PROPOSED REMEDIAL ACTION PLAN

Former C&B Dry Cleaners
Environmental Restoration Project
Jamestown, Chautauqua County
Site No. E907028
February 2013

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

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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 contaminants at the site has resulted in threats to public health and the environment that would be addressed by the remedy proposed by this Proposed Remedial Action Plan (PRAP). The disposal of contaminants at this site, as more fully described in Section 6 of this document, has contaminated various environmental media. Contaminants include hazardous waste and/or petroleum. The proposed remedy is intended to attain the remedial action objectives identified for this site 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 1996 Clean Water/ Clean Air Bond Act provides funding to municipalities for the investigation and cleanup of brownfields. Brownfields are abandoned, idled, or under-used properties where redevelopment is complicated by real or perceived environmental contamination. They typically are former industrial or commercial properties where operations may have resulted in environmental contamination. Brownfields often pose not only environmental, but legal and financial burdens on communities. Under the Environmental Restoration Program, the state provides grants to municipalities to reimburse up to 90 percent of eligible costs for site investigation and remediation activities. Once remediated, the property can then be reused.

The Department has issued this document 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 in the document repository identified below.

SECTION 2: CITIZEN PARTICIPATION

The Department seeks input from the community on all PRAPs. This is an opportunity for public participation in the remedy selection process. The public is encouraged to review the reports and documents, which are available at the following repository:

A public comment period has been set from: 02/15/13 to 03/31/13

A public meeting is scheduled for the following date: 03/04/13, 6:30-8:30 PM

Public meeting location: James Prendergast Library, 509 Cherry Street, Jamestown, NY

At the meeting, the findings of the remedial investigation (RI) and the alternatives analyses (AA) 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 through to:

Anthony Lopes, P.E.
NYS Department of Environmental Conservation
Division of Environmental Remediation
270 Michigan Ave
Buffalo, NY 14203-2915
allopes@gw.dec.state.ny.us

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 the proposed remedy identified herein. 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.

Receive Site Citizen Participation Information By Email

Please note that the Department's Division of Environmental Remediation (DER) is "going paperless" relative to citizen participation information. The ultimate goal is to distribute citizen participation information about contaminated sites electronically by way of county email listservs. Information will be distributed for all sites that are being investigated and cleaned up in a particular county under the State Superfund Program, Environmental Restoration Program, Brownfield Cleanup Program, Voluntary Cleanup Program, and Resource Conservation and Recovery Act Program. We encourage the public to sign up for one or more county listservs at http://www.dec.ny.gov/chemical/61092.html

SECTION 3: SITE DESCRIPTION AND HISTORY

Location: The former 0.22 acre C&B Dry Cleaners site is located in an urban area at 2241

Washington Street in the City of Jamestown, Chautauqua County. The site is 200 feet from the Pelican Manufacturing Site (Class C – Remediation complete), and 1,000 feet from the Former Jamestown City Landfill Site (Class 3 - contamination does not presently and is not reasonably foreseeable to constitute a significant threat to public health or the environment).

Site Features: The main site features include a gravel access road, parking areas, and the foundation remains of the former 2,170 sq ft building, demolished in 2003. The site is generally flat.

Current Zoning and Land Use: The site is currently inactive, and is zoned C-M, service and highway commercial. The surrounding parcels are currently used for a combination of commercial and utility right-of-ways. The nearest residential area is 0.3 miles east. A vacant commercial building, known as the Swanson Building, is located immediately adjacent to the sites southern property line.

Past Use of the Site: From 1931 to 1999, the site was used as a commercial dry cleaner. The County of Chautauqua obtained the property through foreclosure in 2001. In 2001, based on an Environmental Site Assessment (ESA) and site inspections, the County conducted an emergency removal action to remove various abandoned chemicals and solvents, including bleach, ethylene based solvents, and tetrachlorethene (PCE). Two 500 gallon underground storage tanks (USTs), associated piping, UST contents (pea gravel and volatile liquid), and excavated soil/fill were also removed and disposed off-site during this 2001 emergency removal action. The building was demolished in 2003.

Site Geology and Hydrology: Overburden consists of 6-8 ft of sand/gravel/fill material underlain in some areas by a thin layer of peat, grading into a native gravelly sand and silt. Depth to groundwater is roughly 6 feet. Site groundwater flow is to the south.

A site location map is attached as Figure 1.

SECTION 4: LAND USE AND PHYSICAL SETTING

The Department may consider the current, intended, and reasonably anticipated future land use of the site and its surroundings when evaluating a remedy for soil remediation. For this site, an alternative that restricts the use of the site to Commercial Use as described in Part 375-1.8(g) is being evaluated.

A comparison of the results of the investigation to the appropriate standards, criteria and guidance values (SCGs) for the identified land use and the unrestricted use SCGs for the site contaminants is included in the Tables for the media being evaluated in Exhibit A.

SECTION 5: 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.

No PRPs have been documented to date.

Since no viable PRPs have been identified, there are currently no ongoing enforcement actions. However, legal action may be initiated at a future date by the state to recover state response costs should PRPs be identified.

SECTION 6: SITE CONTAMINATION

6.1: Summary of the Remedial Investigation

A Remedial Investigation (RI) has been conducted. The purpose of the RI was to define the nature and extent of any contamination resulting from previous activities at the site. The field activities and findings of the investigation are described in the RI Report.

The following general activities are conducted during an RI:

- Research of historical information,
- Geophysical survey to determine the lateral extent of wastes,
- Test pits, soil borings, and monitoring well installations,
- Sampling of waste, surface and subsurface soils, groundwater, and soil vapor,
- Sampling of surface water and sediment,
- Ecological and Human Health Exposure Assessments.

The analytical data collected on this site includes data for:

- groundwater
- soil
- soil vapor

6.1.1: Standards, Criteria, and Guidance (SCGs)

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

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

6.1.2: RI Results

The data have identified contaminants of concern. A "contaminant of concern" is a contaminant that is sufficiently present in frequency and concentration in the environment to require evaluation for remedial action. Not all contaminants identified on the property are contaminants of concern. The nature and extent of contamination and environmental media requiring action are summarized in Exhibit A. Additionally, the RI Report contains a full discussion of the data. The contaminant(s) of concern identified at this site is/are:

TETRACHLOROETHYLENE (PCE)	ARSENIC
TRICHLOROETHENE (TCE)	DICHLOROETHYLENE

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

- groundwater
- soil
- soil vapor intrusion

6.2: 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.

The following IRM(s) has/have been completed at this site based on conditions observed during the RI.

IRM - Offsite Soil Vapor Mitigation

A sub-slab vapor mitigation system was installed at an adjacent commercial building in September 2006 to address the high concentrations of PCE (190,000 ug/m3) found in soil vapor.

6.3: 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.

Based upon the resources and pathways identified and the toxicity of the contaminants of ecological concern at this site, a Fish and Wildlife Resources Impact Analysis (FWRIA) was deemed not necessary.

Nature and Extent of Contamination

Prior to Remediation: Based on investigations to date, the primary contaminants of concern are chlorinated volatile organic compounds, including tetrachloroethylene [PCE], trichlorethylene [TCE], and cis-1,2-dichloroethylene, and arsenic.

Soil (on-site) - Eleven different TCL VOCs were detected in on-site subsurface soils, but only PCE was detected at concentrations that exceeded the commercial SCGs in two locations. The PCE concentrations detected in soil were 8,000 parts per million (ppm) and 160 ppm exceeding the Protection of Groundwater Soil Cleanup Objectives (SCOs) of 1.3 ppm. The Protection of Groundwater SCO (1.3 ppm) is also exceeded at several other locations. Toxicity Characteristic Leaching Procedure (TCLP) analysis of subsurface soil from two areas indicate the concentration of PCE at 45 mg/l and 2.7 mg/l respectively, exceeding the regulatory threshold for characteristic hazardous waste of 0.7 mg/l. These samples were from near the former UST area and the former wash tubs.

Arsenic was detected at concentrations that exceeded the SCOs in the four on-site soil samples analyzed for TAL metals. Arsenic was detected at concentrations of 109 ppm and 85.7 ppm respectively, above the Protection of Groundwater and Commercial Use SCO of 16 ppm.

Soil (off-site) - VOCs detected in off-site subsurface soil were below the protection of groundwater SCO's.

Groundwater (on-site) - Seven different TCL VOCs were detected in all but one of seven on-site groundwater samples at concentrations that exceeded NYSDEC Class GA Groundwater Standard or Guidance Value. PCE concentrations ranged from 7 to 1,000,000 parts per billion (ppb), with the most significantly elevated concentrations detected in the groundwater sample in the vicinity of the former USTs. The PCE concentrations in a majority of the remaining on-site locations were significantly above the SCG of 5.0 ppb, but none approached the levels near the former USTs. The other VOCs detected at concentrations above the SCGs include 1,1,2,2-tetrachloroethane; 1,1-dichloroethene (1,1-DCE); vinyl chloride; cis-1,2-dichloroethene; isopropylbenzene; and TCE.

Groundwater (off-site) - Five different TCL VOCs were detected in all but one of the 18 off-site groundwater samples at concentrations that exceeded SCGs. PCE was present in 15 of the 21 samples at concentrations above the SCG, with concentrations up to 9,200 ppb. These concentrations were highest near the project site and decreased significantly with distance from the project site. The other VOCs detected at concentrations above the SCGs included 1,1,1-trichloroethane, cis-1,2-DCE, vinyl chloride and TCE.

The results indicate that the groundwater contaminant plume has migrated off-site to the south of the project site, impacting the two adjacent properties. The contaminant plume also slightly extends beyond the northerly boundary of the site.

Soil Vapor and Indoor Air - Contaminants from the site have adversely impacted indoor air quality at an adjacent property north of the site which was addressed by an IRM. PCE was detected in the sub-slab soil vapor and in an ambient air sample collected from the basement and the results exceeded the NYSDOH indoor air guidance value for PCE. The concentration of PCE in the sub-slab sample was 190,000 ug/m3, and in the ambient air basement sample 2,200 ug/m3.

6.4: Summary of Human Exposure Pathways

This human exposure assessment identifies ways in which people may be exposed to site-related contaminants. Chemicals can enter the body through three major pathways (breathing, touching or swallowing). This is referred to as *exposure*.

Access to the site is unrestricted. However, contact with contaminated soil or groundwater is unlikely unless people dig below the ground surface. People are not drinking the contaminated groundwater because the area is served by a public water supply that is not contaminated by the site. Volatile organic compounds in the groundwater may move into the soil vapor (air spaces within the soil), which in turn may move into overlying buildings and affect the indoor air quality. This process, which is similar to the movement of radon gas from the subsurface into the indoor air of buildings, is referred to as soil vapor intrusion. Because there is no on-site building, inhalation of site contaminants in indoor air due to soil vapor intrusion does not represent a concern for the site in its current condition. However, the potential exists for the inhalation of site contaminants due to soil vapor intrusion for any future on-site development. A sub-slab depressurization system (system that ventilates/removes the air beneath the building) has been installed in an off-site building to prevent the indoor air quality from being affected by the contamination in soil vapor beneath the building.

6.5: 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 action objectives for this site are:

Groundwater

RAOs for Public Health Protection

- Prevent ingestion of groundwater with contaminant levels exceeding drinking water standards.
- Prevent contact with, or inhalation of volatiles, from contaminated groundwater.

Soil

RAOs for Public Health Protection

- Prevent ingestion/direct contact with contaminated soil.
- Prevent inhalation of or exposure from contaminants volatilizing from contaminants in soil.

RAOs for Environmental Protection

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

Soil Vapor

RAOs for Public Health Protection

- Mitigate impacts to public health resulting from existing, or the potential for, soil vapor intrusion into buildings at a site.

SECTION 7: SUMMARY OF THE PROPOSED REMEDY

To be selected, the remedy must be protective of human health and the environment, be cost-effective, comply with other statutory requirements, and utilize permanent solutions, alternative technologies or resource recovery technologies to the maximum extent practicable. The remedy must also attain the remedial action objectives identified for the site, which are presented in Section 6.5. Potential remedial alternatives for the Site were identified, screened and evaluated in the AA report.

A summary of the remedial alternatives that were considered for this site is presented in Exhibit B. Cost information is presented in the form of present worth, which represents the amount of money invested in the current year that would be sufficient to cover all present and future costs associated with the alternative. This enables the costs of remedial alternatives to be compared on a common basis. As a convention, a time frame of 30 years is used to evaluate present worth costs for alternatives with an indefinite duration. This does not imply that operation, maintenance, or monitoring would cease after 30 years if remediation goals are not achieved. A summary of the Remedial Alternatives Costs is included as Exhibit C.

The basis for the Department's proposed remedy is set forth at Exhibit D.

The proposed remedy is referred to as the Alternative C: Vadose Soil Excavation and In-situ Soil/Groundwater Treatment remedy.

The estimated present worth cost to implement the remedy is $1,287,000. The cost to construct the remedy is estimated to be $1,264,000 and the estimated average annual cost is $5,300.

The elements of the proposed remedy are as follows:

A remedial design program will be implemented to provide the details necessary for the construction, operation, optimization, maintenance, and monitoring of the remedial program. Green remediation principles and techniques will be implemented to the extent feasible in the design, implementation, and site management of the remedy as per DER-31. The major green remediation components are as follows;

- Considering the environmental impacts of treatment technologies and remedy stewardship over the long term;
- Reducing direct and indirect greenhouse gases and other emissions;

- Increasing energy efficiency and minimizing use of non-renewable energy;
- Conserving and efficiently managing resources and materials;
- Reducing waste, increasing recycling and increasing reuse of materials which would otherwise be considered a waste;
- Maximizing habitat value and creating habitat when possible;
- Fostering green and healthy communities and working landscapes which balance ecological, economic and social goals; and
- Integrating the remedy with the end use where possible and encouraging green and sustainable re-development.

1. The remedial design program will include a Pre-Design Investigation to:

    a. Verify arsenic soil contamination results and limits of in the northwest area of the site (SP-13 & SP 15).
    b. Verify PCE soil contamination results in the vadose zone.
    c. Determine the insitu chemical oxidation parameters.

2. Excavation and off-site disposal of on-site soils located in the area of soils contaminated with arsenic which exceed SCGs for Protection of Groundwater of 16 ppm.

3. This alternative includes the removal and off-site disposal of the VOC contaminated subsurface soil/fill down to the top of the groundwater table (unsaturated soil removal, 4-6 feet bgs), with the areal extent defined by the use of the protection of groundwater soil cleanup objectives to the extent practicable given any need to maintain structures in the excavation areas. The excavations will be backfilled in accordance with the requirements of 6NYCRR375-6.7(d).

4. Prior to backfilling the former UST area excavation, a chemical oxidant will be mixed in the groundwater in the bottom of the excavation to rapidly reduce the concentrations of PCE in this area. In-situ chemical oxidation is a technology used to treat chlorinated ethene compounds (a type of volatile organic compound) in saturated soils/groundwater. The process injects a chemical oxidant into the subsurface groundwater via injection wells, an infiltration gallery, or excavation. As the chemical oxidant comes into contact with the contaminant, an oxidation reaction occurs that breaks down the contaminant into relatively benign compounds such as carbon dioxide and water. Several chemical oxidants are commercially available such as: Fenton's Reagent, Permanganate (as either potassium and/or sodium permanganate), Persulfate (as either potassium and/or sodium persulfate), and ozone. These will be the chemical oxidants evaluated prior to the full implementation of this technology to determine the one best suited for this site. Laboratory and on-site pilot scale studies would be conducted to more clearly define design parameters.

5. Upon development, a sub-slab depressurization system (SSDS) will be installed in the Swanson Building. Upon obtaining all required permits/approvals, the existing sump in the building would be connected directly to the sanitary sewer.

6. The contaminated groundwater plume (on and off-site) will be treated in-situ with a Hydrogen Release Compound (HRC®), sodium lactate, molasses, vegetable oil and microbial colonies/stimulants to facilitate bioaugmentation for anaerobic reductive dechlorination (ERD). These chemical oxidants will be evaluated prior to the full implementation of this technology to determine the one best suited for this site. Laboratory and on-site pilot scale studies would be conducted to more clearly define design parameters.

At this site, the material would be applied through injection wells screened in the saturated zone (approximately 6 to 9 feet bgs) to target the VOC contaminants of concern in groundwater. The method of injection and depth of injection will be determined by location of the contamination. It is estimated that the material would be injected in three applications over several months.

7. Imposition of an institutional control in the form of an environmental easement for the controlled property that:

- 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);
- allows the use and development of the controlled property for commercial and industrial uses as defined by Part 375-1.8(g), although land use is subject to local zoning laws;
- restricts the use of groundwater as a source of potable or process water, without necessary water quality treatment as determined by the NYSDOH or County DOH;
- requires compliance with the Department approved Site Management Plan.

8. Site Management Plan

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 ensure the following institutional and/or engineering controls remain in place and effective:

   Institutional Controls: The Environmental Easement discussed in number 7 above.

   Engineering Controls: The sub-slab depressurization system discussed in number 4 above.

   This plan includes, but may not be limited to:

   - an Excavation Plan which details the provisions for management of future excavations in areas of remaining contamination;

- a provision for further investigation to refine the nature and extent of contamination in areas where access was previously hindered (i.e., under the Swanson Building) if and when the building is demolished;
- descriptions of the provisions of the environmental easement including any land use, groundwater and/or surface water use restrictions;
- a provision for evaluation of the potential for soil vapor intrusion for any buildings developed on the site, including provision for implementing actions recommended to address exposures related to soil vapor intrusion;
- provisions for the management and inspection of the identified engineering controls;
- maintaining site access controls and Department notification; and
- 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 may not be limited to:

- monitoring of groundwater to assess the performance and effectiveness of the remedy;
- a schedule of monitoring and frequency of submittals to the Department;
- monitoring for vapor intrusion for any buildings developed on and near the site, as may be required by the Institutional and Engineering Control Plan discussed above.

c. An Operation and Maintenance (O&M) Plan to ensure continued operation, maintenance, optimization, monitoring, inspection, and reporting of any mechanical or physical components of the remedy. The plan includes, but is not limited to:

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

Exhibit A

Nature and Extent of Contamination

This section describes the findings of the Remedial Investigation for all environmental media that were evaluated. As described in Section 6.1, samples were collected from various environmental media to characterize the nature and extent of contamination.

For each medium, 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), and in-organics (metals). For comparison purposes, the SCGs are provided for each medium that allows for unrestricted use. For soil, if applicable, the Restricted Use SCGs identified in Section 6.1.1 are also presented.

Waste/Source Areas

As described in the RI report, waste and source materials were identified at the site and are impacting groundwater, soil, and soil vapor on and off-site.

Wastes are defined in 6 NYCRR Part 375-1.2(aw) and include solid, industrial and/or hazardous wastes. Source Areas are defined in 6 NYCRR Part 375(au). Source areas are areas of concern at a site were substantial quantities of contaminants are found which can migrate and release significant levels of contaminants to another environmental medium.

Existing wastes/source areas identified at the site include:

- Former UST Area – Elevated VOC concentrations were detected in soil samples collected in locations under and west of the former USTs.

Seven test pits were excavated from four to five feet deep across the site (Figure 3). Photoionization Detector (PID) measurements from soil collected from TP-3 ranged from 52 parts per million (ppm) at approximately two feet below grade to 4,000 ppm at approximately four feet below grade. The remaining four test pits revealed the presence of fill materials with significantly lower PID measurements. No sampling was conducted as a part of the test pit program.

Twenty soil probes, ten test borings and five monitoring well borings were completed across the project site, and 24 soil probes were advanced on adjoining properties during the first four sampling events (Figure 3). The visual and PID screening of the retrieved soil samples indicate the presence of contaminated soils beneath the central, eastern, south and south-central portions of the project site and on adjoining sites. The screening of the wet/saturated retrieved soil samples indicates the presence of contaminated groundwater in the above referenced areas. Based on PID measurements, the most significantly impacted soils are located in the eastern (SP-4) and south-central (MW-5) portions of the site. Additionally, the highest PID measurements in the wet/saturated soils are located in the central (SP-8) and the south-central (SP-18) portions of the site.

Although eleven (11) different TCL VOCs were detected in the on-site subsurface soil samples, only PCE was detected at concentrations that exceeded the SCOs. The highest PCE concentrations were detected at MW-5 and TB-5, 8,000 ppm and 160 ppm respectively (Figure 4), exceeding the SCO of 1.3 ppm for restricted use protection of groundwater. MW-5 was placed in the area of the former USTs, and SP-4 was placed proximal to the former location of the wash tubs. Additionally, it should be noted the total concentrations of Tentatively Identified Compounds (TICs) is greater than 500 ppm in SP-9.

Based on elevated PID readings and visual/olfactory evidence of contamination, two samples were submitted for TCLP analysis at MW-5 and SP-4 (Table 6). PCE was detected in the sample collected from MW-5 at a concentration of 45 mg/L (TCLP), which is more than 64 times greater than the NYCRR Part 370 hazardous waste limit of 0.7 mg/L. The leachable concentration of PCE in the sample collected from SP-4 was 2.7 mg/L, nearly four times greater than the NYCRR Part 370 hazardous waste limit of 0.7 mg/L. These TCLP concentrations indicate that the impacted soils in these sample locations would be defined as a hazardous waste. The total PCE concentrations in the sample collected from SP-4 was similar to those detected in other samples collected at the project site, indicating that these other soils would likely also be defined as a hazardous waste.
It is noted that all other RCRA characteristic analyses were within the regulatory values.

SVOCs, pesticides, herbicides, and metals were either not detected or were not detected at concentrations above the regulatory values in any of the soil/fill samples (Table 4).

Seven different TCL VOCs were detected in the off-site subsurface samples (Table 3). However, none of the compounds were detected at a concentration that exceeded its SCG. The results indicate that the soil contamination is limited to the project site.

Arsenic and iron were detected at concentrations that exceeded the SCGs in the four on-site soil samples analyzed for TAL metals Table 5. Similar levels of iron are also often encountered at similar concentrations in urban settings and/or in fill materials. However, arsenic was detected in SP-13 and SP-15 at concentrations of 109 ppm and 85.7 ppm, respectively, exceeding the protection of groundwater SCGs of 16 ppm and natural Eastern USA background values (3-12 ppm).

Certain waste/source areas identified at the site were addressed by the IRM(s) described in Section 6.2. The remaining waste/source area(s) identified during the RI will be addressed in the remedy selection process.

Groundwater

On-Site Groundwater

Seven different TCL VOCs were detected in all but one of seven on-site groundwater samples at concentrations that exceeded NYSDEC Class GA Groundwater Standard or Guidance Value (Tables 7 and 8). PCE concentrations ranged from 7 to 1,000,000 ppm, with the most significantly elevated concentrations detected in the groundwater sample from MW-5, in the vicinity of the former USTs (Figure 5). The PCE concentrations in the remaining on-site locations were also significantly above the NYSDEC Class GA Groundwater Standard or Guidance Value of 5 ppm, but none approached the levels in MW-5. The other VOCs detected at concentrations above the SCGs include: 1,1,2,2-tetrachloroethane; 1,1-dichloroethene (1,1-DCE); vinyl chloride; cis-1,2-dichloroethene; isopropylbenzene; and TCE.

The results indicate that the groundwater beneath the central and eastern portions of the project site has been significantly impacted by the VOC contamination present in the subsurface soil/fill at the project site. The results also indicate that the groundwater beneath the south-central portion of the site (MW-5 location) is the most severely impacted. This area is immediately down gradient of the former USTs and also adjacent to the southern property line of the project site. The southward groundwater flow direction and presence of high concentrations of contaminants along the southern property boundary indicated the likelihood of down gradient impacts.

Off-Site Groundwater

Five different TCL VOCs were detected in at least one of the 21 off-site groundwater/surface water samples at concentrations that exceeded SCGs (Table 7).

PCE was present in 15 of the 21 samples at concentrations above the SCG, with concentrations ranging from 6 to 9,200 ppm. These concentrations were highest near the project site and decreased significantly with distance from the project site. The other VOCs detected at concentrations above the SCGs included 1,1,1-trichloroethane, cis-1,2-DCE, vinyl chloride and TCE.

The results indicate that the groundwater contaminant plume has migrated off-site to the south of the project site, impacting the Swanson and former Pelican properties (Figure 5). The SP-26 results indicate that the contaminant plume slightly extends beyond the northerly boundary of the site toward the adjacent Pal Joey's restaurant, albeit at relatively low concentrations.

Table #1 - Groundwater

Detected Constituents	Concentration Range Detected (ppb)[a]	SCG[b] (ppb)	Frequency Exceeding SCG
VOCs			
1,1,2,2-Tetrachloroethane	ND - 7	5	1 of 10
Tetrachloroethene	ND – 1,000,000	5	26 of 33
Trichloroethene	ND – 4,800	5	21 of 33
1,1-Dichloroethene	ND - 27	5	1 of 33
cis-1,2-Dichloroethene	ND – 1,100	5	15 of 33
Vinyl chloride	ND - 120	2	4 of 33
	ND -	5	
Inorganics			
Iron	5,140 – 22,300	300	5 of 5
Lead	8.9 – 25.5	25	1 of 5
Manganese	453 – 5,690	300	5 of 5
Sodium	35,200 – 112,000	20,000	5 of 5
Thallium	ND – 3.2	0.5	1 of 5

a - ppb: parts per billion, which is equivalent to micrograms per liter, ppm, in water.

b- SCG: Standard Criteria or Guidance - Ambient Water Quality Standards and Guidance Values (TOGs 1.1.1), 6 NYCRR Part 703, Surface water and Groundwater Quality Standards, and Part 5 of the New York State Sanitary Code (10 NYCRR Part 5).

Based on the findings of the RI, the past disposal of hazardous waste has resulted in the contamination of groundwater. The site contaminants that are considered to be the primary contaminants of concern which will drive the remediation of groundwater to be addressed by the remedy selection process are: tetrachloroethene (PCE); trichloroethene (TCE); 1,1-dichloroethene (1,1-DCE); cis-1,2-dichloroethene; vinyl chloride.

Soil

A total of 59 soil borings were installed on and off-site. Forty soil samples were collected from 32 of the soil borings. Sample depths ranged from ground surface to 15-feet below ground surface (bgs).

Of the 40 soil samples collected, four samples were analyzed for full Target Compound List (TCL)/Target Analyte List (TAL). Thirty-five samples were analyzed for TCL VOCs only; with the exception of one sample. This sample was analyzed for TCL VOCs as well as TCLP VOCs. Finally, one sample was analyzed for TCLP SVOCs, PCBs, pesticides, herbicides, and inorganics (metals), as well as reactivity, corrosivity, and ignitability.

Of the 40 soil samples collected on-site (Table 1), one or more of the SCGs were exceeded in seven samples Three soil samples, MW-5, SP-4, and TB-5 exceeded the SCG for PCE (Table 3). Four soil samples, SP-3, SP-11, SP – 13, and SP-15 exceeded SCGs for one or more inorganic parameters (Table 5).

Table #2 - Soil

Detected Constituents	Concentration Range Detected (ppm)[a]	Unrestricted SCG[b] (ppm)	Frequency Exceeding Unrestricted SCG	Restricted Use SCG[c] (ppm)	Frequency Exceeding Restricted SCG Protection of Groundwater
VOCs					
Tetrachloroethene	ND – 8,000,000	1,300	15 of 31	1,300	15 of 31
Trichloroethene	ND – 2,800	470	17 of 31	470	17 of 31
cis-1,2-Dichloroethene	ND – 5,600	250	9 of 19	250	9 of 19
Toluene	ND – 1,400	700	6 of 19	700	6 of 19
Inorganics					
Arsenic	85-109	13	2 of 4	16	2 of 2

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 Use Soil Cleanup Objectives for the Protection of Public Health for protection of groundwater Use, unless otherwise noted.
d - SCG: Part 375-6.8(b), Restricted Use Soil Cleanup Objectives for the Protection of Groundwater.

Based on the findings of the Remedial Investigation, the past disposal of hazardous waste has resulted in the contamination of soil. The site contaminants identified in soil which are considered to be the primary contaminants of concern, to be addressed by the remedy selection process are tetrachloroethene (PCE), trichloroethene (TCE), and arsenic.

Surface Water

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

Sediments

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

Soil Vapor

The evaluation of the potential for soil vapor intrusion resulting from the presence of site related soil or groundwater contamination was evaluated by the sampling of soil vapor, sub-slab soil vapor under structures, and indoor air inside structures. At this site, due to the presence of buildings in the impacted area, a full suite of samples were collected to evaluate whether soil vapor intrusion was occurring.

A passive soil gas survey was completed at the site to identify potential source areas of volatile organic compound contamination. Fourteen locations were included in the survey and the results indicate the presence of PCE and TCE at elevated concentrations.

Soil vapor samples were collected at an off-site adjacent building structure to the north of the site in order to determine potential impacts to indoor air quality from contaminants originating from the site (Table 9). Sub-slab, basement ambient, and outdoor ambient air samples were collected and analyzed for VOCs. Results of the indoor air quality sampling indicated an elevated concentration of PCE in the basement ambient air sample in excess of its respective SCG.

Based on the findings of the Remedial Investigation, the disposal of hazardous waste has resulted in the contamination of soil vapor. The site contaminants that are considered to be the primary contaminants of concern which will drive the remediation of soil vapor to be addressed by the remedy selection process are, tetrachloroethene (PCE) and trichloroethene (TCE).

Exhibit B

Description of Remedial Alternatives

The following alternatives were considered based on the remedial action objectives (see Section 6.5) to address the contaminated media identified at the site as described in Exhibit A.

Alternative A: No Action

The No Further Action Alternative recognizes the off-site vapor mitigation system completed by the IRM described in Section 6.2; and the 2001 County emergency removal action to remove various abandoned chemicals/solvents, two 500 gallon Underground Storage Tanks (UST's), and excavated soil/fill described in Section 3. This alternative is evaluated as a procedural requirement as a basis for comparison, leaves the site in its present condition, and does not provide any additional protection of the environment.

Alternative B: Limited Excavation and In-Situ Soil/Ground Water Treatment

This alternative includes the limited excavation and off-site disposal of the most contaminated subsurface soil/fill in the vicinity of MW-5 (to the top of groundwater table at a minimum) in addition to the arsenic contaminated area, and backfill with clean fill. The remaining VOC contaminated soil/fill would be treated in-situ using chemical oxidation.

In-situ chemical oxidation of the groundwater plume would consist of a series of injections throughout the contaminated groundwater plume.

Upon development, a sub-slab depressurization system (SSDS) will be installed in the Swanson Building and the existing sump in the building , upon obtaining all required permits/approvals, connected directly to the sanitary sewer.

This alternative includes institutional controls, in the form of an environmental easement and a site management plan, necessary to protect public health and the environment from any contamination identified at the site.

Present Worth:..*$1,653,000*
Capital Cost:..*$1,612,000*
Annual Costs:..*$5,300*

Alternative C: Vadose Soil Excavation, and In-Situ Groundwater Treatment

This alternative includes the removal and off-site disposal of the VOC contaminated subsurface soil/fill down to the top of the groundwater table (unsaturated soil removal, 4-6 feet bgs), and backfill with clean fill. In addition, the arsenic contaminated soil area will be excavated to meet the SCO.

In-situ remediation of the contaminated groundwater plume would consist of both a chemical oxidant (MW-5 Area) and HRC elsewhere throughout the on-site and off-site VOC plume. In-situ chemical oxidation of the groundwater plume would consist of a series of injections throughout the contaminated groundwater plume.

Upon development, a sub-slab depressurization system (SSDS) will be installed in the Swanson Building. The existing sump in the building, upon obtaining all required permits/approvals, would be connected directly to the sanitary sewer.

This alternative includes institutional controls, in the form of an environmental easement and a site management plan, necessary to protect public health and the environment from any contamination identified at the site.

Present Worth:..*$1,287,000*
Capital Cost:..*$1,264,000*
Annual Costs:..*$5,300*

Alternative D: Complete Excavation and Ex-Situ Ground Water Treatment By Air Stripping

This alternative involves the complete excavation and disposal of the contaminated soil/fill down to native soil and/or clay (13 feet bgs) and backfilling with clean fill.

Treatment of the contaminated groundwater plume will consist of an ex-situ pump and treat system using an air stripper. This system includes additional groundwater collection trenches to intercept the groundwater flow, drain it by gravity to a sump chamber at the lowest point of the site, and pump to the treatment unit prior to direct discharge to the municipal sanitary sewer. Trenches placed along the Swanson Building to collect off-site contaminated groundwater underneath the building in also included.

A remedial design is required to determine the treatment unit and discharge requirements.

This alternative includes institutional controls, in the form of an environmental easement and a site management plan, necessary to protect public health and the environment from any contamination identified at the site.

Present Worth: *$2,070,000*
Capital Cost: *$2,030,000*
Annual Costs: *$30,000*

Alternative E: Complete Excavation and In-Situ Ground Water Treatment

This alternative involves the complete excavation and disposal of the contaminated soil/fill down to native soil and/or clay (13 fbgs) and backfilling with clean fill. In-situ remediation of the contaminated groundwater plume would consist of both a chemical oxidant in the most significantly impacted area (MW-5 Area, 480 sf) and HRC elsewhere throughout the VOC plume which extends south through the Swanson site and onto the Pelican site (total plume estimated at 25,000 sq. ft.). In-situ remediation of the contaminated groundwater plume would consist of 500 HRC injections to be placed one per 50 sf over the contaminated groundwater plume.

This alternative includes institutional controls, in the form of an environmental easement and a site management plan, necessary to protect public health and the environment from any contamination identified at the site.

Present Worth: *$2,241,100*
Capital Cost: *$2,200,200*
Annual Costs: *$5,300*

A restoration to per-disposal or unrestricted conditions alternative was not provided in the RI/AAR. However, it is possible Alternative E could achieve all of the SCGs discussed in Section 6.1.1 and Exhibit A and soil meet the unrestricted soil clean objectives listed in Part 375-6.8(a).

Exhibit C

Remedial Alternative Costs

Remedial Alternative	Capital Cost ($)	Annual Costs ($)	Total Present Worth ($)
Alternative A – No Further Action	0	0	0
Alternative B – Limited Excavation,	$1,612,000	$5,300	$1,653,000

In-situ Soil/Groundwater			
Alternative C – Vadose Soil Excavation, In-situ Groundwater,	$1,264,000	$5,300	$1,287,000
Alternative D – Complete Excavation, Ex-situ Groundwater	$2,030,000	$30,000	$2,070,000
Alternative E – Complete Excavation, In-situ Groundwater	$2,200,200	$5,300	$2,241,100

Exhibit D

SUMMARY OF THE PROPOSED REMEDY

The Department is proposing Alternative C, Vadose Soil Excavation of Contaminated Soil/Fill, and In-Situ Soil/Groundwater Treatment as the remedy for this site. Alternative C would achieve the remediation goals for the site by the excavation and off-site disposal of hazardous soil/fill occurring in the vadose zone. The remaining contaminated soil/fill will be treated in-situ using chemical oxidation.

Upon development, a sub-slab depressurization system (SSDS) will be installed in the Swanson Building. The existing sump in the building , upon obtaining all required permits/approvals, would be connected directly to the sanitary sewer.

The entire contaminated groundwater plume on and off-site is to be treated in-situ with injection of Hydrogen Releasing Compound (HRC) into the saturated zone. A chemical oxidant will be used in the most significantly impacted area near MW-5 to rapidly reduce the concentration of PCE. Annual groundwater monitoring/reporting for a period of 5 years will be conducted to measure the effectiveness of the treatment program. A review of the groundwater remedy will be conducted after 5 years of operation. The elements of this remedy are described in Section 7. The limits of the proposed remedy are shown in Figure 5.

Basis for Selection

The proposed remedy is based on the results of the RI and the evaluation of alternatives. The criteria to which potential remedial alternatives are compared are defined in 6 NYCRR Part 375. A detailed discussion of the evaluation criteria and comparative analysis is included in the AA report.

The selected Alternative C is significantly different than Alternative D recommended by the FS. Alternative C recommends excavation of contaminated soil/fill in the vadose zone and utilizes in-situ rather than ex-situ soil/groundwater treatment.

When reviewing other alternatives, both Alternative D and E include complete excavation of soil fill down to native soil and/or the clay layer, adding stability issues associated with excavation to 13 feet bgs alone the adjacent Swanson building. However, Alternative D proposes the installation of an ex-situ pump and treat groundwater system. Alternative E proposes treatment of the entire on and off-site contaminated groundwater plume with in-situ chemical oxidation. In contrast to conventional pump and treat techniques, in-situ chemical treatment of the groundwater is thought to provide a faster and more complete contaminate removal and/or destruction process. However, the costs evaluation in the AA Report associated with Alternative D (Complete Excavation, Pump and Treat, and in-situ chemical treatment) is less than Alternative E (Complete Excavation and in-situ chemical treatment).

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

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

The proposed remedy, Alternative C, would satisfy this criterion by removing the contaminated soils in the vadose zone and properly disposing off-site, addressing the source of groundwater contamination, the most significant threat to public health and the environment. The entire on and off-site contaminated groundwater plume will be remediated in-situ (i.e., Swanson and Pelican Sites to the south). Alternative C accomplishes this goal without the added risks/costs of additional soil excavation and disposal to native soil (13 feet bgs), backfilling with clean fill, site machinery and trucking, dealing with volumes of groundwater during excavation, and the engineering issues (stability) of excavation along the adjacent Swanson building.

Alternative A (No Action) does not provide sufficient protection to public health and the environment and will not be evaluated further.

Alternative B, would satisfy this criterion by only *removing the most contaminated soils in the MW-5 area to the top of the groundwater table (unsaturated soils) and properly disposing off-site, addressing the main source of groundwater contamination, the most significant threat to public health and the environment. The remaining contaminated soils/fill will be treated in situ using chemical oxidation. The entire on and off-site contaminated groundwater plume will be remediated in-situ (i.e., Swanson parcel and Pelican Site to the south).*

Alternative D, complete *removal of contaminated soils and properly disposing off-site,* would also satisfy this criterion but *to a lesser degree and/or with lower certainty due to the questionable effectiveness and length of time required to meet remediation goals using a pump and treat groundwater treatment system. It's also not clear if Alternative D would treat the entire contaminant plume extending onto the Pelican site to the south.*

Alternative E would satisfy this criterion by complete *removal of the contaminated soils to native clay (approximately 13 feet) and properly disposing off-site, addressing the source of groundwater contamination, the most significant threat to public health and the environment. The entire on and off-site contaminated groundwater plume will be remediated in-situ (i.e., Swanson parcel and Pelican Site to the south).*

2. **<u>Compliance with New York State Standards, Criteria, and Guidance (SCGs).</u>** 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.

Alternatives C complies with SCGs to the extent practicable by excavation of contaminated soils and treatment of the entire on and off-site contaminant plume. Alternative C thereby addresses source areas of contamination, and also creates the conditions necessary to restore groundwater quality to pre-disposal conditions and/or the extent practicable.

Alternatives B, D, and E also comply with this criterion.

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.

Long-term effectiveness is best accomplished by all the Alternatives B,C, D, and E, involving varying degrees of excavation of the contaminated overburden soils and treatment of the entire contaminated groundwater plume.

Alternative C accomplishes this goal without the added risks/costs of additional soil excavation and disposal, backfilling with clean fill, site machinery and trucking, dealing with volumes of groundwater during excavation, and the engineering issues (stability) of excavation along the adjacent Swanson.

Alternative D proposes ex-situ pump and treat groundwater technology, which adds yearly operations and maintenance cost and additional remediation time depending on effectiveness of the collection system (i.e., extracting contaminants desorbed in soil and air stripping).

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.

Alternatives B, C, D, and E, excavation and off-site disposal of contaminated soil, and groundwater treatment reduces the toxicity, mobility and volume of on-site waste by transferring the material to an approved off-site location.

Although free–phase product was not observed during the investigation, the elevated groundwater concentrations indicate that free-phase product may exist. If present, this product may rest on the clay layer observed in some of the deeper borings. Alternative D and E both include complete excavation of the contaminated soil to native soils and/or the clay layer, allowing removal of possible free phase product resting on the clay layer.

However, Alternative D relies on an ex-situ pump and treat system with questions regarding its effectiveness, the length of time needed to complete remediation goals, and limited treatment of the entire contaminated groundwater plume (i.e., Swanson parcel but not the Pelican Site).

Alternative E would permanently reduce the toxicity, mobility and volume of contaminants by complete excavation of on-site contaminated soil, coupled with in-situ chemical treatment of the entire contaminated groundwater plume.

Alternatives B and C rely on in-situ soil/groundwater remediation to accomplish these goals.

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.

Alternatives B, D and E have short-term construction impacts, requiring engineering controls including handling the volumes of contaminated excavation groundwater, and stability issues of excavating along the adjacent Swanson building.

Alternative D, requiring a groundwater pump and treat system, would have short-term and yet to be determined long-term impacts to the environment due to the increase in green house emissions, noise, exhaust, and odor concerns to the neighborhood. These impacts are difficult to impossible to control by engineering means, and directly related to the duration of the activity, which in this case is in question. A pump and treat system could extend 5, 10, 20, 30 years before achieving the remediation goals. These impacts must also be evaluated especially considering the close proximity of a commercial business on the adjoining property to the north (Pal Joey's,) and also numerous commercial businesses in close proximity to the west.

Alternatives B relies on in situ chemical oxidation of the remaining soil/fill (outside MW-5) in the vadose zone, requiring added time and questionable results. Alternative C excavates contaminated soils as much as practically possible in the vadose zone, thus the length of time needed to achieve the remedial objectives will be minimized.

Alternatives B and C are less intrusive to the environment/neighborhood and are the simplest alternatives to implement.

6. <u>Implementability.</u> 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.

Alternatives B and C are the most technically and administrative feasible alternative to implement as contaminated soils are excavated to the extent practical and the entire groundwater plume is treated in-situ. Upon development, this alternative and after obtaining all required permits/approvals, the existing sump in the building would be connected directly to the sanitary sewer.

Contaminated soil excavation is limited to the vadose zone. This removes the soil stability issue of soil excavation along the northern length of the adjacent Swanson building to native soil (13 feet bgs).

Alternative D would require the design of an effective pump and treat system, and possible permits due to noise, odor concerns, and treated groundwater discharged to the sanitary sewer.

7. <u>Cost-Effectiveness.</u> 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.

Alternative D proposes ex-situ pump and treat groundwater technology, adding yearly operations and maintenance costs, additional time depending its effectiveness (i.e., extracting contaminants desorbed in soil and air stripping). The capital investment for a typical ex-situ plant has been estimated to be between three and seven times higher than for the *in-situ* systems. Whereas the *in-situ* methods had virtually no operating costs, the *ex-situ* costs each year have been estimated to be nearly as high as the initial capital costs.

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.

This current zoning and anticipated future use for this site is commercial. Alternatives B, C, D, and E, removal of contaminated soils and remediation of the entire contaminated groundwater plume (on and off-site), would allow this site to meet commercial use restrictions.

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. Since the selected remedy differs significantly from the proposed remedy, notices to the public will be issued describing the differences and reasons for the changes.

Alternative C is being proposed because, as described above, it satisfies the threshold criteria and provides the best balance of the balancing criterion.

Exhibit A

Nature and Extent of Contamination

This section describes the findings of the Remedial Investigation for all environmental media that were evaluated. As described in Section 6.1, samples were collected from various environmental media to characterize the nature and extent of contamination.

For each medium, 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), and in-organics (metals). For comparison purposes, the SCGs are provided for each medium that allows for unrestricted use. For soil, if applicable, the Restricted Use SCGs identified in Section 6.1.1 are also presented.

Waste/Source Areas

As described in the RI report, waste and source materials were identified at the site and are impacting groundwater, soil, and soil vapor on and off-site.

Wastes are defined in 6 NYCRR Part 375-1.2(aw) and include solid, industrial and/or hazardous wastes. Source Areas are defined in 6 NYCRR Part 375(au). Source areas are areas of concern at a site were substantial quantities of contaminants are found which can migrate and release significant levels of contaminants to another environmental medium.

Existing wastes/source areas identified at the site include:

- Former UST Area – Elevated VOC concentrations were detected in soil samples collected in locations under and west of the former USTs.

Seven test pits were excavated from four to five feet deep across the site (Figure 3). Photoionization Detector (PID) measurements from soil collected from TP-3 ranged from 52 parts per million (ppm) at approximately two feet below grade to 4,000 ppm at approximately four feet below grade. The remaining four test pits revealed the presence of fill materials with significantly lower PID measurements. No sampling was conducted as a part of the test pit program.

Twenty soil probes, ten test borings and five monitoring well borings were completed across the project site, and 24 soil probes were advanced on adjoining properties during the first four sampling events (Figure 3). The visual and PID screening of the retrieved soil samples indicate the presence of contaminated soils beneath the central, eastern, south and south-central portions of the project site and on adjoining sites. The screening of the wet/saturated retrieved soil samples indicates the presence of contaminated groundwater in the above referenced areas. Based on PID measurements, the most significantly impacted soils are located in the eastern (SP-4) and south-central (MW-5) portions of the site. Additionally, the highest PID measurements in the wet/saturated soils are located in the central (SP-8) and the south-central (SP-18) portions of the site.

Although eleven (11) different TCL VOCs were detected in the on-site subsurface soil samples, only PCE was detected at concentrations that exceeded the SCOs. The highest PCE concentrations were detected at MW-5 and TB-5, 8,000 ppm and 160 ppm respectively (Figure 4), exceeding the SCO of 1.3 ppm for restricted use protection of groundwater. MW-5 was placed in the area of the former USTs, and SP-4 was placed proximal to the former location of the wash tubs. Additionally, it should be noted the total concentrations of Tentatively Identified Compounds (TICs) is greater than 500 ppm in SP-9.

Based on elevated PID readings and visual/olfactory evidence of contamination, two samples were submitted for TCLP analysis at MW-5 and SP-4 (Table 6). PCE was detected in the sample collected from MW-5 at a concentration of 45 mg/L (TCLP), which is more than 64 times greater than the NYCRR Part 370 hazardous waste limit of 0.7 mg/L. The leachable concentration of PCE in the sample collected from SP-4 was 2.7 mg/L, nearly four times greater than the NYCRR Part 370 hazardous waste limit of 0.7 mg/L. These TCLP concentrations indicate that the impacted soils in these sample locations would be defined as a hazardous waste. The total PCE concentrations in the sample collected from SP-4 was similar to those detected in other samples collected at the project site, indicating that these other soils would likely also be defined as a hazardous waste.
It is noted that all other RCRA characteristic analyses were within the regulatory values.

SVOCs, pesticides, herbicides, and metals were either not detected or were not detected at concentrations above the regulatory values in any of the soil/fill samples (Table 4).

Seven different TCL VOCs were detected in the off-site subsurface samples (Table 3). However, none of the compounds were detected at a concentration that exceeded its SCG. The results indicate that the soil contamination is limited to the project site.

Arsenic and iron were detected at concentrations that exceeded the SCGs in the four on-site soil samples analyzed for TAL metals Table 5. Similar levels of iron are also often encountered at similar concentrations in urban settings and/or in fill materials. However, arsenic was detected in SP-13 and SP-15 at concentrations of 109 ppm and 85.7 ppm, respectively, exceeding the protection of groundwater SCGs of 16 ppm and natural Eastern USA background values (3-12 ppm).

Certain waste/source areas identified at the site were addressed by the IRM(s) described in Section 6.2. The remaining waste/source area(s) identified during the RI will be addressed in the remedy selection process.

Groundwater

On-Site Groundwater

Seven different TCL VOCs were detected in all but one of seven on-site groundwater samples at concentrations that exceeded NYSDEC Class GA Groundwater Standard or Guidance Value (Tables 7 and 8). PCE concentrations ranged from 7 to 1,000,000 ppm, with the most significantly elevated concentrations detected in the groundwater sample from MW-5, in the vicinity of the former USTs (Figure 5). The PCE concentrations in the remaining on-site locations were also significantly above the NYSDEC Class GA Groundwater Standard or Guidance Value of 5 ppm, but none approached the levels in MW-5. The other VOCs detected at concentrations above the SCGs include: 1,1,2,2-tetrachloroethane; 1,1-dichloroethene (1,1-DCE); vinyl chloride; cis-1,2-dichloroethene; isopropylbenzene; and TCE.

The results indicate that the groundwater beneath the central and eastern portions of the project site has been significantly impacted by the VOC contamination present in the subsurface soil/fill at the project site. The results also indicate that the groundwater beneath the south-central portion of the site (MW-5 location) is the most severely impacted. This area is immediately down gradient of the former USTs and also adjacent to the southern property line of the project site. The southward groundwater flow direction and presence of high concentrations of contaminants along the southern property boundary indicated the likelihood of down gradient impacts.

Off-Site Groundwater

Five different TCL VOCs were detected in at least one of the 21 off-site groundwater/surface water samples at concentrations that exceeded SCGs (Table 7).

PCE was present in 15 of the 21 samples at concentrations above the SCG, with concentrations ranging from 6 to 9,200 ppm. These concentrations were highest near the project site and decreased significantly with distance from the project site. The other VOCs detected at concentrations above the SCGs included 1,1,1-trichloroethane, cis-1,2-DCE, vinyl chloride and TCE.

The results indicate that the groundwater contaminant plume has migrated off-site to the south of the project site, impacting the Swanson and former Pelican properties (Figure 5). The SP-26 results indicate that the contaminant plume slightly extends beyond the northerly boundary of the site toward the adjacent Pal Joey's restaurant, albeit at relatively low concentrations.

Table #1 - Groundwater

Detected Constituents	Concentration Range Detected (ppb)[a]	SCG[b] (ppb)	Frequency Exceeding SCG
VOCs			
1,1,2,2-Tetrachloroethane	ND - 7	5	1 of 10
Tetrachloroethene	ND – 1,000,000	5	26 of 33
Trichloroethene	ND – 4,800	5	21 of 33
1,1-Dichloroethene	ND - 27	5	1 of 33
cis-1,2-Dichloroethene	ND – 1,100	5	15 of 33
Vinyl chloride	ND - 120	2	4 of 33
	ND -	5	
Inorganics			
Iron	5,140 – 22,300	300	5 of 5
Lead	8.9 – 25.5	25	1 of 5
Manganese	453 – 5,690	300	5 of 5
Sodium	35,200 – 112,000	20,000	5 of 5
Thallium	ND – 3.2	0.5	1 of 5

a - ppb: parts per billion, which is equivalent to micrograms per liter, ppm, in water.

b- SCG: Standard Criteria or Guidance - Ambient Water Quality Standards and Guidance Values (TOGs 1.1.1), 6 NYCRR Part 703, Surface water and Groundwater Quality Standards, and Part 5 of the New York State Sanitary Code (10 NYCRR Part 5).

Based on the findings of the RI, the past disposal of hazardous waste has resulted in the contamination of groundwater. The site contaminants that are considered to be the primary contaminants of concern which will drive the remediation of groundwater to be addressed by the remedy selection process are: tetrachloroethene (PCE); trichloroethene (TCE); 1,1-dichloroethene (1,1-DCE); cis-1,2-dichloroethene; vinyl chloride.

Soil

A total of 59 soil borings were installed on and off-site. Forty soil samples were collected from 32 of the soil borings. Sample depths ranged from ground surface to 15-feet below ground surface (bgs).

Of the 40 soil samples collected, four samples were analyzed for full Target Compound List (TCL)/Target Analyte List (TAL). Thirty-five samples were analyzed for TCL VOCs only; with the exception of one sample. This sample was analyzed for TCL VOCs as well as TCLP VOCs. Finally, one sample was analyzed for TCLP SVOCs, PCBs, pesticides, herbicides, and inorganics (metals), as well as reactivity, corrosivity, and ignitability.

Of the 40 soil samples collected on-site (Table 1), one or more of the SCGs were exceeded in seven samples Three soil samples, MW-5, SP-4, and TB-5 exceeded the SCG for PCE (Table 3). Four soil samples, SP-3, SP-11, SP – 13, and SP-15 exceeded SCGs for one or more inorganic parameters (Table 5).

Table #2 - Soil

Detected Constituents	Concentration Range Detected (ppm)[a]	Unrestricted SCG[b] (ppm)	Frequency Exceeding Unrestricted SCG	Restricted Use SCG[c] (ppm)	Frequency Exceeding Restricted SCG Protection of Groundwater
VOCs					
Tetrachloroethene	ND – 8,000,000	1,300	15 of 31	1,300	15 of 31
Trichloroethene	ND – 2,800	470	17 of 31	470	17 of 31
cis-1,2-Dichloroethene	ND – 5,600	250	9 of 19	250	9 of 19
Toluene	ND – 1,400	700	6 of 19	700	6 of 19
Inorganics					
Arsenic	85-109	13	2 of 4	16	2 of 2

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 Use Soil Cleanup Objectives for the Protection of Public Health for protection of groundwater Use, unless otherwise noted.
d - SCG: Part 375-6.8(b), Restricted Use Soil Cleanup Objectives for the Protection of Groundwater.

Based on the findings of the Remedial Investigation, the past disposal of hazardous waste has resulted in the contamination of soil. The site contaminants identified in soil which are considered to be the primary contaminants of concern, to be addressed by the remedy selection process are tetrachloroethene (PCE), trichloroethene (TCE), and arsenic.

Surface Water

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

Sediments

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

Soil Vapor

The evaluation of the potential for soil vapor intrusion resulting from the presence of site related soil or groundwater contamination was evaluated by the sampling of soil vapor, sub-slab soil vapor under structures, and indoor air inside structures. At this site, due to the presence of buildings in the impacted area, a full suite of samples were collected to evaluate whether soil vapor intrusion was occurring.

A passive soil gas survey was completed at the site to identify potential source areas of volatile organic compound contamination. Fourteen locations were included in the survey and the results indicate the presence of PCE and TCE at elevated concentrations.

Soil vapor samples were collected at an off-site adjacent building structure to the north of the site in order to determine potential impacts to indoor air quality from contaminants originating from the site (Table 9). Sub-slab, basement ambient, and outdoor ambient air samples were collected and analyzed for VOCs. Results of the indoor air quality sampling indicated an elevated concentration of PCE in the basement ambient air sample in excess of its respective SCG.

Based on the findings of the Remedial Investigation, the disposal of hazardous waste has resulted in the contamination of soil vapor. The site contaminants that are considered to be the primary contaminants of concern which will drive the remediation of soil vapor to be addressed by the remedy selection process are, tetrachloroethene (PCE) and trichloroethene (TCE).

Exhibit B

Description of Remedial Alternatives

The following alternatives were considered based on the remedial action objectives (see Section 6.5) to address the contaminated media identified at the site as described in Exhibit A.

Alternative A: No Action

The No Further Action Alternative recognizes the off-site vapor mitigation system completed by the IRM described in Section 6.2; and the 2001 County emergency removal action to remove various abandoned chemicals/solvents, two 500 gallon Underground Storage Tanks (UST's), and excavated soil/fill described in Section 3. This alternative is evaluated as a procedural requirement as a basis for comparison, leaves the site in its present condition, and does not provide any additional protection of the environment.

Alternative B: Limited Excavation and In-Situ Soil/Ground Water Treatment

This alternative includes the limited excavation and off-site disposal of the most contaminated subsurface soil/fill in the vicinity of MW-5 (to the top of groundwater table at a minimum) in addition to the arsenic contaminated area, and backfill with clean fill. The remaining VOC contaminated soil/fill would be treated in-situ using chemical oxidation.

In-situ chemical oxidation of the groundwater plume would consist of a series of injections throughout the contaminated groundwater plume.

Upon development, a sub-slab depressurization system (SSDS) will be installed in the Swanson Building and the existing sump in the building , upon obtaining all required permits/approvals, connected directly to the sanitary sewer.

This alternative includes institutional controls, in the form of an environmental easement and a site management plan, necessary to protect public health and the environment from any contamination identified at the site.

Present Worth: *$1,653,000*
Capital Cost: *$1,612,000*
Annual Costs: *$5,300*

Alternative C: Vadose Soil Excavation, and In-Situ Groundwater Treatment

This alternative includes the removal and off-site disposal of the VOC contaminated subsurface soil/fill down to the top of the groundwater table (unsaturated soil removal, 4-6 feet bgs), and backfill with clean fill. In addition, the arsenic contaminated soil area will be excavated to meet the SCO.

In-situ remediation of the contaminated groundwater plume would consist of both a chemical oxidant (MW-5 Area) and HRC elsewhere throughout the on-site and off-site VOC plume. In-situ chemical oxidation of the groundwater plume would consist of a series of injections throughout the contaminated groundwater plume.

Upon development, a sub-slab depressurization system (SSDS) will be installed in the Swanson Building. The existing sump in the building, upon obtaining all required permits/approvals, would be connected directly to the sanitary sewer.

This alternative includes institutional controls, in the form of an environmental easement and a site management plan, necessary to protect public health and the environment from any contamination identified at the site.

Present Worth: *$1,287,000*
Capital Cost: *$1,264,000*
Annual Costs: *$5,300*

Alternative D: Complete Excavation and Ex-Situ Ground Water Treatment By Air Stripping

This alternative involves the complete excavation and disposal of the contaminated soil/fill down to native soil and/or clay (13 feet bgs) and backfilling with clean fill.

Treatment of the contaminated groundwater plume will consist of an ex-situ pump and treat system using an air stripper. This system includes additional groundwater collection trenches to intercept the groundwater flow, drain it by gravity to a sump chamber at the lowest point of the site, and pump to the treatment unit prior to direct discharge to the municipal sanitary sewer. Trenches placed along the Swanson Building to collect off-site contaminated groundwater underneath the building in also included.

A remedial design is required to determine the treatment unit and discharge requirements.

This alternative includes institutional controls, in the form of an environmental easement and a site management plan, necessary to protect public health and the environment from any contamination identified at the site.

Present Worth: *$2,070,000*
Capital Cost: *$2,030,000*
Annual Costs: *$30,000*

Alternative E: Complete Excavation and In-Situ Ground Water Treatment

This alternative involves the complete excavation and disposal of the contaminated soil/fill down to native soil and/or clay (13 fbgs) and backfilling with clean fill. In-situ remediation of the contaminated groundwater plume would consist of both a chemical oxidant in the most significantly impacted area (MW-5 Area, 480 sf) and HRC elsewhere throughout the VOC plume which extends south through the Swanson site and onto the Pelican site (total plume estimated at 25,000 sq. ft.). In-situ remediation of the contaminated groundwater plume would consist of 500 HRC injections to be placed one per 50 sf over the contaminated groundwater plume.

This alternative includes institutional controls, in the form of an environmental easement and a site management plan, necessary to protect public health and the environment from any contamination identified at the site.

Present Worth: *$2,241,100*
Capital Cost: *$2,200,200*
Annual Costs: *$5,300*

A restoration to per-disposal or unrestricted conditions alternative was not provided in the RI/AAR. However, it is possible Alternative E could achieve all of the SCGs discussed in Section 6.1.1 and Exhibit A and soil meet the unrestricted soil clean objectives listed in Part 375-6.8(a).

Exhibit C

Remedial Alternative Costs

Remedial Alternative	Capital Cost ($)	Annual Costs ($)	Total Present Worth ($)
Alternative A – No Further Action	0	0	0
Alternative B – Limited Excavation,	$1,612,000	$5,300	$1,653,000

In-situ Soil/Groundwater			
Alternative C – Vadose Soil Excavation, In-situ Groundwater,	$1,264,000	$5,300	$1,287,000
Alternative D – Complete Excavation, Ex-situ Groundwater	$2,030,000	$30,000	$2,070,000
Alternative E – Complete Excavation, In-situ Groundwater	$2,200,200	$5,300	$2,241,100

Exhibit D

SUMMARY OF THE PROPOSED REMEDY

The Department is proposing Alternative C, Vadose Soil Excavation of Contaminated Soil/Fill, and In-Situ Soil/Groundwater Treatment as the remedy for this site. Alternative C would achieve the remediation goals for the site by the excavation and off-site disposal of hazardous soil/fill occurring in the vadose zone. The remaining contaminated soil/fill will be treated in-situ using chemical oxidation.

Upon development, a sub-slab depressurization system (SSDS) will be installed in the Swanson Building. The existing sump in the building , upon obtaining all required permits/approvals, would be connected directly to the sanitary sewer.

The entire contaminated groundwater plume on and off-site is to be treated in-situ with injection of Hydrogen Releasing Compound (HRC) into the saturated zone. A chemical oxidant will be used in the most significantly impacted area near MW-5 to rapidly reduce the concentration of PCE. Annual groundwater monitoring/reporting for a period of 5 years will be conducted to measure the effectiveness of the treatment program. A review of the groundwater remedy will be conducted after 5 years of operation. The elements of this remedy are described in Section 7. The limits of the proposed remedy are shown in Figure 5.

Basis for Selection

The proposed remedy is based on the results of the RI and the evaluation of alternatives. The criteria to which potential remedial alternatives are compared are defined in 6 NYCRR Part 375. A detailed discussion of the evaluation criteria and comparative analysis is included in the AA report.

The selected Alternative C is significantly different than Alternative D recommended by the FS. Alternative C recommends excavation of contaminated soil/fill in the vadose zone and utilizes in-situ rather than ex-situ soil/groundwater treatment.

When reviewing other alternatives, both Alternative D and E include complete excavation of soil fill down to native soil and/or the clay layer, adding stability issues associated with excavation to 13 feet bgs alone the adjacent Swanson building. However, Alternative D proposes the installation of an ex-situ pump and treat groundwater system. Alternative E proposes treatment of the entire on and off-site contaminated groundwater plume with in-situ chemical oxidation. In contrast to conventional pump and treat techniques, in-situ chemical treatment of the groundwater is thought to provide a faster and more complete contaminate removal and/or destruction process. However, the costs evaluation in the AA Report associated with Alternative D (Complete Excavation, Pump and Treat, and in-situ chemical treatment) is less than Alternative E (Complete Excavation and in-situ chemical treatment).

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

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

The proposed remedy, Alternative C, would satisfy this criterion by removing the contaminated soils in the vadose zone and properly disposing off-site, addressing the source of groundwater contamination, the most significant threat to public health and the environment. The entire on and off-site contaminated groundwater plume will be remediated in-situ (i.e., Swanson and Pelican Sites to the south). Alternative C accomplishes this goal without the added risks/costs of additional soil excavation and disposal to native soil (13 feet bgs), backfilling with clean fill, site machinery and trucking, dealing with volumes of groundwater during excavation, and the engineering issues (stability) of excavation along the adjacent Swanson building.

Alternative A (No Action) does not provide sufficient protection to public health and the environment and will not be evaluated further.

Alternative B, would satisfy this criterion by only *removing the most contaminated soils in the MW-5 area to the top of the groundwater table (unsaturated soils) and properly disposing off-site, addressing the main source of groundwater contamination, the most significant threat to public health and the environment. The remaining contaminated soils/fill will be treated in situ using chemical oxidation. The entire on and off-site contaminated groundwater plume will be remediated in-situ (i.e., Swanson parcel and Pelican Site to the south).*

Alternative D, complete *removal of contaminated soils and properly disposing off-site*, would also satisfy this criterion but *to a lesser degree and/or with lower certainty due to the questionable effectiveness and length of time required to meet remediation goals using a pump and treat groundwater treatment system. It's also not clear if Alternative D would treat the entire contaminant plume extending onto the Pelican site to the south.*

Alternative E would satisfy this criterion by complete *removal of the contaminated soils to native clay (approximately 13 feet) and properly disposing off-site, addressing the source of groundwater contamination, the most significant threat to public health and the environment. The entire on and off-site contaminated groundwater plume will be remediated in-situ (i.e., Swanson parcel and Pelican Site to the south).*

2. **<u>Compliance with New York State Standards, Criteria, and Guidance (SCGs).</u>** 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.

Alternatives C complies with SCGs to the extent practicable by excavation of contaminated soils and treatment of the entire on and off-site contaminant plume. Alternative C thereby addresses source areas of contamination, and also creates the conditions necessary to restore groundwater quality to pre-disposal conditions and/or the extent practicable.

Alternatives B, D, and E also comply with this criterion.

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.

Long-term effectiveness is best accomplished by all the Alternatives B,C, D, and E, involving varying degrees of excavation of the contaminated overburden soils and treatment of the entire contaminated groundwater plume.

Alternative C accomplishes this goal without the added risks/costs of additional soil excavation and disposal, backfilling with clean fill, site machinery and trucking, dealing with volumes of groundwater during excavation, and the engineering issues (stability) of excavation along the adjacent Swanson.

Alternative D proposes ex-situ pump and treat groundwater technology, which adds yearly operations and maintenance cost and additional remediation time depending on effectiveness of the collection system (i.e., extracting contaminants desorbed in soil and air stripping).

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.

Alternatives B, C, D, and E, excavation and off-site disposal of contaminated soil, and groundwater treatment reduces the toxicity, mobility and volume of on-site waste by transferring the material to an approved off-site location.

Although free–phase product was not observed during the investigation, the elevated groundwater concentrations indicate that free-phase product may exist. If present, this product may rest on the clay layer observed in some of the deeper borings. Alternative D and E both include complete excavation of the contaminated soil to native soils and/or the clay layer, allowing removal of possible free phase product resting on the clay layer.

However, Alternative D relies on an ex-situ pump and treat system with questions regarding its effectiveness, the length of time needed to complete remediation goals, and limited treatment of the entire contaminated groundwater plume (i.e., Swanson parcel but not the Pelican Site).

Alternative E would permanently reduce the toxicity, mobility and volume of contaminants by complete excavation of on-site contaminated soil, coupled with in-situ chemical treatment of the entire contaminated groundwater plume.

Alternatives B and C rely on in-situ soil/groundwater remediation to accomplish these goals.

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.

Alternatives B, D and E have short-term construction impacts, requiring engineering controls including handling the volumes of contaminated excavation groundwater, and stability issues of excavating along the adjacent Swanson building.

Alternative D, requiring a groundwater pump and treat system, would have short-term and yet to be determined long-term impacts to the environment due to the increase in green house emissions, noise, exhaust, and odor concerns to the neighborhood. These impacts are difficult to impossible to control by engineering means, and directly related to the duration of the activity, which in this case is in question. A pump and treat system could extend 5, 10, 20, 30 years before achieving the remediation goals. These impacts must also be evaluated especially considering the close proximity of a commercial business on the adjoining property to the north (Pal Joey's,) and also numerous commercial businesses in close proximity to the west.

Alternatives B relies on in situ chemical oxidation of the remaining soil/fill (outside MW-5) in the vadose zone, requiring added time and questionable results. Alternative C excavates contaminated soils as much as practically possible in the vadose zone, thus the length of time needed to achieve the remedial objectives will be minimized.

Alternatives B and C are less intrusive to the environment/neighborhood and are the simplest alternatives to implement.

6. <u>Implementability.</u> 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.

Alternatives B and C are the most technically and administrative feasible alternative to implement as contaminated soils are excavated to the extent practical and the entire groundwater plume is treated in-situ. Upon development, this alternative and after obtaining all required permits/approvals, the existing sump in the building would be connected directly to the sanitary sewer.

Contaminated soil excavation is limited to the vadose zone. This removes the soil stability issue of soil excavation along the northern length of the adjacent Swanson building to native soil (13 feet bgs).

Alternative D would require the design of an effective pump and treat system, and possible permits due to noise, odor concerns, and treated groundwater discharged to the sanitary sewer.

7. <u>Cost-Effectiveness.</u> 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.

Alternative D proposes ex-situ pump and treat groundwater technology, adding yearly operations and maintenance costs, additional time depending its effectiveness (i.e., extracting contaminants desorbed in soil and air stripping). The capital investment for a typical ex-situ plant has been estimated to be between three and seven times higher than for the *in-situ* systems. Whereas the *in-situ* methods had virtually no operating costs, the *ex-situ* costs each year have been estimated to be nearly as high as the initial capital costs.

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.

This current zoning and anticipated future use for this site is commercial. Alternatives B, C, D, and E, removal of contaminated soils and remediation of the entire contaminated groundwater plume (on and off-site), would allow this site to meet commercial use restrictions.

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. Since the selected remedy differs significantly from the proposed remedy, notices to the public will be issued describing the differences and reasons for the changes.

Alternative C is being proposed because, as described above, it satisfies the threshold criteria and provides the best balance of the balancing criterion.

Table 1
Former C & B Dry Cleaners Site RI/AA

Sampling/Analysis Summary

Field Program	Sample I.D.	Depth (ft bgs)	Direct PID (ppm)	Sample Collected/ Depth (ft bgs)	Soil Analysis	1st Round Groundwater Analysis	2nd Round Groundwater Analysis	3rd Round Groundwater Analysis	Comments [Depth in ft bgs]
On-site Soil Probes	1	0-16	BG	none	N/A	N/A	N/A	N/A	wet at 8
	2	0-12	BG-1.0	none	N/A	N/A	N/A	N/A	wet at 7.5
	3	0-12	BG-1.0	0-8	Full TCL/TAL	N/A	N/A	N/A	sample wet; wet at 4.5
	4	1.5-3.5	289	2	TCL VOCs	N/A	N/A	N/A	
				2.0-3	Full TCLP;Corr;FP				
		3.5-7	36	4	TCL VOCs				
		7.0-12.5	89	7.5-10	TCL VOCs				sample wet; wet at 7
		12.5-15.0	0.7	none	N/A				moist
	5	0-15	BG-0.8	none	N/A	N/A	N/A	N/A	wet at 10
	6	0-8.5	0.8	8.0-10	TCL VOCs	N/A	N/A	N/A	
		8.5-15	2.4						sample wet; wet at 8.5
	7	1.5-3.0	36	none	N/A	N/A	N/A	N/A	
		3.0-15	BG-3.3						wet at 9
	8	0.5-4	31-45	none	N/A	N/A	N/A	N/A	
		5.5	4.8						
		10.0-15	83-391						wet at 10
	9	1.5-7.5	43	6.0-7.0	TCL VOCs	N/A	N/A	N/A	
		7.5-13	36-173	8.0-10.0	TCL VOCs				sample wet;wet at 7.5
		13-14	32	13.0-14	TCL VOCs				sample wet
	10	1.0-7.5	6.0-23	none	N/A	N/A	N/A	N/A	
		7.5-12	116-175						wet at 7.5
	11	1.0-4.0	36	0.0-12	Full TCL/TAL	N/A	N/A	N/A	
		4.0-12	6.0-12						sample 1/2 wet; wet at 9.5
	12	1.0-3.0	95	none	N/A	N/A	N/A	N/A	
		3.0-7.0	21	none	N/A				
		7.0-12.5	61-125	8.0-9	TCL VOCs				sample wet; wet at 7
		12.5-13.5	BG	none	N/A				
	13	0.0-7.5	3.0-4.0	0-8.5	Full TCL/TAL	N/A	N/A	N/A	
		7.5-8.5	53						some wet soil in sample; wet at 7
		8.5-15	1.1-4.0	none	N/A				
	14	0-15	BG-1.7	12.0-15	TCL VOCs	N/A	N/A	N/A	sample wet; wet at 12
	15	0.0-12	BG	0.0-7	Full TCL/TAL	N/A	N/A	N/A	wet at 7

Table 1
Former C & B Dry Cleaners Site RI/AA

Sampling/Analysis Summary

Field Program	Sample I.D.	Depth (ft bgs)	Direct PID (ppm)	Sample Collected/ Depth (ft bgs)	Soil Analysis	1st Round Groundwater Analysis	2nd Round Groundwater Analysis	3rd Round Groundwater Analysis	Comments [Depth in ft bgs]
Test Borings	1	0-8	BG	2.0-4.0	TCL VOCs	N/A	N/A	N/A	wet at 7.25
	2	1.0-10	BG-0.6	1.0-4	TCL VOCs	N/A	N/A	N/A	wet at 9.5
	3	1.0-10	0.1-0.3	2.0-4	TCL VOCs	N/A	N/A	N/A	wet at 8.25
	4	0.0-8	0.9-2.3	2.0-4	TCL VOCs	N/A	N/A	N/A	wet at 8
	5	0.5-2	25.5	0.5-2	TCL VOCs	N/A	N/A	N/A	
		2.0-8	6.2-10.7	4.0-6	TCL VOCs				wet at 8
	6	0.0-3	0.5-7	2.0-3	TCL VOCs	N/A	N/A	N/A	
		3.0-6	0.6	4.0-6	TCL VOCs				wet at 6
	7	0.0-2	9.8	0.0-2	TCL VOCs	N/A	N/A	N/A	
		2.0-6	1.7-2.3	none	N/A				wet at 5.5
	8	0.0-6	BG	2.0-4	TCL VOCs	N/A	N/A	N/A	wet at 6
	9	0.0-6	0.2	2.0-4	TCL VOCs	N/A	N/A	N/A	wet at 6
	10	0-2	11.4	none	N/A	N/A	N/A	N/A	
		2.0-4	39.2	2.0-4	TCL VOCs				
		4.0-8	10.0-22	4.0-6	TCL VOCs				wet at 8
Monitoring Well	MW1	0.0-14	BG-1.4	none	N/A	Full TCL / TAL	TCL VOCs	N/A	wet at 9
	MW2	0.0-14	BG-0.4	none	N/A	Full TCL / TAL	TCL VOCs	N/A	wet at 8.25
	MW3	0.0-6	0.6-15.1	none	N/A	Full TCL / TAL	TCL VOCs	N/A	
		6.0-13.5	61-138	none	N/A				wet at 5.75
		13.5-14	12.8	none	N/A				becomes moist
	MW4	0-2	2.0	none	N/A	Full TCL / TAL	TCL VOCs	N/A	
		2.0-8	20.9-21	4.0-6	TCL VOCs				wet at 8
		8.0-14	0.2-0.4	none	N/A				
	MW5	0.0-2	6.0	none	N/A	Full TCL / TAL	TCL VOCs	N/A	
		2.0-4	20	none	N/A				
		4.0-14	145-1428	4.0-6	TCL VOCs / TCLP VOCs				wet at 7

Table 1
Former C & B Dry Cleaners Site RI/AA

Sampling/Analysis Summary

Field Program	Sample I.D.	Terminal Depth (ft bgs)	Dry Sample-Highest Direct/Head PID (ppm) @ Depth (ft bgs)	Wet Sample-Highest Direct/Head PID (ppm) @ Depth (ft bgs)	Sample Collected/ Depth (ft bgs)	Soil Analysis	1st Round Groundwater Analysis	2nd Round Groundwater Analysis	3rd Round Groundwater Analysis	Comments [Depth in ft bgs]
On-site Soil Probes	SP 16	12.0	BG @ All / 4.1 @ 4-8	0.5 @ 8.5 / 4.1 @ 4-8	6	TCL VOCs	N/A	TCL VOCs	N/A	wet at 7.0; Micro-well installed
	SP 17	12.0	BG @ All / 6.5 @ 4-8	BG @ All / 6.5 @ 4-8	none	N/A	N/A	N/A	N/A	wet at 7.25
	SP 18	12.0	0.3 @ 4 / 129.1 @ 4-8	2,016 @ 12 / 4,718 @ 8-12	5	TCL VOCs	N/A	N/A	N/A	moist to wet at 4.0, saturated at 6.0
	SP 19	10	4.5 @ 2 / 32.8 @ 0-4	BG @ All / 5.3 @4-8	4	TCL VOCs	N/A	TCL VOCs	N/A	wet at 4.25; Micro-well installed
	SP 20	12.0	BG @ All / 0.5 @ 4-8	BG @ All / 0.5 @ 4-8	4	TCL VOCs	N/A	N/A	N/A	wet at 6.5
Off-site Soil Probes	SP 21	12.0	BG @ All / 1.0 @ 0-4	BG @ All / 0.3 @ 4-8	3	TCL VOCs	N/A	TCL VOCs	N/A	wet at 4.0; Micro-well installed
	SP 22	12.0	BG @ All / 0.4 @ 4-8	BG @ All / 0.4 @ 4-8	none	N/A	N/A	N/A	N/A	wet at 7.0
	SP 23	8.0	BG @ All / no sample	4.3 @ 7 / no sample	3	TCL VOCs	N/A	TCL VOCs	N/A	wet at 4.0; Micro-well installed
	SP 24	15.0	0.3 @ 6 / no sample	BG @ All / no sample	none	N/A	N/A	TCL VOCs	N/A	wet at 7.0; hole collapsed- pushed drive point to 15.0; Micro-well installed
	SP 25	15.5	BG @ All / head not done	BG @ All / 5.3 @4-8	none	N/A	N/A	N/A	TCL VOCs	wet at 6.25; Micro-well installed
	SP 26	15.0	BG @ All / head not done	1.9 @ 6-8 / head not done	none	N/A	N/A	N/A	TCL VOCs	wet at 7.00; Micro-well installed
	SP 27	11.6	see SP 22	see SP 22	none	N/A	N/A	N/A	TCL VOCs	completed in SP 22 hole; wet at 7.0; Micro-well installed
	SP 28	14.0	BG @ All / head not done	36.2 @ 8-10 / head not done	none	N/A	N/A	N/A	TCL VOCs	wet at 8.0; Micro-well installed
	SP 29	12.0	BG @ All / head not done	BG @ All / head not done	none	N/A	N/A	N/A	TCL VOCs	wet at 8.25; Micro-well installed
	SP 30	12.0	BG @ All / head not done	BG @ All / head not done	none	N/A	N/A	N/A	TCL VOCs	wet at 8.0; Micro-well installed
	SP 31	16.0	BG @ All / head not done	22.3 @ 12-13 / head not done	none	N/A	N/A	N/A	TCL VOCs	wet at 8.0; Micro-well installed
	SP 32	16.0	BG @ All / head not done	BG @ All / head not done	none	N/A	N/A	N/A	N/A	wet at 7.0

Table 1
Former C & B Dry Cleaners Site RI/AA

Sampling/Analysis Summary

Field Program	Sample I.D.	Terminal Depth (ft bgs)	Dry Sample-Highest Direct PID (ppm) @ Depth (ft bgs)	Wet Sample-Highest Direct PID (ppm) @ Depth (ft bgs)	Sample Collected/ Depth (ft bgs)	Soil Analysis	1st Round Groundwater Analysis	2nd Round Groundwater Analysis	3rd Round Groundwater Analysis	4th Round Groundwater Analysis	Comments [Depth in ft bgs]
On-site Soil Probes	SP 35	12.0	BG @ All	BG @ All	none	N/A	N/A	N/A	N/A	TCL VOCs	damp at 4, saturated at 8
Off-Site Soil Probes	SP 32A	12.0	BG @ All	BG @ All	10	TCL VOCs	N/A	N/A	N/A	TCL VOCs	wet at 7
	SP 33	12.0	BG @ All	220 @ 7.8-8	none	N/A	N/A	N/A	N/A	N/A	wet at 7.8, saturated at 8
	SP 34	12.0	BG @ All	BG @ All	none	N/A	N/A	N/A	N/A	TCL VOCs	damp at 4, saturated at 9
	SP 36	16.0	BG @ All	0.7 @ 16	15	TCL VOCs	N/A	N/A	N/A	TCL VOCs	wet at 6.5
	SP 37	12	BG @ All	0.6 @ 10	none	N/A	N/A	N/A	N/A	TCL VOCs	damp at 0, saturated at 8
	SP 38	12.0	0.4 @ 4	5.2 @ 6	none	N/A	N/A	N/A	N/A	TCL VOCs	damp at 0, wet at 4
	SP 39	12.0	BG @ All	5.2 @ 6	none	N/A	N/A	N/A	N/A	TCL VOCs	damp at 0, wet at 7.5
	SP 40	16.0	BG @ All	BG @ All	none	N/A	N/A	N/A	N/A	TCL VOCs	damp at 0, wet at 6
	SP 41	12.0	349 @ 7.5	349 @ 8	7.5 and 10	TCL VOCs	N/A	N/A	N/A	TCL VOCs	damp at 0, wet at 8
	SP 42	12.0	BG @ All	0.3 @ 4.5 and 8.5	11	TCL VOCs	N/A	N/A	N/A	TCL VOCs	damp at 0, wet at 4
	SP 43	12.0	1.2 @ 4.5	2.6 @ 5	7.5	TCL VOCs	N/A	N/A	N/A	N/A	damp at 4, wet at 5, saturated at 8

1. Head space PID reading was not completed during this event

Table 2
Former C & B Dry Cleaners Site RI/AA

Groundwater Elevation Summary

Monitoring Well I.D.	Ground Surface Elevation	Top of PVC Casing (TOC) Elevation	June 3, 2005		June 7, 2005		June 27, 2005	
			Depth to Groundwater from TOC	Groundwater Elevation	Depth to Groundwater from TOC	Groundwater Elevation	Depth to Groundwater from TOC	Groundwater Elevation
MW-1	96.16	95.67	4.24	91.43	NM	NA	4.33	91.34
MW-2	99.16	98.48	6.40	92.08	NM	NA	6.49	91.99
MW-3	99.28	98.74	6.53	92.21	NM	NA	6.61	92.13
MW-4	98.57	97.98	NM	NA	5.69	92.29	5.75	92.23
MW-5	97.34	99.41	NM	NA	8.79	90.62	8.42	90.99

Notes:
1. All measurements and elevations are in feet.
2. TOC = Top of PVC casing
NM= Not measured this day
NA= Not applicable

Table 3
Former C&B Dry Cleaners Site RI/AA
Summary of VOC Analytical Results -
Subsurface Soil Samples

LOCATION		ON-SITE											
SAMPLE I.D.	PART 375 SOIL CLEANUP OBJECTIVES: COMMERCIAL	MW-4	MW-5	TB-1	TB-2	TB-3	TB-4	TB-5	TB-5	TB-6	TB-6	TB-7	TB-8
Interval Sampled (ft bgs)		4-6	4-6	2-4	1-4	2-4	2-4	0.5-2	4-6	2-3	4-6	0-2	2-4
DATE SAMPLED		6/1/2005		6/2/2005									
TCL VOCs	CONCENTRATION (ug/Kg)	CONCENTRATION (ug/Kg)											
Cyclohexane	500,000*	1,300 U	1,300 U	11 U	10 U	1,700 U	1,400 U	370 J	1,300 U	1,400 U	1,300 U	1,500 U	11 U
Ethylbenzene	390,000	1,300 U	1,300 U	11 U	10 U	1,700 U	1,400 U	380 J	1,300 U	1,400 U	1,300 U	1,500 U	11 U
Methylcyclohexane	500,000*	1,300 U	1,300 U	11 U	10 U	1,700 U	1,400 U	8,400 DJ	1,300 U	1,400 U	1,300 U	1,500 U	11 U
Methylene chloride	500,000	1,300 U	1,300 U	11 U	10 U	1,700 U	1,400 U	1,300 U	1,300 U	1,400 U	1,300 U	1,500 U	14 U
Tetrachloroethene (PCE)	150,000	7,700	8,000,000 DJ	33	13	3,100	18,000	160,000 D	2,700	6,900	5,900	130,000 DJ	9 J
Total Xylenes	500,000	1,300 U	1,300 U	11 U	10 U	1,700 U	1,400 U	3,000	1,300 U	1,400 U	1,300 U	1,500 U	11 U
Trichloroethene (TCE)	200,000	1,300 U	210 J	11 U	10 U	1,700 U	1,400 U	490 J	1,300 U	1,400 U	1,300 U	1,500 U	11 U
Total TICs	-	0	1,400	10	0	0	0	11,990	0	0	0	0	0
Total VOCs	-	**7,700**	**8,001,610**	**43**	**13**	**3,100**	**18,000**	**184,630**	**2,700**	**6,900**	**5,900**	**130,000**	**9**

LOCATION		ON-SITE											
SAMPLE I.D.	PART 375 SOIL CLEANUP OBJECTIVES: COMMERCIAL	TB-9	TB-10	TB-10	SP-3	SP-4	SP-4	SP-4	SP-6	SP-9	SP-9	SP-9	SP-11
Interval Sampled (ft bgs)		2-4	2-4	4-6	0-8	2	4	7.5-10	8-10	13-14	6-7	8-10	0-12
DATE SAMPLED		6/2/2005			5/13/2005								
TCL VOCs	CONCENTRATION (ug/Kg)	CONCENTRATION (ug/Kg)											
Acetone	500,000	1,400 U	1,400 U	1,300 U	11 U	1,300 U	11 U	11 U	4 J	1,500 U	11 UJ	5,600 U	1,300 U
cis-1,2-Dichloroethene	500,000	1,400 U	1,400 U	1,300 U	11 U	1,300 U	11 U	2 J	14	1,500 U	11 UJ	5,600 U	1,300 U
Cyclohexane	500,000*	1,400 U	1,400 U	1,300 U	11 U	1,300 U	11 U	11 U	11 U	1,500 U	11 UJ	5,600 U	1,300 U
Ethylbenzene	390,000	1,400 U	1,400 U	1,300 U	11 U	1,300 U	11 U	11 U	11 U	1,500 U	11 UJ	5,600 U	1,300 U
Methylcyclohexane	500,000*	1,400 U	1,400 U	1,300 U	11 U	1,300 U	11 U	2 J	11 U	1,500 U	11 UJ	5,600 U	1,300 U
Methylene chloride	500,000	1,400 U	1,400 U	1,300 U	12 U	1,300 U	11 U	11 U	8 J	1,500 U	11 UJ	5,600 U	1,300 U
Tetrachloroethene (PCE)	150,000	730 J	110,000 D	24,000	46	28,000 D	78	190	20	1,500 U	17 J	870 J	7,600
Toluene	500,000	1,400 U	1,400 U	1,300 U	22	610 J	15	220	11 U	340 J	4 J	1,400 J	690 J
Trichloroethene (TCE)	200,000	1,400 U	1,400 U	1,300 U	11 U	1,300 U	2 J	28	12	1,500 U	11 UJ	5,600 U	1,300 U
Total TICs	-	0	0	0	41	32,800	0	0	6,150	12,200	0	593,000	0
Total VOCs	**-**	**730**	**110,000**	**24,000**	**109**	**61,410**	**93**	**442**	**6,208**	**12,540**	**21**	**595,270**	**8,290**

LOCATION		ON-SITE						
SAMPLE I.D.	PART 375 SOIL CLEANUP OBJECTIVES: COMMERCIAL	SP-12	SP-13	SP-14	SP-15	SP-16	SP-18	SP-20
Interval Sampled (ft bgs)		8-9	0-8.5	12-15	0-7	6	5	4
DATE SAMPLED		5/13/2005						
TCL VOCs	CONCENTRATION (ug/Kg)							
Acetone	500,000	2,800 U	1,400 UJ	12 UJ	12 U	12 U	11 U	21
Carbon Disulfide	500,000*	2,800 U	1,400 UJ	12 UJ	12 U	12 U	11 U	2 J
cis-1,2-Dichoroethene	500,000	2,800 U	1,400 UJ	12 UJ	12 U	12 U	11 U	13 U
Methylcyclohexane	500,000*	2,800 U	1,400 UJ	12 UJ	12 U	12 U	11 U	13 U
Methylene chloride	500,000	2,800 U	1,400 UJ	12 UJ	21	6 J	10 BJ	8 J
Tetrachloroethene (PCE)	150,000	740 J	9,900 J	8 J	8 J	5 J	300 D	13 U
Toluene	500,000	490 J	1,400 UJ	9 J	12 U	12 U	11 U	13 U
Trichloroethene (TCE)	200,000	2,800 U	1,400 UJ	12 UJ	12 U	12 U	11 U	13 U
Total TICs	-	418,000	17,230	0	149	7	94	7
Total VOCs	**-**	**419,230**	**27,130**	17	178	18	404	38

Notes:
1. Part 375 Soil Cleanup Objective source is NYSDEC 6NYCRR Part 375 Environmental Remediation Programs (Part 375)
   Determination of Soil Cleanup Objectives and Cleanup Levels for restricted commercial use (Part 375-6.8(b) effective December 14, 2006.
2. Shaded boxes represent exceedances of the regulatory value.
3. (-) = No regulatory value is associated with this analyte.
4. ug/Kg = micrograms per Kilogram (equivalent to parts per billion (ppb)).
5. Only analytes detected in one or more samples are shown.
6. ND = Non Detected
7. Definitions of data qualifiers are presented in Table 9.

* Soil Cleanup Objectives for Individual Organic Volitiles and semivolatiles were capped at 500,000 unless otherwise specified

Table 3 (con't)
Former C&B Dry Cleaners Site RI/AA
Summary of VOC Analytical Results -
Subsurface Soil Samples

LOCATION																		
								OFF-SITE										
SAMPLE I.D.	PART 375 SOIL CLEANUP OBJECTIVES: COMMERCIAL	SP-19		SP-21		SP-23		SP-32A		SP-36		SP-41 COMPOSITE		SP-42		SP-43		
Interval Sampled (ft bgs)		4		3		3		10		15		-		11		7.5		
DATE SAMPLED		5/13/2005						3/12/2007										
TCL VOCs	CONCENTRATION (ug/Kg)																	
Acetone	500,000	11	U	13	U	11	U	12	U	3	BJ	1,300	U	7	BJ	3	BJ	
Bromomethane	500,000*	11	U	13	U	11	U	12	U	11	U	220	J	11	U	12	U	
Carbon Disulfide	500,000*	11	U	13	U	11	U	12	U	11	U	1,300	U	11	U	12	U	
Cyclohexane	500,000*	11	U	13	U	11	U	12	U	11	U	1,600		11	U	12	U	
cis-1,2-Dichoroethene	500,000	11	U	13	U	7	J	12	U	10	J	1,300	U	49		12	U	
Methylcyclohexane	500,000*	11	U	13	U	11	U	12	U	11	U	5,600		11	U	12	U	
Methylene chloride	500,000	6	J	13	U	8	J	5	BJ	7	BJ	1,300	U	6	BJ	6	BJ	
Tetrachloroethene (PCE)	150,000	480	D	13	U	160		12	U	4	J	1,300	U	11	U	12	U	
Toluene	500,000	11	U	13	U	11	U	12	U	11	U	1,300	U	11	U	12	U	
Trichloroethene (TCE)	200,000	11	U	13	U	11	U	12	U	11	U	1,300	U	11	U	12	U	
Total TICs	-	6		-		-		18		18		60,800		21		181		
Total VOCs		**492**		**0**		**175**		**23**		**42**		**68,220**		**83**		**190**		

Notes:
1. Part 375 Soil Cleanup Objective source is NYSDEC 6NYCRR Part 375 Environmental Remediation Programs (Part 375)
Determination of Soil Cleanup Objectives and Cleanup Levels for restricted commercial use (Part 375-6.8(b) effective December 14, 2006
2. Shaded boxes represent exceedances of the regulatory value.
3. (-) = No regulatory value is associated with this analyte.
4. ug/Kg = micrograms per Kilogram (equivalent to parts per billion (ppb)).
5. Only analytes detected in one or more samples are shown.
6. ND = Non Detected
7. Definitions of data qualifiers are presented in Table 9.

* Soil Cleanup Objectives for Individual Organic Volitiles and semivolatiles were capped at 500,000 unless otherwise specified

Table 4
Former C&B Dry Cleaners Site RI/AA

Summary of SVOC and Pesticide/PCB Analytical Results - Soil Samples

Sample I.D.	PART 375 SOIL CLEANUP OBJECTIVES: COMMERCIAL	SP-11		SP-13		SP-15		SP-3	
Interval Sampled (feet bgs):		**0-12**		**0-8.5**		**0-7**		**0-8**	
Date Sampled:		**5/13/2005**		**5/13/2005**		**5/13/2005**		**5/13/2005**	
TCL SVOCs (ug/Kg)									
2-Methylnaphthalene	500,000*	400	U	66	J	50	J	1,900	U
Acenaphthene	500,000	400	U	2,000	U	390	U	230	J
Anthracene	500,000	16	J	69	J	390	U	540	J
Benzo(a)anthracene	5,600	44	J	200	J	34	J	1,200	J
Benzo(a)pyrene	1,000	23	J	130	J	18	J	550	J
Benzo(b)fluoranthene	5,600	65	J	270	J	53	J	1,400	J
Benzo(k)fluoranthene	500,000	62	J	78	J	15	J	360	J
Bis(2-ethylhexyl) phthalate	500,000*	1,400		2,200		1,400		2,800	
Carbazole	500,000*	400	U	2,000	U	390	U	210	J
Chrysene	56,000	39	J	270	J	48	J	1,300	J
Dibenzo(a,h)anthracene	560	16	J	52	J	390	U	190	J
Dibenzofuran	500,000*	400	U	2,000	U	20	J	120	J
Di-n-butyl phthalate	500,000*	16	J	58	J	18	J	1,900	U
Di-n-octyl phthalate	500,000*	400	U	2,000	U	390	U	1,900	U
Fluoranthene	500,000	77	J	450	J	59	J	3,800	
Fluorene	500,000	400	U	2,000	U	390	U	250	J
Indeno(1,2,3-cd)pyrene	5,600	32	J	92	J	19	J	380	J
Naphthalene	500,000	12	J	58	J	39	J	1,900	U
Phenanthrene	500,000	70	J	370	J	390	U	2,800	
Phenol	500,000	35	J	50	J	390	U	93	J
Pyrene	500,000	68	J	290	J	56	J	1,900	
Total TICs	-	330		460		2,910		1,560	
Total SVOCs	**-**	**2,305**		**5,163**		**4,739**		**19,683**	
TCL Pesticides / Total PCBs (ug/Kg)									
4,4'-DDD	92,000	4	U	10		3.9	U	1.4	JN
4,4'-DDE	62,000	4	U	2	J	0.41	J	2.4	JN
4,4'-DDT	47,000	4	U	24	J	2.1	JP	2.6	J
alpha-BHC	3,400	2.1	U	0.45	JN	2	U	4	U
alpha-Chlordane	24,000	2.1	U	0.6	J	2	U	4	U
beta-BHC	3,000	2.1	U	7	JN	1.7	JP	44	
Dieldrin	1,400	4	U	1.1	J	3.9	U	7.7	U
Endosulfan I	200,000	2.1	U	0.62	J	2	U	4	U
Endosulfan II	200,000	4	U	1	J	0.63	JP	7.7	U
Endosulfan Sulfate	200,000	4	U	2.3	JN	3.9	U	7.7	U
Endrin	89,000	4	U	0.43	JN	3.9	U	7.7	U
Endrin aldehyde	500,000*	4	U	1.5	J	3.9	U	5.7	J
Endrin ketone	500,000*	4	U	2.4	J	0.73	JP	8.7	J
gamma-Chlordane	500,000*	2.1	U	1.7	JN	0.43	JP	4	U
Heptachlor	15,000	2.1	U	0.91	JN	0.76	JP	4	U
Methoxychlor	500,000*	0.93	JN	20	U	20	U	84	J

Notes:
1. Part 375 Soil Cleanup Objective source is NYSDEC 6NYCRR Part 375 Environmental Remediation Programs (Part 375)
   Determination of Soil Cleanup Objectives and Cleanup Levels for restricted commercial use (Part 375-6.8(b) effective December 14, 2006.
2. Shaded boxes represent exceedances of the regulatory value and/or highest listed background range.
3. (-) = No regulatory value is associated with this analyte.
4. mg/Kg = milligrams per Kilogram (equivalent to parts per million (ppm)).
5. Only analytes detected in one or more samples are shown.
6. Definitions of data qualifiers are presented in Table 9.

* Soil Cleanup Objectives for Individual Organic Volitiles and Semivolatiles were capped at 500,000 unless otherwise specified

Table 5
Former C&B Dry Cleaners Site RI/AA

Summary of Metals Analytical Results- Soil Samples

	PART 375 SOIL CLEANUP OBJECTIVES COMMERCIAL	EASTERN USA BACKGROUND VALUES	USGS BACKGROUND VALUES	SP-3		SP-11		SP-13		SP-15	
Interval Sampled (feet bgs):		**N/A**	**N/A**	**0-8**		**0-12**		**0-8.5**		**0-7**	
Date Sampled:		**N/A**	**N/A**	**5/13/2005**		**5/13/2005**		**5/13/2005**		**5/13/2005**	
TAL - Metals (mg/Kg)											
Aluminum	10,000*	33,000	-	9,660	J	8,440	J	4,740	J	6,520	J
Antimony	10,000*	-	<1 - 8.8	0.45	UJ	0.49	J	0.99	J	1	J
Arsenic	16	3 - 12	<0.1 - 73	7.8	J	7.1	J	109	J	85.7	J
Barium	400	15 - 600	10 - 1,500	108		99.4		95.5		178	
Beryllium	590	0 - 1.75	<1 - 7	0.29	J	0.29	J	0.24	J	0.25	J
Cadmium	9	0.1 - 1	-	0.09	J	0.18	J	0.04	J	0.03	UJ
Calcium	10,000*	130 - 35,000	-	4,620	J	1,810	J	1,940	J	3,290	J
Chromium	400	1.5 - 40	1 - 1,000	10.4	J	9.3	J	9.1	J	12.1	J
Cobalt	10,000*	2.5 - 60	<0.3 - 70	5.9	BJ	4.9	BJ	3.6	J	4.2	BJ
Copper	270	1 - 50	<1 - 700	19.8	J	16.8	J	41.7	J	27.8	J
Iron	10,000*	2,000 - 550,000	-	17,900	J	13,500	J	54,200	J	41,300	J
Lead	1,000	200 - 500	<10 - 300	25.5	J	26.4	J	84.2	J	143	J
Magnesium	10,000*	100 - 5,000	-	2,510	J	1,720	J	984	J	1,640	J
Manganese	10,000	50 - 5,000	<2 - 7,000	668	J	505	J	203	J	211	J
Mercury	2.8	0.001 - 0.2	0.01 - 3.4	0.011	U	0.034	J	0.063		0.287	J
Nickel	310	0.5 - 25	<5 - 700	14.2	J	11.7	J	8.1	J	10	J
Potassium	10,000*	8,500 - 43,000	-	719	J	543	J	985	J	983	J
Selenium	1,500	0.1 - 3.9	<0.1 - 3.9	0.75	UJ	0.86	J	4.7	J	8.5	J
Silver	1,500	-	-	0.14	UJ	0.16	UJ	0.23	J	0.28	J
Sodium	10,000*	6,000 - 8,000		144	J	75.4	J	800		329	J
Thallium	10,000*	-	-	0.56	UJ	0.6	UJ	1.5	J	0.98	J
Vanadium	10,000*	1 - 300	<7 - 300	14.5	J	12.6	J	13	J	16.5	J
Zinc	10,000	9 - 50	<5 - 2,900	53.2	J	63.6	J	39.3		43.7	J

Notes:
1. Part 375 Soil Cleanup Objective source is NYSDEC 6NYCRR Part 375 Environmental Remediation Programs (Part 375) Determination of Soil Cleanup Objectives and Cleanup Levels for restricted commercial use (Part 375-6.8(b) effective December 14, 2006.
2. Eastern USA Background values were obtained from TAGM 4046.
3. USGS Background values obtained from Table 1 in "Elemental Concentrations in Soils & Other Surficial Materials of the Conterminous United States" by Hansford T. Shacklette and Joesphine G. Boerngen for the USGS in 1984.
4. Shaded boxes represent exceedances of the regulatory value and/or highest listed background range.
5. (-) = No regulatory value is associated with this analyte.
6. mg/Kg = milligrams per Kilogram (equivalent to parts per million (ppm)).
7. SB stands for "Site Background" under the TAGM soil cleanup objectives column.
8. Only analytes detected in one or more samples are shown.
9. Definitions of data qualifiers are presented in Table 9.
* Soil Cleanup Objectives for Individual Metals were capped at 10,000 unless otherwise specified

Table 6
Former C&B Dry Cleaners Site RI/AA

Summary of Analytical Results- Waste Characterization Samples

Sample I.D.	Regulatory Value	SP-4		MW-5	
Interval Sampled (feet bgs):	**-**	**2-3**		**4-6**	
Date Sampled:	**-**	**5/13/2005**		**6/1/2005**	
TCLP VOCs (mg/L)					
Benzene	0.5	0.016	J	0.029	J
Tetrachloroethene	0.7	2.7	D	45	D
Trichloroethene	0.5	0.05	U	0.023	J
TCLP Metals (mg/L)					
Barium	100	0.643		Not Analyzed	
RCRA Characteristics					
Corrosivity (pH)	</= 2 or </= 12.5	7.4		Not Analyzed	
Flashpoint (^{o}F)	< 140	>200		Not Analyzed	
Reactive Sulfide (mg/Kg)	>500	<10		Not Analyzed	
Reactive Cyanide (mg/Kg)	>250	<10		Not Analyzed	

Notes:

1. 40 CRF Parts 261.21, 261.22 and 261.24 are the sources of the regulatory values, which list the maximum allowable levels for the ignitability, corrosivity and toxicity characteristics respectivly for deterimining if a solid waste is defined as ahazardous waste.
2. Shaded boxes represent exceedances of the regulatory value.
3. (-) = No regulatory value is associated with this analyte.
4. mg/L = micrograms per Liter (equivalent to parts per billion (ppb)).
5. Only analytes detected above test method detection limit are shown.
6. Definitions of data qualifiers are presented in Table 9.

Table 7
Former C&B Dry Cleaners Site RI/AA
Summary of VOC Analytical Results- Groundwater Samples

LOCATION		ON-SITE												OFF-SITE		
SAMPLE I.D.	NYSDEC CLASS GA GROUNDWATER STANDARD OR GUIDANCE VALUE	MW-1		MW-2		MW-3		MW-4		MW-5		SP-16	SP-19	SP-21	SP-23	SP-24
DATE SAMPLED		6/3/05	1/11/06	6/3/05	1/11/06	6/3/05	1/11/06	6/3/05	1/11/06	6/3/05	1/11/06	1/12/2006	1/12/2006			
TCL VOCs	CONCENTRATION (ug/L)	CONCENTRATION (ug/L)											CONCENTRATION (ug/L)			
1,1,2,2-Tetrachloroethane	5	10 U	10 U	10 U	50 U	10 U	20 U	10 U	10 U	7 J	10,000 U					
1,1-Dichloroethene	5	10 U	10 U	10 U	50 U	2 J	20 U	10 U	10 U	27	10,000 U	10 U	10 U	10 U	1 J	10 U
cis-1,2-Dichloroethene	5	10 U	10 U	10 U	50 U	73	230	10 U	2 J	250 J	1,100 J	11	10 U	10 U	100	14
Isopropylbenzene	5	10 U	10 U	10 U	50 U	6 J	20 U	10 U	10 U	10 U	10,000 U					
Tetrachloroethene (PCE)	5	7 J	10 U	1,200 D	740	300 D	180	290 D	76 D	110,000 D	1,000,000 D	730 D	230 D	14	9,200 D	850 D
Toluene	5	10 U	10 U	10 U	50 U	10 U	20 U	10 U	10 U	3 J	10,000 U					
Trichloroethene (TCE)	5	10 U	10 U	11	50 U	490 D	270	51	22	830 J	4,800 J	86	6 J	2 J	100	25
Vinyl chloride	2	10 U	10 U	10 U	50 U	11	20 U	10 U	10 U	3 J	10,000 U					

LOCATION		OFF-SITE								
SAMPLE I.D.	NYSDEC CLASS GA GROUNDWATER STANDARD OR GUIDANCE VALUE	SP-25	SP-26	SP-27	SP-28	SP-29	SP-30	SP-31	SWANSON BUILDING	SWAMP
DATE SAMPLED		4/12/2006								
TCL VOCs	CONCENTRATION (ug/L)	CONCENTRATION (ug/L)								
1,1-Dichloroethene	5	10 U	10 U	10 U	2 J	10 U	10 U	10 U	10 U	10 U
Acetone	50	10 U	10 U	10 U	10 U	10 U	10 U	4 J	10 U	4 J
cis-1,2-Dichloroethene	5	10 U	10 U	10 U	310 D	4 J	2 J	14	34	10 U
Tetrachloroethene (PCE)	5	1 J	150	16	44	27	9 J	5,300 D	1,700 D	10 U
trans-1,2-Dichloroethene	5	10 U	10 U	10 U	2 J	10 U	10 U	10 U	10 U	10 U
Trichloroethene (TCE)	5	10 U	10 U	10 U	6 J	4 J	4 J	23	33	10 U
Vinyl chloride	2	10 U	10 U	10 U	120 D	10 U	10 U	10 U	10 U	10 U

LOCATION		ON-SITE	OFF-SITE							
SAMPLE I.D.	NYSDEC CLASS GA GROUNDWATER STANDARD OR GUIDANCE VALUE	SP-35	SP-34	SP-36	SP-37	SP-38	SP-39	SP-40	SP-41	SP-42
DATE SAMPLED		3/12/2007								
TCL VOCs	CONCENTRATION (ug/L)	CONCENTRATION (ug/L)								
1,1,1-Trichloroethane	5	10 U	10 U	1 J	10 U	1 J	6 J	10 U	10 U	10 U
1,1-Dichloroethane	5	10 U	10 U	10 U	1 J	10 U	2 J	10 U	10 U	10 U
1,1-Dichloroethene	5	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Acetone	50	10 U	10 U	2 J	3 J	10 U	10 U	10 U	10 U	10 U
Benzene	1	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Chlorobenzene	5	10 U	10 U	10 U	10 U	2600	10 U	10 U	10 U	10 U
cis-1,2-Dichloroethene	5	10 U	10 U	130	500 D	97	180	3 J	3 J	74
Cyclohexane	-	10 U	10 U	10 U	10 U	10 U	10 U	10 U	6 J	10 U
Dichlorodifluoromethane	5	10 U	10 U	10 U	2 J	10 U	10 U	10 U	10 U	10 U
Methylcyclohexane	-	10 U	10 U	10 U	10 U	10 U	10 U	10 U	28	10 U
Tetrachloroethene (PCE)	5	44	50	1 J	1 J	7600 D	10 U	4 J	6 J	1100 D
trans-1,2-Dichloroethene	5	10 U	10 U	2 J	1 J	10 U	10 U	10 U	10 U	1 J
Trichloroethene (TCE)	5	10 U	10 U	150	30	59	32	9 J	62	27
Vinyl chloride	2	10 U	10 U	10 U	53	3 J	1 J	10 U	10 U	12

Notes:
1. Class GA regulatory values are derived from NYS Ambient Water Quality Standards TOGS 1.1.1 (Source of Drinking Water, groundwater).
2. Guidance value was used when standard was not avilable.
3. Shaded boxes represent exceedances of the regulatory value.
4. (-) = No regulatory value is associated with this analyte.
5. ug/L = micrograms per Liter (equivalent to parts per billion (ppb)).
6. Only analytes detected in one or more samples are shown.
7. Definitions of data qualifiers are presented in Table 9.

Table 8
Former C&B Dry Cleaners Site RI/AA

Summary of SVOC and Metals Analytical Results

Groundwater Samples

Sample Id	NYSDEC Class GA Groundwater Standard or Guidance Value	MW-1		MW-2		MW-3		MW-4		MW-5	
Date Sampled:	**N/A**	**6/3/2005**		**6/3/2005**		**6/3/2005**		**6/7/2005**		**6/7/2005**	
TCL SVOCs (UG/L)											
2,4-Dimethylphenol	50	10	U	10	U	3	J	19	U	9	U
Acetophenone	N/A	10	U	10	U	10	U	19	U	0.3	J
Diethyl phthalate	50	10	U	10	U	10	U	19	U	1	J
Di-n-butyl phthalate	50	10	U	10	U	10	U	19	U	1	J
Fluoranthene	50	1	J	2	J	0.8	J	3	J	1	J
Naphthalene	10	10	U	10	U	2	J	19	U	9	U
Phenanthrene	50	1	J	2	J	0.7	J	3	J	1	J
Phenol	1	10	U	10	U	10	U	19	U	0.9	J
Pyrene	50	10	U	2	J	1	J	1	J	2	J
TOTAL METALS (UG/L)											
Aluminum	-	12,200	J	5,480	J	3,300	J	12,700		8,890	
Antimony	3	3.4	U	3.4	U	3.4	U	3.4	U	3.4	U
Arsenic	25	10.7	J	6.4	J	3.6	J	15.3		10.8	
Barium	1,000	413		239		408		532	J	386	J
Beryllium	3	0.41	J	0.22	J	0.14	U	0.56	J	0.45	J
Cadmium	5	0.23	UJ	0.23	U	0.23	UJ	0.23	UJ	0.23	UJ
Calcium	-	103,000		91,200		99,700		92,500		89,700	
Chromium	50	12.4		5.8	J	3	J	15		10.5	
Cobalt	-	7.3	J	3	J	2.1	J	7.8	J	7.6	J
Copper	200	28.2	J	11.5	J	9.2	J	30.3	J	32	J
Iron	300	17,400		7,830		5,140		22,300		19,500	
Lead	25	14.2		5.5	J	8.9		25.5		23.3	
Magnesium	35,000	26,000		20,200		25,200		27,700		26,700	
Manganese	300	2,060		453		1,520		1,350		5,690	
Mercury	0.7	0.039	U	0.039	U	0.039	U	0.072	J	0.039	U
Nickel	100	17.8	J	9.1	J	6	J	17.9	J	17.3	J
Potassium	-	4,120	J	5,240		2,780	J	4,330	J	3,870	J
Selenium	10	3.6	U	3.6	U	3.6	U	3.6	J	3.6	U
Silver	50	0.66	U	0.66	U	0.66	U	0.66	U	0.66	U
Sodium	20,000	35,200		112,000		46,600		41,200		38,000	
Thallium	0.5	2.7	U	2.7	U	3.2	J	2.7	U	2.7	U
Vanadium	-	18.5	J	8.9	J	5	J	22.6	J	15.1	J
Zinc	2,000	50		31.5		16.7	J	61		63.2	

Notes:
1. Regulatory values are derived from NYS Ambient Water Quality Standards TOGS 1.1.1 (Source of Drinking Water, groundwater).
2. Guidance value was used when standard was not available.
3. (-) = No regulatory value is associated with this compound.
4. Shaded values represent exceedances of the regulatory value.
5. ug/L = micrograms per Liter (equivalent to parts per billion (ppb)).
6. Only compounds with one or more detections are shown.
7. Definitions of data qualifiers are presented in Table 8.

Table 9
Former C&B Dry Cleaners Site RI/AA

Summary of Pal Joey's Restaurant Air Sampling Results

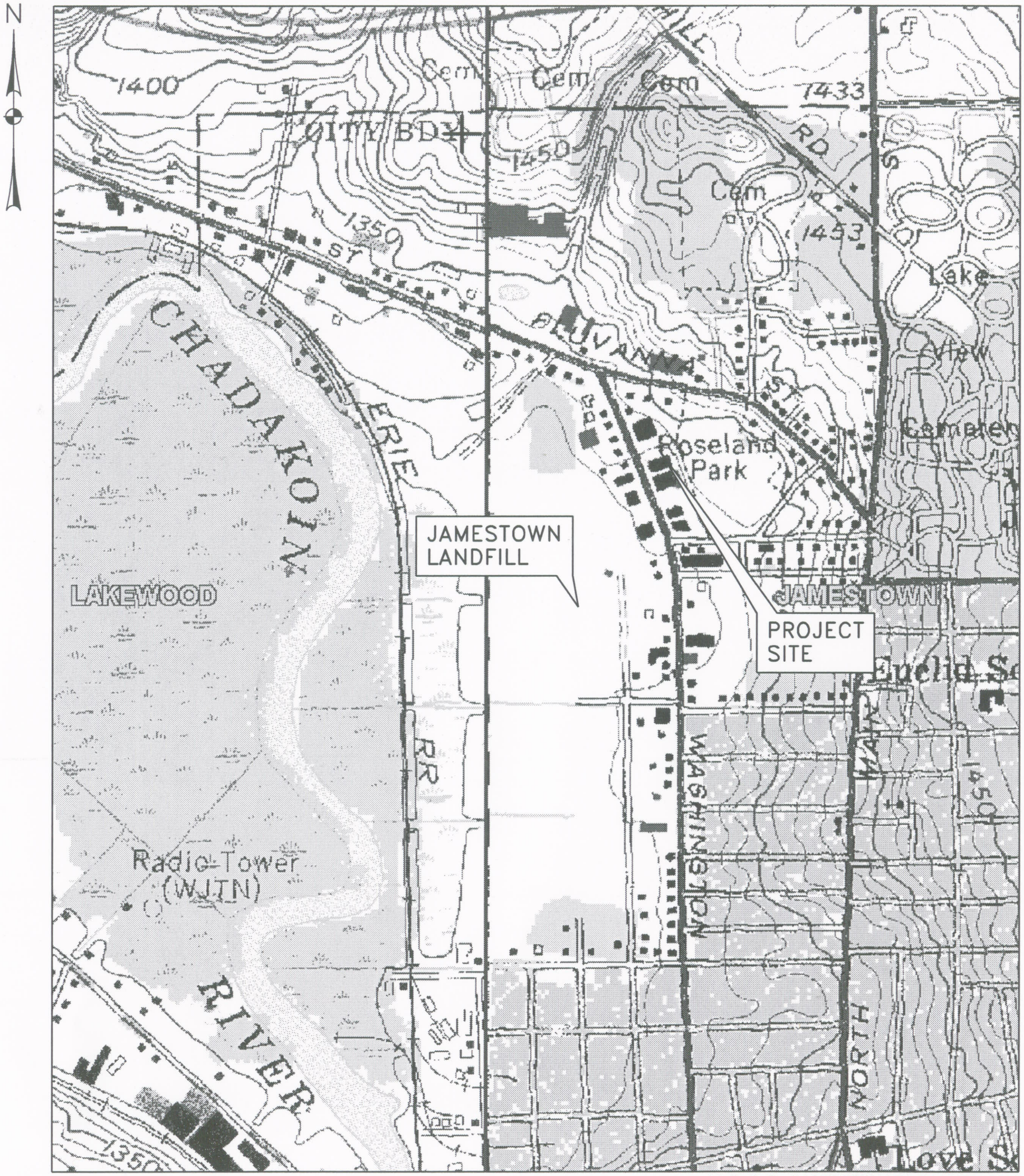
COMPOUND	NYSDOH INDOOR AIR THRESHOLD	SAMPLE I.D.			
		PJ-Subslab	PJ-Base BG	PJ-Outside BG	PJ-Base BG
		4/12/2006			10/10/2006
		Pre-remedial			Post-remedial
		Concentration [ug/m^3]			
Dichlorodifluoromethane	Not Applicable	ND	ND	2.6	2
Chloromethane		ND	ND	1.4	ND
Trichlorofluoromethane		ND	ND	1.4	1.9
Benzene		ND	ND	1.2	3.6
Toluene		ND	ND	3.5	6.3
Ethylbenzene		ND	ND	ND	0.87
m,p-xylene		ND	ND	1.2	2.7
o-xylene		ND	ND	ND	1
1,2,4-Trimethybenzene		ND	ND	ND	1.1
Tetrachloroethene (PCE)	100	190,000	2,200	ND	20

Notes:
1. Shaded boxes represent exceedances of the regulatory value.
2. ND = Non Detected
3. ug/m3 = micrograms per cubic meter.

Table 10
Former C&B Cleaners Site RI/AA

Analytical Testing Data Qualifier Definitions

DATA QUALIFIER	DEFINITION
Organics	
U	Indicates compound was analyzed for, but not detected at or above the reporting limit.
J	Indicates an estimated value. This qualifier is used either when estimating a concentration for tentatively identified compounds where a 1:1 response is assumed, or when the data indicates the presence of a compound that meets the identification criteria but the result is less than the sample quantitation limit but greater than zero.
D	This qualifier identifies all compounds identified in an analysis at the secondary dilution factor.
P	This qualifier is used for a pesticide/Aroclor target analyte when there is greater than 25% differenced for detected concentrations between the two GC columns. The lower of the two values is reported on the data page and flagged with a "P".
Inorganics	
U	Indicates element was analyzed for, but not detected at or above the reporting limit.
J or B	Indicates a value greater than or equal to the instrument detection limit, but less than the quantitation limit.
N	Indicates spike sample recovery is not within the quality control limits.



U.S.G.S. JAMESTOWN QUADRANGLE

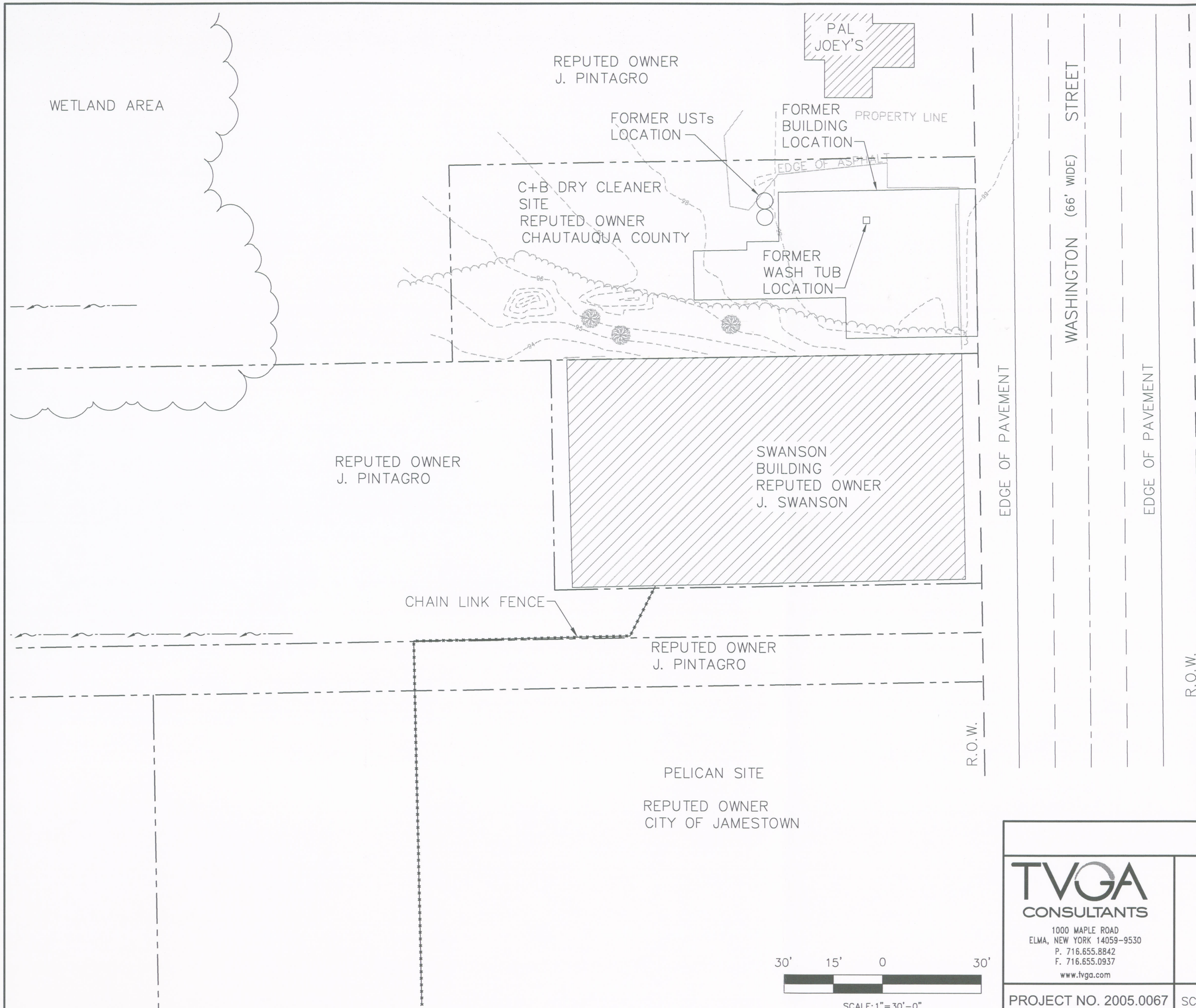
SITE LOCATION MAP

TVGA
CONSULTANTS
1000 MAPLE ROAD, P.O. BOX H
ELMA, NEW YORK 14059-0264
P. 716.655.8842
F. 716.655.0937
www.tvga.com

C & B CLEANERS
2241 WASHINGTON STREET
JAMESTOWN, NEW YORK 14701

PROJECT NO. 0020031	SCALE 1" = 1000'	DATE: 07/08/03	FIGURE NO. 1

S:\Engineering\0020031 - Chaut Co Pilot\CADD\C&BCLEANERS.dwg 10/26/2007 10:31:02 AM EDT



GENERAL NOTES:

1. FOR COMPLETE BOUNDARY INFORMATION SEE SURVEY PREPARED BY OTHERS
2. ALL ELEVATIONS BASED ON ASSUMED DATUM SEE MAP FOR BENCHMARK DESCRIPTION.
3. SITE FEATURES OTHER THAN ON THE C+B DRY CLEANER SITE WERE GENERATED FROM AERIAL PHOTOGRAPHY AND RECORD TAX MAPS FOR ILLUSTRATIVE PURPOSES ONLY.

LEGEND

- GROUND SURFACE CONTOUR
- PROPERTY LINES
- DITCH LINES
- WOODED AREA

SITE PLAN

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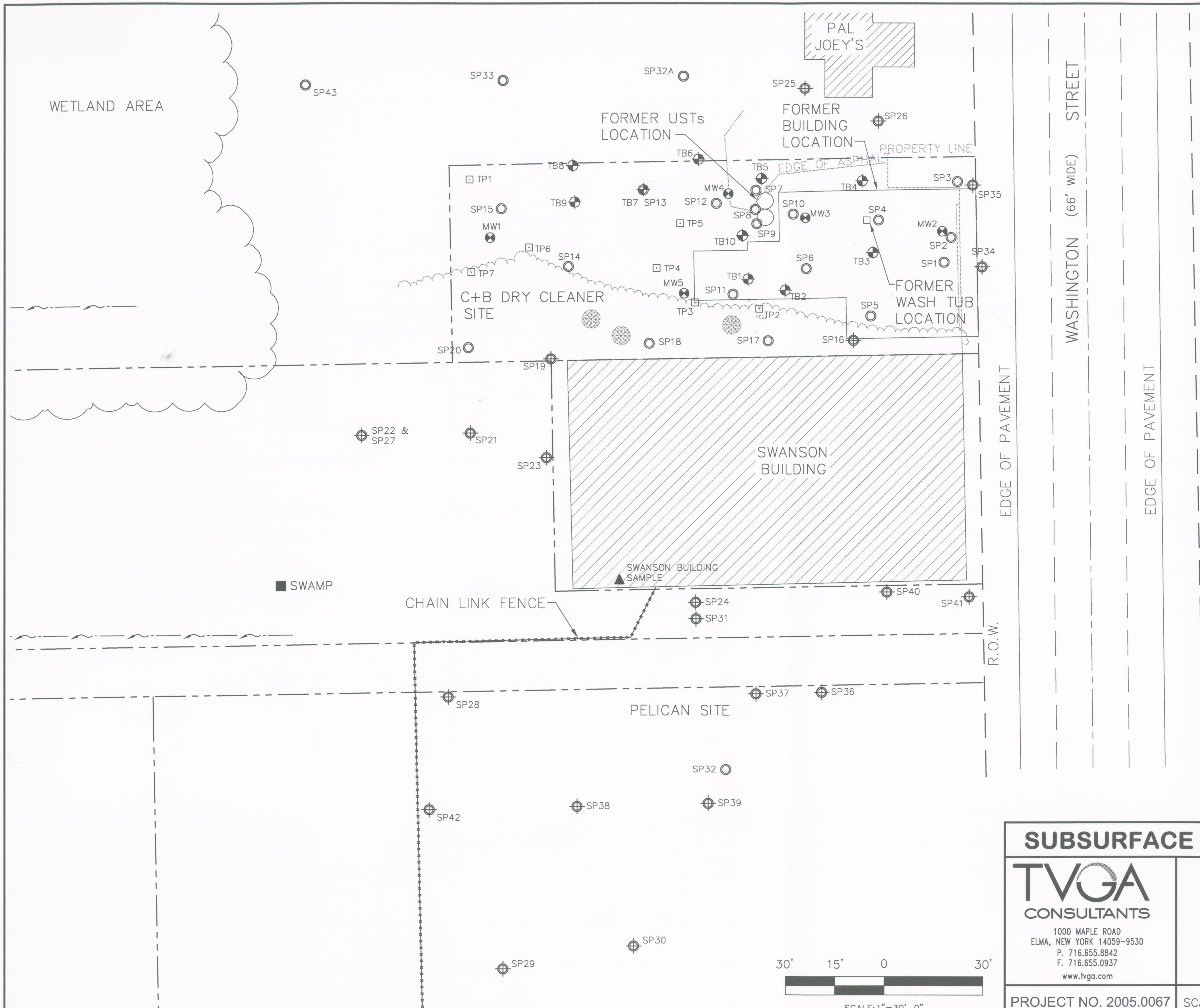
FORMER C & B DRY CLEANER

WASHINGTON STREET
CITY OF JAMESTOWN
CHAUTAUQUA COUNTY, NEW YORK

PROJECT NO. 2005.0067	SCALE: 1" = 30'	DATE: 6/2007	**FIGURE NO. 2**

N:\2005.0067.00-C&B Dry Cleaner\Engineering\CADD\MARCH-07\2005.0067-FIG2.dwg, 12/6/2007 10:04:05 AM, dshaffer



GENERAL NOTES:

1. SITE FEATURES OTHER THAN ON THE C+B DRY CLEANER SITE WERE GENERATED FROM AERIAL PHOTOGRAPHY AND RECORD TAX MAPS FOR ILLUSTRATIVE PURPOSES ONLY.

LEGEND

- SOIL PROBE
- MICRO WELL
- TEST BORING
- SURFACE WATER SAMPLE
- SWAMP SAMPLE
- EXISTING MONITORING WELL
- TEST PIT
- PROPERTY LINES
- DITCH LINES
- WOODED AREA

SUBSURFACE INVESTIGATION LOCATION MAP

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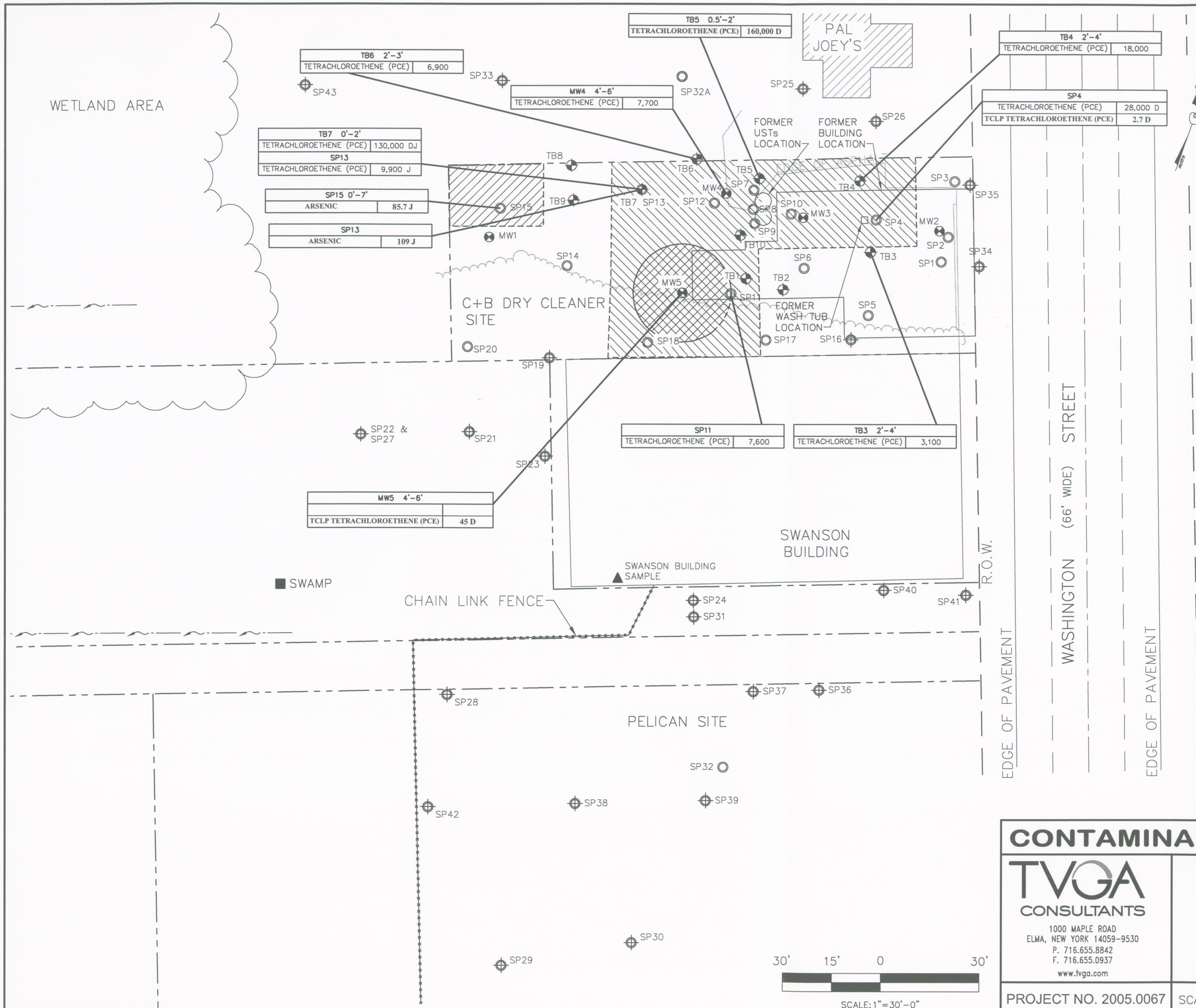
FORMER C & B DRY CLEANER

WASHINGTON STREET
CITY OF JAMESTOWN
CHAUTAUQUA COUNTY, NEW YORK

PROJECT NO. 2005.0067	SCALE: 1" = 30'	DATE: 6/2007	FIGURE NO. 3



NOTES:

1. PCE CONCENTRATIONS IN ug/KG.
2. ARSENIC CONCENTRATIONS IN mg/KG.
3. TCLP CONTAMINATIONS IN mg/L.
4. CONCENTRATIONS IN SC6S IN BOLD.
5. SITE FEATURES WERE GENERATED FROM AERIAL PHOTOGRAPHY AND TAX MAPS FOR ILLUSTRATIVE PURPOSES ONLY. NO SITE SURVEY WAS PERFORMED

LEGEND

- HAZARDOUS SOIL AREA
- ESTIMATED ARSENIC EXCAVATION AREA
- HAZARDOUS SOIL REQUIRING PRE-DISPOSAL TREATMENT
- SOIL PROBE
- MICRO WELL
- TEST BORING
- SURFACE WATER SAMPLE
- SWAMP SAMPLE
- EXISTING MONITORING WELL
- PROPERTY LINES
- DITCH LINES
- TREE/BRUSH AREA

CONTAMINANTS OF CONCERN IN SOIL

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FORMER C & B DRY CLEANER

WASHINGTON STREET
CITY OF JAMESTOWN
CHAUTAUQUA COUNTY, NEW YORK

PROJECT NO. 2005.0067	SCALE: 1" = 30'	DATE: 8/2007	FIGURE NO. 4


TETRACHLOROETHENE CONCENTRATIONS IN GROUNDWATER
WETLAND AREA
MW4 TETRACHLOROETHENE (PCE) 76 D
SP25 TETRACHLOROETHENE (PCE) 1J
PAL JOEY'S
SP26 TETRACHLOROETHENE (PCE) 150
SP32A
MW3 TETRACHLOROETHENE (PCE) 180 D
SP25
SP26
MW5 TETRACHLOROETHENE (PCE) 1,000,000 D
MW1 TETRACHLOROETHENE (PCE) ND
SP35 TETRACHLOROETHENE (PCE) 44
EDGE OF ASPHALT
MW4
SP35
FORMER USTs LOCATION
MW3
MW1
MW2
MW2 TETRACHLOROETHENE (PCE) 740
FORMER WASH TUB LOCATION
SP1
SP34
SP34 TETRACHLOROETHENE (PCE) 50
MW5
C+B DRY CLEANER SITE
FORMER BUILDING LOCATION
WASHINGTON STREET (66' WIDE)
SP16
SP19
SP-16 TETRACHLOROETHENE (PCE) 730 D
SP27 TETRACHLOROETHENE (PCE) 16
SP19 TETRACHLOROETHENE (PCE) 230 D
SP22 & SP27
SP21
SP21 TETRACHLOROETHENE (PCE) 14
SP23
SWANSON BUILDING
SP23 TETRACHLOROETHENE (PCE) 9,200 D
EDGE OF PAVEMENT
EDGE OF PAVEMENT
SWANSON BUILDING TETRACHLOROETHENE (PCE) 1,700 D
SWAMP TETRACHLOROETHENE (PCE) NOT DETECTED
SWANSON BUILDING SAMPLE
SWAMP
CHAIN LINK FENCE
SP24
SP40
SP41
SP24 TETRACHLOROETHENE (PCE) 850 D
SP41 TETRACHLOROETHENE (PCE) 6 J
SP31
R.O.W.
SP31 TETRACHLOROETHENE (PCE) 5,300 D
SP28
PELICAN SITE
SP37
SP36
SP28 TETRACHLOROETHENE (PCE) 44
SP42 TETRACHLOROETHENE (PCE) 1,100 D
SP38
SP39
SP42
SP38 TETRACHLOROETHENE (PCE) 7,600 D
SP29 TETRACHLOROETHENE (PCE) 27
SP30 TETRACHLOROETHENE (PCE) 9 J
SP30
SP29
30' 15' 0 30'
SCALE: 1"=30'-0"
GENERAL NOTES:
1. SITE FEATURES WERE GENERATED FROM AERIAL PHOTOGRAPHY AND TAX MAPS FOR ILLUSTRATIVE PURPOSES ONLY. NO SITE SURVEY WAS PERFORMED.
LEGEND
MICRO WELL
SURFACE WATER SAMPLE
SWAMP SAMPLE
MONITORING WELL
PROPERTY LINES
DITCH LINES
TREE/BRUSH AREA
INFERRED LIMITS OF GROUNDWATER CONTAMINATION PLUME
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FORMER C & B DRY CLEANER
WASHINGTON STREET
CITY OF JAMESTOWN
CHAUTAUQUA COUNTY, NEW YORK
PROJECT NO. 2005.0067
SCALE: 1" = 30'
DATE: 6/2007
FIGURE NO.5