PROPOSED REMEDIAL ACTION PLAN

SI Group, Congress Street Facility
(Formerly: Schenectady International-10th St. Plant)

Operable Unit No. 2

State Superfund Project
Schenectady, New York
Site No. 447007

September 2010

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

PROPOSED REMEDIAL ACTION PLAN

SI Group, Congress Street Facility
(Formerly: Schenectady International-10th St. Plant)

Operable Unit No. 2
State Superfund Project
Schenectady**, New York**
Site No. 447007
September 2010

SECTION 1: SUMMARY AND PURPOSE OF THE PROPOSED PLAN

The New York State Department of Environmental Conservation (the Department), in consultation with the New York State Department of Health (NYSDOH), is proposing a remedy for the above referenced site. The disposal of hazardous waste at the site has resulted in threats to public health and the environment that will be addressed by the remedy proposed by this Proposed Remedial Action Plan (PRAP). The disposal of hazardous wastes at this site, as more fully described in Sections 5 of this document, have contaminated various environmental media. The proposed remedy, discussed in detail in Section 8, is intended to attain the remedial action objectives identified for this site in Section 6 for the protection of public health and the environment. This PRAP identifies the preferred remedy, summarizes the other alternatives considered, and discusses the reasons for the preferred remedy. The Department will select a final remedy for the site only after careful consideration of all comments received during the public comment period.

The New York State Inactive Hazardous Waste Disposal Site Remedial Program (also known as the State Superfund Program) is an enforcement program, the mission of which is to identify and characterize suspected inactive hazardous waste disposal sites and to investigate and remediate those sites found to pose a significant threat to public health and environment.

The Department has issued this PRAP in accordance with the requirements of New York State Environmental Conservation Law and Title 6 of the Official Compilation of Codes, Rules and Regulations of the State of New York, 6 NYCRR Part 375. This document is a summary of the information that can be found in the site related reports and documents which are available for review at the document repositories. The public is encouraged to review the reports and documents, which are available at the following repositories:

NYSDEC Region 4
1130 North Westcott Road
Schenectady, NY
(518) 357-2045
Hours: M-F 8:30-4:45

Schenectady County Library
Central Branch
99 Clinton Street
Schenectady, NY
(518) 388-4500
Hours: M-Th 9-9; F-Sat 9-5; Su 1-5

The Department seeks input from the community on all PRAPs. A public comment period has been set from September 15, 2010 to provide an opportunity for public participation in the remedy selection process. A public meeting is scheduled for September 29, 2010 at the NYSDEC Region 4 Headquarters beginning at 7:30 PM.

At the meeting, the findings of the remedial investigation (RI) and the feasibility study (FS) will be presented along with a summary of the proposed remedy. After the presentation, a question-and-answer period will be held, during which verbal or written comments may be submitted on the PRAP. Written comments may also be sent to Mr. Howard Brezner (project manager) at the following address 1130 North Westcott Road, Schenectady, NY 12306 through October 15, 2010.

The Department may modify the proposed remedy or select another of the alternatives presented in this PRAP, based on new information or public comments. Therefore, the public is encouraged to review and comment on all of the alternatives identified here. Comments will be summarized and addressed in the responsiveness summary section of the Record of Decision (ROD). The ROD is the Department's final selection of the remedy for this site.

SECTION 2: SITE DESCRIPTION AND HISTORY

2.1: Location and Description

The SI Group plant is located at the intersection of Congress Street and Tenth Avenue. It is a former chemical manufacturing facility and began operation in 1910 in the City of Schenectady, Schenectady County. It is Site No. 447007 on the NYS Registry of Inactive Hazardous Waste Disposal Sites (Registry). The site is approximately 7.0 acres in size and is located southwest of the intersection of 10th Street and Congress Street. Residences in a suburban neighborhood are located to the north and east of the site with the closest residence approximately 400 feet across 10th Avenue and Congress Street. Please refer to Figures 1 and 2 for the location map and the former site map, respectively.

The facility sits on a steep embankment. At the bottom of this embankment is Cowhorn Creek, a Class C stream (suitable for fish survival and propagation). Prior to installation of the pump and treat groundwater system as part of the initial remedial actions for the Site (described below), shallow groundwater moved in a southerly direction through the site, broke out in seeps (along the embankment), flowed to (then down) a swale along the southern fence line of the plant property, and ultimately to Cowhorn Creek. Individual seeps near a storm water outfall flowed directly into the creek.

Railroad tracks and a service road lie south of the site and outside of the security fence. A spur from the railroad and an area that previously contained tanks are uphill (partly up the embankment) from the swale and inside the security fence.

As described below under remedial history, in July 1996, the Department made the decision to split the site into two operable units. 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. The first operable unit, (OU1), addressed terminating the pathways by which the contaminants were being released off-site. The ROD for OU1, issued in March 1998, required the installation of a groundwater interception and collection system which is connected to a groundwater treatment system. The system is currently active.

Operable Unit (OU) No. 2, which is the subject of this document, consists of the Fill area that is an area in the southwest corner of the facility where materials from the operations were placed, and the Process area that is the area on-site that was historically used for chemical processing, storage and handling are outlined in Figure 3. Each area will be discussed separately with different proposed remedies.

2.2: Operational/Disposal History

From 1910 to 1997, SI Group manufactured insulating coatings and other chemical products at this facility. Spills, ranging from a few gallons to a few hundred gallons, over the period of operation have contaminated a significant volume of soils. Contaminated soils are located beneath the former process buildings, in transportation areas, southwest of the process buildings and up to the “swale area” between the facility and the railroad tracks (Figure 2).

2.3: Remedial History

In 1984, SI Group, Inc. (SIG) began investigating this site. Operations stopped 1997. In 2004, SIG removed all process equipment, storage tanks, piping and buildings except for a small building used to house the groundwater treatment system (see Figure 3).
A Remedial Investigation/ Feasibility Study (RI/FS) was completed in 1996, and a Record of Decision (ROD) for OU1 was signed in March 1998. The ROD required: installation of a groundwater collection trench, installation of groundwater recovery wells (in areas outside the capture zone of the collection trench), and construction of a groundwater pump and treat (p&t) system for the collected groundwater. These items have eliminated further impacts on the groundwater aquifer and the Cowhorn Creek.

With the buildings removed, site conditions changed. The on-site soils become accessible and, thereby, allowing investigation of the entire Site and evaluation of potential remedial alternatives to address OU2. A work plan to update the RI/FS was prepared in August 2007 and was approved by NYSDEC in a letter dated August 16, 2007.

The final Updated RI Report, along with the SVI Report and responses to NYSDEC comments, were submitted to NYSDEC on January 8, 2009 and were approved by NYSDEC in a letter dated February 1, 2009.

An updated Feasibility Study based on the Updated RI Report was subsequently submitted by SI Group and approved by NYSDEC on March 5, 2010.

Additionally, a pilot test of two in-situ bioremediation technologies was conducted at SI Group’s Rotterdam Junction (RJ) facility from between March 2004 and September 2006. The test demonstrated that by using thermally-enhanced soil vapor extraction, the volatile organic contamination contained in the unsaturated soils could be reduced to a level that allowed the natural bacteria contained in the soil to become active and bio-remediate the residual contamination. Two different methods of heating the soil were tested. One method utilized standard hot air injection and soil vapor extraction, which used convective heating as the heat transfer mechanism. The other method used a heated probe (HeatTrode technology) to conductively heat the soils. The final results of a pilot test determined that both methods are viable.

The final results of a pilot test (at the RJ facility) have determined that a thermally enhanced Soil-Vapor Extraction (SVE) system is a viable technology for these remaining soils. Since the soils and contamination at both the Rotterdam Junction and Congress Street facilities, the Department felt that the results of this test could be used to guide the decisions for cleaning up the Congress Street facility.

1. Remedial Parties and Program.

In January 1983, the Department first identified the site as a Class 2a site. A Class 2a site is a temporary classification assigned to a site that had inadequate and/or insufficient data for inclusion in any of the other classifications in the Registry of Inactive Hazardous Waste Disposal Sites in New York. As a result of identified hazardous waste disposal, the Department listed the site as a Class 2 site on the Registry of Inactive Hazardous Waste Disposal Sites in New York in June 1986. 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.

2. Investigation/Actions.

The following is a chronology of investigations and actions taken in relation to SI Group's Congress Street facility:

- July 1984: groundwater monitoring wells were installed and groundwater samples were taken.
- August 1987: a Consent Order was signed which required SI Group to conduct a Hydrogeologic Investigation and install additional groundwater monitoring wells.
- March 1988: a Hydrogeologic Investigation Report was submitted and contamination confirmed.
- August 1993: the NYSDEC signed a multi-media pollution prevention (M2P2) Consent Order (C. O.) with SIG that required SIG to conduct a RI/FS.
- September 1994: the M2P2 C.O. was modified to require SIG to conduct additional remedial activities necessary for the 10th Street plant.
- January 1996: the Remedial Investigation (RI) was submitted to the NYSDEC.
- July 1996: the Feasibility Study (FS) was submitted to the NYSDEC.
- December 1997: Production ceased at the Congress Street Site
- March 1998: ROD for OU1 approved by NYSDEC, but did not address the long-term source of contamination from the soil (since the buildings had not yet been demolished)
- February 2002: Groundwater Collection and Treatment System (OU1) placed in operation.
- 2004: SIG removed all process equipment, storage tanks, piping and buildings remaining on-site except the building housing the groundwater treatment system.
- March 2004 to September 2006: a pilot test of two in-situ bioremediation technologies was conducted at SI Group's Rotterdam Junction facility.
- July 2007: Work Plan to update the RI and FS submitted to NYSDEC
- August 2007: Work Plan to update the RI and FS approved by NYSDEC
- January 2009: Updated Remedial Investigation Report submitted to NYSDEC
- February 2009: Updated Remedial Investigation Report approved by NYSDEC
- December 2009: Soil Vapor Intrusion Investigation completed
- March 2010: Updated Feasibility Study for the Site approved by NYSDEC

SECTION 3: LAND USE

The Department may consider the current, intended, and reasonable anticipated future land use of the site and its surroundings when assessing the nature and extent of contamination. For this site, alternatives that may restrict the use of the site to restricted industrial and protection of groundwater Soil Cleanup Objectives (SCO) criteria as described in Part 375-1.8 (g) are being evaluated in addition to unrestricted SCGs because the past and possible future uses by the Potentially Responsible parties are industrial in nature and the property is currently zoned for industrial use. Restricted use criteria will be considered when clean up to unrestricted use is deemed infeasible by the Department. Section 8 of this document outlines actions that must be taken if unrestricted use cannot be attained with the selected remedial technology.

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 PRP for the site, documented to date, is SI Group Inc.

The Department and SI Group entered into a Consent Order (#R-0888-90-12) in August 22, 1997. The Order obligates the responsible parties to implement a full remedial program.

SECTION 5: SITE CONTAMINATION

A remedial investigation has been conducted to determine the nature and extent of contamination.

5.1: Summary of the Remedial Investigation

The purpose of the Remedial Investigation (RI) was to define the nature and extent of any contamination resulting from previous activities at the site. An Updated RI was approved by NYSDEC on February 1, 2009 for OU2. The field activities and findings of the investigation are described in the Updated RI Report.

The following general activities were conducted during the Updated RI:

- Research of historical information,
- Soil borings, and monitoring well installations,
- Direct push/Geoprobe® drilling program,
- Sampling of waste, surface and subsurface soils, groundwater and soil vapor
- Sampling of surface water and sediment, groundwater,
- Ecological and Human Health Exposure Assessments.

5.1.1: Standards, Criteria, and Guidance (SCGs)

The remedy must conform to promulgated standards and criteria that are directly applicable, or that are relevant and appropriate. The selection of a remedy must also take into consideration guidance, as appropriate. Standards, Criteria and Guidance are hereafter called SCGs.

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

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. These are summarized in Section 5.1.2. More complete information can be found in the RI Report.

5.1.2: Nature and Extent of Contamination

This section describes the findings of the Updated Remedial Investigation Report. As described in the RI report, waste/ source materials were identified at the site and are impacting groundwater and soil.

Waste/Source Areas

Wastes are defined in 6 NYCRR Part 375-1.2 (aw) and include solid, industrial and/or hazardous wastes. Source Areas are defined in 6 NYCRR Part 375 (au). Source areas are areas of concern at a site where substantial quantities of contaminants are found which can migrate and release significant levels of contaminants to another environmental medium. Wastes and Source areas identified at the site include: product (a mixture of naphthalene, xylene and toluene) floating on the groundwater table in the Process area; and a black tar-like material (cresols) found in the subsurface of the Fill area and under and between concrete slabs in the Process area (Figure 2).

Certain of the waste/source areas identified at the site were addressed by the IRM(s) described in Section 5.2. The remaining waste/source area(s) identified during the RI will be addressed in the remedy selection process.

This section describes the findings for all environmental media that were evaluated. As described in the Updated RI report, groundwater, soil, and soil vapor intrusion samples were collected to characterize the nature and extent of contamination.

For each media, a table summarizes the findings of the investigation. The tables present the range of contamination found at the site in the media and compares the data with the applicable SCGs for the site. The contaminants are arranged into two categories; volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs).

Groundwater

Groundwater samples were collected from monitoring wells and the direct push/Geoprobe® drilling program. The samples were collected to assess groundwater conditions onsite for the purpose of selecting a remedy for OU2. Contaminants detected above the groundwater standards are shown in Table #1.

	Table #1 - Groundwater		
Detected Constituents	Concentration Range Detected (ppb)[a]	SCG[b] (ppb)	Frequency Exceeding SCG
VOCs			
Benzene	.35-31	1	8 of 45
Ethylbenzene	3.8-14,000	5	17 of 45
Toluene	.77-10,000	5	12 of 45
Total Xylenes	.59-45,000	5	19 of 45
SVOCs			
2,4-Dimethyphenol	1.8-990	1	15 of 45
Methylnapthalene	1.4-1700	50	4 of 45
2-Methylphenol	1.9-420	1	9 of 45
4-Methylphenol	.46-2500	1	12 of 45
Acenaphthene	.63-190	20	4 of 45
Benzo(A)Anthracene	36	.002	1 of 45
Di-N-Butylphthalate	1000	50	1 of 45
Fluoranthene	52	50	1 of 45
Fluorene	1.2-120	50	1 of 45
Napthalene	.65-3100	10	12 of 45
Phenanthrene	1.9-200	50	1 of 45
Phenol	.89-150	1	8 of 45
Pyrene	63.3	50	1 of 45

a - ppb: parts per billion, which is equivalent to micrograms per liter, ug/L, in water.
b- SCG: Standard Criteria or Guidance - Ambient Water Quality Standards and Guidance Values (TOGs 1.1.1), 6 NYCRR Part 703, Surface water and Groundwater Quality Standards, and Part 5 of the New York State Sanitary Code (10 NYCRR Part 5).

The primary groundwater contaminants are benzene, toluene, xylene, naphthalene and phenol. The extent of the shallow groundwater contamination (above 15 feet) is shown in Figure 4. There is little deep groundwater contamination (below 15 feet).

Based on the findings of the Updated RI, the disposal of hazardous waste (spills) has resulted in the contamination of groundwater. Migration of contaminated groundwater offsite is controlled by the Groundwater Extraction System installed as part of the remedy for OU1.

Soil

Soil samples were collected from the surface down to the water table throughout the site during the RI. Little to no contamination was detected below the water table. Contaminants detected above the unrestricted SCG's are shown in Table #2. There were no exceedences of metal SCOs.

Table #2 - Soil

Detected Constituents	Concentration Range Detected (ppm)[a]	Unrestricted SCG[b] (ppm)	Restricted Industrial Use SCG[c] (ppm)	Frequency Exceeding Unrestricted SCG
VOCs				
Acetone	0.01-2.8	0.05	1000	5 of 24
Benzene	0.003-0.89	0.06	89	3 of 24
Ethylbenzene	0.002-190	1	780	7 of 24
Methylene Chloride	0.004-0.220	0.05	1000	1 of 24
Toluene	2-240	0.7	1000	5 of 24
Total Xylenes	0.12-710	0. 26	1000	10 of 24
SVOCs				
2-Methylnapthalene	0.073-63	36.4		1 of 24
2-Methylphenol	0.11-100	0.1		4 of 24
2-Nitroaniline	130	0.4		1 of 24
4-Methylphenol	0.057-580	0.5		4 of 24
Benzo(A)Anthracene	0.12-6.1	1		2 of 24
Benzo(A)Pyrene	0.096-4.1	1		6 of 24
Benzo(B)Fluoranthene	0.13-7.1	1		1 of 24
Benzo(K)Fluoranthene	0.078-2.8	0.8		1 of 24
Dibenzo(A,H) Anthracene	0.072-2.3	0.33		4 of 24
Di-N-Butylphthalate	0.35-120	8.1		2 of 24
Indeno(1,2,3-Cd)Pyrene	0.074-7	0.5		1 of 24
Napthalene	0.086-180	12		5 of 24

Table #2 - Soil				
Detected Constituents	Concentration Range Detected (ppm)[a]	Unrestricted SCG[b] (ppm)	Restricted Industrial Use SCG[c] (ppm)	Frequency Exceeding Unrestricted SCG
Phenol	0.12-210	0.33		5 of 24

a - ppm: parts per million, which is equivalent to milligrams per kilogram, mg/kg, in soil;
b - SCG: Part 375-6.8(a), Unrestricted Soil Cleanup Objectives.
c - SCG: Part 375-6.8(b), Restricted Industrial Use Soil Cleanup Objectives; For the compounds that do not have a listed soil cleanup objective, the Department may develop cleanup standards using the Technical Support Document.

The primary soil contaminants are benzene, ethylbenzene, toluene, xylene, naphthalene and phenols. Figure 5 shows the extent of the contamination. The majority of the soil contamination in the Fill area is phenols located below 15 feet in contrast to the Process area where the contamination is benzene, ethylbenzene, toluene, xylene, naphthalene located above 15 feet. Comparing the soil contamination to the groundwater contamination we have concluded that the phenols in the Fill area located below 15 feet minimally contribute to the site's total groundwater contamination. The Process area soil contamination therefore contributes most of the groundwater contamination.

Based on the findings of the Remedial Investigation, the disposal of hazardous waste has resulted in the contamination of soil.

Soil Vapor Intrusion

The evaluation of the potential for soil vapor intrusion resulting from the presence of site related soil and groundwater contamination was evaluated by the sampling of soil vapor. At this site no buildings were present in impacted areas, so only soil vapor was evaluated.

Based on the soil vapor results, contaminated soil vapor does not appear to be migrating from the site to off-site locations at levels requiring further investigations. However, there is a potential for exposures via soil vapor intrusion if buildings are constructed on-site in the future.

A site management plan developed for the site shall include an evaluation for the potential that soil vapor intrusion might occur in any buildings constructed on-site in the future. (See Section 8.2).

5.2: Interim Remedial Measures

An interim remedial measure (IRM) is conducted at a site when a source of contamination or exposure pathway can be effectively addressed before issuance of the Record of Decision.

Product (a mixture of naphthalene, xylene and toluene) floating on the groundwater table was found in several groundwater monitoring wells. This Light Non-Aqueous Phase Liquid (LNAPL) originated from releases that had occurred in the Process area including a tank spill circa 1974. Beginning in July 2008, extraction by bailer was conducted on a weekly, then monthly and now on a quarterly basis to remove as much LNAPL as possible before a final remedy for OU2 is implemented.

5.3: Summary of Human Exposure Pathways

This section describes the current or potential human exposures (the way people may come in contact with contamination) that may result from the site contamination. A more detailed discussion of the human exposure pathways can be found in the RI report available at the document repository. 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.

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.

Currently, there are no known exposure pathways which exist at the site. Potential exposure pathways which could exist in the future include the following:

- Dermal contact or incidental ingestion of contaminants in soil for construction workers involved in future excavation activities.

- Inhalation of vapors from contaminants in groundwater and soil for construction workers involved in future excavation activities.

- Inhalation of vapors accumulating in the indoor air via the vapor intrusion pathway into structures constructed on-site in the future.

- Ingestion, dermal contact and/or inhalation of vapors from contaminated groundwater if drinking water or process wells are installed on-site in the future

5.4: Summary of Environmental Assessment

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

Cowhorn Creek is located along the southern and western boundaries of the SI Group Congress Street facility and represents the primary receptor for contaminants migrating from the site (Figure 2). The Groundwater Collection System (OU1) addresses the migration of contaminants off-site and is monitored daily and evaluated quarterly to assure that the system is operating as designed.

SECTION 6: SUMMARY OF THE REMEDIATION OBJECTIVES

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

The remedial objectives for this site are:

Public Health Protection

Groundwater

- Prevent contact with contaminated groundwater.

Soil

- Prevent ingestion/direct contact with contaminated soil.

Environmental Protection

Groundwater

- Restore the groundwater aquifer to meet ambient groundwater quality criteria, to the extent feasible.

Soil

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

SECTION 7: SUMMARY OF THE EVALUATION OF ALTERNATIVES

To be selected the remedy must be protective of human health and the environment, be cost-effective, comply with other statutory requirements, and utilize permanent solutions, alternative technologies or resource recovery technologies to the maximum extent practicable. Potential remedial alternatives for the Site were identified, screened and evaluated in the feasibility study, which is available at the document repositories established for this site.

A summary of the remedial alternatives that were considered for this site is presented below. Cost information is presented in the form of present worth, which represents the amount of money invested in the current year that will 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 will cease after 30 years if remediation goals are not achieved.

7.1: Description of Remedial Alternatives

Due to distinct soil and engineering concerns the site is divided into two areas for remediation purposes: Process and Fill Areas (Figure 3). Alternatives are presented for each area and designated with “P” for Process Area and “F” for Fill Area.

*Note: For all the remedial alternatives the Groundwater Collection System (OU1) will continue to operate, providing hydraulic containment of the contaminated groundwater. The annual cost for OU1 is $194,000 and the present worth assuming 30 years of operation and a 5% discount rate is $2,980,000 (Table 20 of Updated FS). The annual costs (if any) for OU2 are included in the Capital Cost for each alternative.

The following alternatives were considered to address the contaminated media identified for the Process Area:

Alternative P-1: No Further Action

The No Further Action Alternative recognizes the remediation of the site completed by the IRM(s) described in Section 5.2. This alternative leaves the site in its present condition and does not provide any additional protection of the environment.

Alternative P-2: Permeable Soil Cover with Site Management

This alternative would include:

- Installation of a Permeable Soil Cover over the Process Area
- Institutional/Engineering Controls
- Natural Attenuation
- Surface Water and Groundwater Monitoring
- Site Management Plan

This alternative consists of the excavation of all concrete slabs and footings and installation of a one foot thick permeable soil cover system across the Process Area. Natural attenuation of the contaminated soils would occur in conjunction with the Groundwater Collection System (OU1).

This alternative is expected to achieve industrial SCOs for the Process Area.

Present Worth: $1,426,000*
Capital Cost: $1,426,000
Annual Costs: $0*

Alternative P-3: Excavation (Restoration to Pre-Disposal or Unrestricted Conditions)

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

- Excavation of Impacted Soils in Process Area, Off-site Disposal
- Institutional/Engineering Controls

Under this alternative all on-site debris and soils located in the vadose zone (above the water table) of the Process Area, which exceed the unrestrictive SCOs would be excavated and transported off-site for disposal. Approximately 91,500 cubic yards of soil and debris would be removed. Clean fill would then be brought in to replace the excavated soil and establish the designed grades at the site. There is no contamination below the vadose zone.

This alternative is expected to achieve unrestricted SCOs and protection of groundwater SCOs for the Process Area.

Capital Cost: $56,290,000

Alternative P-4: Limited Excavation

This alternative would include:

- Limited Excavation of Impacted Soils in Process Area, Off-site Disposal
- Institutional/Engineering Controls
- Surface Water and Groundwater Monitoring
- Site Management Plan

Under this alternative the most contaminated debris and soils located in the vadose zone (above the water table) of the Process Area, which exceed the unrestricted SCOs would be excavated and transported off-site for disposal. Approximately 14,570 cubic yards of soil and debris would be removed. Clean fill would then be brought in to replace the excavated soil and establish the designed grades at the site. Approximately 96% of the contamination would be removed with the remainder of the soil remediated by natural attenuation during the operational period of the Groundwater Collection System (OU1).

This alternative is expected to achieve unrestricted SCOs for the Process Area.

Present Worth: *$12,160,000**
Capital Cost: *$12,160,000*
Annual Costs: *$0**

Alternative P-5: Thermally-Enhanced Soil Vapor Extraction

This alternative would include:

- In-Situ Treatment in Process Area Using Thermally-Enhanced SVE
- Bioventing/Biosparging
- Removal of Slabs, Surface Obstructions and Building Footings
- Institutional/Engineering Controls
- Surface Water and Groundwater Monitoring
- Site Management Plan

Soil vapor extraction (SVE) is an in-situ technology used to treat volatile organic compounds (VOCs) in soil. The process physically removes contaminants from the soil by applying a vacuum to a SVE well that has been installed into the vadose zone (the area below the ground but above the water table). The vacuum draws air through the soil matrix which carries the VOCs from the soil to the SVE well. The air extracted from the SVE wells is then run through an activated carbon treatment canister or equivalent system to remove the VOCs before the air is discharged to the atmosphere.

Thermally enhanced SVE uses conduction (e.g., using hot water in pipes) or convection (e.g., hot-air injection) to transmit heat through the unsaturated zone to increase the volatilization rate of both volatiles and semi-volatiles and to facilitate extraction. Both heating technologies were tested at SI Group's Rotterdam Junction facility (RJ) for two years and found to be equally effective. Since the soils and contamination at Rotterdam Junction are similar to that at SI Group's Congress Street facility, the results of this study are being used in this document.

Using the extraction wells already in place, SVE is followed by bioventing or biosparging to promote natural biodegradation of semi-volatile organics (SVOCs), which are not as effectively removed by SVE as volatiles. Bioventing provides oxygen to stimulate naturally occurring soil microorganisms to degrade compounds in unsaturated zones. Biosparging is the cyclic pulsing of alternating air extraction and injection to optimize for the bioremediation of SVOCs.

Cost estimates for the treatment of two different areas have been prepared for the Process Area (Figure 6). Alternative P-5A treats only Area A (26,260 ft2) and is expected to address approximately 96% of the contaminant mass in the Process Area. Alternative P-5B treats Areas A and B of the designated Process Area and is expected to address approximately 98% of the contamination in the Process Area. These variations were prepared to enable the comparison with both Alternative 4, which treats a limited area, and Alternative 3, which addresses the entire Process Area. The relative costs to treat the additional area will also be applicable to Alternatives P-6 and P-7.

This alternative is expected to achieve industrial SCOs for the Process Area.

Alternative P-5A
Present Worth: $3,790,000*
Capital Cost: $3,790,000
Annual Costs: $0*

Alternative P-5B
Present Worth: $7,050,000*
Capital Cost: $7,050,000
Annual Costs: $0*

Alternative P-6: Multi-Phase Extraction

This alternative would include:
• In-Situ Treatment in Process Area Using Multi-Phase Extraction
• Bioventing/Biosparging
• Removal of Slabs, Surface Obstructions and Building Footings
• Institutional/Engineering Controls
• Surface Water and Groundwater Monitoring
• Site Management Plan

Multi-phase extraction (MPE) involves removal of contaminated groundwater, free-phase product contamination, and soil vapors from a common extraction well under vacuum conditions. Essentially, MPE is the coupling of soil vapor extraction (SVE) and groundwater pump and treat. Groundwater recovery is achieved by pumping at or below the water table. The applied vacuum extracts soil vapor and enhances groundwater recovery.

A network of SVE/dewatering wells would be installed to a minimum depth of 12 feet and would likely be extended an additional 2 to 3 feet below the groundwater. In order to effectively remove contaminant mass, the groundwater would be lowered 2 to 3 feet to allow the remediation of the entire area by SVE. It is anticipated that a dual-pump multi-phase extraction unit would be used. This method of remediation would allow for removal of the VOCs and an appreciable fraction of the SVOCs. The enhanced air flow through the subsurface would increase the volume and percentage of oxygen available in the subsurface to aid in biodegradation of the organics that are not removed. It is anticipated that the system would operate continuously for up to two years. After this, it is expected that vapor concentrations may decline to a level that post extraction treatment is not necessary. At that time, it is anticipated that the system would be modified to a cyclic pulsing of alternating air extraction and injection to optimize for bioremediation of SVOCs or to passive bioventing.

This system is expected to achieve the restricted industrial SCOs for the Process Area.

Alternative P-6A (Area A)
Present Worth: $3,480,000*
Capital Cost: $3,480,000
Annual Costs: $0*

Alternative P-6B (Area A and B)
Present Worth: $6,750,000*
Capital Cost: $6,750,000
Annual Costs: $0*

Alternative P-7: In-Situ Treatment Using ISTD

This alternative would include:

• In-Situ Treatment Using in-situ thermal desorption (ISTD)
• Removal of Slabs, Surface Obstructions and Building Footings
• Institutional/ Engineering Controls
• Surface Water and Groundwater Monitoring
• Site Management Plan

Soils and waste containing VOCs and SVOCs would be remediated by in-situ thermal desorption (ISTD). In ISTD, soil is heated in-situ to higher temperatures than typically used for thermally-enhanced SVE (Alternative P5). Volatile and semi-volatile contaminants are vaporized and rise to the unsaturated zone where they are removed by vacuum extraction and then run through an activated carbon treatment canister or equivalent system to remove the VOCs before the air is discharged to the atmosphere.

Benefits of ISTD include the ability to treat and/or destroy a wide range of contaminants. In addition, ISTD can treat free product in the form of LNAPL. However, costs associated with this technology are high due to the energy required and extensive operation and maintenance costs. Furthermore, SVOCs are not as readily treated as VOCs.

Alternative P-7 includes installation of vertical ISTD heaters at approximately 12 ft spacing for a total of approximately 250 heater-only wells for Area A and 640 for Areas A and B (Figure 6). Vapors would be extracted from approximately 50 or 125 vertical multi-phase extraction wells, respectively. The heaters would extend to a minimum depth of 12 feet and would likely be extended an additional two to three feet into the groundwater. Off-gas treatment would include an un-heated vapor collection manifold, a condensing front end prior to vapor treatment, and liquid separation with granular-activated carbon (GAC) for condensate and groundwater treatment. The non-condensable vapors would be treated by a thermal oxidizer.

These alternatives are expected to achieve the restricted industrial SCOs for the Process Area.

Alternative P-7A (Area A)
Present Worth: $6,220,000*
Capital Cost: $6,220,000
Annual Costs: $0*

Alternative P-7B (Area A and B)
Present Worth: $10,430,000*
Capital Cost: $10,430,000
Annual Costs: $0*

The following alternatives were considered to address the contaminated media identified for the Fill Area:

Alternative F-1: No Further Action

The No Further Action Alternative recognizes the remediation of the site completed by the IRM(s) described in Section 5.2. This alternative leaves the site in its present condition and does not provide any additional protection of the environment.

Alternative F-2: Capping with Site Management

This alternative includes:

• Installation of an Impervious Cap over the Fill Area

- Institutional/Engineering Controls
- Long-Term Groundwater Hydraulic Containment, On-site Treatment
- Surface Water and Groundwater Monitoring
- Site Management Plan

The installation of an impermeable cap, with continued operation of the GWCS, would reduce the current level of risk to human health and the environment associated with the Fill Area by further isolating the waste mass and associated contamination. The cap would restrict the infiltration of precipitation and surface water and would be installed over most existing concrete slabs and asphalt. Based on the known presence of landfill materials (construction/demolition debris, etc.) as well as the tar-like contamination identified during the Updated RI, it is anticipated that restricting the infiltration of surface water would reduce the leaching of contaminants into the groundwater.

This alternative is expected to achieve industrial restricted SCOs for the Fill area.

Present Worth: *$280,000**
Capital Cost: *$280,000*
Annual Costs: *$0**

Alternative F-3: Permeable Cap and Natural Attenuation

This alternative includes:

- Natural Attenuation
- Institutional/Engineering Controls
- Installation of a Permeable Cap over the Fill Area
- Long-Term Groundwater Hydraulic Containment, On-site Treatment
- Surface Water and Groundwater Monitoring
- Site Management Plan

Natural attenuation is a remedial method that reduces the mass and concentration of contaminants in the environment without human intervention. Long-term monitoring of the site conditions is needed to confirm whether or not the contaminants are being degraded at reasonable rates to ensure protection of human health and the environment. Site data should clearly indicate whether concentrations of contaminated media are being adequately reduced without active remediation.

The installation of a permeable cap, with continued operation of the GWCS, would reduce the current level of risk to human health and the environment associated with the Fill Area by further isolating the waste mass and associated contamination. The permeable cap would promote the infiltration of precipitation and surface water, enhancing natural soil flushing and thus removing contaminants at a higher rate. Based on the known presence of landfill materials (construction/demolition debris, etc.) as well as the black tar-like contamination identified during the Updated RI, it is anticipated that enhancing the infiltration of surface water would increase the leaching of contaminants into the groundwater, which would then be removed and treated by the GWCS.

This alternative is expected to achieve industrial restricted SCOs for the Fill area.

Present Worth: *$500,000**
Capital Cost: *$500,000*
Annual Costs: *$0**

Alternative F-4: Restoration to Pre-Disposal or Unrestricted Conditions

This alternative would include:
• Excavation of Impacted Soils in Fill Area, Off-site Disposal
• Relocation of Treatment Facility
• Institutional/Engineering Controls
• Surface Water and Groundwater Monitoring

Under this alternative all on-site soils located in the vadose zone (above the water table) of the Fill area which exceed Unrestricted SCOs would be excavated and transported off-site for disposal. Approximately 40,400 cubic yards of soil and debris would be removed. Clean fill would then be brought in to replace the excavated soil and establish the designed grades at the site.

Engineering and institutional controls would be used during remediation of the Fill Area. The GWCS would continue to be operated until the groundwater meets the RAOs. An extensive stabilization system would need to be implemented to facilitate waste and soil excavation given the inherent slope instability.

This alternative is expected to achieve unrestrictive SCOs and protection of groundwater SCOs for the Fill Area.

Capital Cost: *$29,810,000*

Alternative F-5: Limited Excavation

This alternative includes:
• Limited Excavation of Impacted Soils in Fill Area, Off-site Disposal
• Installation of a Permeable Cap over the Fill Area
• Institutional/Engineering Controls
• Surface Water and Groundwater Monitoring
• Site Management Plan

Alternative F-5 is the partial excavation and removal of the contaminated material above unrestricted SCOs in the Fill Area. The excavation would use conventional benching and shoring techniques. Upon completion of the excavation, a permeable cap would be placed over the waste mass remaining in place. Engineering and institutional controls would be used to restrict disturbance of the Fill Area. The GWCS would continue to be operated in the long-term to control groundwater migration from the area. A long-term groundwater and surface water monitoring program would be maintained to ensure containment of the Fill Area. Alternative F-5 is similar to Alternative F-4, but would not remove all of waste mass in the Fill Area.

This alternative is expected to achieve unrestricted SCOs for the Fill area.

Present Worth: *$6,690,000**
Capital Cost: *$6,690,000*
Annual Costs: *$0**

Alternative F-6: Soil Vapor Extraction and Capping

This alternative includes:
• In-Situ Treatment in Fill Area Using Conventional SVE
• Bioventing/Biosparging
• Installation of a Permeable Cap over the Fill Area
• Removal of Slabs, Surface Obstructions and Building Footings (excepting Treatment Facility)
• Institutional/Engineering Controls

• Surface Water and Groundwater Monitoring
• Site Management Plan

Alternative F-6 is the in-situ treatment of the Fill Area using conventional soil vapor extraction (SVE) technology (see Alternative P-5). Following removal of the VOCs, the system would be converted to biosparging to promote bioremediation of the waste mass. A permeable cap (see Alternative F-3) would be placed over the Fill Area since the SVE system would only remove a small component of the waste mass. Engineering and institutional controls would be used to restrict disturbance of the Fill Area since contamination and solid waste materials would remain. The GWCS would continue to be operated in the long term to control groundwater migration from the area and to remove contaminated groundwater from the Fill Area. A groundwater and surface water monitoring program would be maintained to ensure containment of the Fill Area. In addition, Alternative F-6 includes the removal of surface slabs, the loading dock, and other surface obstructions as well as in-situ treatment using conventional SVE and biosparging.

This technology would not address contamination present within the black tar-like material observed in the Fill Area, as demonstrated during the treatability analyses conducted by SI Group (see Section 2.7.3.1 of the Updated FS), nor would it address solid waste materials. Therefore, while the technology would remove some contamination in the short term, the GWCS would need to continue operating in order to remove and treat contaminated groundwater.

This alternative is expected to achieve industrial restricted SCOs for the Fill Area.

Present Worth: *$6,040,000**
Capital Cost: *$6,040,000*
Annual Costs: *$0**

Alternative F-7: Thermally-Enhanced In-Situ Treatment

This alternative includes:
• In-Situ Treatment in Fill Area Using Thermally-Enhanced SVE
• Bioventing/Biosparging
• Installation of Permeable Cap over the Fill Area
• Removal of Slabs, Surface Obstructions and Building Footings (excepting Treatment Facility)
• Institutional/Engineering Controls
• Surface Water and Groundwater Monitoring
• Site Management Plan

Alternative F-7 is the in-situ treatment of some contamination in the Fill Area using thermally-enhanced SVE followed by biosparging (see Alternative P-5). A permeable cap would be placed over the Fill Area since the SVE system would only remove a small portion of the waste mass.

Engineering and institutional controls would be used to restrict disturbance of the Fill Area since contamination and solid waste materials would remain. The GWCS would continue to be operated in the long term to control groundwater migration from the area and to remove contaminated groundwater from the Fill Area. A long term groundwater and surface water monitoring program would be maintained to ensure containment of the Fill Area.

This technology would not address contamination present within the black tar-like material observed in the Fill Area, as demonstrated during the treatability analyses conducted by SI Group (see Section 2.7.3.1), nor would it address solid waste materials. Therefore, while the technology would remove some additional contamination in the short-term, the GWCS would need to continue operating in order to remove and treat contaminated groundwater.

This alternative is expected to achieve industrial restricted SCOs for the Fill Area.

Present Worth: *$6,600,000**
Capital Cost: *$6,600,000*
Annual Costs: *$0**

Alternative F-8: Multi-Phase Extraction

This alternative includes:
• In-Situ Treatment in Fill Area Using Multi-Phase Extraction
• Bioventing/Biosparging
• Installation of Permeable Cap over the Fill Area
• Removal of Slabs, Surface Obstructions and Building Footings (excepting Treatment Facility)
• Institutional/Engineering Controls
• Surface Water and Groundwater Monitoring
• Site Management Plan

Alternative F-8 includes the in-situ treatment of some contamination in the Fill Area using multi-phase extraction technology (see Alternative P-6).

Following removal of the VOCs, the system would be converted to biosparging to promote bioremediation of the waste mass. A permeable cap would be placed over the Fill Area since the MPE system would only remove a small portion of the contamination in the waste mass. Engineering and institutional controls would be used to restrict disturbance of the Fill Area since contamination and solid waste materials would remain.

A network of SVE/dewatering wells would be installed to depths ranging from 15 to 28 feet depending on location within the Fill Area. Wells would be installed on a 25-foot grid to maximize efficiency of the system. This method of remediation would allow for removal of the volatile organic compounds. The enhanced air flow through the subsurface would increase the volume and percentage of oxygen available in the subsurface to aid in biodegradation of the waste. Lowering the groundwater would increase the area available for treatment.

This technology would not address contamination present within the black tar-like material observed in the Fill Area, as demonstrated during the treatability analyses conducted by SI Group (see Section 2.7.3.1 of RI), nor would it address solid waste materials. Therefore, while the technology would remove some contamination in the short-term, the GWCS would continue to operate, removing and treating contaminated groundwater. The majority of contamination, as well as the solid waste materials, would remain in the Fill Area and would thus require that a permeable cover system be installed. It is expected that the monitoring program would continue to monitor the reduction in contaminant levels in the Fill Area.

This alternative is expected to achieve industrial restricted SCOs for the Fill Area.

Present Worth: *$6,070,000**
Capital Cost: *$6,070,000*
Annual Costs: *$0**

7.2 Evaluation of Remedial Alternatives

The criteria to which potential remedial alternatives are compared are defined in 6 NYCRR Part 375, which sets forth the requirements for the remediation of inactive hazardous waste disposal sites in New York. A detailed discussion of the evaluation criteria and comparative analysis is included in the feasibility study.

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

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

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

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

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

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

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

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

7. Cost-Effectiveness. Capital costs and annual operation, maintenance, and monitoring costs are estimated for each alternative and compared on a present worth basis. Although cost-effectiveness is the last balancing criterion evaluated, where two or more alternatives have met the requirements of the other criteria, it can be used as the basis for the final decision. The costs for each alternative are presented in the Remedial Alternatives Cost Tables. Table 3 shows the costs for the Process Area and table 4 the costs for the Fill Area.

Table 3
Process Area Remedial Alternative Costs

Remedial Alternative	Capital Cost ($)	Annual Costs ($)	Total Present Worth ($)
P-1: No Action	0	$0*	$0*

P-2: Capping	1,426,000	$0*	1,426,000*
P-3: Excavation	55,420,000	$0*	55,420,000*
P-4: Limited Excavation	12,160,000	$0*	12,160,000*
P-5A: Thermal SVE Area A	3,790,000	$0*	3,790,000*
P-5B: Thermal SVE Area A and B	7,050,000	$0*	7,050,000*
P-6A: Multi-Phase Area A	3,480,000	$0*	3,480,000*
P-6B: Multi-Phase Area A and B	6,750,000	$0*	6,750,000*
P-7A: ISTD Area A	6,220,000	$0*	6,220,000*
P-7B: ISTD Area A and B	10,430,000	$0*	10,430,000*

Table 4
Fill Area Remedial Alternative Costs

Remedial Alternative	Capital Cost ($)	Annual Costs ($)	Total Present Worth ($)
F-1: No Action	0	$0*	$0*
F-2: Capping	280,000	$0*	280,000*
F-3: Permeable Cap and Natural Attenuation	500,000	$0*	500,000*
F-4: Excavation	28,940,000	$0*	28,940,000*
F-5: Limited Excavation	6,690,000	$0*	6,690,000*
F-6: Conventional SVE	6,040,000	$0*	6,040,000*
F-7: Thermal SVE	6,600,000	$0*	6,600,000*
F-8: Multi-Phase	6,070,000	$0*	6,070,000*

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

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

9. Community Acceptance. Concerns of the community regarding the investigation, the evaluation of alternatives, and the PRAP are evaluated. A responsiveness summary will be prepared that describes public comments received and the manner in which the Department will address the concerns raised. If the selected remedy differs significantly from the proposed remedy, notices to the public will be issued describing the differences and reasons for the changes.

SECTION 8: SUMMARY OF THE PROPOSED REMEDY

The Department is proposing Alternative F-3 (Permeable Cap) for the Fill Area and for the Process area P-5A (In-Situ Treatment of Area A Using Enhanced Soil Vapor Extraction and Biosparging and Natural Attenuation of Area B of the Process Area) with Alternative P-7A as a contingency if the results from P-5A are deemed unsatisfactory by the Department. The elements of each remedy are described at the end of this section.

8.1 Basis for Selection

The proposed remedies are based on the results of the RI and the evaluation of alternatives.

Process Area:

Threshold criteria - Alternative P-1 (No Further Action) provides no additional protection to public health and the environment and will not be evaluated further. All of the other alternatives for the process area meet these criteria.

Long-term Effectiveness and Permanence – Alternative P-2 (Physical Containment via a Permeable Cap) does not remove any waste and relies on natural attenuation; thus, this alternative does not have much long-term effectiveness or permanence. Alternative P-3 has the most effectiveness and permanence, since it calls for the complete removal of the contamination. Alternatives P-4 through P-7 would not remove all of the contamination, but the magnitude of remaining risks would be low, the engineering controls would limit the risks and the reliability of the controls is good.

Reduction of Toxicity, Mobility or Volume – Alternative P-2 does not remove any waste and relies on natural attenuation; thus, the reduction of toxicity or volume of contamination would be minimal, while the mobility of the contamination could potentially increase. Alternative P-3 (Excavation) would result in the greatest reduction of toxicity, mobility and volume, since it calls for the complete removal of the contamination. Alternatives P-4 through P-7 would not remove all of the contamination, but would permanently and significantly reduce in varying degrees the toxicity, mobility and volume of the current contamination; at a minimum, all of these alternatives would reduce the contamination down to at least industrial soil SCOs.

Short-term Impacts and Effectiveness – Alternative P-2 would have a minimal short-term impact and would only take a few months to complete. Alternative P-3 would have a large short-term impact because of the amount of material to be removed and the number of trucks needed to remove that soil; this alternative would last only a few months. Alternative P-4 (Partial Excavation) is similar to the impacts and time of Alternative P-3, but would have smaller impacts and take less time. Alternatives P-5 through P-7 would have small short-term impacts because the small amount of soil to be removed and the control of any air emissions, but could take several years to complete.

Implementability - All of the Alternatives should have little technical or administrative difficulties, although Alternative P-3 would require a large amount of removal equipment and trucks.

Cost-Effectiveness – The costs for each Alternative are laid out in Table 3 above. Of all of the Alternatives, Alternative P-5A (Treatment of Area A and Natural Attenuation of Area B) is the most cost effective because it is less expensive; would have significant long-term effectiveness and permanence through the removal of approximately 96% of the contamination in the Process Area and the remediation of the remaining contamination through pump & treat and natural attenuation; would have little short-term impact; and is easily implemented.

Land Use – Other than Alternative P-3, the unrestricted SCOs may not be achieved. Current zoning of the property would only allow industrial use . It is expected that Alternatives P-2, and P-4 through P-7 would clean up the soils to industrial SCOs.

Community Acceptance criteria cannot be evaluated at this time. After the public meeting and comment period is over, this criteria will be evaluated.

Fill Area:

Threshold criteria - Alternative F-1 (No Further Action) provides no additional protection to public health and the environment and will not be evaluated further. All of the other alternatives for the process area meet these criteria.

Long-term Effectiveness and Permanence – Alternative F-2 (Impervious Cap) does not remove any waste and relies on natural attenuation; thus, this alternative does not have much long-term effectiveness or permanence. Alternative F-3 (Pervious Cap) has some long-term effectiveness/permanence because it does allow precipitation to penetrate the cap and mobilize the contaminants, so that they can be removed by the groundwater pump and treat system of OU1. Alternative F-4 (Excavation) has the most effectiveness and permanence, since it calls for the complete removal of the contamination. Alternatives F-5 through F-8 would not remove all of the contamination, but the magnitude of remaining risks would be low, the controls would limit the risks and the reliability of the controls is good.

Reduction of Toxicity, Mobility or Volume – Alternative F-2 does not remove any waste and relies on natural attenuation; thus, the reduction of toxicity or volume of contamination would be minimal, while the mobility of the contamination could potentially increase. Alternative F-3 does not remove any waste, but, since it would allow the penetration of precipitation and would funnel the contaminants to the groundwater pump and treat system, it would reduce the toxicity and volume of waste. Alternative F-4 would result in the greatest reduction of toxicity, mobility and volume, since it calls for the complete removal of the contamination. Alternatives F-5 through F-8 would not remove all of the contamination, but would permanently and significantly reduce in varying degrees the toxicity, mobility and volume of the current contamination; at a minimum, all of these alternatives would reduce the contamination down to at least industrial soil SCOs.

Short-term Impacts and Effectiveness – Alternatives F-2 and F-3 would have a minimum short-term impact and would only take a few months to complete. Alternative F-4 would have a large short-term impact because of the amount of material to be removed and the number of trucks needed to remove that soil; this alternative would last only a few months. Alternative F-5 (Limited excavation) is similar to the impacts and time of Alternative F-4, but smaller impacts and less time. Alternatives F-6 through F-8 would have small short-term impacts because the small amount of soil to be removed and the control of any air emissions, but could take several years to complete.

Implementability - Alternatives F-2, F-3 and F-6 through F-8 should have little technical or administrative difficulties. Alternatives F-4 and F-5 would require a large amount of specialized removal equipment because the contaminants are located 15 feet below ground; a large number of trucks because the amount of material to be removed is large; and be difficult to accomplish because it impact on the nearby structure.

Cost-Effectiveness – The costs for each Alternative are laid out in Table 4 above. Of all of the Alternatives, Alternative F-3 (Installation of a Permeable Cap and Natural Attenuation) is the most cost effective because it is less expensive; would have long-term effectiveness and permanence by funneling the contamination to the pump & treat where they would be removed and natural attenuation; would have little short-term impact; and is easily implemented.

Land Use – Other than Alternative F-4, the unrestricted SCOs may not be achieved. SIG has indicated that they want the property to be used only for industrial purposes. It is expected that Alternatives F-2 through F-7 would clean up the soils to industrial SCOs.

Community Acceptance criteria cannot be evaluated at this time. After the public meeting and comment period is over, this criteria will be checked.

8.2 Elements of the Proposed Remedy

The elements of the proposed remedy are as follows:

Process Area Alternative P-5A (Thermally-Enhanced SVE):

1. A remedial design program will be implemented to provide the details necessary for the construction, operation, maintenance, and monitoring of the remedial program. Selection of the soil heating technology would be made with the approval of the Department based on its effectiveness. If the heating technology is not effective, thermal desorption (Alternative P-7A) would be implemented.

2. In order to facilitate in-situ treatment of impacted soils on the Site, it would be necessary to first remove existing surface slabs, building footings, and other surface obstructions present in the Process Area. The portion of concrete is estimated to be on the order of 170 cubic yards of concrete.

3. In order to backfill areas where concrete and associated soil is removed, 2,500 tons of clean fill would be imported to the Process Area.

4. Thermally enhanced SVE using conduction or convective technology would be installed using Geoprobe™ or conventional drilling techniques. SVE units would be installed to a minimum depth of 12 feet and would likely be extended an additional two to three feet into the groundwater.

5. A dewatering system would be required to lower the water level 2 to 3 feet to maximize the total column of unsaturated soil and allow treatment of the total area.

6. It is also anticipated that after an initial period of continuous heating and vacuum extraction, the system would be modified to cyclic pulsing of alternating extraction and injection (biosparging) to optimize for bioremediation of SVOCs.

7. A thermally-enhanced SVE system would require treatment of VOCs in the air/off-gases emitted from the SVE system. Carbon adsorption or equivalent technology, in which pollutants are removed from the soil vapor extracted from the ground, has been used for estimating purposes and would require additional piping and treatment units on-site during remedial activities.

8. The level of cleanup would be monitored. Based on the success of remediation, SI Group may be able to request termination of the groundwater collection in the Process Area. It has been estimated that the GWCS would remain in operation for approximately fifteen years following remediation. However, it would not terminate until protection of groundwater SCOs are achieved.

9. Figure 7 lays out the boundaries of Alternative P-5A.

Fill Area Alternative F-3 (Permeable Cap and Natural Attenuation):

10. A remedial design program will be implemented to provide the details necessary for the construction, operation, maintenance, and monitoring of the remedial program.

11. In order to facilitate in-situ treatment of impacted soils in the Fill Area, it would be necessary to first remove existing surface slabs, the loading dock, and other surface obstructions present in the Fill Area. Product or other man made materials would be removed, tested and disposed of off-site. Furthermore, it is not anticipated that sheeting and/or shoring would be necessary during the slab/concrete removal.

12. In order to backfill areas where concrete is removed, 50 yd^3 of clean fill would need be imported to the Fill Area.

13. A permeable cover system would be installed over the Fill Area to further contain the contamination present in the waste mass while also encouraging the maximum amount of surface water to flow through the waste mass to the GWCS. The cap would be installed to tie into existing Fill Area features (i.e. the Treatment Facility) and topography to the extent possible. Following the installation of the cover system, it would be necessary to modify existing monitoring/pumping wells.

14. It is expected that monitoring wells would be used to monitor the attenuation of the residual contamination; however, the contaminant concentrations are not expected to reach the cleanup goals for a minimum of 30 years across the entire Fill Area.

15. Figure 7 lays the boundaries of remedial design for Alternative F-3.

The following applies to the entire site:

16. A site cover would be installed to allow for industrial use of the site. The cover would consist either of the structures such as buildings, pavement, sidewalks comprising the site development or a soil cover in areas where the upper one foot of exposed surface soil exceeds the industrial soil cleanup objectives (SCOs). Where the soil cover is required it would be a minimum of one foot of soil, meeting the SCOs for cover material as set forth in 6 NYCRR Part 375-6.8(d). The soil cover would be placed over a demarcation layer. The upper six inches of the soil would be of sufficient quality to maintain a vegetation layer. Non-vegetated areas (buildings, roadways, parking lots, etc.) are covered by either a paving system or concrete at least 6 inches thick

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

18. To maximize the net environmental benefit, Green remediation and sustainability efforts are considered in the design and implementation of the remedy to the extent practicable, including;
    - energy efficiency
    - reducing green house gas emissions
    - encouraging low carbon technologies
    - conserve natural resources
    - increase recycling and reuse of clean materials
    - preserve open space and working landscapes
    - design cover systems to be usable for habitat or recreation

19. Imposition of an institutional control in the form of an environmental easement that:

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

20. Since the remedy results in contamination remaining at the site that does not allow for unrestricted use, a Site Management Plan is required, which includes the following:

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

Institutional Controls:

The Environmental Easement discussed in Paragraph 19 above.

Engineering Controls:

The soil cover discussed in Paragraph 16.

This plan includes, but may not be limited to:

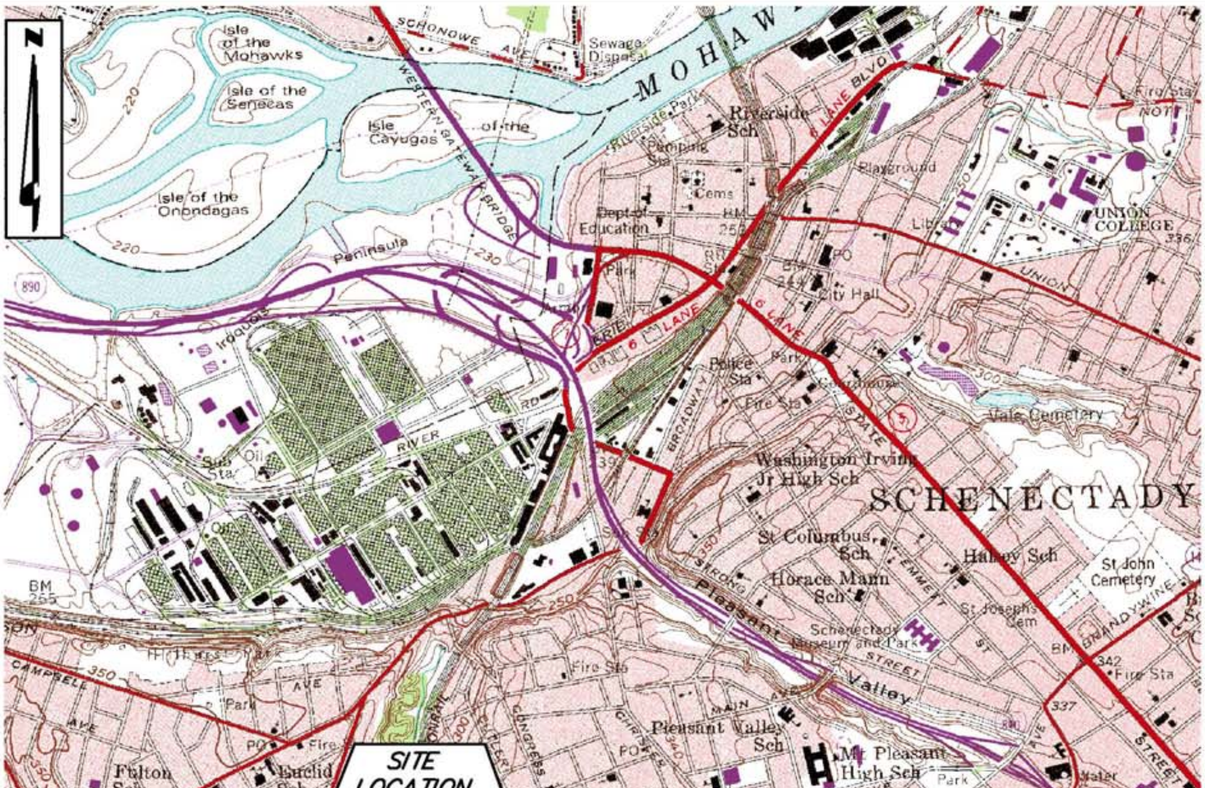
(i) Soil Management Plan which details the provisions for management of future excavations in areas of remaining contamination;
(ii) Descriptions of the provisions of the environmental easement including any land use, and groundwater use restrictions;
(iii) Provisions for the management and inspection of the identified engineering controls;
(iv) Maintaining site access controls and Department notification; and
(v) The steps necessary for the periodic reviews and certification of the institutional and/or engineering controls;

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

(i) Monitoring of groundwater to assess the performance and effectiveness of the remedy;
(ii) Schedule of monitoring and frequency of submittals to the Department;
(iii) Provision to evaluate the potential for vapor intrusion for any buildings developed on the site, including provision for mitigation of any impacts identified;
(iv) Provision to evaluate the potential for soil vapor intrusion for existing buildings if building use changes significantly or if a vacant building become occupied.

(c) an Operation and Maintenance Plan to assure continued operation, maintenance, monitoring, inspection, and reporting of for any mechanical or physical components of the remedy. The plan includes, but is not limited to:

(i) compliance monitoring of treatment systems to assure proper O&M as well as providing the data for any necessary permit or permit equivalent reporting;
(ii) maintaining site access controls and Department notification; and
(iii) providing the Department access to the site and O&M records.



Drawing Copyright © 2009

CHA

III Winners Circle, PO Box 5269 - Albany, NY 12205-0269
Main: (518) 453-4500 · www.chacompanies.com

SITE LOCATION

UPDATED FEASIBILITY STUDY

CONGRESS STREET FACILITY
SI GROUP INC.
SCHENECTADY, NEW YORK

PROJECT NO.	15091.2010.1102
DATE:	02/25/09
FIGURE 1	

File: M:\15091\CS\FEASIBILITY STUDY\ACAD\ACAD\FIGURE 1.DWG Saved: 4/15/2009 3:23:59 PM Plotted: 4/15/2009 3:25:59 PM User: Weatherby Jr., Bill

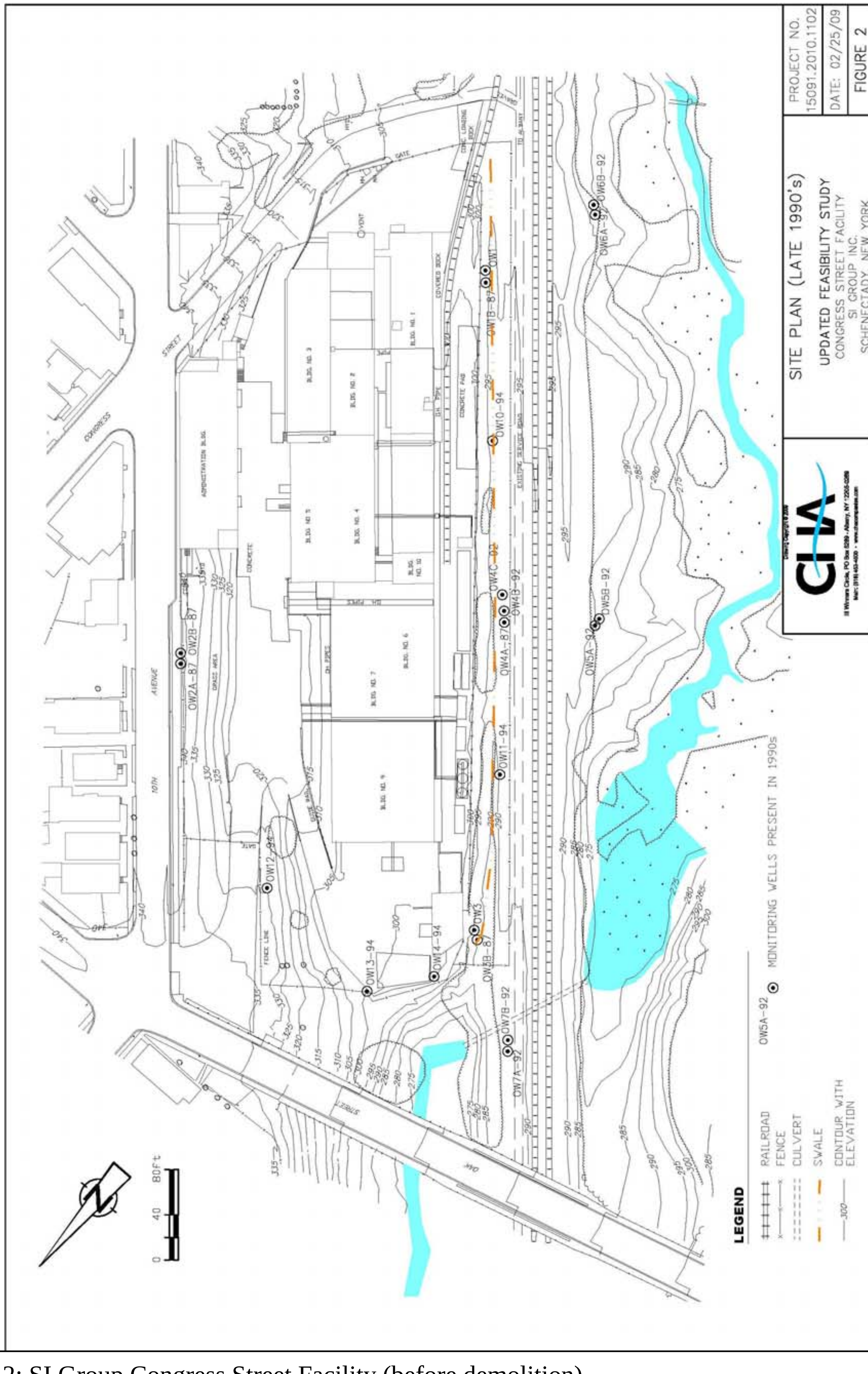


Figure 2: SI Group Congress Street Facility (before demolition).

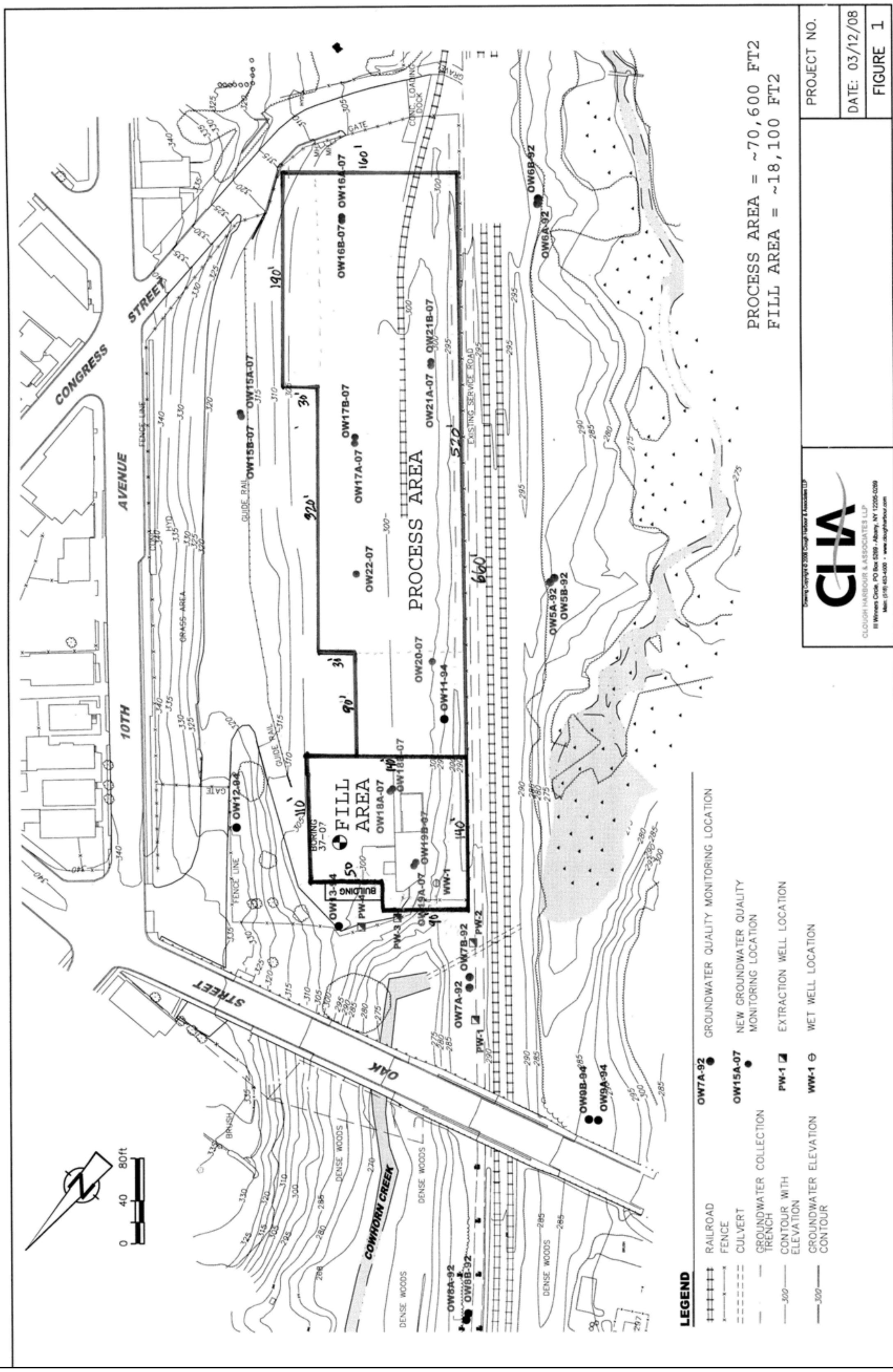


Figure 3: Areas of Concern for Operational Unit 2

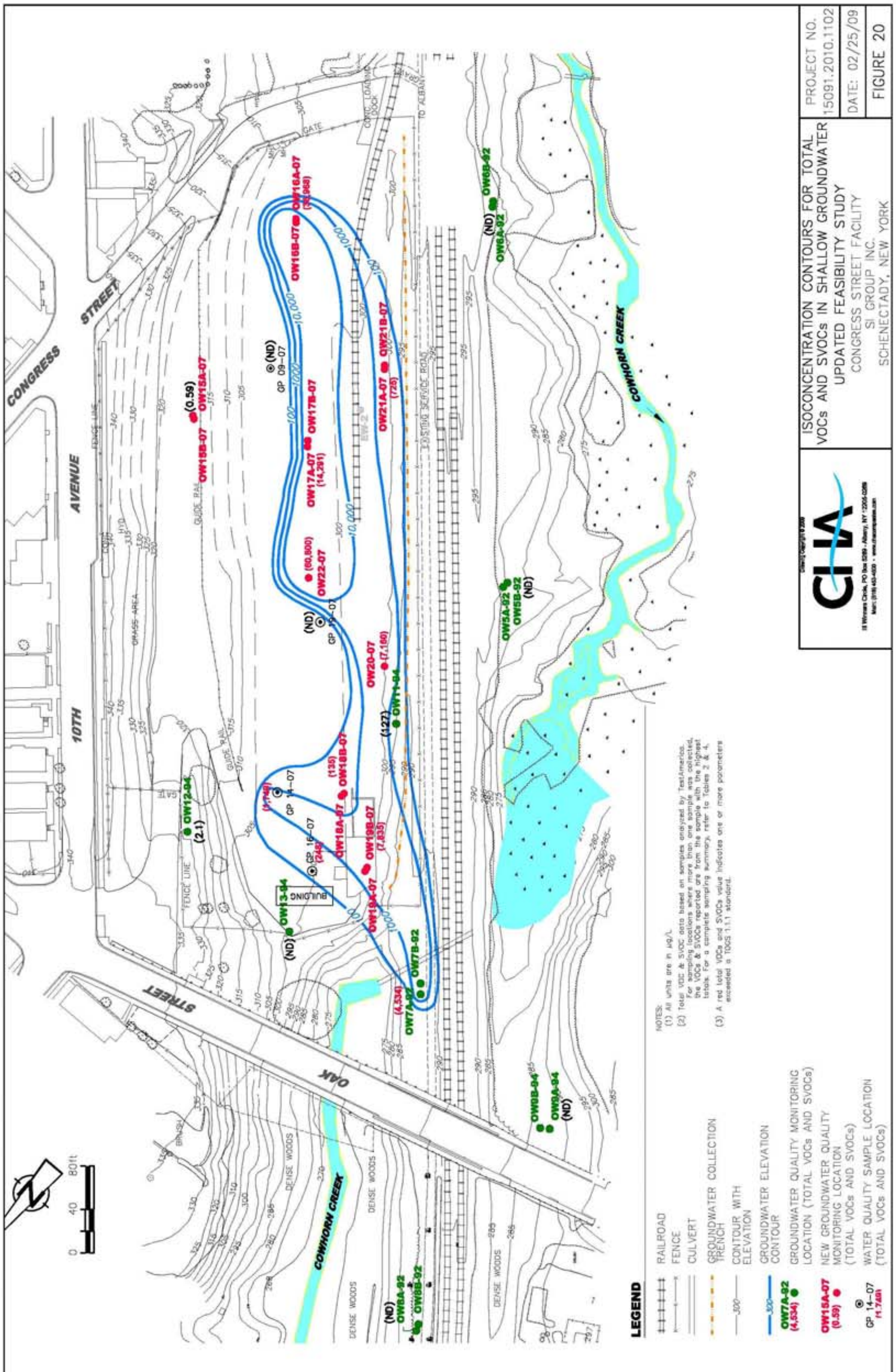


Figure 4: Extent of Groundwater Contamination

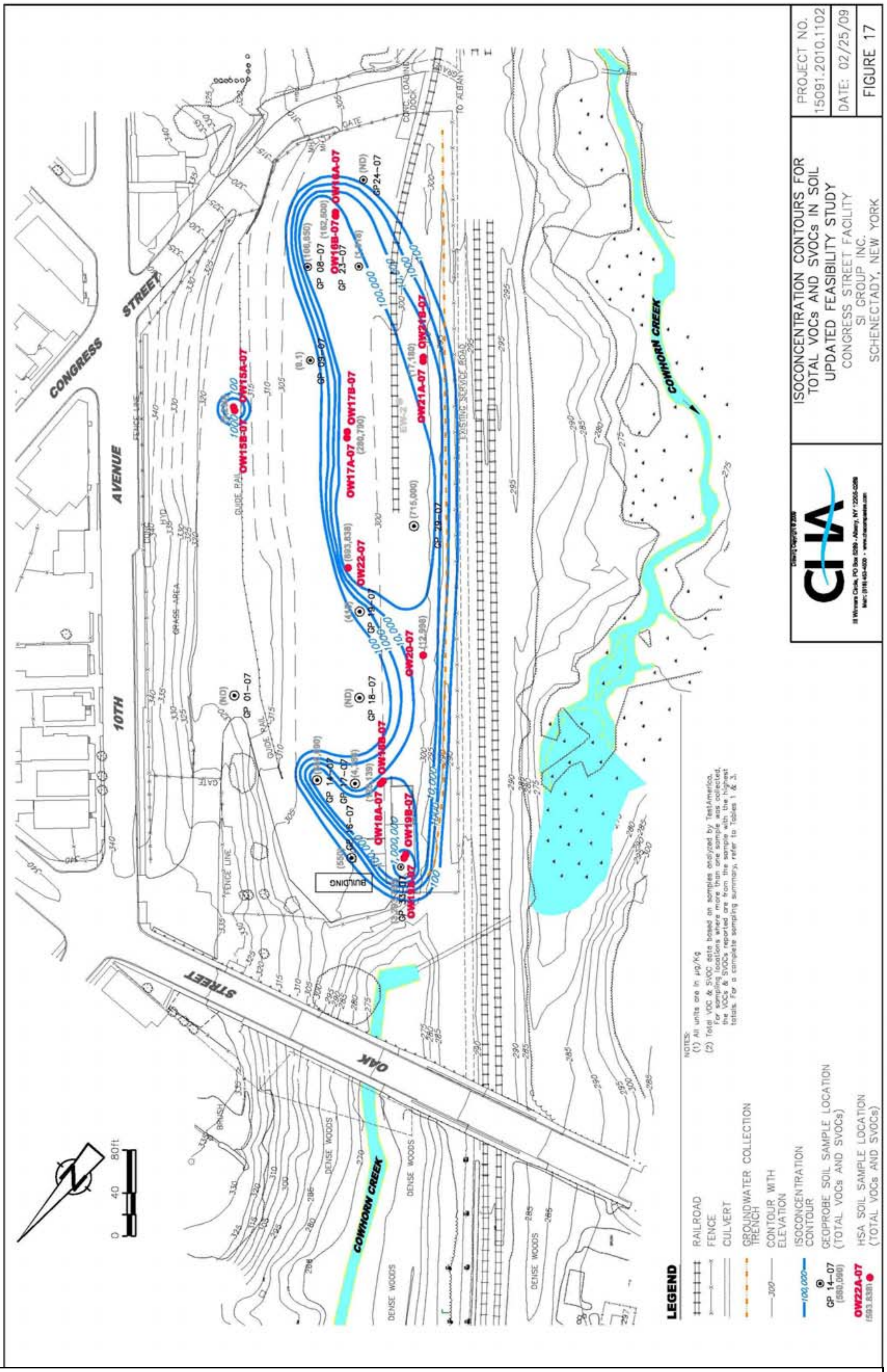


Figure 5: Extent of Soil Contamination

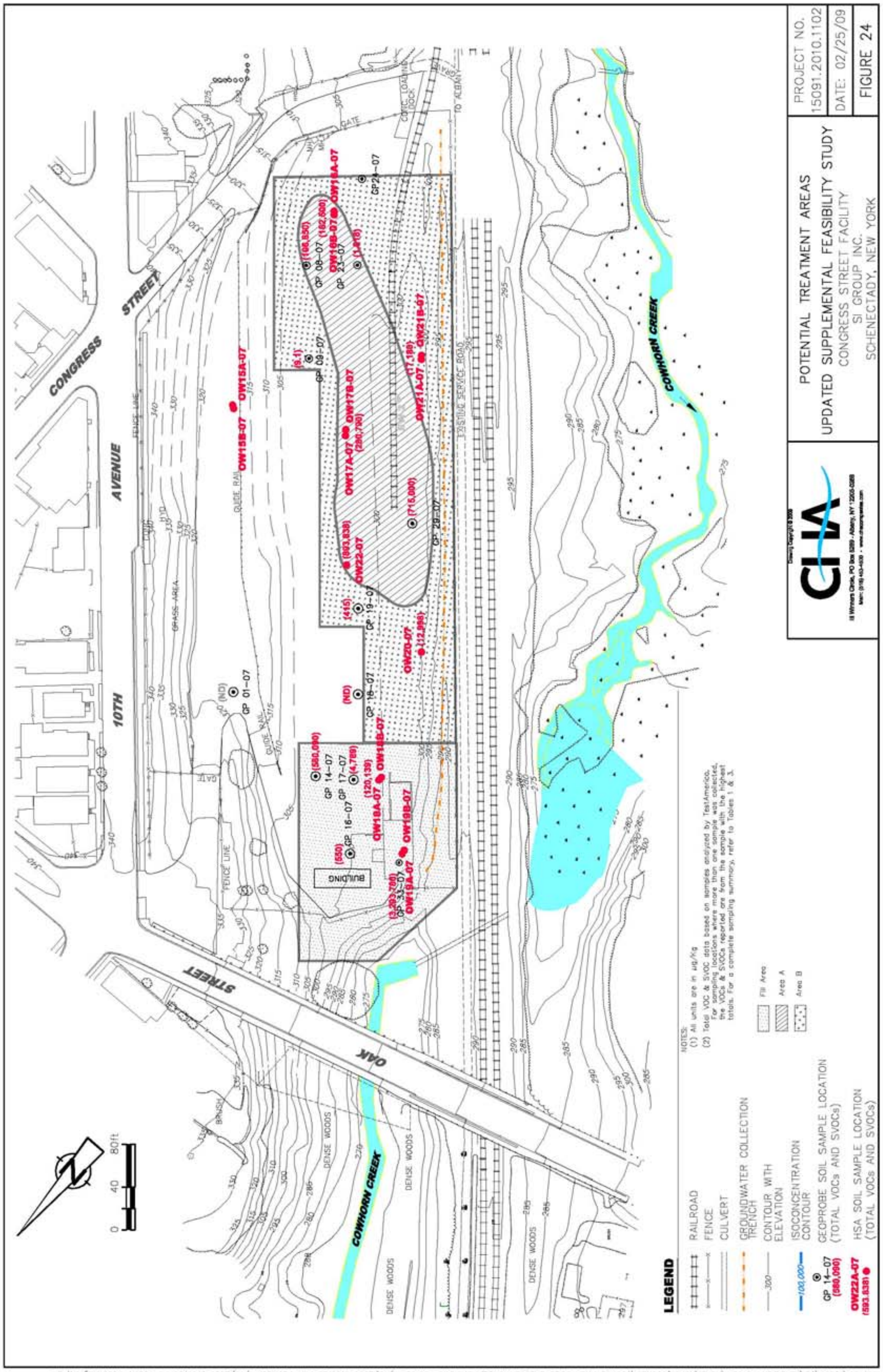


Figure 6: Fill Area and Process Area (Area A and Area B)