LABELLA Associates, P.C.

Engineering
Architecture
Environmental

Remedial Alternatives Analysis

Location:

1600 Penfield Road
Penfield, New York

Prepared for:

Springs Land Company, LLC
PO Box 262
Port Gibson, New York

LaBella Project No. 209408

July 2009

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1.0 Introduction

This Remedial Alternatives Analysis (RAA) provides a summary of remedial alternatives evaluated and selects remedial actions to be implemented for the parcel located at 1600 Penfield Road in the Town of Penfield, Monroe County, New York, New York State Department of Environmental Conservation (NYSDEC) Brownfield Cleanup Program (BCP) Site #C828131. Hereinafter, this parcel will be referred to as "the Site." A Project Locus Map is included as Figure 1.

The remedial alternatives were evaluated based on the data obtained during a preliminary Phase II Environmental Site Assessment (ESA), a Passive Soil Gas Survey, a Remedial Investigation (RI) and an Interim Remedial Measure (IRM) conducted at the Site. This RAA summarizes the findings of the Remedial Investigation Report for the Site; however, the RI Report should be referenced for greater details on these activities. The comparison of alternatives takes into account the proposed use of the Site and the current uses of the surrounding area.

2.0 Background

The Site consists of approximately 0.60 acres of land improved by an approximately 4,550 square foot building, which is currently vacant. The remainder of the Site is predominantly paved with landscaped lawn areas along the western and northern portions of the Site. The surrounding properties are commercial properties with some residential beyond. The properties directly adjacent to the Site and the occupants are indicated below:

- North – 1606 Penfield Road: Day Care Facility and Dance Studio
- East – 1610 Penfield Road: Unoccupied Automated Banking Facility
- South – Right of Way (ROW): Penfield Road (with a large parking lot for commercial plaza beyond)
- West – 1598 Penfield Road: Commercial office space with three tenants

A Site Plan (included as Figure 2), illustrates the Site boundaries and the adjacent properties.

The current building was constructed in approximately 1961 and has reportedly been operated as a dry cleaner from that time until approximately 2005. However, on-site dry cleaning operations may not have been implemented for the entire time period. A plumbing diagram (unknown date) indicated that drain lines from the building discharged to a 1,500-gallon pre-cast concrete wastewater holding tank located adjacent to the northern portion of the building.

In October, 2005, the Site was entered into the NYSDEC Brownfield Cleanup Program (BCP) (BCP Site #C828131).

3.0 Areas of Concern

This section summarizes the preliminary Phase II ESA, Passive Soil Gas Survey, RI, and IRM conducted at the Site. Based on the data obtained from this work, the Areas of Concern (AOCs) remaining at the Site are presented. These AOCs will be subsequently evaluated for remedial alternatives.

Phase II ESA

Labella conducted a preliminary Phase II ESA in August 2002 at the Site as part of a potential real estate transaction. The preliminary Phase II ESA identified the presence of solvent-impaired soil and shallow groundwater at the Site in the area of the concrete holding tank. The preliminary Phase II ESA consisted of advancing nine (9) soil borings (designated B-1 through B-9) and installing one groundwater monitoring well (designated MW-1). The approximate locations of the soil borings and monitoring well are shown on Figure 3.

The analytical results indicated that Tetrachloroethene (PCE) is present in soil at levels above the NYSDEC Technical and Administrative Guidance Memorandum (TAGM) 4046 Soil Clean-up Objectives to Protect Groundwater Quality. In addition, PCE was also present above its associated 6 New York Code of Rules and Regulations (6 NYCRR) Part 703 Groundwater Standard in the shallow groundwater monitoring well installed at the Site. Based on observations made during the soil boring and sampling study, and the comparison of the analytical data to the NYSDEC standards, there appeared to be a remedial concern with regard to solvent impaired soil and groundwater in the vicinity of the 1,500-gallon pre-cast concrete wastewater holding tank located immediately north of the building. [*Note: The comparison to NYSDEC TAGM standards was made prior to entrance into the NYSDEC BCP.*]

Passive Soil Gas Survey

LaBella also implemented a Passive Soil Gas Survey on August 27, 2003 to determine the presence, identity, and 'relative' concentrations of targeted contaminants along the down-gradient property lines at the Site. The soil gas survey results were used to assess whether targeted compounds may potentially be migrating off site. The soil gas survey consisted of sampling at thirteen (13) soil gas sampling locations (designated SG-1 through SG-13), which are shown on Figure 3.

The analytical results from the Passive Soil Gas Survey indicated that the highest constituent detected at the Site was PCE with lesser amounts of the PCE breakdown product trichloroethylene (TCE). Based on the analytical results, the highest levels of PCE and TCE were concentrated in the vicinity of the northwest property corner. A comprehensive Passive Soil Gas Survey Report was submitted to the NYSDEC on October 27, 2003.

Remedial Investigation

LaBella initiated a RI in October 2006 to delineate the nature and extent of contamination at the Site. The RI consisted of advancing forty-four (44) shallow soil borings (designated B-10 though B-34, and B-39 through B-55), advancing one (1) deep soil boring, installing ten (10) shallow groundwater monitoring wells (designated MW-1 through MW-10), installing one (1) nested pair of deep groundwater monitoring wells (MW-6D), and sampling three (3) soil gas sampling locations (designated SG-15 through SG-17), which are shown on Figure 4.

The analytical results from the RI indicated that PCE is present in shallow soil (generally between 5 and 15 feet in depth) at levels above the Subpart 375-6 Remedial Program Soil Cleanup Objectives (RPSCOs) for the Protection of Groundwater. Shallow groundwater samples contained PCE, Trichloroethene (TCE), cis-1,2-Dichloroethene (DCE), trans-1,2-DCE, Vinyl Chloride, 1,1-DCE, and Toluene above NYCRR Part 703 Groundwater Standards and Guidance Values. Samples of deeper groundwater [MW-6M (30'-40') and MW-6D (62'-72')] did detect concentrations of PCE; however, the concentrations were significantly lower than the shallow groundwater samples. Figure 5 summarizes the groundwater RI data.

A comprehensive Remedial Investigation Report was submitted to the NYSDEC in June 2009.

Interim Remedial Measures

The interim remedial measures at the Site have included the removal of 632-gallons of CVOC-impacted water from the wastewater holding tank and the removal of approximately 220 cubic yards of soil in the area around the wastewater holding tank. A total of 175 cubic yards were transported off-Site for disposal in accordance with the applicable regulations. Figure 4 indicates the location of the IRM work and includes the confirmatory soil sampling results.

Areas of Concern

The cumulative findings/work of the preliminary Phase II ESA, Passive Soil Gas Survey, RI, and IRM conducted at the Site have identified three AOCs remaining at the Site that warrant further remedial actions. The nature and extent of impacts for these areas have been defined and are summarized below in comparison to the Remedial Action Objectives (RAOs), refer to Section 5.0:

- *AOC #1: Concrete Wastewater Holding Tank Area* – This AOC consists of CVOC-impacted soil and groundwater associated with the Concrete Wastewater Holding Tank Area. The grid pattern of Phase I soil borings indicated that the horizontal extent of soils meeting hazardous waste criteria appears to be limited to immediately adjacent to the concrete wastewater holding tank area and to the north/northeast to the approximate location of borings B-1, B-27, and B-28. The vertical extent of soils that meet hazardous waste criteria appears to be limited to approximately 10-feet in depth around B-27 and possibly to around 15-feet around B-28. Although the deepest soil sample from B-28 exceeded hazardous waste criteria, it is not anticipated that significant contamination extends beyond 15-feet BGS outside of the B-28 and wastewater holding tank areas. The IRM removed and disposed of approximately 238 tons of contaminated soil and 632 gallons of contaminated waters. The IRM removed the wastewater holding tank and the worst case soils in proximity to the holding tank. It was estimated that 88% of the contaminant mass at the Site was removed with the IRM. The confirmatory sampling results indicated that PCE concentrations in each of the samples were above the Part 375-6 RPSCOs for the Protection of Groundwater and one bottom sample from beneath the former tank area exceeded the RPSCO for Restricted Commercial Use.

Based on the RI data and IRM data, it appears that impacts above RAOs in the unsaturated zone in this area are limited to beneath the northern portion of the building. In addition, significant impacts in the saturated zone were left in-place in the area of confirmatory soil samples BS-1 and SW-1. As such, this AOC focuses on addressing the unsaturated zone impacts beneath the northern portion of the building and the worst-case soils lift in-place around the concrete wastewater holding tank. The estimated extent of these impacts is shown on Figure 6.

- *AOC #2: Former PCE Still Area* – This AOC consists of CVOC-impacted soil associated with the former PCE still area. Contamination from the former PCE still appears to have migrated from the Still through the floor and into the shallow overburden soil and groundwater. The Phase I soil borings indicated that the horizontal extent of the impacted soil appears to be limited to soil beneath the southern corner of the building. Soils in the immediate area of the former PCE Still may require remedial actions and the soil exceeding RAOs has been conservatively estimated at 425 square feet. The estimated extent of impacts in this area is shown on Figure 6.

- *AOC #3: Groundwater/Saturated Zone Contamination* – This AOC consists of shallow saturated soil and groundwater impacted with CVOCs.
    - Northern Extent – The groundwater sample from monitoring well MW-3 only detected minor concentrations of CVOCs and soils observed from numerous borings in the northern portion of the property (B-14 through B-20) did not detect significant evidence of impairment. Based on this data, the northern extent of groundwater contamination has been generally defined and is limited to groundwater south of B-16 through B-20.
    - Eastern Extent – Soils observed from borings B-24, B-29, and B-34 did not encounter evidence of impairment and PID readings were less than 10 ppm from within the saturated zone. Furthermore, a soil sample from boring B-29 from within the saturated zone (8'-10.6') detected only minor concentrations of CVOCs that were below the NYSDEC RPSCO for the protection of groundwater. A groundwater sample from MW-5 detected only minor concentrations of CVOCs, which were below Part 703 Groundwater Standards.
    - Southern Extent – Soil borings B-53, B-54, and B-55 did not detect evidence of impairment and PID readings from the saturated zone within these borings were below 2 ppm. Therefore, on-Site source areas have not impacted the southern portion of the Site.
    - Western Extent – Groundwater contamination appears to extend up to and beyond the western/northwestern property line. This is based on groundwater samples collected from wells MW-2 and MW-7 which are approximately 10 feet from the west property line. These wells contained concentrations of CVOCs above the Part 703 Groundwater Standards.

Figure 5 illustrates the extent of on-Site groundwater requiring remedial action.

4.0 Objective

The objective of this RAA is to evaluate remedial alternatives to address the AOCs presented above and select remedial actions to be implemented. As defined in NYSDEC DER-10 (Section 4.0), remedial alternatives will be evaluated based on the following criteria:

1.) Overall Protection of Public Health and the Environment: This criterion evaluates exposure and residual risks to human health and the environment during or subsequent to implementation of the alternative.

2.) Compliance with SCGs: This criterion evaluates whether the remedial alternative will ultimately result in compliance with SCGs, to the extent practicable.

3.) Long-Term Effectiveness and Permanence: This criterion evaluates if the remedy is effective in the long-term after implementation (e.g., potential rebound). In the event that residual impacts will remain as part of the alternative, then the risks and adequacy/reliability of the controls are also evaluated.

4.) Reduction of Toxicity, Mobility, or Volume with Treatment: This criterion evaluates the reduction of contaminant toxicity, mobility or volume as a result of the remedial alternative. In addition, the reversibility of the contaminant destruction or treatment is evaluated.

5.) Short-Term Effectives: This criterion evaluates if the remedial alternative protects the community, workers and the environment during implementation.

6.) Implementability: This criterion evaluates the remedial alternative based on its suitability, implementability at the specific site, and availability of services and materials that will be required.

7.) Cost: This criterion evaluates the capital, operation, maintenance, and monitoring costs for the remedial alternative. The estimated costs are presented on a present worth basis.

8.) Community Acceptance: A summary of the public participation program completed as part of the project. In addition, any public comments concerns and overall perception are addressed as part of the criteria.

5.0 Remedial Action Objectives

Remedial action objectives (RAOs) are medium-specific objectives for the protection of public health and the environment and are developed based on contaminant-specific standards, criteria, and guidance (SCGs) established by NYSDEC and/or New York State Department of Health (NYSDOH).

Soil RAOs

The RAOs for soil used in this RAA are:

- NYCRR Subpart 375-6 Remedial Program Soil Cleanup Objectives (RPSCOs) for the Protection of Public Health/Commercial Use; and
- NYCRR Subpart 375-6 RPSCOs for the Protection of Groundwater.

Table 1

Remedial Investigation RAOs for Soil

Chlorinated VOCs	**Subpart 375-6 Restricted Use Soil Cleanup Objective for the Protection of Public Health: Commercial Use (µg/Kg)**	**Subpart 375-6 Restricted Use Soil Cleanup Objective for the Protection of Groundwater (µg/Kg)**
Tetrachloroethene (PCE)	150,000	1,300
Trichloroethene (TCE)	200,000	470
(cis) 1,2-Dichloroethene (cis-1,2-DCE)	500,000	250
(trans) 1,2-Dichloroethene (trans-1,2-DCE)	500,000	190
1,1- Dichloroethene (1,1-DCE)	500,000	330
Vinyl Chloride (VC)	13,000	20

Notes:
(1) All concentrations listed in micrograms per kilogram (µg/Kg) roughly equivalent to parts per billion (ppb)

Groundwater RAOs

The RAOs for groundwater will be the 6 NYCRR Part 703 Groundwater Standards. The Part 703 Groundwater Standards for the CVOCs at the Site are shown in Table 2.

Table 2

RAOs for Groundwater

CVOCs	NYSDEC Part 703 Groundwater Standards (µg/L)
Tetrachloroethene (PCE)	5
Trichloroethene (TCE)	5
(cis) 1,2-Dichloroethene (cis-1,2-DCE)	5
Dichloroethene (cis-1,2-DCE) (trans 1,2-DCE)	5
1,1- Dichloroethene (1,1-DCE)	5
Vinyl Chloride (VC)	2
Toluene	5

Note:

Although the NYSDEC Part 703 Groundwater Standards are presented as the groundwater SCGs, it is expected that based on the use of the Restricted Use Soil Cleanup Objectives that an environmental easement will be put in place which will provide for a groundwater use restriction for the site

Soil Vapor RAOs

The RAOs for soil vapor will be the New York State Department of Health (NYSDOH) Guidance for Evaluating Soil Vapor Criteria as referenced in Guidance for Evaluating Soil Vapor Intrusion in the State of New York (February 2005). It should be noted that the proposed redevelopment includes constructing an automated car wash at the facility where there will be no site workers (with the exception of occasional maintenance).

6.0 Development of Remedial Alternatives

This section develops the remedial alternatives being considered for addressing the AOCs identified for the Site. The remedial alternatives evaluated for each AOC are summarized below. Each of the remedial alternatives is also being evaluated based on the proposed re-use of the Site as an unmanned automated car wash.

1.) AOC #1: Concrete Wastewater Holding Tank Area

- No Action: The no action alternative is included as a procedural requirement and as a baseline to evaluate other alternatives. Under this alternative, no further remedial or monitoring activities would occur beyond those implemented during the IRM work. No environmental easement would be recorded to run with the land including institutional or engineering controls to further manage residual contamination. This area would remain virtually as it is and change in use would not be limited except by existing land use controls such as zoning.

- Site Management Plan with Institutional Controls: Under this alternative, institutional controls (e.g., deed restrictions, NYSDEC Environmental Easement, etc.) and development of a Site Management Plan (SMP) including a Health and Safety Plan (HASP) would be implemented to protect against exposure and also control Site use. In addition, long-term groundwater monitoring would be included in this alternative as part of the SMP.

- Additional Soil Removal and Disposal: Under this alternative, unsaturated zone CVOC-impacted soils above RAOs beneath the footprint of the building currently at the Site would be removed. In addition, the removal would also include the worst-case saturated zone soils from beneath the former concrete wastewater holding tank area that were left in-place during the IRM soil removal (i.e., in the area of confirmatory soil samples BS-1 and SW-1). Subsequent to the removal work, the area would be backfilled for the redevelopment work. The remaining saturated zone soil impacts in this area would be addressed as part of AOC #3.

2.) AOC #2: Former PCE Still Area

- No Action: The no action alternative is included as a procedural requirement and as a baseline to evaluate other alternatives. Under this alternative, no further remedial or monitoring activities would occur beyond those implemented during the IRM work. No environmental easement would be recorded to run with the land including institutional or engineering controls to further manage residual contamination. This area would remain virtually as it is and change in use would not be limited except by existing land use controls such as zoning.

- Site Management Plan with Institutional Controls: Under this alternative, institutional controls (e.g., deed restrictions, NYSDEC Environmental Easement, etc.) and development of a SMP including a HASP would be implemented to protect against exposure and also control Site use. In addition, long-term groundwater monitoring would be included in this alternative as part of the SMP.

- Soil Removal and Disposal: Under this alternative, the CVOC-impacted soil that is above the RAOs would be removed and the area backfilled and restored. Groundwater and saturated zone soil impacts in this area would be addressed as part of AOC #3.

3.) AOC #3: Groundwater/Saturated Zone Contamination

- No Action: The No Action alternative is included as a procedural requirement and as a baseline to evaluate other alternatives. Under this alternative, no further remedial or monitoring activities would occur beyond those implemented during the IRM work. No environmental easement would be recorded to run with the land including institutional or engineering controls to further manage residual contamination. This area would remain virtually as it is and change in use would not be limited except by existing land use controls such as zoning.

- Site Management Plan with Institutional Controls: Under this alternative, institutional controls (e.g., deed restrictions, NYSDEC Environmental Easement, etc.) and development of a SMP including a HASP would be implemented to protect against exposure and also control Site use. In addition, long-term groundwater monitoring would be included in this alternative as part of the SMP.

- Injection System to Treat Groundwater/Saturated Zone: Under this alternative, injection system infrastructure would be installed which would provide a means to introduce appropriate chemical treatments (e.g., permanganate, whey, etc.) to the saturated zone at planned intervals to facilitate the breakdown of the contaminants of concern at the Site. The specific chemical to be used would be determined after a bench scale study and/or through a pilot test at the Site to confirm adequate breakdown of contaminants. The bench scale study and/or pilot test will be conducted with NYSDEC oversight/approval prior to selecting the treatment chemical. [*Note: It is intended that this groundwater/saturated zone alternative be completed in conjunction with the removal of unsaturated zone soils from AOC #1 and AOC #2.*]

- Extensive Saturated Zone Soil and Groundwater Removal: Under this alternative, a mass excavation would be completed to remove impacts above RAOs in the soil and conduct aggressive dewatering to facilitate removal of saturated zone soils and remove impacted groundwater.

- Permeable Reactive Barrier: Under this alternative, a permeable reactive barrier (PRB) would be installed along the downgradient property line (western property line) to treat CVOC impacts that are migrating to the adjacent property. For the purpose of this evaluation, it is assumed that zero valent iron would be used to construct the barrier.

- Groundwater Pump & Treat: Under this alternative, extraction wells would be installed along the downgradient property line (i.e., western property line) to extract groundwater and pumped to a groundwater remediation system for treatment prior to discharge to the sanitary sewer. [*Note: It is intended that this groundwater/saturated zone alternative be completed in conjunction with the removal of unsaturated zone soils from AOC #1 and AOC #2.*]

7.0 Detailed Evaluation of Alternatives

1.) AOC #1: Concrete Wastewater Holding Tank Area

No Action

Description

Under this alternative the impacts left in place would remain as is and future Site use and development would not be limited. In addition, remedial and monitoring activities as well as placement of institutional controls at the Site would not be implemented.

Assessment

This alternative may not be protective of human health or the environment. Soil samples collected from this area were found to exceed NYSDEC Part 375 Soil Cleanup Objectives and in the event that this area is disturbed in the future with no action, there is a potential for human exposure to the impacts and potentially the environment.

With the exception of possible natural attenuation of VOCs, this alternative would not result in the reduction of contaminant toxicity, mobility or volume and therefore would not be in compliance with chemical-specific RAOs.

There would be no increased short-term risks associated with the no action alternative for the concrete wastewater holding tank area since remedial activities are not implemented and there does not appear to be a current exposure pathway with these impacts; however, this alternative may not be effective in the long-term and is not a permanent remedy.

Based on the findings of the studies performed to date it is anticipated that this alternative would not be acceptable to the community.

Of the alternatives being considered, the no action alternative for this AOC is not effective for the long-term and does not reduce toxicity, mobility, or volume of petroleum related impacts to this AOC. The estimated cost for this alternative is summarized below:

Estimated Cost of No Action ..... $ 0

Site Management Plan with Institutional Controls

Description

Under this restricted use alternative, institutional controls (e.g., deed restrictions, NYSDEC Environmental Easement, etc.) and development of an SMP including a HASP, would be implemented to minimize potential exposures and also control Site use. The SMP would include procedures for properly handling and disposing of impacted media (e.g., soil, etc.) in this area should it be disturbed in the future.

Assessment

This alternative would be protective of human health at the Site since the site is unoccupied; however, this alternative would leave significant impacts in-place that would not be protective of the environment and potentially downgradient receptors in the future. The SMP would provide the necessary controls to minimize potential future exposures to on-site disturbances of soil and groundwater in this area and the institutional controls would provide the necessary mechanism to ensure proper notification to future owners.

Although active remediation is not proposed as part of this alternative, this alternative would provide for long-term management of this area. With the exception of possible decreases in the concentration of VOCs through natural attenuation processes, this alternative would not result in the immediate reduction of contaminant toxicity, mobility or volume; and, therefore would not be in compliance with chemical-specific RAOs.

There would be no increased short-term risks associated with the institutional action for this AOC since remedial activities are not implemented. This alternative should be effective in the short-term; however, it may not be effective in the long-term; and is not a permanent remedy.

Based on the findings of the studies performed to date, it is anticipated that this alternative may be acceptable to the community due to the planned commercial use of the Site.

The institutional action alternative for this AOC is feasible. The cost for this alternative is summarized below and detailed in Table 1:

Estimated Cost of SMP with Institutional Controls.....$ 9,450

Additional Soil Removal and Disposal

Description

Under this alternative, unsaturated zone soils beneath the building (i.e., directly south of the concrete wastewater holding tank and the worst case soils that were left in-place during the IRM soil removal (i.e., in the area of confirmatory soil samples BS-1 and SW-1) would be removed and disposed of off-site in accordance with applicable regulations. For the purpose of this evaluation, it is assumed that an approximate 20-foot by 15-foot area would be excavated to 16-feet in depth. Since a portion of this area is clean backfill from the IRM it is estimated that about 120 cubic yards of soil would require removal and disposal. The extent of the soil removal would include the area shown on Figure 5. It should be noted that the previous IRM removed the worst-case soils from the Site which was estimated to be approximately 88% of the total contaminant mass at the Site. This added soil removal, is anticipated increase that amount to more than 95% of the contaminant mass at the Site having been removed. As with the IRM, it is proposed that this soil removal consist of staging the soil to conduct a "Contained-In Demonstration" (i.e., NYSDEC TAGM 3028) to determine if some or all of the soil can be treated as non-hazardous waste. In addition, confirmatory soil samples would be collected in accordance with NYSDEC DER-10.

This alternative assumes the following for the scoping and cost estimating:

- 60 cy (or about 100 tons) of hazardous waste
- 60 cy (or about 100 tons) of non-hazardous waste (assumes approved contained-in
- 5 confirmatory soil samples would be collected and analyzed for halogenated VOCs
- 3,000-gallons of hazardous waste waters requiring disposal in order to facilitate the soil removal work

Assessment

This alternative should be protective of human health and the environment. Unsaturated zone soil with contaminant concentrations above RAOs from the concrete wastewater holding tank would be removed and disposed of off-site and the worst-case saturated zone soils left in-place from the IRM would also be removed. This removal should also reduce groundwater impacts in this area.

This alternative would result in the reduction of the toxicity, mobility, and volume of contaminants in the soil. Although some impacts above chemical-specific SCGs would be left in-place for the saturated zone soils, the intent would be to address these soils as part of AOC #3.

This alternative would increase short-term risks for the community and the workers during implementation; however, a health and safety plan and community air monitoring plan would be developed to manage these risks and protect the community. This alternative would be effective in the long-term. The soil removal and disposal alternative would be a permanent remedy for the removed soils.

Based on the findings of the studies performed to date, it is anticipated this alternative would be acceptable to the community; however, this alternative would impact the community during implementation.

Of the alternatives being considered, the soil removal and disposal alternative for this AOC is feasible. The cost for this alternative is summarized below and detailed in Table 2:

Estimated Cost of Additional Soil Removal and Disposal .....$ 93,594

2.) AOC #2: Former PCE Still Area

No Action

Description

Under this alternative the impacts associated with the former still area would remain as is and future Site use and development would not be limited. In addition, remedial and monitoring activities as well as placement of institutional controls at the Site would not be implemented.

Assessment

This alternative may not be protective of human health or the environment. Soil samples collected from this area were found to exceed RAOs.

With the exception of possible natural attenuation of VOCs, this alternative would not result in the reduction of contaminant toxicity, mobility or volume and therefore would not be in compliance with chemical-specific SCGs.

There would be no increased short-term risks associated with the no action alternative since remedial activities are not implemented; however, this alternative may not be effective in the long-term and is not a permanent remedy.

Based on the findings of the studies performed to date it is anticipated that this alternative may not be acceptable to the community.

The estimated cost for this alternative summarized below:

Estimated Cost of No Action ..... $ 0

Site Management Plan with Institutional Controls

Description

Under this alternative, institutional controls (e.g., deed restrictions, NYSDEC Environmental Easement, etc.) and development of an SMP including a HASP, would be implemented to minimize potential exposures and also control Site use. The SMP would include procedures for properly handling and disposing of impacted media (e.g., soil, etc.) at the Site should it be disturbed in the future.

Assessment

This alternative should minimize potential impacts to human health and the environment due to the former PCE still area. Soil samples collected from this area exceed RAOs. This alternative would implement controls (institutional actions, SMP, etc.) in the event that ground intrusive work was conducted in this area during future use of the Site.

With the exception of possible decreases in the concentration of VOCs through natural attenuation processes or during future ground intrusive work in this area, this alternative would not result in the reduction of contaminant toxicity, mobility or volume; and, therefore would not be in compliance with chemical-specific SCGs.

There would be no increased short-term risks associated with the institutional action alternative for this AOC since remedial activities are not implemented. This alternative may not be effective in the long-term and is not a permanent remedy.

Based on the findings of the studies performed to date, it is anticipated that this alternative may not be acceptable to the community.

Of the alternatives being considered, the institutional action alternative for this AOC may be feasible. The costs for this alternative are summarized below and detailed in Table 3:

Estimated Cost of SMP with Institutional Controls.....$ 9,450

Soil Removal and Disposal

[Note: This removal will remove some saturated zone soil; however, the remaining impacted saturated zone soils would be addressed as part of AOC #3.]

Description

Under this alternative, the soil impacted above the RAOs from the unsaturated zone area beneath the PCE Still would be removed and disposed of off-site in accordance with applicable regulations. For the purpose of this evaluation, it is assumed that an approximate 425 square foot area will be removed to approximately 9.5-feet. The current building at the Site will be demolished and soil removal should take place after the building has been removed. The excavated area would be backfilled and restored. The extent of the soil removal would include the area shown on Figure 6. As with the IRM, it is proposed that this soil removal consist of staging the soil to conduct a "Contained-In Demonstration" (i.e., NYSDEC TAGM 3028) to determine if some or all of the soil can be treated as non-hazardous waste. In addition, confirmatory soil samples would be collected in accordance with NYSDEC DER-10.

This alternative assumes the following for the scoping and cost estimating:

- 150 cy (or about 240 tons) of non-hazardous waste (assumes approved contained-in
- 6 confirmatory soil samples

Assessment

This alternative should be protective of human health and the environment. Soil concentrations that exceed RAOs in the immediate area of the former PCE still would be removed and disposed of off-site.

This alternative would result in the reduction of the toxicity, mobility, and volume of contaminants in the unsaturated zone soil and as such, would be effective in the long term and result in the permanent removal of contaminants of concern from this area.

There would be an increase in short-term risks associated with the soil removal work for this alternative; however, these risks could be managed through a HASP and CAMP which would be included in a detailed remedial work plan.

It is anticipated that this alternative would be acceptable to the community and for the anticipated planned future use of the Site.

Of the alternatives being considered, the soil removal action for this AOC is feasible. The cost for this alternative is summarized below and detailed in Table 4:

Estimated Cost of Soil Removal and Disposal $78,870

3.) AOC #3: Groundwater/Saturated Zone Contamination

No Action

Description

Under this alternative, no actions would be implemented to reduce the contaminant impacts associated with groundwater and the saturated zone soils at the Site. Future Site use and development would not be limited. In addition, remedial and monitoring activities as well as placement of institutional controls at the Site would not be implemented.

Assessment

This alternative is not protective of human health or the environment. Groundwater samples collected across the Site contained concentrations of CVOCs above RAOs.

With the exception of possible natural attenuation of VOCs, this alternative would not result in the reduction of contaminant toxicity, mobility or volume and therefore would not be in compliance with chemical-specific SCGs.

There would be no increased short-term risks associated with the no action alternative since remedial activities are not implemented. This alternative may not be effective in the long-term and is not a permanent remedy.

Based on the findings of the studies performed to date it is anticipated that this alternative may not be acceptable to the community.

Of the alternatives being considered, the no action alternative for this AOC is not effective for the long-term and it does not reduce toxicity, mobility, or volume of impacts to this AOC. The estimated cost for this alternative is summarized below:

Estimated Cost of No Action ..... $ 0

Site Management Plan with Institutional Controls

Description

Under this alternative, institutional controls (e.g., deed restrictions, NYSDEC Environmental Easement, etc.) and development of an SMP including a HASP, would be implemented to minimize potential exposures and also control Site use. The SMP would include procedures for properly handling and disposing of impacted media (e.g., groundwater, soil, etc.) at the Site should it be disturbed in the future.

Assessment

This alternative should minimize potential impacts to human health and the environment due to groundwater contamination at the Site; however, it will not prevent off-site migration. This alternative would implement controls (institutional actions, SMP, etc.) in the event that ground intrusive work was conducted at the Site in the future.

With the exception of possible decreases in the concentration of VOCs through natural attenuation processes or during future ground intrusive work at the Site, this alternative would not result in the reduction of contaminant toxicity, mobility or volume; and, therefore would not be in compliance with chemical-specific SCGs.

There would be no increased short-term risks associated with the institutional action alternative for this AOC since remedial activities are not implemented. This alternative may not be effective in the long-term and may not be a permanent remedy.

Based on the findings of the studies performed to date, it is anticipated that this alternative may not be acceptable to the community due to the current use of the adjacent properties.

Of the alternatives being considered, the institutional action alternative for this AOC may not be feasible. The costs for this alternative are summarized below and detailed in Table 5:

Estimated Cost of SMP with Institutional Controls.....$ 9,450

Injection System to Treat Groundwater/Saturated Zone

Description

[*Note: This alternative, assumes that the soil contamination within the unsaturated zone around AOC #1 and AOC #2 and the worst-case impacted soils beneath the former concrete wastewater holding tank that were left in-place from the IRM (i.e., BS-1 and SW-1) would be removed and disposed of off-site in accordance with applicable regulations (i.e., the soil and removal options for AOC #1 and AOC #2).*]

This alternative includes installing infrastructure to facilitate injection of treatment chemicals in order to treat the impacted groundwater and saturated zone soils at the Site. The system would introduce an appropriate chemical (i.e., permanganates, whey, or others) to the saturated zone at planned intervals to breakdown the contaminants of concern within the saturated zone. A conceptual system layout is shown on Figure 7. Although the final system details would be based on the design, currently it is anticipated this system could be implemented via a tank and gravity fed into the distribution system.

A bench scale study (i.e., site-specific analysis) of the effectiveness of one or more products to treat CVOC impacted media may be performed. Specifically, representative samples of saturated zone soil and groundwater from impacted locations would be collected and submitted to a laboratory. The lab would perform bench scale feasibility studies on the samples using several different treatment chemicals in order to determine which products are effective for the specific conditions at the Site. The results of the bench scale study along with a recommended product would be submitted to the NYSDEC for approval. Subsequently, the NYSDEC approved product would be used in a pilot study to confirm in-field effectiveness prior to full scale application. [*Note: A field pilot study may be requested in lieu of the bench scale study.*] The final system design will be conducted after selecting a remedial product in order to ensure proper system design details (e.g., material compatibilities, injection point construction, storage tank size, etc.). Groundwater monitoring will be performed until CVOC contaminant concentrations are below the RAOs for the Site.

This alternative assumes the following for the scoping and cost estimating:

- 100 cy (160 tons) of non-hazardous waste (assumes approved contained-in) will be generated from trenching operations
- 10 soil samples will be required
- 550 feet of horizontal piping/trenching will be necessary
- 52 injection points will be necessary
- one 4,000-gallon storage tank will be located in the maintenance room in the proposed building
- 7 groundwater monitoring wells will be sampled semi-annually during the remedial work
- the treatment chemical will be sodium permanganate and will require annual injections for 5-years

Assessment

This alternative should be protective of human health and the environment. On-site treatment with a long-term injection system will destroy contaminants in the saturated zone including at the property line so that off-site migration of impacts is addressed.

This alternative would result in the reduction of the toxicity, mobility, and volume of contaminants in the soil and groundwater. This alternative over time will achieve compliance with chemical-specific SCGs.

There would be some limited increase in short-term risks for the community and the workers implementing the alternative and depending on the materials used some increased risk with the transfer/storage of such materials; however, these risks could be managed through a propertly implemented remedial work plan. This alternative would be effective in the long-term and would be a permanent remedy.

Based on the findings of the studies performed to date, it is anticipated that the results of this alternative would be acceptable to the community.

Of the alternatives being considered, the injection system to treat groundwater and saturated zone soil is feasible. The cost for this alternative is summarized below and detailed in Table 6. [*Note: based on the time for completion of this alternative, annual costs have been evaluated on a present worth basis.*]

Estimated Cost of Injection System.....$ 485,898

Extensive Saturated Zone Soil and Groundwater Removal and Disposal

Description

Under this alternative, the saturated zone soils impacted above RAOs would be removed over the entire Site and disposed of off-Site in accordance with applicable regulations. The estimated extent of this removal area is the same as the groundwater plume area shown on Figure 5 (i.e., green area). To facilitate removal within the saturated zone, aggressive dewatering would be necessary in order to remove soils to depths up to approximately 16 feet.

For the purpose of this evaluation, it is assumed that an approximate 4,500 square-foot area would be excavated to 16-feet in depth. This equates to approximately 2,700 cubic yards of soil that would require removal and disposal. The excavation would then be backfilled and restored. As with the IRM, it is proposed that this soil removal consist of staging the soil to conduct a "Contained-In Demonstration" (i.e., NYSDEC TAGM 3028) to determine if some or all of the soil can be treated as non-hazardous waste. In addition, confirmatory soil samples would be collected in accordance with NYSDEC DER-10.

This alternative assumes the following for the scoping and cost estimating:

- 30% of the soils will fail the contained in and be considered hazardous waste (i.e., 810 cy or about 1,300 tons)
- 1,890 cy (3,020 tons) of soil will be considered non-hazardous waste (assumes approved contained-in)
- 25 confirmatory soil samples analyzed for halogenated VOCs
- 70,000 gallons of water will be removed which will require disposal as hazardous waste

Assessment

This alternative would be protective of human health and the environment. Soil and groundwater with contaminant concentrations above RAOs on-site would be removed and disposed of off-site.

This alternative would result in the reduction of the toxicity, mobility, and volume of contaminants in the soil and groundwater. Therefore, this alternative would be in compliance with chemical-specific SCGs.

This alternative would significantly increase short-term risks for the community and the workers implementing the soil and groundwater removal since a large area would be disturbed for an extended period of time. This alternative would be effective in the long-term be a permanent remedy.

Based on the findings of the studies performed to date, it is anticipated that the results of this alternative would be acceptable to the community; however, there would be significant disruption to the community and potentially exposure to vapor releases from such work.

Of the alternatives being considered, the soil removal and disposal alternative for this AOC is not practical in terms of cost. The cost for this alternative is summarized below and detailed on Table 7:

Estimated Cost of Extensive Soil and Groundwater Removal .....$ 1,088,478

Permeable Reactive Barrier

Description

Under this alternative, a permeable reactive barrier (PRB), such as zero valent iron, would be installed along the western property boundary in order to treat dissolved phase impacted groundwater that is migrating off-site. The PRB would require excavating a trench (or potentially drilling a series of injection/mixing points) to at least 20 to 25-ft. in depth all along the western property boundary. The PRB would include a 'funnel' set up on the northern and southern ends of the PRB to promote funneling of groundwater through the PRB. In order to minimize the potential for flow retardation to cause an 'overflow' above the PRB, the PRB should be constructed above the seasonally high groundwater table elevation. A conceptual layout of a PRB at the Site is shown on Figure 8. A bench scale study (i.e., site-specific analysis) of the effectiveness of various available PRB products to treat CVOC impacted media would be performed. Specifically, representative samples of saturated zone soil and groundwater from impacted locations would be collected and submitted to a laboratory. The lab would perform bench scale feasibility studies on the samples using several different PRB products in order to determine which products are effective for the specific conditions at the Site. The results of the bench scale study would provide the necessary information to design the PRB (e.g., thickness of PRB required to treat chemicals prior to exiting PRB). The results of the bench scale test would be submitted along with a recommended product to the NYSDEC for approval. This alternative would include groundwater monitoring of the existing monitoring wells and include monitoring wells downgradient of the PRB in order to evaluate for 'breakthrough' of contaminants or potentially contaminants dropping beneath the barrier. [*Note: The extensive RI testing did not identify a confining layer that the PRB could be 'locked' into and thus a significant concern with this approach would be contaminants migrating beneath the PRB.*]

This alternative assumes the following for the scoping and cost estimating:

- 1,300 cy (or about 2,080 tons) of non-hazardous waste (assumes approved contained-in) will be generated during trenching activities
- 5,000 gallons of hazardous waste waters will be generated and require disposal in order to facilitate the PRB installation
- the PRB will be zero-valent iron (QVI) and extend 140 feet in length (including funnel), be approximately 10-feet wide and be constructed to 25 feet in depth
- semi-annual groundwater monitoring will be required for 30-years on seven (7) monitoring wells

Assessment

This alternative should be protective of human health and the environment. The barrier will be effective in containing groundwater contamination to the Site and treating contaminants that are migrating off-site.

This alternative would only result in the reduction of the toxicity, mobility, and volume of contaminants that pass through the barrier. Therefore, this alternative would not be in compliance with chemical-specific SCGs.

This alternative would increase short-term risks for the community and the workers implementing the barrier installation. This alternative would prevent migration in the long-term as long as the barrier is maintained and groundwater concentrations downgradient of the PRB are monitored to evaluate for 'breakthrough'.

Based on the findings of the studies performed to date, it is anticipated that the results of this alternative would be acceptable to the community in conjunction with the alternatives suggested for the other AOCs.

Of the alternatives being considered, permeable barrier alternative for this AOC is not practical in terms of construction feasibility and the potential for contaminants to migrate beneath the PRB. The cost for this alternative is summarized below and detailed in Table 8 *[Note: based on the time for completion of this alternative, annual costs have been evaluated on a present worth basis]*:

Estimated Cost of Permeable Reactive Barrier.....$ 1,249,350

Groundwater Pump and Treat

Description

Under this alternative, groundwater extraction wells would be installed along the downgradient edge of the property in order to establish a capture zone for the entire saturated zone impact area. A conceptual layout of a groundwater extraction system for the Site is shown on Figure 9. The extraction wells would be installed to depths of approximately 20 feet and be piped to a groundwater treatment system on-site. The exact number and location of extraction wells would be determined after a pump test on-site. Based on the types of impacts and concentrations of contaminants, it is assumed that the remedial system would consist of a low profile air stripper for removing the majority of the dissolved phase impacts in groundwater followed by a carbon drum for polishing the groundwater prior to discharging to the sanitary sewer. In addition, it is also assumed that the effluent air from the air stripper will also require treatment prior to discharge. This alternative would include semi-annual groundwater monitoring and quarterly water level gauging to confirm the capture zone of the extraction system.

This alternative assumes the following for the scoping and cost estimating:

- 100 cy (160 tons) of non-hazardous waste (assumes approved contained-in) will be generated during installation of extraction wells and trenching activities
- 5 extraction wells will be required to obtain capture of the plume on-site

- a low-profile air stripper followed by two 55-gallon drums for polishing will be required for groundwater treatment
- two 55-gallon drums of carbon will be required for treatment of the air stripper air discharges
- 7 groundwater monitoring wells will be sampled for halogenated VOCs semi-annually
- quarterly water level gauging will be conducted to confirm capture zone
- this alternative will require up to 30 years to obtain RAOs

Assessment

This alternative should be protective of human health and the environment. The capture of the groundwater plume will minimize off-site migration of impacts.

This alternative would result in the reduction of the toxicity, mobility, and volume of contaminants as they are removed through the extraction and treatment process. This alternative would eventually be in compliance with chemical-specific SCGs; however, the length of time for pump and treat systems can be significant.

This alternative would increase short-term risks for the community and the workers implementing the installation of the system and infrastructure; however, these risks could be minimized with a HASP and CAMP. This alternative would prevent migration in the long-term since the on-site plume would be captured.

Based on the findings of the studies performed to date, it is anticipated that the results of this alternative would be acceptable to the community in conjunction with the alternatives suggested for the other AOCs.

Of the alternatives being considered, groundwater pump and treat for this AOC is practical for construction but is prohibitive due to cost over the long term. The cost for this alternative is summarized below and detailed in Table 9. *[Note: based on the time for completion of this alternative annual costs have been evaluated on a present worth basis]*:

Estimated Cost of Groundwater Pump and Treat .....$ 1,118,124

8.0 Comparative Evaluation of Alternatives and Recommended Actions

This section of the report compares the remedial alternatives proposed for each AOC and presents the recommended action for each AOC.

1.) AOC #1: Concrete Wastewater Holding Tank Area:

- The no action alternative may not be protective of human health and the environment. While the no action alternative may be acceptable to the community, there is a potential that future ground intrusive activities in this area will encounter these impacts, which indicates a level of risk in relation to exposure to workers and any public in the area.

- The SMP with institutional controls is anticipated to be acceptable to the community. This alternative would manage the risk realized during future ground intrusive work in this area and over time will likely remediate this area as it is accessed in the future. However, these impacts will continue to be a source of groundwater contamination.
- The additional soil removal and disposal alternative would be a long-term and permanent remedy, and will eliminate sources of impacts to groundwater and allow residual impacts to attenuate over time. This alternative will likely be acceptable to the community.

The recommended remedial action for AOC #1 is the additional soil removal and disposal.

2.) AOC #2: Former PCE Still Area:

- The no action alternative may not be protective of human health or the environment. In addition, the no action alternative may not be acceptable to the community or in-conjunction with redevelopment of the Site.
- The SMP with institutional controls may be acceptable to the community and facilitate proper redevelopment of the Site should this area be disturbed in the future. However, this remedial alternative does not allow for the reduction of toxicity, mobility or volume of impacted media associated with this AOC and these impacts will continue to be a source of groundwater contamination.
- The soil removal and disposal alternative is a feasible, long-term solution to the unsaturated zone soil impacts above RAOs in this area. Furthermore, removal of the impacted soils will eliminate sources of impacts to groundwater and allow residual impacts to attenuate over time. This alternative immediately reduces the of toxicity, mobility and volume of impacted media associated with this AOC.

The recommended remedial action for AOC #2 is the soil removal and disposal.

3.) AOC #3: Groundwater/Saturated Zone Contamination:

- The no action alternative may not be protective of human health or the environment. In addition, the no action alternative may not be acceptable to the community and could limit the redevelopment of the Site.
- The SMP with institutional controls may not be acceptable to the community; however, this alternative would manage impacts properly when the property is redevelopment in the future. However, this remedial alternative does not allow for the reduction of toxicity, mobility or volume of impacted media associated with this AOC and groundwater migrating off-Site could impact downgradient locations.
- The injection system alternative is a feasible, long-term solution to contamination in this area and will remediate groundwater impacts over time. This alternative will reduce the toxicity, mobility and volume of impacted media associated with this AOC. This alternative can be completed in-conjunction with the redevelopment of the Site as an unmanned automated car wash and is economically feasible. This alternative will also treat groundwater prior to leaving the Site thus minimizing down gradient impacts. This alternative should be acceptable to the community.

- The extensive saturated zone soil and groundwater removal and disposal alternative may be acceptable to the community and is a long-term solution to contamination in this area. This alternative allows for the reduction of toxicity, mobility and volume of impacted media associated with this AOC. This alternative is not economically feasible.
- The permeable reactive barrier alternative is a long-term alternative that will remediate saturated zone impacts over time. It is anticipated that this alternative would be acceptable to the community. However, this alternative presents significant concerns due to the lack of a confining layer to "lock" the PRB into. This alternative is not economically feasible.
- The groundwater pump and treat system is a long-term alternative that will remediate saturated zone impacts over time. It is anticipated that this alternative would be acceptable to the community. However, this alternative requires significant capital and long term maintenance/monitoring costs and, as such, this alternative is not economically feasible.

The recommended remedial action for AOC #3 is the injection system.

9.0 Summary of Recommended Final Remedial Actions

Based on the above recommendations, this section summarizes the overall final remedial strategy for the Site.

Subsequent to NYSDEC approval and completing the soil removal and injection system installation, a Final Engineering Report would be submitted with an Operation, Maintenance and Monitoring (OM&M) Plan and a SMP.

The estimated cost of the three (3) recommended alternatives is below.

Area of Concern	Recommended Action	Estimated Cost
AOC #1 (Concrete Wastewater Holding Tank Area)	Additional Soil Removal and Disposal	$93,594
AOC #2 (Former PCE Still Area)	Soil Removal and Disposal	$78,870
AOC #3 (Groundwater/Saturated Zone Contamination)	Injection System	$485,898
Total	**N/A**	**$649,362***

** The total cost has been reduced to remove repetitive items such as SMP and environmental easements.*

The above recommended alternatives have been also evaluated on an overall approach for the Site based on the proposed redevelopment as an unmanned automated car wash. The removal and disposal of unsaturated zone soils (AOC #1 and #2) and the worst-case soils beneath the former wastewater tank (i.e.,

confirmatory soil samples BS-1 and SW-1) is proposed to be completed as part of the redevelopment work. Subsequent to the soil removal, trenching and injection point installations would be completed for installing system infrastructure. The building design would include the injection system design details and be included with the building construction. The mechanical room would include the storage tank and associated delivery system (manifolds, valves, pumps [if necessary], etc.).

The reuse of the Site as an unmanned car wash provides a good fit for the proposed overall remedy for the Site.

Y:\SPRINGS LAND COMPANY\209408\REPORTS\R09H03SD1.DOC

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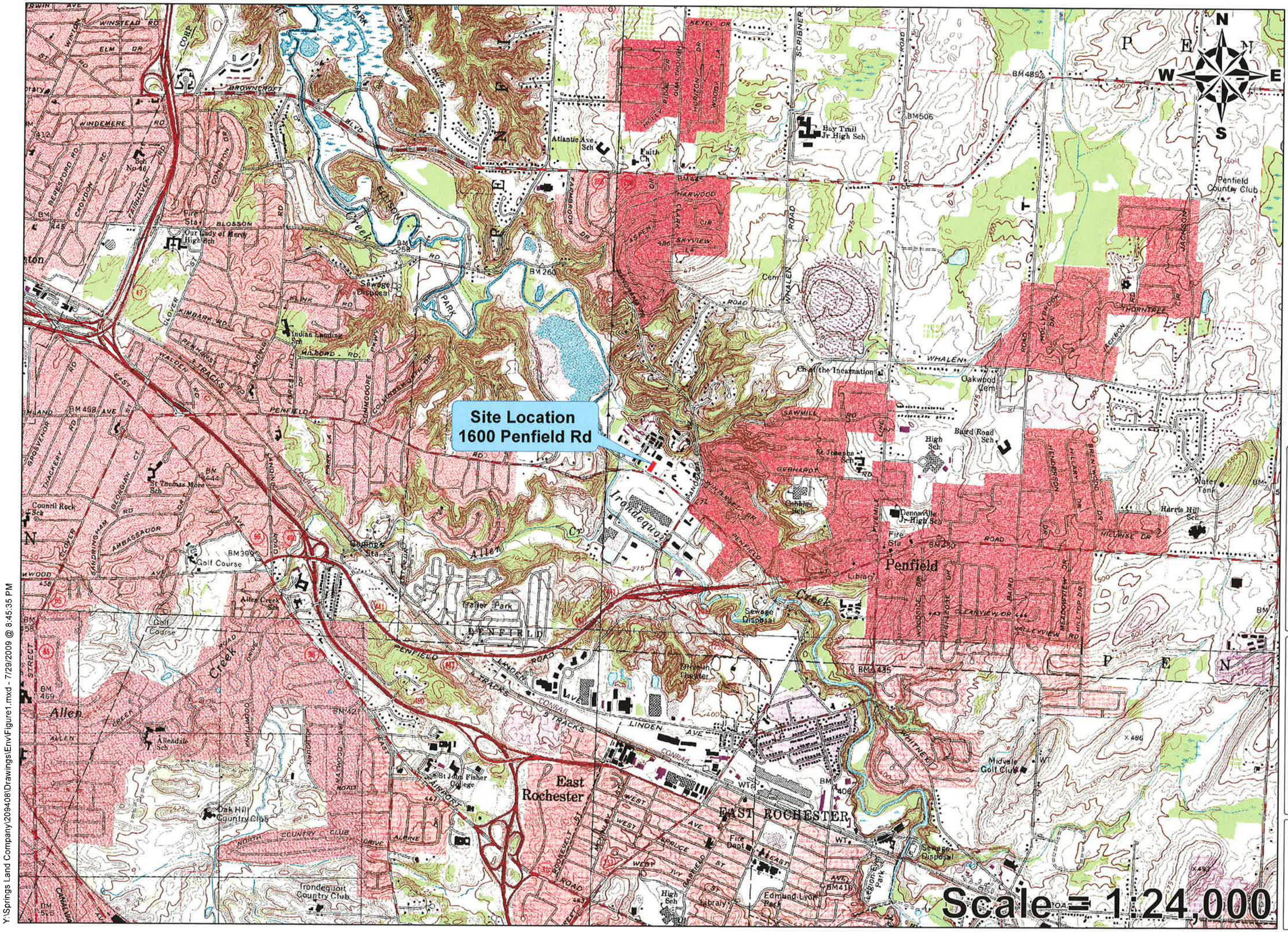
Rochester, New York 14614

Figures



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PROJECT/SUBJECT
CARRIAGE CLEANTOWN
REMEDIAL ALTERNATIVES ANALYSIS

SPRINGS LAND COMPANY, LLC

1600 PENFIELD ROAD
PENFIELD, NEW YORK

DRAWING TITLE
SITE LOCATION MAP
WITH USGS QUADRANGLE
TOPOGRAPHY MAP

ISSUED FOR: DRAFT
DESIGNED BY: JJW
DRAWN BY: RCN
REVIEWED BY: DPN
DATE: JULY 2009

PROJECT/DRAWING NUMBER
209408

FIGURE 1

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Residential

Commercial Property

Commercial Property
with Offices

SITE

Drive Thru ATM
(Unoccupied)

PENFIELD ROAD

Parking Lot with Commercial
Buildings Beyond

Legend

Site Parcel Boundary

Neighboring Parcel Boundaries

0 30 60 120 180 240

Feet

Y:\Springs Land Company\209408\Drawings\Env\Figure2.mxd - 7/29/2009 @ 8:45:01 PM

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PROJECT/CLIENT

CARRIAGE CLEANTOWN
REMEDIAL ALTERNATIVES ANALYSIS

SPRINGS LAND COMPANY, LLC

1600 PENFIELD ROAD
PENFIELD, NEW YORK

DRAWING TITLE

SITE PLAN
WITH ADJACENT
PROPERTIES

ISSUED FOR: DRAFT

DATE: JULY 2009

DESIGNED BY: JJW

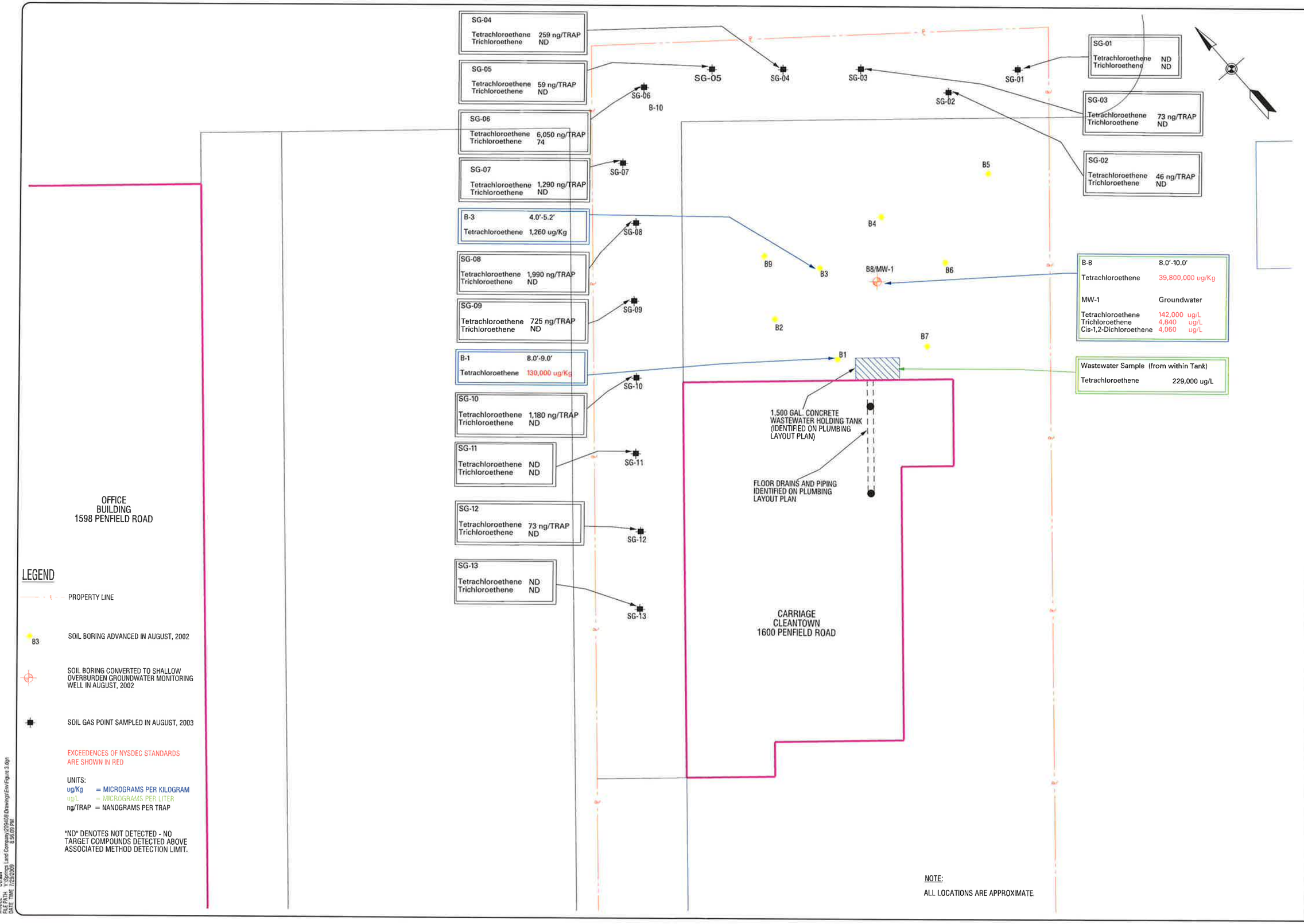
DRAWN BY: RCN

REVIEWED BY: DPK

PROJECT/DRAWING NUMBER

209408

FIGURE 2



NO	REVISION	BY	DATE
1	ADDRESS NYSDEC COMMENTS	RCN	8/5/09
2			
3			
4			
5			
6			

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PROJECT/CLIENT
CARRIAGE CLEANTOWN
REMEDIAL ALTERNATIVES ANALYSIS
SPRINGS LAND COMPANY, LLC
1600 PENFIELD ROAD
PENFIELD, NEW YORK

DRAWING TITLE
SITE PLAN WITH HISTORIC SAMPLING DATA

ISSUED FOR	SCALE	DESIGNED BY	DRAWN BY	REVIEWED BY
DRAFT	1" = 20'	DPN	RCN	DPN
DATE	JULY 2009			

PROJECT NUMBER
209408
DRAWING NUMBER
FIGURE 3
SHEET 1 OF 1

PLOTDRVR Civil-XM-Half-Color.pltcfg
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DATE TIME 7/29/2009 8:56:09 PM

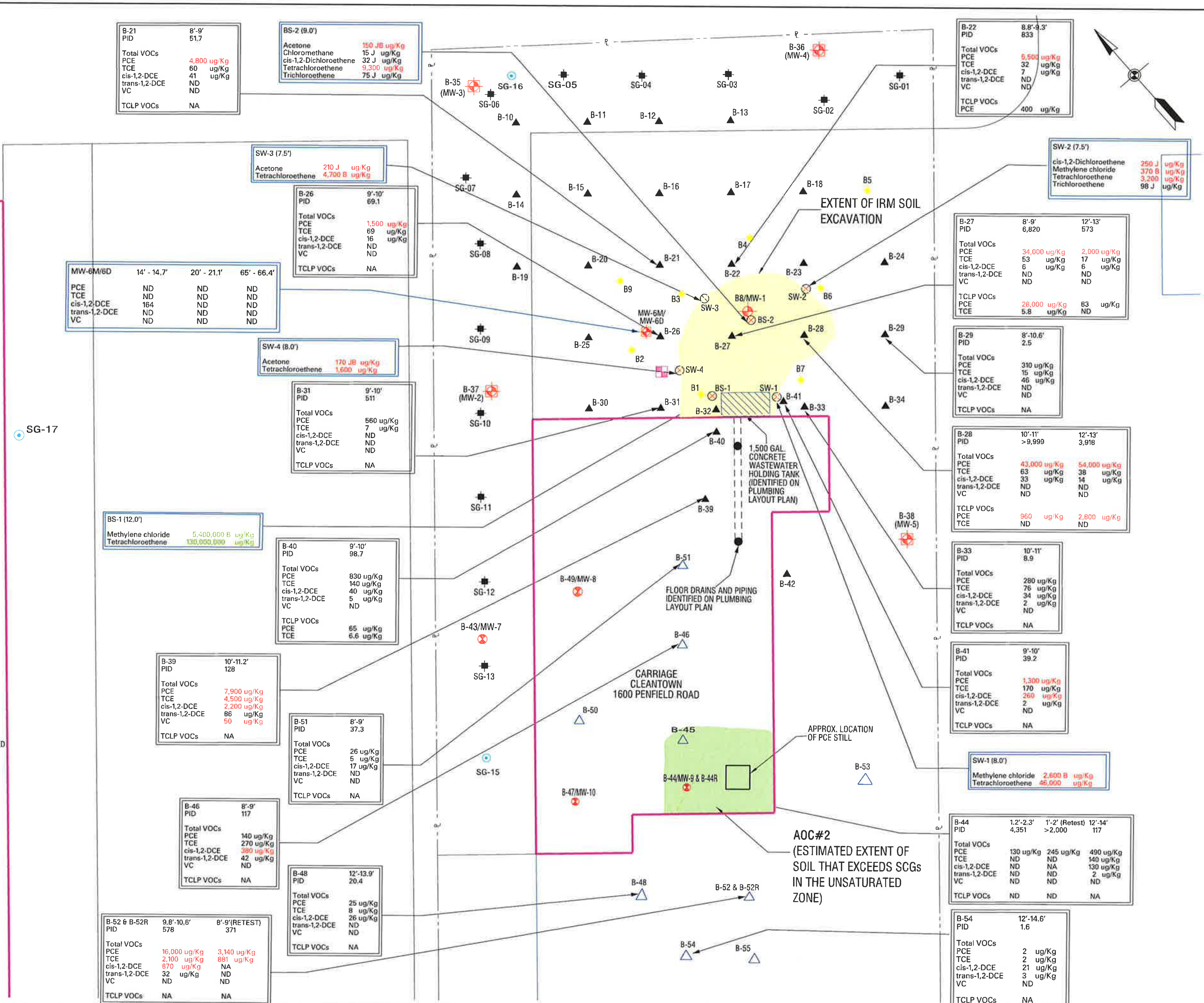
NOTES:

1. ALL LOCATIONS ARE APPROXIMATE.
2. SAMPLE RESULTS IN MICROGRAMS PER KILOGRAM (ug/KG) OR PARTS PER BILLION (PPB).
3. "ND" DENOTES NOT DETECTED - NO INDIVIDUAL TARGET COMPOUNDS DETECTED ABOVE ASSOCIATED METHOD DETECTION LIMIT.
4. ABBREVIATIONS ARE:
   - VOCs - Volatile Organic Compounds
   - TCLP - Toxicity Characteristic Leachate Procedure
   - PCE - Tetrachloroethene
   - TCE - Trichloroethene
   - DCE - Dichloroethene
   - VC - Vinyl Chloride
   - NA - Not Analyzed
5. EXCEEDANCES OF NYSDEC PART 375-6 PROTECTION OF GROUNDWATER STANDARDS ARE SHOWN IN RED.
6. EXCEEDANCES OF SUBPART 375-6 RPSCOs FOR THE PROTECTION OF PUBLIC HEALTH: COMMERCIAL WORKER RECEPTORS ARE SHOWN IN GREEN.

OFFICE BUILDING
1598 PENFIELD ROAD

LEGEND

- PROPERTY LINE
- B3 — SOIL BORING ADVANCED IN AUGUST, 2002
- SOIL BORING CONVERTED TO SHALLOW OVERBURDEN GROUNDWATER MONITORING WELL IN AUGUST, 2002
- SOIL BORING ADVANCED IN NOVEMBER, 2005
- GROUNDWATER MONITORING WELL INSTALLED IN NOVEMBER, 2005
- SOIL GAS POINT SAMPLED IN AUGUST, 2003
- PERMANENT SOIL GAS SAMPLING WELL
- SUPPLEMENTAL SHALLOW OVERBURDEN GROUNDWATER MONITORING WELL LOCATION
- SUPPLEMENTAL SHALLOW SOIL BORING LOCATION
- SUPPLEMENTAL DEEP GROUNDWATER MONITORING WELL LOCATION
- IRM EXCAVATION CLEAN CONFIRMATION SOIL SAMPLE



SG-17
B-21 8'-9' PID 51.7 Total VOCs PCE 4,800 ug/Kg TCE 60 ug/Kg cis-1,2-DCE 41 ug/Kg trans-1,2-DCE ND VC ND TCLP VOCs NA
BS-2 (9.0') Acetone 150 JB ug/Kg Chloromethane 15 J ug/Kg cis-1,2-Dichloroethene 32 J ug/Kg Tetrachloroethene 9,300 ug/Kg Trichloroethene 75 J ug/Kg
SW-3 (7.5') Acetone 210 J ug/Kg Tetrachloroethene 4,700 B ug/Kg
B-26 9'-10' PID 69.1 Total VOCs PCE 1,500 ug/Kg TCE 69 ug/Kg cis-1,2-DCE 16 ug/Kg trans-1,2-DCE ND VC ND TCLP VOCs NA
MW-6M/6D 14' - 14.7' 20' - 21.1' 65' - 66.4' PCE ND ND ND TCE ND ND ND cis-1,2-DCE 164 ND ND trans-1,2-DCE ND ND ND VC ND ND ND
SW-4 (8.0') Acetone 170 JB ug/Kg Tetrachloroethene 1,600 ug/Kg
B-31 9'-10' PID 511 Total VOCs PCE 560 ug/Kg TCE 7 ug/Kg cis-1,2-DCE ND trans-1,2-DCE ND VC ND TCLP VOCs NA
BS-1 (12.0') Methylene chloride 5,400,000 B ug/Kg Tetrachloroethene 130,000,000 ug/Kg
B-40 9'-10' PID 98.7 Total VOCs PCE 830 ug/Kg TCE 140 ug/Kg cis-1,2-DCE 40 ug/Kg trans-1,2-DCE 5 ug/Kg VC ND TCLP VOCs PCE 65 ug/Kg TCE 6.6 ug/Kg
B-39 10'-11.2' PID 128 Total VOCs PCE 7,900 ug/Kg TCE 4,500 ug/Kg cis-1,2-DCE 2,200 ug/Kg trans-1,2-DCE 86 ug/Kg VC 50 ug/Kg TCLP VOCs NA
B-51 8'-9' PID 37.3 Total VOCs PCE 26 ug/Kg TCE 5 ug/Kg cis-1,2-DCE 17 ug/Kg trans-1,2-DCE ND VC ND TCLP VOCs NA
B-46 8'-9' PID 117 Total VOCs PCE 140 ug/Kg TCE 270 ug/Kg cis-1,2-DCE 380 ug/Kg trans-1,2-DCE 42 ug/Kg VC ND TCLP VOCs NA
B-48 12'-13.9' PID 20.4 Total VOCs PCE 25 ug/Kg TCE 8 ug/Kg cis-1,2-DCE 26 ug/Kg trans-1,2-DCE ND VC ND TCLP VOCs NA
B-52 & B-52R 9.8'-10.6' 8'-9'(RETEST) PID 578 371 Total VOCs PCE 16,000 ug/Kg 3,140 ug/Kg TCE 2,100 ug/Kg 881 ug/Kg cis-1,2-DCE 870 ug/Kg NA trans-1,2-DCE 32 ug/Kg ND VC ND ND TCLP VOCs NA NA
B-22 8.8'-9.3' PID 833 Total VOCs PCE 5,500 ug/Kg TCE 32 ug/Kg cis-1,2-DCE 7 ug/Kg trans-1,2-DCE ND VC ND TCLP VOCs PCE 400 ug/Kg
SW-2 (7.5') cis-1,2-Dichloroethene 250 J ug/Kg Methylene chloride 370 B ug/Kg Tetrachloroethene 3,200 ug/Kg Trichloroethene 98 J ug/Kg
B-27 8'-9' 12'-13' PID 6,820 573 Total VOCs PCE 34,000 ug/Kg 2,000 ug/Kg TCE 53 ug/Kg 17 ug/Kg cis-1,2-DCE 6 ug/Kg 6 ug/Kg trans-1,2-DCE ND ND VC ND ND TCLP VOCs PCE 28,000 ug/Kg 83 ug/Kg TCE 5.8 ug/Kg ND
B-29 8'-10.6' PID 2.5 Total VOCs PCE 310 ug/Kg TCE 15 ug/Kg cis-1,2-DCE 46 ug/Kg trans-1,2-DCE ND VC ND TCLP VOCs NA
B-28 10'-11' 12'-13' PID >9,999 3,918 Total VOCs PCE 43,000 ug/Kg 54,000 ug/Kg TCE 63 ug/Kg 38 ug/Kg cis-1,2-DCE 33 ug/Kg 14 ug/Kg trans-1,2-DCE ND ND VC ND ND TCLP VOCs PCE 960 ug/Kg 2,800 ug/Kg TCE ND ND
B-33 10'-11' PID 8.9 Total VOCs PCE 280 ug/Kg TCE 76 ug/Kg cis-1,2-DCE 34 ug/Kg trans-1,2-DCE 2 ug/Kg VC ND TCLP VOCs NA
B-41 9'-10' PID 39.2 Total VOCs PCE 1,300 ug/Kg TCE 170 ug/Kg cis-1,2-DCE 260 ug/Kg trans-1,2-DCE 2 ug/Kg VC ND TCLP VOCs NA
SW-1 (8.0') Methylene chloride 2,600 B ug/Kg Tetrachloroethene 46,000 ug/Kg
B-44 1.2'-2.3' 1'-2' (Retest) 12'-14' PID 4,351 >2,000 117 Total VOCs PCE 130 ug/Kg 245 ug/Kg 490 ug/Kg TCE ND ND 140 ug/Kg cis-1,2-DCE ND NA 130 ug/Kg trans-1,2-DCE ND ND 2 ug/Kg VC ND ND ND TCLP VOCs ND ND NA
B-54 12'-14.6' PID 1.6 Total VOCs PCE 2 ug/Kg TCE 2 ug/Kg cis-1,2-DCE 21 ug/Kg trans-1,2-DCE 3 ug/Kg VC ND TCLP VOCs NA
EXTENT OF IRM SOIL EXCAVATION
1,500 GAL. CONCRETE WASTEWATER HOLDING TANK (IDENTIFIED ON PLUMBING LAYOUT PLAN)
FLOOR DRAINS AND PIPING IDENTIFIED ON PLUMBING LAYOUT PLAN
CARRIAGE CLEANTOWN 1600 PENFIELD ROAD
APPROX. LOCATION OF PCE STILL
AOC#2 (ESTIMATED EXTENT OF SOIL THAT EXCEEDS SCGs IN THE UNSATURATED ZONE)

REVISION: NO. 1 ADDRESS NYSDEC COMMENTS — BY RCN — DATE 8/8/09

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PROJECT/CLIENT: CARRIAGE CLEANTOWN REMEDIAL ALTERNATIVES ANALYSIS
SPRINGS LAND COMPANY, LLC
1600 PENFIELD ROAD
PENFIELD, NEW YORK

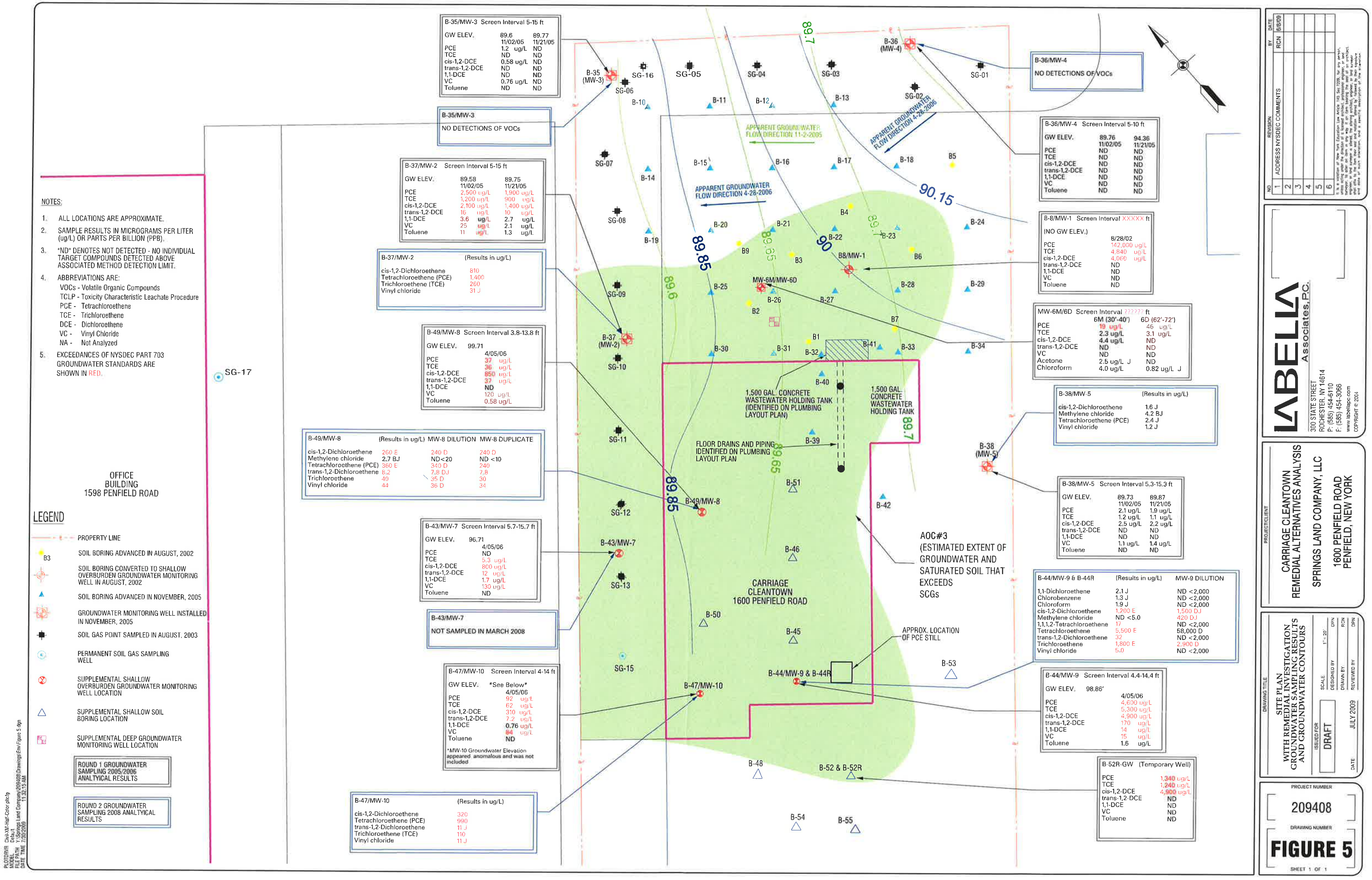
DRAWING TITLE: SITE PLAN WITH REMEDIAL INVESTIGATION SOIL SAMPLING RESULTS

ISSUED FOR: DRAFT — DATE: JULY 2009 — SCALE: 1" = 20' — DESIGNED BY: DPN — DRAWN BY: RCN — REVIEWED BY: DPN

PROJECT NUMBER 209408

DRAWING NUMBER FIGURE 4

SHEET 1 OF 1


B-35/MW-3 Screen Interval 5-15 ft
GW ELEV. 89.6 11/02/05 89.77 11/21/05
PCE 1.2 ug/L ND
TCE ND ND
cis-1,2-DCE 0.58 ug/L ND
trans-1,2-DCE ND ND
1,1-DCE ND ND
VC 0.76 ug/L ND
Toluene ND ND
B-35/MW-3
NO DETECTIONS OF VOCs
B-37/MW-2 Screen Interval 5-15 ft
GW ELEV. 89.58 11/02/05 89.75 11/21/05
PCE 2,500 ug/L 1,900 ug/L
TCE 1,200 ug/L 900 ug/L
cis-1,2-DCE 2,100 ug/L 1,400 ug/L
trans-1,2-DCE 16 ug/L 10 ug/L
1,1-DCE 3.6 ug/L 2.7 ug/L
VC 25 ug/L 2.1 ug/L
Toluene 11 ug/L 1.3 ug/L
B-37/MW-2 (Results in ug/L)
cis-1,2-Dichloroethene 810
Tetrachloroethene (PCE) 1,400
Trichloroethene (TCE) 260
Vinyl chloride 31 J
B-49/MW-8 Screen Interval 3.8-13.8 ft
GW ELEV. 99.71 4/05/06
PCE 37 ug/L
TCE 36 ug/L
cis-1,2-DCE 850 ug/L
trans-1,2-DCE 37 ug/L
1,1-DCE ND
VC 120 ug/L
Toluene 0.58 ug/L
B-49/MW-8 (Results in ug/L) MW-8 DILUTION MW-8 DUPLICATE
cis-1,2-Dichloroethene 260 E 240 D 240 D
Methylene chloride 2.7 BJ ND<20 ND <10
Tetrachloroethene (PCE) 360 E 340 D 240
trans-1,2-Dichloroethene 8.2 7.8 DJ 7.8
Trichloroethene 40 35 D 30
Vinyl chloride 44 36 D 34
B-43/MW-7 Screen Interval 5.7-15.7 ft
GW ELEV. 96.71 4/05/06
PCE ND
TCE 5.3 ug/L
cis-1,2-DCE 800 ug/L
trans-1,2-DCE 12 ug/L
1,1-DCE 1.7 ug/L
VC 130 ug/L
Toluene ND
B-43/MW-7
NOT SAMPLED IN MARCH 2008
B-47/MW-10 Screen Interval 4-14 ft
GW ELEV. *See Below* 4/05/06
PCE 92 ug/L
TCE 62 ug/L
cis-1,2-DCE 310 ug/L
trans-1,2-DCE 7.2 ug/L
1,1-DCE 0.76 ug/L
VC 84 ug/L
Toluene ND
*MW-10 Groundwater Elevation appeared anomalous and was not included
B-47/MW-10 (Results in ug/L)
cis-1,2-Dichloroethene 320
Tetrachloroethene (PCE) 990
trans-1,2-Dichloroethene 11 J
Trichloroethene (TCE) 110
Vinyl chloride 11 J
B-36/MW-4
NO DETECTIONS OF VOCs
B-36/MW-4 Screen Interval 5-10 ft
GW ELEV. 89.76 11/02/05 94.36 11/21/05
PCE ND ND
TCE ND ND
cis-1,2-DCE ND ND
trans-1,2-DCE ND ND
1,1-DCE ND ND
VC ND ND
Toluene ND ND
B-8/MW-1 Screen Interval XXXXX ft
(NO GW ELEV.) 8/28/02
PCE 142,000 ug/L
TCE 4,840 ug/L
cis-1,2-DCE 4,060 ug/L
trans-1,2-DCE ND
1,1-DCE ND
VC ND
Toluene ND
MW-6M/6D Screen Interval ?????? ft
6M (30'-40') 6D (62'-72')
PCE 19 ug/L 46 ug/L
TCE 2.3 ug/L 3.1 ug/L
cis-1,2-DCE 4.4 ug/L ND
trans-1,2-DCE ND ND
VC ND ND
Acetone 2.5 ug/L J ND
Chloroform 4.0 ug/L 0.82 ug/L J
B-38/MW-5 (Results in ug/L)
cis-1,2-Dichloroethene 1.6 J
Methylene chloride 4.2 BJ
Tetrachloroethene (PCE) 2.4 J
Vinyl chloride 1.2 J
B-38/MW-5 Screen Interval 5.3-15.3 ft
GW ELEV. 89.73 11/02/05 89.87 11/21/05
PCE 2.1 ug/L 1.9 ug/L
TCE 1.2 ug/L 1.1 ug/L
cis-1,2-DCE 2.5 ug/L 2.2 ug/L
trans-1,2-DCE ND ND
1,1-DCE ND ND
VC 1.1 ug/L 1.4 ug/L
Toluene ND ND
B-44/MW-9 & B-44R (Results in ug/L) MW-9 DILUTION
1,1-Dichloroethene 2.1 J ND <2,000
Chlorobenzene 1.3 J ND <2,000
Chloroform 1.9 J ND <2,000
cis-1,2-Dichloroethene 1,200 E 1,500 DJ
Methylene chloride ND <5.0 420 DJ
1,1,1,2-Tetrachloroethene 17 ND <2,000
Tetrachloroethene 5,500 E 58,000 D
trans-1,2-Dichloroethene 32 ND <2,000
Trichloroethene 1,800 E 2,900 D
Vinyl chloride 5.0 ND <2,000
B-44/MW-9 Screen Interval 4.4-14.4 ft
GW ELEV. 98.86' 4/05/06
PCE 4,600 ug/L
TCE 5,300 ug/L
cis-1,2-DCE 4,900 ug/L
trans-1,2-DCE 170 ug/L
1,1-DCE 14 ug/L
VC 15 ug/L
Toluene 1.6 ug/L
B-52R-GW (Temporary Well)
PCE 1,340 ug/L
TCE 1,240 ug/L
cis-1,2-DCE 4,900 ug/L
trans-1,2-DCE ND
1,1-DCE ND
VC ND
Toluene ND
APPARENT GROUNDWATER FLOW DIRECTION 11-2-2005
APPARENT GROUNDWATER FLOW DIRECTION 4-28-2006
APPARENT GROUNDWATER FLOW DIRECTION 4-28-2006
89.7
90.15
90
89.85
89.6
89.65
89.7
89.65
89.85
B-35 (MW-3)
B-36 (MW-4)
B-37 (MW-2)
B-38 (MW-5)
SG-01
SG-02
SG-03
SG-04
SG-05
SG-06
SG-07
SG-08
SG-09
SG-10
SG-11
SG-12
SG-13
SG-15
SG-16
SG-17
B-10
B-11
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B-32
B-33
B-34
B-39
B-40
B-41
B-42
B-43/MW-7
B-45
B-46
B-47/MW-10
B-48
B-49/MW-8
B-50
B-51
B-52 & B-52R
B-53
B-54
B-55
B-44/MW-9 & B-44R
B8/MW-1
MW-6M/MW-6D
B1
B2
B3
B4
B5
B6
B7
B9
1,500 GAL. CONCRETE WASTEWATER HOLDING TANK (IDENTIFIED ON PLUMBING LAYOUT PLAN)
1,500 GAL. CONCRETE WASTEWATER HOLDING TANK
FLOOR DRAINS AND PIPING IDENTIFIED ON PLUMBING LAYOUT PLAN
CARRIAGE CLEANTOWN 1600 PENFIELD ROAD
AOC#3 (ESTIMATED EXTENT OF GROUNDWATER AND SATURATED SOIL THAT EXCEEDS SCGs
APPROX. LOCATION OF PCE STILL
OFFICE BUILDING 1598 PENFIELD ROAD
NOTES:
1. ALL LOCATIONS ARE APPROXIMATE.
2. SAMPLE RESULTS IN MICROGRAMS PER LITER (ug/L) OR PARTS PER BILLION (PPB).
3. "ND" DENOTES NOT DETECTED - NO INDIVIDUAL TARGET COMPOUNDS DETECTED ABOVE ASSOCIATED METHOD DETECTION LIMIT.
4. ABBREVIATIONS ARE:
VOCs - Volatile Organic Compounds
TCLP - Toxicity Characteristic Leachate Procedure
PCE - Tetrachloroethene
TCE - Trichloroethene
DCE - Dichloroethene
VC - Vinyl Chloride
NA - Not Analyzed
5. EXCEEDANCES OF NYSDEC PART 703 GROUNDWATER STANDARDS ARE SHOWN IN RED.
LEGEND
PROPERTY LINE
B3 SOIL BORING ADVANCED IN AUGUST, 2002
SOIL BORING CONVERTED TO SHALLOW OVERBURDEN GROUNDWATER MONITORING WELL IN AUGUST, 2002
SOIL BORING ADVANCED IN NOVEMBER, 2005
GROUNDWATER MONITORING WELL INSTALLED IN NOVEMBER, 2005
SOIL GAS POINT SAMPLED IN AUGUST, 2003
PERMANENT SOIL GAS SAMPLING WELL
SUPPLEMENTAL SHALLOW OVERBURDEN GROUNDWATER MONITORING WELL LOCATION
SUPPLEMENTAL SHALLOW SOIL BORING LOCATION
SUPPLEMENTAL DEEP GROUNDWATER MONITORING WELL LOCATION
ROUND 1 GROUNDWATER SAMPLING 2005/2006 ANALYTICAL RESULTS
ROUND 2 GROUNDWATER SAMPLING 2008 ANALYTICAL RESULTS
PLOTDRVR Clr-XM-Half-Color.pltcfg
MODEL Default
FILE PATH Y:\Springs Land Company\209408\Drawings\Env\Figure 5.dgn
DATE TIME 7/20/2009 11:32:15 AM
NO REVISION BY DATE
1 ADDRESS NYSDEC COMMENTS RCN 6/8/09
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PROJECT/CLIENT
CARRIAGE CLEANTOWN REMEDIAL ALTERNATIVES ANALYSIS
SPRINGS LAND COMPANY, LLC
1600 PENFIELD ROAD PENFIELD, NEW YORK
DRAWING TITLE
SITE PLAN WITH REMEDIAL INVESTIGATION GROUNDWATER SAMPLING RESULTS AND GROUNDWATER CONTOURS
SCALE 1" = 20'
DESIGNED BY DPN
DRAWN BY RCN
REVIEWED BY DPN
ISSUED FOR DRAFT
DATE JULY 2009
PROJECT NUMBER 209408
DRAWING NUMBER
FIGURE 5
SHEET 1 OF 1

OFFICE
BUILDING
1598 PENFIELD ROAD

EXTENT OF IRM SOIL REMOVAL

PROPOSED ADDITIONAL WORST-CASE SCENARIO REMOVAL AREA

PROPOSED ADDITIONAL SOIL REMOVAL AREAS FROM UNSATURATED ZONE SOILS

1,500 GAL. CONCRETE WASTEWATER HOLDING TANK (IDENTIFIED ON PLUMBING LAYOUT PLAN)

FLOOR DRAINS AND PIPING IDENTIFIED ON PLUMBING LAYOUT PLAN

EXISTING BUILDING

PROPOSED BUILDING FOOTPRINT

APPROX. LOCATION OF PCE STILL

CARRIAGE CLEANTOWN 1600 PENFIELD ROAD

B-35 (MW-3)
B-36 (MW-4)
B-37 (MW-2)
B-38 (MW-5)
B-43/MW-7
B-44/MW-9 & B-44R
B-47/MW-10
B-49/MW-8
MW-6M/ MW-6D
B8/MW-1
BS-1
BS-2
SW-1
SW-2
SW-3
SW-4
SG-01
SG-02
SG-03
SG-04
SG-05
SG-06
SG-07
SG-08
SG-09
SG-10
SG-11
SG-12
SG-13
SG-15
SG-16
B-10
B-11
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B-33
B-34
B-39
B-40
B-41
B-42
B-45
B-46
B-48
B-50
B-51
B-52 & B-52R
B-53
B-54
B-55
B1
B2
B3
B4
B5
B6
B7
B9

NOTE:
ALL LOCATIONS ARE APPROXIMATE.

LEGEND

- PROPERTY LINE
- B3 — SOIL BORING ADVANCED IN AUGUST, 2002
- SOIL BORING CONVERTED TO SHALLOW OVERBURDEN GROUNDWATER MONITORING WELL IN AUGUST, 2002
- SOIL BORING ADVANCED IN NOVEMBER, 2005
- GROUNDWATER MONITORING WELL INSTALLED IN NOVEMBER, 2005
- SOIL GAS POINT SAMPLED IN AUGUST, 2003
- PERMANENT SOIL GAS SAMPLING WELL
- SUPPLEMENTAL SHALLOW OVERBURDEN GROUNDWATER MONITORING WELL LOCATION
- SUPPLEMENTAL SHALLOW SOIL BORING LOCATION
- SUPPLEMENTAL DEEP GROUNDWATER MONITORING WELL LOCATION
- IRM SOIL REMOVAL AREA
- PROPOSED ADDITIONAL REMOVAL OF UNSATURATED ZONE IMPACTS
- PROPOSED ADDITIONAL WORST-CASE SCENARIO REMOVAL AREA

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MODEL: Model
FILE PATH: Y:\Springs Land Company\209408\Drawings\Env\Figure 6.dgn
DATE TIME: 7/31/2009 10:23:40 AM

NO	REVISION	BY	DATE
1	ADDRESS NYSDEC COMMENTS	RCN	8/8/09
2			
3			
4			
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6			

It is a violation of New York Education Law Article 145 Sec 7209, for any person, unless acting under the direction of a licensed architect, professional engineer, or land surveyor, to alter an item in any way. If an item bearing the seal of an architect, professional engineer, or land surveyor is altered, the altering architect, engineer or land surveyor must affix to the item his or her seal and the notation "altered by" followed by his or her signature and date. In such instance, only a specific description of the alteration may be required.

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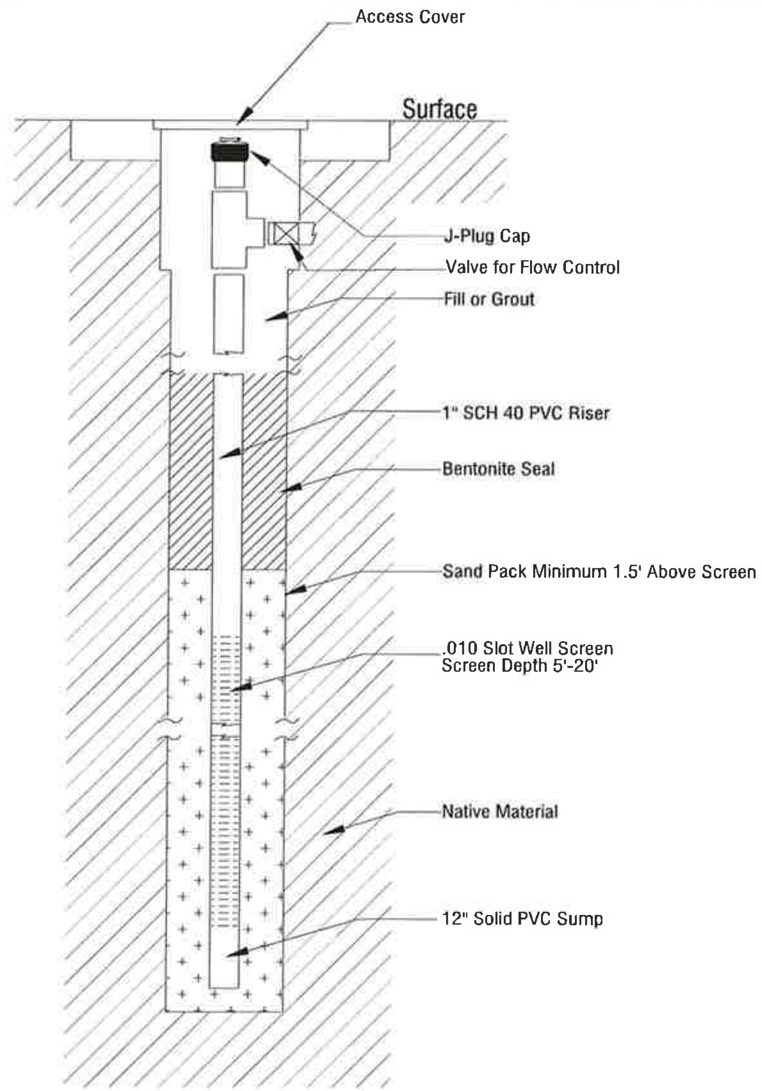
PROJECT/CLIENT
CARRIAGE CLEANTOWN
REMEDIAL ALTERNATIVES ANALYSIS
SPRINGS LAND COMPANY, LLC
1600 PENFIELD ROAD
PENFIELD, NEW YORK

DRAWING TITLE
SITE PLAN
PROPOSED UNSATURATED ZONE
SOIL REMOVAL ALTERNATIVE

ISSUED FOR: DRAFT
SCALE: 1" = 20'
DESIGNED BY: DPN
DRAWN BY: RCN
REVIEWED BY: DPN
DATE: JULY 2009

PROJECT NUMBER
209408
DRAWING NUMBER
FIGURE 6
SHEET 1 OF 1



DETAIL

LEGEND

- PROPERTY LINE
- SOIL BORING ADVANCED IN AUGUST, 2002
- SOIL BORING CONVERTED TO SHALLOW OVERBURDEN GROUNDWATER MONITORING WELL IN AUGUST, 2002
- SOIL BORING ADVANCED IN NOVEMBER, 2005
- GROUNDWATER MONITORING WELL INSTALLED IN NOVEMBER, 2005
- SOIL GAS POINT SAMPLED IN AUGUST, 2003
- PERMANENT SOIL GAS SAMPLING WELL
- SUPPLEMENTAL SHALLOW OVERBURDEN GROUNDWATER MONITORING WELL LOCATION
- SUPPLEMENTAL SHALLOW SOIL BORING LOCATION
- SUPPLEMENTAL DEEP GROUNDWATER MONITORING WELL LOCATION
- ESTIMATED EXTENT OF GROUNDWATER THAT EXCEEDS SCGs
- INJECTION POINT

NOTE:

ALL LOCATIONS ARE APPROXIMATE.

NO	REVISION	BY	DATE
1	ADDRESS NYSDEC COMMENTS	RCN	8/8/09
2			
3			
4			
5			
6			

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PROJECT/CLIENT

CARRIAGE CLEANTOWN
REMEDIAL ALTERNATIVES ANALYSIS

SPRINGS LAND COMPANY, LLC

1600 PENFIELD ROAD
PENFIELD, NEW YORK

DRAWING TITLE

SITE PLAN
WITH IN-SITU TREATMENT
SYSTEM ALTERNATIVE

ISSUED FOR	DRAFT
DATE	JULY 2009
SCALE	1" = 30'
DESIGNED BY	DPN
DRAWN BY	RCN
REVIEWED BY	DPN

PROJECT NUMBER
209408

DRAWING NUMBER
FIGURE 7

SHEET 1 OF 1

PLOTDRVR Civil-XM-Half-Color.pltcfg
MODEL Default
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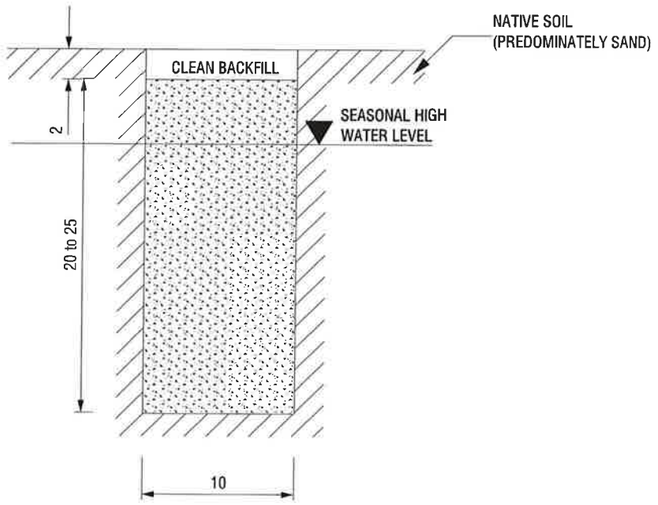
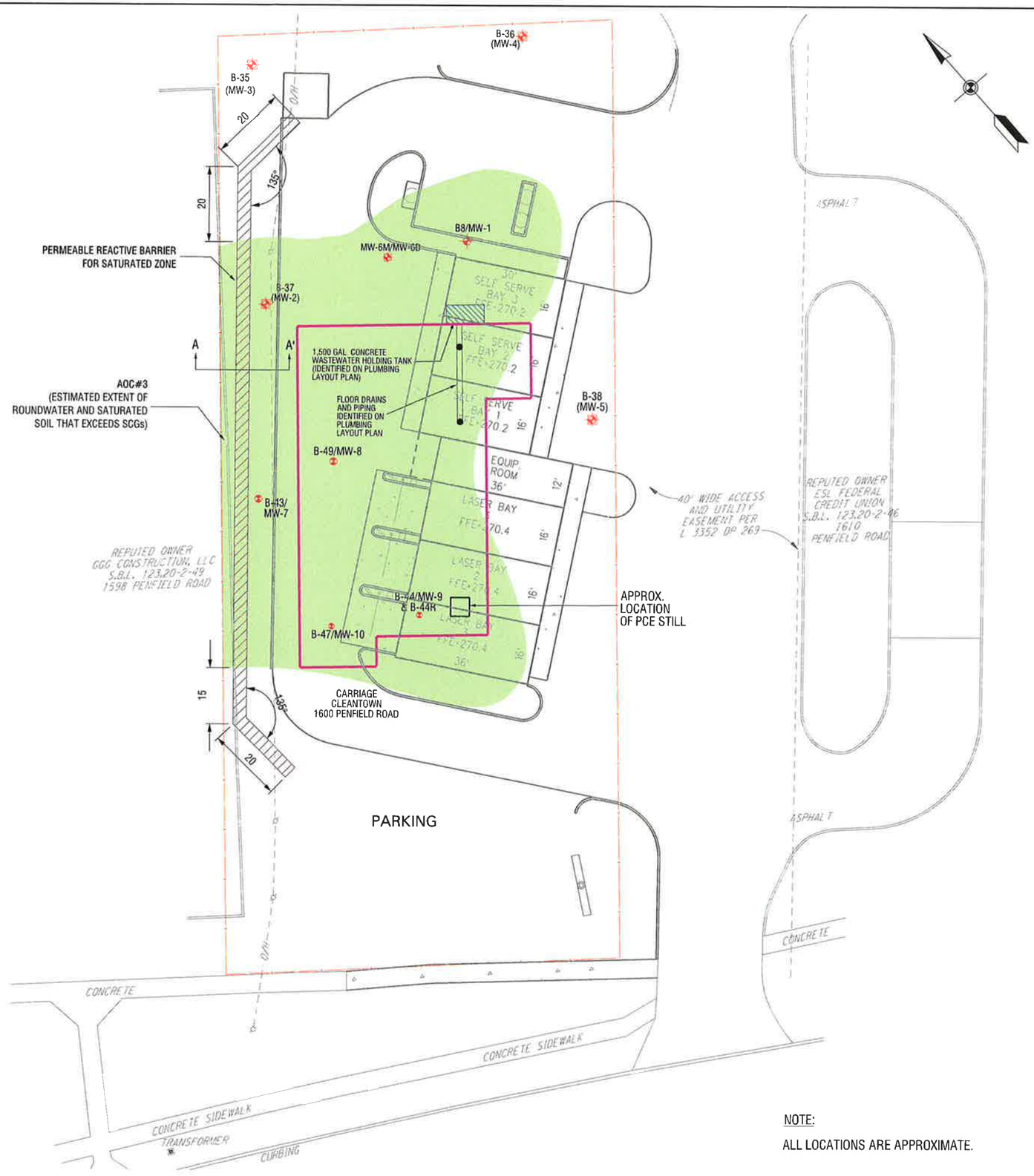
DATE TIME 7/31/2009 1:16:23 PM



CROSS SECTION A-A'



LEGEND

- PROPERTY LINE
- B3 — SOIL BORING ADVANCED IN AUGUST, 2002
- SOIL BORING CONVERTED TO SHALLOW OVERBURDEN GROUNDWATER MONITORING WELL IN AUGUST, 2002
- SOIL BORING ADVANCED IN NOVEMBER, 2005
- GROUNDWATER MONITORING WELL INSTALLED IN NOVEMBER, 2005
- SOIL GAS POINT SAMPLED IN AUGUST, 2003
- PERMANENT SOIL GAS SAMPLING WELL
- SUPPLEMENTAL SHALLOW OVERBURDEN GROUNDWATER MONITORING WELL LOCATION
- SUPPLEMENTAL SHALLOW SOIL BORING LOCATION
- SUPPLEMENTAL DEEP GROUNDWATER MONITORING WELL LOCATION
- ESTIMATED EXTENT OF GROUNDWATER THAT EXCEEDS SCGs

NOTE:

ALL LOCATIONS ARE APPROXIMATE.

NO.	REVISION	BY	DATE
1	ADDRESS NYSDEC COMMENTS	RCN	6/8/09
2			
3			
4			
5			
6			

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CARRIAGE CLEANTOWN
REMEDIAL ALTERNATIVES ANALYSIS

SPRINGS LAND COMPANY, LLC

1600 PENFIELD ROAD
PENFIELD, NEW YORK

DRAWING TITLE

SITE PLAN
WITH PERMABLE REACTIVE
BARRRIER ALTERNATIVE FOR
SATURATED ZONE

ISSUED FOR	DRAFT
SCALE	1" = 30'
DESIGNED BY	DPN
DRAWN BY	RCN
REVIEWED BY	DPN
DATE:	JULY 2009

PROJECT NUMBER
209408

DRAWING NUMBER
FIGURE 8

SHEET 1 OF 1

PLOTDRVR GW-XX-Half-Color.pltcfg
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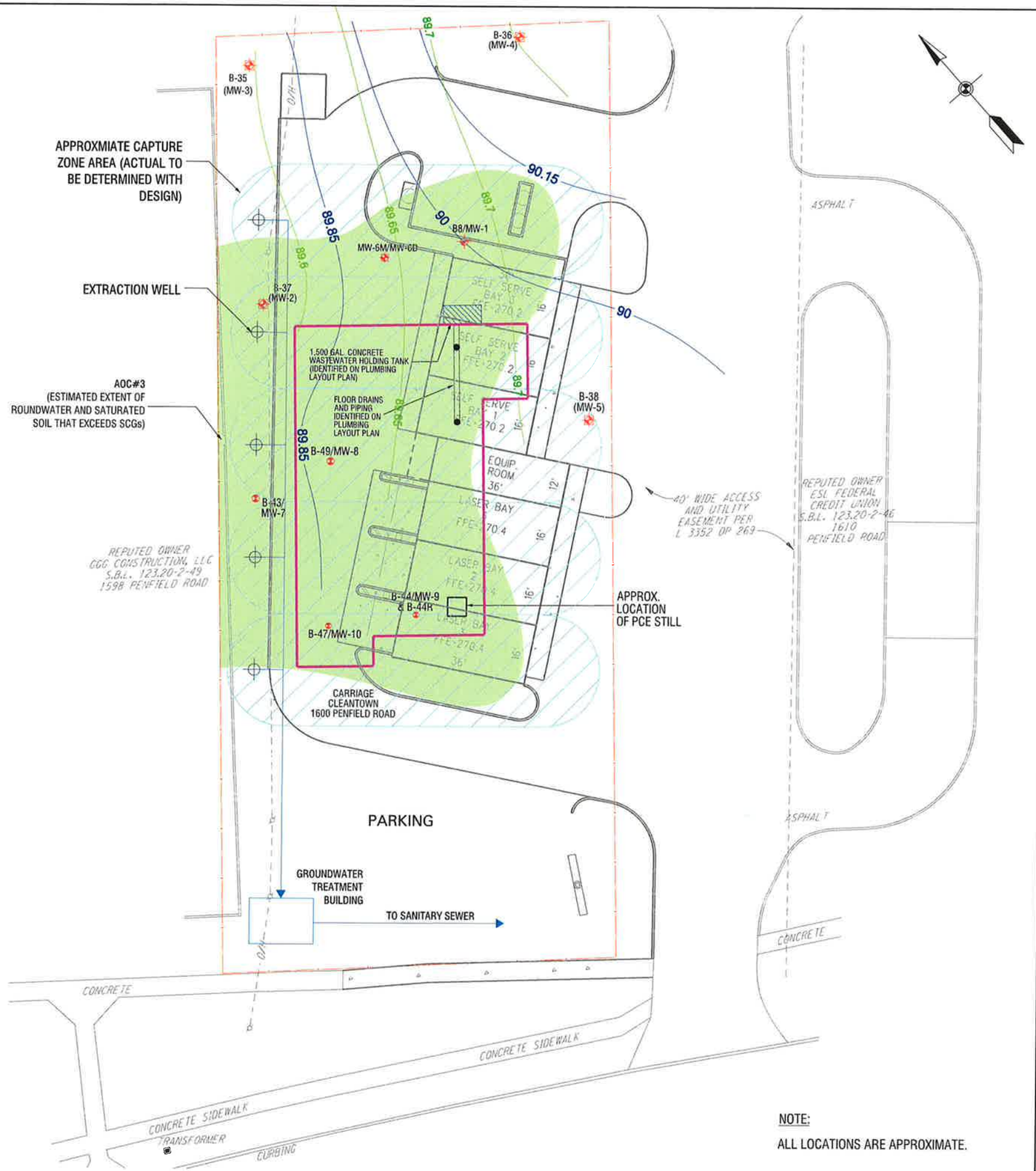

LEGEND

- PROPERTY LINE
- B3 — SOIL BORING ADVANCED IN AUGUST, 2002
- SOIL BORING CONVERTED TO SHALLOW OVERBURDEN GROUNDWATER MONITORING WELL IN AUGUST, 2002
- SOIL BORING ADVANCED IN NOVEMBER, 2005
- GROUNDWATER MONITORING WELL INSTALLED IN NOVEMBER, 2005
- SOIL GAS POINT SAMPLED IN AUGUST, 2003
- PERMANENT SOIL GAS SAMPLING WELL
- SUPPLEMENTAL SHALLOW OVERBURDEN GROUNDWATER MONITORING WELL LOCATION
- SUPPLEMENTAL SHALLOW SOIL BORING LOCATION
- SUPPLEMENTAL DEEP GROUNDWATER MONITORING WELL LOCATION
- ESTIMATED EXTENT OF GROUNDWATER THAT EXCEEDS SCGs
- EXTRACTION WELL

NOTE:

ALL LOCATIONS ARE APPROXIMATE.

NO	REVISION	BY	DATE
1	ADDRESS NYSDEC COMMENTS	RCN	8/6/09
2			
3			
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PROJECT/CLIENT
CARRIAGE CLEANTOWN
REMEDIAL ALTERNATIVES ANALYSIS
SPRINGS LAND COMPANY, LLC
1600 PENFIELD ROAD
PENFIELD, NEW YORK

DRAWING TITLE
SITE PLAN WITH GROUNDWATER PUMP AND TREAT ALTERNATIVE

SCALE	1" = 30'
DESIGNED BY	DPN
DRAWN BY	RCN
REVIEWED BY	DPN
ISSUED FOR	DRAFT
DATE	JULY 2009

PROJECT NUMBER
209408

DRAWING NUMBER
FIGURE 9

SHEET 1 OF 1

PLOTDRVR Dwl-XM-Half-Color.pltg
MODEL Default
FILE PATH Y:\Springs Land Company\209408\Drawings\Env\Figure 8.dgn
DATE TIME 7/31/2009 10:44:27 AM

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LaBella Associates, P.C.
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Rochester, New York 14614

Tables

Table 1
AOC #1: Concrete Wastewater Holding Tank Area
Site Management with Institutional Controls

Remedial Alternatives Analysis

Former Carriage Cleaners
1600 Penfield Road
Penfield, New York

Professional Costs	
Environmental Easement	$ 1,000
Site Management Plan (including HASP)	$ 3,500
Total Professional Cost	*$ 4,500*
Estimated Regulatory Fees (est. 75% of Professional Cost)	$ 3,375
20% Contingency	**$ 1,575**
Total Estimated Cost	**$ 9,450**

Table 2
AOC #1: Concrete Wastewater Holding Tank Area
Soil Removal and Disposal

Remedial Alternatives Analysis

Former Carriage Cleaners
1600 Penfield Road
Penfield, New York

Professional Costs		
Remedial Work Plan	$	2,500
Remedial Oversight	$	4,000
Environmental Easement	$	1,000
Site Management Plan (including HASP)	$	3,500
Reporting to DEC	$	3,500
Total Professional Cost	*$*	*14,500*
Estimated Regulatory Fees (est. 75% of Professional Cost)	$	10,875
Subcontractor Costs		
Equipment Mobilization and Demobilization	$	1,000
Decontamination pad	$	500
Construct contaminated soil staging areas	$	750
Soil Excavation, Segregation and Staging (est. 120 cy)	$	2,500
Import, Install and Compact clean backfill (est. 120 cy)	$	4,000
Load Soil for Disposal	$	1,000
Transport and Dispose of Non-hazardous Soils (est. 100 tons)	$	7,500
Transport, and Dispose of Hazardous Soil (est. 100 tons)	$	20,000
Transport and Dispose of Hazardous Water (est. 3,000-gallons)	$	6,000
Removal of Construction Facilities	$	1,000
Organic Vapor Control	$	1,000
Taxes	$	3,620
Total Subcontractor Cost	*$*	*48,870*
Laboratory Cost		
Characterization/Contained-In (est. 10 samples for total/TCLP halogenated VOCs)	$	3,000
Confirmatory Soil Samples (est. 5 samples for halogenated VOCs)	$	750
Total Laboratory Cost	*$*	*3,750*
20% Contingency	**$**	**15,599**
Total Estimated Cost	**$**	**93,594**

Table 3
AOC #2: Former PCE Still Area
Site Management with Institutional Controls

Remedial Alternatives Analysis

Former Carriage Cleaners
1600 Penfield Road
Penfield, New York

Professional Costs	
Environmental Easement	$ 1,000
Site Management Plan (including HASP)	$ 3,500
Total Professional Cost	*$ 4,500*
Estimated Regulatory Fees (est. 75% of Professional Cost)	$ 3,375
20% Contingency	**$ 1,575**
Total Estimated Cost	**$ 9,450**

Table 4
AOC #2: Former PCE Still Area
Soil Removal and Disposal

Remedial Alternatives Analysis

Former Carriage Cleaners
1600 Penfield Road
Penfield, New York

Professional Costs		
Remedial Work Plan	$	2,500
Remedial Oversight	$	4,000
Environmental Easement	$	1,000
Site Management Plan (including HASP)	$	3,500
Reporting to DEC	$	3,500
Total Professional Cost	*$*	*14,500*
Estimated Regulatory Fees (est. 75% of Professional Cost)	$	10,875
Subcontractor Costs		
Equipment Mobilization and Demobilization	$	1,000
Decontamination pad	$	500
Construct contaminated soil staging areas	$	750
Soil Excavation, Segregation and Staging (est. 150 cy)	$	3,000
Import, Install and Compact clean backfill (est. 150 cy)	$	5,500
Load Soil for Disposal	$	1,000
Transport and Dispose of Non-hazardous Soils (est. 240 tons)	$	20,000
Removal of Construction Facilities	$	1,000
Organic Vapor Control	$	1,000
Taxes	$	2,700
Total Subcontractor Cost	*$*	*36,450*
Laboratory Cost		
Characterization/Contained-In (est. 10 samples for total/TCLP halogenated VOCs)	$	3,000
Confirmatory Soil Samples (est. 6 samples for halogenated VOCs)	$	900
Total Laboratory Cost	*$*	*3,900*
20% Contingency	**$**	**13,145**
Total Estimated Cost	**$**	**78,870**

Table 5
AOC #3: Groundwater/Saturated Zone Contamination
Site Management with Institutional Controls

Remedial Alternatives Analysis

Former Carriage Cleaners
1600 Penfield Road
Penfield, New York

Professional Costs	
Environmental Easement	$ 1,000
Site Management Plan (including HASP)	$ 3,500
Total Professional Cost	*$ 4,500*
Estimated Regulatory Fees (est. 75% of Professional Cost)	$ 3,375
20% Contingency	**$ 1,575**
Total Estimated Cost	**$ 9,450**

Table 6
AOC #3: Groundwater/Saturated Zone Contamination
Injection System

Remedial Alternatives Analysis

Former Carriage Cleaners
1600 Penfield Road
Penfield, New York

Professional Costs		
Remedial Design Work Plan	$	6,500
System Installation Oversight	$	17,500
Assistance with Bulk Chemical Deliveries*	$	5,000
Long-Term Groundwater Monitoring (est 5 yrs)*	$	20,000
Environmental Easement	$	1,000
Site Management Plan (including HASP)	$	3,500
Reporting to DEC	$	10,000
Total Professional Cost	*$*	*63,500*
Estimated Regulatory Fees (est. 75% of Professional Cost)	$	47,625
Subcontractor Costs		
Equipment Mobilization and Demobilization	$	2,000
Decontamination pad	$	500
Construct contaminated soil staging areas	$	750
Installation of Injection System Points (est. 52 pts.)	$	25,000
Trenching for System Installation (est. 550 ft.)	$	3,000
Materials and Labor for horizontal piping	$	5,500
Curb boxes for injection pts.	$	7,500
Mixc. Fittings (valves, tees, etc.)	$	5,000
Load Soil for Disposal	$	1,000
Transport and Dispose of Non-hazardous Soils (est. 160 tons)	$	12,000
Removal of Construction Facilities	$	1,000
Organic Vapor Control	$	1,000
Taxes	$	5,140
Total Subcontractor Cost	*$*	*69,390*
Treatment Chemical Cost (assumes sodium permanganate)		
Permanganate (est. 17,000 lbs per event with 5 events)*	$	185,000
Shipping*	$	8,500
Total Treatment Chemical Cost	*$*	*193,500*
Laboratory Cost		
Bench Scale Study	$	15,000
Characterization/Contained-In (est. 10 samples for total/TCLP halogenated VOCs)	$	3,000
Confirmatory Soil Samples (est. 6 samples for halogenated VOCs)	$	900
Groundwater Sampling (est. 7 wells sampled semi-annually for 5 years)*	$	12,000
Total Laboratory Cost	*$*	*30,900*
20% Contingency	**$**	**80,983**
Total Estimated Cost	**$**	**485,898**

**These items are considered "Annual" costs and thus these cost are presented as present worth costs over the life of the project (5 years).*

Table 7
AOC #3: Groundwater/Saturated Zone Contamination
Extensive Saturated Zone Soil and Groundwater Removal

Remedial Alternatives Analysis

Former Carriage Cleaners
1600 Penfield Road
Penfield, New York

Professional Costs		
Remedial Work Plan	$	3,500
Remedial Oversight	$	20,000
Environmental Easement	$	1,000
Site Management Plan (including HASP)	$	3,500
Reporting to DEC	$	3,500
Total Professional Cost	*$*	*31,500*
Estimated Regulatory Fees (est. 75% of Professional Cost)	$	23,625
Subcontractor Costs		
Equipment Mobilization and Demobilization	$	1,000
Decontamination pad	$	500
Construct contaminated soil staging areas	$	750
Soil Excavation, Segregation and Staging (est. 2700 cy)	$	50,000
Import, Install and Compact clean backfill (est. 2700 cy)	$	95,000
Load Soil for Disposal	$	5,000
Transport and Dispose of Non-hazardous Soils (est. 3,020 tons)	$	230,000
Transport and Dispose of Hazardous Soils (est. 1,300 tons)	$	250,000
Transport and Dispose of Hazardous Water (est. 70,000-gallons)	$	140,000
Removal of Construction Facilities	$	1,000
Organic Vapor Control	$	1,000
Taxes	*$*	*61,940*
Total Subcontractor Cost	$	836,190
Laboratory Cost		
Characterization/Contained-In (est. 40 samples for total/TCLP halogenated VOCs)	$	12,000
Confirmatory Soil Samples (est. 25 samples for halogenated VOCs)	$	3,750
Total Laboratory Cost	*$*	*15,750*
20% Contingency	**$**	**181,413**
Total Estimated Cost	**$**	**1,088,478**

Table 8
AOC #3: Groundwater/Saturated Zone Contamination
Permeable Reactive Barrier

Remedial Alternatives Analysis

Former Carriage Cleaners
1600 Penfield Road
Penfield, New York

Professional Costs			
	Remedial Design Work Plan	$	6,500
	PRB Installation Oversight	$	17,500
	Long-Term Groundwater Monitoring (est 30 yrs)*	$	120,000
	Environmental Easement	$	1,000
	Site Management Plan (including HASP)	$	3,500
	Reporting to DEC	$	20,000
	Total Professional Cost	*$*	*168,500*
Estimated Regulatory Fees (est. 75% of Professional Cost)		$	126,375
Subcontractor Costs			
	Equipment Mobilization and Demobilization	$	2,000
	Decontamination pad	$	500
	Construct contaminated soil staging areas	$	750
	Trenching for PRB Installation (est. 140 ft.)	$	10,000
	Installation of PRB (materials and labor, assumes ZVI)	$	475,000
	Load Soil for Disposal	$	1,000
	Transport and Dispose of Non-hazardous Soils (est. 2,080 tons)	$	150,000
	Transport and Dispose of Hazardous Waters (est. 5,000-gallons)	$	10,000
	Removal of Construction Facilities	$	1,000
	Organic Vapor Control	$	1,000
	Taxes	$	52,100
	Total Subcontractor Cost	*$*	*703,350*
Laboratory Cost			
	Bench Scale Study	$	7,500
	Characterization/Contained-In (est. 10 samples for total/TCLP halogenated VOCs)	$	3,000
	Confirmatory Soil Samples (est. 6 samples for halogenated VOCs)	$	900
	Groundwater Sampling (est. 7 wells sampled semi-annually for 30 years)*	$	31,500
	Total Laboratory Cost	*$*	*42,900*
	20% Contingency	**$**	**208,225**
Total Estimated Cost		**$**	**1,249,350**

**These items are considered "annual" costs and thus have been presented as present worth cost over the life of the project (30 yrs).*

Table 9
AOC #3: Groundwater/Saturated Zone Contamination
Groundwater Pump & Treat

Remedial Alternatives Analysis

Former Carriage Cleaners
1600 Penfield Road
Penfield, New York

Professional Costs		
Remedial Design Work Plan	$	10,000
System Installation Oversight	$	17,500
Long-Term Groundwater Monitoring (est 30 yrs)*	$	120,000
Environmental Easement	$	1,000
Site Management Plan (including HASP)	$	3,500
Reporting to DEC	$	20,000
Total Professional Cost	*$*	*172,000*
Estimated Regulatory Fees (est. 75% of Professional Cost)	$	129,000
Subcontractor Costs		
Equipment Mobilization and Demobilization	$	2,000
Decontamination pad	$	500
Construct contaminated soil staging areas	$	750
Installation and Development of Extraction Wells (est. 5 well)	$	25,000
Trenching for System Installation (est. 250 ft.)	$	1,500
Materials and Labor for horizontal piping	$	5,500
Mixc. Fittings (valves, tees, etc.)	$	5,000
Load Soil for Disposal	$	1,000
Transport and Dispose of Non-hazardous Soils (est. 160 tons)	$	12,000
Removal of Construction Facilities	$	1,000
Organic Vapor Control	$	1,000
Taxes	$	4,420
Total Subcontractor Cost	*$*	*59,670*
Treatment System Components		
Extraction Well Pumps	$	3,000
Misc. Pump Accessories	$	1,500
Equilization Tank (1,000-gal.)	$	1,000
Air Stripper	$	30,000
Vapor Phase Carbon (est. 2 55-gallon drums)	$	9,000
Water Phase Carbon (est. 2 55-gallon drums)	$	10,500
Intersystem Piping and Misc.	$	500
Valves, gauges, misc.	$	2,500
Enclosure for System	$	10,000
Allowance for Shipping (est. 15% of system cost)	$	8,700
Total System Component Cost	*$*	*76,700*
System Maintenance and Operational Costs		
Monthly System Checks & Sampling (est. $5,00/yr x 30 yrs.)*	$	150,000
Sewer Use (est. $1,200/yr for 30 years)*	$	36,000
Misc. System Repairs (est. $500/yr for 30 yrs)*	$	15,000
Carbon Drum Change-outs (est. 1/yr for 30 yrs)*	$	150,000
Electricity (est. $300/month for 30 yrs)*	$	108,000
Total O&M Cost	*$*	*459,000*
Laboratory Cost		
Characterization/Contained-In (est. 10 samples for total/TCLP halogenated VOCs)	$	3,000
Confirmatory Soil Samples (est. 6 samples for halogenated VOCs)	$	900
Groundwater Sampling (est. 7 wells sampled semi-annually for 30 years)*	$	31,500
Total Laboratory Cost	*$*	*35,400*
20% Contingency	**$**	**186,354**
Total Estimated Cost	**$**	**1,118,124**

*These items are considered "annual" costs and thus have been presented as present worth cost over the life of the project (30 yrs).