards, criteria and guidance are hereafter called SCGs.

SECTION 2: <u>SITE LOCATION AND DESCRIPTION</u>

The General Electric (GE) Main Plant facility (hereafter referred to as the Main Plant) is located in the City of Schenectady and the Town of Rotterdam, Schenectady County, New York. The 628-acre site is bordered to the north and east by Interstate 890, by the Delaware and Hudson Railroad to the south, and by Rotterdam Square Mall to the west. There are residential properties approximately 50 to 100 feet above the site on the the steep, wooded Bellevue Bluffs south of the railroad. The site location is shown on Figure 1.

The Mohawk River flows west to east along the north side of Interstate 890. The former Binnie Kill channel, which was connected to the Mohawk River until the mid-1900s, passed through the north central and northeastern portion of the site. Over time, most of the former Binnie Kill Channel was filled with soil and demolition debris. A former holding pond within the northern portion of the site is the only area of free-standing water that remains of the former Binnie Kill Channel. A portion of the Erie Canal once passed through the Main Plant site. This portion of the Erie Canal was elevated above surrounding grade.

GE's manufacturing operations are mainly conducted within the central and eastern portions of the site. Two streams, the Poentic Kill and Poenties Kill, two wetland areas, and three former landfill areas are in the western portion of the site. The site is relatively flat except near the former landfill areas. General site features are shown on Figure 2.

SECTION 3: SITE HISTORY

3.1: Operational/Disposal History

GE's history at the Main Plant site began in 1886 when Thomas Edison purchased two vacant factory buildings. Over time, more than 240 structures were erected to meet GE's manufacturing needs. Currently, there are approximately 40 buildings at the 628-acre site and the Main Plant continues to produce large steam turbines and generators.

Over the years, GE has used Main Plant to manufacture a variety of products including electric motors and generators, gas turbines, wire and cable, insulating materials and microwave tubes. GE's manufacturing operations at the Main Plant were generally within the central and eastern portions of the site.

From the mid-1940s through the early 1980s, GE disposed waste and debris in three areas in the western portion of the site: the former East Landfill Area (60-acres), the former West Landfill Area (54-acres), and the former Binnie Kill Landfill Area (7-acres).

Waste disposal occurred in a number of other areas at the site. These include:

- chemical and material storage areas
- buildings and process areas
- lagoons and wastewater discharge areas
- spills
- above-ground and underground storage tanks
- sumps and floor drains
- sewers and piping

3.2: Remedial History

In 1987, the NYSDEC listed the site as a Class 2 site in the Registry of Inactive Hazardous Waste Disposal Sites in New York. A Class 2 site is a site where hazardous waste presents a significant threat to the public health or the environment and action is required.

In 1995, GE entered into Order on Consent #A4-0336-95-09 to complete a site-wide environmental investigation for the Main Plant. Under the Consent Order, the 628-acre site was divided into 20 separate geographic areas or *sectors* to assist with prioritizing the investigative process. Nineteen (19) sectors (Sectors B through T) were segregated into two large areas known as Zone 1 and Zone 2. One additional sector (Sector O) straddles the boundary between Zone 1 and Zone 2. The geometry of the two zones is based on the hydrogeologic conditions beneath the Main Plant. Zone 1, which is in the middle portion of the site, is above the primary groundwater migration pathway beneath the site. Zone 2 represents the remainder of the site located east of the Zone 1 (Zone 2-East) and west of Zone 1 (Zone 2-West). Figure 3 shows the Sector and Zone boundaries.

Based on the above, the NYSDEC has created a number of Operable Units (OU) at the site. An operable unit represents a portion of the site remedy that for technical or administrative reasons can be addressed separately to eliminate or mitigate a release, threat of release or exposure pathway resulting from the site contamination. Operable Unit 01 was an early perimeter groundwater monitoring program set up to evaluate possible effects of the site on the nearby municipal wellfields. This OU was completed in 2000. Operable Unit 02 is the on-going Stark Oil remedial program. Operable Unit 03 is the Zone 1 remedial program and Operable Unit 04 is the Zone 2 remedial program. Operable Units 03 and 04, the subjects of this PRAP, together represent the complete remedy for the GE Main Plant site.

Between 1996 and 1999, GE submitted *Sector Reports* for each Sector. These Sector Reports provided information relative to the historic location of storage areas, storage units, past chemical and petroleum releases, prior sampling locations, analytical data, Interim Remedial Measures (IRMs), and abatement measures. The Interim Remedial Measures and abatement measures are described in further detail in Section 5.2 below.

The information from the Sector Reports was used to prepare two *Area of Concern Reports* and work plans for further investigation. The *Area of Concern Report* (*AOC Report*) for Zone 1 was submitted on January 14, 1997. The *Zone 2 Area of Concern Report* (*Zone 2 AOC Report*) was submitted in March 23, 2000. The Areas of Concern identified in these reports are further described below in Section 5. The Consent Order defines an AOC as an area of the site where there is reason to believe there has been a disposal or release of hazardous waste. The AOCs identified in these two reports have been the focus of extensive investigation, IRMs, and other remediation described in this PRAP. The detailed scope of the investigation of the specific AOCs was defined in the following documents:

- *Revised Remedial Investigation/Feasibility Study Work Plan,* dated January 21, 1999.
- *Zone 1 Phase II Remedial Investigation Work Plan,* dated June 30, 2000
- *Zone 2 Remedial Investigation Work Plan,* dated June 30, 2000.

The purpose of the site investigations has been to determine the nature and extent of contamination resulting from prior manufacturing and disposal operations at the site. The entire RI investigation process commenced in 1995 and ended in 2003. Earlier investigations and data gathering also took place between 1990 and 1995.

The investigative process for the GE Main Plant in Schenectady resulted in the development of numerous reports throughout the years of investigation, interim remedial measures, and program assessment.

- Remedial Investigation (RI) and Feasibility Study (FS) Order on Consent signed in September 1995.
- Sector Reports for twenty sectors prepared and submitted to the Department between 1995 and 1996 for Zone 1 and 1997 through 1999 for Zone 2

- Area of Concern Reports (AOCs) for Zones 1 and 2 prepared and submitted between 1997 and 1999.
- Additional remedial field investigative work initiated in 1999; and completed in 2002.
- The initial site remedial investigation reports summarized and submitted separately for Zone 1 and Zone 2. Zone 1 RI submitted in April 2000. Zone 2 RI submitted in June 2000.

Upon review of the separate RI reports for OU 03 and 04 (Zone 1 and Zone 2), it was deemed appropriate to continue the process on a site-wide basis. Thus, subsequent investigations and reports have treated the site as a whole.

- Comprehensive site-wide RI report prepared for the site and submitted in October 2001.
- Site-wide Feasibility Study report prepared and submitted in January 2002.
- Comments received on the site-wide RI and Revised RI report prepared and submitted in May 2003.
- Comments received on the FS and Revised FS report prepared and submitted in May 2003.
- Final RI and FS reports completed in May 2004.

SECTION 4: ENFORCEMENT STATUS

Potentially Responsible Parties (PRPs) are those who may be legally liable for contamination at a site. This may include past or present owners and operators, waste generators, and haulers.

The NYSDEC and General Electric entered into an administrative Order on Consent on September 6, 1995. The Order (#A4-0336-95-09) obligates the responsible party to implement a Remedial Investigation/Feasibility Study remedial program under the Division of Environmental Remediation's inactive hazardous waste disposal site program. Upon issuance of the Record of Decision (ROD), the NYSDEC will approach General Electric to design and implement the selected remedy.

Pursuant to a separate multi-media Consent Order signed with the NYSDEC's regulatory programs (Division of Water and the Division of Solid & Hazardous Materials) in 1995, GE has removed PCB transformers, closed more than 200 floor drains in on-site buildings, removed PCB-contaminated sediments from storm sewers, and eliminated all process water discharges. The multi-media Order covered active processes in the manufacturing portions of the plant. This multi-media Order has been closed and completed to the NYSDEC's satisfaction and any remaining areas requiring remediation are now incorporated in the proposed remedial plan.

SECTION 5: SITE CONTAMINATION

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

5.1: <u>Summary of the Remedial Investigation</u>

In accordance with the requirements of the site-wide Consent Order, GE completed a Remedial Investigation (RI) and Feasibility Study (FS) for the Main Plant. The purpose of the RI was to collect and evaluate data regarding the nature and extent of contamination at the site. The RI was conducted between July 2000 and January 2003. The *Zone 1 RI Report*, dated April 25, 2000, and the *Revised RI Report*, dated May 30, 2004, describe the field activities and findings of the RI in detail. The RI collected an extensive amount of technical data and historical information. The data generated during these studies provided a technically sound and reliable basis to identify and understand the nature and extent of contamination and potential exposure pathways at the site.

The following activities were conducted during the RI:

- Reviewed all prior site investigation data and information;
- Collected 182 soil samples from 171 locations;
- Installed 53 new monitoring wells and 54 new piezometers;
- Collected 273 groundwater samples from 174 monitoring wells and piezometers;
- Collected 192 groundwater screening samples from 116 temporary monitoring locations;
- Collected nine non-aqueous phase liquid (NAPL) samples from nine locations;
- Collected two rounds of synoptic water levels and four partial rounds of water level measurements;
- Collected 39 surface water samples from on-site water bodies;
- Collected 164 sediment samples from on-site water bodies;
- Collected 10 biota samples;
- Conducted a long-term pumping test; and
- Conducted 18 slug tests.

As of January, 2003, there are 233 monitoring wells, 79 piezometers, and 23 staff gauges on-site. The site database contains information from 1,050 borings, 1,482 groundwater samples, 511 soil samples, 163 surface water samples, 213 sediment samples, 15 biota samples, and 2,066 water level measurements. These data include information collected during this investigation, as well as, during previous RI phases and other investigations.

Figures 4, 5, and 6 show locations of samples taken of groundwater. Figures 7 and 8 show the location of surface and subsurface soil samples. Figure 9 shows the location of surface water, sediment, and biota samples.

To determine whether the site media contain contamination at levels of concern, data from the investigation were compared to the following SCGs:

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

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

- Sediment SCGs are based on the NYSDEC “Technical Guidance for Screening Contaminated Sediments.”

Based on the RI results, in comparison to the SCGs and potential public health and environmental exposure routes, certain media and areas of the site require remediation. More complete information can be found in the RI report.

As a result of investigations at the site, seven media-based Areas of Concern (AOCs) were identified. These AOCs are:

- Groundwater
- Surface Water and adjacent wetlands
- Sediments
- Former East Landfill Seeps
- Soils
- Ambient Air (including indoor air)
- Site Habitats

Groundwater

The groundwater AOC includes both shallow groundwater in the fill material and the floodplain deposits and groundwater in the channel fill and glaciolacustrine deposits. The primary AOC at the Main Plant is the groundwater in the channel fill deposits (sand and gravel) that migrates beneath the site toward the Mohawk River.

Surface Water

The surface water in the Poentic Kill and Poenties Kill are an AOC at the Main Plant because these streams receive water from other AOCs (groundwater and seeps).

Sediments

The sediments in the Poentic Kill and Poenties Kill are an AOC because of the threat of wastes migrating to the streams and remaining in sediment.

Eastern Landfill Seeps

The seep areas along the eastern bank of the Poentic Kill are considered an AOC. All seeps are along the ½-mile long segment of the Poentic Kill. The seeps are a primary AOC because of the potential to impact other AOCs (surface water, sediments, and biota in the Poentic Kill).

Soils

The soils, including surficial soils and subsurface soils are an AOC at the Main Plant.

Ambient Air

Ambient air was identified as a potential AOC so that it could be determined whether airborne constituents, if any, had potential to pose a significant threat to either human health or the environment. No evidence of airborne constituents posing such a threat were detected.

Potential vapor intrusion to indoor air in site buildings and structures has also been identified as an area of concern at the site.

Site Habitats

The site habitats are considered to be an Area of Concern. These areas have been shown to support a wide array of wildlife. These existing wetlands, streams, and terrestrial cover are adjacent to, or on, GE's former landfill areas.

5.1.1: Site Geology and Hydrogeology

The stratigraphic units that have been identified beneath the site are the fill, floodplain deposits, channel fill deposits, glaciolacustrine deposits, deltaic deposits, glacial till, and the Canajoharie Shale. The shale is overlain by approximately 30 to 144 feet of unconsolidated sedimentary deposits.

Fill

The fill material consists of sediments, sands, gravel, cinders, bricks, coal, wood, ash, porcelain, construction debris, and reworked natural material that was used to reclaim the floodplain of the Mohawk River during the multiple phases of westward and northward development of the 628-acre industrial property.

The thickness of fill ranges from zero to approximately 55 feet. The fill is thickest near the Waste Water Treatment Plant (WWTP) and along the former Binnie Kill Channel. The thickness of fill in and around the former landfill areas ranges from zero to approximately 40 feet. The fill is not present along the Poentic Kill where the channel is incised into the underlying floodplain deposits. The fill is also not present on the western side of the site where the floodplain has remained relatively undisturbed.

Figure 10 is an east to west geologic cross-section of the Main Plant. Figure 11 is a north to south cross-section.

Floodplain

The floodplain deposits consist of fine-grained sands, silts, and clays that were deposited along the banks of the Mohawk River. The floodplain deposits range from zero to approximately 39 feet in thickness throughout the site and up to 48 feet west of the site. The floodplain deposits are thickest beneath the Rotterdam Square Mall (up to 48 feet) and beneath Building 273 (up to 39 feet). The floodplain deposits thin to the south near the bluff and to the northeast near the former Binnie Kill Channel.

The floodplain deposits are thin or absent near the WWTP near the northern boundary of the site. The floodplain deposits are thin or absent beneath a portion of the former West Landfill Area that corresponds to the historic channels of the Poenties Kill. The floodplain deposits are thin or absent along the former Binnie Kill Channel because the channel was, at one time, an arm of the Mohawk River.

The top of the floodplain deposits represents the natural ground surface of the historic Mohawk Flats prior to the development of this 628-acre property. The surface of the floodplain deposits generally slopes from the south to the north towards the former Binnie Kill Channel and the Mohawk River, a drop of approximately 10 feet.

There are depressions in the top of the floodplain deposits near the WWTP and along the former Binnie Kill Channel that correspond to the areas where these floodplain deposits are either thin or absent. These areas represent either former river channels or man-made excavations.

Channel Fill Deposits

The channel fill deposits are composed of river-deposited sands and gravels that form a permeable matrix. At some locations, the channel fill is predominantly comprised of gravels, while at other locations it is comprised of fine- to coarse-grained sands. This stratigraphic unit is the primary water-bearing unit beneath the site. The channel fill deposits beneath Zone 1 are the primary AOC because of their ability to transport large volumes of groundwater and, potentially, contaminants off-site.

The channel fill deposits beneath the site range from zero to 75 feet thick. The channel fill deposits are thickest near the Mohawk River. Because the channel fill deposits are more permeable than the overlying floodplain and underlying glaciolacustrine deposits, these sandy deposits gather and transmit groundwater beneath the site. The band of thick channel deposits that extends from southwest of Building 265 towards the Mohawk River is a preferred groundwater pathway in the channel fill deposits beneath the site (Zone 1).

No channel fill deposits are found along the southern portion of the site near the Bellevue Bluffs. This is the southern extent of historic channels of the Mohawk River and its post-glacial ancestor, the Iromohawk River.

Glaciolacustrine Deposits

Following the retreat of the continental ice sheet in this area, much of the region became inundated by glacial Lake Albany. The lake was formed by glacial melt water and surface water runoff. This lake became the depositional area of lacustrine deposits consisting of varved clays, silts, and deltaic sand deposits.

The glaciolacustrine deposits appear to consist primarily of fine-grained silts and clays near the former landfill areas. The glaciolacustrine deposits encountered beneath Zone 1 consisted of primarily coarse-grained silts and fine- to medium-grained sand interbedded with discontinuous lake clays. The coarser-grained glaciolacustrine deposits are capable of producing significant amounts of water.

The glaciolacustrine deposits range in thickness from zero to approximately 100 feet on-site. The glaciolacustrine deposits are thin or absent in the areas beneath the northern portion of the former West Landfill Area and the eastern portion of the site. The glaciolacustrine deposits are thickest beneath the former East Landfill Area and along the western boundary of the site. The primary factor controlling the thickness of the glaciolacustrine deposits appears to be the topography of the bedrock.

Deltaic Deposits

The least abundant unit at the site are the deltaic deposits, which occurs only at the western most end of the site. The deltaic deposits, which interfinger with the varved clays and silts of the overlying glaciolacustrine deposits, are only present in one boring location at the extreme western end of the GE property. The deltaic deposits consist of silts, sands and gravels that were deposited at the confluence of glacial Lake Albany and the prehistoric Iromohawk River. The deltaic deposits thicken to the west towards the Schenectady and Rotterdam municipal well field. Some borings west of the GE property line, near the Rotterdam Square Mall, contain sands and gravels that are probably equivalent to the deltaic deposits.

Glaciofluvial Deposits

The glaciofluvial deposits consist of the coarse sands and gravel of the principal aquifer for the Schenectady and Rotterdam municipal well field, which is approximately 3,200 feet west and northwest of the site. These sands and gravels were deposited during the high flow or a series of high flow events resulting from the catastrophic draining of glacial Lake Albany. These deposits are not found beneath the site, but are found west of Campbell Road.

Glacial Till

The glacial till rests on the bedrock and was formed at the base of the glacier that covered the area during the Pleistocene. This type of till is referred to as a "basal till." It is characterized by a lack of sorting and a high density or compactness. The high density resulted from the weight of the overlying ice, which may have been as much as a mile thick.

Bedrock

The bedrock beneath the site is the Ordovician-aged Canajoharie Shale, which constitutes a member of Trenton Group in the Mohawk Valley. The Canajoharie Shale is a thick (up to 2,200 feet) sequence of interbedded sandstone and shale that is virtually unfossiliferous. However, since erosion has removed the upper beds of the Canajoharie Shale, its exact stratigraphic thickness is difficult to establish.

Hydrogeology

Groundwater beneath the site originates from two distinct sources:

- Rainfall recharge to the fill material and floodplain deposits; and

- Groundwater underflow through the channel fill and glaciolacustrine deposits from recharge sources located upgradient from GE's property.

The glaciolacustrine deposits, which form the bluff south of the site, can produce a significant amount of upgradient recharge to the alluvial deposits beneath the site. The groundwater then migrates toward the Mohawk River or into the Poentic Kill.

There are two water-bearing zones that have been identified in the area: the fill material and the channel fill deposits. Although they are generally saturated, the remaining stratigraphic deposits (floodplain deposits, glaciolacustrine clays and silt deposits, till deposits, and the bedrock) act as confining or semi-confining layers for the two water-bearing zones.

In general, the groundwater in the fill material and floodplain deposits is either transpired by vegetation, migrates laterally into the Poentic Kill, or percolates downward through the floodplain deposits into the channel fill deposits. Shallow groundwater flow is generally from south to north toward the Mohawk River. The water table is generally in the floodplain deposits beneath the fill throughout much of the site, except in the former landfill areas. Figure 12 is a groundwater flow map for the fill/floodplain deposits.

The channel fill deposits are considered to be a semi-confined aquifer because the overlying floodplain deposits and the underlying glaciolacustrine deposits are generally less permeable yet contribute some groundwater to the more permeable channel fill. In addition, the potentiometric surface in the channel fill deposits is generally above the base of the overlying floodplain deposits. The groundwater within the channel fill deposits converges toward Zone 1 and then north towards the Mohawk River. Figure 13 is a groundwater flow map for the channel fill and glaciolacustrine deposits.

There is a well established hydrogeologic divide west of the western boundary of the site that separates groundwater beneath the site from the groundwater west of the site. The groundwater beneath the site and east of the divide migrates toward the Mohawk River. The groundwater west of the hydrogeologic divide migrates north-westward towards the Mohawk River or the Schenectady-Rotterdam municipal well field.

5.1.2: <u>Nature of Contamination</u>

As described in the RI report, many surface and subsurface soil, groundwater, surface water, sediment, and biota samples were collected to characterize the nature and extent of contamination. As summarized in Table 1, the main categories of contaminants that exceed their SCGs are volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs) including polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), and inorganics (metals). Light non-aqueous phase liquids (LNAPLs) have been observed at the site. An LNAPL will tend to float on water. The observed LNAPLs include various petroleum products such as gasoline, fuel oil, diesel fuel, lubricating oil, and waste oil. The nature and extent of LNAPL at the site is also provided in Table 1.

PCBs are a group of 209 different synthetic organic chemicals which were used by industry because of their resistance to heat and degradation, their being good electrical insulators and dielectric fluids, and their having certain other useful properties. PCBs generally have relatively low solubility in water (are "hydrophobic"), relatively low volatility in air, and tend to preferentially associate with oils and fats (are "lipophilic"). PCBs also preferentially associate with organic carbon. In the environment, PCBs are relatively persistent, and are degraded only under certain conditions. PCBs bioaccumulate in animals; for example, PCBs concentrations found in fish are frequently 100,000 or more times higher than levels found in water. PCBs pose a health risk to humans depending on the route and duration of exposure and the dose received. PCBs also pose ecological health risks.

VOCs are a group of organic chemicals which, as compared to PCBs, have greater solubility in water, and evaporate readily into air. The VOCs found at the GE Main Plant Site are primarily industrial solvents such as TCE. VOCs generally do not bioaccumulate in the food chain, and are not persistent in an aquatic environment due to their high volatility. They can be persistent in subsurface environments. VOCs pose various human health and environmental risks depending on which chemical is present, route of exposure, duration of exposure, and dose received.

SVOCs are another group of organic chemicals which generally have moderate solubility in water, and do not evaporate into air readily. SVOCs pose various health and environmental risks depending on which chemical is present, route and duration of exposure, and dose received.

Ambient air has not been adversely affected by past site activities and operations. Iron was the only compound detected in surface water samples at concentrations that exceeded NYSDEC surface water standards. PCBs, VOCs (primarily benzene, toluene, and xylene) and polycyclic aromatic hydrocarbons (PAHs) were detected in sediment samples at concentrations that exceed NYSDEC's sediment screening criteria. However, these surface water and sediment impacts in the surface water bodies appear to be directly related to releases from other media based AOCs (groundwater, seeps, and soil). Based on this data, four of the seven media-based AOCs (soil, groundwater, seeps, and site habitats) and the areas in which light non-aqueous phase liquids have been found are addressed in the evaluated remedial action for this site.

The VOCs of concern include:

benzene	chlorobenzene	1,1-dichloroethane

ethylbenzene	toluene	vinyl chloride
trichloroethene	xylene	1,2-dichloroethene

The SVOCs of concern include:

acenaphthene	benzo(a)anthracene
benzo(a)pyrene	benzo(b)fluoranthene
naphthalene	chrysene

PCBs detected include:

Aroclor-1242	Aroclor-1248
Aroclor-1254	Aroclor-1260

Metals of concern include:

iron	antimony
mercury	manganese
lead	nickel

5.1.3: <u>Extent of Contamination</u>

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

Chemical concentrations are reported in parts per billion (ppb) for water and parts per million (ppm) for waste, soil, and sediment. For comparison purposes, where applicable, SCGs are provided for each medium.
Table 1 summarizes the degree of contamination for the contaminants of concern in surface water, sediment, biota, groundwater, surface and subsurface soil, and NAPL and compares the data with the SCGs for the site. The following are the media which were investigated and a brief summary of the findings of the investigation.

Waste Materials

- LNAPLs (primarily petroleum products) were found, or were previously addressed, near the former East Landfill Area, the former Insulating Materials Product Section (IMPS) Area, the former Stark Oil Facility, Building 49/53, west of Building 273, and near the City Water Main IRM Area.

Figure 14 shows the location of significant concentrations of LNAPL on the site.

Surface Soil (0 to 2 feet below ground surface)

- PCBs were detected in surface soils at concentrations that exceed the NYSDEC SCG of 1 ppm in the former East and West Landfill Areas, near former Building 259, near former Building 29, near former Building 60, near former Building 109, and in the waste water treatment plant area.

- PAHs and metals were detected in surface soils at concentrations that exceed SCGs.

Figure 15 shows the location of areas of significant surface soil contamination.

Subsurface Soil (> 2 feet below ground surface)

- PCBs were detected in subsurface soils at concentrations that exceed the NYSDEC SCG of 10 ppm in the former East Landfill Area, near former Building 85, and in the former Binnie Kill Channel.

- VOCs were detected in subsurface soils in the former Wire Mill Area, former IMPS Area, former East Landfill Area, City Water Main IRM Area, the WWTP Area, and the former Binnie Kill Channel at concentrations that exceed NYSDEC's SCG for total VOCs.

- PAHs and metals were detected in subsurface soils at concentrations that exceed SCGs.

Figure 14 indicates the location of major subsurface soil contamination.

Groundwater

- PCBs were detected in shallow groundwater at concentrations that exceed the NYSDEC's groundwater standards near the former East Landfill Area, near Building 49/53, and in the former Binnie Kill Channel. PCBs were also detected in LNAPL found in these areas.

- VOCs (BTEX and other petroleum compounds) were detected in shallow groundwater at concentrations that exceed the NYSDEC groundwater standards near the Water Main IRM Area, south of the WWTP Area, in the former East and West Landfill Areas, near the former IMPS Area, near the former Stark Oil Facility, and in channel fill groundwater beneath the former East Landfill Area.

- VOCs (chlorinated solvents) were detected in shallow groundwater near the WWTP, the former Wire Mill Area, and in channel fill groundwater near the WWTP, the former Wire Mill Area, the former IMPS Area, west of the former West Landfill Area, and near the former Building 285 parking lot.

- PAHs were detected in shallow groundwater at concentrations that exceed groundwater standards in the former East Landfill Area, near Building 49/53, and in the former Binnie Kill Channel.

Figures 16 and 17 show the extent of groundwater contamination in the fill/floodplain and channel fill aquifers, respectively, at the site.

Surface Water and Seeps

- PCBs, VOCs, and metals were detected in seeps at concentrations that exceed NYSDEC's groundwater standards.

- Based on an evaluation of filtered and unfiltered samples, the PCBs found in the seeps are sorbed to suspended particles.

- Iron was the only compound detected in surface water samples at concentrations that exceeded NYSDEC surface water standards.

Figure 18 shows the location of surface water contamination. Figure 19 shows the results of seep sampling.

Sediments

- There were a total of sixteen sediment samples collected from the Poentic Kill, Poenties Kill, and wetlands in 2000. These samples were analyzed for PCBs, SVOCs, and metals. Seven of the sixteen sediment samples contained PCBs. Where detected, the total PCB concentration ranged from 0.127 ppm to 0.783 ppm, which are above the NYSDEC's sediment screening criteria. PAHs and metals were also detected in sediments at concentrations that exceed the NYSDEC's sediment screening criteria.

Figure 20 shows the results of sediment sampling.

Biota and Site Habitats

- Large areas of the site, especially in and around the former landfill areas, were found to support a wide array of vegetation and wildlife.

- PCBs were detected in biota samples collected near the seeps at concentrations that exceed NYSDEC's standards. Both vertebrates (fish and frog) and invertebrates (crayfish) were collected and analyzed for PCBs. Where detected, the total concentrations of PCBs in two crayfish samples ranged from 0.2 ppm to 0.209 ppm. The total PCB concentration in a frog sample was 0.26 ppm. The total PCBs in fish samples ranged from 0.0529 ppm to 4.92 ppm. The highest PCB concentrations were found in fish collected near seeps 2 through 4.

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

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

During the course of the site investigations and operations of the plant, GE implemented a wide variety of Interim Remedial Measures (IRMs) and remedial actions. Twelve IRMs and response actions were completed and there are currently six on-going IRMs and response actions. The completed actions meet a number of the remedial objectives set forth in the RI/FS to abate potential sources, remove free-product, reduce the risk of exposure to site workers and environmental receptors, and improve site habitats. The IRMs were completed under the terms of the site-wide Remedial Consent Order and technical work plans approved by the NYSDEC. Other actions were completed under the terms of the Multi-media Consent Order or were proactive measures initiated by General Electric. The total cost of remedial actions completed to date is estimated to be $16,400,000. The completed and ongoing remedial measures are listed below.

Waste and Source Removal

- Removal and bioremediation of approximately 2,685 cubic yards of petroleum-impacted soil discovered during construction of an addition to Building 262 (1992 to 2002, Remedial Consent Order, inactive hazardous waste disposal site program).

- Investigation and removal of 430 aboveground and underground storage tanks (1998 to present, Remedial Consent Order, inactive hazardous waste disposal site program).

- Substantial completion of the Sector R Holding Pond IRM, including the removal of more than 6,000 tons of PCB and metals- impacted soils, and treatment of more than 4,200,000 gallons of contaminated water (2001 to 2004, Remedial Consent Order, inactive hazardous waste disposal site program).

- Removal of mercury and mercury- contaminated debris and soil from Building 265 (1998, Remedial Consent Order, inactive hazardous waste disposal site program).

Free-Product Recovery

- Implementation of several measures, including on-going monthly monitoring, vacuum extraction of free-product, and bioremediation at the former Stark Oil Facility (1991 to present, Stark Oil Consent Order).

- Removal of over 2,505 tons of gasoline and petroleum-contaminated soil and treatment of approximately 100,000 gallons of water at the City Water Main LNAPL Collection IRM, and on-going monitoring for free-product (1998, Remedial Consent Order, inactive hazardous waste disposal site program).

- Installation of 16 monitoring wells at the former Insulating Materials Product Section (IMPS) Area, where product had been previously encountered, and on-going monthly monitoring and vacuum extraction to recover free-product (2003 to present, Remedial Consent Order, inactive hazardous waste disposal site program).

- On-going monthly monitoring and vacuum extraction of free-product at Building 49/53 (1986 to present, Remedial Consent Order, inactive hazardous waste disposal site program).

Operations, Infrastructure, and Sewer Cleaning

- Removal of more than 440 PCB-containing transformers from active and inactive manufacturing buildings (under the Multi-media Consent Order from 1995 to 2001).

- Closure of the permitted hazardous waste Treatment, Storage, and Disposal Facility (TSDF) at former Building 259 in accordance with a NYSDEC Closure Plan (under the Multi-media Consent Order).

- Closure of RCRA 90-day Storage Areas (under the Multi-media Consent Order).

- Cleaning of 500 feet of storm sewer associated with former Building 269 (1996, Remedial Consent Order, inactive hazardous waste disposal site program).

- Cleaning of 800 linear feet of storm sewer in the Hi-Yard Area, and removal of approximately 170 cubic yards (80 tons) of PCB-containing sediment and 430,000 gallons of contaminated water (1999, under the Multi-media Consent Order).

- Completion of a site-wide assessment of storm sewer flow and sewer sediments, and removal of an additional 220 tons of PCB-contaminated sediments (1996, under the Multi-media Consent Order).

Programs to Reduce the Risk of Exposure for Site Workers and Environmental Receptors

- Armoring of the stream bank of the Poentic Kill adjacent to the former East Landfill Area (2003, Remedial Consent Order, inactive hazardous waste disposal site program;

- Management, control, and reduction of the migration of contamination from the former East Landfill Area by planting numerous native trees and implementing a pilot agronomic cover program (1999 to present, Remedial Consent Order, inactive hazardous waste disposal site program;

- On-going control, collection, and treatment of seeps near the southwest corner of the former East Landfill Area (2001 to present, Remedial Consent Order, inactive hazardous waste disposal site program; and

- On-going site-wide renovations, soil covers, and plantings (ongoing, GE initiative).

Site Habitat Improvement

- Placement of soil cover and planting of indigenous plant species over the former Binnie Kill Landfill Area (Remedial Consent Order, inactive hazardous waste disposal site program);

- Removal of surface debris and placement of soil cover over portions of the former East and West Landfill Areas (Remedial Consent Order, inactive hazardous waste disposal site program); and

Figure 21 shows the location of the major IRMs.

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

This section describes the types of human exposures that may present added health risks to persons at or around the site. GE performed a baseline Human Health Risk Assessment in 1999 to evaluate potential risks posed by the site, in its unremediated state, to human health under current and reasonably foreseeable future conditions. The assessment is summarized below. A more detailed discussion of the human exposure pathways can be found in Appendix H of the April 25, 2000 Zone 1 Remedial Investigation report.

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

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

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

Exposure pathways and scenarios were evaluated and risks quantified for:

- current and future residents in areas northwest of the Main Plant
- potential current or future users of the Mohawk River as a source of drinking water
- current and future employees working at the site
- potential trespassers and occasional users of the former landfills
- potential future workers who perform subsurface work, construction, or maintenance on the property

- potential recreational users of the former landfill areas

Cancer risk estimates were calculated for the potential scenarios. Cancer risk refers to the probability that an individual in a specific population could develop cancer from site-related exposures. The risk calculations indicate that exposures to GE Main Plant contaminants do not pose a human cancer risk threat greater than the target cancer risk of one in one million (sometimes represented as $1x10^{-6}$).

The primary concern for area residents is the potential use of groundwater as drinking water source. Based on the results of the Remedial Investigation and a number of years of monitoring data, the groundwater beneath the Main Plant does not flow toward or otherwise affect the City of Schenectady or Town of Rotterdam wellfields located to the northwest of the site. This is primarily due to a well-established groundwater divide on the western boundary of the site, shown on Figure 13. Groundwater from the site is not currently affecting nor is it expected to affect in the future these public wells or any other known drinking water supplies. No known users of site-related groundwater are located in areas downgradient of the site or within the contaminated plume areas on the site. No off-site contamination (soil, surface water, or groundwater) was found during the course of site investigations.

No site-related chemicals of concern have been detected in the Mohawk River. Conservative assumptions were used to estimate potential future concentrations of chemicals of concern in surface water (primarily through the potential discharge of vinyl chloride from the shallow groundwater plume to the surface water along the northern boundary of the site). The potential concentrations were determined to be well below drinking water standards.

The primary potential exposure pathway for employees is through migration of volatile organic chemicals into indoor air from shallow contaminated groundwater and soil vapor. Results of limited soil gas sampling from the RI indicate that conditions at the site do not pose a significant or unacceptable carcinogenic or non-carcinogenic health risk in that portion of the plant. Additional evaluation of potential vapor intrusion in other areas of the site would be performed during the design and remedy phase.

Potential exposure pathways for trespassers include ingestion of soil and sediment, skin contact with soil and sediment, inhalation of particulate matter, or direct contact with surface water. Risks calculated for these pathways indicate that the site does not pose a significant or unacceptable risk of carcinogenic or non-carcinogenic health effects to potential trespassers.

Under reasonably foreseeable future conditions, site workers may be exposed to soil via incidental ingestion, dermal contact with soil, and inhalation of particulate matter. Risks calculated based on soil concentrations in the developed areas of the site indicate no unacceptable risks to potential construction workers.

The potential use of the former landfill areas for recreation was evaluated. Exposure scenarios include surface soil in the former landfills, sediment in the Poentic Kill and Poenties Kill, and surface water in the Poentic Kill. Given the concentrations and the calculated potential average daily exposures, it was determined that the site does not pose a significant or unacceptable risk for carcinogenic or non-carcinogenic health effects to future recreational users.

5.4: Summary of Environmental Impacts

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

General Electric completed a Screening Level Ecological Risk Assessment (SLERA) in 1999. The SLERA was originally included in the April 25, 2000 Zone 1 Remedial Investigation Report. The SLERA was subsequently revised and is included in Appendix H of the May 2003 site-wide Remedial Investigation report. The Screening Level Ecological Risk Assessment presents a detailed discussion of the existing and potential impacts from the site to fish and wildlife receptors.

Significant environmental resources and habitats identified nearby include:

- Mohawk River (NYSDEC Class A surface water body)
- Poentic Kill (NYSDEC Class B surface water body)
- Poenties Kill (NYSDEC Class C surface water body)
- NYSDEC regulated wetlands S-115

The Mohawk River is the largest surface water feature and flows west to east along the northern boundary of the site. The Poentic Kill is a continually flowing stream that flows through the site between the former East and West landfills and discharges into the Mohawk River. The Poenties Kill is an intermittent stream that flows along the western border of the site and into the Poentic Kill north of the former West Landfill. The channel is poorly defined and the Poenties Kill generally forms a marsh along the western property boundary. There are two wetlands near the former landfills. One wetland is south of the West Landfill and covers approximately 4 acres. The second wetland is located along the western boundary of the site and covers approximately 34 acres; this wetland is NYSEC regulated wetland S-115.

The following environmental exposure pathways have been identified:

- Potential dermal contact with soils in the former landfills to terrestrial biota.
- Potential incidental ingestion of soils in the former landfills by terrestrial biota.
- Potential dermal contact with surface water, pore water, or sediment in the Poentic Kill by aquatic biota.
- Potential incidental ingestion of sediment in the Poentic Kill by aquatic biota.
- Potential ingestion of surface water from the Poentic Kill by terrestrial biota.
- Potential ingestion of prey (primarily fish and amphibians) from the Poentic Kill by terrestrial and aquatic biota.

The following impacts to environmental resources were noted:

- Sediments in the Poentic Kill adjacent to the former East Landfill contained PCBs with concentrations ranging from 0.127 ppm to 0.783 ppm, which are above the NYSDEC's sediment screening criteria. PAHs and metals were also detected in sediments at concentrations that exceed the NYSDEC's sediment screening criteria.

- PCBs, VOCs, and metals were detected in seeps from the East Landfill at concentrations that exceed NYSDEC's groundwater standards. PCBs found in the seeps are sorbed to suspended particles.

- Iron was the only compound detected in Poentic Kill surface water samples at concentrations that exceeded NYSDEC surface water standards.

- PCBs were detected in biota samples collected near the seeps at concentrations that exceed NYSDEC's standards. Both vertebrates (fish and frog) and invertebrates (crayfish) were collected and analyzed for PCBs. Where detected, the total concentrations of PCBs in two crayfish samples ranged from 0.2 ppm to 0.209 ppm. The total PCB concentration in a frog sample was 0.26 ppm. The total PCBs in fish samples ranged from 0.0529 ppm to 4.92 ppm. The highest PCB concentrations were found in fish collected near the seeps

Large areas of the site, especially in and around the former landfill areas, were found to support a wide array of vegetation and wildlife. Communities of terrestrial flora were found to be diverse and healthy and are not considered to be adversely impacted by site contaminants. Faunal results from the RI and SLERA indicate the potential for adverse affects, primarily due to elevated PCB concentrations in suspended seep sediment and seep water coming from the former East Landfill. Sediments contained levels of PCBs in excess of the sediment screening criteria, but below the threshold concentration (1 ppm total PCB) that would typically drive sediment removal efforts. Interim Remedial Measures implemented at the seep areas in 2000 are effectively removing the source of PCBs to the sediments.

Site contamination has impacted the groundwater resource in the fill and floodplain and channel fill aquifers. The site is located over the highly productive aquifer that services the City of Schenectady and Town of Rotterdam wellfields located approximately 3,000 feet to the northeast. The part of the aquifer under the site is not currently used for public water supply.

Contaminants in groundwater do not appear to have adversely affected the quality of surface water in the on-site aquatic habitats, despite indications that shallow groundwater discharges to the Poentic Kill and Poenties Kill near the former landfills. Off-site contamination (soil, sediment, surface water, or groundwater) was not found during the course of site investigations. No site-related contamination was found in the adjacent Mohawk River.

SECTION 6: <u>SUMMARY OF THE REMEDIATION GOALS</u>

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

The remediation goals for this site are to eliminate or reduce to the extent practicable:

- exposures of persons at or around the site to VOCs, SVOCs, PCBs, and metals in surface and subsurface soils, seeps and groundwater;

- environmental exposures of flora or fauna to VOCs, SVOCs, PCBs, and metals in surface and subsurface soil, seeps and groundwater;

- the release of contaminants from soil into groundwater that may create exceedances of groundwater quality standards;

- further groundwater impacts through source control or targeted soil removals; and,

- the release of contaminants from surface soil, subsurface soil, shallow groundwater, and seeps into surface water and sediments through erosion, run-off, and discharge.

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

- ambient groundwater quality standards; and,

- soil cleanup objectives for surface and subsurface soil.

SECTION 7: SUMMARY OF THE EVALUATION OF ALTERNATIVES

The selected remedy must be protective of human health and the environment, be cost-effective, comply with other statutory requirements, and utilize permanent solutions, alternative technologies or resource recovery technologies to the maximum extent practicable. Potential remedial alternatives for the General Electric Main Plant Site were identified, screened, and evaluated in the FS report which is available at the document repositories. The section below presents and describes several general technologies that were evaluated during the PRAP process.

Remedial Technologies Discussed in this Plan

Leachate Seep Collection and Treatment

All alternatives include the collection, treatment and discharge of seep water near the former East Landfill to remove polychlorinated biphenyls (PCBs), metals and VOCs before the water enters the Poentic Kill.

The specific components associated with the collection, treatment and discharge system will be determined during the remedial design phase. Collection of seep water will be achieved by providing a preferential path from areas of seepage to sump or collection points. The seep water will be pumped or passively collected from the sumps before being treated and discharged.

The collected water will be treated prior to discharge. The treatment system technologies may include filtration, aeration, or granular activated carbon (GAC). Treatment system technologies may rely on gravity to move water through the treatment system. The capacity of the treatment system technologies can be designed to handle the range of anticipated flows and may, therefore, include pumping, storage and containment in the system process.

Filtration would be effective for removing contaminants that are precipitated and sorbed to particulates. GAC/carbon is an effective treatment for most dissolved organic contaminants. Since carbon can be inhibited by suspended solids or metals present in the influent water, it is usually placed after filtration of suspended particles to reduce fouling of this media.

After treatment, the water will be discharged to the Poentic Kill in compliance with effluent limitations established by the NYSDEC. The collection and treatment system will require periodic monitoring to confirm that the system is operating effectively.

Air Sparging/Soil Vapor Extraction

Alternatives 3, 4, and 6 include air sparging/soil vapor extraction (AS/SVE) to remove volatile organic contaminants from soil and shallow groundwater.

The components of an AS/SVE system include:

- Air injection points
- Blower to force air into the ground via the air injection points
- Soil vapor extraction points to collect the volatized contaminants
- Treatment system for the volatized contaminants

Air sparging is the injection of pressurized air into the groundwater through a series of horizontal or vertical injection points. The number and depth of injection points will be determined during preliminary design and subsequent field pilot testing. As the injected air rises to the surface, it will volatilize the organic compounds. The volatized contaminants will then be collected through a series of soil vapor extraction points.

The soil vapor containing the stripped volatile organic compounds, along with any groundwater that may be collected in the extraction system, are treated to remove the contaminants before the air and water are discharged in compliance with the effluent limitations established by the NYSDEC.

Excavation Alternatives

Several of the alternatives under consideration involve varying degrees of contaminated soil removal from locations within the former landfills and select locations within the manufacturing Site for off-site disposal. Excavation of contaminated soil is an effective technology for complete and expeditious removal of contaminated soil from a Site. Excavated areas would be backfilled with clean material to existing grades as described in each alternative.

Removal and off-site disposal of exposed materials in the former landfills include discrete locations where bulky materials are found on the surface of the former landfills or locations where surface and subsurface soil has been detected at concentrations above NYSDEC's recommended soil clean-up objectives (RSCOs). Removal and off-site disposal of exposed wastes is generally easy to implement. Planning prior to implementation is necessary in order to reduce any potential impacts to the existing site habitats. This technology is effective for reducing human contact and environmental interaction with contaminants. Proper disposal of removed material at a licensed off-site facility may result in final treatment or destruction of the waste, however, final waste containment is more common.

RCRA/Part 360 Cap

Alternative 5 includes a cap with an impermeable subsurface barrier to prevent precipitation from entering the fill and groundwater and waste from migrating out of the site.

This cap would be designed to meet the requirements for solid waste landfill capping (6NYCRR Part 360) and PCB disposal facilities (TSCA Part 761). The components of the cap, from bottom to top would be:

- Bedding layer of sand or geotextile to protect the barrier from underlying debris
- Impermeable layer of geomembrane or compacted clay
- Barrier protection layer of 18" of soil
- Layer (6") of vegetated topsoil or asphalt

The underlying fill and/or bedding layer would be properly sloped to promote drainage along the overlying barrier layer and away from the site. Additional drainage layers or structures may be necessary to convey water collected above the barrier to the discharge point.

This cap is intended to minimize the amount of precipitation entering the fill. As a result, this cap would have stringent requirements for intrusive work beneath the cap and restrictions on structures built over it.

Agronomic Cover

An agronomic or phyto- cover ("AC") is an integrated plant and soil system that has a sufficiently deep soil profile, with abundant vegetative cover (and roots) and an adequate water holding capacity, so that a large quantity of precipitation and surface percolation is removed by evaporative losses from the soil surface and transpiration by the vegetation. The agronomic cover system utilizes various ecological means, including the installation of grasses, plants, trees and other vegetative materials, in conjunction with additions of soil from proximal sources, where necessary, for covering surface and subsurface materials in-place. Agronomic covers are designed to minimize the excavation and off-site disposal of waste materials.

Traditional landfill covers involve the removal of all surface vegetation, the displacement of any fauna occupying the area, the excavation, transport, placement and grading of large volumes of off-site soil, including sands and clays removed and transported from sometimes distant borrow sources. Traditional covers also include the installation of man-made materials including geosynthetic materials (plastics and geotextiles). This traditional cover system requires pre-engineered design for particular, site-specific conditions including elevation control, run-off and future protection of the cover from erosion and other environmental and weather-related conditions. In contrast, AC's utilize the capacity of existing ecosystems to protect human health and the environment and contain the subsurface materials. In many cases, existing vegetation and soil cover, with the installation of areas of rapidly growing vegetation, and/or small areas of additional cover, will suffice to offer sufficient protection.

The upper cover (biologically active soil zone), of a phyto-cover system is designed to store the infiltrating and percolating water. This water is then available for removal or up-take through the plant root structure. An AC consists of a bi-modal plant community: plants that remove large amounts of water, and plants selected for their ecological restoration value. Examples of plants that have high water up-take efficiencies include willow and poplar trees. These trees have the added benefit of rapid growth (and therefore large root mass coverage) with 5 to 10 feet of growth per year, in early years, and up to 15 feet once established and if managed for biomass production. Daily water removal rates for large stands of the willows and poplars range from 50 to 350 gallons of water per tree. As AC's increase in their ecological complexity over time, the density of ground cover increases and more water is shed from the site before it penetrates into the upper soil layers. In this way, percolation and downward movement of water is further reduced over time.

Enhanced In-Situ Bioremediation

Alternatives 3, 4, and 5 involve enhanced in-situ bioremediation to remove volatile organic compounds (VOCs)s from groundwater. Enhanced in-situ bioremediation involves modifying the conditions in the treatment area to make them more favorable to the natural degradation of contaminants or to speed up the degradation of chemical compound processes that are already occurring. This often means the addition of oxygen, a hydrogen source, microorganisms, or other nutrients into the subsurface in order to enhance the naturally occurring contaminant degradation. The type and method of enhancement depends on the nature, type and concentration of contaminant compounds as well as the existing conditions in the area to be treated.

Petroleum compounds are degraded under aerobic conditions. Microorganisms use oxygen as an electron donor to breakdown naturally occurring organic carbon sources and petroleum compounds. Aerobic biodegradation is enhanced by adding oxygen to the groundwater. This is typically accomplished by injecting an oxygen releasing compound that slowly releases oxygen to the groundwater.

Chlorinated solvents, such as TCE and DCE, which do not degrade under aerobic conditions, can be degraded anaerobically. In this case, microorganisms use electron donors other than oxygen to metabolize organic carbon. Anaerobic biodegradation can be accelerated by the addition of hydrogen or other amendments to the groundwater. Hydrogen Release Compound (HRC) is a commercially available substance that gradually releases lactic acid after it is injected into groundwater. The lactic acid is quickly metabolized by anaerobic microorganisms by releasing hydrogen into the groundwater. The hydrogen acts as an electron donor, facilitating the biodegradation of chlorinated hydrocarbons by reductive dehalogenation.

There are other amendments that may be injected into the subsurface to promote anaerobic degradation. Carbon sources that are soluble (such as sodium lactate or molasses), slowly soluble (such as vegetable oil), or insoluble (such as chitin or bark mulch) can be used, depending upon the system design, to support reductive dechlorination of TCE to ethene by native bacteria.

Summaries of the remedial alternatives that were considered for this site are discussed below. The present worth represents the amount of money invested in the current year that would be sufficient to cover all present and future costs associated with the alternative. This enables the costs of remedial alternatives to be compared on a common basis. As a convention, a time frame of 30 years is used to evaluate present worth costs for alternatives with an indefinite duration. This does not imply that operation, maintenance, or monitoring would cease after 30 years if remediation goals are not achieved.

Each alternative includes the numerous Interim Remedial Measures completed or underway at the site. Those IRMs are discussed in detail in Section 5.2 of this plan. The total estimated cost for these actions is $16,400,000. The capital costs for these IRMs are not included in the costs discussed below. Operation, Maintenance, and Monitoring (OM&M) costs for continuing IRMs are included.

Table 2 provides a summary of the alternatives evaluated. Table 3 provides a matrix of the alternatives for comparison purposes. Table 4 provides a summary of the costs associated with each alternative.

The results of the RI indicate that groundwater (including landfill leachate seeps), surface soils, and subsurface soils, require remediation in several areas of the site. The former landfills, including the former East, West, and Binne Kill landfills, will also require remediation. Several media, such as surface water, sediments, and air are not proposed for active remediation.

Groundwater

Proposals for the remediation of groundwater in several areas include source area treatment using bioremediation technologies and one alternative using a traditional collection and treatment system ("pump and treat") for comparison. The results of the RI indicate that natural biodegradation processes are effective at attenuating, or decreasing, concentrations of volatile organic chemicals in the groundwater at the site. GE performed a separate study that indicates enhancement of this natural condition with bioremediation technologies, in concert with subsequent monitoring of the natural attenuation process, may be an effective remedy for the groundwater. A detailed report of the results of this study is available in the document repositories and on the website as noted earlier in the proposed plan.

Alternatives 3, 4, and 6 include air sparging/soil vapor extraction (AS/SVE) to remove volatile organic contaminants from soil and shallow groundwater in the vicinity of the East Landfill.

All alternatives include the collection, treatment and discharge of seep water near the former East Landfill to remove polychlorinated biphenyls (PCBs), metals and VOCs before the water enters the Poentic Kill.

Former Landfills

Two major remedial alternatives, in addition to the no-action alternative, were evaluated for the former landfills: an agronomic cover system and a traditional man-made landfill cap system. The agronomic cover system for the former landfills, as summarized in the above technology box, is included in several alternatives. A traditional solid waste landfill closure system, the prescriptive Part 360 cap described above, is included in Alternative 5 for comparison. Both closure systems are intended and would be designed to reduce and mitigate, to the extent possible, migration of contaminants, direct contact of waste to human and ecological receptors, and infiltration and subsequent leachate/seep production and groundwater contamination. From a technical and regulatory standpoint, the complete closure plan proposed for the former landfills in Alternative 3, 4, and 6, (using an agronomic cover in concert with vegetative plantings and enhancements, seep collection, air sparging and treatment of shallow groundwater, targeted soil removal, soil covers, LNAPL collection, and monitoring), was deemed to have the equivalent performance and protectiveness of a prescriptive system under Part 360.

Given the environmental conditions noted at the former landfills (lack of significant contamination in the channel fill aquifer of concern, lack of significant groundwater plumes, lack of migration of contaminants beyond the footprint of the landfills, and the lack of a well-defined waste mass amenable to removal), the landfill closure systems proposed (the Part 360 cap and the agronomic cover system) are deemed sufficient to be protective, in concert with the other remedial systems evaluated for the entire plant.

A detailed summary of the phytoremediation program is available in the document repositories and on the website as noted earlier in the proposed plan.

Soil (Surface and Subsurface)

Several alternatives include targeted removals of surface and subsurface soils containing PCBs from areas in the manufacturing portion of the plant and from areas in the former East and West landfills. These include discrete locations where bulky materials are found on the surface of the former landfills, in adjacent drainage ditches, or locations in the manufacturing areas where surface and subsurface soil has been detected at concentrations above NYSDEC's recommended soil clean-up objectives in TAGM 4046.

Where included, these efforts would involve:

- Excavation, removal and off-site disposal of approximately 2,650 cubic yards of PCB-containing surface and subsurface soil from nine areas in the manufacturing part of the site. Surface soil (0-2 feet) containing greater than 1 ppm total PCBs and subsurface soil (> 2 feet) containing greater than 10 ppm total PCBs will be removed.

- Excavation, removal and off-site disposal of approximately 1,500 tons of surface soils, over an area of 12,700 total square feet, containing greater than 10 ppm total PCBs from seven areas in the former East and West Landfills. Following removal, one to two feet of clean fill would placed on the excavated areas prior to those areas being incorporated into the closure systems evaluated for the landfills.

The need for extensive soil and/or PCB (or other waste material) removal from the landfills was considered in the Feasibility Study process in the context of potential technical or engineering benefit to an overall remedy, or providing some additional protection to the public health and the environment. Significant concentrations of PCB were not found in the subsurface or in the waste mass. Given the extent of PCB contamination (primarily in isolated surface soil hits and drainage ditch soils) and the lack of impact noted in site media (no PCB-related groundwater contamination in non-NAPL areas, no non-particulate-associated PCB contamination in seeps and surface water), significant removal of PCB-contaminated materials was not deemed to be necessary.

Surface Water
Iron was the only compound detected in surface water samples at concentrations that exceeded NYSDEC surface water standards. Direct remediation of surface water in the on-site surface water bodies is thus not part of the proposed remedy. Potential impacts on surface water would be addressed by alternatives that include controlling seeps from the East Landfill, through the current East Landfill Seep IRM, and through enhancements to the seep treatment and collection system. Further surface water protection was evaluated in those alternatives that include shallow groundwater treatment by air sparging at locations between the former East Landfill and the Poentic Kill.

Sediments
While PCBs, VOCs (primarily benzene, toluene, and xylene) and polycyclic aromatic hydrocarbons (PAHs) were detected in sediment samples from the Poentic Kill at concentrations that exceed NYSDEC's sediment screening criteria, the levels are generally below concentrations (1 ppm total PCB, for example) that would drive active sediment removal efforts. The sediment impacts in the surface water bodies appear to be directly related to releases from other media such as the seeps and overland flow of PCBs from contaminated surface soils on the East Landfill. Remedial efforts evaluated, such as seep collection and treatment, targeted removals of surface soils containing PCBs, and closure and cover of the former landfills, should mitigate impacts to the surface water bodies and sediments. Comprehensive monitoring of the surface water, sediments, and biota is included in most alternatives to determine the effectiveness of this strategy.

Air
Ambient air has not been adversely affected by past site activities and operations and is not covered by this plan. While a potential exposure pathway for employees may exist through the migration of volatile organic chemicals into indoor air from shallow contaminated groundwater, results of limited soil gas sampling from the RI and the use of a conservative groundwater-to-air transfer model indicate that conditions at the site do not pose a significant or unacceptable carcinogenic or non-carcinogenic health risk to employees in

those portions of the plant evaluated. Active remediation for indoor air was not included in this plan, beyond institutional controls and evaluations concerning potential future use of the property. A detailed evaluation of the potential for vapor intrusion to indoor air in existing site buildings and structures, to supplement information generated during the Remedial Investigation, would be included in the Design phase of the remedy. Information from this evaluation would be used to determine the need for remedial action to mitigate any unacceptable exposures to indoor air contaminants or soil vapors.

7.1: <u>Description of Remedial Alternatives</u>

The following potential remedies were considered to address the contaminated soils, surface water, and groundwater at the site.

Alternative 1: No Further Action (except for monitoring)

The No Further Action alternative recognizes remediation of the site conducted under previously completed IRMs or IRMs currently underway. Once all current IRMs are complete, continued monitoring would be necessary to evaluate the effectiveness of the remediation completed under the IRMs. This alternative would leave the site in its present condition and would not provide any additional protection to human health or the environment.

Present Worth: $4,100,000
Capital Cost: $120,000
Annual OM&M:
(Years 1-5): $543,000
(Years 5-30): $409,000

The elements of this alternative include:

- No additional active remedial actions would be completed at the site.
- Previously completed Interim Remedial Measures (IRMs) and abatement measures would be incorporated into the proposed remedy.
- Continuation and/or completion of on-going IRMs and remediation systems. These include:
  - Free-product recovery at several locations.
  - Eastern Landfill Seep Collection at Seeps 2 through 4 (including monitoring).
  - Evaluation of PCB contamination at former Building 81.
- Long term monitoring program which would include:
  - Monitor groundwater in the channel fill deposits annually one year travel time upgradient from the Mohawk River.
  - Monitor groundwater in the fill and floodplain deposits annually one year upgradient of on-site surface water bodies.
  - Monitor the active seeps along the Poentic Kill and the surface water in the Poentic Kill and Poenties Kill annually.
  - Survey, including sampling and analysis, of the biota and wildlife habitats every five years.

- Periodic review of the effectiveness of the remedy.

Time to implement the remedy is estimated at 6 months from completion of design and approval of work plans.

Alternative 2: No Further Action with Institutional Controls and Monitoring

For Alternative 2, institutional controls would be implemented at the site in addition to the completed and on-going IRMs and abatement measures. This alternative would leave the site in its present condition but provide additional protection to human health or the environment through the use of institutional controls.

Present Worth: *$23,400,000*
Capital Cost: *$200,000*
Annual OM&M:
(Years 1-5): *$1,716,000*
(Years 5-30): *$1,582,000*

The elements of this alternative include:

- No additional active remedial actions would be completed at the site.
- Previously completed Interim Remedial Measures (IRMs) and abatement measures would be incorporated into the proposed remedy.
- Continuation and/or completion of on-going IRMs and remediation systems. These include:
    - Free-product recovery at several locations.
    - Eastern Landfill Seep Collection at Seeps 2 through 4 (including monitoring).
    - Evaluation of PCB contamination at former Building 81.
- *Site Management Plan* to include:
    - *Contingency Plan/Soil Management Plan* to evaluate and address areas where contamination is identified during future site operations.
    - Comprehensive *Health and Safety Plan* for site workers.
    - Free-product recovery *Standard Operating Procedure* (SOP) to address future spills or newly discovered spill areas that require recovery operations.
    - Maintenance program for the campus rehabilitations.
- Institutional controls and environmental easements (with annual certification), including access controls and restrictions on the future use of the property and groundwater on the site.
- Long term monitoring program which would include:
    - Monitor groundwater in the channel fill deposits annually at locations one year travel time upgradient from the Mohawk River.
    - Monitor groundwater in the fill and floodplain deposits annually at locations one year travel time upgradient from on-site surface water bodies.
    - Monitor the active seeps along the Poentic Kill and the surface water in the Poentic Kill and Poenties Kill annually.
    - Survey, including sampling and analysis, of biota and wildlife habitats every five years.

- Periodic review of the effectiveness of the remedy.

The time to implement remedial measure is 6 to 12 months from completion of design and approval of work plans and institutional control documents.

Alternative 3: Agronomic Landfill Cover/Source Area Treatment

For Alternative 3, the same institutional controls described for Alternative 2 would be imposed at the site. Completed and on-going IRMs are included in the remedy. The maintenance program for maintaining the soil and asphalt covers in the manufacturing area would be expanded to include the areas covered during implementation of this alternative. However, the maintenance requirements for the agronomic covers on the former landfill areas would be different. Active remediation for several areas is proposed including targeted soil removals, agronomic closure of the landfills and groundwater source area treatment.

Present Worth: $39,300,000
Capital Cost: $12,100,000
Annual OM&M:
(Years 1-5): $2,260,000
(Years 5-30): $2,157,000

The elements of this alternative include:

- Previously completed Interim Remedial Measures (IRMs) and abatement measures would be incorporated into the proposed remedy.
- Continuation and/or completion of on-going IRMs and remediation systems. These include:
  - Free-product recovery at several locations.
  - Eastern Landfill Seep Collection at Seeps 2 through 4 (including monitoring)
  - Evaluation of PCB contamination at former Building 81.

Soil

- Soil or asphalt covers over surface soil in portions of the manufacturing area.
- Removal and off-site disposal of surface soil at locations in the manufacturing area where PCBs have been detected at concentrations greater than 1 ppm.
- Removal and off-site disposal of subsurface soil at locations in the manufacturing area where PCBs have been detected at concentrations greater than 10 ppm.
- Removal and off-site disposal of surface soil at select locations in the former landfills, prior to the placement of the agronomic cover system, where PCBs have been detected at concentrations greater than 10 ppm.

Former Landfills

- Agronomic cover over selected portions of the former East and West Landfills.
- Enhancement of site habitats.

Groundwater

- In-situ anaerobic bioremediation of chlorinated solvents at the source area at the former Wire Mill Area.
- In-situ anaerobic bioremediation of chlorinated solvents at the source area at the former Propeller Test Building in the WWTP Area.

- *Site Management Plan* to include:
    - *Contingency Plan/Soil Management Plan* to evaluate and address areas where contamination is identified during future site operations.
    - Comprehensive *Health and Safety Plan* for site workers.
    - Free-product recovery *Standard Operating Procedure* (SOP) to address future spills or newly discovered spill areas that require recovery operations.
    - Maintenance program for the campus rehabilitations.
- Institutional controls and environmental easements (with annual certification), including access controls and restrictions on the future use of the property and groundwater on the site.
- Long term monitoring program which would include:
    - Evaluation of the effectiveness of the agronomic cover system at the site landfills
    - Monitoring of the performance of groundwater and source area treatment measures.
    - Monitoring of the progress of natural attenuation of contaminants in site groundwater.
    - Monitoring of groundwater quality in the channel fill deposits annually at locations approximately one year and three years travel time upgradient from the Mohawk River.
    - Monitoring of groundwater quality in the fill and floodplain deposits annually at locations approximately one year and three years travel time upgradient from on-site surface water bodies.
    - Monitoring of the quality of surface water in the Poentic Kill and Poenties Kill annually.
    - Survey, including sampling and analysis, of biota and wildlife habitats every five years.
- Periodic review of the effectiveness of the remedy.

The time to implement remedial measure is 2 years from completion of design and approval of work plans and institutional control documents.

Alternative 4: Agronomic Landfill Cover/Groundwater Collection/Source Area Treatment

Alternative 4 includes implementation of the same institutional controls described for Alternative 2 with an expanded maintenance program for the rehabilitated portions of the manufacturing areas and the addition of maintenance for the agronomic cover systems on the former landfills. Expanded seep and shallow groundwater collection and treatment is the primary difference between Alternative 4 and 3.

Present Worth: $45,800,000
Capital Cost: $13,300,000
Annual OM&M:

(Years 1-5): $2,616,000
(Years 5-30): $2,513,000

The elements of this alternative include:

- Previously completed Interim Remedial Measures (IRMs) and abatement measures would be incorporated into the proposed remedy.
- Continuation and/or completion of on-going IRMs and remediation systems. These include:
  - Free-product recovery at several locations.
  - Eastern Landfill Seep Collection at Seeps 2 through 4 (including monitoring).
  - Evaluation of PCB contamination at former Building 81.

Soil

- Soil or asphalt covers in portions of the manufacturing area where soil may be impacting groundwater.
- Removal and off-site disposal of surface soil at locations in the manufacturing area where PCBs have been detected at concentrations greater than 1 ppm.
- Removal and off-site disposal of subsurface soil at locations in the manufacturing area where PCBs have been detected at concentrations greater than 10 ppm.
- Removal and off-site disposal of surface soil at select locations in the former landfills, prior to the placement of the agronomic cover system, where PCBs have been detected at concentrations greater than 10 ppm.

Former Landfills

- Agronomic cover system over portions of the former East and West Landfills.
- Enhancement of site habitats.

Groundwater

- Expanded seep collection and treatment systems for the seeps along the former East Landfill.
- Shallow groundwater treatment using air sparging technology for select areas between the former East Landfill and Poentic Kill.
- In-situ aerobic bioremediation of groundwater contamination at select source area locations, including the DM-405F area.
- In-situ anaerobic bioremediation of chlorinated solvents at the source area at the former Wire Mill Area.
- In-situ anaerobic bioremediation of chlorinated solvents at the source area at the former Propeller Test Building in the Waste Water Treatment Plant Area.

- *Site Management Plan* to include:

    - *Contingency Plan/Soil Management Plan* to evaluate and address areas where contamination is identified during future site operations.
    - Comprehensive *Health and Safety Plan* for site workers.
    - Free-product recovery *Standard Operating Procedure* (SOP) to address future spills or newly discovered spill areas that require recovery operations.
    - Maintenance program for the campus rehabilitations.
- Institutional controls and environmental easements (with annual certification), including access controls and restrictions on the future use of the property and groundwater on the site.
- Long term monitoring program which would include:
    - Evaluation of the effectiveness of the agronomic cover system at the site landfills
    - Monitoring of the performance of groundwater and source area treatment measures.
    - Monitoring of the progress of natural attenuation of contaminants in site groundwater.
    - Monitoring of groundwater quality in the channel fill deposits annually at locations approximately one year and three years travel time upgradient from the Mohawk River.
    - Monitoring of groundwater quality in the fill and floodplain deposits annually at locations approximately one year and three years travel time upgradient from on-site surface water bodies.
    - Monitoring of the quality of surface water in the Poentic Kill and Poenties Kill annually.
    - Survey, including sampling and analysis, of biota and wildlife habitats every five years.
- Periodic review of the effectiveness of the remedy.

The time to implement remedial measure is 3 years from completion of design and approval of work plans and institutional control documents.

Alternative 5: Part 360 Landfill Capping/Source Area Treatment

Alternative 5, like Alternatives 3 and 4, includes implementation of the institutional controls described for Alternative 2. Maintenance requirements for the man-made caps would be different. Alternative 5 contains standard 6 NYCRR Part 360 capping systems for the on-site landfill rather than the agronomic cover system.

Present Worth: *$105,600,000*
Capital Cost: *$57,500,000*
Annual OM&M:
(Years 1-5): *$3,576,000*
(Years 5-30): *$3,473,000*

The elements of this alternative include:

- Previously completed Interim Remedial Measures (IRMs) and abatement measures would be incorporated into the proposed remedy.
- Continuation and/or completion of on-going IRMs and remediation systems. These include:
    - Free-product recovery at several locations.

    - Eastern Landfill Seep Collection at Seeps 2 through 4 (including monitoring).
    - Evaluation of PCB contamination at former Building 81.

Soil

- Soil or asphalt covers over surface soil in portions of the manufacturing area.
- Removal and off-site disposal of surface soil at locations in the manufacturing area where PCBs have been detected at concentrations greater than 1 ppm.
- Removal and off-site disposal of subsurface soil at locations in the manufacturing area where PCBs have been detected at concentrations greater than 10 ppm.

Former Landfills

- Grade and cap soil and groundwater at the former landfill areas with man-made caps as follows:
    - Former East Landfill using a RCRA hazardous waste landfill cap design.
    - Former West Landfill using a Part 360 solid waste landfill cap design.
    - Former Binnie Kill Landfill using a construction and demolition landfill cap design.

Groundwater

- Shallow groundwater collection and treatment on the west and north sides of the former East Landfill.
- Aerobic bioremediation at the DM-405F Area near the former Sector R Holding Pond.
- In-situ anaerobic bioremediation of chlorinated solvents at the source area at the former Wire Mill Area.
- In-situ anaerobic bioremediation of chlorinated solvents at the source area at the former Propeller Test Building in the WWTP Area.

- *Site Management Plan* to include:
    - *Contingency Plan/Soil Management Plan* to evaluate and address areas where contamination is identified during future site operations.
    - Comprehensive *Health and Safety Plan* for site workers.
    - Free-product recovery *Standard Operating Procedure* (SOP) to address future spills or newly discovered spill areas that require recovery operations.
    - Maintenance program for the campus rehabilitations.
- Institutional controls and environmental easements (with annual certification), including access controls and restrictions on the future use of the property and groundwater on the site.
- Long term monitoring program which would include:
    - Evaluation of the effectiveness of the agronomic cover system at the site landfills
    - Monitoring of the performance of groundwater and source area treatment measures.
    - Monitoring of the progress of natural attenuation of contaminants in site groundwater.
    - Monitoring of groundwater quality in the channel fill deposits annually at locations approximately one year and three years travel time upgradient from the Mohawk River.

- Monitoring of groundwater quality in the fill and floodplain deposits annually at locations approximately one year and three years travel time upgradient from on-site surface water bodies.
- Monitoring of the quality of surface water in the Poentic Kill and Poenties Kill annually.
- Survey, including sampling and analysis, of biota and wildlife habitats every five years.

- Periodic review of the effectiveness of the remedy.

The time to implement remedial measure is 4 years from completion of design and approval of work plans and institutional control documents.

Alternative 6: Agronomic Landfill Cover/Boundary Collection of Groundwater

Alternative 6 is similar to Alternative 4 in that is includes an agronomic cover system for the landfills. The major difference is treatment of the groundwater plumes at downgradient locations along the site boundaries rather than a focused treatment of the contamination source areas.

Present Worth: *$53,000,000*
Capital Cost: *$16,700,000*
Annual OM&M:
(Years 1-5): *$2,878,000*
(Years 5-30): *$2,784,000*

The elements of this alternative include:

- Previously completed Interim Remedial Measures (IRMs) and abatement measures would be incorporated into the proposed remedy.
- Continuation and/or completion of on-going IRMs and remediation systems. These include:
    - Free-product recovery at several locations.
    - Eastern Landfill Seep Collection at Seeps 2 through 4 (including monitoring).
    - Evaluation of PCB contamination at former Building 81.

Soil

- Soil or asphalt covers over surface soil in portions of the manufacturing area.
- Removal and off-site disposal of surface soil at locations in the manufacturing area where PCBs have been detected at concentrations greater than 1 ppm.
- Removal and off-site disposal of subsurface soil at locations in the manufacturing area where PCBs have been detected at concentrations greater than 10 ppm.
- Removal and off-site disposal of surface soil at select locations in the former landfills, prior to the placement of the agronomic cover system, where PCBs have been detected at concentrations greater than 10 ppm.

Former Landfills

- Agronomic cover over portions of the former East and West Landfills.
- Enhancement of site habitats.

Groundwater

- Expanded seep collection and treatment systems for the seeps along the former East Landfill.
- Install shallow ground treatment system in select areas between the former East Landfill and Poentic Kill.
- In-situ groundwater treatment systems to treat the groundwater in the channel fill deposits along the north site boundary.

- *Site Management Plan* to include:
    - *Contingency Plan/Soil Management Plan* to evaluate and address areas where contamination is identified during future site operations.
    - Comprehensive *Health and Safety Plan* for site workers.
    - Free-product recovery *Standard Operating Procedure* (SOP) to address future spills or newly discovered spill areas that require recovery operations.
    - Maintenance program for the campus rehabilitations.
- Institutional controls and environmental easements (with annual certification), including access controls and restrictions on the future use of the property and groundwater on the site.
- Long term monitoring program which would include:
    - Evaluation of the effectiveness of the agronomic cover system at the site landfills
    - Monitoring of the performance of groundwater and source area treatment measures.
    - Monitoring of the progress of natural attenuation of contaminants in site groundwater.
    - Monitoring of groundwater quality in the channel fill deposits annually at locations approximately one year and three years travel time upgradient from the Mohawk River.
    - Monitoring of groundwater quality in the fill and floodplain deposits annually at locations approximately one year and three years travel time upgradient from on-site surface water bodies.
    - Monitoring of the quality of surface water in the Poentic Kill and Poenties Kill annually.
    - Survey, including sampling and analysis, of biota and wildlife habitats every five years.
- Periodic review of the effectiveness of the remedy.

The time to implement remedial measure is 4 years from completion of design and approval of work plans and institutional control documents.

7.2 <u>Evaluation of Remedial Alternatives</u>

The criteria to which potential remedial alternatives are compared are defined in 6 NYCRR Part 375, which governs the remediation of inactive hazardous waste disposal sites in New York State. A detailed discussion of the evaluation criteria and comparative analysis is included in the FS report.

The first two evaluation criteria are termed "threshold criteria" and must be satisfied in order for an alternative to be considered for selection.

1. Protection of Human Health and the Environment. This criterion is an overall evaluation of each alternative's ability to protect public health and the environment.

Alternatives 1 and 2 provide the least disruption to the existing resources and ecosystems. However, they provide no active measures to protect the natural resources (soil, groundwater, surface water) beyond the continuation of existing IRMs. The agronomic cover included as part of Alternatives 3, 4, and 6 will act to enhance the habitats, while protecting the on-site fauna from direct contact with contaminants.

Alternatives 2 through 6 include institutional controls that will protect the human health of site workers and other potential site users . These controls would also continue the no risk condition that was shown in the Baseline Human Health Risk Assessment (BHHRA).

Alternatives 4, 5, and 6 include additional measures to add levels of protection to the Poentic Kill and the Mohawk River. Alternatives 4 and 6 achieve this with measures that enhance the habitat areas, causing only limited temporary disruption to the existing habitats during implementation. Construction of Alternative 5 would cause the complete destruction of the site habitats and destroy portions of adjacent wetlands.

Alternatives 4 and 5 include more measures to protect and improve the quality of on-site groundwater than Alternatives 1, 2, 3, and 6.

2. Compliance with New York State Standards, Criteria, and Guidance (SCGs). Compliance with SCGs addresses whether a remedy will meet environmental laws, regulations, and other standards and criteria. In addition, this criterion includes the consideration of guidance which the NYSDEC has determined to be applicable on a case-specific basis.

Alternatives 6 will enable the channel fill groundwater at the site boundary to meet groundwater standards in a shorter time than Alternatives 1 through 5 would, but would not provide treatment of the principal VOC source areas. Alternatives 3 through 5 would likely achieve groundwater standards at the site boundary in a shorter time than Alternatives 1 and 2 because they include remedial measures that target areas of elevated VOC concentrations.

Alternatives 3, 4, and 5 will enable on-site groundwater to achieve groundwater standards before Alternatives 1, 2, and 6 because Alternatives 3, 4, and 5 include treatment of the principal VOC source areas. With Alternatives 1, 2, and 6, the channel fill groundwater beneath the site would not achieve groundwater standards for the foreseeable future.

Data confirms that the water quality of the Mohawk River has not been adversely impacted by the VOCs that are present in the on-site groundwater and that the water in the Mohawk River is currently in compliance with Class A surface water standards for VOCs. Alternatives 3 through 6 include groundwater treatment measures that would aid in maintaining and protecting the surface water quality of the Mohawk River.

Alternatives 4, 5, and 6 all include measures to address the VOC containing shallow groundwater migrating from the former East Landfill to the Poentic Kill and the seeps. These measures would provide increasing degrees of protection so that the water in the Poentic Kill continues to meet surface water standards for VOCs.

Alternatives 3, 4, and 6, which include targeted removal of PCB impacted surface soils in the former East and West Landfills, and Alternatives 3 through 6, which include targeted removal of PCB-impacted soils in the manufacturing area, would comply with TSCA disposal regulations. The earthwork that is part of Alternatives 3, 4, 5, and 6 would employ appropriate dust control measures.

Alternatives 4, 5, and 6 include treatment systems that would have air and water discharges. These systems would be designed to comply with air and water discharge requirements.

Alternative 5 includes capping soil and groundwater at the former landfill areas with man-made landfill caps of various designs based NYSDEC guidance. The agronomic cover included in Alternatives 3, 4, and 6, in conjunction with the other remedial measures, would provide equivalent performance to a traditional man-made cap.

The next five “primary balancing criteria” are used to compare the positive and negative aspects of each of the remedial strategies.

3. Short-term Effectiveness. The potential short-term adverse impacts of the remedial action upon the community, the workers, and the environment during the construction and/or implementation are evaluated. The length of time needed to achieve the remedial objectives is also estimated and compared against the other alternatives.

Alternatives 2 through 6 would provide immediate protection to human health with varying degrees of short-term risk. Alternative 6 provides a more immediate reduction in the concentrations of VOCs in the groundwater in the channel fill deposits along the northern site boundary, but does not treat VOC source areas or reduce concentrations of contaminants in on-site groundwater.

The manufacturing area cover, which is included in Alternatives 3 through 6, would require that a substantial quantity of cover be brought to the site. This is likely to lead to increased risk to the public and workers through transportation injuries. However, in contrast to Alternative 3, 4, and 6, Alternative 5 includes bringing an additional 1.7 million cubic yards of material to the site to construct the caps in the former landfill areas. The additional truck traffic would significantly increase the risk of transportation injuries and cause a broader array of impacts (noise, dust, traffic) to people living near the site and the borrow areas. Alternative 5 would cause damage to more than 130 acres of existing habitats in the western portion of the site and would impact much of the 90 acres of habitats that surround the former landfill areas. Alternative 5 would also require significant land consumption at and from the borrow source areas.

4. Long-term Effectiveness and Permanence. This criterion evaluates the long-term effectiveness of the remedial alternatives after implementation. If wastes or treated residuals remain on-site after the selected remedy has been implemented, the following items are evaluated: 1) the magnitude of the remaining risks, 2) the adequacy of the engineering and/or institutional controls intended to limit the risk, and 3) the reliability of these controls.

In some areas of the site, data indicates that contaminants in the groundwater are naturally attenuating. This process would be allowed to continue with all of the alternatives. The measures included in Alternatives 3, 4, and 5, especially the treatment of the principal VOC source areas, would reduce the levels of contaminants, leading to an increased reduction of VOCs throughout the on-site groundwater.

In Alternatives 1 and 2, which do not include treatment of the principal source areas, groundwater in the channel fill deposits upgradient of the Mohawk River would not meet groundwater standards in the foreseeable future. Implementation of treatment systems for the principal VOC source areas in Alternatives 3, 4, and 5, would reduce the time needed to meet groundwater standards at the Site near the Mohawk River to approximately 30 years, although concentrations of VOCs in groundwater at the site near the Mohawk River would begin to decline after approximately 10 years. With Alternative 6, the use of groundwater stripping wells at the northern site boundary would reduce the time needed to meet groundwater standards near the Mohawk River to approximately 24 years. However, the stripping wells would need to be operated for considerably longer than 30 years until all the contaminants in the principal VOC source areas migrated to the groundwater stripping wells. With Alternatives 3, 4, and 5, in-situ anaerobic biodegradation would be enhanced at, or immediately downgradient of principal VOC source areas. Depending upon the design of the system, the source areas could be completely degraded, based on the results of the bench-scale laboratory studies, within as little as five years.

The agronomic cover over the former East and West Landfill Areas, included as part of Alternatives 3, 4, and 6, would effectively prevent site fauna from direct contact with the remaining waste mass, as would the Part 360 cap in Alternative 5. The cover would also serve to reduce infiltration of precipitation, and thus leachate production. In addition, the agronomic cover would reduce the mobility of the wastes. The agronomic cover system would likely to be increasingly effective as time passes and the plants mature. Alternatives 3 and 4 are therefore more effective in the long term. Alternative 5 would permanently destroy wetlands, as well as riparian and upland habitats.

5. Reduction of Toxicity, Mobility or Volume. Preference is given to alternatives that permanently and significantly reduce the toxicity, mobility or volume of the wastes at the site.

Alternatives 1 and 2 provide no active measures to reduce the mobility, toxicity, or volume of the wastes present at the site beyond the reduction in mobility and toxicity gained through continuation of the free-product and Seep IRMs and the volume reduction obtained by completing the Sector R Holding Pond IRM. The agronomic cover included in Alternatives 3, 4, and 6 would reduce the mobility of the waste by reducing infiltration through the waste and potentially through phytoremediation. The man-made caps included in Alternative 5 would reduce the mobility of the wastes in the habitat areas.

The additional seep control systems and air sparge curtain along the Poentic Kill, which are included in Alternatives 4 and 6, would provide greater reduction in the mobility, toxicity, and volume of contaminants than simply continuing the Seep IRM (Alternatives 1 through 3). The groundwater collection and treatment for the shallow groundwater in the former East Landfill, which is included in Alternative 5, would provide similar reduction in toxicity, mobility, and volume as the combined measures included in Alternatives 4 and 6.

Continuation of the on-going IRMs and the free-product SOP, which are included in Alternatives 3 through 6, would also reduce the volume of the waste. Placement of soil and asphalt covers over soil that is impacting groundwater, which are included in Alternatives 3, 4, and 5, would reduce the mobility of contaminants. The treatment of the primary VOC source areas at the former Wire Mill Area and the former Propeller Test Building Area, in conjunction with treatment of saturated soil and groundwater at the DM-405F Area, in Alternatives 4 and 5, would provide a greater reduction in the volume of contaminants than Alternative 3, which treats only the principal VOC source areas.
The boundary groundwater treatment systems in Alternative 6, combined with the expanded seep systems and the groundwater treatment system along the former East Landfill, would, like Alternatives 4 and 5, reduce the toxicity and volume of contaminants in groundwater, but would not provide for the destruction of the contaminants like Alternatives 4 and 5. At the site boundary, Alternative 6 would provide a similar reduction in toxicity and volume of contaminants as the groundwater protection and treatment measures included in Alternatives 4 and 5. However, with Alternative 6 the time frame for reduction in toxicity and volume on-site would be for longer since the groundwater treatment would only be located along the site boundaries. In contrast, Alternatives 4 and 5 provided for the treatment of the principal chlorinated VOC source areas at the former Wire Mill and the former Propeller Test Building Areas, treatment of groundwater near the soil with elevated VOCs near DM-405F, the use of asphalt covers over soil that may be impacting groundwater near DM-401F and the Water Main IRM Area, and the treatment or collection measures for shallow groundwater along the former East Landfill Area. These measures would result in a more rapid reduction in the toxicity and volume of contaminants than the boundary systems included in Alternative 6 because of the proximity of the treatment and protective measures to the impacted areas. In addition, the groundwater collection, treatment, and protective measures in Alternatives 4 and 5 would reduce the mobility of wastes, while the boundary measures in Alternative 6 would not reduce the mobility of contaminants until the contaminants had migrated to the systems. The groundwater treatment and protective measures in Alternative 3 would provide a reduction in the toxicity, volume, and mobility of wastes more quickly than the measures included in Alternative 6, but the groundwater treatment and protective measures in Alternatives 4 and 5 would provide the most rapid reductions in toxicity, volume, and mobility of wastes.

6. Implementability. The technical and administrative feasibility of implementing each alternative are evaluated. Technical feasibility includes the difficulties associated with the construction of the remedy and the ability to monitor its effectiveness. For administrative feasibility, the availability of the necessary personnel and materials is evaluated along with potential difficulties in obtaining specific operating approvals, access for construction, institutional controls, and so forth.

Alternative 1 would be easy to implement. The off-site groundwater and surface water use restrictions proposed as part of Alternatives 2 through 5 would require coordination with various agencies and landowners. In general, the technologies proposed for Alternatives 3 through 6 would not be difficult to implement. Construction of remedial measures within the saturated zone would be challenging, although similar measures have been constructed at many sites. The tremendous quantity of fill and capping materials needed to construct the caps for Alternative 5 may be difficult to obtain locally.

7. Cost-Effectivness. Capital costs and operation, maintenance, and monitoring costs are estimated for each alternative and compared on a present worth basis. Although cost-effectiveness is the last balancing criterion evaluated, where two or more alternatives have met the requirements of the other criteria, it can be used as the basis for the final decision. A summary of costs for each alternative are presented in Table 4.

Alternative 1 would cost the least to implement because it requires no action beyond continuing existing IRMs. Alternative 2 would cost slightly more to implement because it includes institutional controls. Alternatives 3, 4, and 6 are comparable in cost. The components of Alternatives 3, 4, and 6 that contribute most to the cost increase over Alternative 2 is the soil and asphalt needed for the manufacturing area cover and the removal and off-site disposal of PCB-impacted soils. The increased cost to implement Alternative 4 over Alternative 3 reflects the addition of measures to treat the VOCs in the shallow groundwater in the former East Landfill Area before the groundwater migrates to the Poentic Kill and the additional seep control and treatment measures. Alternatives 4 and 6 are very similar in cost, despite their approaches for treating groundwater. The proposed remedial actions in Alternative 5 would cost approximately two times more to implement than the remedial actions proposed in Alternatives 3, 4, or 6, an increase of approximately sixty million dollars. The primary component of this increased cost is the purchase and placement of sufficient fill to achieve the designed minimum slopes for the man-made caps and the cost of materials to construct caps over more than 130 acres.

This final criterion is considered a “modifying criterion” and is taken into account after evaluating those above. It is evaluated after public comments on the Proposed Remedial Action Plan have been received.

8. Community Acceptance. Concerns of the community regarding the RI/FS reports and the PRAP have been evaluated. The responsiveness summary (Appendix A) presents the public comments received and the manner in which the NYSDEC addressed the concerns raised.

Several letters were received pertaining to extending the public comment period. The comment period was extended twice, ending on February 28, 2005 rather than the original end date of December 16, 2004. Several letters had questions regarding the potential effect of the remedial plan on redevelopment and reuse of those portions of the property not currently in use. There were several comments on the groundwater flow conditions.

SECTION 8: SUMMARY OF THE SELECTED REMEDY

Based on the Administrative Record (Appendix B) and the discussion presented below, the NYSDEC has selected Alternative 4 as the remedy for this site. The elements of this remedy are described at the end of this section.

The selected remedy is based on the results of the RI and the evaluation of alternatives presented in the FS. In addition, as required by the Order on Consent, the effect of each alternative on the Mohawk River, the Poenties Kill, the Poentic Kill, on-site groundwater, off-site groundwater, and the City of Schenectady and Town of Rotterdam municipal well fields was considered.

Figure 22 shows the selected remedy for the entire site. Figures 23, 24, 25, and 26 show details of the remedy pertaining to the former on-site landfills.

Summary of Evaluation of Alternative 4

Alternative 4 was selected because, as described below, it satisfies the threshold criteria and provides the best balance of the primary balancing criteria described in Section 7.2. It will achieve the remediation goals for the site by removing and or controlling surface and subsurface soils, seeps, and NAPLs that represent the most significant source of contamination to surface water and groundwater. By treatment of groundwater plumes and source areas, it will create the conditions needed to restore groundwater quality to the extent practicable. Alternative 4 is the least destructive alternative that meets the remedial objectives for the site, is protective of human health and the environment, and is the most cost effective alternative that meets the remedial objectives.

Alternatives 1 and 2 were ruled out because they would not achieve all the remedial objectives. Alternative 4 was chosen over Alternative 3 because it will provide additional levels of protection for surface waters at and near the site and will allow groundwater that migrates in the channel fill to achieve groundwater standards in a shorter time frame. Alternative 4 was chosen over Alternative 5 based on environmental impact and cost effectiveness. Alternative 5 would significantly impact the existing habitats on the entire western third of the site and displace the wildlife into the surrounding areas. In contrast, Alternative 4 will enhance the site habitats. Alternative 4 was chosen over Alternative 6 based on the active treatment of source areas. Although Alternative 6 would achieve groundwater standards north of the property boundary, where there are no current or anticipated future receptors near the Mohawk River, in a slightly shorter time frame, the source areas would not be treated. Another advantage of Alternative 4 over Alternative 6 is that Alternative 4 includes treatment of the principal VOC source areas at the site. This will allow the channel fill groundwater beneath the site to achieve groundwater standards, through natural attenuation, in a more timely manner. In contrast, the channel fill groundwater beneath the site would not meet groundwater standards for the foreseeable future if Alternative 6 were implemented.

Alternative 4 includes measures to remediate VOCs in groundwater beneath the central portion of the site, prevent shallow impacted groundwater in the former East Landfill Area from reaching the Poentic Kill, remove targeted areas of impacted soil, address other areas of the site where residual contamination has been detected, and protect and enhance the site habitats. The recommended alternative achieves the remedial objectives for the Main Plant site.

The estimated total present worth cost to implement the remedy is $45,800,000. Capital costs for construction of the new proposed active remedial actions is $13,300,000. The estimated average annual operation, maintenance, and monitoring costs for 30 years is $2,513,000. The total costs for remedial actions completed prior to this PRAP were $16,400,000.

The elements of the selected remedy are as follows:

1. Remedial design program to provide the details necessary for the construction, operation, maintenance, and monitoring of the proposed remedy at the site. Additional groundwater, soil, and other samples will be taken, as part of a Pre-Design Investigation, to further define site conditions, confirm excavation and treatment volumes, and generally aid in the final design of the remedy. The Pre-Design Investigation will also include a detailed evaluation of the potential for vapor intrusion to indoor air in existing site buildings and structures, to supplement information generated during the Remedial Investigation. Information from this evaluation will be used to determine the need for remedial action to mitigate any unacceptable exposures to indoor air contaminants or soil vapors.

2. Previously completed Interim Remedial Measures (IRMs) and abatement measures will be incorporated into the proposed remedy.

3. The proposed remedy will include the continuation and/or completion of on-going IRMs and remediation systems. These include:

    - Free-product recovery at several locations.
    - Eastern Landfill Seep Collection at Seeps 2 through 4 (including monitoring).
    - Evaluation of PCB contamination at former Building 81.

4. Active remediation is proposed for a number of source areas on site. These include:

    Soil

    - Excavation and off-site disposal of surface soil at locations in the manufacturing area where PCBs have been detected at concentrations greater than 1 ppm.
    - Excavation and off-site disposal of subsurface soil at locations in the manufacturing area where PCBs have been detected at concentrations greater than 10 ppm.
    - Excavation and off-site disposal of surface soil at select locations in the former landfills, prior to the placement of the agronomic cover system, where PCBs have been detected at concentrations greater than 10 ppm.
    - Soil or asphalt covers over surface soil in portions of the manufacturing area.

    Former Landfills

    - Agronomic cover system over portions of the former East and West Landfills.

- Enhancement of site habitats including the planting of select flora species.

Groundwater

- Expanded seep collection and treatment systems for the seeps along the former East Landfill.
- Shallow groundwater treatment using air sparging technology for select areas between the former East Landfill and Poentic Kill.
- In-situ aerobic bioremediation of groundwater contamination at select source area locations, including the DM-405F area.
- In-situ anaerobic bioremediation of chlorinated solvents at the source area at the former Wire Mill Area.
- In-situ anaerobic bioremediation of chlorinated solvents at the source area at the former Propeller Test Building in the Waste Water Treatment Plant Area.

5. A *Site Management Plan* will be developed to guide future activities at the site. This plan will include:

    - *Contingency Plan/Soil Management Plan* to evaluate and address areas where contamination is identified during future site operations.
    - Comprehensive *Health and Safety Plan* for site workers.
    - Free-product recovery *Standard Operating Procedure* (SOP) to address future spills or newly discovered spill areas that require recovery operations.
    - Maintenance program for the campus rehabilitations.

6. An institutional control will be imposed, in such form as the NYSDEC may approve, that will require compliance with the approved *Site Management Plan*.

    An institutional control will be imposed, in such form as the NYSDEC may approve, that will prevent the use of groundwater as a source of potable or process water without necessary water quality treatment as determined by the Schenectady County Department of Health. Due to the continued presence of volatile organic compounds in groundwater for some period of time after remediation, the potential for vapor intrusion to indoor air must be evaluated prior to any new construction or change in use of existing structures on the site. Additional institutional controls and environmental easements, including access controls and restrictions on the future use of the site property will be imposed.

    The property owner will complete and submit to the NYSDEC an annual certification until the NYSDEC notifies the property owner in writing that this certification is no longer needed. This submittal will contain certification that the institutional controls and engineering controls put in place, pursuant to the Record of Decision, are still in place, have not been altered, and are still effective.

    A notification will be sent to the county clerk for filing, to notify future owners of the residual contaminants remaining on the site.

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

8. Since the remedy results in untreated hazardous waste remaining at the site, a long term monitoring program will be instituted as part of the *Site Management Plan*. This will include:

   - Evaluation of the effectiveness and performance of the agronomic cover system at the site landfills
   - Monitoring of the performance of groundwater and source area treatment measures.
   - Monitoring of the progress of natural attenuation of contaminants in site groundwater.
   - Monitoring of groundwater quality in the channel fill deposits annually at locations approximately one year and three years travel time upgradient from the Mohawk River.
   - Monitoring of groundwater quality in the fill and floodplain deposits annually at locations approximately one year and three years travel time upgradient from on-site surface water bodies.
   - Monitoring of the quality of surface water in the Poentic Kill and Poenties Kill annually.
   - Survey, including sampling and analysis, of biota and wildlife habitats every five years.

   This program will allow the effectiveness of the site-wide remedy to be monitored and will be a component of the operation, maintenance, and monitoring plan for the site. Periodic review of the effectiveness of the remedy will be conducted.

SECTION 9: <u>HIGHLIGHTS OF COMMUNITY PARTICIPATION</u>

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

- Repositories for documents pertaining to the site were established.

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

- A public meeting was held on November 30, 2004 to present and receive comment on the PRAP.

- A 30-day comment period (November 16, 2004 - December 16, 2004) was established. This period was subsequently extended twice after requests by interested parties. The final comment period extended from November 16, 2004 to February 28, 2005.

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

Supporting Information Index

TABLES

FIGURES

TABLE 1

Nature and Extent of Contamination

Media		Compounds	Locations with Concentrations Greater Than NYSDEC Standards	SCG
Soil	Surface Soil	PCBs	Former Building 29 - up to 31 mg/kg	1 ppm
			Former Building 259 - up to 76 mg/kg	
			Former East Landfill Area- up to 133 mg/kg	
			Former West Landfill Area- up to 4.69 mg/kg	
			South of Building 84 - up to 1.1 mg/kg	
			Waste Water Treatment Plant Area - up to 3.8 mg/kg	
			Near Former Building 109 - 2.12 mg/kg	
		SVOCs	Site-wide - Total less than 500 mg/kg, individual PAHs greater than RSCOs	500 ppm
		Metals	Site-wide - As, Ba, Be, Cd, Cr, Co, Cu, Fe, Hg, Ni, Se, V, Zn greater than RSCOs	
	Subsurface Soil	PCBs	Former East Landfill Area - up to 146 mg/kg	10 ppm
			Former Binnie Kill Channel - up to 12 mg/kg	
			West of Building 81 - up to 15 mg/kg	
		VOCs	Former Wire Mill - chlorinated solvents up to 150 mg/kg	10 ppm
			Former IMPS Area - BTEX up to 1,780 mg/kg	
			Former East Landfill Area- BTEX up to 166 mg/kg	
			City Water Main IRM Area - Petroleum Hydrocarbons - up to 82 mg/kg	
			Waste Water Treatment Plant Area - Chlorinated Solvents and petroleum hydrocarbons up to 38 mg/kg	
			Former Binnie Kill Channel - BTEX and chlorinated VOCs up to 13.9 mg/kg	
		SVOCs	Site-wide - Total less than 500 mg/kg, individual PAHs greater than RSCOs	500 ppm
			West of Building 2 - Total PAHs up to 1,433 mg/kg	
		Metals	Site-wide - As, Ba, Be, Cd, Cr, Co, Cu, Fe, Hg, Ni, Se, Zn greater than RSCOs	
Groundwater	Fill &	PCBs	Former Binnie Kill Channel - up to 4.8 ug/L	0.09 ppb

	Floodplain Deposits			
			Building 49/53 - up to 1.91 ug/L	
			Former East Landfill Area- up to 48.3 ug/L	
			Former Chip Pad - up to 1.09 ug/L	
		VOCs	City Water Main IRM Area - Petroleum Hydrocarbons up to 1,960 ug/L	
			South of Waste Water Treatment Plant Area - Chlorinated solvents and petroleum hydrocarbons up to 815,000 ug/L	
			Former Wire Mill - chlorinated solvents up to 111 ug/L	
			Former East Landfill Area - BTEX up to 51,400 ug/L	
			Former Chip Pad - Petroleum hydrocarbons up to 2,920 ug/L	
			Former Stark Oil Area - Petroleum hydrocarbons up to 5,900 ug/L	
			Former IMPS Area - BTEX up to 357 ug/L	
			Former West Landfill Area - BTEX and Petroleum hydrocarbons up to 296 ug/L	
Groundwater	Fill & Floodplain Deposits	SVOCs	Former East Landfill Area - PAHs up to 3,400 ug/L	
			Former Chip Pad - PAHs up to 201 ug/L	
			Building 49/53 - PAHs up to 218 ug/L	
			Former Binnie Kill Channel - up to 11.4 ug/L	
		Metals	Site-wide - Ag, As, Ba, Be, Cd, Cr, Cu, Fe, Hg, Mg, Mn, Na, Ni, Pb, Sb, Se, Th, Zn	
	Channel Fill & Glaciolacustrine Deposits	VOCs	Former Wire Mill - chlorinated solvents up to 46,200 ug/L	
			Former East Landfill Area - BTEX up to 78 ug/L	
			Former IMPS Area - Chlorinated solvents up to 155 ug/L	
			Waste Water Treatment Plant Area - Chlorinated solvents and petroleum hydrocarbons up to 1,330 ug/L	
			Former West Landfill Area- chlorinated ethenes up to 25 ug/L	

			Former Building 285 Parking Lot - up to 69 ug/L	
		Metals	Site-wide - As, Ba, Be, Cd, Cr, Cu, Fe, Hg, Mg, Mn, Na, Ni, Pb, Sb, Th	
Seeps	Former East Landfill Area	PCBs	Up to 3.9 ug/L	0.09 ppb
		VOCs	BTEX up to 289 ug/L	
		Metals	Fe, Mn, Na, Mg, Cd, Ba, Hg, Th	
Site Habitats	Biota	PCBs	up to 4.92 mg/kg	0.110 ppm
LNAPL	Former East Landfill Area	Fuel oil, gasoline, lubricating oil with up to 4.7 mg/kg PCBs	up to 0.6 feet of product (January 2003)	
	Former IMPS Area	Gasoline and mineral spirits with up to 79 mg/kg PCBs	up to 2.1 feet of product (December 2002)	
	Former Stark Oil Area	Waste oil	up to 0.1 feet of product (September 2002)	
	Building 49/53	Fuel oil	up to 0.94 feet of product (December 2002)	
LNAPL	West of Building 273	Diesel fuel and Fuel oil with up to 145 mg/kg PCBs	up to 1.06 feet of product (September 2002)	
	City Water Main IRM Area	Weathered gasoline	None found since 1999	
LNAPL	Former Chip Pad	Lubricating oil with 288 mg/kg PCB	up to 0.5 feet of product (August 2001)	

[a] ppb = parts per billion, which is equivalent to micrograms per liter, ug/L, in water;
ppm = parts per million, which is equivalent to milligrams per kilogram, mg/kg, in soil;
ug/m^3 = micrograms per cubic meter
[b] SCG = standards, criteria, and guidance values;
[c] LEL = Lowest Effects Level and SEL = Severe Effects Level. A sediment is considered to be contaminated if either of these criteria is exceeded. If both criteria are exceeded, the sediment is severely impacted. If only the LEL is exceeded, the impact is considered to be moderate.
ND = Not detected

TABLE 2

Summary of Alternatives

Alternative 1

- No additional active remedial actions would be completed.
- Previously completed Interim Remedial Measures (IRMs) and abatement measures.
- Continuation and/or completion of on-going IRMs and remediation systems.
- Long term monitoring program.

Alternative 2

- No additional active remedial actions would be completed.
- Previously completed Interim Remedial Measures (IRMs) and abatement measures.
- Continuation and/or completion of on-going IRMs and remediation systems.
- Institutional controls and environmental easements, including access controls and restrictions on the future use of the property and groundwater on the site.
- Site Management Plan.
- Long term monitoring program.

Alternative 3

- Previously completed Interim Remedial Measures (IRMs) and abatement measures.
- Continuation and/or completion of on-going IRMs and remediation systems.
- Institutional controls and environmental easements, including access controls and restrictions on the future use of the property and groundwater on the site.
- Soil covers or asphalt covers over surface soil in portions of the manufacturing area.
- Excavation and off-site disposal of soils in landfill and manufacturing areas containing PCBs.
- Agronomic cover over selected portions of the former East and West Landfills.
- Enhancement of site habitats.
- Bioremediation and treatment of groundwater at selected source areas.
- Site Management Plan.
- Long term monitoring program.

Alternative 4

- Previously completed Interim Remedial Measures (IRMs) and abatement measures.
- Continuation and/or completion of on-going IRMs and remediation systems.
- Institutional controls and environmental easements, including access controls and restrictions on the future use of the property and groundwater on the site.

- Soil covers or asphalt covers over surface soil in portions of the manufacturing area.

- Excavation and off-site disposal of soils in landfill and manufacturing areas containing PCBs.
- Agronomic cover system over portions of the former East and West Landfills.
- Enhancement of site habitats.
- Expanded seep collection and treatment systems for the seeps along the former East Landfill.
- Shallow groundwater treatment for areas between the former East Landfill and Poentic Kill.
- Bioremediation and treatment of groundwater at selected source areas.
- Site Management Plan.
- Long term monitoring program.

Alternative 5

- Previously completed Interim Remedial Measures (IRMs) and abatement measures.
- Continuation and/or completion of on-going IRMs and remediation systems.
- Institutional controls and environmental easements, including access controls and restrictions on the future use of the property and groundwater on the site.
- Soil covers or asphalt covers over surface soil in portions of the manufacturing area.
- Excavation and off-site disposal of soils in manufacturing areas containing PCBs.
- Grade and cap soil and groundwater at the former landfill areas with man-made caps as follows:
    - Former East Landfill using a RCRA hazardous waste landfill cap design.
    - Former West Landfill using a Part 360 solid waste landfill cap design.
    - Former Binnie Kill Landfill using a construction and demolition landfill cap design.
- Shallow groundwater treatment on the west and north sides of the former East Landfill.
- Bioremediation and treatment of groundwater at selected source areas.
- Site Management Plan.
- Long term monitoring program.

Alternative 6

- Previously completed Interim Remedial Measures (IRMs) and abatement measures.
- Continuation and/or completion of on-going IRMs and remediation systems.
- Institutional controls and environmental easements, including access controls and restrictions on the future use of the property and groundwater on the site.
- Soil covers or asphalt covers over surface soil in portions of the manufacturing area.
- Excavation and off-site disposal of soils in landfill and manufacturing areas containing PCBs.
- Agronomic cover over portions of the former East and West Landfills.
- Enhancement of site habitats.
- Expanded seep collection and treatment systems for the seeps along the former East Landfill.
- Shallow ground treatment in select areas between the former East Landfill and Poentic Kill.
- Groundwater treatment systems of channel fill deposits along the north site boundary.
- Site Management Plan.
- Long term monitoring program.

TABLE 3
Matrix of Alternatives

Alternative	Monitoring	IRMs	Institutional Controls	PCB Soil Removal	Soil Covers	Expanded Seep Collection	Groundwater Source Area Treatment	Shallow Groundwater Treatment	Groundwater Plume Control	Agronomic Landfill Closure	Part 360 Landfill Cap
1	x	x									
2	x	x	x								
3	x	x	x	x	x		x			x	
4	x	x	x	x	x	x	x	x		x	
5	x	x	x	x	x		x	x			x
6	x	x	x	x	x	x		x	x	x	

TABLE 4

Remedial Alternative Costs

ALTERNATIVE	CAPITAL COSTS		ANNUAL O&M COSTS	PRESENT WORTH 30 YEARS OF O&M COSTS	TOTAL PRESENT WORTH PROPOSED REMEDIAL ACTIONS	TOTAL PRESENT WORTH PROPOSED AND COMPLETED REMEDIAL ACTIONS
	COMPLETED REMEDIAL ACTIONS	PROPOSED REMEDIAL ACTIONS				
1	$16,400,000	**$120,000**	**$409,000**	$3,970,000	**$4,100,000**	$20,500,000
2	$16,400,000	**$200,000**	**$1,582,000**	$23,170,000	**$23,400,000**	$39,800,000
3	$16,400,000	**$12,100,000**	**$2,157,000**	$27,160,000	**$39,300,000**	$55,700,000
4	$16,400,000	**$13,300,000**	**$2,513,000**	$32,170,000	**$45,800,000**	$62,200,000
5	$16,400,000	**$57,500,000**	**$3,473,000**	$47,770,000	**$105,600,000**	$122,000,000
6	$16,400,000	**$16,700,000**	**$2,784,000**	$36,020,000	**$53,000,000**	$69,400,000

Note: Annual O&M costs include operations and maintenance costs that will be incurred only in the early years as well as those that will continue for 30 years.

APPENDIX A

Responsiveness Summary

RESPONSIVENESS SUMMARY
General Electric Main Plant
City of Schenectady/Town of Rotterdam, Schenectady County, New York
Site No. 447004

The Proposed Remedial Action Plan (PRAP) for the General Electric Main Plant site was prepared by the New York State Department of Environmental Conservation (NYSDEC), in consultation with the New York State Department of Health (NYSDOH), and was issued to the document repositories on November 16, 2004. The PRAP outlined the remedial measures proposed for the contaminated waste, soil, and groundwater at the General Electric Main Plant site.

Public Participation Activities

The PRAP was prepared by the New York State Department of Environmental Conservation (NYSDEC), in consultation with the New York State Department of Health (NYSDOH) and announced via a Fact Sheet (Attachment 1) sent to the site mailing list, articles in the local newspapers, and selected mailings of the complete PRAP to local officials and interested parties. The mailing list includes local citizens, local, state and federal governmental agencies, media, and environmental organizations. The PRAP and other supporting information were also posted on the NYSDEC's Division of Environmental Remediation public website at http://www.dec.state.ny.us/website/der/projects/.

A public meeting was held at the Schenectady County Community College, Stockade Room 101 on November 30, 2004. The meeting included a presentation by NYSDEC officials on the results of the Remedial Investigation and Feasibility Study and discussions of the proposed remedy. The meeting provided an opportunity for the public to ask questions, discuss their concerns, and provide comment on the proposed plan. Approximately 40 people attended the meeting. The public comment period was originally scheduled to end on December 16, 2004. After requests from two interested parties, the comment period was extended an additional 42 days to January 28, 2005. An updated fact sheet, announcing the extension, was mailed to the site mailing list. An additional request for additional time was received on January 25, 2005 and the comment period was extended to February 28, 2005. An updated fact sheet, announcing the additional extension, was again mailed to the site mailing list.

Contact with Public

Written and verbal comments will become part of the Administrative Record for this site. Written comments were received from the following parties during the course of the public comment periods:

Original Comment Period (November 16 - December 16, 2004):

- Letter dated December 13, 2004 from John Van Deloo, M.D., Schenectady, NY;
- Fax of draft letter dated December 15, 2004 from Maryde King, Schenectady County Economic Development and Planning Department;
- Letter and fax dated December 16, 2004 from Peter Sheehan, Conservation Vice Chair, Sierra

Club Hudson Mohawk Group;

- Letter and fax dated December 16, 2004 from Bernard Sisson, P.E., City Engineer, City of Schenectady; and,
- E-mails from Hudson Valley Community College student Richard Kennedy dated December 2, 3, and 4, 2004.

Extended Comment Period (December 17, 2004 - January 28, 2005):

- E-mail to the DEC website dated December 22, 2004 from Carl Strang, Board of Education, Schalmont School District;
- Letter (final version of letter fax of December 15, 2004) dated January 11, 2005 from Maryde King, Schenectady County Economic Development and Planning Department;
- Letter and e-mail to the DEC website dated January 25, 2005 from Susan Lawrence, John VanDeloo, and Aaron Mair, Sierra Club Hudson Mohawk group; and,
- Letter dated January 28, 2005 from John J. Paolino, Supervisor of the Town of Rotterdam.

***Additional Extended Comment Period (January 29, 2005 - February 28, 2005)*:**

No comments were received during the last comment period.

A meeting was held with representatives of the Sierra Club Hudson Mohawk Group on February 18, 2005 to further explain the proposed plan and answer specific questions.

Media Activity

- Article on PRAP and public meeting dated December 16, 2004 in Daily Gazette (Section A), Schenectady, NY;
- Article on PRAP and public meeting dated December 16, 2004 in Times Union (front section), Albany, NY;
- Radio interview regarding PRAP and public meeting on WAMC 90.3 FM public radio station program “The Roundtable” on December 16, 2004;
- Editorial dated December 18, 2004 in Daily Gazette, Schenectady, NY;
- Letter to Editor dated December 20, 2004 in Daily Gazette from John VanDeloo, Schenectady, NY; and,
- Notice dated December 23, 2004 in Daily Gazette “News in Brief” section regarding extension of public comment period to January 28, 2005.
- Notice in Daily Gazette regarding extension of comment period to February 28, 2005.

Comments and Responses

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

Where the same or similar issues were raised either in writing or verbally during the public meetings or phone calls, they have been grouped together and are addressed once. The remaining issues were addressed individually. The issues raised at the public meeting have been grouped into the following categories: (I) Extent of Contamination/Investigation Issues; (II) Remedy Selection/Technology Issues; (III) Site Restoration and Redevelopment; and, (IV) Other Issues.

Public Meeting Questions and Answers

(I) Extent of Contamination/Investigation Issues

Comment 1: Was there an effort made during the Remedial Investigation to interview past and present General Electric employees to see if they have information concerning waste disposal?

Response 1: An extensive effort was made to generate historical information regarding past product usage and waste disposal practices at the Main Plant. This included file searches, review of facility engineering plans, maps, and drawings, and interviews with GE employees with knowledge of past activities. This effort resulted in the production of the Sector and Zone reports for specific areas of the site which in turn were used to develop specific plans for sampling and investigation during the Remedial Investigation.

Comment 2: Were there test pits dug in the landfills? Were metals found?

Response 2: A large number of soil borings, monitoring wells, and surface and subsurface soil samples were part of the overall investigation at the former site landfills. Additionally, a number of surface water, sediment, and biota samples were taken around the landfills. In some cases, test trenches and excavations were used to supplement the investigative efforts. Metals were discovered, though at generally low concentrations. Of more concern were detections of PCBs and petroleum compounds. PCBs were detected in surface and subsurface samples and those areas with levels of concern have been proposed for removal.

Comment 3: Were samples taken in the Binnie Kill where it enters the Mohawk? Were test borings done along the stream?

Response 3: Samples were taken from the surface soils, subsurface soils, and groundwater along the alignment of the former Binnie Kill where it passes through the Main Plant property. This was done to determine whether the now buried channel was acting as a preferred pathway for contaminant migration. In some areas, contamination was found in the former channel, notably at the Former Holding Pond area and at the DM-405F areas located at some considerable distance from the end of the former stream. Sediment and surface water samples were taken from several locations in the Mohawk River upstream of the former mouth of the stream (these did not show site-related contamination), though no samples were taken specifically where the former Binnie Kill entered the Mohawk.

Comment 4: Is the leachate from the landfills going somewhere?

Response 4: There are several leachate seeps that were observed entering the Poentic Kill along the western boundary of the former East landfill. These have been extensively sampled and are currently being collected and treated as part of the East Landfill Seep Interim Remedial Measure.

Comment 5: Comment was made that it was hard to believe the Mohawk River was not contaminated from the site given the amount of waste that may have gone downstream during the years of plant operation.

Response 5: While there is no specific information that site wastes were disposed into the surface water in the vicinity of the plant, the positive findings from the Remedial Investigation are that sediment and surface water sampling in the Mohawk River do not indicate site-related impacts.

Comment 6: Regarding underground storage tanks - how many? What were they used for? What condition were they in when they were removed? Are all remaining tanks in compliance with DEC regulations?

Response 6: A large number of underground storage tanks of all sizes, uses, and condition were found at the site. A detailed evaluation of these was done during the Underground Storage Tank Interim Remedial Measure. This effort resulted in the investigation and evaluation (and in many cases, removal) of approximately 430 underground storage tanks. Any product storage facilities, including tanks, currently in use at the plant are in compliance with applicable regulations.

Comment 7: What are the sizes of the former landfills?

Response 7: The former Binnie Kill Landfill is approximately 7-acres, the former East Landfill is approximately 60-acres, and the former West Landfill covers approximately 54-acres.

Comment 8: What standards and criteria were used in our evaluations?

Response 8: Data from the site investigations were compared to the following standards, criteria, and guidance (SCGs):

- Groundwater, drinking water, and surface water SCGs are based on

NYSDEC "Ambient Water Quality Standards and Guidance Values" and Part 5 of the New York State Sanitary Code.

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

- Sediment SCGs are based on the NYSDEC "Technical Guidance for Screening Contaminated Sediments."

The PRAP does include contaminant-specific goals for soil cleanup in certain areas (the 1 ppm goal for PCBs in surface soil and the 10 ppm goal for PCBs in subsurface soil, for example). The effort needed to confirm the attainment of these goals will be established in the Remedial Design.

(II) Remedy Selection/Technology Issues

Comment 9: Has the bioremediation technology proposed for the groundwater source areas been done at a site this large?

Response 9: Bioremediation has been proposed and implemented at a number of sites in NYS and nationwide. It is an effective and proven technology for those sites deemed to have the appropriate conditions necessary for success. While the overall 628-acre site is large, the specific areas of the site proposed for bioremediation are no larger than other typical sites.

Comment 10: Why did we propose Alternative 4 over the others?

Response 10: Sections 7 and 8 of the PRAP provide a summary of the evaluation process that lead to the proposing of Alternative 4 as the preferred remedy for this site. Alternative 4, in concert with the extensive interim remedial measures already completed, is protective of the public health and environment and achieves the remediation goals set for the site. It removes, treats, or controls surface and subsurface soils, landfill seeps, and non-aqueous phase liquids that represent the most significantly contaminated media at the site. Through treatment of groundwater plumes and source areas, it creates conditions to allow the restoration of groundwater quality. The innovative closure of the site landfills would reduce and mitigate to the extent possible the migration of contaminants, direct contact of waste to human and ecological receptors, production of leachate and seeps and subsequent groundwater contamination, while preserving the existing habitats and ecological communities. The remedy has good long and short term effectiveness, is technically feasible, and is cost effective.

Comment 11: Why are you collecting the former landfill seeps (as part of the proposed remedy and on-going interim remedial measures) if there is not much contamination in them?

Response 11: While the seeps are not significantly contaminated, they do contain some contaminants that we would not like to enter the surface water system and potentially affect biota. These include iron and manganese and low levels of PCBs.

Comment 12: How long will it take until the groundwater concentrations in the plumes reach acceptable levels? (As a result of the bioremediation proposed for the source areas and the subsequent natural attenuation)

Response 12: We have not developed a specific estimate of the number of years that will be necessary for the groundwater concentrations in the bioremediation areas to reach groundwater standards; the various alternatives were compared to each other in a more qualitative way. Modeling of the program during its first few years of operation will provide a better measure of system performance. However, it is estimated, based on the studies done to date, that groundwater contaminant concentrations near the site boundary with the Mohawk River will be significantly reduced within approximately 10 years, with achievement of groundwater standards within approximately 30 years.

Comment 13: Will there be a re-opener if the remedy doesn't work?

Response 13: All of the remedial systems proposed in the PRAP will be monitored and reviewed periodically to determine their effectiveness. If a system is not performing as designed, General Electric will be required to fix, expand, or otherwise improve the system to make it provide the level of protection needed and achieve the remediation goals.

Comment 14: The plan for the former landfills seems to be based on the fact that the contaminants are not moving out of the landfills.

Response 14: The remedial technologies that made it to the final level of analysis for the former landfills were driven in part on the lack of significant migration of site contaminants from the former landfills. Given the environmental conditions noted at the former landfills (the lack of significant contamination in the channel fill aquifer of concern, the relative absence of contaminated groundwater plumes moving downgradient from the landfills, and the lack of a well-defined waste mass amenable to excavation and removal), the two primary landfill alternatives, the traditional Part 360 landfill cover and the more innovative agronomic cover system, were deemed to be protective, in concert with the other remedial systems proposed at the landfills (shallow groundwater treatment, leachate collection, and soil removals).

Comment 15: What will stop the groundwater plumes from reaching the Mohawk River?

Response 15: Groundwater monitoring along the northern boundary of the site, adjacent to the Mohawk River, indicates groundwater contamination. Shallow groundwater is presumed to already be discharging into the Mohawk River. Sampling in the Mohawk River does not indicate any impacts. This may be a function of the low groundwater discharge rate relative to the surface water flow in the river. Treatment of the groundwater contamination source areas near the river (particularly at the propeller test facility area) will further reduce the concentrations of contaminants in groundwater.

Comment 16: The only difference between Alternative 4 and Alternative 6 seems to be money - why did we not choose Alt 6?

Response 16: There is a difference in capital cost between the alternatives of approximately $3,400,000 which is due to the difference in the remedial technologies employed. The primary technical difference between Alternatives 4 and 6 is in the approach to groundwater treatment and remediation. Alternative 4 proposes to treat the groundwater source areas (the contaminated soils/media and the highly concentrated plumes in the near source areas), while Alternative 6 proposes a more traditional pump and treat scenario for the groundwater plume area at the site boundary. Given the favorable results of the site-specific studies done to evaluate the natural biodegradation potential, Alternative 4 provides a greater potential to significantly reduce the concentrations in the source areas and provide conditions favorable to the long-term restoration of the groundwater. While the pumping of groundwater is certainly feasible, given the lack of off-site impacts to groundwater receptors and the Mohawk River, the need to pump and intercept groundwater at the site boundaries is lessened considerably. Pumping and treating at the site boundary will remove mass volume of contaminants from the plumes but will not reduce contaminant concentrations in the plumes or reduce the source areas' continuing contribution to the plumes, thus restoration of groundwater is not significantly enhanced. The performance of the bioremdiation program will be closely monitored; if it does not perform as expected and contaminant reductions are not favorable, it is possible that additional remedial technologies would be added, including a pumping and treatment scenario, to achieve the remedial goals.

Comment 17: Will excavated soil be taken off-site? Where?

Response 17: Soils excavated as part of the remediation will be taken off-site. The exact facilities will be determined during the contracting and procurement phase of the project, however, the design and construction plans will require the soils to be disposed at facilities that are fully permitted for the wastes involved and in good regulatory standing.

Comment 18: Why are certain areas to be covered with asphalt?

Response 18: Asphalt covers are proposed in certain portions of the manufacturing area where low level metals concentrations from historical industrial uses have been found in surface soils. These contamination levels are below those that would require removal or remediation under NYS regulations, but as a conservative measure to protect shallow groundwater and reduce potential worker exposures, these areas are proposed to be covered with asphalt (and in some cases, clean soil).

(III) Site Restoration and Redevelopment

Comment 19: Will areas of the site be useful for redevelopment? What if new contamination is found?

Response 19: Portions of the GE Main Plant property could be redeveloped right now, depending on what is proposed and the specific area of the plant site that would be used. The NYSDEC has long maintained publicly that we would work with any developer, whether it was GE or an outside entity, to focus investigative or remedial efforts, if required, to enable re-development of portions of the plant site. Large portions of the plant site are not proposed for active remediation in the PRAP (as shown in Figure 22), as significant contaminant sources were not found in those areas. These areas could be used, and are used, for industrial purposes. Some of the areas where groundwater plumes exist, for example, could be used for development, given proper engineering controls and design. Still other areas, such as the former landfills, will not be amenable for commercial, industrial, or residential use, now or in the future. Although the site-wide Remedial Investigation was very comprehensive, it was not feasible to sample every square inch of the plant in detail; potential developers would have to exercise some due diligence in investigating any particular parcels of interest to determine the exact environmental conditions that exist. Any remedy selected will contain a Site Management Plan which will guide future activities at the site, including development. Part of that plan will be a Contingency Plan/Soil Management Plan which will provide a process to evaluate and address areas where contamination is identified during future site operations. The proposed plan also contains institutional controls that will control and restrict certain uses, such as use of groundwater, unless appropriate measures are put in place and approvals obtained.

Comment 20: Will certain areas of the site be deemed clean or available? Will portions of the site be reclassified (such as to a class 4) after remediation?

Response 20: As noted above, portions of the site are not included in the active remedial systems proposed, and thus could be available for redevelopment. It is possible that specific areas could be separated from the main site (the entire 628-acre property is currently classified as one, class 2 site) in the future.

(IV) Other Issues

Comment 21: Have the City or Town been given extra resources (money) for monitoring of the municipal well fields due to the presence of the site and landfills?

Response 21: No, as the results of the Remedial Investigation indicate that the on-site landfills are not affecting the groundwater at the municipal well fields.

Comment 22: Concern was expressed over the effectiveness of the proposed bioremediation of the groundwater source areas as "this is the same company that says to leave the PCBs in the Hudson River and let bioremediation/natural processes do the job".

Response 22: It is indeed the same company involved with the Hudson River site and the GE Main Plant site, though the business groups and people involved at each site are different. Equally different are the environmental conditions and types of contaminants documented at the respective sites. The proposed bioremediation system for the Main Plant is based on specific data collected over time from the various site media (including all aquifers of concern). GE performed detailed studies to determine the actual potential for natural and enhanced processes to biodegrade the contamination found in the groundwater. The results of that study, included in the Remedial Investigation and Feasibility Study reports, indicates enhanced bioremediation would be an effective remedial technology for the groundwater source areas. The NYSDEC will closely monitor this program to determine its actual effectiveness upon implementation.

Comment 23: Will there be more than one public meeting? Compared to the extensive effort for the Hudson River PCB site, the public does not seem to have enough chance for comment or to obtain information.

Response 23: At the current time, there are no additional public meetings scheduled for this site. The Hudson River PCB site extends for many miles and cross-cuts numerous physical and political boundaries, including many towns and counties. Thus, several public meetings were required to provide a convenient forum for the interested parties. By contrast, the GE Main Plant is much smaller and is located within the confines of the City of Schenectady and Town of Rotterdam. More importantly, the Hudson River site also has been demonstrated to be impacting natural and potential public health resources. Drinking water, recreational water resources, sediments, and fisheries are impacted by the disposal that occurred into the river. Again, by contrast, investigations at the GE Main Plant site do not indicate any off-site impacts and the health risk assessment did not reveal any significant public health threat from the site. Thus, the public participation effort for the site, which is typical of that performed for most sites in the NYSDEC remedial program, is deemed sufficient.

Comment 24: Are the municipal well fields to the west (City of Schenectady and Town of Rotterdam) contaminated and are they being treated?

Response 24: The Town of Rotterdam well field wells (the northernmost well field, closer to the river) have had very low level (below drinking water standards) detections of chlorinated volatile organic contaminants. The City wells, located approximately between the GE site and the Rotterdam wells have not had any detections. As the contaminant concentrations in the municipal wells are below health-based drinking water standards, no treatment is currently being conducted. These wells are routinely monitored at a frequency prescribed by the county health department.

Comment 25: What kind of treatment is done at the GE Main Plant wastewater treatment plant? Is it in compliance with the new storm water discharge regulations? Does all the site drainage go to the WWTP?

Response 25: The treatment plant at GE is a primary treatment plant for non-contact cooling waters, storm waters, and sanitary wastes from the site buildings. It is not used for treatment of any site industrial wastes (all of those wastes are managed and taken off-site for treatment and disposal at permitted facilities). The system can currently handle up to 60 million gallons per day (MGD), with overflow capacity in the event of a large storm event to handle 100 MGD. The system is in compliance with all applicable regulations. Large portions of the site, particularly developed areas in the central manufacturing area, are connected to the storm water drainage system.

Comment 26: Did NYSDOT or NYSDEC do any sampling associated with the recent culvert replacement under 890?

Response 26: The NYSDEC did not do any environmental sampling during the culvert replacement.

<u>Comment Letters Received - Specific Questions and Answers</u>

Written comments are reproduced below exactly as received and specific responses offered.

Letter and fax dated December 16, 2004 from Bernard Sisson, P.E., City Engineer, City of Schenectady.

Beginning in 1997, the City of Schenectady began to replace approximately 7,500 feet of 24-inch water main pipe that passes through GE Main Plant along River Road. In 1998, the City Water Main LNAPL Interim Remedial Measure (IRM) was conducted for a small area along the excavation where site- related contaminants were encountered during the assessment of pipe replacement. The IRM was conducted under a remedial work plan approved by the NYSDEC, NYSDOH Bureau of Public Water Supply Protection, Schenectady County Public Health Services, and in full consultation with the City of Schenectady's City Engineer's Office. Contaminated soil and petroleum product was removed. In this one area, GE designed and installed a five-well product monitoring and recovery system along River Road within the new pipe trench. No contaminants had entered the pre-existing water supply pipe. Protective measures installed included wrapping the new water line with a low permeability geosynthetic clay liner, installation of fluorocarbon pipe gaskets, and encasing the entire pipe with a secondary concrete collar. Monitoring wells along the pipe are monitored and gauged routinely. Free product has not been detected along the trench alignment since the initial remediation took place. Indeed, the water table in that area is consistently below the bottom of the water main pipe.

The following documents are available concerning this project:

Sampling Report - City of Schenectady Water Main Investigation (1 volume)
Dames & Moore June 10, 1998

Interim Remedial Measures (IRM) Work Plan (1 volume)
Recovery of LNAPL Along City Water Main Installation
C.T. Male Associates June 26, 1998

Technical Specifications and Plans (1 volume)
Remediation of Soil and Product in Area of 24" Transmission Main
C.T. Male Associates June 1998

Final Interim Remedial Measure Engineering Plan and Construction Certification Report (1 volume)
Recovery of LNAPL Along City Water Main Installation
C.T. Male Associates May 25, 1999

Operation and Maintenance Manual (1 volume)
Recovery of LNAPL Along 24" Water Transmission Main
C.T. Male Associates May 25, 1999

The following are comments from the City Engineer's letter:

Comment 27: 1. It is requested that the locations where contamination was detected in the area of, in close proximity to or upgradient of the water transmission main, and the associated type and levels be clearly identified in a document to be submitted to the City. This is necessary so that the City will know ahead of time where contamination is or anticipated to be in relation to the water transmission main and they can take necessary precautions and have procedures in place should they need to make emergency repairs, etc. on-site. This document should be updated as new information becomes available and resubmitted to the City.

Response 27: The documents noted above, along with the Remedial Investigation, clearly show the limits of contamination known to be associated with the City Water Main. With the exception of the IRM area discussed, no significant contamination or waste was found along the alignment of the water main on GE property. The City of Schenectady will be provided with all known information about the water main area.

Comment 28: 2. What provisions will be put in place to prevent contamination from contacting the water transmission main, which could affect the integrity of the gaskets and/or joint material?

Response 28: As noted above, an active pumping well system was installed adjacent to the water main to remove free product and contaminants from the groundwater. Additional protective measures included wrapping the new water line with a low permeability geosynthetic clay liner, installation of fluorocarbon (teflon) pipe gaskets, and encasing the entire pipe with a secondary concrete collar. No free product contamination has been noted in the trench wells in some time.

Comment 29: 3. Will the Comprehensive Health and Safety Plan for site workers that will be included as a component of the Site Management Plan just pertain to GE workers or will it also address precautions to be taken and procedures to be followed for City employees and/or City contractors that have to come on-site to make repairs, etc. to the City water transmission main?

Response 29: The Site Management Plan, which includes a Health and Safety Plan, as well as a Contingency Plan/Soil Management Plan, is designed primarily for GE workers and contractors. However, as happened previously during the original City Water Main project, GE, NYSDEC, NYSDOH, and the local health department will work cooperatively and effectively with the City and its contractors in the event repairs are needed. There is also a stand-alone Operation and Maintenance Manual for the City Water Main IRM, as noted above.

Comment 30: 4. Who will be responsible for the additional costs incurred to train workers and manage contaminated soil and/or groundwater in the area of the water transmission main when repairs are made or a new water line installed? The contamination was not generated by the City and, therefore, the City should not incur additional costs to perform work on the water transmission as a result of the site contamination.

Response 30: General Electric is liable for site-related contamination and the City is liable for its water main. For the previous work, a combination of GE contractors and City contractors performed the necessary work according to their particular needs, expertise, and areas of responsibility and liability, under the overall review of the NYSDEC. The exact apportionment of costs and responsibility assigned to GE or others would depend, of course, on the work to be done and the presence or absence of contamination.

Comment 31: 5. Have investigations or research been conducted to determine the limits of the waste mass at the Former East Landfill and Former West Landfill, and whether waste mass is present over or in close proximity to the water transmission main? If not, it is requested that the limits of the waste mass in relation to the water transmission main be determined. If waste is present over or in close proximity to the water main will GE be responsible for providing access to the water main and then restoring the area where waste mass is removed?

Response 31: The limits of fill and the waste mass in the former East and West Landfills are well defined. During the work in 1997 and 1998, the water main pipe was excavated through the former West Landfill area where it passes between landfill cells C and D. While the line is certainly adjacent to the waste mass, no significant waste or obvious contaminants were noted in the excavations. As the original water main pipe pre-dated the landfill in that area, it appears the alignment was kept clear of landfilling in later years.

Comment 32: 6. Will a clear zone (of clean soil, where no contamination or waste mass is present) be provided within the water transmission main right-of-way (easement) and to the depth of the pipe?

Response 32: The remedial plan does not call for any specific additional work along the alignment of the water main. As noted in Responses 26 and 31, no significant contamination or waste mass was encountered along the pipe easement, with the exception of the IRM area which has been subsequently remediated. Of course, there is now clean fill (or the original fill which was deemed clean and replaced) over the entire length of the pipe that was replaced in the original water main work by the City.

Letter dated December 13, 2004 from John Van Deloo, M.D., Schenectady, NY.

The letter requested an extension of the public comment period and advocated the adoption of Alternative 6, rather than the Alternative 4 proposed in the PRAP. These issues are addressed throughout this summary.

E-mail from Hudson Valley Community College student.

The e-mail requested general information on the citizen participation process and the attendees of the public meeting. This information was provided to Mr. Kennedy.

Letter and fax dated December 16, 2004 from Peter Sheehan, Conservation Vice Chair, Sierra Club Hudson Mohawk Group.

The letter requested a 30-day extension of the first comment period. The comment period was subsequently extended to January 28, 2005 and again to February 28, 2005.

E-mail to the DEC website dated December 22, 2004 from Carl Strang, President of the Board of Education, Schalmont Central School District.

Comment 33: We are very interested in the remediation plan and would like to know if the plan provides for remediation that covers potential future liability which might be required for reuse of the land for industrial or commercial purposes.

Response 33: Current and future liability for the site and its environmental condition rests with General Electric. The plan provides for remediation that will be protective of the public health and the environment within the context of State laws and regulations governing inactive hazardous waste disposal sites. It is not a plan designed to provide or preclude development opportunities. Please see Comment and Response 19 and 20, above.

Comment 34: We are also interested in the timeline for this remediation process. Is there a projected date that the land would be ready for some sort of industrial or commercial redevelopment?

Response 34: The current tentative timeline calls for a Record of Decision in March 2005, the detailed Remedial Design to commence in 2005 and end in 2006, with the implementation of all remedial activities to be complete by 2009. As noted in various responses to comments above, large portions of the site are not included in the remedial program and would thus be available (and, of course, are currently in use) for industrial or perhaps commercial development (depending on local regulations).

Letter (final version of letter fax of December 15, 2004) dated January 11, 2005 from Maryde King, Schenectady County Economic Development and Planning Department.

Comment 35: • One of the best ways to receive indications of the environmental effects of the contamination on the site is biometric sampling. As the PERP reports, only ten biota samples where taken and that only PCBs were sampled for in biota. It appears that much more extensive biota sampling is called for. A reliable baseline of biota sampling should be undertaken prior to further remediation, so that it can be determined if remediation measures are effective.

Response 35: It is agreed that a reliable baseline is necessary to determine the effectiveness of any remedial measures. To that end , GE submitted a Natural Resources Evaluation Report in August 1996 which included an inventory of all site habitats and ecological communities and an inventory of the plants and animals found at the site. Fourteen ecological community types, 292 species of plants, and 90 animal species were identified in that first effort. Some limited biota sampling and analysis, for a wide range of contaminants including metals and PCBs, was conducted at that point. Two rounds of biota samples were collected in September and December 2000; these were fish and invertebrates and the primary analysis was for PCBs. A total of 14 fish and macroinvertebrate samples were taken. These data, along with seep data, surface water data, and the results of sediment sampling, were used to determine the overall impacts to the biota. The NYSDEC will examine this issue during the Pre-design investigation phase to ensure that adequate sampling of biota has been done prior to remediation. The PRAP does include a provision for a survey of the biota and site habitats to be done periodically; this survey would necessarily include sampling and analysis of biota.

Comment 36: • The six alternatives given do not include the alternative of completely removing all contamination. Although this option may be unreasonable costly it should be outlined and a reasonable estimate of complete remediation of the site should be evaluated before it is judged as unfeasible.

Response 36: The six alternatives presented in the PRAP are only the final alternatives that remain after several rounds of detailed evaluation and screening of a wide-range of potential remedial technologies. This process is fully described in Section 6 of the Feasibility Study. As the site has various and disparate areas with unique problems, one solution was not appropriate to be applied throughout the site. In some cases, such as PCB-contaminated soil in the manufacturing area, all contamination (i.e., all contamination above cleanup standards, criteria, and guidelines) will be removed. In others, such as the former landfills, the practical and fiscal infeasibility of excavating and removing nearly two hundred acres of landfill (with its attendant risk of exposure to workers and the community during excavation, handling, and transportation, and then subsequent re-disposal in another community) was recognized early in the process and that solution was eliminated. All technologies selected for detailed evaluation were evaluated using the 8 criteria noted in the PRAP in order to develop a range of solutions that will be protective of the public health and environment and be technically feasible.

Comment 37: • The remediation plan should include quantitative remediation goals. For example by a specified date soil samples in a certain area should not exceed a specified value for a specified list of contaminants of concern. It is only by comparing results to quantitative goals can we determine if remediation measures are working successfully.

Response 37: The PRAP does include contaminant-specific goals for soil cleanup in certain areas (the 1 ppm goal for PCBs in surface soil and the 10 ppm goal for PCBs in subsurface soil, for example) and also lists a number of the standards, criteria, and guidelines (SCGs) that will used during the remediation. Please see Section 5.1 of the PRAP for a list of the SCGs. The process and effort to confirm the attainment of these goals for the site will be established in the Remedial Design.

Comment 38: • The Council was disappointed by the turnout of the meeting. Remediation of this site is obviously important to the City of Schenectady, the Town of Rotterdam and Schenectady County as a whole. The County Department of Environmental Conservation believes that additional public information meetings need to be held with a more effective attempt to reach the effected public. Possibly the meeting should be held at the International Charter School, or Immaculate Conception or a church located in the Bellevue Neighborhood. Increased public education and input now might prevent problems later. We would also recommend that the comment period be sufficiently delayed in order to accommodate input from these additional meetings.

Response 38: The turnout of the public meeting was in line with expectations, given the historical interest in the remedial program at the site. While the numbers were not large, a wide range of interests were represented. As noted above, the comment period was extended twice to allow additional input from interested parties.

Comment 39: • GE's contamination will apparently impact the site for many years to come. This is a valuable aquifer area and due to GE's removal of buildings as well as contaminating the property they have drastically reduced the value of this property. Since it does not appear that the remediation is going to bring any increased economic value in the next decade or two, the Department should consider requiring GE to provide a benefits package as compensation to effected communities similar to what is provided in some CERCLA remediations.

Response 39: Regarding redevelopment of the site, please see Comment/Responses 19 and 20 above. The redevelopment potential of this property, now or in the future, will depend upon the anticipated contemplated use and would proceed in a manner consistent with applicable State and local regulations, and would, like other development of active industrial properties, be consistent with the land use desired by the owner of the property. Large portions of the property are conducive now for use as an industrial manufacturing facility. As noted elsewhere, aquifers in use as public water supplies have not been affected by this site. The determination of the economic value of a site, either current or future, is beyond the purview of the remedial effort here. The remedy is designed to be protective of the public health and environment. Of course, completion of the remedial program will certainly provide benefits, including enhanced redevelopment potential, within the constraints discussed above.

Comment 40:

- A review of the maps indicates that there was no sediment sampling of the Binniekill at its current outlet into the Mohawk River under State Street at the location of the Western Gateway Bridge. This area has collected sediment for many years and could be impacted by past dumping on the GE site. Sampling should be conducted to determine types of contaminants present. Then a determination could be made of their source, if present, and if remediation is appropriate.

Response 40: This question was also asked at the public meeting. Samples were taken from the surface soils, subsurface soils, and groundwater along the alignment of the former Binnie Kill where it passes through the Main Plant property. This was done to determine whether the buried channel was acting as a preferred pathway for contaminant migration. In some areas, contamination was found in the former channel, notably at the Former Holding Pond area and at the DM-405F area. Sediment and surface water samples were taken from the Mohawk River, though no samples were taken specifically where the former Binnie Kill entered the Mohawk. The NYSDEC will look at that area during the Pre-design investigation to evaluate the need for additional sediment samples.

Letter and e-mail to the DEC website dated January 25, 2005 from Susan Lawrence, John VanDeloo, and Aaron Mair, all of the Sierra Club Hudson Mohawk group.

Comment 41: *Page 2, 1st Paragraph - How many years, if ever, before the site can be reused? The answer at the November 30 public meeting was that the State did not know and it would be at least decades and perhaps generations.*

Response 41: This question was asked at the public meeting by representatives of the Schenectady County Planning Department. The answer given was that the GE Main Plant property could be redeveloped right now, depending on what was proposed and the specific area of the plant site that would be used. The NYSDEC has long maintained publicly that we would work with any developer, whether it was GE or an outside entity, to focus investigative or remedial efforts, if required, to enable redevelopment of portions of the plant site. Large portions of the plant site are not proposed for active remediation in the PRAP (as shown in Figure 26) and could be used, and are used, for industrial purposes right now. Some of the areas where groundwater plumes exist, for example, could be used for development, given proper engineering controls and design. Still other areas, such as the former landfills, will not be amenable for commercial or industrial use, now or in the future.

The Schenectady Main Plant is presently owned and operated by GE for manufacturing of steam turbines and generators and for the office headquarters for GE Energy's Energy Products business. Obviously, future use of GE property is dependent upon GE's plans for the property. Future development on-site would be assessed based upon the anticipated contemplated use and would proceed in a manner consistent with applicable State and local regulations, and would, like other development of active industrial properties, be consistent with the land use desired by the owner of the property. Nothing in the PRAP adversely affects the continuing use of the property as an industrial facility, nor does the PRAP adversely affect potential reuse of large portions of the property.

Comment 42: *Page 2, 2nd Paragraph - Why does the Plan not provide for more intensive clean-up? At the November 30 public meeting, the answer was the site is too large.*

Response 42: The proposed plan requires cleanup for those portions of the site deemed to require cleanup under the remedial program regulations and guidelines. The preferred remedial alternative, Alternative 4, and associated clean-up activities, was selected by the NYSDEC, after consultation with the NYS Department of Health, based on a detailed, multi-year evaluation of the site and proposes a remedy that would be protective of human health and the environment. The comprehensive evaluation summarized in the May 2004 Feasibility Study Report (FS) focused on the elimination of any identified threats to human health and the environment utilizing established and standardized screening criteria (statutory requirements, technology availability, practicability, etc.). Alternative 4 and other remedial clean-up measures included in the FS were determined by the NYSDEC and NYSDOH to provide protection to human health and the environment while satisfying all of the applicable criteria.

Comment 43: *Page 2, 3rd Paragraph - Why can't there be more provisions for local input, similar to the planning clean-up for PCBs in the Hudson River? At the November 30 public meeting, the answer was that the site is too small.*

Response 43: The answer to this question at the public meeting did indicate a difference in size between the Hudson River Federal Superfund site and the GE Main Plant. The Hudson River PCB site extends for many miles and cross-cuts numerous physical and political boundaries, including many towns and counties. Thus, several public meetings were required to provide a convenient forum for the interested parties. By contrast, the GE Plant is much smaller and is located within the confines of the City of Schenectady and Town of Rotterdam. More importantly, the Hudson River site also has been demonstrated to be impacting natural and potential public health resources. Drinking water, recreational water resources, sediments, and fisheries are impacted by the disposal that occurred into the river. Again, by contrast, investigations at the GE Main Plant site do not indicate any off-site impacts and the health risk assessment did not reveal any significant public health threat from the site. Thus, the public participation effort for the site, which is typical of that performed for most sites in the NYSDEC remedial program, is deemed sufficient.

The public participation process for the Schenectady Main Plant clean-up has been on-going. A previous public availability session was conducted in November 2001 to review progress of the Site clean-up. As discussed in the PRAP, voluminous and detailed remedial investigation summary reports over the 10-year investigative period have been available for public review at the Schenectady County Public Library and at NYSDEC. NYSDEC staff have been available over the years, on an informal basis, to discuss the site investigation materials that were in the repository.

The November 30, 2004 public meeting was conducted to review all of the information that has been generated over the years, to share with the public the thinking process that lead to the development of the PRAP and a proposed selected remedial program, and to discuss the remedial alternative plan with the local community and provide answers and information for those with questions about this multi year effort.

Comment 44: *Page 2, 4th Paragraph - What protection is in the Plan for the main public water main from the Aquifer well field passing through the Main Plant Site to the City of Schenectady?*

Response 44: Please see the response to the City of Schenectady questions regarding the water main in Comments/Responses 26 - 31 above. Beginning in 1997, the City of Schenectady began to replace approximately 7,500 feet of 24-inch water main pipe that passes through GE Main Plant along River Road. In 1998, the City Water Main LNAPL Interim Remedial Measure (IRM) was conducted for a small area along the excavation where site- related contaminants were encountered during the assessment of pipe replacement. The IRM was conducted under a remedial work plan approved by the NYSDEC, NYSDOH Bureau of Public Water Supply Protection, Schenectady County Public Health Services, and in full consultation with the City of Schenectady's City Engineer's Office.

Contaminated soil and petroleum products were removed. In this one area, GE designed and installed a five-well product monitoring and recovery system along River Road within the new pipe trench. No contaminants had entered the pre-existing water supply pipe. Protective measures installed included wrapping the new water line with a low permeability geosynthetic clay liner, installation of fluorocarbon pipe gaskets, and encasing the entire pipe with a secondary concrete collar. Monitoring wells along the pipe are monitored and gauged routinely. Free product has not been detected along the trench alignment since the initial remediation took place. Indeed, the water table in that area is consistently below the bottom of the water main pipe.

Comment 45: *Page 2, 5th Paragraph - How effective will water treatment be if limited only to certain sites and if bioremediation is used at source areas, which requires the addition of carbon sources for the bacteria to be active?*

Response 45: Groundwater treatment locations on site were chosen based on an extensive and focused remedial investigative program including soil borings, groundwater monitoring wells and detailed sampling and analysis over many years. The direct treatment proposed within contaminant source areas has advantages over traditional groundwater "pump and treat" technologies. The bioremediation treatment technology enhances the natural breakdown of industrial constituents that site studies confirmed was already occurring. It is anticipated that nutrient (carbon) sources will need to be added as part of the remedial system. Contaminants in these source areas will be destroyed faster with addition of these amendments.

As such, overall groundwater quality will be improved by this selected approach.

Comment 46: *Page 2, 6th Paragraph - What clean-up, containment and processing can be done and is proposed to ensure that hazardous waste will not leak into wetlands, streams and the Mohawk River or that volatile organic compounds will not become airbourne?*

Response 46: The chosen remedial alternative, Alternative 4, includes containment of waste within the three former landfills using a cover system that includes removal of elevated concentrated PCBs at select locations, cover soil to prevent erosion of surface soils and an agronomic cover (combination of soils and plants) to provide holding capacity for infiltrating water. Also, as indicated in the Alternative 4 remedial plan, an enhanced seep collection (to supplement the existing system) and treatment system for seep water and groundwater is proposed for shallow groundwater that moves toward the Poentic Kill Stream. As noted in the RI reports and the PRAP, some low level contamination was noted in the Poentic Kill sediments adjacent to the former East Landfill. The levels were below those that would require remediation. Contamination from the GE site has not been detected in the Mohawk River surface water or sediments.

As indicated above, VOCs in groundwater are to be addressed though bioremediation treatment technologies at source areas. This proactive approach will further protect the Mohawk River. Samples of soil and soil gas studies conducted during the RI did not show elevated VOC levels in soil and site-related contaminants were not detected in ambient air.

Comment 47: *Page 2, 7thParagraph - Since the commercially zoned parcel adjacent to the landfill along Campbell Road has been rezoned to high density residential use, and a proposed high density residential complex is under consideration for that parcel, what surface and subsurface migration and/or controls will be put in place to protect that prospective community? Is there a need for a new remediation model to factor in the new residential?*

Response 47: Data collected during the RI, as well as on-going perimeter monitoring, have shown and consistently confirmed that there are no elevated contaminant levels in groundwater west of the Site. The existing residence areas to the west of the site are provided with potable water by the Town of Rotterdam, as would any other future development. No new remedial model would therefore be required. The GE site does not affect the area to the west of the groundwater divide. There is a significant data set that has consistently established this.

Comment 48: *Page 2, 8th Paragraph - Since the proposed new sewers for the Long Pond development will be draining effluent to the Rotterdam Town Sewage treatment plant, there will be a reasonable possibility that surface contamination from the GE site may load the Long Pond development effluent with GE hazardous dump leachate and be pumped to the Town sewage plant. What controls will be factored in to ensure that there will be no transfer to the Rotterdam Town sewage system?*

Response 48: As detailed in the RI and indicated above, no contaminants from the GE Main Plant have been detected west of the site in the Campbell Road region in surface water, wetland sediments, or groundwater. Leachate from the West Landfill has not been observed. The controls proposed for treatment of shallow groundwater and seeps on the GE site along the former East Landfill will prevent contaminant migration towards the adjacent stream; at any rate, this area is at some significant distance from the proposed development and surface flow is north in the Poentic Kill to the Mohawk River. Sanitary waste from proposed homes would not, therefore, receive any contamination associated with the GE property. In view of the data, the concern expressed is not a scenario that has the potential to allow the transport of contaminants to the sewage treatment plant as no surface contaminants from the GE site have been detected in this region. Given the topography, the data collected, and the surface water and groundwater flow regimes known in the area, there does not seem to be reasonable engineering/hydraulic scenario in which surface waters or waste, if it existed, from GE could enter a properly designed sewer system in the new development.

Highlighted Comments from Alan Randall:

Comment 49: *Page 2, 10th Paragraph - In the PRAP there does not appear to any data compilations and little interpretation as to the origin and sources of contamination nor the rate of migration of the contaminants. We would request the DEC to revise the PRAP to include this extremely important data.*

Response 49: The data is included by reference to reports available at the NYSDEC offices and at the reference desk of the Schenectady County Public Library. Detailed discussions of hydrogeology and contaminant distribution can be found in the 1997 Area of Concern Report and the May 2004 Remedial Investigation Report. Documentation of the hydrologic divide is summarized in the August 2000 report by Terran Research.

Comment 50: *Page 3, 1st Paragraph - On Page 18 of the PRAP there is a reference to the "well-established ground water divide on the western boundary of the Site". However, it appears that there is no data in the PRAP to support the existence of the boundary west of the inferred divide.*

Response 50: Again, the data is included by reference to documents available for review by the public. The existence of the hydrologic divide that separates groundwater that flows beneath the site toward the direction of the Mohawk River from groundwater that migrates in a different direction towards the well field has been documented in reports prepared by Terran Research, Woodward Clyde, Dames & Moore, and URS. The hydrologic divide has been confirmed throughout these study efforts and is based on data collected over a 15-year period.

Comment 51: *Page 3, 2nd Paragraph - Figure 10 of the PRAP depicts a continuous gravel aquifer extending westward to Campbell Road. Where is the evidence that more test holes were drilled west of Campbell Road to confirm existence of the "channel-fill aquifer"?*

Response 51: The data is available in the RI Report and AOC Reports in the public library. There are over 900 borings included in the geologic database which were used to assess the stratigraphy near the site. The borings include numerous test wells installed west of the site. These wells were installed as part of various investigations conducted by the City of Schenectady and Town of Rotterdam and by the Wilmorite

Group (Rotterdam Square Mall).

An important distinction that must be noted is the difference between the principal aquifer material and the channel fill deposits. The principal aquifer material from which the Rotterdam and Schenectady well field draw water consists of coarse sands and gravel of glaciofluvial origin. This formation thins to the east and terminates west of Campbell Road. It is laterally continuous with the deltaic and glaciolacustrine deposits found beneath the site. The channel fill deposits consist of sands and much finer gravel than found in the principal aquifer. The channel fill material extends across the site and on top of the glaciolacustrine deposits and principal aquifer material.

As discussed in Putman's 2000 report, the potentiometric surface contours in the channel fill deposits consistently show a steep gradient along Campbell Road. (This area is west of the area shown in the Figure in the PRAP) This suggests a zone of decreased transmissivity. This zone supported by boring log data for wells in this vicinity which show a north south trending remnant of finer grained material.

Comment 52: *Page 3, 3rd Paragraph - The PRAP on page 14 states that the extent of the ground-water contamination in the fill/flood plan and channel-fill aquifers is shown in Figures 16 and 17. We do not find it clearly shown and would like more in depth proof of the extent of the ground water contamination.*

Response 52: The PRAP is an administrative document that concisely summarizes the data and proposed remedy, which were collected/developed over many years and is documented in volumes of reports in the document repository. The nature and extent of contamination is detailed in the RI Report dated May 2004. These volumes are available in the reading rooms at the Schenectady County Public Library and the NYSDEC Central Office in Albany, New York.

Groundwater samples were collected from monitoring wells S-2 and S-8 west of Campbell Road and were analyzed for VOCs, SVOCs, PCBs, pesticides, and metals. No VOCs, SVOCs, PCBs, and pesticides were detected. Naturally occurring metals were detected at concentrations consistent with un-impacted groundwater in the aquifer.

Specific Comments in Attachment from Allan Randall:

The following responses are intended to clarify points and answer questions raised in the January 25th letter and, where appropriate, direct the commentor to existing reports and documentation prepared during the remedial investigation and feasibility study process. The volumes of data and assessment materials generated during the site investigation process were referenced within the PRAP. The RI/FS documents, the Sector Report studies, the Area of Concern Reports, and related materials, provide a comprehensive evaluation and understanding of the Site and the specific details about the remedial program.

The GE Schenectady remedial program has been conducted over many years and, specifically over the past 9 plus years under the GE/DEC Order-on-Consent. The history and chronology of investigative activities are summarized in the PRAP. There are volumes of reports prepared which provide thousands of data points and analytical sample results utilized to develop the remedial approach detailed in the PRAP.

The remedial process was initiated with the development of twenty sector reports to review and detail the past manufacturing activities and documented environmental occurrences throughout the 640-acres since development of the property was commenced more than 115 years ago.

The site was divided into two zones (Zone 1 being the central portion of the Site and Zone 2 West and Zone 2 East), based on the geology and hydrogeologic site conditions and features. As you note, there is great detail in these numerous reports which were then utilized to develop the area of concern (AOC) investigation and sampling and analysis plans. After completion of these many years of on-site drilling, sampling of all media (surface soil, subsurface soil, sediments, groundwater, surface water including, streams, wetlands, the Mohawk River, ambient air etc.) the initial comprehensive, site-wide remedial investigation (RI) reports were prepared. A Revised RI report, dated 2004, also summarized the extensive site investigation history. The feasibility study report (FS) was prepared, based on the information generated throughout the years of site study, to evaluate all the investigative data and sampling results and present remedial alternatives for clean-up of the entire 640-acre site. The remedial program is detailed in the PRAP.

These Sector reports, AOC reports, RI reports, FS reports and all other documents prepared prior to and throughout the RI/FS remedial program have been available for public view since 2001 at the Schenectady County Public Library and the NYSDEC Central Office in Albany. Due to the many years of investigation and volumes of data prepared, a public availability session was conducted at the Schenectady County Community College in November 2001 to review with the public the remedial program status, including all the existing data and findings, remedial actions completed, schedule for completion of the RI/FS program. There was an open comment/question forum provided for the public at that time. Representatives from the NYS DEC and NYS DOH, along with private consultants and technical representatives from GE were available at that time to provide additional information to interested members of the public.

Comment 53: *Page 1, 1. – Is the term "well-established" intended to mean "well-documented"?*

Response 53: Yes. The groundwater divide between the Rotterdam & Schenectady well fields and the GE Schenectady Site has been studied and documented over the past 15 years. Dr. George W. Putman, of Terran Research, has conducted numerous independent studies since the early 1990s and reported his findings summarizing the naturally occurring and established groundwater divide located beneath Campbell Road. His findings, including divide location illustrations, have been summarized in the report entitled, *Hydrogeology of the General Electric Main Plant, Schenectady, New York, Terran Research Inc*, August 2000. Other reports documenting this divide include:

- *Expansion of the Ground-Water Monitoring Well Network; General Electric Plant Landfills, Schenectady, New York,* Dunn Geoscience Corp, 1983.
- *Field Investigation Report; Monitoring Well Locations Map,* Woodward-Clyde, 1989
- *Area of Concern Report*, Dames & Moore, January 17, 1997
- *Schenectady Aquifer Protection Zones Final Report*, Malcolm Pirnie, February 1989

- *Hydrogeologic Evaluation – Proposed Rotterdam Square, Town of Rotterdam, Schenectady County, New York*, Haley & Aldrich, February 1981

Comment 54: *Page 1, 1. - Is the term intended to mean "permanent, capable of being shifted appreciably"*

Response 54: The divide shown in the *Revised RI Report* (May 2004) is one of several parallel flow lines. This divide separates groundwater that migrates northward beneath the site from groundwater that migrates northward west of the site. The exact location of this divide may shift depending on conditions, but the studies confirm that any shifting that might occur does not alter the well documented finding that the groundwater under the GE site will not flow to the west. As discussed below, there is no basis to suggest that the groundwater which migrates under the site has the potential to affect the water supply wells to the west of the site.

The hydrologic divide discussed by Terran Research separates water that migrates northward towards the Mohawk River and groundwater that is within the zone of influence of the municipal well fields. As summarized by the Terran Research studies over the past 10+ years, portions of the divide appear to be caused by stratigraphy (i.e., the existence of fine grained material identified in boring logs in the area). The portion of the divide south of the intersection of Old River Road and Campbell Road was consistently observed in the same location during the 10+ years of Terran Research's study, to the east of Campbell Road and west of the GE Schenectady Site. The portion of the divide north of the intersection of Old River Road and Campbell Road shifts slightly east or west due to changes in infiltration, precipitation, pumping rates, etc.

Thus, there is an area between the western boundary of GE's Main Plant and Campbell Road that is between these two divides where groundwater continues to migrate northward towards the Mohawk River, but is east of the zone of influence of the municipal well field. Furthermore, the aquifer has been shown to draw more significantly from the Mohawk River and from the north-northeast due to demand (Winslow). The ratio of groundwater that is derived from induced recharge from the river versus from the aquifer to the south fluctuates depending on river water temperature and water stage in the Barge Canal.

Comment 55: *Page 1, 1. - These authors recognize a thick gravel aquifer west of Campbell Road, but inferred predominantly silt or sandy silt of lacustrine origin near and east if Campbell Road, with a thin (alluvial?) gravel aquifer atop of the lacustrine deposits that was penetrated by one borehole north of the GE plant. However, no bore hole logs between Campbell Road and the GE plant were available to the authors of these reports. . . . Are there more test holes drilled for GE or others near and slightly west of the Campbell Road, and do they confirm that this channel-fill aquifer (which may be a product of late-deglacial torrents that follow the Mohawk River valley) connects with the deeper gravels that form the Schenectady aquifer west of Campbell Road?*

Response 55: The multitude of data from the GE Schenectady remedial program is available in the RI Report and AOC Reports. There are over 900 borings included in the geologic database, which were used to assess the stratigraphy near the site. The borings include numerous test wells installed west of the site. These wells were installed as part of various investigations conducted by the City of Schenectady and Town of Rotterdam and by the Wilmorite Group (Rotterdam Square Mall).

An important distinction that must be noted is the difference between the principal aquifer material and the channel fill deposits. The principal aquifer material from which the Rotterdam and Schenectady well field draw water consists of coarse sands and gravel of glaciofluvial origin. This formation thins to the east and terminates west of Campbell Road. It is laterally continuous with the deltaic deposits west of the Main Plant and glaciolacustrine deposits found beneath the site. The channel fill deposits consist of sands and much finer gravel than those found in the principal aquifer. The channel fill material extends across the site and on top of the glaciolacustrine deposits and principal aquifer material.

As discussed in Putman's 2000 report, the potentiometric surface contours in the channel fill deposits consistently show a steep gradient along Campbell Road. This area is west of the area shown in the Figure in the PRAP. This suggests a zone of decreased transmissivity. This zone is supported by boring log data for wells in this vicinity, which show a north south trending remnant of finer grained material.

Comment 56: *Page 2, 2. - Are these figures intended to mean that at all the many "sampling" locations not flagged, no contaminants were detected??*

Response 56: The intent of the figures (16 & 17) included in the PRAP were to provide a general, high-level summary of the multitude of investigative data and results from the RI program. Specifically, Figures 16 & 17 illustrate the locations and results of higher concentrations of contaminants detected during the RI program including representative locations within the groundwater for the corresponding geologic depositional layers. For a detailed summary of detected and non-detected constituents, including better illustrations of sampling locations, please refer to the *Revised RI Report*.

Comment 57: *Page 2, 2. - Given the alarmingly high level of VOCs at the Wire Mill Site (fig 17), was there not some attempt to define the extent of the likely plume of VOCs by drilling and sampling additional wells?*

Response 57: There has been extensive additional investigation at the Wire Mill source area to define the lateral and vertical extent and concentrations, including downgradient sampling and monitoring. Specifically, 40 soil borings, 21 additional monitoring wells, and over 175 groundwater samples have been collected to define the conditions at the Wire Mill source area. As a part of the additional investigation activities at the Wire Mill, GE advanced 35 soil borings using cone penetration testing (CPT) technology to assess the stratigraphy and hydrogeologic conditions in the area in greater detail than is feasible with standard drilling methods. GE also installed monitoring wells screened within 3 different vertical zones in the channel fill layer at several downgradient locations. The results of these investigation tasks are included in the *Revised RI Report*.

In order to expedite the remedial design efforts, a microcosm laboratory study was conducted at GE Global Research Center of samples collected of soil and groundwater from the Wire Mill and Waste Water Treatment Plant (WWTP) source area locations to evaluate the receptivity and quantified magnitude to biodegradation and enhanced bioremediation. The results of these two studies were positive and confirmed that the area is anaerobically active and that contaminant biodegradation has been occurring under current conditions. The proposed remedy will address the source areas by enhancing the natural processes already occurring. The results of the microcosm studies of the source areas were summarized in the Revised RI report.

Comment 58: *Page 2, 3. - Alternative 4 also includes Agronomic Cover. It is not clear to me whether the rationale for Agronomic Landfill Cover is consistent with the rationale for the aforementioned bioremediation in selected source areas.*

Response 58: The use of the agronomic cover in Alternative 3, 4 and 6 is for final closure of the former landfills as part of the comprehensive landfill cover system. The agronomic cover is an integrated plant and soil system that has a sufficiently deep soil profile, with abundant vegetative cover (and roots) and an adequate water holding capacity, so that a large quantity of precipitation and surface percolation is removed by evaporative losses from the soil surface and transpiration by the vegetation.

The agronomic cover, like a more traditional capping system, is designed to minimize direct contact with waste, minimize infiltration of precipitation and reduce subsequent leachate generation and groundwater contamination. Given the environmental conditions noted at the former landfills (the lack of significant contamination in the channel fill aquifer of concern, the relative absence of contaminated groundwater plumes moving downgradient from the landfills, and the lack of a well-defined waste mass amenable to excavation and removal), the agronomic cover system was deemed to be protective, in concert with the other remedial systems proposed at the landfills (shallow groundwater treatment, leachate collection, and soil removals).

Groundwater remediation utilizing bioremediation, as detailed above and in the RI reports, for the floodplain and channel fill source area groundwater will not require an agronomic cover as the upper fill and floodplain soil exhibits such low permeability that its contribution and potential to contribute to lateral migration of VOCs is negligible.

Comment 59: *Page 3, a) - Is delaying the leaching of contaminants from shallow soil desirable? One reason for selecting Alternative 4 over Alternative 6 is that with Alternative 6 "the time frame for reduction of toxicity and volume on site would be longer" (p. 38, last paragraph). I would suppose that if leaching of shallow soils is in fact delayed by Agronomic Covers, the time frame for reducing toxicity in the channel-fill aquifer would be correspondingly lengthened – which seems contrary to the rationale for selecting Alternative 4. Perhaps, however, there is evidence that a delay in leaching will allow the shallow contaminants to be naturally degraded in situ, so should be encouraged.*

Response 59: As noted in Response 58 above, delaying and slowing of infiltration through a cover system (and, thus, subsequent reduced leachate production) is desirable for the former landfills. The channel fill aquifer is not significantly contaminated in the former landfill areas. The rationale referred to in the comment, i.e, the greater reduction in time frames for toxicity in the channel fill aquifer for Alternative 4 versus Alternative 6, really refers to the groundwater plume areas in other portions of the site.

The proposed agronomic cover for the former landfill areas at the GE Main Plant was initiated with a site-specific pre-design evaluation followed by a pilot installation program consisting of test plots initiated in 1998. Some examples of test pilot agronomic plots included areas adjacent to the west portion of the former East landfill where areas of perched groundwater were emanating from the landfill toe as seeps. Locations were chosen for deep planting by fast-growing phreatophytic vegetation (e.g., willows, poplars, etc.). During the past 5 years, pilot plots using a multitude of plant types have been established to ascertain the best planting density, planting depth, cover soil thickness, and species mixture to maximize evapotranspiration (ET) in these areas. The objective is two-fold: (i) to reduce percolation (of incident precipitation) proximal to these areas of historic seepage, with the goal to minimize recharge, and (ii) where applicable, to intercept and "treat" shallow groundwater. The design elements were targeted along the projected recharge path to achieve these objectives.

The agronomic cover is a portion of the complete, comprehensive cover system for the former landfills. The cover system also includes removal of contaminated soil at select locations, cover soil to prevent erosion of surface soil, and shallow groundwater and seep water treatment to abate the migration of contaminants into the adjacent Poentic Kill. The plant-base systems, both treatment and ET components, were designed to compliment these cover systems components.

In terms of reduction of toxicity, the plants incorporated into the agronomic cover include fast growing hybrids that produce large volumes of root exudates and slough off a large proportion of their root cells during the course of a growing season (fine roots, making up 30 – 75% of the tree root mass turnover rapidly – i.e., every seven to eleven months). These dead and exuded tissues contribute large amounts of carbon-centered ("C-centered) molecules into the rhizosphere (veneer of soil around the roots – typically 2-5 millimeters – where biological activity is 2-3 orders of magnitude higher than background soils. The hybrid plants experimented with during pilot-scale growth trials at the site, develop voluminous root masses. The large root masses result in expanded rhizosphere volumes, with millions of soil organisms swarming around to consume the C-centered molecules (typically enzymes and cellulose, or their derivative sugars) as food sources. This magnitude of biological activity has been shown to effectively reduce levels of organic contaminants, because the soil microbes cannot differentiate between one C-centered molecule (root exudates) and another (soil contaminant). As a result, while mobility may be somewhat retarded by slower leachate generation, plants will aid in contaminant level reductions.

Comment 60: *Page 3, b) - I am not acquainted with studies that document how effectively Agronomic Covers may reduce infiltration to the water table in the climate of central New York. However, willow trees (and many other high-transpiring plants such as alfalfa) are known to be phreatophytes, which can and do extend their roots many feet to below the water table. Therefore, the high water-removal rates cited for willow and poplar trees on p.24 likely include extraction of water from below the water table. Such extraction would NOT reduce potential leaching of shallow soils by infiltrating precipitation, because any ground-water thus transpired had already infiltrated to the water table.*

Response 60: As discussed above, the agronomic pilot program experimented with many vegetation types at the site, some of which are phreatophytes. The pilot test plots also evaluated various planting depths and strategies for controlling rooting depth, among these being feeder tubes that take oxygen and nutrients to the roots at selected rooting depths. Phreatophytes can extend their roots to great depths (up to 200 ft. in one published study), however, while they can extend to below the water table, even phreatophytes do not prefer having their roots immersed in water for too long as the oxygen content of water, especially groundwater is typically low (2-3%) and insufficient for supporting roots for long periods. Further, the very existence of roots within a water table will drive it anoxic as sloughed off root cells (see above) will consume oxygen during decomposition. A more likely scenario is that in dry climates, roots will penetrate to the water table, and proliferate in the vadose zone (areas of increased water potentials immediately above a water table) immediately above the water table. This zone allows sufficient moisture and oxygen for roots to grow.

However, in wet climates like New York, much of the water necessary for healthy plant (and root) growth is found in an extended moist (vadose) zone well above the water table. In fact, the design of an agronomic cover leans heavily on the assumption that there is sufficient water within the upper 6 feet of soil (well above the typical water table at the site, which in the landfills is usually around 8 to 10 feet where the agronomic cover is being installed). These studies have documented the existence of these moist vadose zones during pilot-scale testing.

While phreatophytes will undoubtedly seek water to support their roots, sufficient water (average 36 inches over the last 40 years, and closer to 50 inches in 2004) exists through precipitation and infiltration into shallow soils (0 – 6 feet) that the majority of these roots are found well above the water table, unless we direct, manage, and support their healthy growth into the shallow water table, as described in the former discussion. The agronomic cover, as designed, follows the US EPA Alternative Cover Assessment Program (ACAP) principals that the soil acts as a sponge and the plants "pump" to remove infiltrating water before it percolates to groundwater. During pilot-scale testing of these principals at the former landfills, sap flow signatures were observed which indicated that the agronomic cover was performing as designed in designated places.

Comment 61: *Page 3, 4. - However, water-table contours (fig. 12) are consistently a foot or more higher than potentiometric contours in the channel-fill aquifer (fig 13) all across the GE property. If this condition obtains at most times throughout the year, as I would expect, there must be a downward gradient, so I would expect most contaminants (other than LNAPLs) in the shallow sediments to migrate downward into the channel-fill aquifer*

Response 61: The downward hydraulic gradient from the fill and floodplain deposits has been consistently observed. Hydrogeologic evaluation of groundwater migration throughout the remedial program and summarized in the *Revised RI Report*, including pump tests, slug testing and frequent and numerous groundwater gauging and contouring events with subsequent modeling have shown that 98% of the groundwater migration occurs laterally through the channel fill deposits with minor downward contribution (2.3 to 7.4 inches per year across the entire site) through the relatively less permeable silt and clay floodplain deposits.

The silt and clay floodplain deposits also slow the downward migration of contaminants. While impacts have been detected in channel fill groundwater, concentrations of VOCs and SVOCs are consistently orders-of-magnitude less than concentrations found in the overlying fill and floodplain deposits

Comment 62: *Page 3, 4. - I do not know what distances that requirement will turn out to be, but Figure 13 suggests that there is already a "picket fence" of observation wells all along the north property boundary. The purpose of this requirement is to document the quality of water leaving the site. . . . Accordingly, it seems to me that consideration should be given to some network of upgradient monitoring in the channel-fill aquifer on site.*

Response 62: The wells noted in PRAP will be closer to the landfills; it is intended to have them serve as monitors to determine the effectiveness of the landfill cover and indicate problems long before any contaminants reach the perimeter wells. The exact location and number of additional downgradient monitoring wells necessary for future remedial performance evaluation of groundwater will be determined during the remedial design phase of the remedial program. The siting of wells in the fill and floodplain deposits as noted in the PRAP was for illustrative purposes and was not meant to exclude possible channel fill monitoring well locations as well.

There are over 300 existing monitoring wells on site. Several of the wells are installed along the southern (upgradient) boundary of the site. Some of these wells have been sampled multiple times as part of the remedial investigation and GE's ongoing perimeter groundwater monitoring sampling. These data are included in the *Revised RI Report*.

Letter dated January 28, 2005 from John J. Paolino, Supervisor of the Town of Rotterdam.

The letter served to inform NYSDEC of a proposed residential development along the western boundary of the GE Main Plant property and to urge NYSDEC to choose a remedy that would be protective of the public.

APPENDIX B

Administrative Record

Administrative Record

General Electric Main Plant
Operable Units No. 03 and 04
Site No. 4-47-004

1. Proposed Remedial Action Plan for the **General Electric Main Plant** site, Operable Units No. 03 and 04, dated November 2004, prepared by the NYSDEC.

2. Order on Consent, Index No. A4-0336-95-09, between NYSDEC and General Electric Company, executed in September 1995.

3. Preliminary Site Assessments and Field Investigations:

Hydrogeologic Investigation of the Insulating Materials Product Section (*Woodward Clyde* March 1983)

Review of Groundwater Flow Conditions at the IMPS Site (*Woodward Clyde* Nov. 1984)

Review of Groundwater Conditions at the IMPS Site (*Woodward Clyde* January 1986)

Field Investigation Report 1989 (3 volumes) *(Woodward-Clyde* October 1989)
Volume 1 - Field Investigation Report
Volume 2 - Appendices A - I
Volume 3 - Appendix J

Site Inspection Report - General Electric Schenectady *(NUS Corp/USEPA* March 29, 1991)

Perimeter Groundwater Monitoring Reports (*Dames & Moore* 1991 - 1995)

Hydrologic Divide Study: Schenectady Wellfields to General Electric Co. Main Plant
Terran Research, Inc.

Quarterly Report I	January 17, 1992
Quarterly Report II	May 1992
Quarterly Report III	
Quarterly Report IV	
Quarterly Report V	
Quarterly Report VI	November 10, 1993

4. Remedial Program Work Plans:

Field Investigation Work Plan 1986 (1 volume)
Woodward-Clyde October 1986

Remedial Investigation/Feasibility Study Work Plan (1 volume)
Dames & Moore October 15, 1998

Revised Remedial Investigation/Feasibility Study Work Plan (1 volume)
Dames & Moore January 21, 1999

Zone 1 Phase 2 Remedial Investigation Work Plan (1 volume)
URS/Dames & Moore June 30, 2000

Zone 2 Remedial Investigation Work Plan (1 volume)
URS/Dames & Moore June 30, 2000

5. Sector and Zone Studies:

Sector Studies (20 reports/22 volumes) *(Dames & Moore* 1996 - 1999) (*Rust E&I* 1996)

Zone 1 Sector Appendix Reports (15 volumes) *(RUST Environment & Infrastructure* September 1996)

Volume 1 - Sector D, Sector E Parts 1&2 of 3
Volume 2 - Sector E Part 3, Sector Specific Information - Transformers, Sector O
Volume 3 - Sector Specific Information - Transformers Sector P - Solid Waste Management Units Sectors G, N, O, P
Volume 4 - Sector Specific Information - Storage Tanks Sectors G, O, P, Q
Volume 5 - Sector Specific Information - Spills Sectors G, O, P, Q
Volume 6 - Sector Specific Information - Previous Investigations Sectors G, O
Volume 7 - Sector Specific Information - Previous Investigations Sector Q Part 1 of 2
Volume 8 - Sector Specific Information - Previous Investigations Sector Q part 2 - Wastewater Treatment Plant, Final Construction Report - Wastewater Treatment Plant Design Report - Industrial Wastewater Report - Geotechnical Investigation WWTP
Volume 9 - Sector Specific Information - Previous Investigations Sector T - Perimeter Wells Monitoring Reports 1991-1993
Volume 10 - Multi-Sector Information - PCB Electrical Equipment
Volume 11 - Multi-Sector Information - Storage Tanks Part 1 of 2
Volume 12 - Multi-Sector Information - Storage Tanks Part 2 of 2 - SWMUs Part 1 of 2
Volume 13 - Multi-Sector Information - SWMUs Part 2 of 2 - Industrial Solid Waste Management Study - Spills Part 1 of 2
Volume 14 - Multi-Sector Information - Spills Part 2 of 2 - Previous Investigations - Sewer Discharges - Best Management Plans
Volume 15 - Multi-Sector Information - SPPC Plans 1992, 1990, 1986

Area of Concern Report (7 volumes) *(Dames & Moore* January 14, 1997)

Volume I - Text, Tables, Figures
Volume II - Appendix A Geology and Hydrogeology Report
Volume III - Appendix B Contaminant Distribution Summary Tables
Volume IV - Appendix C Natural Resources Evaluation Report
Appendix D Sector report Summary Tables
Volume V - Appendix E Index of Boring Logs (Book 1)
Volume VI - Appendix E Index of Boring Logs (Book 2)
Volume VII - Appendix E Index of Boring Logs (Book 3)

Zone 2 Area of Concern Report (2 volumes) *(Dames & Moore* March 23, 2000)

Volume I - Text, Tables, Figures
Volume II - Appendices A - C

6. Remedial Investigations:

Monthly Progress Report & Meeting Agenda (1 volume) *(GE Power Systems* December 18, 1997)

Sampling Report - Mohawk River Sampling (*Dames & Moore* August 10, 1998)

Sampling & Analysis Report - Groundwater Sampling Program (1 volume) *(Dames & Moore* October 1998)

Summary of Landfill Investigations (3 volumes) *(Dames & Moore* December 16, 1999*)*

Volume I - Text, Tables, Figures
Volume II - Appendices A - F
Volume III - Appendix F (cont.) And Appendix G

Draft Evaluation of Remedial Alternatives for Landfills (*Dames & Moore* December 13, 1999)

Zone 1 Remedial Investigation Report (4 volumes) *(Dames & Moore* April 25, 2000)

Volume I - Text, Tables, Figures
Volume II - Appendices A - F
Volume III - Appendix F cont and App. G
Volume IV - Appendices

Supplemental Remedial Investigation Program Materials (2 volumes) *(URS/Dames & Moore* June 30, 2000)

Volume I - Text, Tables, Figures
Volume II - Appendices A-C

Remedial Investigation Report (4 volumes) *(URS Corporation* October 19, 2001)

Volume I - Text, Tables, Figures
Volume II - Appendices A - D
Volume III - Appendix E
Volume IV - Appendix F

7. Final RI Report:

Revised Remedial Investigation Report (7 volumes) (*URS Corporation* May 2004)
Volume I - Text

Volume II - Tables and Figures
Volume III - Appendices A, B, C, and D
Volume IV - Appendix E Part 1
Volume V - Appendix E Part 2
Volume VI - Appendix F
Volume VII - Appendices G and H

8. Final FS Report:

Revised Feasibility Study Report (1 volume) (*URS Corporation* May 2004)

9. IRM Documentation:

City Water Main

Sampling Report - City of Schenectady Water Main Investigation (1 volume)
Dames & Moore June 10, 1998

Interim Remedial Measures (IRM) Work Plan (1 volume)
Recovery of LNAPL Along City Water Main Installation
C.T. Male Associates June 26, 1998

Technical Specifications and Plans (1 volume)
Remediation of Soil and Product in Area of 24" Transmission Main
C.T. Male Associates June 1998

Final Interim Remedial Measure Engineering Plan and Construction Certification Report (1 volume)
Recovery of LNAPL Along City Water Main Installation
C.T. Male Associates May 25, 1999

Operation and Maintenance Manual (1 volume)
Recovery of LNAPL Along 24" Water Transmission Main
C.T. Male Associates May 25, 1999

Hi-Yard PCBs

Interim Remedial Measures Work Plan (1 volume)
Remediation of PCB Sediments in Hi-Yard Area Storm Sewer Line
C.T. Male Associates August 2, 1999

Technical Specifications and Plans (1 volume)
Remediation of PCB Sediments in Hi-Yard Area Storm Sewer Line
C.T. Male Associates June 1999

Interim Remedial Measures Construction Certification Report (1 volume)
Remediation of PCB Sediments in Hi-Yard Area Storm Sewer Line
C.T. Male Associates January 31, 2000

Underground Storage Tank Program

Underground Storage Tank Interim Remedial Measures Work Plan (1 volume)
Earth Tech October 1998

Phase I Interim Remedial Measures (1 volume)

Underground Storage Tank Report
Earth Tech June 1999

Phase II Interim Remedial Measures (1 volume)
Underground Storage Tank Work Plan
Earth Tech October 1999

Former East Landfill

East Landfill Geophysics Investigation (1 volume)
Earth Tech January 1998

Seep Evaluation Report (1 volume)
GE Main Plant, Schenectady NY
Dames & Moore October 30, 1998

Revised Interim Remedial Measures Work Plan (1 volume)
Eastern Landfill Seeps
Dames & Moore March 29, 2000

Interim Remedial Measures Work Plan (1 volume)
Former Landfill Area - GE Main Plant
Natresco & URS Corp. May 1, 2001

Draft Evaluation of Remedial Alternatives for Landfills - GE Main Plant (1 volume)
Dames & Moore December 13, 1999

Other/Buildings

Storm Sewer Evaluation and Remediation (1 volume)
Rust E&I November 1996

Final Report for General Electric Company, Schenectady, NY (1 volume)
Building 265 Mercury Remediation
OHM Remediation Services Corp. March 31, 1999

Interim Remedial Measure Work Plan (1 volume)
Sector R Holding Pond, GE Main Plant
URS Corp. March 28, 2001

Final Report Interim Remedial Measures Activities (4 volumes)
Sector R Holding Pond
Blasland Bouck & Lee March 2004

Final Report Interim Remedial Measures (1 volume)

Cleaning Storm Sewers Associated with Former Building 269
OHM Remediation Services Corp. January 5, 1999

10. Fact Sheets/Notices:

Public Meeting/PRAP Release Fact Sheet - November 16, 2004

Extension of Public Comment Period Fact Sheet Update - December 16, 2004

2nd Extension of Public Comment Period Fact Sheet Update - January 28, 2005

11. Correspondence related to remedy selection:

- Letter dated December 13, 2004 from John Van Deloo, M.D., Schenectady, NY;
- Fax of draft letter dated December 15, 2004 from Maryde King, Schenectady County Economic Development and Planning Department;
- Letter and fax dated December 16, 2004 from Peter Sheehan, Conservation Vice Chair, Sierra Club Hudson Mohawk Group; and,
- Letter and fax dated December 16, 2004 from Bernard Sisson, P.E., City Engineer, City of Schenectady:
- E-mail from Hudson Valley Community College student
- E-mail to the DEC website dated December 22, 2004 from Carl Strang, Board of Education, Schalmont School District;
- Letter (final version of letter fax of December 15, 2004) dated January 11, 2005 from Maryde King, Schenectady County Economic Development and Planning Department;
- Letter and e-mail to the DEC website dated January 25, 2005 from Susan Lawrence, John VanDeloo, and Aaron Mair, Sierra Club Hudson Mohawk group; and,
- Letter dated January 28, 2005 from John J. Paolino, Supervisor of the Town of Rotterdam.

LEGEND

$ SEEP LOCATIONS

0 400 800 1200 1600 Feet

GRAPHIC SCALE IN FEET

Title: SEEP RESULTS

Location: MAIN PLANT SCHENECTADY, NEW YORK

Client: GENERAL ELECTRIC COMPANY

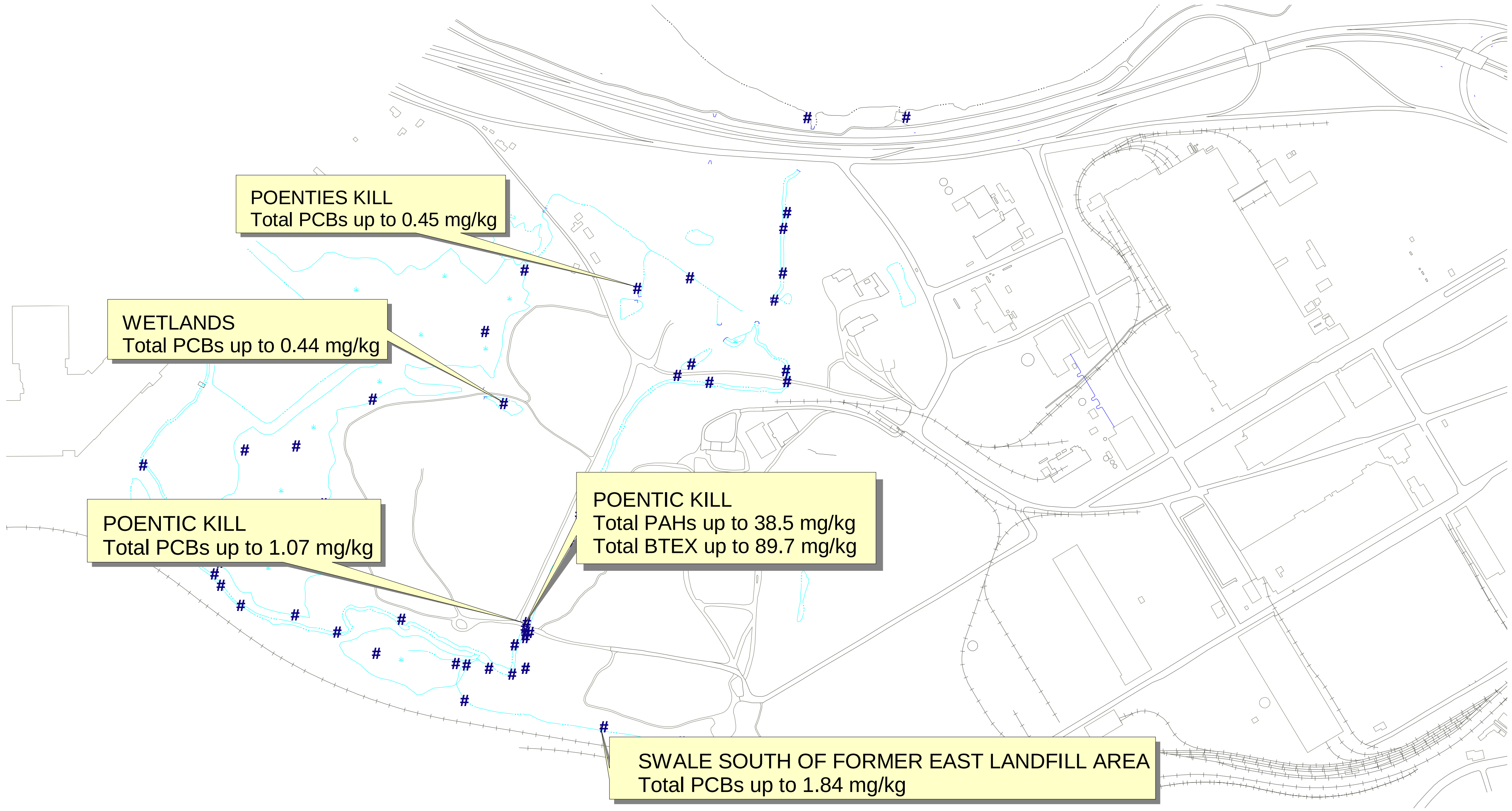
URS

URS Corporation
28 Corporate Drive, Suite 200
Clifton Park, New York 12065

Drafter: DAD	Date: October 2004
Drg. Size: 11 x 17	Job No.: 38394054.10000

FIGURE 19

P:\In Progress\GE Main Plant\PRAP\Figures\Combined Locations.apr



N
W E
S

LEGEND

SEDIMENT SAMPLING LOCATION

0 400 800 1200 1600 Feet

GRAPHIC SCALE IN FEET

Title: SEDIMENT RESULTS

Location: MAIN PLANT
SCHENECTADY, NEW YORK

Client: GENERAL ELECTRIC COMPANY

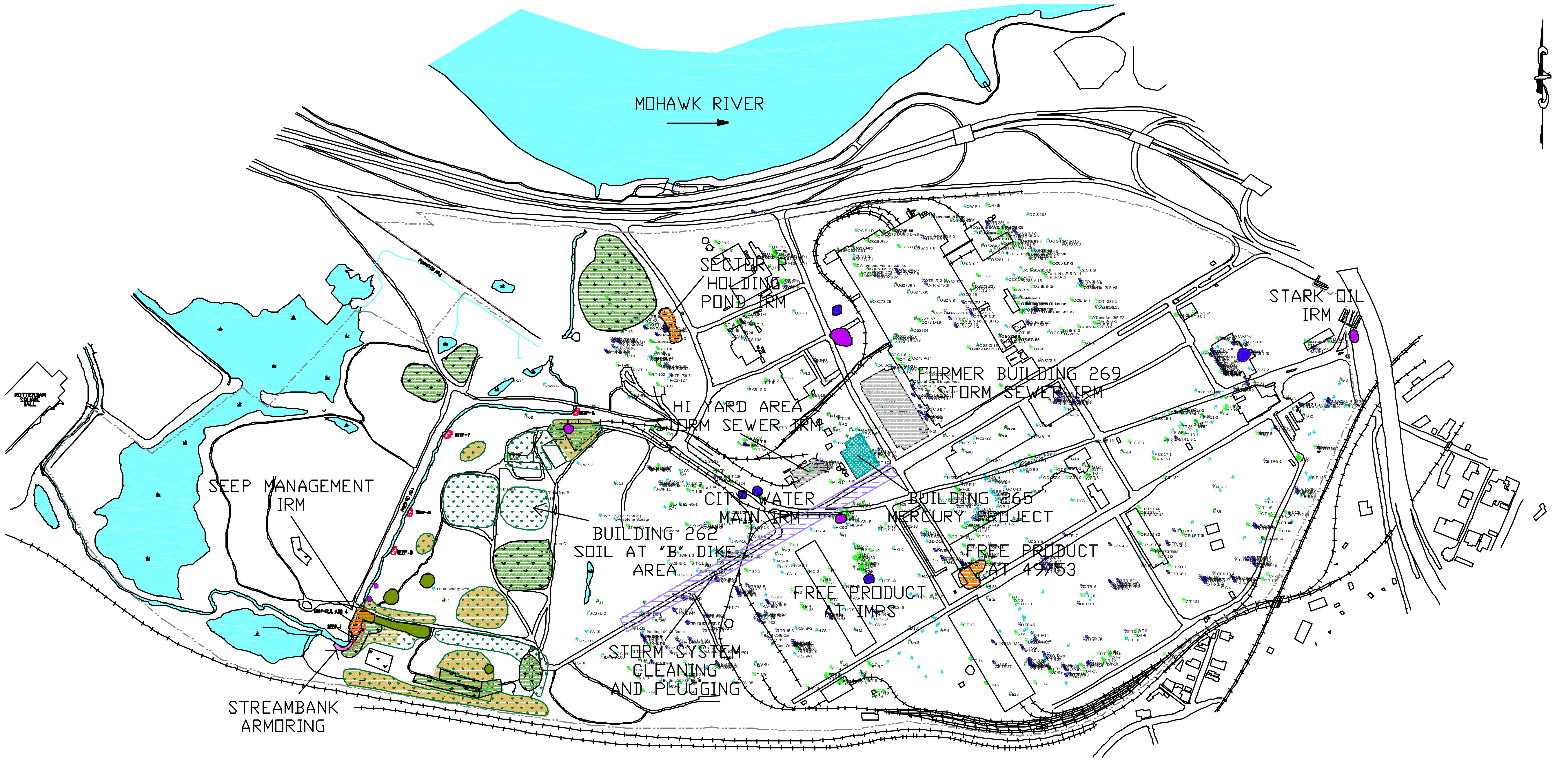
URS

URS Corporation
28 Corporate Drive, Suite 200
Clifton Park, New York 12065

Drafter: DAD
Date: October 2004
Drg. Size: 11 x 17
Job No.: 38394054.10000

FIGURE 20

P:\In Progress\GE Main Plant\PRAP\Figures\Combined Locations.apr



0 200 400 800 1600 FT

GRAPHIC SCALE (IN FEET)

LEGEND

- EXISTING BUILDING
- PROPERTY BOUNDARY
- WETLAND AREA
- IRM CONTINUED
- ONGOING FREE PRODUCT RECOVERY
- PAST FREE PRODUCT RECOVERY
- STORM SYSTEM CLEANING AND PLUGGING
- COMPLETED SOIL COVER ADDITIONS
- COMPLETED PLANTINGS
- PROPOSED VEGETATION PLANTINGS
- PROPOSED SOIL REMOVAL AND/OR COVER ADDITIONS
- PROPOSED SOIL EXCAVATION AND REPLACEMENT
- COMPLETED IRM
- BUILDING 265 MERCURY PROJECT
- CLOSED STORAGE UNITS
- TANK INVESTIGATIONS
- TRANSFORMER REMOVALS
- SPILL INVESTIGATIONS
- STREAMBANK ARMORING

FIGURE 21

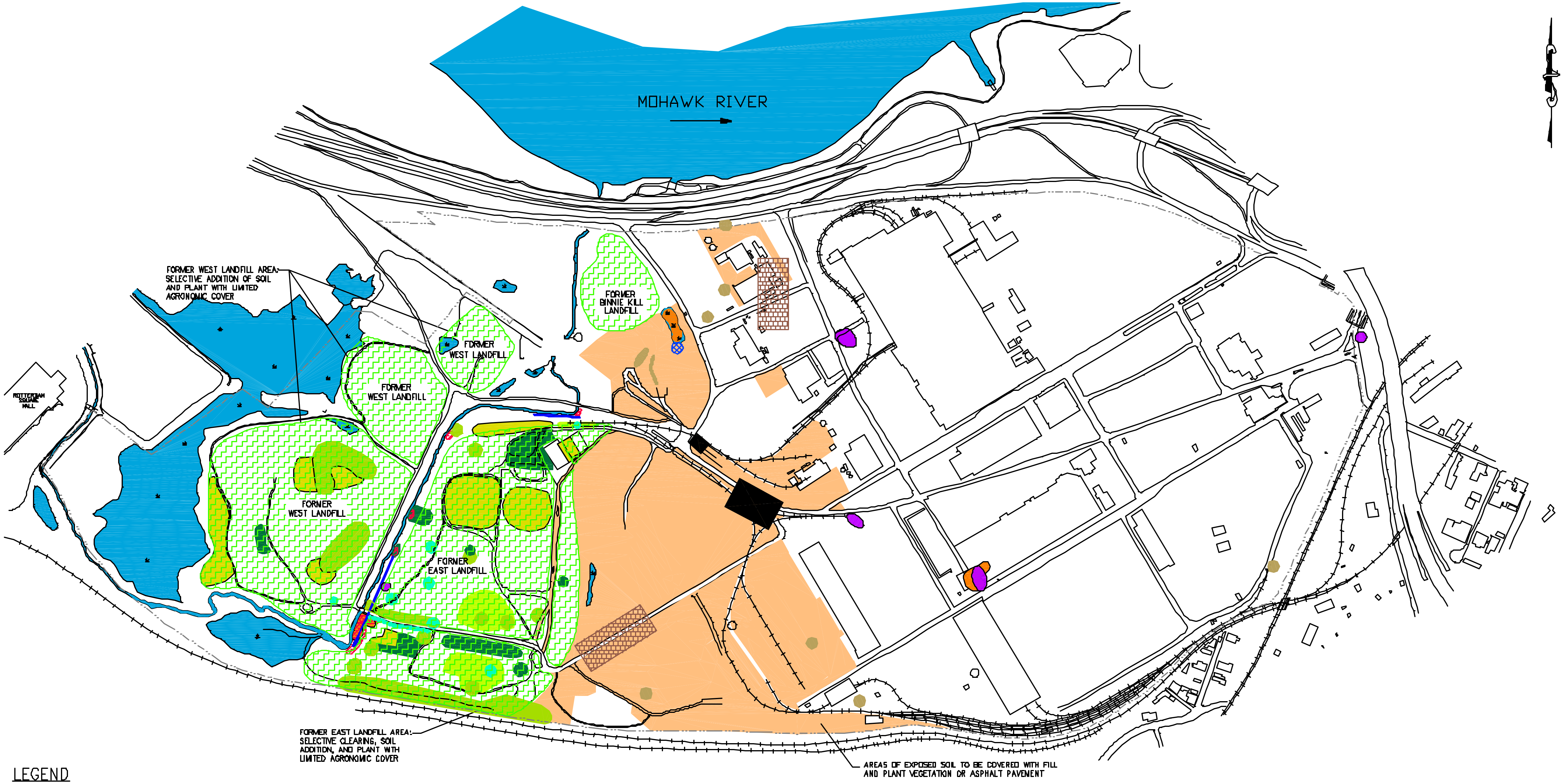
LOCATIONS OF INTERIM REMEDIAL MEASURES (IRMs)

GENERAL ELECTRIC COMPANY
MAIN PLANT, SCHENECTADY, NEW YORK

URS

646 PLANK ROAD, SUITE 202
CLIFTON PARK, NEW YORK 12065

P:\In Progress\GE\Main Plant\PRAP\Figures\Fig 21 Location of IRMs.dwg



LEGEND

- EXISTING BUILDING
- PROPERTY BOUNDARY
- WETLAND AREA
- EXTENT OF FORMER LANDFILL (APPROXIMATE)
- AGRONOMIC COVER
- SEEP LOCATIONS
- VEGETATION PLANTINGS
- VEGETATION PLANTINGS AND REMOVAL OF EXPOSED WASTES
- AREAS OF THIN COVER OR POOR ORGANIC MATTER TO RECIEVE SUPPLEMENTAL COVER AND PLANTINGS
- AREAS OF EXPOSED SOIL TO BE COVERED WITH FILL OR ASPHALT PAVEMENT
- AREA WITH PCB's 1 – 10 mg/kg IN SURFACE SOIL AND PCB's > 10 mg/kg IN SUBSURFACE SOIL TO BE EXCAVATED, DISPOSED OFF-SITE, AND THE SURFACE RESTORED
- AREA WITH PCB's 1 – 10 mg/kg IN SURFACE SOIL AND PCB's > 10 mg/kg IN SUBSURFACE SOIL TO BE COVERED WITH SOIL AND PLANTED – SEE LANDFILL MAP
- AREA WITH PCB's > 10 mg/kg IN SURFACE SOIL TO BE EXCAVATED, DISPOSED OFF-SITE, AND REPLACED WITH SOIL AND PLANTED
- AIR SPARGE CURTAINS
- ASPHALT CAP
- ENHANCED AEROBIC BIOREMEDIATION
- IRM CONTINUED
- FREE PRODUCT RECOVERY SOP: PRODUCT THICKNESS > 0.1 FEET OR > 0.02 FEET AND WITHIN 50 FEET FROM A SURFACE WATER BODY
- ENHANCED ANAEROBIC BIOREMEDIATION

NOTES:
1–REFER TO FIGURE 7–2 IN FEASIBILITY STUDY REPORTFOR USE RESTRICTIONS.
2–COMPLETED IRMS AND ABATEMENT MEASURES NOT SHOWN. REFER TO FIGURE 3–7 IN FEASIBILITY STUDY REPORT.
3–EXCAVATION AREAS ARE NOT SHOWN TO SCALE.

FIGURE 22

PROPOSED REMEDY (ALTERNATIVE 4) SITEWIDE

GENERAL ELECTRIC COMPANY
MAIN PLANT, SCHENECTADY, NEW YORK

URS 28 CORPORATE DRIVE, SUITE 200
CLIFTON PARK, NEW YORK 12065

P:\In Progress\GE\Main Plant\PRAP\Figures\Fig 22 Proposed Remedy–Sitewide.dwg

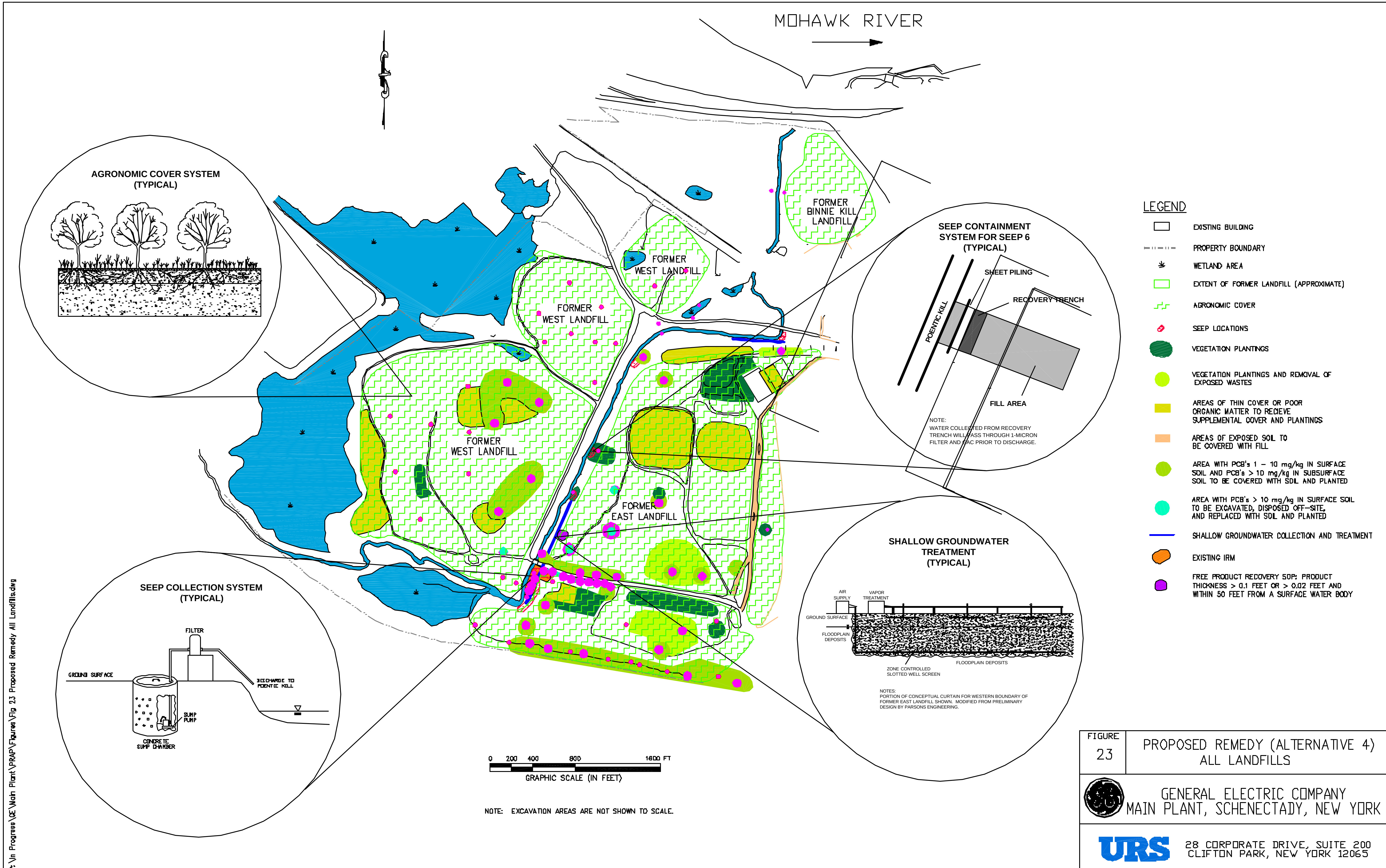


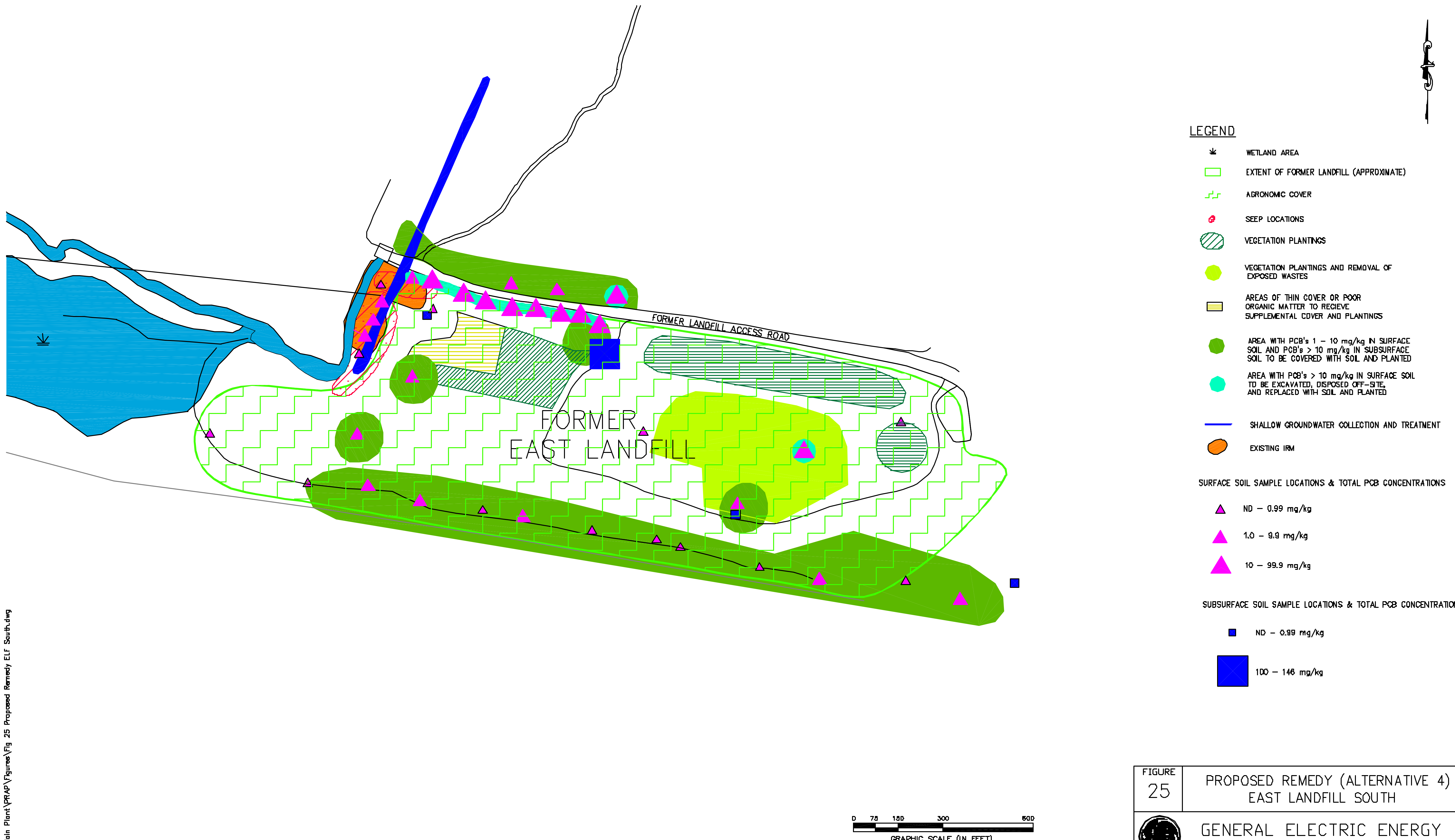
FIGURE 23

PROPOSED REMEDY (ALTERNATIVE 4)
ALL LANDFILLS

GENERAL ELECTRIC COMPANY
MAIN PLANT, SCHENECTADY, NEW YORK

URS
28 CORPORATE DRIVE, SUITE 200
CLIFTON PARK, NEW YORK 12065

FIGURE 24
PROPOSED REMEDY (ALTERNATIVE 4)
EAST LANDFILL NORTH



NOTE: EXCAVATION AREAS ARE NOT SHOWN TO SCALE.

FIGURE 25

PROPOSED REMEDY (ALTERNATIVE 4)
EAST LANDFILL SOUTH

GENERAL ELECTRIC ENERGY
MAIN PLANT, SCHENECTADY, NEW YORK

URS
28 CORPORATE DRIVE, SUITE 200
CLIFTON PARK, NEW YORK 12065

P:\In Progress\GE\Main Plant\PRAP\Figures\Fig 25 Proposed Remedy ELF South.dwg

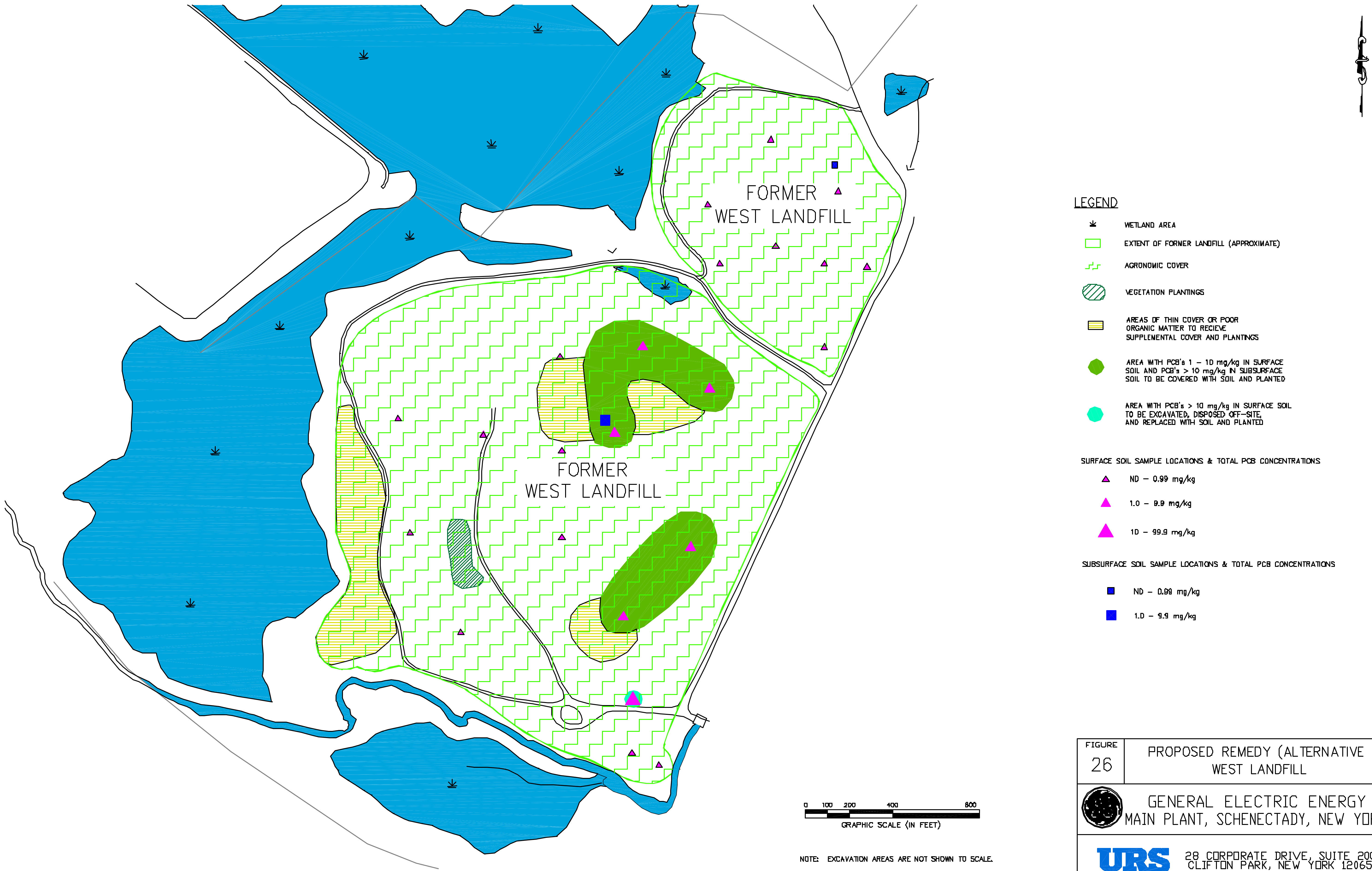
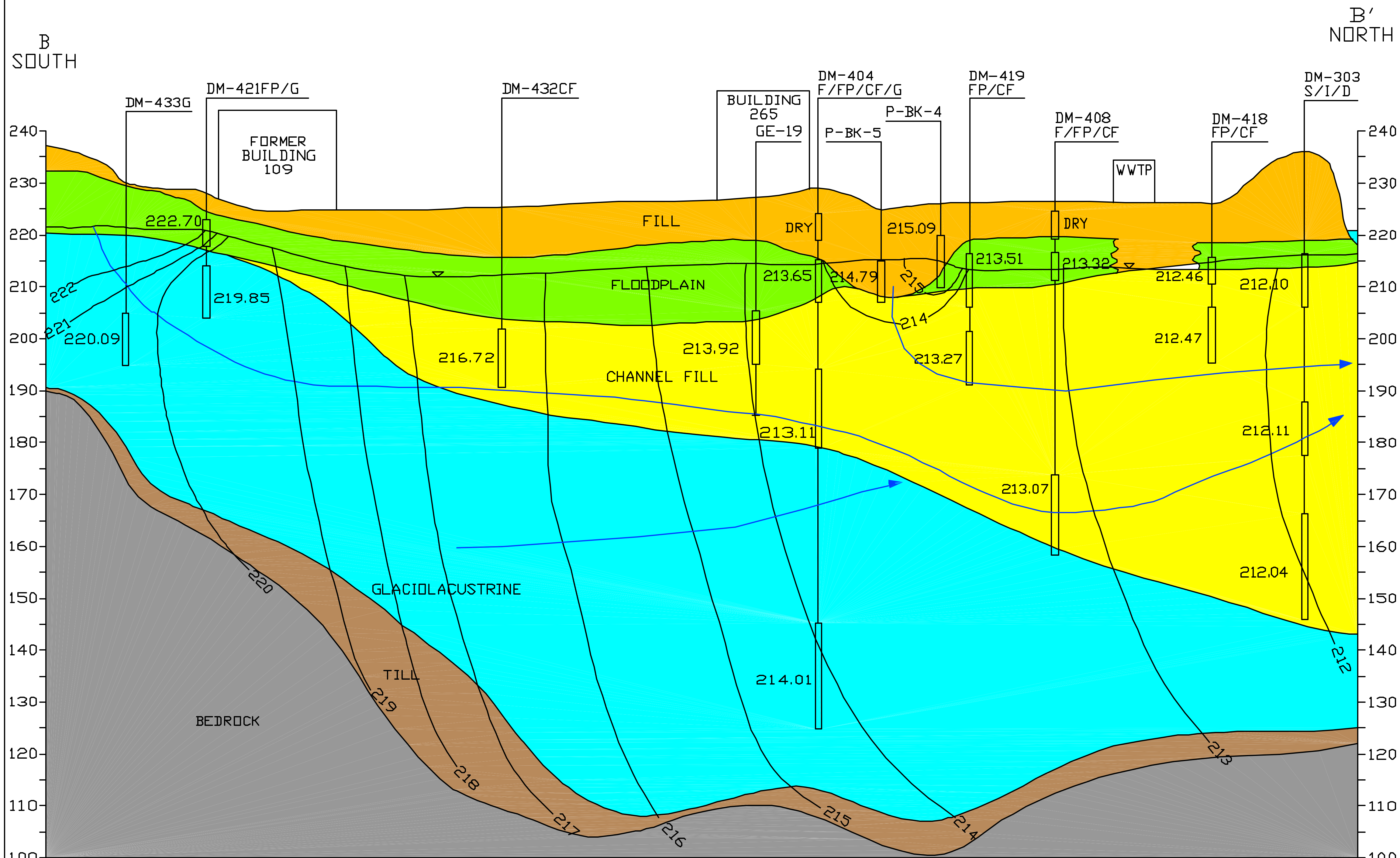
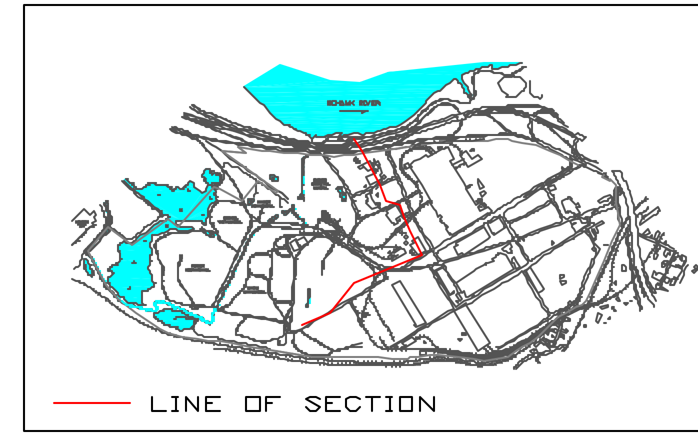


FIGURE 26	PROPOSED REMEDY (ALTERNATIVE 4) WEST LANDFILL
	GENERAL ELECTRIC ENERGY MAIN PLANT, SCHENECTADY, NEW YORK
URS	28 CORPORATE DRIVE, SUITE 200 CLIFTON PARK, NEW YORK 12065

F:\In Progress\GE\Main Plant\FRAP\Figures\Fig 26 Proposed Remedy West Landfill.dwg





LEGEND

GE-19 WELL DESIGNATION AND APPROXIMATE LOCATION
GENERALIZED GROUND SURFACE

214.33 WATER ELEVATION (FEET MSL) (FEBRUARY 20, 2001)

INTERPRETED WATER TABLE (FEBRUARY 20, 2001)

—215— EQUIPOTENTIAL CONTOUR (FEET MSL) DASHED WHERE INFERRED

FILL

FLOODPLAIN, SILTS, CLAYS, FINE GRAINED SANDS, ORGANIC MATTER

CHANNEL FILL DEPOSITS MEDIUM TO COARSE GRAINED SANDS, GRAVEL

GLACIOLACUSTRINE DEPOSITS PRIMARY CLAYS AND SILTS, SILTY FINE SANDS OR LAKE CLAYS IN SOME AREAS

TILL

BEDROCK-CANAJOHARIE FORMATION-SHALE WITH SANDSTONE AND SILTSTONE INTERBEDS

NOTES:

1. REFER TO FIGURE 5-1 FOR THE ORIENTATION OF THE LINE OF SECTION.

2. REFER TO BORING LOGS IN AOC REPORT AND APPENDIX B FOR DETAILED LITHOLOGIC DESCRIPTIONS.

3. ELEVATIONS ARE IN FEET ABOVE SEA LEVEL (FEET MSL) BASED ON NATIONAL GEODETIC VERTICAL DATUM 1929 (NGVD29).

GRAPHIC SCALE (IN FEET)
0 400 800

VERTICAL EXAGGERATION = 20x

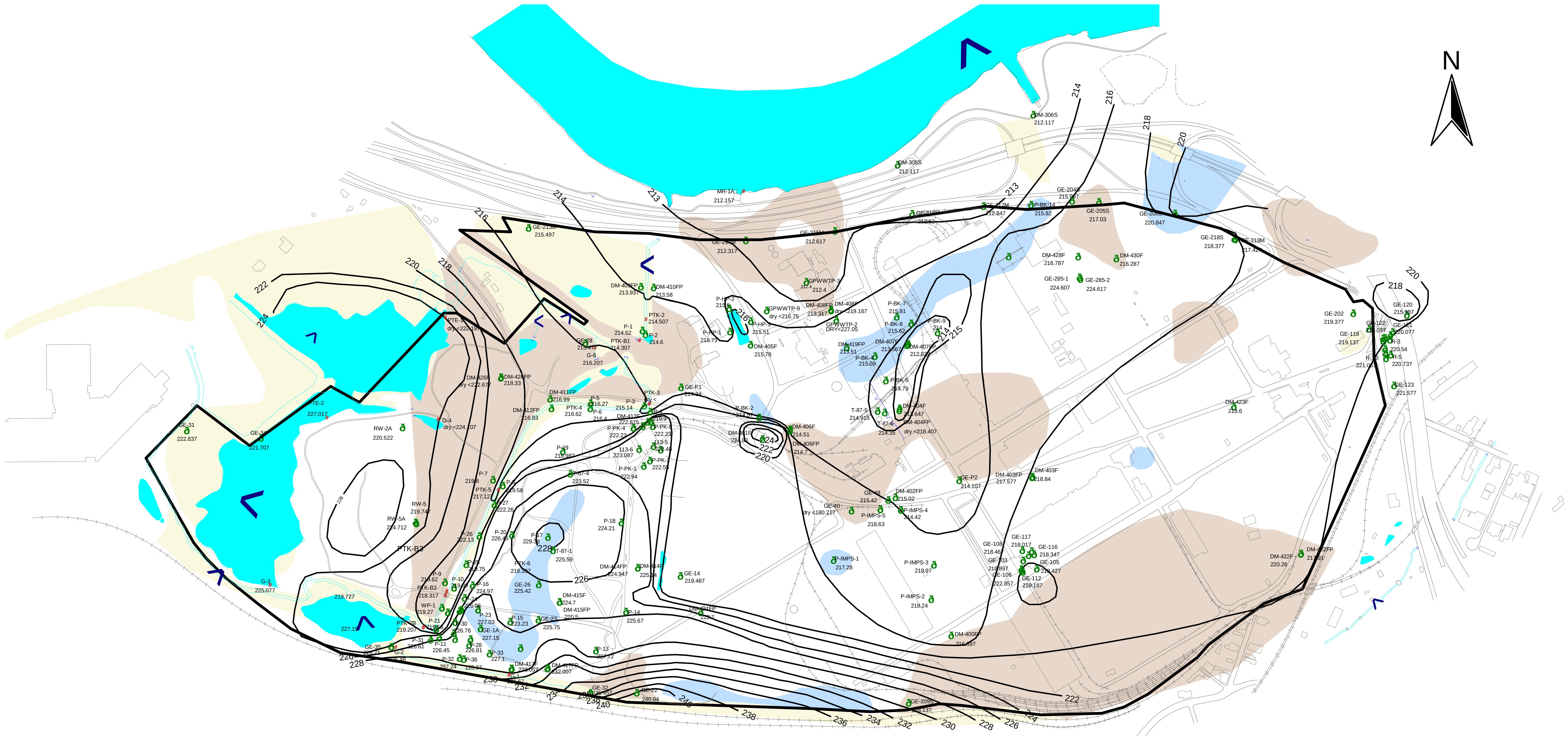
FIGURE 11

GEOLOGIC CROSS-SECTION NORTH/SOUTH

GENERAL ELECTRIC COMPANY
MAIN PLANT, SCHENECTADY, NEW YORK

URS CORPORATION
646 PLANK ROAD, SUITE 202
CLIFTON PARK, NEW YORK 12065

P:\In Progress\GE\Main Plant\PRAP\Figures\Fig 11 Geological Cross-Section North-South.dwg



LEGEND:
- PROPERTY BOUNDARY
- FILL AND FLOODPLAIN MONITORING WELL LOCATION
- SURFACE WATER GAUGE LOCATION
- WATER TABLE CONTOURS (FEET MSL)
- SURFACE WATER

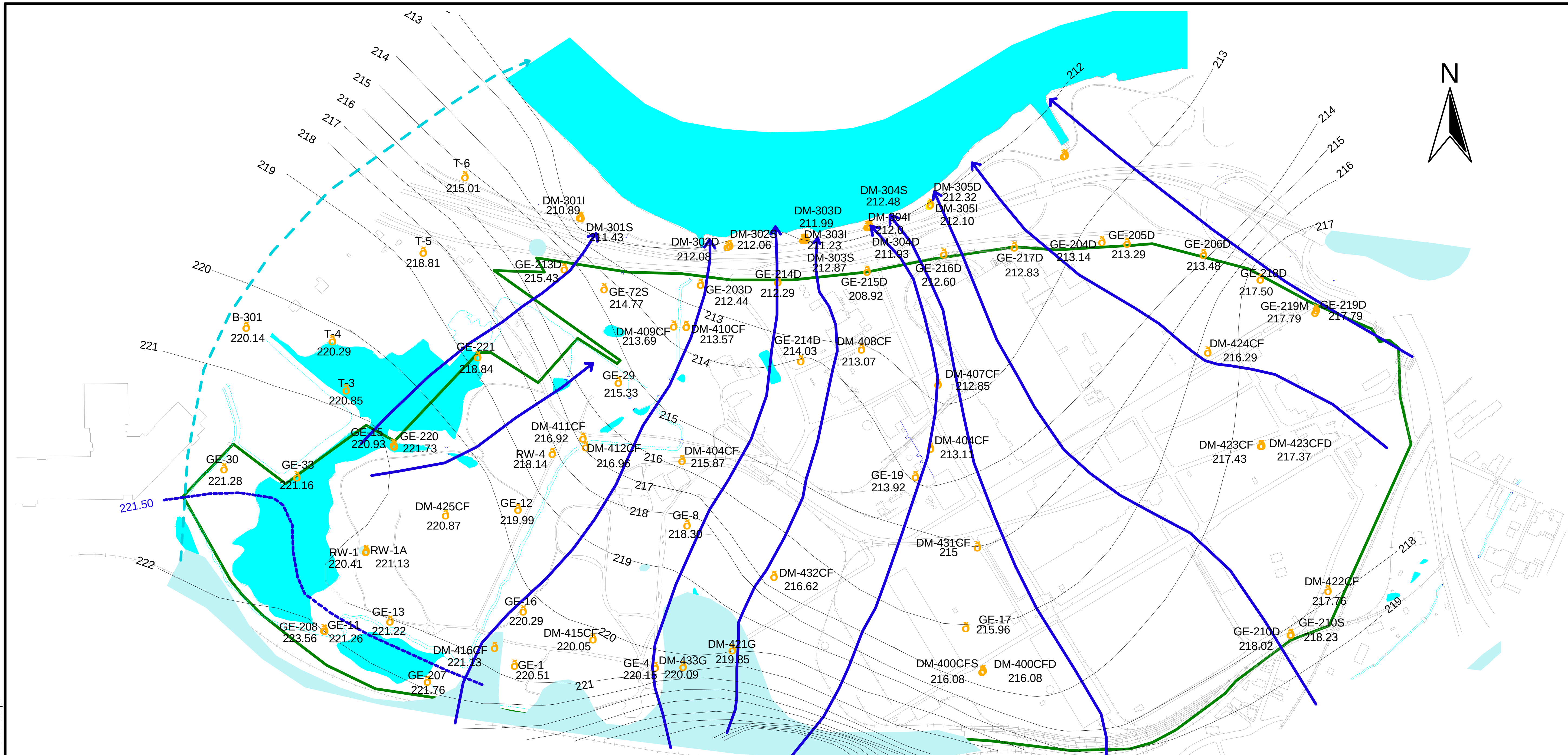
SHADED AREAS
- FILL NOT ENCOUNTERED
- GREATER THAN 10 FEET SATURATED FILL
- NO GROUNDWATER IN FILL
- SURFACE WATER FLOW ARROW

NOTES:
FOR CLARITY ONLY SELECTED DATA POINTS WERE LABELLED.
SEE TABLE 6-1 FOR DATA.
CONTOUR INTERVAL EQUALS 2 FEET.

GRAPHIC SCALE
0 300 600 900 1200 Feet

FIGURE 12	GROUNDWATER FLOW FILL AND FLOODPLAIN AQUIFER
	GENERAL ELECTRIC COMPANY MAIN PLANT SCHENECTADY, NEW YORK
URS	646 PLANK ROAD SUITE 202 CLIFTON PARK, NEW YORK 12065

P:\Database\GE Main Plant\PRAP\watertables.apr



LEGEND:

POTENTIOMETRIC SURFACE

- SELECTED FLOW LINES
- POTENTIOMETRIC SURFACE CONTOURS (FEET MSL)
- SELECTED SUPPLEMENTAL CONTOURS (FEET MSL)
- HYDROLOGIC DIVIDE
- CHANNEL FILL MONITORING WELL LOCATION
- CHANNEL FILL NOT ENCOUNTERED
- PROPERTY BOUNDARY
- SURFACE WATER

NOTES:
CONTOUR INTERVAL 1 FOOT

FIGURE 13	GROUNDWATER FLOW CHANNEL FILL AQUIFER
	GENERAL ELECTRIC COMPANY MAIN PLANT SCHENECTADY, NEW YORK
URS	646 PLANK ROAD SUITE 202 CLIFTON PARK, NEW YORK 12065

P:\Database\GE Main Plant\PRAP\watertables.apr

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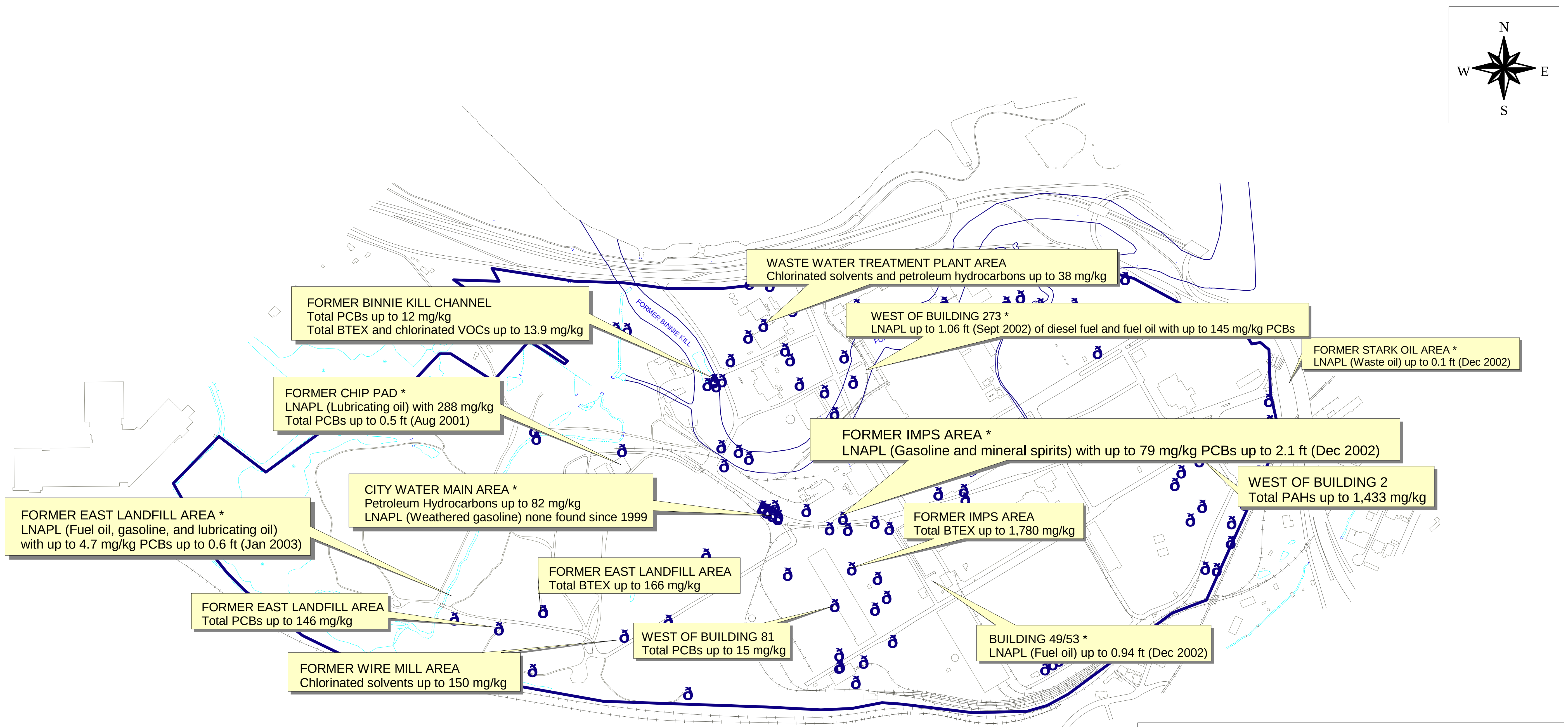


LEGEND

ð SUBSURFACE SOIL SAMPLING LOCATION FOR VOCs

Note: * LNAPL samples collected from temporary or permanent monitoring wells.

0 400 800 1200 1600 Feet

GRAPHIC SCALE IN FEET

Title: LNAPL AND SUBSURFACE SOIL RESULTS

Location: MAIN PLANT SCHENECTADY, NEW YORK

Client: GENERAL ELECTRIC COMPANY

URS

URS Corporation
28 Corporate Drive, Suite 200
Clifton Park, New York 12065

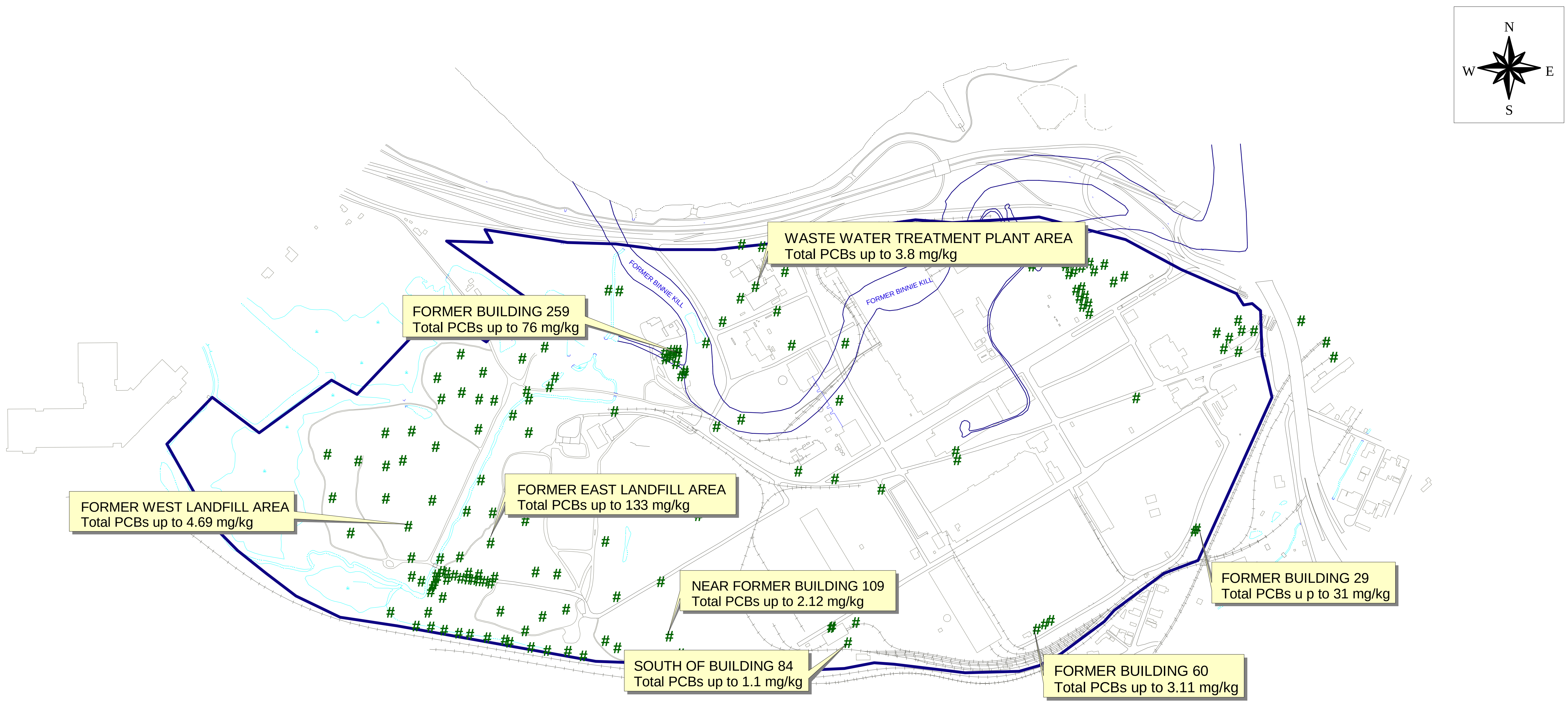
Drafter: DAD

Date: October 2004

Drg. Size: 11 x 17

Job No.: 38394054.10000

FIGURE 14



LEGEND

SURFACE SOIL SAMPLING LOCATION

0 400 800 1200 1600 Feet

GRAPHIC SCALE IN FEET

Title: SURFACE SOIL RESULTS

Location: MAIN PLANT
SCHENECTADY, NEW YORK

Client: GENERAL ELECTRIC COMPANY

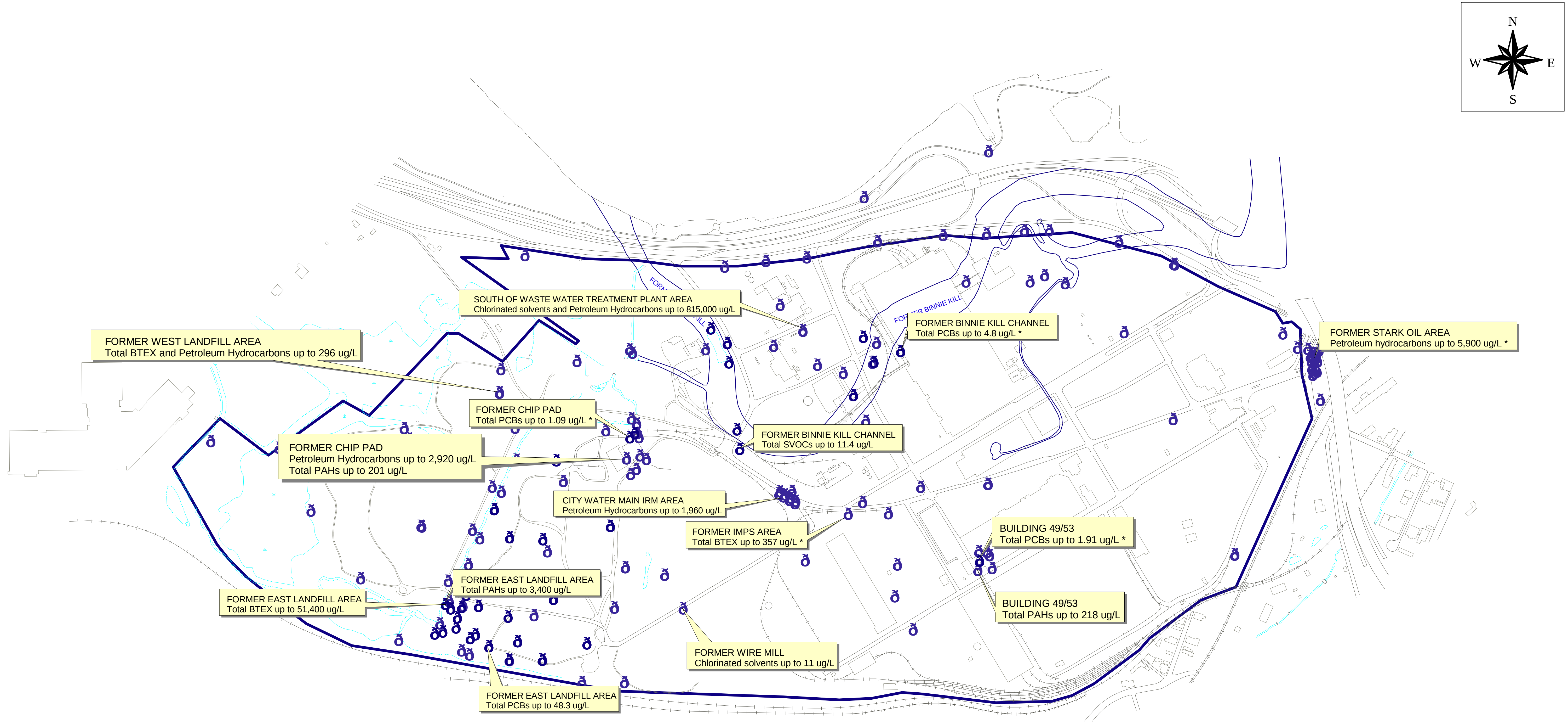
URS

URS Corporation
28 Corporate Drive, Suite 200
Clifton Park, New York 12065

Drafter:	Date:
DAD	October 2004
Drg. Size: 11 x 17	Job No.: 38394054.10000

FIGURE 15

P:\In Progress\GE Main Plant\PRAP\Figures\Combined Locations.apr



LEGEND

ǒ GROUNDWATER SAMPLING LOCATION FOR VOCs

Note * - LNAPL present in well. Analytical results may not be representative of actual groundwater concentrations.

0 400 800 1200 1600 Feet

GRAPHIC SCALE IN FEET

Title: GROUNDWATER RESULTS FILL AND FLOODPLAIN AQUIFER

Location: MAIN PLANT SCHENECTADY, NEW YORK

Client: GENERAL ELECTRIC COMPANY

URS

URS Corporation
28 Corporate Drive, Suite 200
Clifton Park, New York 12065

Drafter: DAD

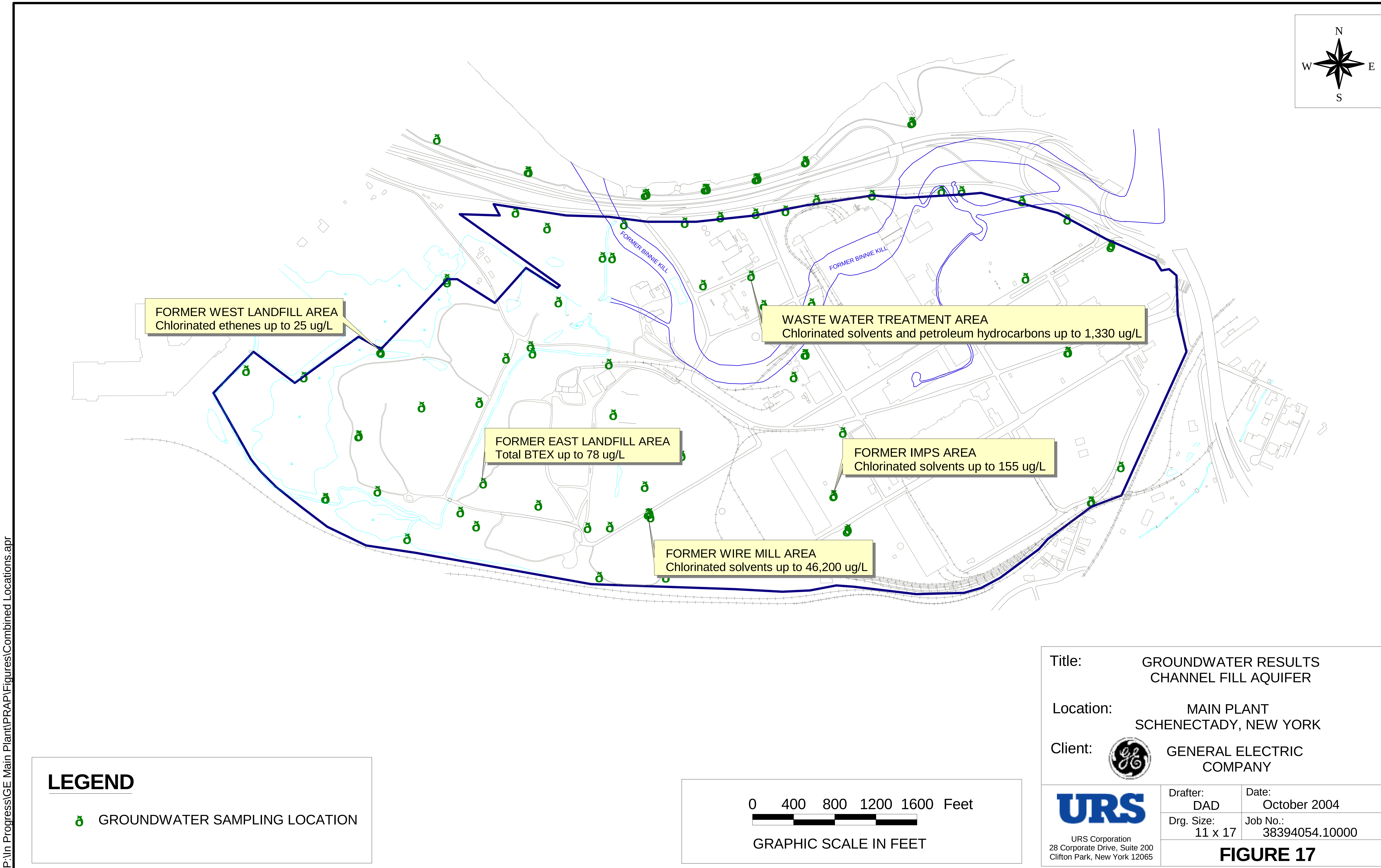
Date: October 2004

Drg. Size: 11 x 17

Job No.: 38394054.10000

FIGURE 16

P:\In Progress\GE Main Plant\PRAP\Figures\Combined Locations.apr



P:\In Progress\GE Main Plant\PRAP\Figures\Combined Locations.apr

Title: GROUNDWATER RESULTS CHANNEL FILL AQUIFER

Location: MAIN PLANT SCHENECTADY, NEW YORK

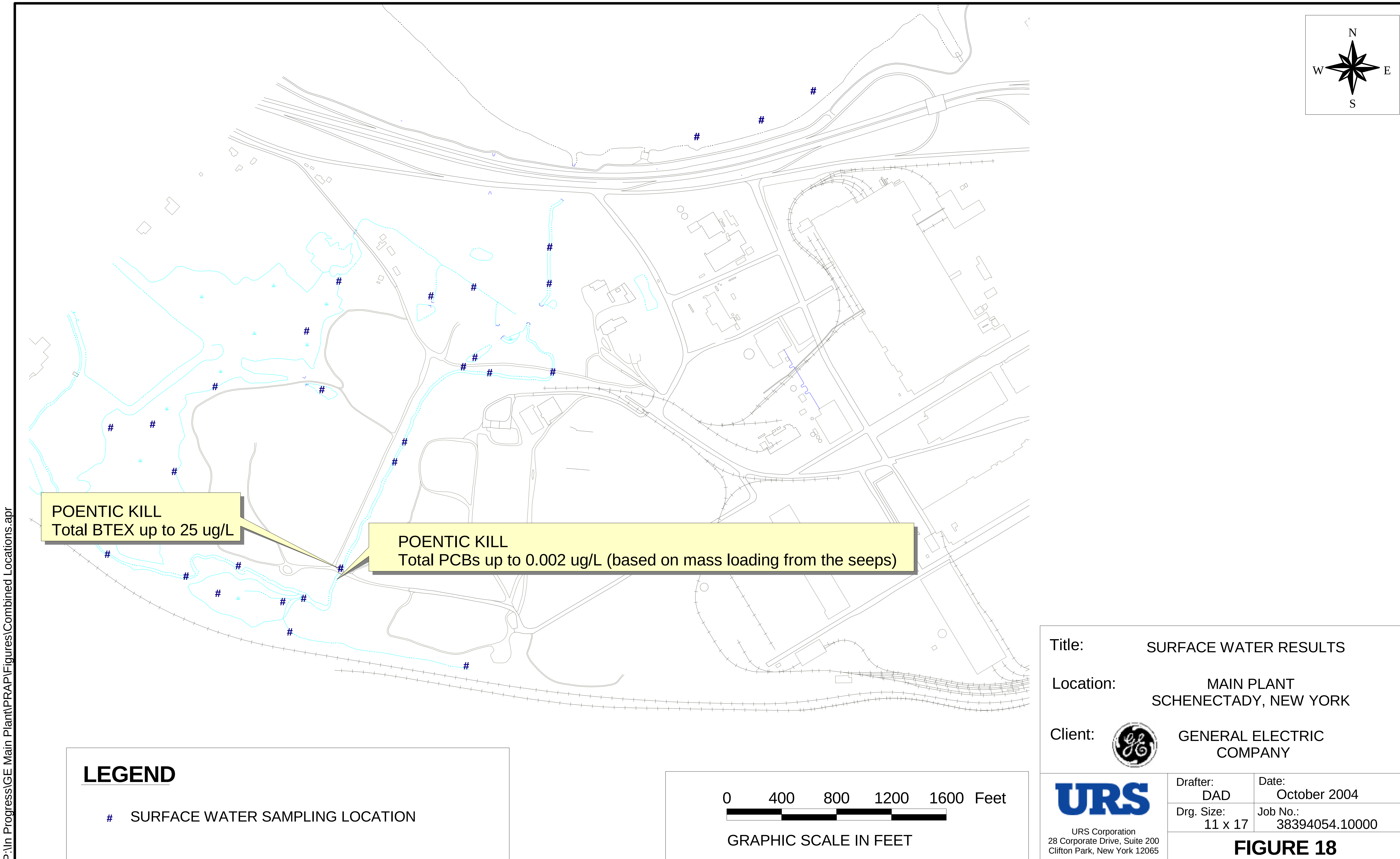
Client: GENERAL ELECTRIC COMPANY

URS

URS Corporation
28 Corporate Drive, Suite 200
Clifton Park, New York 12065

Drafter: DAD | Date: October 2004
Drg. Size: 11 x 17 | Job No.: 38394054.10000

FIGURE 17



Title: SURFACE WATER RESULTS

Location: MAIN PLANT SCHENECTADY, NEW YORK

Client: GENERAL ELECTRIC COMPANY

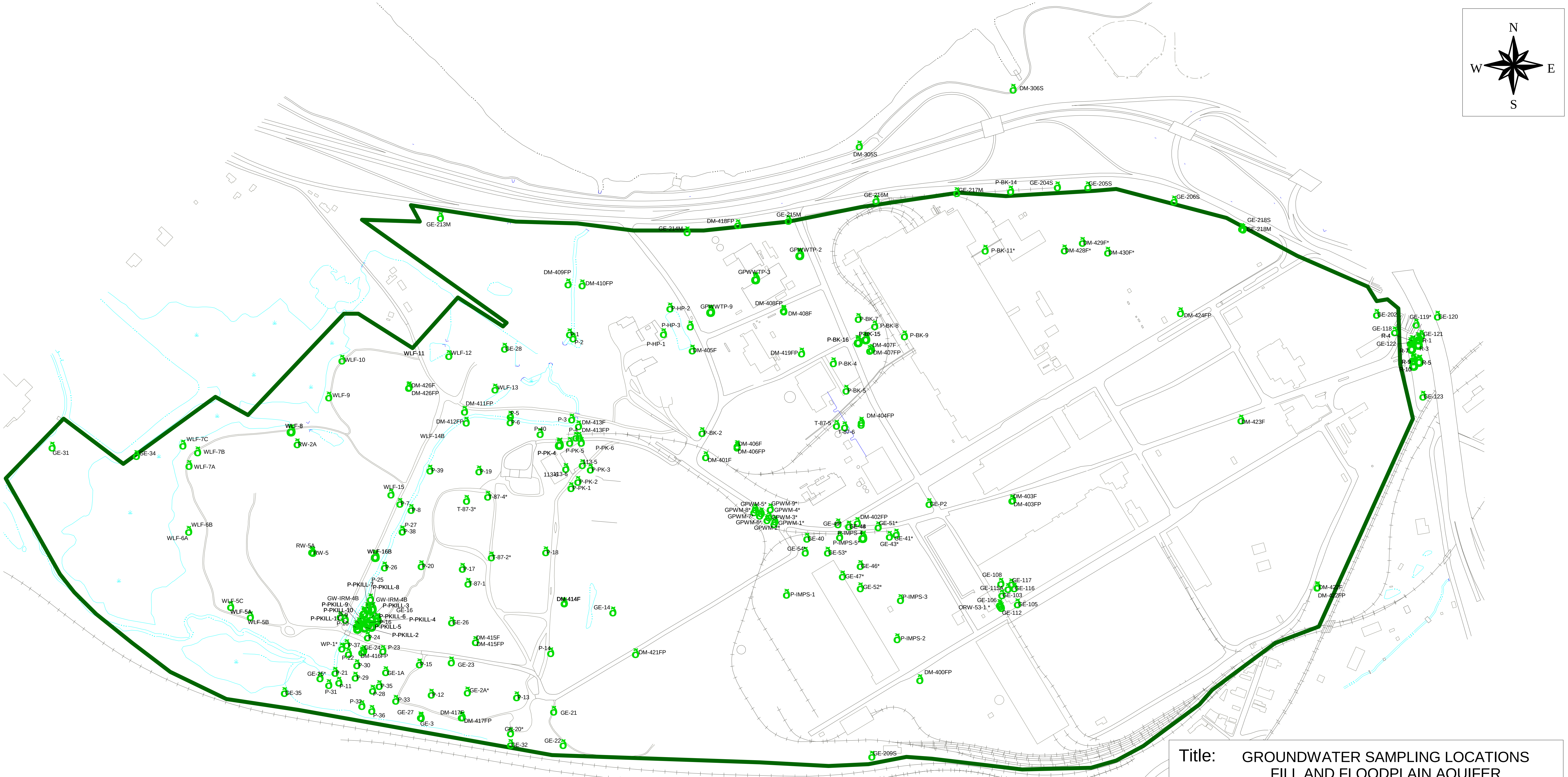
URS

URS Corporation
28 Corporate Drive, Suite 200
Clifton Park, New York 12065

Drafter: DAD	Date: October 2004
Drg. Size: 11 x 17	Job No.: 38394054.10000

FIGURE 18

P:\In Progress\GE Main Plant\PRAP\Figures\Combined Locations.apr



LEGEND

GROUNDWATER MONITORING WELLS - FILL AND FLOODPLAIN DEPOSITS

NOTES:
*: INDICATES WELL HAS BEEN ABANDONED OR DESTROYED.

0 400 800 1200 1600 Feet

GRAPHIC SCALE IN FEET

Title: GROUNDWATER SAMPLING LOCATIONS
FILL AND FLOODPLAIN AQUIFER

Location: MAIN PLANT
SCHENECTADY, NEW YORK

Client: GENERAL ELECTRIC
COMPANY

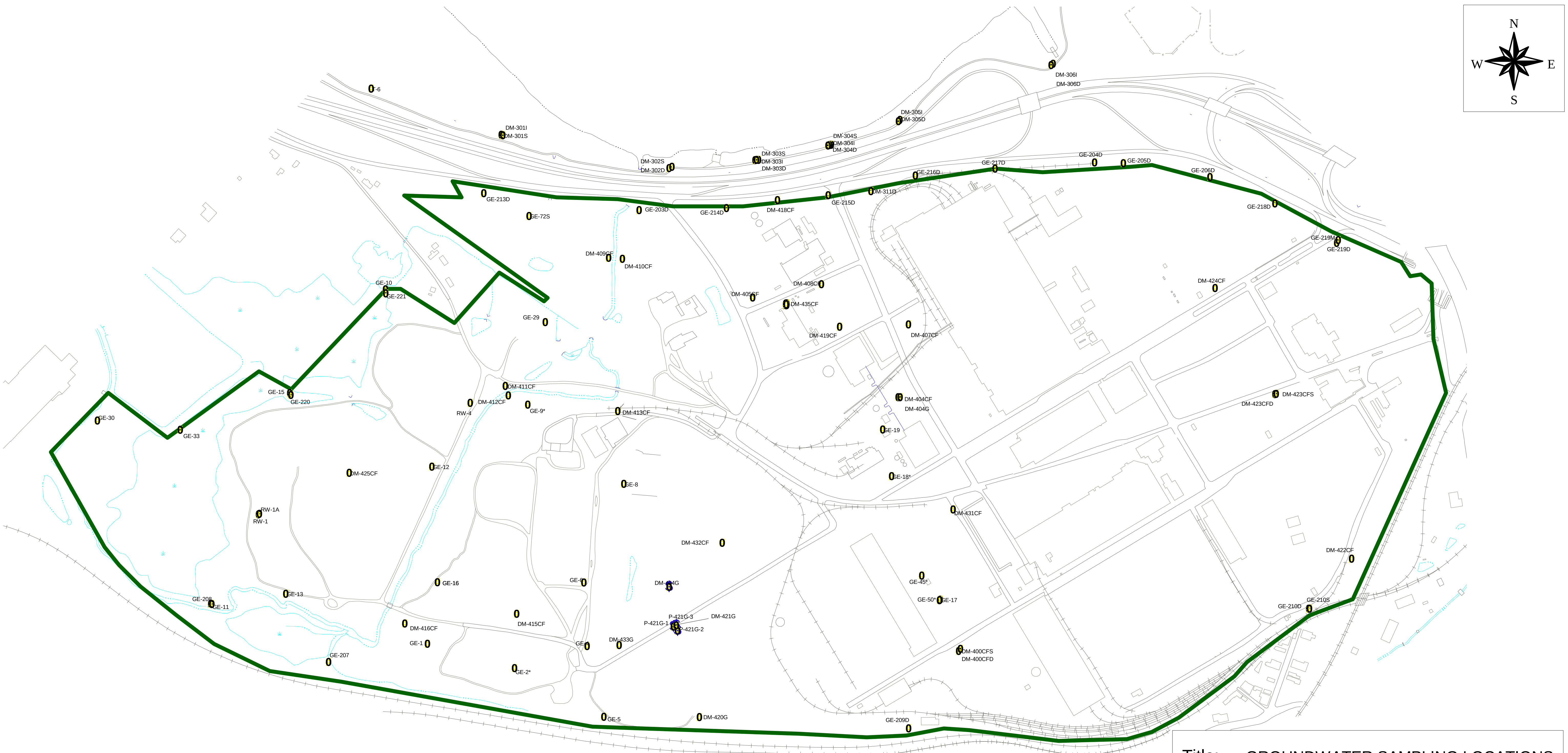
URS

URS Corporation
28 Corporate Drive, Suite 200
Clifton Park, New York 12065

Drafter:	Date:
DAD	October 2004
Drg. Size: 11 x 17	Job No.: 38394054.10000

FIGURE 4

P:\In Progress\GE Main Plant\PRAP\Figures\ location maps - altered 12-16-03.apr



Title: GROUNDWATER SAMPLING LOCATIONS CHANNEL FILL AQUIFER

Location: MAIN PLANT SCHENECTADY, NEW YORK

Client: GENERAL ELECTRIC COMPANY

URS

URS Corporation
28 Corporate Drive, Suite 200
Clifton Park, New York 12065

Drafter:	Date:
DAD	October 2004
Drg. Size: 11 x 17	Job No.: 38394054.10000

FIGURE 5

LEGEND

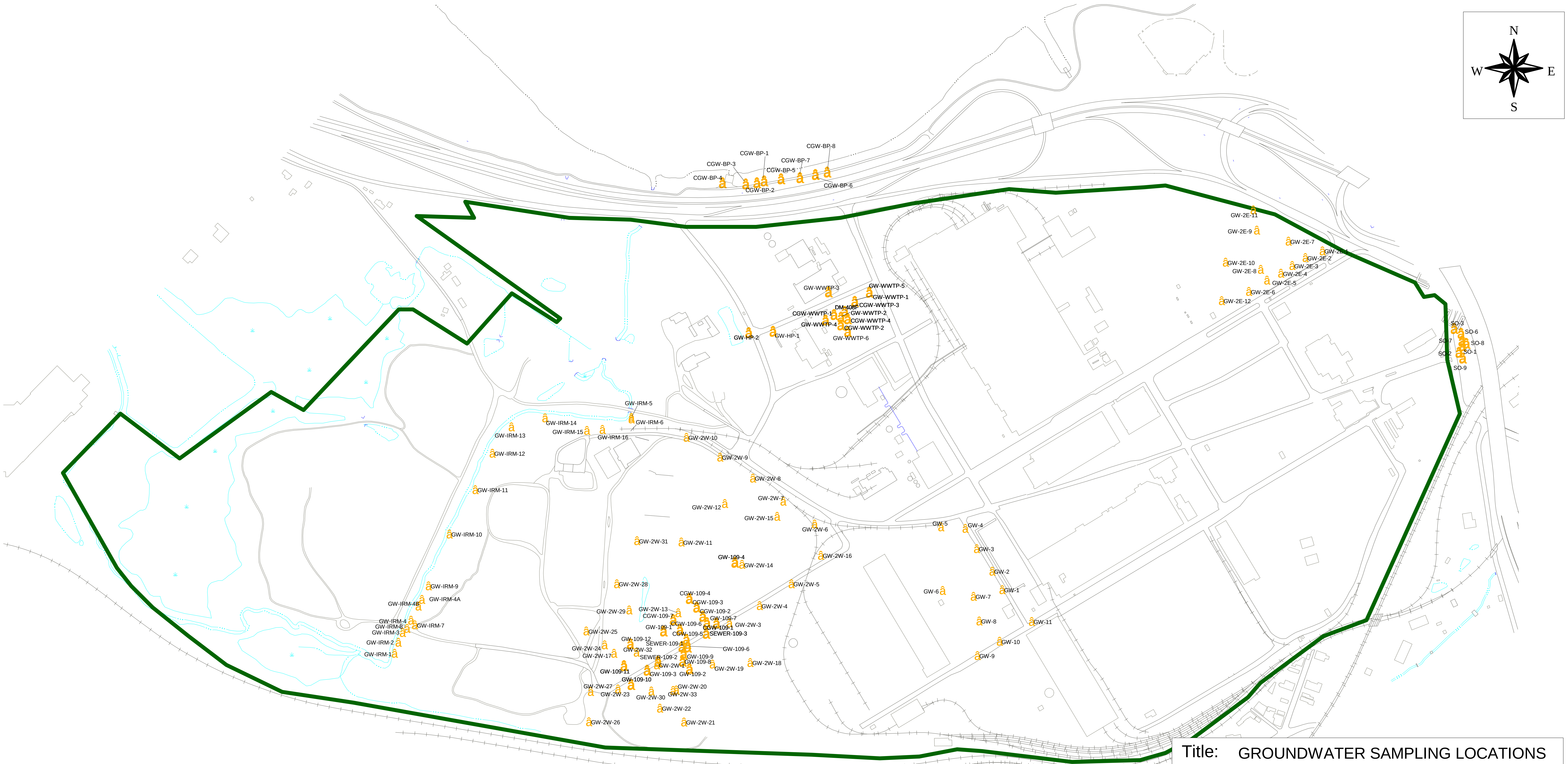
0 GROUNDWATER MONITORING WELL- CHANNEL FILL AND GLACIOLACUSTRINE

NOTES:
*: INDICATES WELL HAS BEEN ABANDONED OR DESTROYED.

0 400 800 1200 1600 Feet

GRAPHIC SCALE IN FEET

P:\In Progress\GE Main Plant\PRAP\Figures\ location maps - altered 12-16-03.apr



NOTE: Groundwater screening samples refer to samples collected using direct push methods or from soil borings with temporary well screen.

LEGEND

â GROUNDWATER SCREENING SAMPLING LOCATION

0 300 600 900 1200 Feet

GRAPHIC SCALE IN FEET

Title: GROUNDWATER SAMPLING LOCATIONS PLUME SCREENING

Location: MAIN PLANT SCHENECTADY, NEW YORK

Client: GENERAL ELECTRIC COMPANY

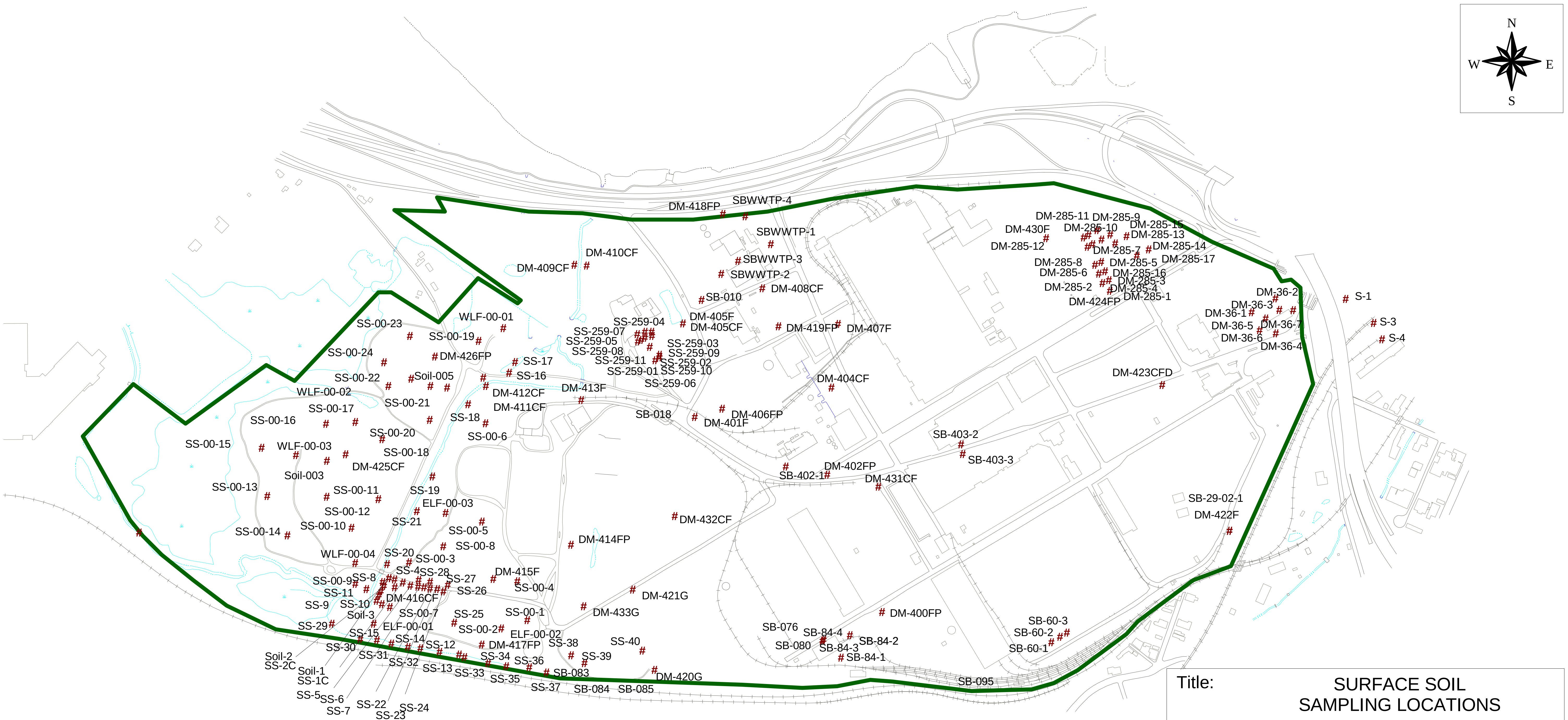
URS

URS Corporation
28 Corporate Drive, Suite 200
Clifton Park, New York 12065

Drafter: DAD	Date: October 2004
Drg. Size: 11 x 17	Job No.: 38394054.10000

FIGURE 6

P:\In Progress\GE Main Plant\PRAP\Figures\ location maps - altered 12-16-03.apr



LEGEND

SURFACE SOIL SAMPLING LOCATION

0 400 800 1200 1600 Feet

GRAPHIC SCALE IN FEET

Title:	SURFACE SOIL SAMPLING LOCATIONS
Location:	MAIN PLANT SCHENECTADY, NEW YORK
Client:	GENERAL ELECTRIC COMPANY

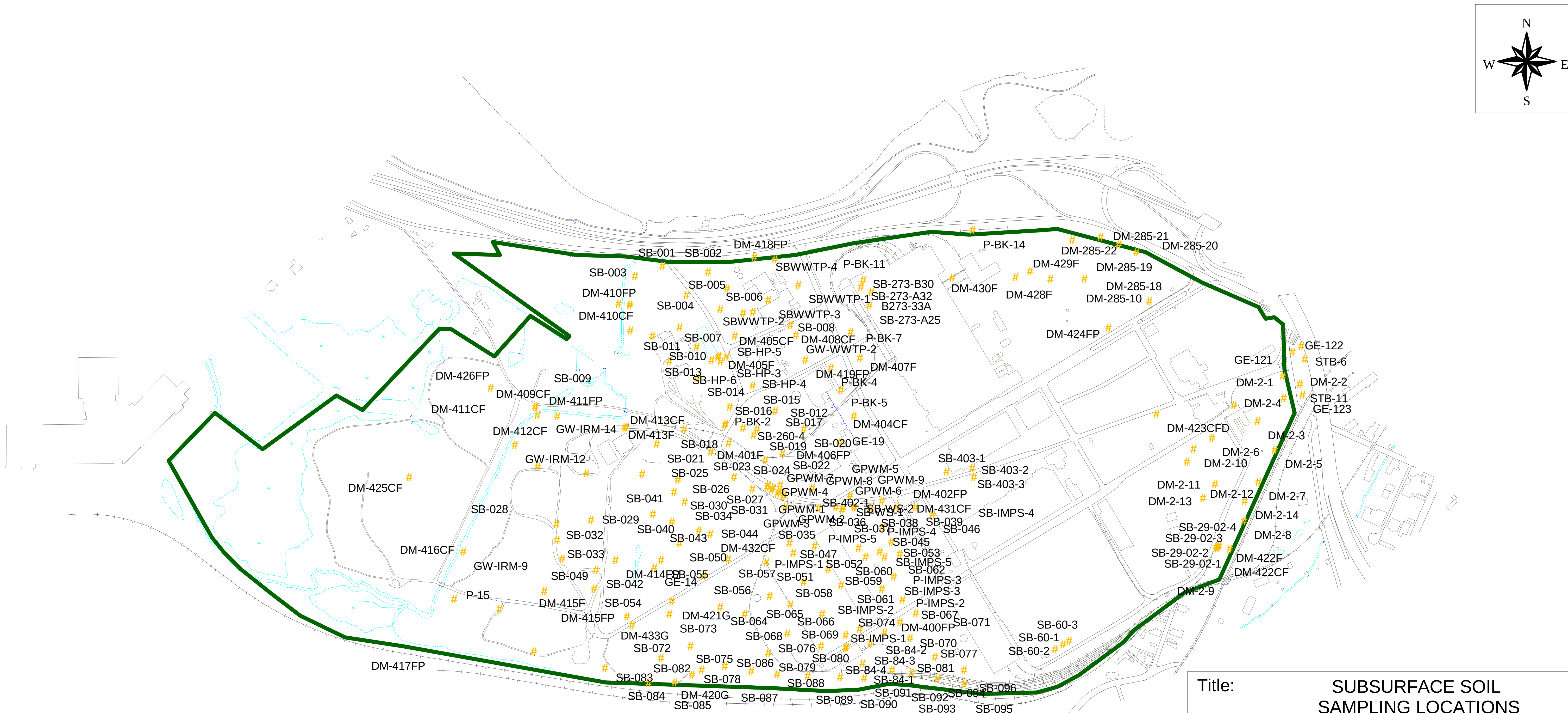
URS

URS Corporation
28 Corporate Drive, Suite 200
Clifton Park, New York 12065

Drafter: DAD	Date: October 2004
Drg. Size: 11 x 17	Job No.: 38394054.10000

FIGURE 7

P:\In Progress\GE Main Plant\PRAP\Figures\ location maps - altered 12-16-03.apr



P:\In Progress\GE Main Plant\PRAP\Figures\ location maps - altered 12-16-03.apr

LEGEND

SUBSURFACE SOIL SAMPLING LOCATION

0 400 800 1200 1600 Feet

GRAPHIC SCALE IN FEET

Title:	SUBSURFACE SOIL SAMPLING LOCATIONS
Location:	MAIN PLANT SCHENECTADY, NEW YORK
Client:	GENERAL ELECTRIC COMPANY

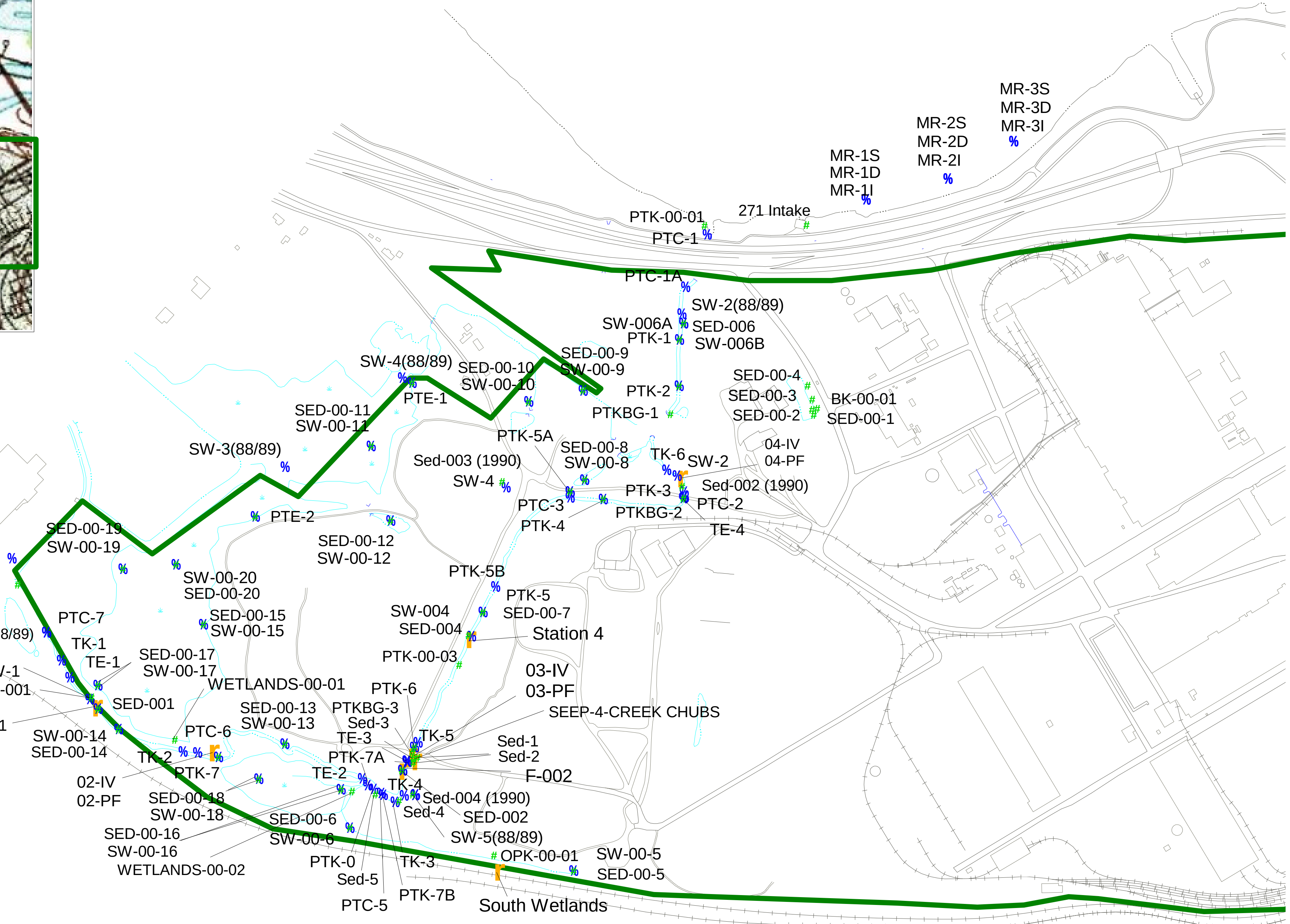
URS

URS Corporation
28 Corporate Drive, Suite 200
Clifton Park, New York 12065

Drafter: DAD	Date: October 2004
Drg. Size: 11 x 17	Job No.: 38394054.10000

FIGURE 8

NOTES:
SAMPLES 01-PF AND 01-IV ARE LOCATED APPROXIMATELY 3500 FEET UPSTREAM



N
W
E
S

LEGEND

% SURFACE WATER SAMPLING LOCATION

SEDIMENT SAMPLING LOCATION

r BIOTA SAMPLING LOCATION

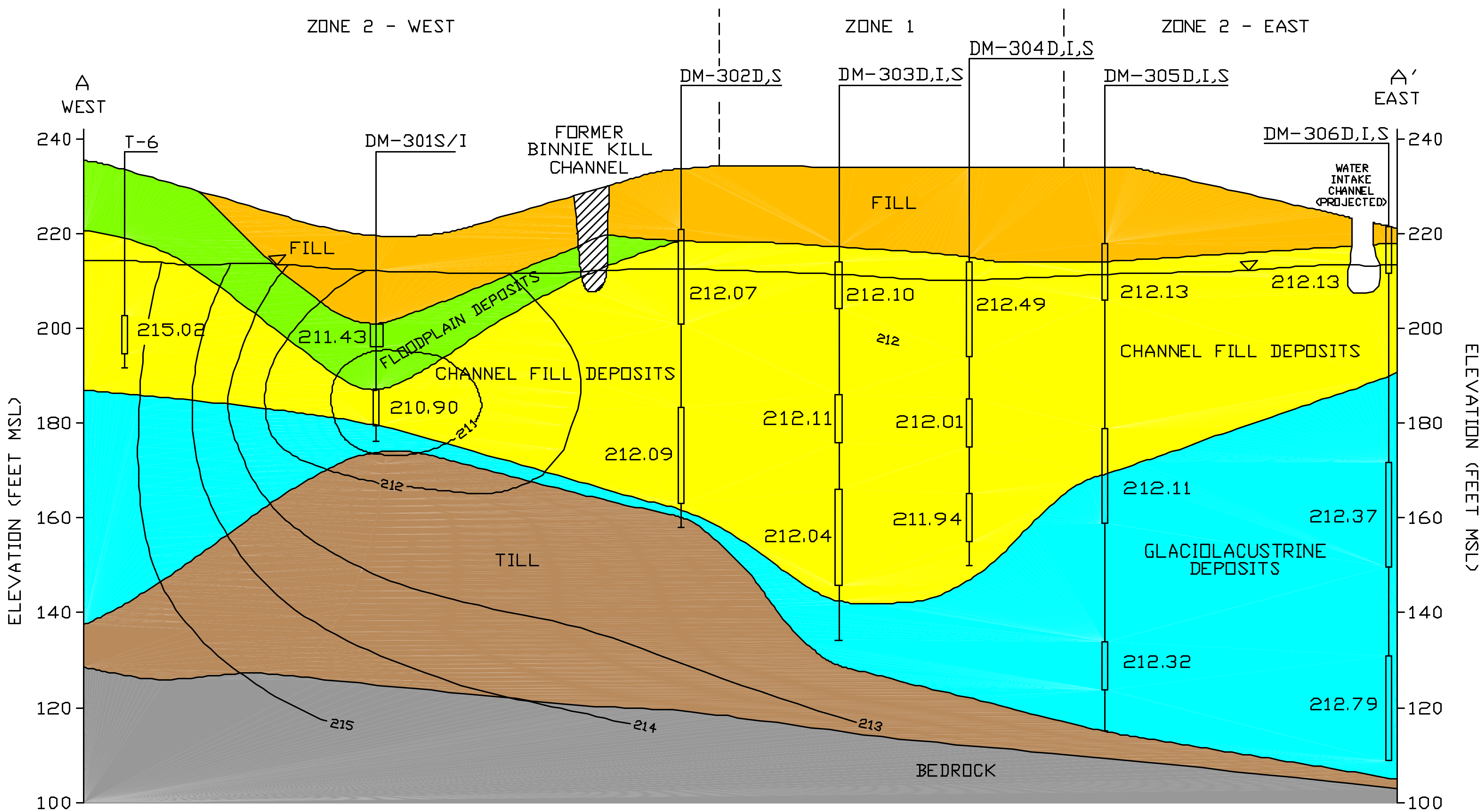
0 400 800 1200 1600 Feet

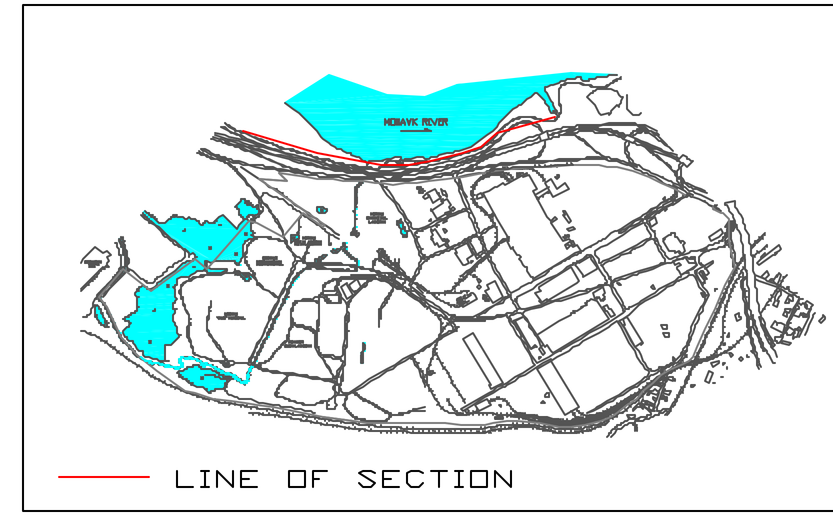
GRAPHIC SCALE IN FEET

Title:	SURFACE WATER, SEDIMENT AND BIOTA SAMPLING LOCATIONS
Location:	MAIN PLANT SCHENECTADY, NEW YORK
Client:	GENERAL ELECTRIC COMPANY

URS URS Corporation 28 Corporate Drive, Suite 200 Clifton Park, New York 12065	Drafter: DAD	Date: October 2004
	Drg. Size: 11 x 17	Job No.: 38394054.10000
	FIGURE 9	

P:\In Progress\GE\Main Plant\PRAP\Figures\ locationmaps2.apr





NOTES:

1. REFER TO FIGURE 5-1 FOR THE ORIENTATION OF THE LINE OF SECTION.
2. REFER TO BORING LOGS IN AOC REPORT FOR DETAILED LITHOLOGIC DESCRIPTIONS.
3. ELEVATIONS ARE IN FEET ABOVE SEA LEVEL (FEET MSL) BASED ON NATIONAL GEODETIC VERTICAL DATUM 1929 (NGVD29).

LEGEND:

DM-301I — WELL DESIGNATION AND APPROXIMATE LOCATION

GENERALIZED GROUND SURFACE

214.05 — WATER ELEVATION (FEBRUARY 20, 2001)

POTENTIOMETRIC SURFACE OF CHANNEL FILL DEPOSITS (FEBRUARY 20, 2001)

—212— EQUIPOTENTIAL CONTOUR (FEET MSL) DASHED WHERE INFERRED

FILL

FLOODPLAIN, SILTS, CLAYS, FINE GRAINED SANDS, ORGANIC MATTER

CHANNEL FILL DEPOSITS MEDIUM TO COARSE GRAINED SANDS, GRAVEL

GLACIOLACUSTRINE DEPOSITS PRIMARY CLAYS AND SILTS, SILTY FINE SANDS OR LAKE CLAYS IN SOME AREAS

TILL

BEDROCK-CANAJOHARIE FORMATION-SHALE WITH SANDSTONE AND SILTSTONE INTERBEDS

GRAPHIC SCALE (IN FEET)
0 350 700
VERTICAL EXAGGERATION = 17.5x

FIGURE 10

GEOLOGIC CROSS-SECTION EAST/WEST

GENERAL ELECTRIC COMPANY
MAIN PLANT, SCHENECTADY, NEW YORK

URS CORPORATION
646 PLANK ROAD, SUITE 202
CLIFTON PARK, NEW YORK 12065

P:\In Progress\GE\Main Plant\PRAP\Figures\Fig 10 Geological Cross-Section East-West.dwg

FIGURE 1	SITE LOCATION

GENERAL ELECTRIC COMPANY
MAIN PLANT
SCHENECTADY, NEW YORK

N

GRAPHIC SCALE (FEET)

0 0.5 1 MILE

Property Boundary

USGS Schenectady, NY 15' Quadrangle, 1954 (Photorevised 1980)

URS

646 PLANK ROAD SUITE 202
CLIFTON PARK, NEW YORK 12065

P:\In Progress \GE\Main Plant \PRAP\Figures\Fig 2 General Site Features.dwg

N

LEGEND

- APPROXIMATE PROPERTY LINE
- EXISTING BUILDING
- FORMER BUILDING
- 36 BUILDING NUMBER
- FORMER LANDFILL AREA
- WATER BOUNDARIES
- SEEP AREA

0 450 900

GRAPHIC SCALE IN FEET

Title: GENERAL SITE FEATURES

Location: MAIN PLANT SCHENECTADY, NEW YORK

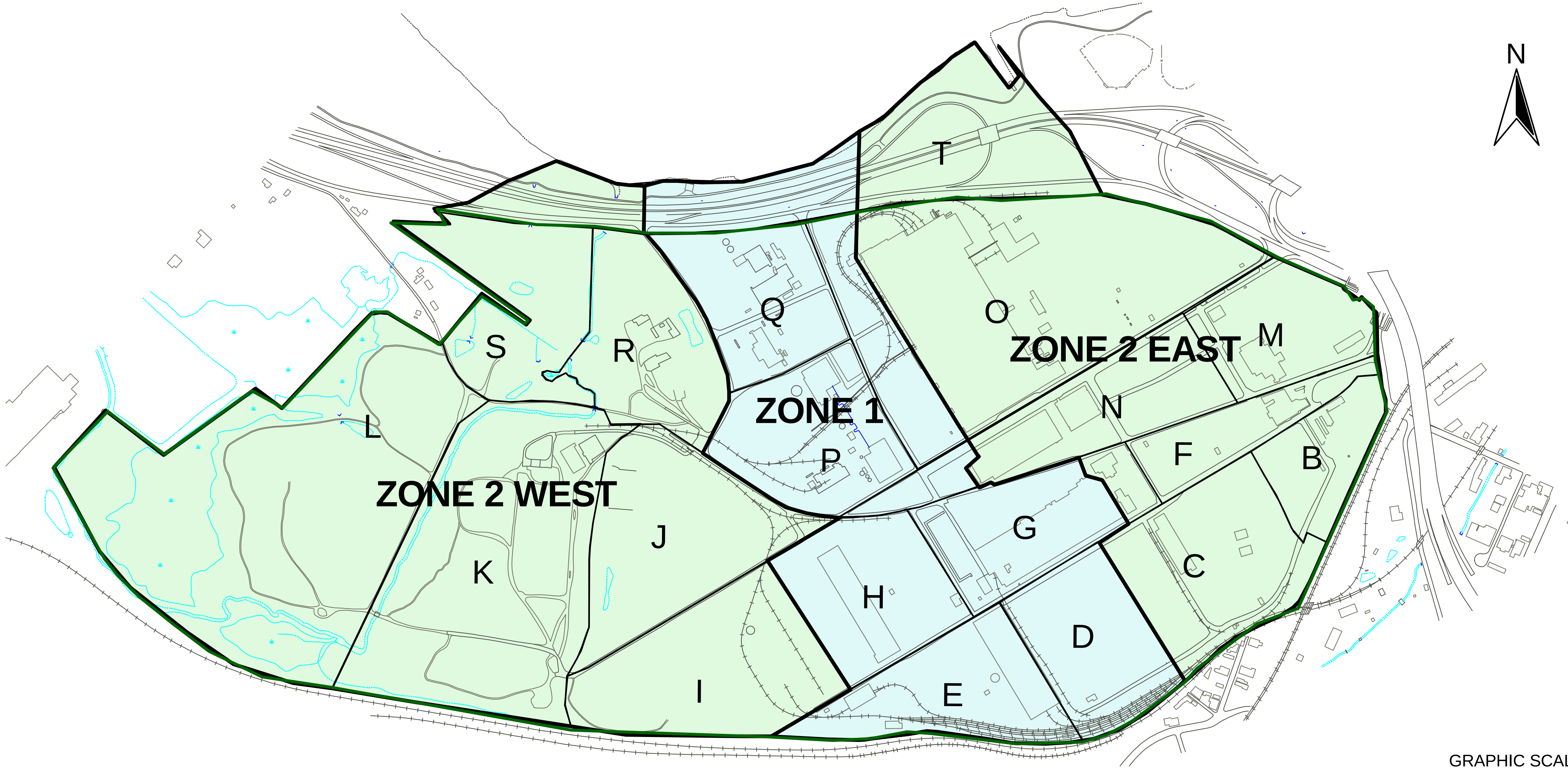
Client: GENERAL ELECTRIC COMPANY

URS

URS Corporation
28 Corporate Drive, Suite 200
Clifton Park, New York 12065

Drafter: DAD	Date: October 2004
Drg. Size: 11 x 17	Job No.: 38394054.10000

FIGURE 2



GRAPHIC SCALE

0 400 800 1200 Feet

LEGEND:
PROPERTY BOUNDARY
SECTOR BOUNDARIES
ZONE BOUNDARIES

FIGURE 3

ZONES AND SECTORS

GENERAL ELECTRIC COMPANY
MAIN PLANT
SCHENECTADY, NEW YORK

URS

646 PLANK ROAD SUITE 202
CLIFTON PARK, NEW YORK 12065

P:\Database\GE Main Plant\ArcData\PRAP\E3 Zones & Sectors.apr