PROPOSED REMEDIAL ACTION PLAN

Quick and Clean Cleaners
State Superfund Project
Cedarhurst, Nassau County
Site No. 130198
July 2021

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

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SECTION 1: SUMMARY AND PURPOSE OF THE PROPOSED PLAN

The New York State Department of Environmental Conservation (the Department), in consultation with the New York State Department of Health (NYSDOH), is proposing a remedy for the above referenced site. The disposal of hazardous wastes at the site has resulted in threats to public health and the environment that would be addressed by the remedy proposed by this Proposed Remedial Action Plan (PRAP). The disposal of hazardous wastes at this site, as more fully described in Section 6 of this document, has contaminated various environmental media. The proposed remedy is intended to attain the remedial action objectives identified for this site for the protection of public health and the environment. This PRAP identifies the preferred remedy, summarizes the other alternatives considered, and discusses the reasons for the preferred remedy.

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

The Department has issued this document in accordance with the requirements of New York State Environmental Conservation Law and Title 6 of the Official Compilation of Codes, Rules and Regulations of the State of New York; (6 NYCRR) Part 375. This document is a summary of the information that can be found in the site-related reports and documents in the document repositories identified below.

SECTION 2: CITIZEN PARTICIPATION

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

Peninsula Public Library
Attn: Reference Desk
280 Central Ave
Lawrence, NY 11559
Phone: 516-239-3262

New York State Dept. of Environmental Conservation
Attn: Mr. Bill Fonda
50 Circle Road
Stony Brook, NY 11790-3409
Phone: 613-444-0350

A public comment period has been set from: July 14, 2021 to August 13, 2021

A public meeting is scheduled for the following date: August 5, 2021 at 7:00 PM

Public meeting location: Cedarhurst Village Hall, 200 Cedarhurst Avenue, Cedarhurst, NY 11516

At the meeting, the findings of the remedial investigation (RI) and the feasibility study (FS) will be presented along with a summary of the proposed remedy. After the presentation, a question-and-answer period will be held, during which verbal or written comments may be submitted on the PRAP.

Written comments may also be sent through to:

Caroline Jalanti
NYS Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway
Albany, NY 12233
caroline.jalanti@dec.ny.gov

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

Receive Site Citizen Participation Information By Email

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

SECTION 3: SITE DESCRIPTION AND HISTORY

Location: The Quick and Clean Dry Cleaners site is 0.318 acres in size and located in a suburban

portion of Nassau County. The site is located at 380 Rockaway Turnpike, approximately 200 yards north of Burnside Avenue in the Town of Hempstead.

Site Features: The main feature of the site is one large building with paved parking to the west and north fully covering the remainder of the lot.

Current Zoning and Land Use: The site is zoned commercial, and an urgent care medical facility operates within the on-site building. The adjacent and surrounding parcels are zoned a combination of commercial and residential.

Past Use of the Site: The site was historically used as a dry-cleaning facility. Prior use of dry-cleaning fluids or solvents, such as tetrachloroethene (PCE) have led to site contamination. Contaminated soil was excavated under the direction of the Nassau County Department of Health in 1992. Soil, groundwater and soil vapor have been impacted. The site was classified as a Class 2 inactive hazardous waste disposal site in 2011.

Site Geology and Hydrogeology: Subsurface materials at the site consist of medium to coarse sand and gravel for the upper 10 feet followed by fine to medium sand to 18 feet below grade. A clay unit, present from 34 feet to 52 feet below grade, was documented during subsurface investigations. Groundwater is approximately four feet below grade and flows to the north-northwest toward Head of Bay, located approximately one quarter mile from the site. There are no downgradient water supply wells between the site and the groundwater discharge point of Head of Bay.

A site location map is attached as Figure 1. A site map is presented as Figure 2.

SECTION 4: LAND USE AND PHYSICAL SETTING

The Department may consider the current, intended, and reasonably anticipated future land use of the site and its surroundings when evaluating a remedy for soil remediation. For this site, alternatives (or an alternative) that restrict(s) the use of the site to commercial use (which allows for industrial use) as described in Part 375-1.8(g) are/is being evaluated in addition to an alternative which would allow for unrestricted use of the site.

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

SECTION 5: ENFORCEMENT STATUS

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

The PRPs for the site, documented to date, include:

380 Rockaway Turnpike Realty Corp.

The Department and 380 Rockaway Turnpike Realty Corp. entered into a Consent Order on March 23, 2012. The Order obligates the responsible party to implement a full remedial program.

SECTION 6: SITE CONTAMINATION

6.1: Summary of the Remedial Investigation

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

The following general activities are conducted during an RI:

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

The analytical data collected on this site includes data for:

- groundwater
- soil
- soil vapor
- indoor air
- sub-slab vapor

6.1.1: Standards, Criteria, and Guidance (SCGs)

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

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

6.1.2: RI Results

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

tetrachloroethene (PCE)	vinyl chloride (VC)
trichloroethene (TCE)	cis-1,2-dichloroethylene (cis-DCE)
perfluorooctanoic acid (PFOA)	perfluorooctanesulfonic acid (PFOS)

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

- groundwater
- soil vapor intrusion

6.2: Interim Remedial Measures

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

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

Sub-slab Depressurization System

Based on the results of sampling conducted on-site, it was determined that indoor air had the potential to be impacted by volatile organic compounds (VOCs). Mitigation measures, including sealing of infiltration points and installing a sub-slab depressurization system (SSDS), were taken at the on-site building to address potential indoor air contamination associated with soil vapor intrusion. The SSDS installation was completed in September 2015, and documented in an Interim Remedial Measure Construction Completion Report, dated June 2016.

6.3: Summary of Environmental Assessment

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

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

Nature and Extent of Contamination: Soil and groundwater samples were analyzed for VOCs, semi-volatile compounds (SVOCs), polychlorinated biphenyls (PCBs), metals, pesticides and per- and polyfluoroalkyl substances (PFAS). Soil vapor, sub-slab vapor and ambient air samples were analyzed for VOCs. Based upon investigations to date, the primary contaminants of concern at the site are VOCs, such as tetrachloroethene (PCE) and its breakdown compounds, trichloroethene (TCE), cis-1,2-dichloroethylene (cis-DCE) and vinyl chloride (VC). These contaminants were found in soils, groundwater and/or soil vapor.

Soil - Sampling results showed that detections of PCE, TCE, cis-DCE, and VC in on-site soils were all below unrestricted use soil cleanup objectives (UUSCOs).The UUSCOs for PCE, TCE, cis-DCE, and VC are 1.3 parts per million (ppm), 0.47 ppm, 0.25 ppm, and 0.02 ppm, respectively. During the investigation, access to sample beneath the building was not feasible, so the Department was unable to determine if additional soil contamination is present beneath the building slab.

All other analyzed compounds were either non-detect or below the UUSCO, except for the pesticides 4,4-DDE and 4,4-DDT, and total chromium. Detections of these analytes were all below their respective commercial use standards.

Perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS) were detected in shallow soil samples at levels up to 0.26 ppm and 3.5 ppm, respectively. The UUSCO and protection of groundwater guidance values for PFOA in soil are 0.66 ppb and 1.1 ppb, respectively. For PFOS in soil, the guidance values are 0.88 ppb and 3.7 ppb, respectively.

Groundwater - PCE concentrations were documented at up to 20,400 parts per billion (ppb) at 30-32 feet below ground surface (bgs); TCE was found at up to 578 ppb at 30-32 feet bgs; cis-DCE at up to 13,000 ppb at 10-12 feet bgs; and VC at up to 6,580 ppb at 10-12 feet bgs. The ambient groundwater quality standard is 5 ppb for PCE, TCE, and cis-DCE, and 2 ppb for VC. Contamination in groundwater has migrated approximately 400 feet downgradient, off-site to the northwest.

The metals iron and sodium were detected in samples above groundwater quality standards; however, they are consistent with regional groundwater concentrations. Thallium was also detected in samples above the groundwater quality standard; however, it was detected in the most upgradient well and is not considered site related. Pesticide detections were all below groundwater quality standards. PCBs were not detected in groundwater at the site.

High levels of petroleum related VOCs were detected in all on-site monitoring wells. The contamination is attributed to neighboring gas stations with known petroleum spills which are being investigated and remediated under the Department's Spills program.

The emerging contaminants, 1,4-dioxane, PFOA, and PFOS, were detected at levels up to 0.18 ppb, 348 parts per trillion (ppt), and 98.3 ppt, respectively. The maximum contaminant levels (MCLs) in drinking water for 1,4-dioxane, PFOA, and PFAS are 1 ppb, 10 ppt, and 10 ppt, respectively. PFOA and PFOS levels were significantly lower in an upgradient sample, indicating that the site is a source of the PFAS contamination.

There are no downgradient water supply wells between the site and the groundwater discharge point of Head of Bay.

Soil Vapor - Contaminants reported in soil gas during the 2010 Site Characterization were: PCE at concentrations up to 450 micrograms per cubic meter (ug/m^3) in the northwestern portion of the site. PCE breakdown products TCE, cis-DCE and VC were also documented at up to 330 ug/m^3, 4,900 ug/m^3, and 11 ug/m^3, respectively.

Sub-slab Vapor and Indoor Air - During the 2013 heating season sampling event, the on-site building did not have detectable levels of PCE and TCE in indoor air. The on-site sub-slab sample contained PCE and TCE at 124 ug/m^3 and 5.37 ug/m^3, respectively. Indoor air and sub-slab samples collected from two off-site buildings were non-detect for PCE and TCE. Sampling at a third off-site building found indoor air levels of PCE and TCE at 4.88 ug/m^3 and 1.24 ug/m^3, respectively, with sub-slab levels at 15.9 ug/m^3 and 3.6 ug/m^3, respectively.

The results indicate that actions to address exposures for the on-site building were necessary. A sub-slab depressurization system (SSDS) was installed in the on-site building in September 2015 as an Interim Remedial Measure (IRM). Subsequent quarterly testing of the SSDS has shown the system to be achieving depressurization beneath the entire slab of the on-site building and has addressed the potential for impacts to indoor air from soil vapor intrusion.

6.4: Summary of Human Exposure Pathways

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

People are not drinking contaminated groundwater because the area is served by a public water supply that obtains water from a different source not affected by this contamination. Direct contact with contaminants in the soil is unlikely because the majority of the site is covered with buildings and pavement. Volatile organic compounds in the groundwater and/or soil may move into the soil vapor (air spaces within the soil), which in turn may move into overlying buildings and affect the indoor air quality. This process, which is similar to the movement of radon gas from the subsurface into the indoor air of buildings, is referred to as soil vapor intrusion. Measures are in place to control the potential inhalation of site contamination due to soil vapor intrusion. Sampling indicates soil vapor intrusion is not a current concern for off-site buildings and residences.

6.5: Summary of the Remediation Objectives

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

The remedial action objectives for this site are:

Groundwater

RAOs for Public Health Protection

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

RAOs for Environmental Protection

- Restore ground water aquifer to pre-disposal/pre-release conditions, to the extent practicable.
- Remove the source of ground or surface water contamination.

Soil Vapor

RAOs for Public Health Protection

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

SECTION 7: SUMMARY OF THE PROPOSED REMEDY

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

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

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

The proposed remedy is referred to as the In-Situ Chemical Treatment, Cover System and Soil Vapor Intrusion Mitigation remedy.

The estimated present worth cost to implement the remedy is $474,000. The cost to construct the remedy is estimated to be $300,000 and the estimated average annual cost is $40,000.

The elements of the proposed remedy are as follows:

1. Remedial Design

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

- Considering the environmental impacts of treatment technologies and remedy stewardship over the long term;
- Reducing direct and indirect greenhouse gases and other emissions;
- Increasing energy efficiency and minimizing use of non-renewable energy;
- Conserving and efficiently managing resources and materials;
- Reducing waste, increasing recycling and increasing reuse of materials which would otherwise be considered a waste;
- Maximizing habitat value and creating habitat when possible;
- Fostering green and healthy communities and working landscapes which balance ecological, economic and social goals; and
- Integrating the remedy with the end use where possible and encouraging green and sustainable re-development.

2. Cover System

A site cover currently exists in the area occupied by the site building and will be maintained to allow for commercial use of the site. Any site redevelopment will maintain the existing site cover. The site cover may include paved surface parking areas, sidewalks or soil where the upper one foot of exposed surface soil meets the applicable soil cleanup objectives (SCOs) for commercial use. Any fill material brought to the site will meet the requirements for the identified site use as set forth in 6NYCRR part 375-6.7(d).

3. In-Situ Chemical Treatment

In-situ chemical treatment will be implemented to treat contaminants in groundwater. A chemical oxidant will be injected into the subsurface via a temporary injection well network to destroy the contaminants in groundwater both on-site and downgradient off-site. The method, depth and type of injection, and impact on PFAS compounds present at the site, will be finalized during the remedial design.

Monitoring will be required downgradient and within the treatment zone. Monitoring will be conducted for, at a minimum, VOCs and PFAS compounds downgradient of the treatment zone.

4. Vapor Mitigation

Any on-site buildings will be required to have a sub-slab depressurization system, or a similar engineered system, to mitigate the migration of vapors into the building from groundwater. Mitigation measures were taken as an IRM, as discussed in Section 6.2, at the on-site building to address potential indoor air contamination from volatile organic compounds associated with soil vapor intrusion and were operational in September 2015 and will continue under the remedy.

5. Engineering and Institutional Controls

Imposition of an institutional control in the form of an environmental easement and a Site Management Plan, as described below, will be required. The remedy will achieve a commercial cleanup at a minimum and will include an environmental easement, and site management plan as described below.

Imposition of an institutional control in the form of an environmental easement for the controlled property which will:

- require the remedial party or site owner to complete and submit to the Department a periodic certification of institutional and engineering controls in accordance with Part 375-1.8(h)(3);
- allow the use and development of the controlled property for commercial use as defined by Part 375-1.8(g), although land use is subject to local zoning laws;
- restrict the use of groundwater as a source of potable or process water, without necessary water quality treatment as determined by the NYSDOH or County DOH; and
- require compliance with the Department approved Site Management Plan.

6. Site Management Plan

A Site Management Plan is required, which includes the following:

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

Institutional Controls: The Environmental Easement discussed in Paragraph 5 above.

Engineering Controls: The cover system discussed in Paragraph 2 above and the sub-slab depressurization system discussed in Paragraph 4 above.

This plan includes, but may not be limited to:

- an Excavation Plan which details the provisions for management of future excavations in areas of remaining contamination;
- descriptions of the provisions of the environmental easement including any land use and groundwater restrictions;
- provisions for the management and inspection of the identified engineering controls,
- maintaining site access controls and Department notification;
- the steps necessary for the periodic reviews and certification of the institutional and/or engineering controls; and
- a provision that should a building foundation or building slab be removed in the future, a cover system consistent with that described in Paragraph 2 above will be placed in any areas where the upper one foot of exposed surface soil exceed the applicable soil cleanup objectives.

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

- monitoring of groundwater to assess the performance and effectiveness of the remedy;
- a schedule of monitoring and frequency of submittals to the Department;
- provision for additional soil sampling in the event that soils beneath the slab of the building become accessible in the future; and
- monitoring for vapor intrusion for any occupied existing or future buildings on the site, as may be required by the Institutional and Engineering Control Plan discussed above.

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

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

Exhibit A

Nature and Extent of Contamination

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

For each medium for which contamination was identified, a table summarizes the findings of the investigation. The tables present the range of contamination found at the site in the media and compares the data with the applicable SCGs for the site. The contaminants include volatile organic compounds (VOCs) and per- and polyfluoroalkyl substances (PFAS). For comparison purposes, the SCGs are provided for each medium that allows for unrestricted use. For soil, if applicable, the Restricted Use SCGs identified in Section 4 and Section 6.1.1 are also presented.

Groundwater

Groundwater samples were collected from multi-level monitoring wells, located on-site and off-site, extending to 72 feet below ground surface (bgs). On-site monitoring wells were sampled for volatile organic compounds (VOC), semi-volatile organic compounds (SVOCs), pesticides, PCBs, metals and per and polyfluorinated alkyl substances (PFAS). VOC contamination was fully delineated in groundwater with the majority of contamination present above 60 feet bgs. One on-site sample collected did contain VOC contamination down to 72 feet bgs. Metals were detected in on-site samples consistent with regional groundwater conditions. No other compounds were detected above NYS SCGs.

Table 1 - Groundwater	**130198**	**Screening Criteria in use: NEW YORK STATE CLASS GA**	
Detected Constituents	**Concentration Range Detected (ppb)[a]**	**SCG[b] (ppb)**	**Frequency Exceeding SCG**
Metals NYS CLASS GA			
Iron	653-14,500	300	4/4
Sodium	6,620-26,100	20000	1/4
Thallium	5.60-8.1	0.5	2/4
VOC NYS CLASS GA			
cis-1,2-Dichloroethylene (cis-DCE)	0-13,000	5	43/107
Benzene	0-48.0	1	9/39
Ethylbenzene	0-2,200	5	14/38
Tetrachloroethylene (PCE)	0-20,400	5	49/107
Toluene	0-5,800	5	15/41

Trichloroethylene (TCE)	0-578	5	13/107
Vinyl Chloride	0-6,580	2	23/106
Xylenes, Total	0-6,300	5	3/41
PFAS NYS Drinking Water Standards (parts per trillion, or ppt)			
perfluorooctanoic acid (PFOA)	1.24-345	10[c,d]	4/5
perfluorooctanesulfonic acid (PFOS)	1.16-132	10[c,d]	3/5

a - ppb: parts per billion, which is equivalent to micrograms per liter, ug/L, in water.
b - SCG: Standard Criteria or Guidance - Ambient Water Quality Standards and Guidance Values (TOGs 1.1.1), 6 NYCRR Part 703, Surface water and Groundwater Quality Standards, and Part 5 of the New York State Sanitary Code (10 NYCRR Part 5).
c – MCL: Maximum Contaminant Level – NYS Dept. of Health Drinking Water Standards
d – ppt: parts per trillion, which is equivalent to nanograms per liter, ng/L, in water.

The primary contaminants of concern are tetrachloroethene (PCE) and its breakdown products; trichloroethene (TCE), cis-1,2-dichlorothylene (cis-DCE), and vinyl chloride (VC), associated with the previous dry cleaning operation and improper handling of chlorinated solvents. Secondary contaminants of concern identified at the site are PFAS compounds which will require monitoring throughout the remedial process. PFAS compounds may have been introduced to the dry cleaning waste stream by the routine washing of fabrics or clothing manufactured with PFAS, or fabrics that received a subsequent chemical treatment such as a stain resistant application. Other contaminants found include ethylbenzene, toluene, and xylene associated with a historic spill at the neighboring gas station, resulting in a co-mingled contaminant plume at the northeast property boundary. Groundwater contamination is presented in Figures 3a and 3b.

Based on the findings of the RI, the past disposal of hazardous waste has resulted in the contamination of groundwater. The site contaminants that are considered to be the primary contaminants of concern which will drive the remediation of groundwater to be addressed by the remedy selection process are: PCE, TCE, cis-DCE, VC, PFOA, and PFOS.

Soil Vapor

The evaluation of the potential for soil vapor intrusion was evaluated by the sampling of soil vapor, sub-slab vapor under structures, and indoor air inside structures. At this site, due to the presence of buildings in the impacted area, a full suite of samples was collected to evaluate whether actions are needed to address exposures related to soil vapor intrusion.

Sub-slab vapor samples were collected from beneath structures located on-site and three adjacent residential properties during March 2013. Indoor air and outdoor air samples were also collected at this time. The samples were collected to assess the potential for soil vapor intrusion. The results indicate PCE and TCE were detected in on-site and off-site sub-slab vapor.

The 2010 Site Characterization identified PCE at concentrations up to 450 micrograms per cubic meter (ug/m^3) in the northwestern portion of the site. PCE breakdown products TCE, cis-DCE and VC were also documented at up to 330 ug/m^3, 4,900 ug/m^3, and 11 ug/m^3, respectively. These results indicate that the primary soil vapor contaminants are PCE, TCE, cis-DCE, and VC which are chemicals associated with previous dry cleaning operation at the site. The results indicate PCE and TCE were detected in on-site and off-site sub-slab vapor. Indoor air samples collected during the 2013 heating season reported non-detect readings. As noted on Figures 4a and 4b, the primary soil vapor contamination is found under the on-site building.

Soil vapor and indoor air sampling in the adjacent private residences did not find any site-related contamination at levels requiring additional actions to address human exposures. Therefore, mitigation is recommended for the on-site building and no further action is recommended for off-site residential properties.

In September 2015, a sub-slab depressurization system (SSDS) was installed in the on-site building as an Interim Remedial Measure (IRM). Subsequent quarterly testing of the SSDS has shown the system to be achieving depressurization beneath the entire slab of the on-site building, thus addressing these soil vapor concerns.

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

Exhibit B

Description of Remedial Alternatives

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

Alternative 1: No Further Action

The No Further Action Alternative recognizes the remediation of the site completed by the IRM(s) described in Section 6.2. This alternative leaves the site in its present condition and does not provide any additional protection of the environment.

Alternative 2: No Further Action with Site Management

The No Further Action with Site Management Alternative recognizes the remediation of the site completed by the IRM(s) described in Section 6.2 and Site Management and Institutional Controls and Engineering Controls are needed to confirm the effectiveness of the IRM. This alternative maintains engineering controls which were part of the IRM and includes institutional controls, in the form of an environmental easement and site management plan, needed to protect public health and the environment from contamination remaining at the site.

Present Value: $112,000
Capital Costs: $60,000
Annual Costs: $12,000

Alternative 3: Ex-Situ Groundwater Treatment

This alternative utilizes groundwater extraction wells and aboveground treatment to remove volatile organic compounds (VOCs) in groundwater. Active pumping of the extraction system creates a localized depression of the water table, known as a capture zone. Contaminated groundwater within the capture zone is drawn toward the extraction wells, preventing further migration of the plume shown on Figures 3a and 3b. The extracted groundwater is then passed through a separator to remove non-aqueous phase liquids, then through one or more vessels containing Granular Activated Carbon (GAC). GAC removes dissolved contaminants from extracted groundwater by adsorption. Following treatment, the clean water will be discharged to the sanitary sewer.

This alternative also employs site management, including institutional and engineering controls (IC/EC), to ensure the remedy continues to be protective and to allow the appropriate reuse of the property until remedial objectives are achieved. Institutional controls are anticipated to include existing Nassau County Public Health Ordinance, Article 4 which prohibits potable use of groundwater without prior approval. Due to the potential presence of soil contamination beneath the site building, which could not be accessed for sampling, the environmental easement and

Site Management Plan (SMP) will limit the use of the site to commercial use, and include a provision to investigate beneath the building when it becomes accessible. The SMP will also include an excavation work plan to ensure proper management of soil that may be excavated from the site.

Present Worth: $1,260,000
Capital Cost:.....$731,000
Annual Costs:.....$122,000

Alternative 4: Air Sparge with Soil Vapor Extraction (SVE) and Vapor Mitigation

This alternative utilizes air sparging (injection) and soil vapor extraction to address the groundwater plume contaminated by volatile organic compounds (VOCs). VOCs are removed from the groundwater and soil below the water table (saturated soil) by injecting air into the contaminated zone. Injected air, rising through the groundwater, volatilizes and transfers the VOCs from the groundwater and/or soil into the injected air. The VOCs are carried with the injected air upward into the vadose zone (the area below the ground surface but above the water table) where a soil vapor extraction system designed to remove the injected air is installed. The SVE system applies a vacuum to wells that have been installed into the vadose zone to remove the VOCs along with the air introduced by the sparging process. The airstream containing VOCs extracted by the SVE wells is then passed through a treatment system, such as activated carbon, which removes the VOCs prior to the air being discharged to the atmosphere.

The number and depth of air injection and SVE wells will be determined during the remedial design. The air containing VOCs extracted from the SVE wells will be treated by passing the air stream through a treatment system, such as activated carbon, which will remove the VOCs from the air prior to it being discharged to the atmosphere.

Any on-site building will be required to have a sub-slab depressurization system, or a similar engineered system, to mitigate the migration of vapors into the building from groundwater.

This alternative also employs site management, including institutional and engineering controls (IC/EC), to ensure the remedy continues to be protective and to allow the appropriate reuse of the property until remedial objectives are achieved. Institutional controls are anticipated to include existing Nassau County Public Health Ordinance, Article 4 which prohibits potable use of groundwater without prior approval. Due to the potential presence of soil contamination beneath the site building, which could not be accessed for sampling, the environmental easement and
Site Management Plan (SMP) will limit the use of the site to commercial use, and include a provision to investigate beneath the building when it becomes accessible. The SMP will also include an excavation work plan to ensure proper management of soil that may be excavated from the site.

Present Worth: $1,041,000
Capital Cost: $610,000
Annual Costs: $55,000

Alternative 5: In-Situ Enhanced Bioremediation and Vapor Mitigation

In-situ enhanced biodegradation will be employed to treat contaminants in groundwater in an area to be determined during the remedial design. The biological breakdown of contaminants through anaerobic reductive dechlorination will be enhanced by a means determined to be most effective during a pilot study. The method and depth of injection will be determined during the remedial design.

Any on-site building will be required to have a sub-slab depressurization system, or a similar engineered system, to mitigate the migration of vapors into the building from groundwater.

This alternative also employs site management, including institutional and engineering controls (IC/EC), to ensure the remedy continues to be protective and to allow the appropriate reuse of the property until remedial objectives are achieved. Institutional controls are anticipated to include existing Nassau County Public Health Ordinance, Article 4 which prohibits potable use of groundwater without prior approval. Due to the potential presence of soil contamination beneath the site building, which could not be accessed for sampling, the environmental easement and Site Management Plan (SMP) will limit the use of the site to commercial use, and include a provision to investigate beneath the building when it becomes accessible. The SMP will also include an excavation work plan to ensure proper management of soil that may be excavated from the site.

Present Worth: $386,000
Capital Cost: $190,000
Annual Costs: $25,000

Alternative 6: In-Situ Chemical Treatment to Pre-Disposal or Unrestricted Conditions and Vapor Mitigation

In-situ chemical treatment will be implemented to treat contaminants in groundwater. A chemical oxidant will be injected into the subsurface to destroy the contaminants in groundwater located beneath the site and migrating off-site to the northwest with groundwater flow *via* a temporary injection well network. The method and depth of injection will be finalized during the remedial design.

Any on-site building will be required to have a sub-slab depressurization system, or a similar engineered system, to mitigate the migration of vapors into the building from groundwater.

This alternative also employs site management, including institutional and engineering controls (IC/EC), to ensure the remedy continues to be protective and to allow the appropriate reuse of the property until remedial objectives are achieved. Institutional controls are anticipated to include existing Nassau County Public Health Ordinance, Article 4 which prohibits potable use of groundwater without prior approval. Due to the potential presence of soil contamination beneath the site building, which could not be accessed for sampling, the environmental easement and Site Management Plan (SMP) will limit the use of the site to commercial use, and include a provision to investigate beneath the building when it becomes accessible. The SMP will also include an excavation work plan to ensure proper management of soil that may be excavated from the site.

Present Worth: $474,000
Capital Cost: $300,000
Annual Costs: $40,000

Exhibit C

Remedial Alternative Costs

Remedial Alternative	Capital Cost ($)	Annual Costs ($)	Total Present Worth ($)
No Further Action	0	0	0
No Further Action with Site Management	$60,000	$12,000	$112,000
Ex-Situ Groundwater Treatment and Vapor Mitigation	$731,000	$122,000	$1,260,000
In-Situ Air Sparging and Vapor Mitigation	$610,000	$55,000	$1,041,000
In-Situ Enhanced Bioremediation and Vapor Mitigation	$190,000	$25,000	$386,000
In-Situ Chemical Treatment and Vapor Mitigation	$300,000	$40,000	$474,000

Exhibit D

SUMMARY OF THE PROPOSED REMEDY

The Department is proposing Alternative 6, in-situ chemical treatment and vapor mitigation as the remedy for this site. Alternative 6 would achieve the remediation goals for the site by injecting a chemical injectate into the subsurface to transform and reduce contamination. The elements of this remedy are described in Section 7. The proposed remedy is depicted in Figure 5.

Basis for Selection

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

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

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

The proposed remedy, Alternative 6, will satisfy this criterion by destroying on-site and off-site contamination in groundwater to standards, criteria, and guidance values. Alternative 3 will also satisfy this criterion. Alternatives 4 and 5 will meet the groundwater remedial action objectives and meet the threshold criteria. Neither Alternative 1, nor Alternative 2, No Further Action with Site Management, can satisfy this criterion and will not be evaluated further.

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

The PFOA and PFOS maximum contaminant levels for drinking water in public water supplies are considered by the Department to be relevant and appropriate criteria for ambient groundwater. Previous source removals of chlorinated solvents in soil under the direction of the Nassau County Department of Health in 1992, as discussed above, are likely to have removed sources of PFOA and PFOS to groundwater as remaining soil concentrations for PFOA and PFOS are below the Department's protection of groundwater soil cleanup objective guidance values. Levels of PFAS in groundwater are expected to attenuate and there are no drinking water supply wells between the site and Head of Bay, which is hydraulically downgradient of the site. Therefore, all alternatives will rely on groundwater monitoring and institutional controls to prevent exposure to groundwater.

Alternative 6 complies with SCGs as it addresses both on-site and off-site contamination. Alternatives 3, 4, and 5 will also comply with this criterion but to a lesser degree or with lower certainty as they are primarily on-site actions. Because Alternatives 3, 4, 5, and 6 satisfy the threshold criteria, the remaining criteria are particularly important in selecting a final remedy for the site.

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

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

Alternatives 3, 4, 5, and 6 accomplish long-term effectiveness by treating the source area and preventing further off-site migration of contamination. Alternative 6 further incorporates off-site remedial elements, in addition to source area treatment, and reduces long-term monitoring needs. All alternatives will require engineering and institutional controls until groundwater standards are met, and it is determined by the Department, in consultation with NYSDOH, that SSDSs are no longer needed.

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

Alternatives 5 and 6, through the anaerobic biodegradation and in-situ chemical treatment processes have the ability to permanently reduce the toxicity, mobility or volume of contaminants. Alternative 5, however, requires extensive pilot testing and monitoring to ensure the most effective product is selected for the site conditions and may require amendments to the subsurface conditions to promote biodegradation. Alternative 4, in-situ air sparging, is effective in reducing the mobility of chlorinated solvents, however, this technology commonly has initially high removal rates followed by an extended period of lower removal rates and may not continue to effectively reduce contaminant mobility over longer periods. Alternative 3, ex-situ groundwater treatment, reduces the mobility, toxicity and volume of contaminants by extracting the contaminants from the water table as it applies treatment methods such as air strippers or carbon adsorption vessels to remove contaminants.

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

Alternatives 3 through 6 all have short-term impacts which could easily be managed, however, Alternatives 5 and 6 would have lesser impacts as they would not require the housing or storage of ex-situ treatment apparatus needed for Alternatives 3 and 4. The time needed to achieve the remedial objective is the shortest for Alternative 6 and longest for Alternative 3, with Alternative 5 taking less time to achieve remediation goals than Alternative 4.

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

Alternative 6 is favorable in that the technology has been used in many instances to treat similar contamination, is readily available, and will be used to treat on- and off-site contamination simultaneously. Alternative 6 will be the easiest to monitor effectiveness of the remedy and undertake additional remedial actions. Alternative 5 is also readily implementable but will require a longer and more exhaustive remedial design and pilot study period. Alternatives 5 and 6 require specific permitting, however, they will reach the remedial objectives of this site at a faster rate with less field work than Alternatives 3 and 4. Alternative 3 and 4 are both widely used technologies that are readily implementable, however, both require access to off-site properties for the storage of ex-situ treatment housing and storage areas. While ex-situ groundwater treatment is most effective in treating light non-aqueous phase liquids, which are found floating on top of the water table, it may be less effective in reducing the mobility or volume of the site contaminants of concern as they are found at multiple and deeper depths of the groundwater table such as is at this site.

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

The costs of the alternatives vary significantly. Alternative 3 has both the highest capital and annual cost resulting in the highest present worth cost. Alternative 4, in-situ air sparging, has both a higher capital cost and annual cost than either Alternatives 5 or 6. Alternative 5, enhanced bioremediation, has the lowest capital cost and annual cost, however, this alternative requires both a more exhaustive remedial design and pilot study period and a much longer time period to achieve remedial goals than Alternative 6. Alternative 6, in-situ chemical treatment, has moderate capital cost and annual cost, however, it is easily implemented and can achieve remedial goals in the shortest time.

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

An environmental easement is required for the remaining alternatives, *i.e*. Alternatives 3, 4, 5, and 6, because groundwater contamination is expected to remain above the NYS Class GA groundwater criteria during the treatment period. The proposed restricted commercial use, until groundwater meets standards and the potential presence of contamination beneath the building is addressed, is consistent with local zoning and surrounding land uses, so Alternatives 3 through 6 meet this criterion equally. Once groundwater meets standards and soil beneath the building is addressed, the easement may be extinguished and the site would meet unrestricted conditions under Alternatives 3 through 6.

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

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

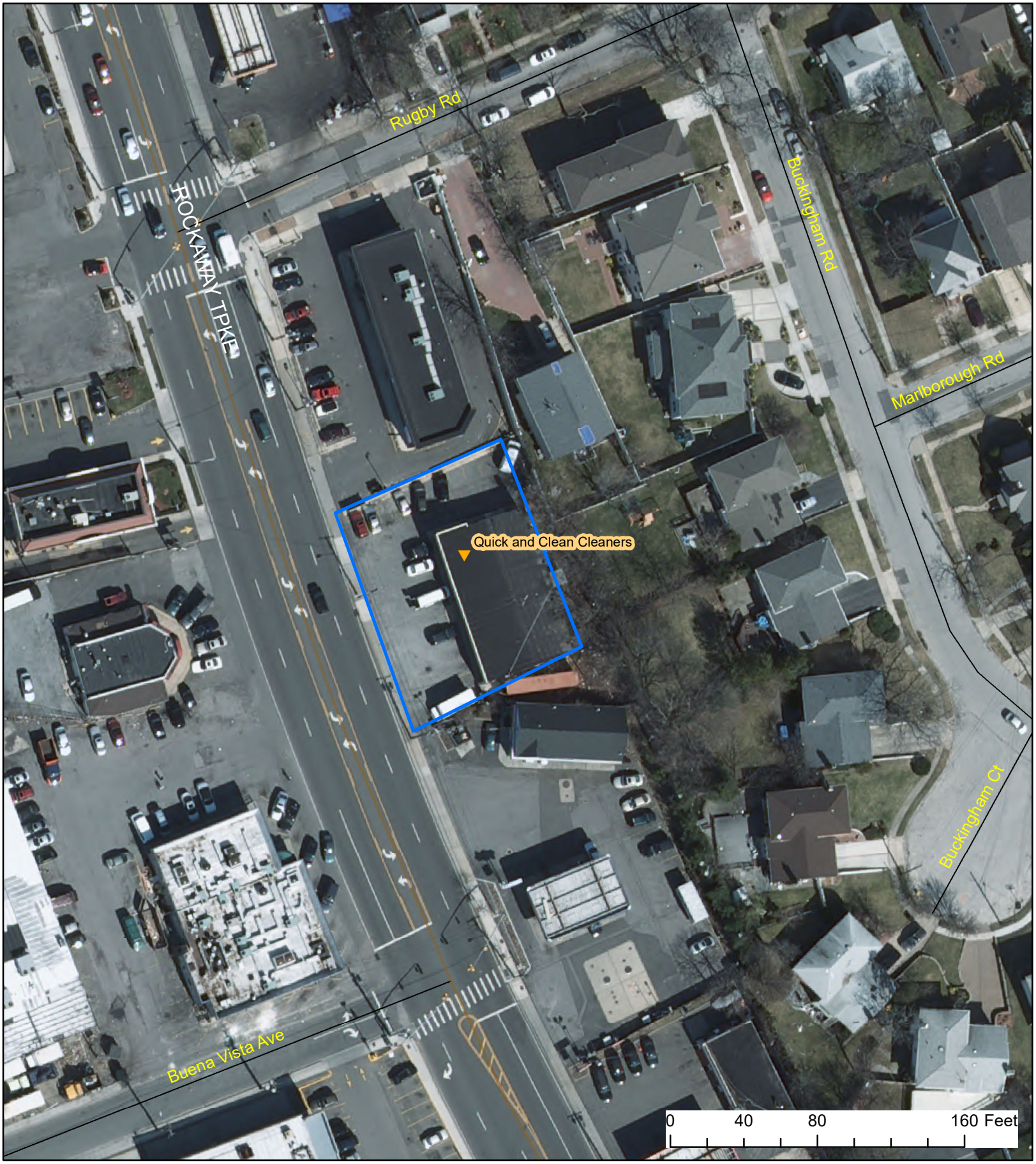
Alternative 6 is being proposed because, as described above, it satisfies the threshold criteria and provides the best balance of the balancing criterion.

Figure 1 - Site Location

Legend

Quick and Clean Cleaners

0 0.125 1.25 0.5 Miles



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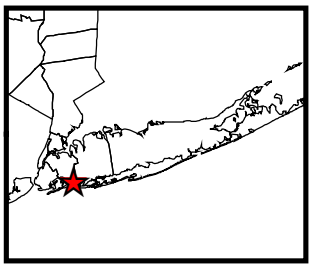

New York State Department of Environmental Conservation

Quick and Clean Cleaners Site
380 Rockaway Turnpike, Cedarhurst NY 11516
DEC Site No.: 130198

Figure 2- Site Map

Legend

Site Border

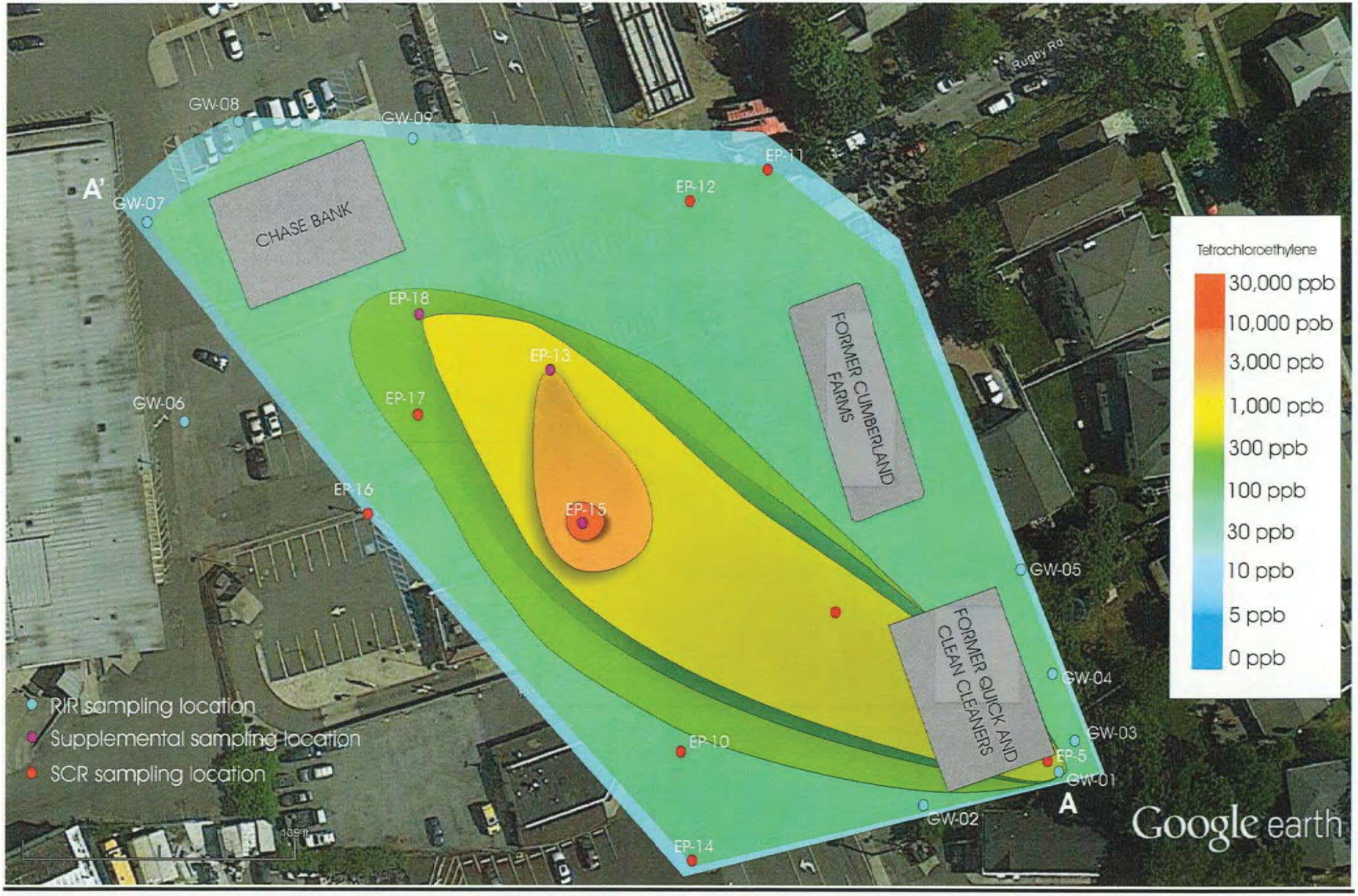

Figure 3a –PCE Areal View

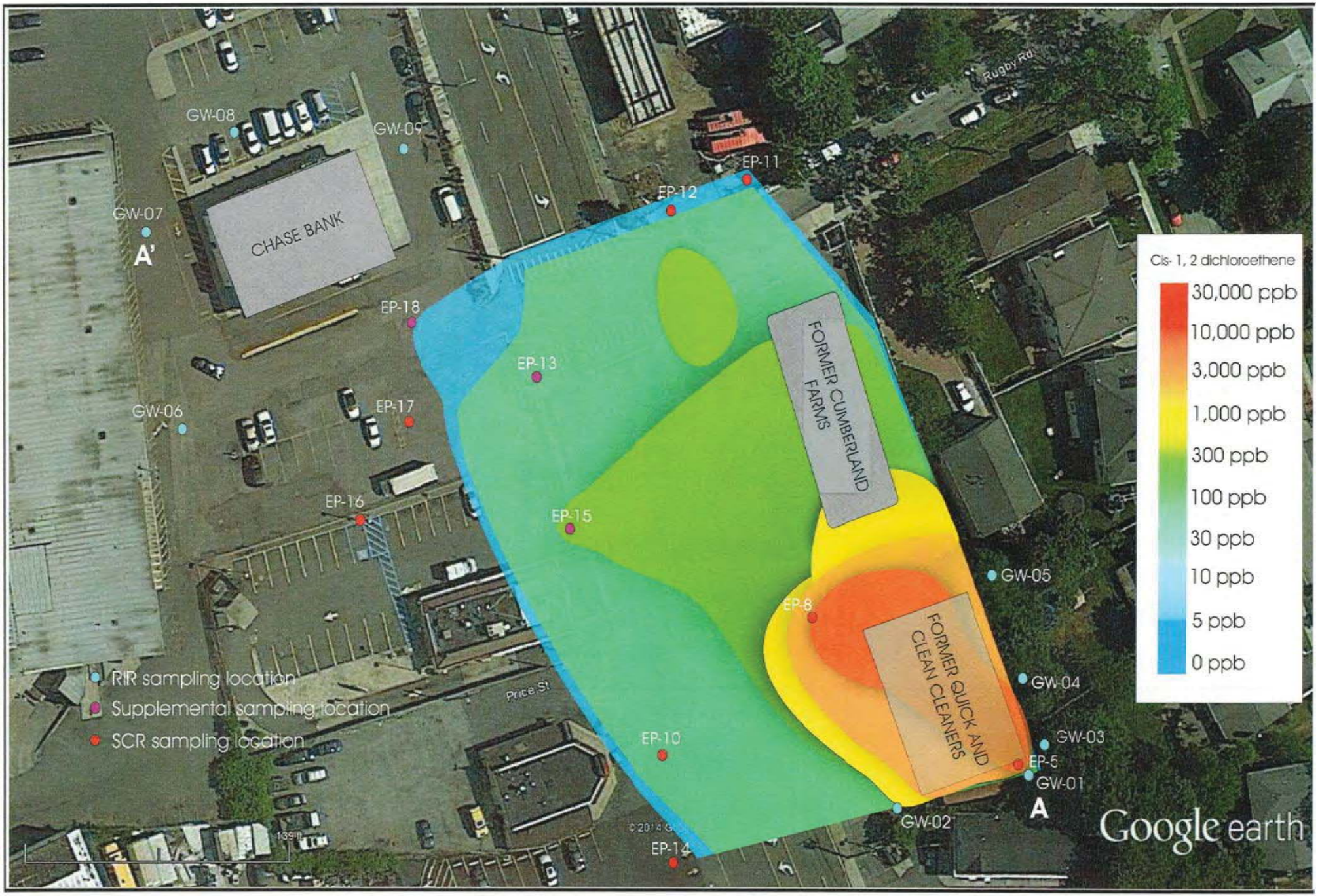

Figure 3b – cis-DCE Areal View

Figure 4a
Tetrachloroethene (PCE) Soil Gas Analytical Results

- Results from 02/02/10
- Digital orthoimage base map obtained from the NYSGIS Clearinghouse. Photo taken during April 2007

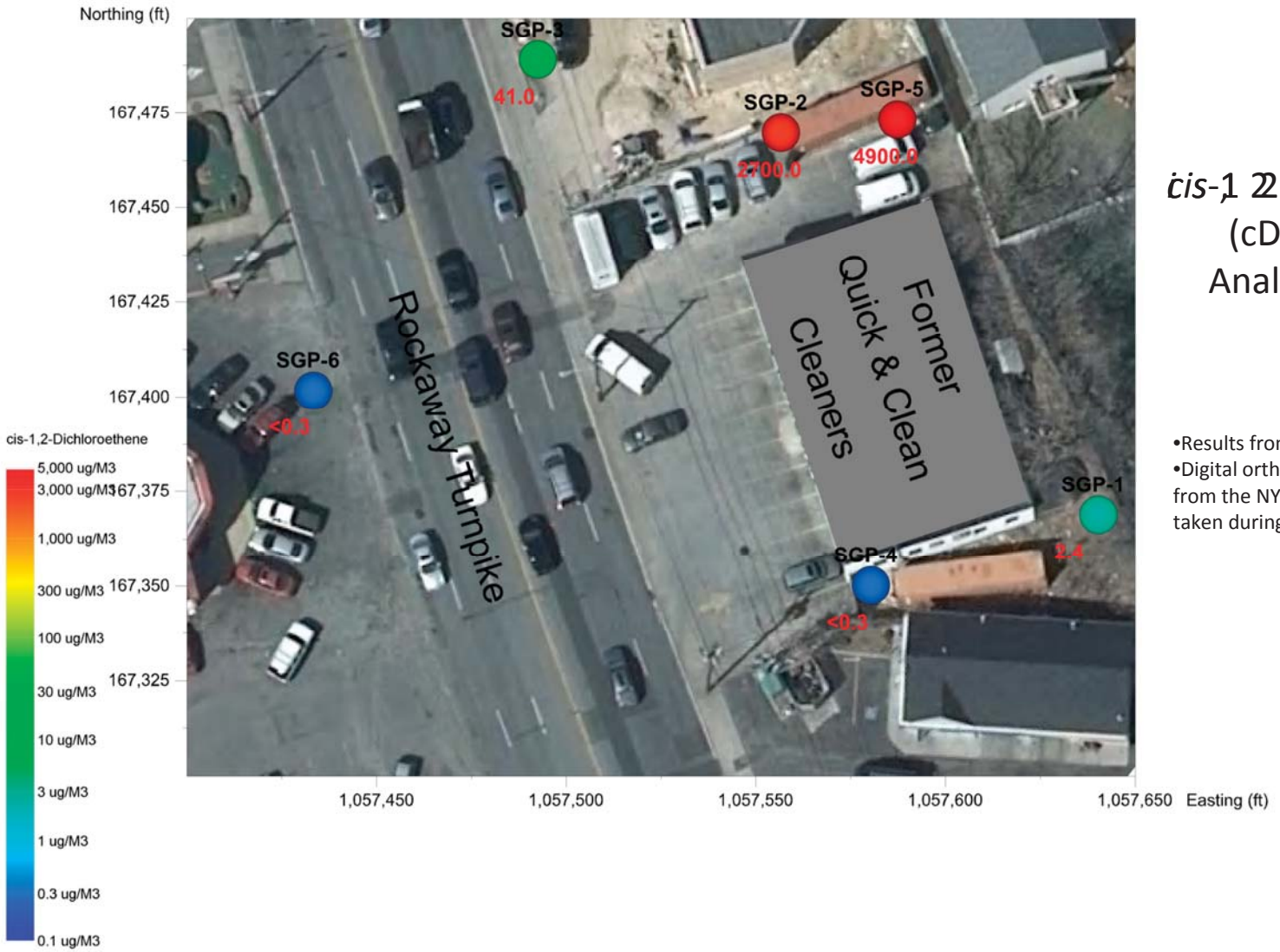

Figure 4b
cis-1,2-Dichloroethene (cDCE) Soil Gas Analytical Results

- Results from 02/02/10
- Digital orthoimage base map obtained from the NYSGIS Clearinghouse. Photo taken during April 2007

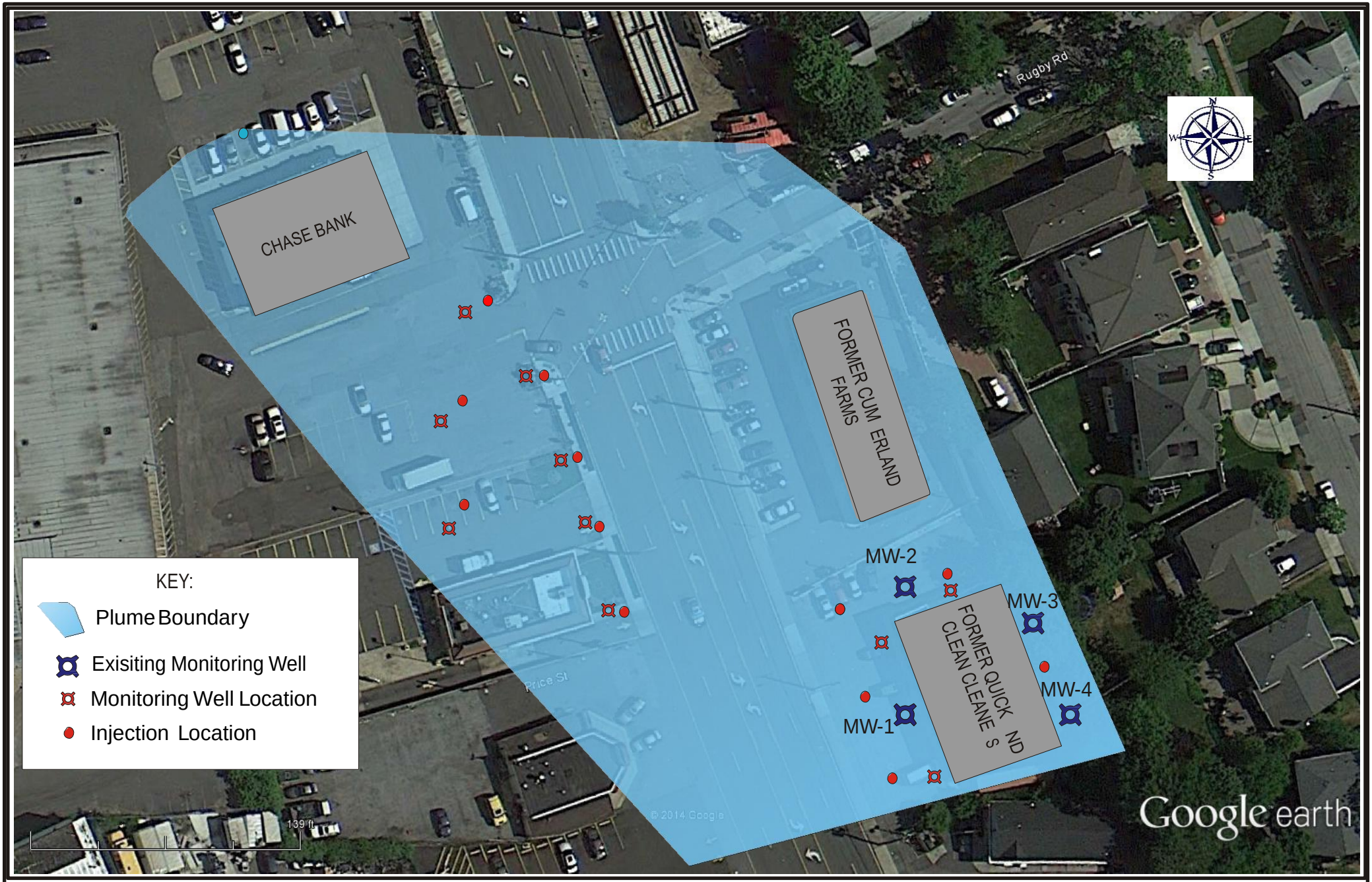

Figure- 5 Proposed Injection/ Monitoring Well Locations

Former Quick and Clean Cleaners
380 Rockaway Turnpike
Cedarhurst, NY