RECORD OF DECISION

Operable Unit Two
Peninsula Boulevard Groundwater Plume Superfund Site
Nassau County, New York

United States Environmental Protection Agency
Region 2
New York, New York
September 2017

528290

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PART 1 DECLARATION

SITE NAME AND LOCATION

Peninsula Boulevard Groundwater Plume Superfund Site
Hewlett, Nassau County, New York
Superfund Site Identification Number: NYN000204407
Operable Unit: 02

STATEMENT OF BASIS AND PURPOSE

This Record of Decision (ROD) documents the U.S. Environmental Protection Agency's (EPA's) selection of a remedy for Operable Unit 2 (OU2) of the Peninsula Boulevard Groundwater Plume Superfund Site (Site), in Nassau County, New York, which was chosen in accordance with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended, 42 U.S.C. §§ 9601-9675, and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 C.F.R. Part 300. This decision document explains the factual and legal basis for selecting the OU2 remedy. The attached index (see Appendix III) identifies the items that comprise the Administrative Record, upon which the selected remedy is based.

The New York State Department of Environmental Conservation (NYSDEC) was consulted on the planned remedy in accordance with Section 121(f) of CERCLA, 42 U.S.C. § 9621(f), and concurs with the selected remedy (see Appendix IV).

ASSESSMENT OF THE SITE

Actual or threatened releases of hazardous substances from the Site, if not addressed by the implementation of the response action selected in this ROD, may present an imminent and substantial endangerment to public health, welfare, or the environment.

DESCRIPTION OF THE SELECTED REMEDY

The selected remedy described in this document actively addresses the sources of the groundwater contamination at the Site. This is the second remedial phase, or operable unit, for the Site, identified as OU2. A previous ROD for OU1, signed in September 2011, selected a remedy to address the contaminated groundwater. For the purposes of this OU2 ROD, the area comprised of Cedarwood Cleaners at 1244 West Broadway, a formerly vacant parcel at 1255 West Broadway (the former Vacant Lot), 1245 West Broadway, the Long Island Rail Road (LIRR) Substation, and sections of West Broadway and Hewlett Parkway adjacent to Cedarwood Cleaners are collectively referred to as Area of Concern 1 (AOC 1). Piermont Cleaners, located at 1309 Broadway, is referred to as Area of Concern 2 (AOC 2).

The major components of the selected remedy for AOC 2 include the following:

- In-situ treatment of contaminated groundwater and soil through anaerobic bioremediation;
- Implementation of a long-term groundwater monitoring program to track and monitor changes in soil and groundwater contamination in OU2 to ensure that remedial action objectives (RAOs) are attained;
- During the remedial design, measures will be evaluated to mitigate potential impacts to properties at or nearby AOC 1 and AOC 2 from vapors (such as the installation and operation of vapor recovery wells) that may be generated by the treatment processes. If the evaluation indicates any measures are necessary, they will be implemented as part of the remedy;
- Institutional controls to ensure that the remedy remains protective until RAOs are achieved for protection of human health over the long term. A plan will be developed which specifies those institutional controls to be utilized to ensure that the remedy is protective. Institutional controls regarding impacts to groundwater and soil use may include, as determined to be appropriate, existing governmental controls, such as well permit requirements, and restrictive covenants or environmental easements; and,
- Development of a Site Management Plan (SMP) to provide for the proper, post-construction management of the Site remedy for OU2, including the use of institutional controls until RAOs are met, as well as long-term monitoring and certifications.

The major components of the selected remedy for AOC 1 are the same as those identified for AOC 2 above, but also include the heating of contaminated soil and groundwater using a technology such as electric resistivity heating (ERH) to increase the bioremediation rates.

To potentially enhance the environmental benefits of the preferred remedy, consideration will be given, during the design, to technologies and practices that are sustainable, in accordance with EPA Region 2's Clean and Green Energy Policy and NYSDEC's Green Remediation Policy.[1] This will include consideration of green remediation technologies and practices.

DECLARATION OF STATUTORY DETERMINATIONS

The selected remedy meets the requirements for remedial actions set forth in Section 121 of CERCLA, 42 U.S.C. § 9621, because it meets the following requirements: 1) it is protective of human health and the environment; 2) it meets a level or standard of control of the hazardous substances, pollutants, and contaminants that at least attains the legally applicable or relevant and appropriate requirements under federal and state laws unless a statutory waiver is justified; 3) it is cost-effective; and 4) it utilizes permanent solutions and alternative treatment or resource recovery technologies to the maximum extent practicable. In addition, Section 121 of CERCLA includes a preference for remedies that employ treatment that permanently and significantly reduces the volume, toxicity, or mobility of hazardous substances as a principal element. The selected remedy satisfies this preference, as contaminated material will be treated through in-situ bioremediation.

[1] See https://www.epa.gov/greenercleanups/epa-region-2-clean-and-green-policy, and http://www.dec.ny.gov/docs/remediation_hudson_pdf/der31.pdf.

Because this remedy will not result in hazardous substances, pollutants, or contaminants remaining on Site above levels that allow for unlimited use and unrestricted exposure, but it will take more than five years to attain the remediation goals, EPA will conduct a review within five years of construction completion for the Site to ensure that the remedy is, or will be, protective of human health and the environment.

ROD DATA CERTIFICATION CHECKLIST

The following information is included in the Decision Summary section of this ROD. Additional information can be found in the Administrative Record file for this action.

- ✓ A discussion of the current nature and extent of contamination is included in the "Summary of Site Characteristics" section.
- ✓ Chemicals of concern and their respective concentrations may be found in the "Summary of Site Characteristics" section.
- ✓ Potential adverse effects associated with exposure to Site contaminants may be found in the "Summary of Site Risks" section.
- ✓ A discussion of soil and groundwater remediation goals for chemicals of concern may be found in the "Remedial Action Objectives" section and in Table 7 and Table 8, respectively, in Appendix II.
- ✓ A discussion of principle threat waste is contained in the "Principle Threat Wastes" section.
- ✓ Current and reasonably anticipated future land use assumptions are presented in the "Current and Potential Future Land and Resources Uses" section.
- ✓ Estimated capital, operation and maintenance, and total present-worth costs are discussed in the "Description of Remedial Alternatives" section.
- ✓ Key factors that led to selecting the remedy (*i.e.*, how the selected remedy provides the best balance of tradeoffs with respect to the balancing and modifying criteria, highlighting criteria key to the decision) may be found in the "Comparative Analysis of Alternatives" and "Statutory Determinations" sections.

AUTHORIZING SIGNATURE

A. Carpenter

Angela Carpenter,
Acting Director
Emergency and Remedial Response Division

9-28-17
Date

PART 2 DECISION SUMMARY

1. SITE NAME, LOCATION, AND DESCRIPTION

The Peninsula Boulevard Groundwater Plume Superfund Site (Site) consists of the area within and around a groundwater plume located in the Village of Hewlett, Town of Hempstead, Nassau County, New York. John F. Kennedy International Airport is located approximately three miles to the west of the Site. A Site location map is provided as Figure 1.

The area consists of a mix of commercial and residential properties, with the majority of the commercial properties being located along Mill Road, Peninsula Boulevard, Broadway, and West Broadway. Woodmere Middle School is located along the western Site boundary. Portions of Motts Creek, Doxey Brook Drain, and an unnamed tributary leading to Motts Creek are located within the Site.

The residences in the area of the Site are serviced by the New York American Water Company (NYAWC). The water delivered to these residences is a blend of water from several well fields, including a well field operated by NYAWC approximately 3,500 feet north of West Broadway (Plant #5 Well Field). Since 1991, NYAWC has been treating groundwater pumped from this well field with an air stripper prior to distribution. Based on a review of water supply well records in the area, private wells are not utilized for drinking water in the area.

EPA has elected to address the conditions at the Site in separate phases, or operable units (OUs), for remediation purposes. OU1 addresses the cleanup of contaminated groundwater. OU2 addresses the remediation of the sources of the contamination found in the groundwater.

2. SITE HISTORY AND ENFORCEMENT ACTIVITIES

Under NYSDEC oversight, a series of investigations were conducted from 1991 to 1999 at the former Grove Cleaners, located at 1274 Peninsula Boulevard. The investigations revealed an extensive groundwater contaminant plume extending both to the north and south of Peninsula Boulevard, primarily consisting of tetrachloroethylene (PCE) and its breakdown products, including trichloroethylene (TCE). The results of the investigation suggested source areas other than the former Grove Cleaners property were contributing to the groundwater contaminant plume. Following the implementation of interim remedial measures, which consisted of the removal of impacted soils related to solvent discharges to a dry well, a “no further action” remedy was selected by NYSDEC in March 2003, under state authorities, for the former Grove Cleaners facility, and NYSDEC requested that EPA address the area-wide groundwater plume under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

On March 7, 2004, EPA proposed the Site for inclusion on CERCLA’s National Priorities List (NPL), and on July 22, 2004, EPA included the Site on the NPL. As mentioned above, the Site is being addressed by EPA in two separate OUs. EPA conducted a remedial investigation/feasibility study (RI/FS) for OU1 at the Site from 2005 through 2010. The RI identified groundwater contaminated with PCE, PCE breakdown products, and low levels of other volatile organic compounds (VOCs). The source of the PCE groundwater contamination was not able to be identified during the OU1 RI. EPA issued a ROD for OU1 in September 2011, which called for

the extraction and treatment of contaminated groundwater, in-situ chemical treatment in targeted areas, and institutional controls. EPA completed the remedial design for the OU1 remedy in September 2016. Construction of the OU1 remedy has not yet begun. EPA initiated the RI for OU2 in 2012 with the purpose of identifying the source(s) of the groundwater contamination.

3. HIGHLIGHTS OF COMMUNITY PARTICIPATION

On June 15, 2017, EPA released a Proposed Plan for the cleanup of OU2 to the public for comment. Supporting documentation comprising the administrative record was made available to the public at the information repositories maintained at the Hewlett Public Library, located at 1125 Broadway in Hewlett, New York; the EPA Region 2 Office in New York City; and EPA's website for the Site at https://www.epa.gov/superfund/peninsula-groundwater. EPA published notice of the start of the public comment period and the availability of the above-referenced documents in the *Long Island Herald* on June 15, 2017. A copy of the public notice published in the *Long Island Herald* can be found in Appendix V. EPA accepted public comments on the Proposed Plan from June 15, 2017 through July 17, 2017.

On June 22, 2017, EPA held a public meeting at the Hewlett Bay Firehouse, located at 25 Franklin Avenue, Hewlett, New York, to inform officials and interested citizens about the Superfund process; to present the Proposed Plan for OU2 of the Site, including the preferred remedial alternative; and to respond to questions and comments from the attendees. Responses to the questions and comments received at the public meeting and in writing during the public comment period are included in an attached Responsiveness Summary (See Appendix V).

4. SCOPE AND ROLE OF RESPONSE ACTION

Section 300.5 of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 C.F.R. § 300.5, defines an OU as a discrete action that comprises an incremental step toward comprehensively addressing a site's problems. A discrete portion of a remedial response eliminates or mitigates a release, a threat of release, or a pathway of exposure. The cleanup of a site can be divided into a number of OUs, depending on the complexity of the problems associated with a site.

As noted above, EPA has designated two OUs for the Site. OU1 addresses the contaminated groundwater; a remedy for OU1 was selected in 2011. OU2, which is the subject of this ROD, addresses the remediation of the sources of contamination found in the groundwater, and it is the final response action planned to be selected for the Site. The primary objectives of the action set forth in this ROD are to remediate the groundwater and soil contamination associated with the sources of the VOC groundwater plume at the Site, and to minimize the migration of these contaminants.

5. SUMMARY OF SITE CHARACTERISITCS

5.1 Hydrogeology

The Upper Glacial Aquifer (UGA) underlies the Site. Groundwater flow in the UGA at the Site is dominated by a groundwater divide located approximately 2,000 feet south of Peninsula Boulevard, along a low ridge trending southwest to northeast. North of the divide, groundwater flow is both north and west, depending upon depth. South of the divide, groundwater flow within the UGA is southward toward Macy Channel.

North of the Site, the UGA overlies the Jameco Aquifer. In this area of Long Island, the Jameco Aquifer is limited in extent, but it is an important water-bearing zone because of its high hydraulic conductivity on the order of 200 feet per day. The NYAWC Plant #5 Well Field, located approximately 3,500 feet north of West Broadway, utilizes the Jameco Aquifer as its source for water production and does not utilize the UGA. Given the similar hydraulic properties of the UGA and Jameco Aquifer, there is the potential for significant hydraulic connection between the two units. However, data obtained as a result of the RI activities indicate that the Gardiners Clay, which separates the UGA from the Jameco Aquifer, acts as a confining unit in the area of the Site.

The inter-bedded nature of sediments in the UGA suggests significant vertical and horizontal variability in hydraulic conductivity values. The “20-foot clay” is a discontinuous, semi-confining layer within the UGA that separates the UGA into an upper and lower zone in some areas of the Site.

The depth to groundwater within the unconfined portion of the UGA ranges from approximately 3 to 15 feet below grade surface (bgs), while it ranges from 6 to 17 feet bgs in the semi-confined portion of aquifer. Saturated thickness of the unconfined UGA above the “20-foot clay” layer ranges from 10 to 30 feet. Saturated thickness of the deeper portion of the UGA, below the “20-foot clay,” including the pressure head component caused by the semi-confined conditions, is approximately 55 to 65 feet.

5.2 Summary of the Remedial Investigation

The RI Report for OU2 of the Site, dated May 2017, provides the analytical results of surface soil, subsurface soil, soil gas, and groundwater samples collected from 2012 to 2016 at Cedarwood Cleaners, Mill Road Cleaners, Piermont Cleaners, the former Vogue French Cleaners, and a former vacant lot located at 1255 West Broadway (former Vacant Lot), including adjacent parcels. Soil sampling was not conducted at the former Grove Cleaners property because impacted soils related to solvent discharges to a dry well were removed pursuant to an interim remedial measure under NYSDEC direction.

Sampling activities during this RI were conducted at the Site in phases. In 2012, EPA installed and sampled exterior and sub-slab soil gas monitoring wells and temporary groundwater monitoring wells at Cedarwood Cleaners, Mill Road Cleaners, Piermont Cleaners, and the former Vogue French Cleaners. Based on these findings, in 2013, EPA utilized a Membrane Interface Probe with

Hydraulic Profiling Tool (MiHPT) to characterize subsurface geologic/hydrogeologic conditions and survey for the presence of VOCs at Cedarwood Cleaners, Piermont Cleaners, and the former Vogue French Cleaners.

In 2014, EPA conducted soil sampling and groundwater profiling at the Cedarwood Cleaners, Piermont Cleaners, and the former Vogue French Cleaners. Based on the 2014 results, in early 2015, EPA conducted additional soil sampling and groundwater profiling at Cedarwood Cleaners and Piermont Cleaners. In addition, the sampling program was expanded to conduct soil sampling and groundwater profiling at the former Vacant Lot, including adjacent parcels and public right-of-ways in the immediate area.

Using this data, in late 2015 through early 2016, EPA installed permanent groundwater monitoring wells in the area and conducted further soil sampling and two rounds of groundwater sampling from the permanent groundwater monitoring wells. A subset of the soil and groundwater samples were submitted for compound-specific isotope analysis (CSIA). CSIA is an analytical method that can be used to gain information regarding potential contaminant sources, extent of degradation, and comingling of contaminant plumes. The CSIA revealed that the PCE detected in the groundwater and soil samples was from the same parental PCE stock.

In June and July of 2016, EPA conducted a transducer study involving certain monitoring wells at Cedarwood Cleaners, Piermont Cleaners, the former Vacant Lot, and a stilling well in the Macy Channel, a nearby inlet of the Great South Bay. A transducer study involves measuring water levels to obtain a better understanding of the direction of groundwater flow.

Data collected by EPA during this period, in addition to aerial imagery and a digital elevation model from the United States Geographical Survey, were used to develop localized, three-dimensional models of the PCE plumes in soil and groundwater at OU2 of the Site. The model also resulted in an estimate of the PCE mass in soil and groundwater for each stratigraphic layer sampled during drilling, profiling, or monitoring activities.

Soil Sampling Results

PCE and TCE were the only VOCs detected in soil at concentrations exceeding the NYSDEC Subpart 375-6 Protection of Groundwater Soil Cleanup Objectives (SCOs). SCOs for PCE and TCE are 1.3 and .470 milligrams per kilogram (mg/kg), respectively.

Cedarwood Cleaners

Soil sampling revealed subsurface soil contamination at depths up to approximately 80 feet bgs. Maximum concentrations of PCE and TCE were detected in subsurface soil at 1,350 mg/kg and 1.8 mg/kg at depths of 33 feet bgs and 67.5 feet bgs, respectively. In addition, testing revealed the presence of dense non-aqueous phase liquid (DNAPL) in the southern portion of the property at a depth of approximately 35 feet bgs. Test results and visual observations indicated that DNAPL was present at depths between 33 and 35.5 feet bgs and light non-aqueous phase liquid (LNAPL) was present at depths between 17 and 18 feet bgs.

Former Vacant Lot, 1245 West Broadway, and LIRR Substation Right-of-Way (ROW)

At the former Vacant Lot, soil sampling revealed PCE contamination at a maximum concentration of 118 mg/kg at a depth of 60 feet bgs. At 1245 West Broadway, soil sampling revealed PCE contamination at a maximum concentration of 11,100 mg/kg at a depth of 41.5 feet bgs. Generally, concentrations of TCE at these two properties were detected below 1 mg/kg.

At the LIRR Substation ROW, soil sampling did not reveal significant concentrations of PCE or TCE.

Piermont Cleaners

Soil sampling revealed PCE at a maximum concentration of 2.7 mg/kg at a depth of 35.5 feet bgs. TCE was generally not detected in soil samples from the Piermont Cleaners property.

Former Vogue French Cleaners

PCE and TCE were not detected in soil samples collected at this property.

Mill Road Cleaners

PCE and TCE were not detected in soil samples collected at this property.

Groundwater Sampling Results

Cedarwood Cleaners

Groundwater samples collected from the shallow UGA, "20-foot clay," and deep UGA between depths of 22 and 71 feet bgs revealed PCE and TCE at concentrations up to 65,000 micrograms per liter (µg/L) and 5,000 µg/L, respectively. Other VOCs detected included: 1,1,2- trichloro-1,2,2-trifluoroethane (150 µg/L); 1,2,3- trichlorobenzene (18 µg/L); benzene (570 µg/L); methylene chloride (2,500 µg/L); and *cis*-1,2- dichloroethene (*cis*-1,2-DCE) (42 µg/L).

Former Vacant Lot, 1245 West Broadway, and LIRR Substation ROW

Groundwater samples collected from the shallow UGA, 20-foot clay, and deep UGA revealed PCE and TCE concentrations up to 800,000 µg/L and 2,000 µg/L, respectively. Other VOCs detected included: 2- butanone (50 µg/L); benzene (100 µg/L); 1,1-dichloroethene (15 µg/L); *cis*-1,2-DCE (520 µg/L); methyl tert-butyl ether (140 µg/L); and, vinyl chloride (12 µg/L).

Piermont Cleaners

Groundwater samples collected from the shallow UGA, 20-foot clay, and deep UGA revealed PCE and TCE concentrations up to 1,200 µg/L and 21J µg/L, respectively. Other VOCs detected included: benzene (3.5 µg/L); *cis*-1,2-DCE (51 µg/L); methylene chloride (4,900 µg/L); and vinyl

chloride (12 µg/L).

Former Vogue French Cleaners

PCE and TCE were not detected in any of the groundwater samples collected at the former Vogue French Cleaners property. Benzene, ranging from 1.2 µg/L to 3.5 µg/L, was detected in samples collected immediately downgradient of the property.

Jameco Aquifer

As part of the remedial design for OU1, EPA installed three groundwater monitoring wells in the Jameco Aquifer, the aquifer underlying the UGA, to determine whether Site-related contaminants have impacted the Jameco Aquifer. As part of this effort, one well was installed upgradient of the Site, one was installed downgradient of the source areas, and one was installed within the Site. Based on the sampling results, no Site-related VOCs (e.g., PCE and TCE) were detected in the groundwater samples collected from these wells, indicating that the contaminants have not migrated through the Gardiners Clay and into the Jameco Aquifer.

Soil-Gas Sampling Results

Cedarwood Cleaners

PCE was detected in outdoor, or exterior, soil gas samples at Cedarwood Cleaners at concentrations ranging from 22 micrograms per cubic meter (µg/m^3) to 110,000 µg/m^3, and TCE was detected at concentrations ranging from undetected, or "non-detect," to a level of 4,500 µg/m^3. Soil gas samples were also collected from beneath the concrete floor slab of the building. In those sub-slab soil gas samples, PCE was detected at concentrations ranging from 9,500 µg/m^3 to 5,500,000 µg/m^3, and TCE was detected at concentrations ranging from 50 µg/m^3 to 36,000 µg/m^3. Indoor-air samples were not collected because of the indoor use of PCE at the dry cleaner. Other VOCs detected in soil gas included: vinyl chloride, 1,1-dichloroethene, trans-1,2-dichloroethene, and *cis*-1,2-DCE.

Piermont Cleaners

PCE was detected in exterior soil gas samples at Piermont Cleaners at concentrations ranging from 1,000 to 10,000 µg/m^3, and TCE was detected at concentrations ranging from 1.96 to 1,100 µg/m^3. In the sub-slab soil gas samples, PCE was detected at concentrations ranging from 950 to 21,000 µg/m^3, and TCE was detected at concentrations ranging from 34 to 2,600 µg/m^3. Indoor-air samples were not collected because of the indoor use of PCE at the dry cleaner. Other VOCs detected in soil gas included: vinyl chloride, 1,1-dichloroethene, trans-1,2-dichloroethene, and *cis*-1,2-DCE.

Vapor Intrusion

VOC vapors released from contaminated groundwater and/or soil have the potential to move through the soil and seep through cracks in basements, foundations, sewer lines, and other openings. As part of the OU1 RI, EPA conducted vapor intrusion sampling at fifteen residences. The results of the analyses indicated that one residence had concentrations of VOCs at or above EPA Region 2's acceptable screening levels for sub-slab and indoor air. In 2009, EPA installed a sub-slab depressurization system at this residence, and subsequent sampling indicated that VOCs were no longer detected in indoor air. EPA anticipates conducting vapor intrusion sampling near the two source areas identified during the OU2 RI, pending obtaining permission for access. If EPA determines that there are other properties impacted by the Site, the Agency can take additional actions, as necessary, to address existing or potential future exposure through inhalation of vapors migrating from contaminated groundwater into buildings at the Site.

6. CURRENT AND POTENTIAL FUTURE LAND AND RESOURCE USES

Land Use

The property at the Site is highly developed, with large areas of impervious surfaces and little remaining natural area. The area consists of a mix of commercial and residential properties, with the majority of the commercial properties being located along principal thoroughfares of Mill Road, Peninsula Boulevard, Broadway, and West Broadway. Several hundred residences are located throughout the Site. Most residences are single-family homes. There are several small apartment buildings at the Site, as well as commercial buildings containing medical and professional offices. Approximately 24,792 people live within one mile of the center of the Site according to the 2010 Census.

NYAWC operates its Plant #5 Well Field on property located within approximately 3,500 feet north of West Broadway. All residences and commercial buildings within the Site are connected to the public-water supply.

EPA does not anticipate that the land-use pattern at the Site will change.

Groundwater Use

The potable water supply on Long Island is dependent upon the aquifers underlying the island. These aquifers, including the UGA, Jameco, Magothy, and Lloyd, comprise a system of sole or principal source aquifers that are defined by EPA as supplying at least 50% (and in actuality providing 100%) of drinking water consumed in the area overlying the aquifers. The aquifers underlying Long Island are composed primarily of sand and gravel, mixed with lesser amounts of silt and clay.

NYAWC maintains a water supply plant (Plant #5) and the Plant #5 Well Field that, along with other nearby NYAWC plants, provide water to a significant population of southwestern Nassau County. NYAWC utilized wells from the shallowest aquifer, the UGA, through at least the mid-

1990s. There is evidence that the confining layer of the "20-foot clay" diminishes in thickness and may not be uniform or present in the vicinity of Plant #5 Well Field. Information provided by NYAWC during the RI indicates that, as of September 2010, NYAWC has taken all of its UGA wells out of commission and is pumping exclusively from the Jameco at the Plant #5 Well Field.

Other NYAWC plants in the area (including Plants #9, #10, #15, and #24), located north of Plant #5 Well Field and the Site, utilize the Magothy as their source aquifer. Water supplied to the residences and businesses at the Site is a blend of water provided through a complex, integrated system of well fields and water treatment and storage plants.

7. SUMMARY OF SITE RISKS

As part of the CERCLA remedy selection process, EPA conducted a baseline risk assessment at OU1 to estimate current and future effects of contaminants on human health and the environment. The baseline risk assessment includes a human health risk assessment (HHRA) and an ecological risk assessment. A HHRA is an analysis of the potential adverse human health and ecological effects of releases of hazardous substances from a site or OU in the absence of any actions or controls to mitigate such releases, under current and future land and resource uses. The baseline risk assessment provides the basis for taking action and identifies the contaminants and exposure pathways that need to be addressed if remedial action is determined to be necessary.

7.1 Baseline Human Health Risk Assessment

The HHRA consists of a four-step process to assess site-related cancer risks and non-cancer health hazards. The four-step process is comprised of the following: Hazard Identification, Exposure Assessment, Toxicity Assessment, and Risk Characterization. As a result of the HHRA conducted for OU1, PCE, TCE, *cis*-1,2-DCE, and vinyl chloride were identified as the primary, Site-related contaminants of concern contributing most significantly to elevated cancer risk and non-cancer hazard based on the potential for direct contact exposure to groundwater.

7.2 OU2 Human Health Risk Assessment Screening

A risk screening evaluation, serving as a streamlined HHRA, was conducted for OU2 to assess the potential for these Site-related contaminants to pose current or future risks to human health and the environment in the absence of any remedial action. As mentioned above, EPA conducted a HHRA as part of the OU1 remedial investigation. The remedial investigation of the source areas at OU2 revealed the same chemicals of potential concern (the first step in the risk assessment process described below) for the contaminated soil and groundwater at OU2 as previously identified in the OU1 HHRA. Since the first step in the risk assessment process was previously completed as part of the OU1 HHRA, a streamlined HHRA was performed for OU2.

Risk Assessment Definitions and Process.

A four-step process is used for assessing site-related human health risks for a reasonable maximum exposure (RME) scenario. The process (as discussed below in subsections 7.2.1 – 7.2.4, in more

detail) includes:

- *Hazard Identification* – uses the analytical data collected to identify the chemicals of potential concern (COPCs) at the site for each medium with consideration of a number of factors explained below;
- *Exposure Assessment* - estimates the magnitude of actual and/or potential human exposures, the frequency and duration of these exposures, and the pathways (e.g., consumption of fish, ingesting contaminated soils, etc.) by which humans are potentially exposed;
- *Toxicity Assessment* - determines the types of adverse health effects associated with chemical exposures, and the relationship between magnitude of exposure (dose) and severity of adverse effects (response); and
- *Risk Characterization* - summarizes and combines outputs of the exposure and toxicity assessments to provide a quantitative assessment of site-related risks. The risk characterization also identifies contaminants with concentrations which exceed acceptable levels, defined in the NCP as an excess lifetime cancer risk greater than 1×10^{-6} (one in a million) to 1×10^{-4} (one in ten thousand) or a Hazard Index (HI) greater than 1.0 for non-cancer health effects; contaminants at these concentrations are considered chemicals of concern (COCs) and are typically those that will require remediation at the site. Also included in this section is a discussion of the uncertainties associated with these risks and hazards.

The OU2 HHRA used exposure point concentrations (EPCs) and available risk-based screening levels, i.e., EPA May 2016 Regional Screening Levels (RSLs) at a target risk of 1×10^{-6} and target hazard quotient (HQ) of 1 to calculate facility-specific cancer risks and non-cancer HQs. The RSLs incorporate assumptions on potential exposure scenarios and human receptors, along with contaminant-specific toxicological information. The EPCs were estimated using either the maximum detected concentration of a contaminant or the 95% upper-confidence limit (UCL) of the average concentration as explained in Section 7.2.2. Chronic daily intakes were calculated based on the reasonable maximum exposure (RME), which is the highest exposure reasonably anticipated to occur at the Site. The RME is intended to estimate a conservative exposure scenario that is still within the range of possible exposures.

Each of these steps, as applied to OU2 of the Site, are described below.

7.2.1 Hazard Identification

As part of the OU1 HHRA, PCE, TCE, *cis*-1,2-DCE, and vinyl chloride were identified as the primary, Site-related COCs contributing most significantly to elevated cancer risk and non-cancer hazard resulting from direct contact exposure to groundwater. As a result, a risk assessment screening evaluation, serving as a streamlined HHRA, was conducted for OU2 to assess the potential for these site-related contaminants to pose current or future risks to human health and the environment in the absence of any remedial action. Therefore, the COPCs evaluated in the OU2 HHRA screening included PCE, TCE, *cis*-1,2-DCE, and vinyl chloride. Additional detail can be found in Appendix II - Table 1 and the OU2 HHRA.

7.2.2 Exposure Assessment

Consistent with Superfund policy and guidance, the HHRA assumes that there will be no remediation or institutional controls to mitigate or remove hazardous substance releases. Cancer risks and non-cancer hazard indices were calculated based on an estimate of the reasonable maximum exposure (RME) expected to occur under current and future conditions at a site. The RME is defined as the highest exposure that is reasonably anticipated to occur at a site.

For the purposes of conducting the OU2 HHRA, the two source areas were evaluated separately. The area comprised of Cedarwood Cleaners, the former Vacant Lot, 1245 West Broadway, the LIRR Substation, and sections of West Broadway and Hewlett Parkway adjacent to Cedarwood Cleaners is referred to as Area of Concern 1 (AOC 1). Piermont Cleaners is referred to as AOC 2.

The HHRA evaluated potential risks to populations associated with both current and potential future land uses within each exposure area. The two areas of concern are located in primarily commercial areas, and future land use is expected to remain the same. Potable water is currently provided by a treated public water supply. Exposure pathways were identified for each potentially exposed population and each potential exposure scenario for surface soil, subsurface soil, and groundwater.

The current and future land use scenarios assessed within the risk screening evaluation included the following populations and exposure pathways:

- Resident (child and adult): ingestion, dermal contact, and inhalation of soil particles and vapors from surface soils (0-2 feet) and ingestion, dermal contact, and inhalation of tap water under a future-use scenario where groundwater is an untreated source of tap water;
- Site Worker (adult): ingestion, dermal contact, and inhalation of soil particles and vapors from surface soils; and,
- Construction Worker (adult): ingestion, dermal contact and inhalation of soil particles and vapors from both surface and subsurface soil (0-10 feet).

A summary of the exposure pathways included in the HHRA screening can be found in Appendix II - Table 2. Exposures were evaluated using either the maximum value of a contaminant or a statistical estimate of the data evaluated as the EPC, which is typically an upper-bound estimate (i.e., 95% UCL) of the average concentration for each contaminant. As explained under the Risk Characterization section, risk and hazards for the potential source areas were driven by Site-related COCs in groundwater. As such, a summary of EPCs is provided for the COCs in groundwater only, which can be found in Appendix II - Table 1. A comprehensive list of EPCs for COCs in all media can be found in Table 1 of the OU2 HHRA.

7.2.3 Toxicity Assessment

In this step, the types of adverse health effects associated with contaminant exposures and the relationship between magnitude of exposure and severity of adverse health effects were determined. Potential health effects are contaminant-specific and may include the risk of

developing cancer over a lifetime or other non-cancer health effects, such as changes in the normal functions of organs within the body (e.g., changes in the effectiveness of the immune system). Some contaminants are capable of causing both cancer and non-cancer health effects.

Under current EPA guidelines, the likelihood of carcinogenic risks and non-carcinogenic hazards because of exposure to site chemicals are considered separately. Consistent with current EPA policy, it was assumed that the toxic effects of the site-related chemicals would be additive. Thus, cancer and non-cancer risks associated with exposures to individual COPCs were summed to indicate the potential risks and hazards associated with mixtures of potential carcinogens and non-carcinogens, respectively.

Toxicity data for the human health risk assessment are provided in the Integrated Risk Information System (IRIS) database, the Provisional Peer Reviewed Toxicity Database (PPRTV), or another source that is identified as an appropriate reference for toxicity values consistent with EPA's directive on toxicity values. This information is presented in Appendix II - Table 3 (non-carcinogenic toxicity data summary) and Appendix II - Table 4 (cancer toxicity data summary).

7.2.4 Risk Characterization

Non-carcinogenic risks were assessed using a hazard index (HI) approach, based on a comparison of expected contaminant intakes and benchmark comparison levels of intake (reference doses, reference concentrations). Reference doses (RfDs) and reference concentrations (RfCs) are estimates of daily exposure levels for humans (including sensitive individuals) that are thought to be safe over a lifetime of exposure. The estimated intake of chemicals identified in environmental media (e.g., the amount of a chemical ingested from contaminated drinking water) is compared to the RfD or the RfC to derive the HQ for the contaminant in the particular medium. The HI is obtained by adding the HQs for all compounds within a particular medium that impacts a particular receptor population.

The HQ for oral and dermal exposures is calculated as below. The HQ for inhalation exposures is calculated using a similar model that incorporates the RfC, rather than the RfD.

HQ = Intake/RfD

Where: HQ = hazard quotient
Intake = estimated intake for a chemical (mg/kg-day)
RfD = reference dose (mg/kg-day)

The intake and the RfD will represent the same exposure period (i.e., chronic, subchronic, or acute).

As previously stated, the HI is calculated by summing the HQs for all chemicals for likely exposure scenarios for a specific population. An HI greater than 1.0 indicates that the potential exists for non-carcinogenic health effects to occur as a result of site-related exposures, with the potential for health effects increasing as the HI increases. When the HI calculated for all chemicals for a specific

population exceeds 1, separate HI values are typically calculated for those chemicals that are known to act on the same target organ. These discrete HI values are then compared to the acceptable limit of 1 to evaluate the potential for non-carcinogenic health effects on a specific target organ. For the purposes of the streamlined HHRA screening, however, target organ effects were not specifically evaluated since each of the total residential groundwater hazard estimates were well above 1. Each chemical driving this hazard contributed individual HIs above 1 as well, meaning that the target organs impacted by each chemical would also be above 1. The HIs calculated provide a useful reference point for gauging the potential significance of multiple contaminant exposures within a single medium or across media.

Non-carcinogenic hazards were indicated for groundwater exposure to the future resident only, within both exposure areas. The HI for each receptor (child and adult) exposed to soil was below 1. PCE was the primary driver of elevated hazard at each exposure area, although *cis*-1,2-DCE and TCE contributed as well. A summary of the non-carcinogenic hazards associated with the future groundwater exposure pathway is provided in Appendix II - Table 5.

For carcinogens, risks are generally expressed as the incremental probability of an individual developing cancer over a lifetime as a result of exposure to a carcinogen, using the cancer slope factor (SF) for oral and dermal exposures and the inhalation unit risk (IUR) for inhalation exposures. Excess lifetime cancer risk for oral and dermal exposures is calculated from the following equation, while the equation for inhalation exposures uses the IUR, rather than the SF:

Risk = LADD x SF

Where: Risk = a unitless probability (1×10^{-6}) of an individual developing cancer
LADD = lifetime average daily dose averaged over 70 years (mg/kg-day)
SF = cancer slope factor, expressed as [1/(mg/kg-day)]

These risks are probabilities that are usually expressed in scientific notation (such as 1×10^{-4}). An excess lifetime cancer risk of 1×10^{-4} indicates that one additional incidence of cancer may occur in a population of 10,000 people who are exposed under the conditions identified in the assessment. Again, as stated in the NCP, the acceptable risk range for site-related exposure is 1×10^{-6} (i.e., one additional incidence of a cancer may occur in a population of 1,000,000 who are exposed under the conditions) to 1×10^{-4}.

As shown in Appendix II - Table 6, total carcinogenic risks greater than 1×10^{-4} were identified for the future resident exposed to groundwater within each exposure area. PCE was the primary driver of elevated risk at AOC 1, although TCE and vinyl chloride contributed as well. While none of the individual COCs attributed to carcinogenic risk above the acceptable risk range at AOC 2, the total excess lifetime cancer risk was greater than 1×10^{-4}. PCE and vinyl chloride were the primary risk drivers. The cancer risks estimated for all soil exposure pathways at the Site were less than the acceptable risk range established in the NCP.

7.2.5 Uncertainties in the Risk Assessment

The procedures and inputs used to assess risks in this evaluation, as in all such assessments, are subject to a wide variety of uncertainties. In general, the main sources of uncertainty include:

- environmental chemistry sampling and analysis;
- environmental parameter measurement;
- fate and transport modeling;
- exposure parameter estimation; and
- toxicological data.

Uncertainty in environmental sampling arises in part from the potentially uneven distribution of chemicals in the media sampled. Consequently, there is significant uncertainty as to the actual levels present. Environmental chemistry-analysis error can stem from several sources including the errors inherent in the analytical methods and characteristics of the matrix being sampled.

Uncertainties in the exposure assessment are related to estimates of how often an individual would actually come in contact with the chemicals of concern, the period of time over which such exposure would occur, and in the models used to estimate the concentrations of the chemicals of concern at the point of exposure.

Uncertainties in toxicological data occur in extrapolating both from animals to humans and from high to low doses of exposure, as well as from the difficulties in assessing the toxicity of a mixture of chemicals. These uncertainties are addressed by making conservative assumptions concerning risk and exposure parameters throughout the assessment. As a result, the risk assessment provides upper-bound estimates of the risks to populations near the Site, and is highly unlikely to underestimate actual risks related to the Site.

7.3 Ecological Risk Assessment

EPA conducted a Screening Level Ecological Risk Assessment (SLERA) as part of OU1. The SLERA was conducted to evaluate the potential for ecological effects from exposure to surface water, interstitial water, and/or sediments. In the SLERA, EPA concluded that the risk to potential receptors through either direct contact or ingestion of media containing contaminants was below EPA's acceptable hazard index of 1, indicating that there would be no adverse ecological impacts. Based on the results of the OU2 RI, concentrations of contaminants detected in soil at OU2 of the Site are at depth and, as such, unlikely to pose any unacceptable risks to aquatic or terrestrial ecological receptors.

7.4 Risk Characterization Conclusion

The results of the risk screening indicate that the contaminated groundwater presents an unacceptable risk to human health at AOC 1 and AOC 2. The estimated cancer risks for future residents of 1.6×10^{-2} for PCE, 1.6×10^{-3} for TCE, and 8.8×10^{-4} for vinyl chloride exceed EPA's target risk range. Additionally, estimated non-cancer HI for the future residents of 6.2 for *cis*-1,2-

DCE, 4,300 for PCE, 280 for TCE, and 38 for vinyl chloride exceed the EPA's target threshold of 1.

The SLERA indicated that the Site does not pose any unacceptable risks to ecological receptors at OU2 of the Site.

7.5 Basis for Taking Action

Based on the results of the OU2 RI/FS and the risk assessment screening, EPA has determined that a response action is necessary and that the response action selected in this ROD is necessary to protective of the public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment.

8. REMEDIAL ACTION OBJECTIVES

Remedial action objectives (RAOs) are specific goals to protect human health and the environment. These objectives are based on available information and standards, such as applicable or relevant and appropriate requirements (ARARs), to-be-considered (TBC) guidance, and site-specific, risk-based levels established using the risk assessments described above.

The following RAOs have been established for contaminated groundwater at AOC 1 and AOC 2 of OU2:

- Prevent or minimize current and potential future human exposure (via inhalation, ingestion, and dermal contact) to VOCs in groundwater at concentrations in excess of federal and state standards by addressing the source;
- Restore the impacted aquifer to its most beneficial use as a source of drinking water by reducing contaminant levels to the more stringent of federal and state standards; and,
- Minimize the potential for further migration of groundwater containing VOC concentrations greater than federal and state standards.

The remediation goals for groundwater are presented in Table 7.

Note that these RAOs are not intended to modify those RAOs identified in the OU1 ROD.

The following RAOs have been established for contaminated soil at OU2:

- Prevent impacts to groundwater resulting from soil contamination with concentrations greater than the remediation goals; and,
- Reduce or eliminate the potential for soils with VOCs exceeding the remediation goals to be a continued source of contamination to the aquifer.

The remediation goals for soil are presented in Table 8.

Remediation Areas

As mentioned previously, the OU2 RI identified two separate source areas, referred to as AOC 1 and AOC 2. AOC 1 consists of Cedarwood Cleaners, the former Vacant Lot, 1245 West Broadway, the LIRR Substation, and sections of West Broadway and Hewlett Parkway adjacent to Cedarwood Cleaners. AOC 2 consists of Piermont Cleaners, which is located within a commercial strip mall at the northeastern intersection of Broadway and Piermont Avenue. Refer to Figures 2 and 3.

Contaminated soil in AOC 1 and AOC 2 is present at depths below the water table, where the pores between soil particles are filled with water. This contaminated soil, often referred to as saturated soil in the OU2 RI/FS, in conjunction with the resultant contaminated groundwater is the focus of the remedial alternatives evaluated.

9. DESCRIPTION OF REMEDIAL ALTERNATIVES

Section 121(b)(1) of CERCLA, 42 U.S.C. § 9121(b)(1), mandates that remedial actions must be protective of human health and the environment, cost-effective, and utilize permanent solutions and alternative treatment technologies and resource recovery alternatives to the maximum extent practicable. Section 121(b)(1) also establishes a preference for remedial actions which employ, as a principal element, treatment to permanently and significantly reduce the volume, toxicity, or mobility of the hazardous substances, pollutants, and contaminants at a site. Section 121(d) further specifies that a remedial action must attain a level or standard of control of the hazardous substances, pollutants, and contaminants that at least meets ARARs under federal and state laws, unless a waiver can be justified pursuant to Section 121(d)(4) CERCLA, 42 U.S.C. §9621(d)(4).

Detailed descriptions of the remedial alternatives presented in this ROD can be found in EPA's Feasibility Study Report, dated March 2017.

The construction time provided for each alternative reflects only the time required to construct or implement the remedy and does not include the time required to design the remedy, negotiate the performance of the remedy with any potentially responsible parties, or procure contracts for design and construction, or operation and maintenance.

9.1 Description of Common Elements among Remedial Alternatives

All of the alternatives, with the exception of the no action alternative, include the following common components:

<u>Long-Term Monitoring:</u>

Long-term monitoring to ensure that the soil and groundwater quality improves following the implementation of these alternatives until the remediation goals are achieved. The groundwater sampling would also monitor groundwater quality, including degradation by-products generated by the treatment processes.

Vapor Mitigation at AOC 1 and AOC 2

During the remedial design, measures would be evaluated to mitigate potential impacts to properties at or nearby AOC 1 and AOC 2 from vapors (such as the installation and operation of vapor recovery wells) generated by the treatment processes. If the evaluation indicates any measures are necessary, they will be implemented as part of the remedy.

Institutional Controls:

Implementation of institutional controls for soil and groundwater use restrictions would be required until RAOs are achieved to ensure the remedy remains protective. Institutional controls for groundwater and soil use may include, as determined to be appropriate, existing governmental controls, such as well permit requirements, and restrictive covenants or environmental easements. EPA intends to pursue the creation of environmental easements at appropriate properties at AOC 1 and AOC 2 and to file such environmental easements in the property records of Nassau County until such time that RAOs are attained.

Site Management Plan:

Development of a Site Management Plan (SMP) to provide for the proper, post-construction management of the remedy would be necessary, such as through the use of institutional controls until RAOs are met, as well as through long-term groundwater monitoring, periodic reviews, and certifications.

9.2 Description of the Remedial Alternatives

Alternative 1: No Action

Capital Cost:	$0
Annual O&M Costs:	$0
Present-Worth Cost:	$0
Construction Time:	Not Applicable

The NCP requires that a “No Action” alternative be developed and considered as a baseline for comparing other remedial alternatives. Under this alternative, there would be no remedial action conducted at the Site. This alternative does not include any monitoring or institutional controls. As mentioned above, because this alternative would result in contaminants remaining at the Site that are above levels that would otherwise allow for unrestricted use and unlimited exposure, CERCLA requires that if hazardous substances, pollutants, or contaminants remain on the Site post-remedy, the Site be reviewed at least once every five years. If justified by the review, additional response actions may be implemented.

Alternative 2: Air Sparging/Soil Vapor Extraction (AS/SVE); Long-Term Monitoring; Institutional Controls

AOC 1

Capital Cost:	$2,899,086
Total O&M Costs:	$7,211,883
Present-Worth Cost:	$10,492,429
Construction Time:	6 months to 1 year

AOC 2

Capital Cost:	$1,736,759
Total O&M Costs:	$4,422,318
Present-Worth Cost:	$6,399,321
Construction Time:	6 months to 1 year

Under this alternative, an AS/SVE system would be built, including the installation of a network of vertical air injection or sparging wells into the saturated zone of the aquifer and a network of vapor extraction wells installed into the unsaturated zone. A stream of air under pressure would be injected into the subsurface via the sparging well, and extraction wells would be used to remove contaminants in the vapor phase. VOCs in the vapor phase would be collected from each vacuum extraction well and pumped to a treatment system that would utilize activated granular carbon.

AS/SVE can be implemented in different system configurations. For the purposes of developing a conceptual design and cost estimate for comparison with other technologies, the FS estimated the installation of approximately 59 AS wells and 53 SVE wells to remediate groundwater and soil contamination in AOC 1. In AOC 2, the FS estimated the installation of approximately 14 AS wells and 10 SVE wells.

An asphalt cap would also be installed at the former Vacant Lot to improve the effectiveness of the AS/SVE system by minimizing short circuiting of air flow from the ground surface. The entire footprint of Cedarwood Cleaners and Piermont Cleaners are each currently covered with asphalt, concrete pavement, and a concrete slab-on-grade building. This conceptual design would require further evaluation during the remedial design if chosen to be implemented. Additional wells would have to be installed to monitor the progress of the remediation.

Alternative 3: In-Situ Thermal Remediation; Long-Term Monitoring; Institutional Controls

AOC 1

Capital Cost:	$21,632,524
Total O&M Costs:	$18,722,129
Present-Worth Cost:	$41,048,610
Construction Time:	6 months to 1 year

AOC 2

Capital Cost:	$7,256,345
Total O&M Costs:	$6,015,498
Present-Worth Cost:	$13,548,991
Construction Time:	6 months to 1 year

Under this alternative, an in-situ thermal treatment method, such as Electric Resistivity Heating (ERH), would be employed to treat contaminated groundwater and soil. ERH uses the heat generated by the resistance of the soil matrix to the flow of electrical current between electrodes to raise subsurface temperatures up to 100°C. ERH applies electricity into the ground using heavy cables that connect the power control unit and electrodes. Electricity flows evenly between electrodes within the treatment volume. The water in the subsurface conducts electricity between electrodes. Soil is naturally resistant to the flow of electrical current, thus resulting in the heating of the soil and groundwater. Heat causes the underground contaminants and water to evaporate, creating in-situ steam and vapor. Contaminated vapor and steam are extracted using vacuum extraction wells, captured and treated above-ground with granular activated carbon.

The conceptual design for AOC 1 estimates that approximately 221 electrodes co-located with 221 vacuum extraction wells would be installed. The conceptual design for AOC 2 estimates the installation of approximately 33 electrodes co-located with 33 vacuum extraction wells.

Each electrode boring would be 12 inches in diameter and installed vertically to a depth of 81 feet bgs. Each vacuum recovery well would be co-located with an electrode and installed to a depth of 10 feet bgs as groundwater is anticipated between 12 and 15 feet bgs. The average distance between electrodes would be approximately 16 feet. At each AOC, the recovery wells would be connected to a blower/treatment system. A temporary building or treatment trailer would be located at each AOC to house the treatment equipment. The exact location of the treatment buildings would be determined during the remedial design. This conceptual design would require further evaluation during the remedial design if chosen to be implemented.

Alternative 4A: In-Situ Bioremediation; Long-Term Monitoring; Institutional Controls

AOC 1

Capital Cost:	$3,798,403
Total O&M Costs:	$1,783,220
Present-Worth Cost:	$5,866,084
Construction Time:	6 months to 1 year

AOC 2

Capital Cost:	$1,589,854
Total O&M Costs:	$1,382,456
Present-Worth Cost:	$3,186,371
Construction Time:	6 months to 1 year

Under this alternative, in-situ bioremediation would be implemented to transform VOC contamination into non-toxic compounds. Enhanced anaerobic biodegradation (EAB) involves the injection of an electron donor, nutrients, and/or dechlorinating microorganisms, as necessary, into the subsurface. Electron donors include lactate, whey, and emulsified vegetable oil. The electron donors are delivered via injection wells or direct push technology into the subsurface, creating strong reducing conditions where anaerobic biodegradation transforms chlorinated VOCs through reductive dechlorination into innocuous compounds, such as carbon dioxide, ethene, ethane, and chloride.

The addition of soluble carbon to the subsurface supports the growth of indigenous microbes in groundwater. As bacteria feed on the soluble carbon, they consume dissolved oxygen and other electron acceptors (contaminants), thereby reducing the potential for oxidation reduction, or redox, in groundwater. As bacteria ferment the organic portion of the oil, they release various volatile fatty acids that diffuse and serve as electron donors for other bacteria.

The conceptual design for the implementation of this alternative at AOC 1 consists of a grid of approximately 63 injection wells and a treatment zone from 15 feet bgs to 80 feet bgs. At AOC 2, seven injection wells would be installed along the front of the building, near the area of highest groundwater contamination.

A treatability study conducted as part of the remedial design for OU1 demonstrated significant reduction of contaminant concentrations within the treatment area using an emulsified vegetable oil. An additional pilot study would be conducted during the remedial design to determine a suitable, Site-specific amendment and to develop Site-specific engineering parameters, such as radius of injection, dosage, and frequency of injections.

Alternative 4B: In-Situ Bioremediation with Heat Enhanced Plume Attenuation; Long-Term Monitoring; Institutional Controls

AOC 1

Capital Cost:	$15,768,864
Total O&M Costs:	$5,332,620
Present Worth Cost:	$21,552,450
Construction Timeframe:	6 months to 1 year

The alternative uses a hybrid approach, combining the EAB treatment described under Alternative 4A with heat enhancement. Under this approach, the injection of the bioremediation amendment would be followed by gently heating the saturated soil and groundwater with Heat Enhanced Plume Attenuation (HEPA) to approximately 40°C to enhance the bioremediation rates in the subsurface.

At AOC 1, it is estimated that in addition to the installation of 63 injection wells for the delivery of the amendment, approximately 91 electrodes, 12 inches in diameter, would also be installed vertically to a depth of approximately 81 feet bgs to heat the soil and groundwater. The average distance between electrodes would be approximately 25 feet and would be connected to the power

supply present in the area. The HEPA technology was not considered for AOC 2 because the contaminant levels are not as high as AOC 1.

A pilot study would be conducted during the remedial design to determine a suitable, Site-specific amendment and to evaluate the effectiveness of heat enhancement. Site-specific engineering parameters, such as radius of influence, operating temperatures, dosage, and frequency of injections, would also be developed.

10. COMPARATIVE ANALYSIS OF ALTERNATIVES

In selecting a remedy for a site, EPA considers the factors set forth in Section 121 of CERCLA, 42 U.S.C. § 9621, and conducts a detailed analysis of the viable remedial alternatives in accordance with the NCP, 40 C.F.R Section 300.430(e)(9), the EPA's *Guidance for Conducting Remedial Investigations and Feasibility Studies*, OSWER Directive 9355.3-01, and the EPA's *A Guide to Preparing Superfund Proposed Plans, Records of Decision, and Other Remedy Selection Decision Documents*, OSWER 9200.1-23.P. The detailed analysis consists of an assessment of the individual alternatives set forth in the FS against each of the nine evaluation criteria set forth at Section 300.430(e)(9)(iii) of the NCP and a comparative analysis focusing upon the relative performance of each alternative against those criteria.

A comparative analysis of these alternatives, based upon the nine evaluation criteria noted below, follows.

Threshold Criteria *- The first two remedy selection criteria are known as "threshold criteria" because they are the minimum requirements that each response measure must meet in order to be eligible for selection as a remedy.*

10.1 Overall Protection of Human Health and the Environment

"Overall Protection of Human Health and the Environment" determines whether an alternative eliminates, reduces, or controls threats to public health and the environment through institutional controls, engineering controls, or treatment.

Alternative 1 (No Action) would not meet RAOs and would not be protective of human health and the environment because no action would be taken. Alternatives 2, 3, 4A, and 4B are active remedies that address the sources of the groundwater contamination at the Site and would restore groundwater quality over the long-term. Potential impacts to properties at or nearby AOC 1 and AOC 2 from vapors generated by the treatment processes would be mitigated, to the extent necessary, through the installation and operation of vapor recovery wells. Protectiveness under Alternatives 2, 3, 4A, and 4B requires a combination of actively reducing contaminant concentrations and limiting exposure to residual contaminants through institutional controls until RAOs are met.

10.2 Compliance with ARARs, to be Considered (TBCs) and other Guidance

Section 121(d) of CERCLA, 42 U.S.C. § 9621(d), and Section 300.430(f)(1)(ii)(B) of the NCP, 40 C.F.R. § 300.430(f)(1)(ii)(B), require that remedial actions at CERCLA sites at least attain legally applicable or relevant and appropriate federal and state requirements, standards, criteria, and limitations, collectively referred to as "ARARs," unless such ARARs are waived under Section 121(d)(4) of CERCLA. "Compliance with ARARs" addresses whether a remedy will meet all ARARs or whether there is a basis for invoking a waiver.

EPA and the New York State Department of Health (NYSDOH) have promulgated maximum contaminant levels (MCLs) (40 C.F.R. Part 141 and 10 NYCRR § 5-1.51, respectively), which are enforceable standards for various drinking water contaminants.

The aquifer at the Site is classified as Class GA (6 NYCRR §§ 701.15, 701.18), meaning that it is designated as a potable drinking water supply. As groundwater within OU2 is a potential source of drinking water, federal and state MCLs are considered to be chemical-specific ARARs. If more than one ARAR applies to a particular contaminant, compliance with the more stringent standard is required.

EPA has also identified NYSDEC's unrestricted use soil cleanup objectives (6 NYCRR § 375-6.3(b)) as an ARAR, a "to-be considered," or other guidance to address contaminated soil at the Site. A list of chemical-specific, location-specific, and action-specific ARARs can be found in Tables 11, 12, and 13, respectively, in Appendix II of this ROD.

Alternative 1 would not comply with chemical-specific ARARs for soil and groundwater. Action-specific ARARs do not apply to this alternative because no remedial action would be conducted.

For Alternatives 2, 3, 4A, and 4B, it is intended that chemical-specific and action-specific ARARs would be achieved. Alternatives 2, 3, 4A, and 4B would meet the action-specific ARARs by following the health and safety regulations and waste handling and disposal regulations, as applicable. Alternatives 2, 4A (at AOC 2 only), and 4B are expected to achieve chemical-specific ARARs in 30 years, compared to 3 years for Alternative 3. For Alternative 4A at AOC 1, ARARs would not be achieved in a reasonable timeframe because of the presence of elevated contaminant concentrations and silty-clay layers.

There are no location-specific ARARs associated with OU2.

Primary Balancing Criteria *- The next five remedy selection criteria, 3 through 7, are known as "primary balancing criteria." These five criteria are factors with which tradeoffs between response measures are assessed so that the best option will be chosen, given site-specific data and conditions.*

10.3 Long-Term Effectiveness and Permanence

"Long-term Effectiveness and Permanence" considers the ability of an alternative to maintain protection of human health and the environment over time.

Alternative 1 does not provide long-term effectiveness or permanence as no active remedial measure is proposed. Alternatives 2, 3, 4A, and 4B are considered effective technologies for treatment and/or containment of contaminated soil and groundwater, if designed and constructed properly.

Alternatives 2, 3, 4A, and 4B rely on a combination of treatment and institutional controls. Institutional controls for groundwater and soil use in AOC 1 and AOC 2 may include, as determined to be appropriate, existing governmental controls, such as well permit requirements, and restrictive covenants or environmental easements. EPA intends to pursue the granting of environmental easements at appropriate properties at AOC 1 and AOC 2 until such time that RAOs are attained.

Alternative 2, AS/SVE, may be effective in removing VOC contamination in saturated soil and groundwater. However, the effectiveness of this technology in areas with clay/silty soils may be limited. The effectiveness of Alternative 2 is limited in scope to the extraction of contaminants in the saturated zone. Alternative 4A would be more reliable than Alternative 2 because bioremediation has been proven effective in OU1 pre-design investigations. Alternative 4B allows for a combination of bioremediation and heat enhancement to target and treat areas containing VOC contamination at elevated concentrations that are sorbed to the silty clay.

Alternative 3 is expected to be more effective and reliable in removing VOC contamination in saturated soil and groundwater because the high temperatures used in in-situ thermal remediation significantly enhance soil vapor extraction. Among Alternatives 2, 3, 4A, and 4B, it is anticipated that Alternative 3, using in-situ thermal remediation, would provide the highest mass reduction of soil and groundwater contamination in the shortest period of time, followed by Alternative 4B using bioremediation and HEPA (not applicable for AOC 2). Alternative 4A, using bioremediation alone, would enhance degradation of contaminants, but we estimated that it would require a longer remedial timeframe.

As mentioned previously, the effectiveness of each of these technologies is contingent upon the proper design, including the installation of infrastructure such as electrodes, injection wells, extraction wells, and vacuum extraction wells in the most appropriate locations to treat the contamination. Because the areas requiring remediation are located in a densely populated area with little or no available space for construction, adjustments that could impact the effectiveness of the technology may need to be taken into consideration. Among the alternatives, the challenges posed by the densely populated area to the effectiveness of the technology are greatest for Alternative 3 and would require further evaluation during the remedial design.

Alternatives 2, 3, 4A, and 4B would provide adequate control of risk to human health through the implementation of institutional controls until the remediation goals are achieved, acknowledging that Alternative 3 is expected to be the shortest in duration to achieve the remediation goals.

10.4 Reduction in Toxicity, Mobility, or Volume Through Treatment

"Reduction in Toxicity, Mobility, or Volume of Contaminants through Treatment" evaluates an alternative's use of treatment to reduce the harmful effects of principal contaminants, their ability to move in the environment, and the amount of contamination present.

Alternative 1 would not provide any reduction of toxicity, mobility, or volume of contaminants because no remedial action would be conducted, and the alternative does not include long-term monitoring of soil or groundwater conditions.

Alternatives 2, 3, 4A, and 4B would reduce the toxicity, mobility, and volume of contaminants through treatment of soil and groundwater.

Alternative 3, using in-situ thermal remediation, is anticipated to be the most reliable mass reduction technology because of the high temperatures achieved in the subsurface volatilize the contaminants, including those sorbed to the silty clay.

Alternative 4B, using in-situ bioremediation and HEPA, provides the next most reliable means of mass reduction because heating the subsurface to approximately 40°C enhances the bioremediation rates in silty soils. Alternative 4A, using in-situ bioremediation, provides the next best mass removal technology. As mentioned above, the treatability study conducted as part of the remedial design for OU1 demonstrated significant reduction of contaminant concentrations within the treatment area using an emulsified vegetable oil as the bioremediation amendment. Because the subsurface would not be heated under this alternative, bioremediation rates would not be enhanced.

Alternative 2, using AS/SVE system, would be the least reliable mass reduction technology because of the limitations of this technology in clay/silty soils.

10.5 Short-Term Effectiveness

"Short-term Effectiveness" considers the length of time needed to implement an alternative and the risks the alternative poses to workers, residents, and the environment during implementation.

Alternative 1 would not have short-term impacts because no action would be implemented.

Alternatives 2, 3, 4A, and 4B would have significant short-term impacts on remediation workers and the public during implementation.

Based on the extent of contamination present at AOC 1, the presence of contamination beneath West Broadway, and the challenges of implementing a remedy in a densely populated area with

little or no available space for construction, Alternatives 2, 3, 4A, and 4B would have a significant negative impact on certain local businesses, privately owned properties, and transportation infrastructure. The implementation of any of these alternatives would specifically impact the property and business operation of Cedarwood Cleaners, as well as the privately owned former Vacant Lot across the street. Implementation of these alternatives would require, at a minimum, the total suspension of commercial operations at the Cedarwood Cleaners property, with the associated, resulting loss of income and employment at this small business for a period of six months or more. Injection and/or treatment wells would have to be installed under the Cedarwood Cleaners facility, which may lead to the creation of VOC vapors that could possibly accumulate inside the building. Although measures would be implemented to mitigate the potential impact of VOC vapors that may be released to other nearby properties, these measures would be insufficient to guard against the potential VOC vapor releases to the Cedarwood Cleaners facility. Because of the significantly higher temperatures employed, Alternative 3 has the potential to produce more vapors than Alternatives 2, 4A and 4B and would require significant vapor management.

Until recently, the former Vacant Lot property was operated as a parking lot. The owner of the former Vacant Lot property obtained a building permit from the local municipality and has begun construction of a new structure on the property. Under Alternatives 2, 3, 4A, and 4B, injection and/or treatment wells would have to be installed at the former Vacant Lot property, which may lead to the creation of VOC vapors. In addition, Alternative 3 generates heat during the treatment process. Depending on the proximity of the new structure to the electrodes, the potential exists for the generation of heat close to the building floor and, therefore occupancy may not be permitted during active treatment. Depending on the use of the property at the time of the implementation of any of the active alternatives (2, 3, 4A, or 4B), a temporary shutdown of commercial operations or other long-term prohibitions at the former Vacant Lot property may be necessary. During the remedial design, measures would be evaluated to minimize disruptions to operations at the property.

At Piermont Cleaners, which is part of an active strip mall with multiple other businesses, it is anticipated that Alternative 2, 3, and 4A would be implemented without significant disruption to Piermont Cleaners or the other businesses located in the strip mall. To the extent practicable, construction activities would be performed during weekends or after hours, and injection and/or treatment wells could be installed near the front and potentially the rear of the building, rather than inside. However, under Alternative 3, heat would likely be generated close to the building floor during the treatment process, therefore tenants would not be permitted to occupy Piermont Cleaners and the immediately adjacent businesses during active treatment. During the remedial design, measures would be evaluated to minimize disruptions to the businesses.

The implementation of any of Alternatives 2, 3, 4A, or 4B regarding AOC 1 would require street closings (full and partial) for extended periods. Efforts could be taken to minimize traffic disruption, such as the development during remedial design of a traffic plan to re-route the traffic through alternate streets. Coordination and access would be required from the municipality and County and/or New York State Department of Transportation for work that requires any road-closures.

The possibility of exposure of workers, the surrounding community, and the local environment to contaminants during the implementation of Alternatives 2, 3, 4A, and 4B is present, but minimal. VOC vapors may be generated by the remedial activities. Alternative 3 would produce more vapors than the other alternatives because higher temperatures would result in greater quantities of vapors being generated in the aquifer. Extraction wells could be used to collect vapors generated in the subsurface, thereby minimizing the impact of vapors to adjacent parcels.

Drilling activities, including the installation of monitoring, extraction, and injection wells, could produce contaminated liquids that present some risk to remediation workers at OU2 of the Site. However, measures would be implemented to mitigate exposure risks, including the installation of fencing to restrict access to above-grade treatment components.

Alternatives 2, 3, 4A, and 4B include monitoring that would provide the data needed for proper management of the remedial processes and a mechanism to address any potential impacts to the community, remediation workers, and the environment. Risk from exposure to contaminated saturated soil and groundwater during any construction activities would require management through occupational health and safety controls.

The remedial implementation timeframe required for Alternative 2 is estimated to be 10 years. For Alternative 3, the implementation timeframe is estimated to be 18 months. For Alternative 4A, a timeframe of 10 years is estimated. The time estimated for Alternative 4B is 20 years.

10.6 Implementability

"Implementability" addresses the technical and administrative feasibility of a remedy from design through construction and operation. Factors such as availability of services and materials, administrative feasibility, and coordination with other governmental entities are also considered.

All the alternatives are implementable. Alternative 1 would be easiest to implement, both technically and administratively, as there are no activities to implement. Alternatives 2, 3, 4A, and 4B are all implementable, although each present significant challenges.

Alternatives 2, 3, 4A, and 4B would be technically implementable because services, materials, and experienced vendors would be readily available. Pilot studies would be necessary during the design phase to obtain Site-specific design parameters for Alternatives 2, 3, 4A, and 4B.

Although technically implementable, Alternatives 2, 3, 4A and 4B would have a notable impact on certain local businesses, privately owned properties, transportation infrastructure, and other operations in the vicinity of the Site. They will require traffic re-routing and management in the vicinity of West Broadway and the Hewlett Parkway because the installation of injection and extraction wells would impact adjacent areas as a result of the limited space. The alternatives would also significantly impact the operations of Cedarwood Cleaners, as discussed above. With respect to the former Vacant Lot, the property owner has obtained a building permit from the local municipality and has begun construction of a structure on the property. Such construction plans may be impacted by the implementation of Alternatives 2, 3, 4A, and 4B.

In-situ thermal remediation under Alternative 3 is a well-established technology to address the elevated levels of contamination in the clay/silty layers. Although in-situ thermal remediation would be effective in removing the contamination in the fine grained clay/silt layer, controlling vapors generated during implementation of this technology is expected to be challenging, and the vapors would have the potential to migrate and impact the surrounding community. In-situ bioremediation via HEPA, a component of Alternative 4B, and in-situ bioremediation, a component of Alternative 4A, are also well-established. As mentioned previously, significant contamination reduction was observed during the bioremediation treatability study conducted as part of the remedial design for OU1. The limitations of AS/SVE in clay/silty layers and concentrations of contaminants in the source area, make the successful implementation of Alternative 2 less likely than the other alternatives.

Although technically implementable, the densely populated area, with little or no available space for construction, poses significant implementability challenges for each of the four active alternatives. These challenges, which are discussed above, are greatest under Alternative 3, followed in descending order by Alternative 4B, and then Alternatives 4A and 2.

10.7 Cost

"Cost" includes estimated capital and annual operation and maintenance costs, as well as present worth cost. Present worth cost is the total cost of an alternative over time in terms of today's dollar value. Cost estimates are expected to be accurate within a range of +50 to -30 percent. This is a standard assumption in accordance with EPA guidance.

The estimated capital costs, operation and maintenance (O&M) costs, and present worth costs for the alternatives are discussed in detail in EPA's FS Report. The cost estimates are based on the best available information. Alternative 1 has no cost because no activities are proposed. The present worth cost, using a discount rate of 7%, for Alternatives 2 through 4B at each AOC are as follows:

Alternative	Capital Cost ($)	Total O&M Cost ($)	Present Worth ($)
1.No Action	0	0	0
2. Air Sparging/Soil Vapor Extraction, LTM, ICs—AOC 1	2,899,086	7,211,883	10,492,429
2. Air Sparging/Soil Vapor Extraction, LTM, ICs—AOC 2	1,736,759	4,422,318	6,399,321
3. In-Situ Thermal Remediation, LTM, ICs— AOC 1	21,632,524	18,722,129	41,048,610
3. In-Situ Thermal Remediation, LTM, ICs— AOC 2	7,256,345	6,015,498	13,548,991
4A. In-Situ Bioremediation, LTM, ICs—AOC 1	3,798,403	1,783,220	5,866,084
4A. In-Situ Bioremediation, LTM, ICs— AOC 2	**1,589,854**	**1,38 2,456**	**3,186,371**

4B. In-Situ Bioremediation with Heat Enhanced Plume Attenuation, LTM, ICs—AOC 1	**15,768,864**	**5,332,620**	**21,552,450**

Note: The selected remedy is shown in bold.

Modifying Criteria *- The final two remedy selection criteria, 8 and 9, are called "modifying criteria" because new information or comments from the state or the community on the Proposed Plan may modify the preferred response measure or cause another response measure to be considered.*

10.8 State/Support Agency Acceptance

"State/Support Agency Acceptance" considers whether the State and/or Support Agency agrees with the EPA's analyses and recommendations.

NYSDEC, in consultation with the NYSDOH, concurs with the selected remedy. A letter of concurrence is attached in Appendix IV.

10.9 Community Acceptance

"Community Acceptance" considers whether the local community agrees with the EPA's analyses and preferred alternative. Comments received on the Proposed Plan are an important indicator of community acceptance.

EPA solicited input from the community on the remedial alternatives proposed for OU2 at the Site. Verbal comments received from community members at the June 22, 2017, public meeting did not support or oppose the preferred alternative. Comments were generally inquiries about the nature and extent of contamination at the Site and public health and safety. During the comment period from June 15, 2017 to July 17, 2017, two comment letters were received via email. Copies of the comment letters are provided as Attachment D to Appendix V. A summary of significant comments contained in the letters and the comments received at the public meeting on June 22, 2017, as well as EPA's responses to those comments, are provided in the Responsiveness Summary (Appendix V).

11. PRINCIPAL THREAT WASTES

The NCP establishes an expectation that the EPA will use treatment to address the principal threats posed by a site wherever practicable (40 C.F.R. § 300.430(a)(1)(iii)(A)). The "principal threat" concept is applied to the characterization of "source materials" at a Superfund site. A source material is material that includes or contains hazardous substances, pollutants, or contaminants that act as a reservoir for the migration of contamination to groundwater, surface water, or air, or act as a source for direct exposure. Principal threat wastes are those source materials considered to be highly toxic or highly mobile that generally cannot be contained in a reliable manner or would present a significant risk to human health or the environment should exposure occur. The decision to treat these wastes is made on a site-specific basis through detailed analysis of

alternatives, using the remedy selection criteria described above. The manner in which principal threat wastes are addressed provides a basis for making a statutory finding as to whether the remedy must employ treatment as a principal element.

EPA's findings to date indicate the presence of principal threat wastes in AOC 1. Results from the investigation showed maximum concentrations of PCE of 1,350 mg/kg in subsurface soil at Cedarwood Cleaners and 11,100 mg/kg at 1245 West Broadway. In addition, the DNAPL at the Cedarwood Cleaners is considered a principal threat waste. The selected remedy will address this contamination. No principal threat wastes have been identified for AOC 2.

12. SELECTED REMEDY

12.1 Description of the Selected Remedy

The selected remedy for OU2 is Alternative 4B, In-Situ Bioremediation with Heat Enhanced Plume Attenuation; Long-Term Monitoring; Institutional Controls for AOC 1 and Alternative 4A, In-Situ Bioremediation; Long-Term Monitoring; Institutional Controls for AOC 2.

The major components of the selected remedy for AOC 2 include the following:

- In-situ treatment of contaminated groundwater and soil through anaerobic bioremediation;
- Implementation of a long-term groundwater monitoring program to track and monitor changes in soil and groundwater contamination in OU2 to ensure that RAOs are attained;
- During the remedial design, measures will be evaluated to mitigate potential impacts to properties at or nearby AOC 1 and AOC 2 from vapors (such as the installation and operation of vapor recovery wells) that may be generated by the treatment processes. If the evaluation indicates any measures are necessary, they will be implemented as part of the remedy;
- Institutional controls to ensure that the remedy remains protective until RAOs are achieved for protection of human health over the long term. A plan will be developed which specifies institutional controls to ensure that the remedy is protective. Institutional controls for groundwater and soil use may include, as determined to be appropriate, existing governmental controls, such as well permit requirements, and restrictive covenants or environmental easements; and,
- Development of a Site Management Plan (SMP) to provide for the proper, post-construction management of the Site remedy for OU2, including the use of institutional controls until RAOs are met, as well as long-term monitoring and certifications.

The major components of the selected remedy for AOC 1 are the same as those identified for AOC 2 above, except that the former also includes the heating of contaminated soil and groundwater using a technology such as ERH to increase the bioremediation rates.

In an effort to potentially enhance the environmental benefits of the selected remedies, consideration will be given, during the design, to technologies and practices that are sustainable, in accordance with EPA Region 2's Clean and Green Energy Policy and NYSDEC's Green

Remediation Policy.[2] This will include consideration of green remediation technologies and practices.

12.2 Summary of the Rationale for the Selected Remedy

Based upon the requirements of CERCLA, the results of the OU2 investigation, the detailed analysis of the alternatives, and public comments, EPA has determined the combination of Alternative 4B (In-Situ Bioremediation with Heat Enhanced Plume Attenuation; Long-Term Monitoring; Institutional Controls) for AOC 1 and Alternative 4A (In-Situ Bioremediation; Long-Term Monitoring; Institutional Controls) for AOC 2 best satisfy the requirements of Section 121 of CERCLA, 42 U.S.C. § 9621, and provides the best balance of tradeoffs among the remedial alternatives with respect to the NCP's nine evaluation criteria, as set forth in Section 300.430(e)(9) of the NCP.

Alternative 1 (No Action) was not selected because it is not protective of human health and the environment. While Alternative 2 (AS/SVE) and Alternative 3 (In-Situ Thermal Remediation) are both proven technologies to actively remediate VOC-contaminated groundwater and saturated soils, Site-specific considerations at OU2 of this Site present impediments that make these alternatives less suitable for addressing Site soil and groundwater RAOs. Under Alternative 2, the presence of fine grained clay/silt layers is expected to affect the performance of the AS/SVE system by limiting the migration of air and thereby limiting the effectiveness of air delivery and vapor recovery. Extracted vapor could be trapped within the remediation area depending on the continuity of the clay/silt layer. Although in-situ thermal remediation under Alternative 3 would be effective in removing the contamination in the fine grained clay/silt layer, controlling vapors generated during implementation of this technology is expected to be challenging, and the vapors would have the potential to migrate and impact the surrounding community.

Bioremediation (Alternative 4A) has been proven effective in pre-design investigations conducted at OU1 of the Site. In AOC 2, Alternative 4A will effectively achieve the RAOs and will reduce concentrations of contaminants of concern to meet the remediation goals in soil and groundwater. Utilizing in-situ bioremediation in combination with heat enhancement (Alternative 4B) in AOC 1 increases bioremediation rates thereby increasing the effectiveness for in-situ anaerobic bioremediation to remove elevated concentrations of VOC-contamination in the saturated soils. The densely populated area, with little or no available space for construction, poses significant implementability challenges for each of the active alternatives, and yet Alternatives 4A and 4B can be implemented with fewer challenges than Alternative 3, and at significantly lower costs.

12.3 Summary of the Estimated Selected Remedy Costs

The estimated capital, O&M, and present worth costs of the selected remedy are discussed in detail in EPA's March 2017 FS Report. The cost estimates, which are based on available information, are order-of-magnitude engineering cost estimates that are expected to be within +50 to -30 percent

[2] See https://www.epa.gov/greenercleanups/epa-region-2-clean-and-green-policy, and http://www.dec.ny.gov/docs/remediation_hudson_pdf/der31.pdf.

of the actual cost of the project. Changes to the cost estimate can occur as a result of new information and data collected during the design of the remedy.

A cost estimate summary for the selected remedy is presented in Table 9 and Table 10 in Appendix II. The estimated capital, O&M, and total present-worth costs are presented below:

Alternative	Capital Cost ($)	Total O&M Cost ($)	Present Worth ($)
AOC 1: Alternative 4B; In-Situ Bioremediation with Heat Enhanced Plume Attenuation, LTM, ICs	15,768,864	5,332,620	21,552,450
AOC 2: Alternative 4A; In-Situ Bioremediation, LTM, ICs	1,589,854	1,38 2,456	3,186,371
Selected Remedy Total Cost	**17,358,718**	**5,335,115**	**24,738,821**

12.4 Expected Outcomes of the Selected Remedy

The selected remedy actively addresses the contamination identified in the soils and groundwater in AOC 1 and AOC 2. Remediation of the sources of groundwater contamination at the Site will address principal threat waste material which acts as a reservoir for continued contamination of the groundwater. The selected remedy will restore the aquifer in the OU2 area. Remediation of the soils and groundwater in AOC 1 and AOC 2 will also be beneficial to OU1 remedial efforts; by eliminating the continuing source of contamination to the aquifer present in OU2 areas, the timeframe for aquifer restoration in OU1 areas will be shortened. The results of the risk assessment indicate excess cancer risk and non-cancer health hazards associated with future human ingestion of groundwater above acceptable levels under baseline conditions. The response action selected in this ROD will eliminate risks associated with this pathway.

Current land use in the OU2 project area is commercial. Surrounding land use is a mixture of commercial and residential. There will be disruption in the OU2 project area during the implementation of the remedy, particularly in AOC 1, where, at a minimum, operations at the Cedarwood Cleaners would have to cease for a period of at least six months. However, upon completion of the remedy, the cleanup would allow for unrestricted use and unlimited exposure.

Groundwater and soil remediation goals for the COCs at OU2 of the Site are presented in Table 7 and Table 8. Achieving the remediation goals will restore the aquifer to its beneficial use.

13. STATUTORY DETERMINATIONS

EPA has determined that the selected remedy complies with the CERCLA and NCP provisions for remedy selection, meets the threshold criteria, and provides the best balance of tradeoffs among the alternatives with respect to the balancing and modifying criteria. CERCLA and NCP provisions require the selection of remedies that are protective of human health and the environment, comply with ARARs (or justify a waiver from such requirements), are cost effective, and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum

extent practicable. In addition, CERCLA includes a preference for remedies that employ treatment that permanently and significantly reduce the volume, toxicity, or mobility of hazardous substances as a principal element (or justify not satisfying the preference). The following sections discuss how the OU2 remedy meets those statutory requirements.

13.1 Protection of Human Health and the Environment

The selected remedy will protect human health and the environment because over the long-term it will address sources of contamination that will result in the restoration of groundwater quality at OU2 at the Site to drinking-water standards. Protection will also be achieved by eliminating all remaining direct-contact risks to human health associated with contaminated groundwater.

Institutional controls will also assist in the protecting human health over both the short- and long-term at this OU by helping to control and limit exposure to hazardous substances until RAOs are achieved.

13.2 Compliance with ARARs

The selected remedy complies with chemical-specific and action-specific ARARs. There are no location-specific ARARs that apply to OU2. A complete list of the ARARs, TBCs, and other guidance that concern the selected remedy is presented in Table 11, Table 12, and Table 13, which can be found in Appendix II.

13.3 Cost Effectiveness

A cost-effective remedy is one whose costs are proportional to its overall effectiveness (40 C.F.R. § 300.430(f)(1)(ii)(D)). Overall effectiveness is based on the evaluations of long-term effectiveness and permanence, reduction in toxicity, mobility, and volume through treatment, and short-term effectiveness.

Each of the alternatives underwent a detailed cost analysis. In that analysis, capital and annual O&M costs were estimated and used to develop present-worth costs. In the present-worth cost analysis, annual O&M costs were calculated for the estimated life of each alternative. The total estimated present worth cost for implementing the selected remedy is $24,738,821.

Based on the comparison of overall effectiveness to cost, the selected remedy meets the statutory requirement that Superfund remedies be cost effective (40 C.F.R. § 300.430(f)(1)(ii)(D)) in that it represents reasonable value for the money to be spent. Overall effectiveness was evaluated by assessing three of the five balancing criteria in combination (long-term effectiveness and permanence; reduction in toxicity, mobility, and volume through treatment; and short-term effectiveness). Overall effectiveness was then compared to costs to determine cost-effectiveness. The overall effectiveness of the selected remedy has been determined to be proportional to the costs, and the selected remedy therefore represents reasonable value for the money to be spent.

13.4 Utilization of Permanent Solutions and Alternative Treatment (or Resource Recovery) Technologies to Maximum Extent Practicable

The selected remedy complies with the statutory mandate to utilize permanent solutions, alternative treatment technologies, and resource recovery alternatives to the maximum extent practicable. Of those alternatives that are protective of human health and the environment and comply with ARARs (or provide a basis for invoking an ARAR waiver), the EPA has determined that the selected remedy provides the best balance of tradeoffs among the alternatives with respect to the balancing criteria set forth in the Section 300.430(f)(1)(i)(B) of the NCP, because they each represent the maximum extent to which permanent solutions and treatment technologies can be utilized in a practicable manner at this OU. The selected remedy satisfies the criteria for long-term effectiveness and permanence by permanently reducing the mass of contaminants in the soil and groundwater at the Site, thereby reducing the toxicity, mobility, and volume of contamination.

The selected remedy is implementable because it employs standard technologies that are readily available.

13.5 Preference for Treatment as a Principal Element

Through the use of in-situ bioremediation and heat enhancement technologies, the selected remedy satisfies the statutory preference for remedies that employ treatment as a principal element.

13.6 Five-Year Review Requirements

Because this remedy will not result in hazardous substances, pollutants, or contaminants remaining on Site above levels that allow for unlimited use and unrestricted exposure, but it will take more than five years to attain the remediation goals, EPA will conduct a review within five years of construction completion for the Site to ensure that the remedy is, or will be, protective of human health and the environment.

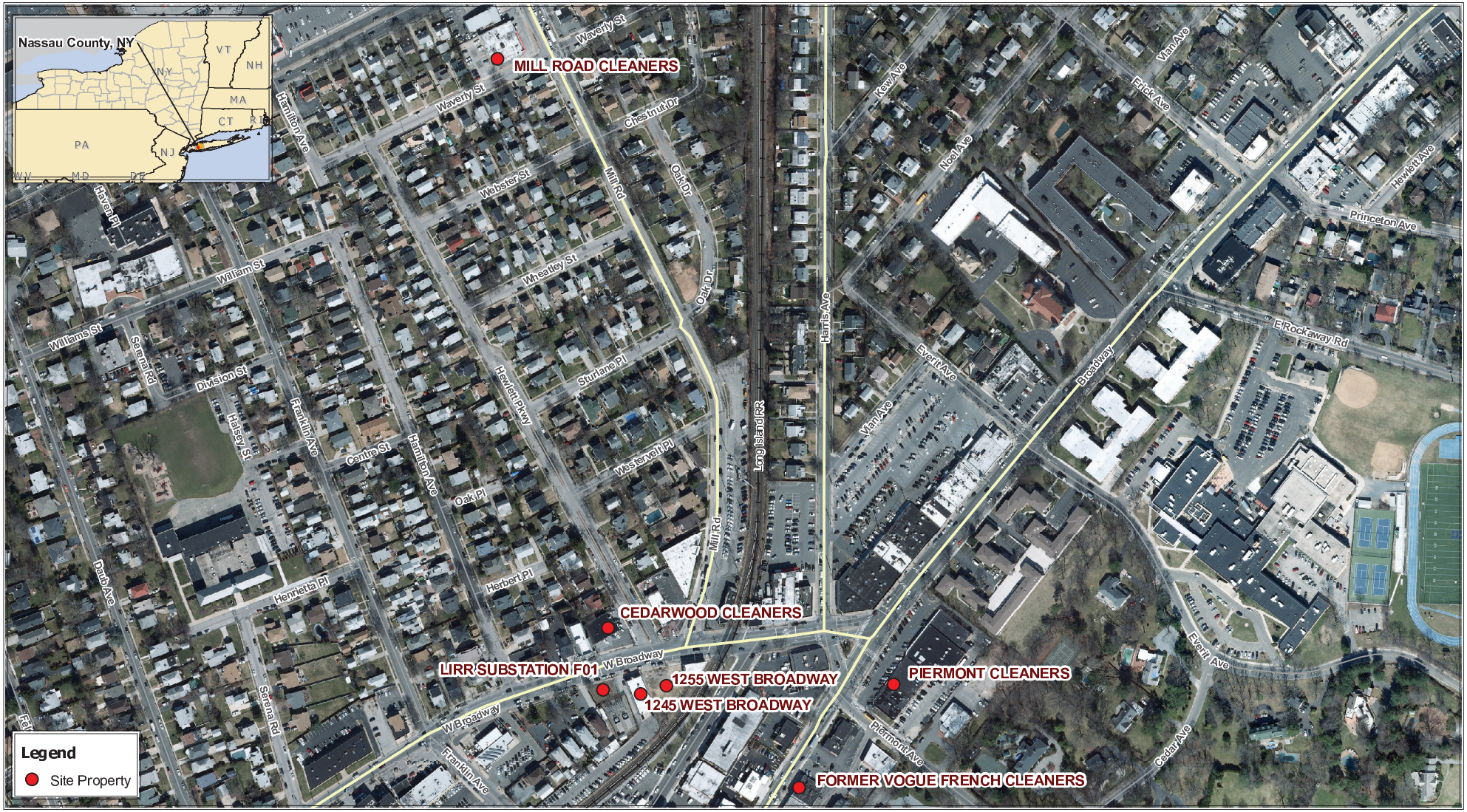
14. DOCUMENTATION OF SIGNIFICANT CHANGES

The Proposed Plan for OU2 of the Site was released on June 15, 2017. The Proposed Plan identified Alternative 4B as the preferred alternative for remediating AOC 1, and Alternative 4A as the preferred alternative for remediating AOC 2 of the Site.

EPA considered all comments at the public meeting on June 22, 2017, and reviewed all written (including electronic formats, such as e-mail) during the public comment period and has determined that no significant changes to the remedy, as originally identified in the Proposed Plan, are necessary or appropriate.

APPENDIX I

FIGURES



Map created using 2010 orthoimagery data from NY state.

Map Creation Date: 04 April 2016

Coordinate system: State Plane New York Long Island
FIPS: 3104
Datum: NAD83
Units: Feet

240 0 240
Feet

Figure 1: Map
Peninsula Boulevard Site
Hewlett, NY

Area of Concern 1

Area of Concern 2

Figure 2: Area of Concern 1 (AOC 1) and Area of Concern 2 (AOC 2)

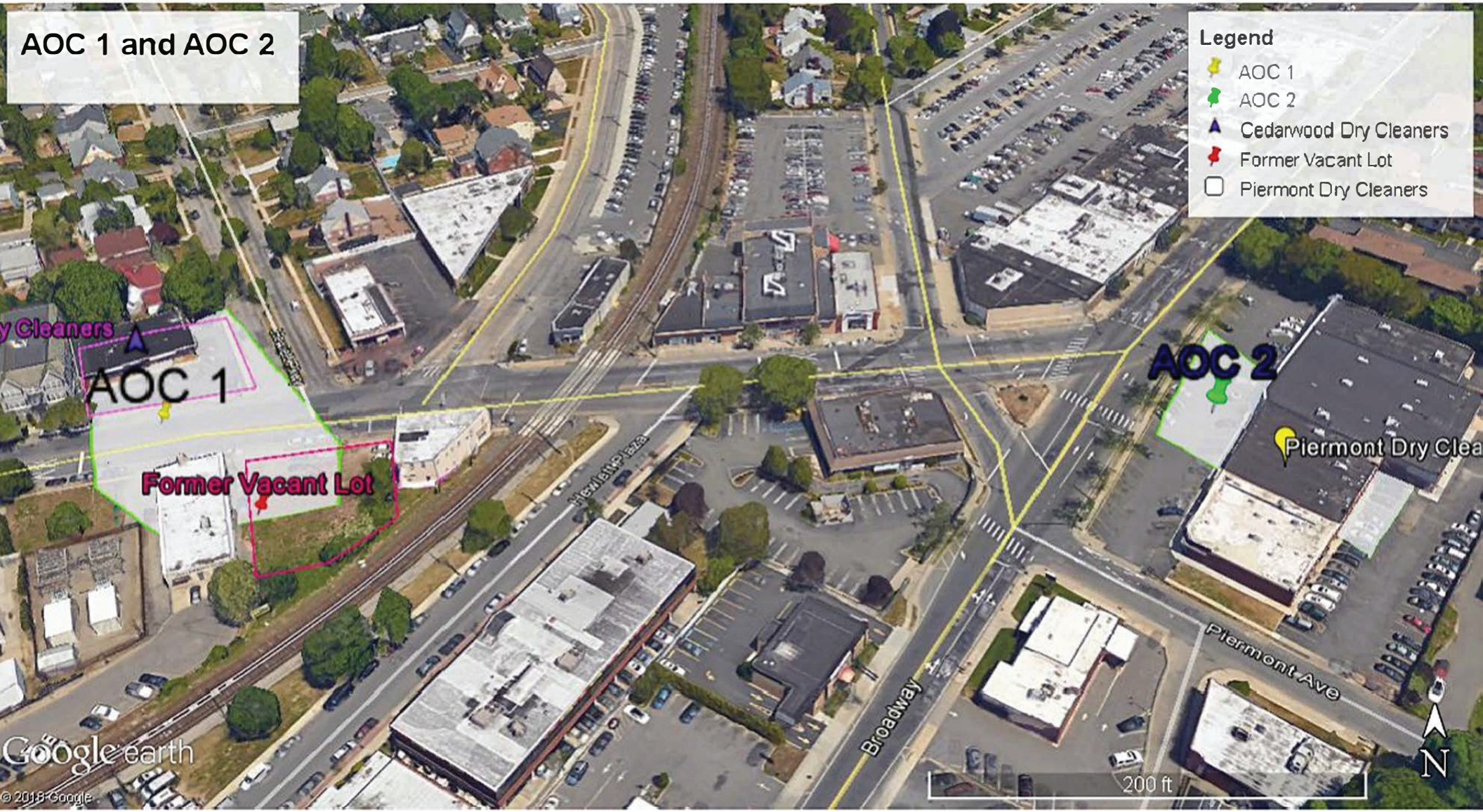


Figure 3: AOC 1 and AOC 2

APPENDIX II

TABLES

Table 1
Summary of Chemicals of Concern and
Medium-Specific Exposure Point Concentrations

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Point	Chemical of Concern	Concentration Detected		Concentration Units	Frequency of Detection	Exposure Point Concentration (EPC)[1]	EPC Units	Statistical Measure
		Minimum	Maximum					
Groundwater AOC 1	cis-1,2-dichloroethylene	0.96	2600	µg/l	24 / 93	222	µg/l	99% KM (Chebyshev) UCL
	Tetrachloroethylene	1.2	800000	µg/l	84 / 95	176216	µg/l	99% KM (Chebyshev) UCL
	Trichloroethylene	0.78	6300	µg/l	40 / 93	785	µg/l	95% KM Approximate Gamma UCL
	Vinyl chloride	12	300	µg/l	5 / 93	17	µg/l	95% KM (t) UCL
Groundwater AOC 2	cis-1,2-dichloroethylene	0.23	51	µg/l	48 / 66	6.2	µg/l	KM H-UCL
	Tetrachloroethylene	0.21	4260	µg/l	49 / 66	674	µg/l	97.5% KM (Chebyshev) UCL
	Trichloroethylene	0.22	21	µg/l	31 / 66	2.8	µg/l	KM H-UCL
	Vinyl chloride	0.56	12	µg/l	14 / 66	1.5	µg/l	KM H-UCL

Footnotes:
(1) 95% UCLs were calculatd using ProUCL version 5.1 for constituent datasets with a sample size greater than or equal to 10 samples and 5 or more detects.

Definitions:
UCL=upper confidence limit
µg/l=microgram per liter

Table 2
Selection of Exposure Pathways

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor (Age)	Exposure Route	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current/Future	Soil	Surface Soil (0-2 feet)	AOC 1 and AOC 2	Resident	Adult and Child (0-6 yrs)	Dermal	Quantitative	Residents may come into contact with contaminants in surface soil through incidental ingestion, direct contact, and/or inhalation of fugitive dusts and volatile chemicals released from soil.
						Ingestion	Quantitative	
						Inhalation	Quantitative	
				Commercial/ Industrial Worker	Adult	Dermal	Quantitative	Site workers may come into contact with contaminants in surface soil through incidental ingestion, direct contact, and/or inhalation of fugitive dusts and volatile chemicals released from soil while working at the site.
						Ingestion	Quantitative	
						Inhalation	Quantitative	
		Surface and Subsurface Soil (0-10 feet)	AOC 1 and AOC 2	Construction Worker	Adult	Dermal	Quantitative	Construction workers may come into contact with contaminants in surface and subsurface soil through incidental ingestion, direct contact, and/or inhalation of fugitive dusts and volatile chemicals released from soil while working at the site.
						Ingestion	Quantitative	
						Inhalation	Quantitative	
Future	Groundwater	Groundwater	AOC 1 and AOC 2	Resident	Adult and Child (0-6 yrs)	Dermal	Quantitative	Residents are currently supplied treated groundwater from a municipal source. Although the future potable use of untreated groundwater is highly unlikely, residents could hypothetically be exposed to groundwater via untreated potable uses or through installation of personal wells.
						Ingestion	Quantitative	
						Inhalation	Quantitative	

Table 3
Non-Carcinogenic Toxicity Data Summary

Pathway: Ingestion/Dermal

Chemicals of Concern	Chronic/ Subchronic	Oral RfD Value	Oral RfD Units	Absorp. Efficiency (Dermal)[1]	Adjusted RfD (Dermal)	Adjusted Dermal RfD Units	Primary Target Organ	Combined Uncertainty /Modifying Factors	Sources of RfD Target Organ	Dates of RfD[2]
cis-1,2-dichloroethylene	Chronic	0.002	mg/kg-day	1	0.002	mg/kg-day	Kidney	3,000	IRIS	7/15/2016
Tetrachloroethylene	Chronic	0.006	mg/kg-day	1	0.006	mg/kg-day	Neurological	1,000	IRIS	7/15/2016
Trichloroethylene	Chronic	0.0005	mg/kg-day	1	0.0005	mg/kg-day	Heart/Immunological/Developmental/Kidney	10 to 1,000	IRIS	7/15/2016
Vinyl chloride	Chronic	0.003	mg/kg-day	1	0.003	mg/kg-day	Liver	30	IRIS	7/15/2016

Pathway: Inhalation

Chemicals of Concern	Chronic/ Subchronic	Inhalation RfC	Inhalation RfC Units	Primary Target Organ	Combined Uncertainty /Modifying Factors	Sources of RfC Target Organ	Dates of RfC[2]
cis-1,2-dichloroethylene	NA	NA	NA	NA	NA	NA	NA
Tetrachloroethylene	Chronic	0.04	mg/m^3	Neurological	100	IRIS	7/15/2016
Trichloroethylene	Chronic	0.002	mg/m^3	Heart/Immunological	10 to 100	IRIS	7/15/2016
Vinyl chloride	Chronic	0.1	mg/m^3	Liver	30	IRIS	7/15/2016

Footnotes:
(1) Source: Risk Assessments Guidance for Superfund. Volume 1: Human Health Evaluation Manual (Part E). Section 4.2 and Exhibit 4-1.
(2) Dates reflect when the source was searched and not the publication date.

Definitions:
IRIS=Integrated Risk Information System
mg/kg-day=milligram per kilogram per day
mg/m^3=milligram per cubic meter
NA=not available
RfC=reference concentration
RfD=reference dose

Table 4
Cancer Toxicity Data Summary

Pathway: Ingestion/ Dermal

Chemical of Concern	Oral Cancer Slope Factor	Units	Adjusted Cancer Slope Factor (for Dermal)	Slope Factor Units	Weight of Evidence/Cancer Guideline[1]	Source	Date[2]
cis-1,2-dichloroethylene	NA	NA	NA	NA	Inadequate information to assess carcinogenic potential	NA	NA
Tetrachloroethylene	2.1E-03	$(mg/kg\text{-}day)^{-1}$	2.1E-03	$(mg/kg\text{-}day)^{-1}$	likely to be carcinogenic to humans	IRIS	7/15/2016
Trichloroethylene[3]	4.6E-02	$(mg/kg\text{-}day)^{-1}$	4.6E-02	$(mg/kg\text{-}day)^{-1}$	carcinogenic to humans	IRIS	7/15/2016
Vinyl chloride	7.2E-01	$(mg/kg\text{-}day)^{-1}$	7.2E-01	$(mg/kg\text{-}day)^{-1}$	A	IRIS	7/15/2016

Pathway: Inhalation

Chemical of Concern	Unit Risk	Units	Inhalation Cancer Slope Factor	Slope Factor Units	Weight of Evidence/Cancer Guideline[1]	Source	Date[2]
cis-1,2-dichloroethylene	NA	NA	NA	NA	Inadequate information to assess carcinogenic potential	NA	NA
Tetrachloroethylene	0.0021	$(mg/kg\text{-}day)^{-1}$	0.0021	$(mg/kg\text{-}day)^{-1}$	likely to be carcinogenic to humans	IRIS	7/15/2016
Trichloroethylene[4]	0.046	$(mg/kg\text{-}day)^{-1}$	0.046	$(mg/kg\text{-}day)^{-1}$	carcinogenic to humans	IRIS	7/15/2016
Vinyl chloride	0.72	$(mg/kg\text{-}day)^{-1}$	0.72	$(mg/kg\text{-}day)^{-1}$	A	IRIS	7/15/2016

Footnotes:

(1) Weight of evidence information obtained from IRIS. Categories are as follows:
A=Known human carcinogen
B2=Probable human carcinogen based on sufficient evidence of carcinogenicity in animals
C=Possible human carcinogen
D=Not classifiable due to lack of animal bioassays and human studies

(2) Dates reflect when the source was searched and not the publication date.

(3) The slope factor is adult-based. TCE is carcinogenic by a mutagenic mode of action for induction of kidney tumors. The kidney lifetime oral slope factor is 9.3×10^{-3} per mg/kg-day.

(4) The inhalation unit risk is adult-based. TCE is carcinogenic by a mutagenic mode of action for induction of kidney tumors. The kidney lifetime unit risk is 1.0×10^{-6} per $\mu g/m^3$.

Definitions:
IRIS=Integrated Risk Information System
IUR=inhalation unit risk
NA=Not available
(mg/kg-day)-1=per milligrams per kilogram per day
$(\mu g/m^3)^{-1}$=per micrograms per cubic meter

Table 5
Risk Characterization Summary - Non-Carcinogens

Scenario Timeframe: Future
Receptor Population: Resident (AOC 1)
Receptor Age: Child and Adult

Medium	Exposure Medium	Exposure Point	Chemical Of Concern[1]	Primary Target Organ(s)	Non-Carcinogenic Hazard Quotient[2]
Groundwater	Groundwater	Tap Water	cis-1,2-Dichloroethylene	Kidney	6.2E+00
			Tetrachloroethylene	Neurological	4.3E+03
			Trichloroethylene	Heart/Immunological/ Developmental/Kidney	2.8E+02
			Vinyl chloride	Liver	3.8E-01
				Groundwater Hazard Index Total[3]=	**4.6E+03**
				Receptor Hazard Index[3]=	**4.6E+03**

Scenario Timeframe: Future
Receptor Population: Resident (AOC 2)
Receptor Age: Child and Adult

Medium	Exposure Medium	Exposure Point	Chemical Of Concern[1]	Primary Target Organ(s)	Non-Carcinogenic Hazard Quotient[2]
Groundwater	Groundwater	Tap Water	cis-1,2-Dichloroethylene	Kidney	1.7E-01
			Tetrachloroethylene	Neurological	1.6E+01
			Trichloroethylene	Heart/Immunological/ Developmental/Kidney	1.0E+00
			Vinyl chloride	Liver	3.4E-02
				Groundwater Hazard Index Total[3]=	**1.8E+01**
				Receptor Hazard Index[3]=	**1.8E+01**

Footnotes:
(1) A streamlined risk screening evaluation was conducted for the Operable Unit (OU) 2 source areas. This evaluation was limited to the primary contaminants of concern selected for OU1 (groundwater plume), as shown above.
(2) The Hazard Quotients (HQs) displayed represent the combined hazard for the child and adult resident across the ingestion, dermal contact and inhalation exposure pathways. Hazards specific to each exposure pathway and age group were not included in the risk screening evaluation.
(3) The HI represents the summed HQs for each chemical. The risk screening evaluation did not include HIs by target organ.

Table 6
Risk Characterization Summary - Carcinogens

Scenario Timeframe: Future
Receptor Population: Resident (Cedarwood Cleaners/Vacant Lot)
Receptor Age: Child and Adult

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risk Exposure Routes Total[2]
Groundwater	Groundwater	Tap Water	cis-1,2-Dichloroethylene[1]	NA
			Tetrachloroethylene	1.6E-02
			Trichloroethylene	1.6E-03
			Vinyl chloride	8.8E-04
			Exposure Medium Total=	1.9E-02
			Total Risk=	**1.9E-02**

Scenario Timeframe: Future
Receptor Population: Resident (Piermont Cleaners)
Receptor Age: Child and Adult

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risk Exposure Routes Total[2]
Groundwater	Groundwater	Tap Water	cis-1,2-Dichloroethylene[1]	NA
			Tetrachloroethylene	6.1E-05
			Trichloroethylene	5.7E-06
			Vinyl chloride	8.0E-05
			Exposure Medium Total=	1.5E-04
			Total Risk=	**1.5E-04**

Footnotes:(1) The risk associated with exposure to cis-1,2-Dichloroethylene could not be assessed as there no cancer toxicity values associated with this chemical.(2) The cancer risk estimates displayed represent the combined risk across the ingestion, dermal contact and inhalation exposure pathways. Risks specific to each exposure pathway were not included in the risk screening evaluation.Definitions:NA=not available

Table 7 Cleanup Levels for Contaminants of Concern in OU2 Groundwater				
Chemicals of Concern (COCs)	**NYSDEC Water Quality Standard (µg/L)**	**Federal Maximum Contaminant Level (µg/L)**	**NYSDOH Drinking Water Quality Standards (µg/L)**	**Cleanup Level* (µg/L)**
cis-1,2-DCE	5	70	5	5
trans-1,2-DCE	5	10	5	5
TCE	5	5	5	5
PCE	5	5	5	5
Vinyl Chloride	2	2	2	2

Notes:

*The cleanup level represents the level to which each COC will be cleaned up to. The cleanup level is the more stringent of the federal or state value listed above. The table does not include all ARARs, TBCs and other guidance that applies to the remedy selected in this ROD.

Table 8 **Cleanup Levels for Soil**	
Chemicals of Concern (COCs)	**Cleanup Levels* (mg/kg)**
cis-1,2-DCE	0.25
trans-1,2-DCE	0.19
TCE	0.02
PCE	0.47
Vinyl Chloride	1.3

Notes:

* NYSDEC soil cleanup objectives 6 NYCRR Subpart 375-6.5

Table 9 : Cost Estimate Summary for the Selected Remedy AOC1

Alternative 4B, AOC1

In-Situ Bioremediation, HEPA, LTM, and ICs

COST ESTIMATE SUMMARY

Site: Peninsula Boulevard Superfund Site, OU2
Location: Hewlett, Town of Hempstead, New York
Phase: Feasibility Study (-30% - +50%)
Base Year: 2017
Date: March 21, 2017

Description: Alternative 4B consists of bioremediation injections followed by heat enhanced plume attenuation (HEPA) treatment for groundwater and saturated soils at AOC1. PDI will be performed at AOC1. ICs and LTM will be maintained for AOC1. Costs related to temporary or permanent re-location of occupants are not included.

Item No.	Description	Quantity	Unit	Unit Cost	Total	Notes
CAPITAL COSTS:						
1	**Site Survey**					
1.1	Survey	1	LS	$ 15,000	$ 15,000	approx 48,570 sq ft
1.2	Utility Clearance	1	LS	$ 15,000	$ 15,000	
	Sub-Total				**$ 30,000**	
2	**Pre-Design Investigation**					
2.1	Investigation Work Plan	1	LS	$ 75,000	$ 75,000	Sampling Plan, QAPP, HASP
2.2	Geoprobe Mob/Demob	1	LS	$ 6,000	$ 6,000	
2.3	Direct Push Geoprobe Borings	10	Day	$ 1,500	$ 15,000	Assumes 30 borings at AOC1, 15 ft deep; 4 borings/day, assumes 2 days for mob/demob
2.4	Temporary Groundwater Sampling Points	7	Day	$ 2,000	$ 14,000	Assumes 5 temporary points at AOC1, varying depths of 15 to 80 ft deep; 1 boring/day
2.5	Monitoring/Performance Wells Installation	5	EA	$ 4,500	$ 22,500	Assumes 5 MWs at AOC1; 2-inch diameter; 80 ft deep, PVC riser, screen and development.
2.6	Aquifer Pump Test	1	LS	$ 50,000	$ 50,000	Assumes 1 4-inch diameter monitoring well installation; 130 ft deep, PVC riser, screen, and IDW
2.7	Flush-mount curb box with inner locking cap	6	EA	$ 275	$ 1,650	For 6 monitoring wells
2.8	Water Level Measurements/Transducers	1	LS	$ 5,000	$ 5,000	
2.9	Steam Clean Equipment	17	Day	$ 350	$ 5,950	inc. daily rental for steam cleaner and 2 hr/day for decon equipment
2.10	IDW	1	LS	$ 15,000	$ 15,000	Sleeves, decon water, misc used items, Groundwater waste from well installation and development
2.11	Surface Repair	1	LS	$ 6,000	$ 6,000	
2.12	Soil Sample Analysis and data evaluation	108	EA	$ 550	$ 59,400	Sampling 30 borings at 5 ft intervals from 0 - 15 ft bgs for VOCs, 20% QC samples
2.13	Groundwater Sampling and data evaluation	102	EA	$ 1,000	$ 102,000	Sampling 5 temporary points at 5 ft intervals from 15 - 80 ft bgs, and 15 monitoring wells for baseline; 20% QC samples; analysis for VOCs, TOC, ORP, etc
2.14	Geochem and treatability study analysis	6	EA	$ 1,000	$ 6,000	1 deep and 1 shallow sample from 3 locations
2.15	Field Work Oversight	380	MH	$ 150	$ 57,000	2 persons; includes sampling labo
2.16	Treatability Study	1	LS	$ 50,000	$ 50,000	
2.17	Pre-Design Report	1	LS	$ 50,000	$ 50,000	
	Sub-Total				**$ 540,500**	
3	**Site Mobilization/Demobilization**					
3.1	Remedial Action Workplan/Permitting	1	LS	$ 100,000	$ 100,000	
3.2	Submittals/Implementation Plans	1	LS	$ 75,000	$ 75,000	
3.3	Post Construction Submittals	1	LS	$ 40,000	$ 40,000	
3.4	Decontamination Station	1	LS	$ 5,000	$ 5,000	Portable decontamination pad/truck tire wash
	Sub-Total				**$ 220,000**	
4	**Health and Safety**					
4.1	Perimeter Air Monitoring	4	Week	$ 1,200	$ 4,800	Tripod station with Dust and PID monitors
4.2	H&S Monitoring	4	Week	$ 300	$ 1,200	Meters for monitoring work zone
4.3	PPE and Field Supplies	1	LS	$ 5,000	$ 5,000	
	Sub-Total				**$ 11,000**	
5	**Site Preparation**					
5.1	Temporary Security Fence	1,000	LF	$ 30	$ 30,000	Temporary fence around property boundary, extending to Hewlett Parkway and West Broadway during construction
5.2	Silt Fence	400	LF	$ 3	$ 1,200	Install silt fence around Cedarwood Cleaners property perimeter
5.3	Traffic Re-routing and closure of Roadways	1	LS	$ 150,000	$ 150,000	Closure of Hewlett Parkway and West Broadway, traffic study and traffic plan
	Sub-Total				**$ 181,200**	

Table 9 : Cost Estimate Summary for the Selected Remedy AOC1

Alternative 4B, AOC1

In-Situ Bioremediation, HEPA, LTM, and ICs

COST ESTIMATE SUMMARY

Site: Peninsula Boulevard Superfund Site, OU2
Location: Hewlett, Town of Hempstead, New York
Phase: Feasibility Study (-30% - +50%)
Base Year: 2017
Date: March 21, 2017

Description: Alternative 4B consists of bioremediation injections followed by heat enhanced plume attenuation (HEPA) treatment for groundwater and saturated soils at AOC1. PDI will be performed at AOC1. ICs and LTM will be maintained for AOC1. Costs related to temporary or permanent re-location of occupants are not included.

Item No.	Description	Quantity	Unit	Unit Cost	Total	Notes
6	**Pilot Study**					
6.1	Mob/Demob- Drilling subcontractor	1	LS	$ 6,000	$ 6,000	Hollow stem auger rig, decon pad, water truck
6.2	Mob/Demob- Injection subcontractor	1	LS	$ 6,000	$ 6,000	Equipment for pilot test
6.3	Injection Well Installation	2	EA	$ 4,500	$ 9,000	4-inch diameter PVC casing / 20-ft PVC screen; 80 ft deep
	Injection Substrate Material	4,408	LBS	$ 2	$ 6,612	2,204 lbs of Lactoil emulsion per well at Cedarwood Cleaners
6.4						
6.5	Injection Labor and Equipment	1	DAY	$ 6,000	$ 6,000	Labor and equipment for 1, 3man crew + per diem
6.6	Well Development	4	HR	$ 200	$ 800	2 hr / injection well
6.7	Water truck	1	DAY	$ 450	$ 450	2,000 -gal non-potable water
6.8	Temporary water storage tank	1	DAY	$ 30	$ 30	5,000 gal poly
6.9	Delivery fee of truck and tank	1	EA	$ 700	$ 700	includes drop off and pick up
6.10	IDW- Injection Wells	1	LS	$ 4,000	$ 4,000	Includes soil cuttings from installation and water disposal from development of injection wells and decon water
6.11	Pilot Study Sampling	18	EA	$ 1,000	$ 18,000	Sampling one round at 15 MWs, includes sample and VOCs analysis and water chemistry, 20% QC samples
6.12	Data Reduction, Evaluation, Reporting	1	LS	$ 30,000	$ 30,000	
6.13	Surface Repair	1	LS	$ 200	$ 200	
6.14	Flush-mount curb box with inner locking cap	2	EA	$ 1,500	$ 3,000	For injection wells
	Sub-Total				**$ 90,792**	
7	**Full Scale Injection Well Installation**					
7.1	Mob/Demob- Drilling subcontractor	1	LS	$ 100,000	$ 100,000	Hollow stem auger rig, decon pad, water truck
7.2	Injection Well Installation	61	EA	$ 4,500	$ 274,500	4-inch diameter PVC casing / 20-ft PVC screen; 80 ft deep
7.3	Saw cut Slab	5	Day	$ 375	$ 1,875	Rental
7.4	Injection well piping	5,040	LF	$ 40	$ 201,600	
7.5	Well Development	122	HR	$ 200	$ 24,400	2 hr / injection well
	IDW- Injection Wells	1	LS	$ 20,000	$ 20,000	Includes soil cuttings from installation and water disposal
7.6						from development of injection wells and decon water
7.7	Surface Repair	1	LS	$ 5,000	$ 5,000	
7.8	Flush-mount curb box with inner locking cap	61	EA	$ 1,500	$ 91,500	For injection wells
7.9	Asphalt and concrete disposal	5,040	LF	$ 16	$ 80,640	From any trenching or saw cut work
7.10	Waste characterization testing	1	EA	$ 500	$ 500	
	Sub-Total				**$ 800,015**	
8	**Round 1 Injection Event**					
8.1	Mob/Demob- Injection subcontractor	1	LS	$ 16,000	$ 16,000	
	Injection Substrate Material	81,564	LBS	$ 2	$ 122,346	2,204 lbs of Lactoil emulsion per well at Cedarwood Cleaners; 882 lbs of Lactoil emulsion per well at rest of AOC1; assumes 2 of the 63 wells have been injected with EVO during the pilot test
8.2						
8.3	Truck freight charges for Substrate	2	trucks	$ 4,000	$ 8,000	
8.4	Injection Labor and Equipment	31	DAY	$ 3,500	$ 106,750	Labor and equipment for 1 crew + per diem
8.5	Water Truck	31	DAY	$ 450	$ 13,725	2,000 -gal non-potable water
8.6	Temporary water storage tank	31	DAY	$ 30	$ 915	5,000 gal poly
8.7	Delivery fee of water truck and tank	2	EA	$ 700	$ 1,400	includes drop off and pick up
	Performance Sampling	18	EA	$ 550		Sampling for VOCs, labor, mobilization, data management and sample analysis at 15 monitoring wells + 20% QC
8.8					$ 9,900	samples
	Sub-Total				**$ 279,036**	

Table 9 : Cost Estimate Summary for the Selected Remedy AOC1

Alternative 4B, AOC1

In-Situ Bioremediation, HEPA, LTM, and ICs

COST ESTIMATE SUMMARY

Site: Peninsula Boulevard Superfund Site, OU2
Location: Hewlett, Town of Hempstead, New York
Phase: Feasibility Study (-30% - +50%)
Base Year: 2017
Date: March 21, 2017

Description: Alternative 4B consists of bioremediation injections followed by heat enhanced plume attenuation (HEPA) treatment for groundwater and saturated soils at AOC1. PDI will be performed at AOC1. ICs and LTM will be maintained for AOC1. Costs related to temporary or permanent re-location of occupants are not included.

Item No.	Description	Quantity	Unit	Unit Cost	Total	Notes
9	**Heat Enhanced Plume Attenuation (HEPA)- Thermal Treatment**					
9.1	Contractor Mob/Demob	1	LS	$ 1,800,000	$ 1,800,000	Estimate provided by vendor
9.2	Drilling Mob/Demob	1	LS	$ 50,000	$ 50,000	Remote access rig, decon pad, water truck for decon
9.3	Drilling Electrodes	91	EA	$ 4,000	$ 364,000	12-inch OD to 81 feet depth
9.4	Drilling Temperature Monitoring Points (TMPs)	20	EA	$ 4,000	$ 80,000	Avg 14 sensors each
9.5	Power Supply, Instrumentation Controls	1	LS	$ 150,000	$ 150,000	
9.6	Electrical Usage	4,550,000	kwh	$ 0.30	$ 1,365,000	Total energy use during heating phase (3 months) estimated by vendor
9.7	System Installation	1	LS	$ 3,000,000	$ 3,000,000	Estimate provided by vendor
9.8	Startup and Operations	1	LS	$ 560,000	$ 560,000	Estimate provided by vendor
9.9	Reporting and Permitting	1	LS	$ 15,000	$ 15,000	
9.10	Post Remediation Drilling and Soil Sampling	1,600	LF	$ 150	$ 240,000	20 borings up to 80 feet or depending on PDI results
9.11	Soil Sample Analysis and data evaluation	192	EA	$ 550	$ 105,600	Sampling 20 borings, 8 samples per boring, 20% QC samples
9.12	Drill Cutting and Waste Disposal	1	LS	$ 250,000	$ 250,000	
9.13	Permits	1	LS	$ 5,000	$ 5,000	
9.14	Surface Restoration	5,550	SY	$ 40	$ 222,000	Site restoration includes Hewlett Parkway and West Broadway
	Sub-Total				**$ 8,206,600**	
10	**Reporting and Institutional Controls**					
10.1	Remedial Action Report	1	LS	$ 50,000	$ 50,000	
10.2	Institutional Controls	1	LS	$ 20,000	$ 20,000	Environmental easement/deed restriction, legal fees at AOC 1
	Sub-Total				**$ 70,000**	
	Sub-Total Capital costs				**$ 10,429,143**	Sub-Total All Construction Costs.
	Contingency	20%			$ 2,085,829	10% scope + 10% bid
	Sub-Total				**$ 12,514,972**	
	Project Management	6%			$ 750,898	
	Remedial Design	12%			$ 1,501,797	
	Construction Management	8%			$ 1,001,198	
	TOTAL CAPITAL COST				**$ 15,768,864**	

Table 9 : Cost Estimate Summary for the Selected Remedy AOC1

Alternative 4B, AOC1

In-Situ Bioremediation, HEPA, LTM, and ICs

COST ESTIMATE SUMMARY

Site: Peninsula Boulevard Superfund Site, OU2
Location: Hewlett, Town of Hempstead, New York
Phase: Feasibility Study (-30% - +50%)
Base Year: 2017
Date: March 21, 2017

Description: Alternative 4B consists of bioremediation injections followed by heat enhanced plume attenuation (HEPA) treatment for groundwater and saturated soils at AOC1. PDI will be performed at AOC1. ICs and LTM will be maintained for AOC1. Costs related to temporary or permanent re-location of occupants are not included.

Item No.	Description	Quantity	Unit	Unit Cost	Total	Notes
ANNUAL O&M COST:						
Item No.	**Description**	**Year**	**Quantity**	**Unit**	**Unit Cost**	**Total**	**Notes**
1	**In-Situ HEPA O&M - Year 1**						Initial heat treatment to target temperature assumed 3 months by vendor
1.1	Monthly Power Costs		12	MO	$ 30,000	$ 360,000	To maintain temperature
1.2	Initial Power costs		4,550,000	KWH	$ 0.30	$ 1,365,000	Total energy usage for initial heating period estimated by vendor as 4,550,000 kwh
1.3	Plant Operator		384	HR	$ 80	$ 30,720	8 hr/week; 4 weeks/mo
1.4	Maintenance of system		1	LS	$ 2,000	$ 2,000	
	Sub-Total					**$ 1,757,720**	
	Contingency		15%			$ 263,658	
	Project Management					$ 5,000	
	Technical Support					$ 5,000	
	TOTAL OPERATIONAL COSTS (Year 1)					**$ 2,031,378**	
2	**In-Situ HEPA O&M - Year 2 to 5**						Active heating time assumed 5 years
1.1	Monthly Power Costs		12	MO	$ 30,000	$ 360,000	
1.2	Plant Operator		384	HR	$ 80	$ 30,720	8 hr/week; 4 weeks/mo
1.3	Maintenance of system		1	LS	$ 2,000	$ 2,000	
	Sub-Total					**$ 392,720**	
	Contingency		15%			$ 58,908	
	Project Management					$ 5,000	
	Technical Support					$ 5,000	
	TOTAL OPERATIONAL COSTS (Year 2 to 5)					**$ 461,628**	
3	**LTM and Institutional Controls - Year 1 to 5**						
2.1	Maintain Institutional Controls		1	LS	$ 12,000	$ 12,000	
2.2	Groundwater Sampling		30	EA	$ 600	$ 18,000	15 wells semi-annually; includes labor
2.3	Groundwater Sample Laboratory Analysis		36	EA	$ 550	$ 19,800	Total VOCs analysis + 20% QC samples
2.4	Data Reduction, Evaluation and Reporting		1	EA	$ 20,000	$ 20,000	
2.5	Annual Report		1	EA	$ 24,000	$ 24,000	Includes periodic report
	Sub-Total					**$ 93,800**	
	Contingency		15%			$ 14,070	
	Project Management					$ 5,000	
	Technical Support					$ 5,000	
	TOTAL ANNUAL LTM COST (Year 1 to 5)					**$ 117,870**	
4	**LTM and Institutional Controls - Year 5 to 25**						
3.1	Maintain Institutional Controls		1	LS	$ 12,000	$ 12,000	
3.2	Groundwater Sampling		15	EA	$ 600	$ 9,000	15 wells annually; includes labor
3.3	Groundwater Sample Laboratory Analysis		18	EA	$ 550	$ 9,900	Total VOCs analysis + 20% QC samples
3.4	Data Reduction, Evaluation and Reporting		1	EA	$ 20,000	$ 20,000	
3.5	Annual Report		1	EA	$ 24,000	$ 24,000	Includes periodic report
	Sub-Total					**$ 74,900**	
	Contingency		15%			$ 11,235	
	Project Management					$ 5,000	
	Technical Support					$ 5,000	
	TOTAL ANNUAL LTM COST (Year 5 to 25)					**$ 96,135**	

Table 9 : Cost Estimate Summary for the Selected Remedy AOC1

Alternative 4B, AOC1

In-Situ Bioremediation, HEPA, LTM, and ICs

COST ESTIMATE SUMMARY

Site: Peninsula Boulevard Superfund Site, OU2
Location: Hewlett, Town of Hempstead, New York
Phase: Feasibility Study (-30% - +50%)
Base Year: 2017
Date: March 21, 2017

Description: Alternative 4B consists of bioremediation injections followed by heat enhanced plume attenuation (HEPA) treatment for groundwater and saturated soils at AOC1. PDI will be performed at AOC1. ICs and LTM will be maintained for AOC1. Costs related to temporary or permanent re-location of occupants are not included.

Item No.	Description	Quantity	Unit	Unit Cost	Total	Notes

PERIODIC COSTS:

Item No.	Description	Year	Quantity	Unit	Unit Cost	Total	Notes
1	**5 Year Review**	5 to 25					
1.1	Deed Restriction Certification & Site Inspection		1	LS	$ 1,500	$ 1,500	Every 5 years through year 25
1.2	5 Year Review		1	LS	$ 30,000	$ 30,000	
	Sub-Total					**$ 31,500**	
	Contingency		15%			$ 4,725	
	Project Management					$ 5,000	
	Technical Support					$ 5,000	
	TOTAL PERIODIC COSTS (Years 5 to 25)					**$ 46,225**	
2	**System Decommissioning**	5					At the end of Year 5
2.1	Injection Well Abandonment		63	EA	$ 1,500	$ 94,500	Drilling subcontractor, abandonment of injection wells and piping
2.2	Decommission HEPA System Components		1	LS	$ 50,000	$ 50,000	
2.3	HEPA Well Decommissioning		111	EA	$ 1,000	$ 111,000	Electrodes, TMPs
2.4	Reporting		1	LS	$ 30,000	$ 30,000	
	Sub-Total					**$ 285,500**	
	Contingency		15%			$ 42,825	
	Project Management					$ 5,000	
	Technical Support					$ 5,000	
	TOTAL PERIODIC COSTS (Year 5)					**$ 338,325**	
3	**Site Close Out**	25					At the end of Year 25
3.1	Monitoring Well Abandonment		15	EA	$ 1,500	$ 22,500	Drilling subcontractor, abandonment of monitoring well
3.2	Final Closure Report		1	LS	$ 50,000	$ 50,000	
	Sub-Total					**$ 72,500**	
	Contingency		15%			$ 10,875	
	Project Management					$ 5,000	
	Technical Support					$ 5,000	
	TOTAL PERIODIC COSTS (Year 25)					**$ 93,375**	

PRESENT VALUE ANALYSIS: Rate of Return: 7% Inflation Rate 3%

Item No.	Cost Type	Year	Total Cost	Present Value	Notes
1	**Capital Cost**	0		**$ 15,768,864**	
2	**Annual O&M Cost**				
2.1	Year 1	1	$ 2,149,248	$ 2,068,910	
2.2	Year 2 to 5	2 to 5	$ 579,498	$ 2,172,590	
2.3	Year 6 to 25	6 to 25	$ 96,135	$ 1,091,120	
	Sub-Total			**$ 5,332,620**	
3	**Periodic Costs**				
3.1	Year 5	5	$ 384,550	$ 317,849	
3.2	Year 10	10	$ 46,225	$ 31,580	
3.3	Year 15	15	$ 46,225	$ 26,102	
3.4	Year 20	20	$ 46,225	$ 21,580	
3.5	Year 25	25	$ 139,600	$ 53,854	
	Sub-Total			**$ 450,966**	
	TOTAL PRESENT VALUE OF ALTERNATIVE			**$ 21,552,450**	

Table 10: Cost Estimate Summary for the Selected Remedy AOC2

Alternative 4A, AOC2

In-Situ Bioremediation, LTM, and ICs

COST ESTIMATE SUMMARY

Site: Peninsula Boulevard Superfund Site, OU2
Location: Hewlett, Town of Hempstead, New York
Phase: Feasibility Study (-30% - +50%)
Base Year: 2017
Date: March 21, 2017

Description: Alternative 4A consists of bioremediation injections for groundwater and saturated soils at AOC2. ICs and LTM will be maintained for AOC2. PDI will be performed at AOC2.

Item No.	Description	Quantity	Unit	Unit Cost	Total	Notes
CAPITAL COSTS:						
1	**Site Survey**					
1.1	Survey	1	LS	$ 5,000	$ 5,000	approx 7,400 sq ft
1.2	Utility Clearance	1	LS	$ 5,000	$ 5,000	
	Sub-Total				**$ 10,000**	
2	**Pre-Design Investigation**					
2.1	Investigation Work Plan	1	LS	$ 75,000	$ 75,000	Sampling Plan, QAPP, HASP
2.2	Geoprobe Mob/Demob	1	LS	$ 6,000	$ 6,000	
2.3	Direct Push Geoprobe Borings	4	Day	$ 1,500	$ 6,000	Assumes 8 borings at AOC2, 18 ft deep; 4 borings/day, assumes 2 days for mob/demob
2.4	Temporary Groundwater Sampling Points	5	Day	$ 2,000	$ 9,000	Assumes 5 temporary points at AOC2, varying depths of 18 to 38 ft deep; 2 borings/day
2.5	Monitoring/Performance Wells Installation	5	EA	$ 4,500	$ 22,500	Assumes 5 MWs at AOC2; 2-inch diameter; 38 ft deep, PVC riser, screen and development.
2.6	Aquifer Pump Test	1	LS	$ 50,000	$ 50,000	includes 1 4-inch diameter monitoring well installation; 130 ft deep, PVC riser, screen, and IDW
2.7	Flush-mount curb box with inner locking cap	5	EA	$ 275	$ 1,375	For monitoring wells
2.8	Water Level Measurements/Transducers	1	LS	$ 5,000	$ 5,000	
2.9	Steam Clean Equipment	9	Day	$ 350	$ 2,975	inc. daily rental for steam cleaner and 2 hr/day for decon equipment
2.10	IDW	1	LS	$ 15,000	$ 15,000	Sleeves, decon water, misc used items, Groundwater waste from well installation and development.
2.11	Surface Repair	1	LS	$ 2,000	$ 2,000	
2.12	Soil Sample Analysis and data evaluation	38	EA	$ 550	$ 21,120	Sampling 8 borings at 5 ft intervals from 0 - 18 ft bgs for VOCs, 20% QC samples
2.13	Groundwater Sampling and data evaluation	38	EA	$ 1,000	$ 38,400	Sampling 5 temporary points at 5 ft intervals from 18 - 38 ft bgs, and 7 monitoring wells for baseline; 20% QC samples; analysis for VOCs, TOC, ORP, etc
2.14	Geochem and treatbility study analysis	6	EA	$ 1,000	$ 6,000	1 deep and 1 shallow sample from 3 locations
2.15	Field Work Oversight	210	MH	$ 150	$ 31,500	2 persons; includes sampling labor
2.16	Treatability Study	1	LS	$ 50,000	$ 50,000	
2.17	Pre-Design Report	1	LS	$ 50,000	$ 50,000	
	Sub-Total				**$ 391,870**	
3	**Site Mobilization/Demobilization**					
3.1	Remedial Action Workplan/Permitting	1	LS	$ 100,000	$ 100,000	
3.2	Submittals/Implementation Plans	1	LS	$ 75,000	$ 75,000	
3.3	Post Construction Submittals	1	LS	$ 40,000	$ 40,000	
3.4	Decontamination Station	1	LS	$ 5,000	$ 5,000	Portable decontamination pad/truck tire wash
	Sub-Total				**$ 220,000**	
4	**Health and Safety**					
4.1	Perimeter Air Monitoring	4	Week	$ 1,200	$ 4,800	Tripod station with Dust and PID monitors
4.2	H&S Monitoring	4	Week	$ 300	$ 1,200	Meters for monitoring work zone
4.3	PPE and Field Supplies	1	LS	$ 5,000	$ 5,000	
	Sub-Total				**$ 11,000**	
5	**Site Preparation**					
5.1	Temporary Security Fence	400	LF	$ 30	$ 12,000	Temporary fence around a portion of the front parking lot during construction
	Sub-Total				**$ 12,000**	

Table 10: Cost Estimate Summary for the Selected Remedy AOC2

Alternative 4A, AOC2

In-Situ Bioremediation, LTM, and ICs

COST ESTIMATE SUMMARY

Site: Peninsula Boulevard Superfund Site, OU2
Location: Hewlett, Town of Hempstead, New York
Phase: Feasibility Study (-30% - +50%)
Base Year: 2017
Date: March 21, 2017

Description: Alternative 4A consists of bioremediation injections for groundwater and saturated soils at AOC2. ICs and LTM will be maintained for AOC2. PDI will be performed at AOC2.

Item No.	Description	Quantity	Unit	Unit Cost	Total	Notes
6	**Pilot Study**					
6.1	Mob/Demob- Drilling subcontractor	1	LS	$ 6,000	$ 6,000	Hollow stem auger rig, decon pad, water truck
6.2	Mob/Demob- Injection subcontractor	1	LS	$ 6,000	$ 6,000	Equipment for pilot test
6.3	Injection Well Installation	2	EA	$ 2,500	$ 5,000	4-inch diameter PVC casing / 20-ft PVC screen; 38 ft deep
6.4	Injection Substrate Material	3,016	LBS	$ 2	$ 4,524	1,508 lbs of Lactoil emulsion per well at Piermont Cleaners
6.5	Injection Labor and Equipment	1	DAY	$ 6,000	$ 6,000	Labor and equipment for 1, 3man crew + per diem, includes mob and demob
6.6	Well Development	4	HR	$ 200	$ 800	2 hr / injection well; 4 hr/extraction well
6.7	Water truck	1	DAY	$ 450	$ 450	2,000 -gal non-potable water
6.8	Temporary water storage tank	1	DAY	$ 30	$ 30	5,000 gal poly
6.9	Delivery fee of truck and tank	1	EA	$ 700	$ 700	includes drop off and pick up
6.10	IDW- Injection Wells	1	LS	$ 10,000	$ 10,000	Includes soil cuttings from installation and water disposal from development of injection wells and decon water
6.11	Pilot Study Sampling	9	EA	$ 1,000	$ 9,000	Sampling one round at 7 MWs, includes sample and VOCs analysis and water chemistry, 20% QC samples
6.12	Data Reduction, Evaluation, Reporting	1	LS	$ 30,000	$ 30,000	
6.13	Surface Repair	1	LS	$ 200	$ 200	
6.14	Flush-mount curb box with inner locking cap	2	EA	$ 1,500	$ 3,000	For injection wells
	Sub-Total				**$ 81,704**	
7	**Full Scale Injection Well Installation**					
7.1	Mob/Demob- Drilling subcontractor	1	LS	$ 100,000	$ 100,000	Hollow stem auger rig, decon pad, water truck
7.2	Injection Well Installation	5	EA	$ 6,000	$ 30,000	4-inch diameter PVC casing / 20-ft PVC screen; 38 ft deep
7.3	Saw cut Slab	5	Day	$ 375	$ 1,875	Rental
7.4	Injection well piping	722	LF	$ 40	$ 28,880	
7.5	Well Development	10	HR	$ 200	$ 2,000	2 hr / injection well
7.6	IDW- Injection Wells	1	LS	$ 20,000	$ 20,000	Includes soil cuttings from installation and water disposal from development of injection wells and decon water
7.7	Surface Repair	1	LS	$ 5,000	$ 5,000	
7.8	Flush-mount curb box with inner locking cap	5	EA	$ 1,500	$ 7,500	For injection wells
7.9	Asphalt and concrete disposal	722	LF	$ 16	$ 11,552	From any trenching or saw cut work
7.10	Waste characterization testing	1	EA	$ 500	$ 500	
	Sub-Total				**$ 207,307**	
8	**Round 1 Injection Event**					
8.1	Mob/Demob- Injection subcontractor	1	LS	$ 16,000	$ 16,000	
8.2	Injection Substrate Material	7,540	LBS	$ 2	$ 11,310	1,508 lbs of Lactoil emulsion per well at AOC2; assumes 2 of the 7 wells have been injected with EVO during the pilot test
8.3	Truck freight charges for Substrate	1	trucks	$ 4,000	$ 4,000	
8.4	Injection Labor and Equipment	3	DAY	$ 3,500	$ 8,750	Labor and equipment for 1 crew + per diem
8.5	Water Truck	3	DAY	$ 450	$ 1,125	2,000 -gal non-potable water
8.6	Temporary water storage tank	3	DAY	$ 30	$ 75	5,000 gal poly
8.7	Delivery fee of water truck and tank	2	EA	$ 700	$ 1,400	includes drop off and pick up
8.8	Performance Sampling	9	EA	$ 550	$ 4,950	Sampling for VOCs, labor, mobilization, data management and sample analysis at 7 monitoring wells + 20% QC
	Sub-Total				**$ 47,610**	

Table 10: Cost Estimate Summary for the Selected Remedy AOC2

Alternative 4A, AOC2

In-Situ Bioremediation, LTM, and ICs

COST ESTIMATE SUMMARY

Site: Peninsula Boulevard Superfund Site, OU2
Location: Hewlett, Town of Hempstead, New York
Phase: Feasibility Study (-30% - +50%)
Base Year: 2017
Date: March 21, 2017

Description: Alternative 4A consists of bioremediation injections for groundwater and saturated soils at AOC2. ICs and LTM will be maintained for AOC2. PDI will be performed at AOC2.

Item No.	Description	Quantity	Unit	Unit Cost	Total	Notes
10	**Reporting and Institutional Controls**					
10.1	Remedial Action Report	1	LS	$ 50,000	$ 50,000	
10.2	Institutional Controls	1	LS	$ 20,000	$ 20,000	Environmental easement/deed restriction, legal fees at AOC2
	Sub-Total				**$ 70,000**	
	Sub-Total Capital costs				**$ 1,051,491**	Sub-Total All Construction Costs.
	Contingency	20%			$ 210,298	10% scope + 10% bid
	Sub-Total				**$ 1,261,789**	
	Project Management	6%			$ 75,707	
	Remedial Design	12%			$ 151,415	
	Construction Management	8%			$ 100,943	
	TOTAL CAPITAL COST				**$ 1,589,854**	

ANNUAL O&M COST:

Item No.	Description	Quantity	Unit	Unit Cost	Total	Notes
1	**LTM and Institutional Controls - Year 1 to 5**					
1.1	Maintain Institutional Controls	1	LS	$ 12,000	$ 12,000	
1.2	Groundwater Sampling	14	EA	$ 600	$ 8,400	7 wells semi-annually; includes labor
1.3	Groundwater Sample Laboratory Analysis	17	EA	$ 550	$ 9,240	Total VOCs analysis + 20% QC samples.
1.4	Data Reduction, Evaluation and Reporting	1	EA	$ 20,000	$ 20,000	
1.5	Annual Report	1	EA	$ 24,000	$ 24,000	Includes periodic report
	Sub-Total				**$ 73,640**	
	Contingency	15%			$ 11,046	
	Project Management				$ 5,000	
	Technical Support				$ 5,000	
	TOTAL ANNUAL LTM COST (Year 1 to 5)				**$ 94,686**	
2	**LTM and Institutional Controls - Year 6 to 30**					
2.1	Maintain Institutional Controls	1	LS	$ 12,000	$ 12,000	
2.2	Groundwater Sampling	7	EA	$ 600	$ 4,200	7 wells annually; includes labor
2.3	Groundwater Sample Laboratory Analysis	8	EA	$ 550	$ 4,620	Total VOCs analysis + 20% QC samples.
2.4	Data Reduction, Evaluation and Reporting	1	EA	$ 20,000	$ 20,000	
2.5	Annual Report	1	EA	$ 24,000	$ 24,000	Includes periodic report
	Sub-Total				**$ 64,820**	
	Contingency	15%			$ 9,723	
	Project Management				$ 5,000	
	Technical Support				$ 5,000	
	TOTAL ANNUAL LTM COST (Year 6 to 30)				**$ 84,543**	

Table 10: Cost Estimate Summary for the Selected Remedy AOC2

Alternative 4A, AOC2

In-Situ Bioremediation, LTM, and ICs

COST ESTIMATE SUMMARY

Site: Peninsula Boulevard Superfund Site, OU2
Location: Hewlett, Town of Hempstead, New York
Phase: Feasibility Study (-30% - +50%)
Base Year: 2017
Date: March 21, 2017

Description: Alternative 4A consists of bioremediation injections for groundwater and saturated soils at AOC2. ICs and LTM will be maintained for AOC2. PDI will be performed at AOC2.

Item No.	Description	Quantity	Unit	Unit Cost	Total	Notes

PERIODIC COSTS:

Item No.	Description	Year	Quantity	Unit	Unit Cost	Total	Notes
1	**5 Year Review Costs**						
1.1	Deed Restriction Certification & Site Inspection	5 to 30					Every 5 years through year 30
1.2	5 Year Review		1	LS	$ 1,500	$ 1,500	
	Sub-Total		1	LS	$ 30,000	$ 30,000	
						$ 31,500	
	Contingency		15%			$ 4,725	
	Project Management					$ 5,000	
	Technical Support					$ 5,000	
	TOTAL PERIODIC COSTS (Years 5 to 30)					**$ 46,225**	
2	**System Decommissioning**	10					At the end of Year 10
2.1	Injection Well Abandonment		7	EA	$ 1,500	$ 10,500	Drilling subcontractor, abandonment of injection wells and piping
2.2	Reporting		1	LS	$ 30,000	$ 30,000	
	Sub-Total					**$ 40,500**	
	Contingency		15%			$ 6,075	
	Project Management					$ 5,000	
	Technical Support					$ 5,000	
	TOTAL PERIODIC COSTS (Year 10)					**$ 56,575**	
3	**Site Close Out**	30					At the end of Year 30
3.1	Monitoring Well Abandonment		7	EA	$ 1,500	$ 10,500	Drilling subcontractor, abandonment of monitoring wells
3.2	Final Closure Report		1	LS	$ 50,000	$ 50,000	
	Sub-Total					**$ 60,500**	
	Contingency		15%			$ 9,075	
	Project Management					$ 5,000	
	Technical Support					$ 5,000	
	TOTAL PERIODIC COSTS (Year 30)					**$ 79,575**	

PRESENT VALUE ANALYSIS: Rate of Return: 7% Inflation Rate 3%

Item No.	Cost Type	Year	Total Cost	Present Value	Notes
1	**Capital Cost**	0		**$ 1,589,854**	
2	**Annual O&M Cost**				
2.1	Year 1 to 5	1 to 5	$ 94,686	$ 422,908	
2.2	Year 6 to 30	6 to 30	$ 84,543	$ 959,547	
	Sub-Total			**$ 1,382,456**	
3	**Periodic Costs**				
3.1	Year 5	5	$ 46,225	$ 38,207	
3.2	Year 10	10	$ 102,800	$ 70,231	
3.3	Year 15	15	$ 46,225	$ 26,102	
3.4	Year 20	20	$ 46,225	$ 21,575	
3.5	Year 25	25	$ 46,225	$ 17,833	
3.6	Year 30	30	$ 125,800	$ 40,113	
	Sub-Total			**$ 214,060**	
	TOTAL PRESENT VALUE OF ALTERNATIVE			**$ 3,186,371**	

Table 11 Chemical-Specific ARARs, TBCs, and Other Guidance		
REGULATION/ AUTHORITY	**CITATION**	**REQUIREMENT SYNOPSIS**
National Primary Drinking Water Standards	42 U.S.C. § 300f et seq, and 40 CFR Part 141, Subpart F	These federal standards establish maximum contaminant levels (MCLs) which are health-based standards for public water systems.
New York State Groundwater Quality Standards	15-0313, 17-0301, 17-0809; 6 NYCRR Part 703	Provides numerical groundwater quality standards.
New York State Groundwater Quality Standards	10 NYCRR Part 5	Sets standards for public drinking water supplies.
NYS Environmental Remediation Program Soil Cleanup Objectives	6 NYCRR Section 375-6.4(b)(3) and 375-6.5	Establishes standards for soil cleanups.

Table 12 Location-Specific ARARs, TBCs, and Other Guidance		
REGULATION/ AUTHORITY	**CITATION**	**REQUIREMENT SYNOPSIS**
no location Location-Specific ARARs, TBCs, and Other Guidance identified		
N/A	N/A	N/A

Table 13 Action-Specific ARARs, TBCs, and Other Guidance		
REGULATION/ AUTHORITY	**CITATION**	**REQUIREMENT SYNOPSIS**
General Requirement for Site Remediation		
Resource Conservation and Recovery Act (RCRA) – General Standards	42 U.S.C. §§6905, 6912(a), 6924, and 6925; 40 CFR Part 264	General performance standards requiring minimization of need for further maintenance and control. Also requires decontamination or disposal of contaminated equipment, structures and soils. Outlines requirements for safety equipment and spill control when treating, handling and/or storing hazardous wastes. Provides emergency procedures to be used when following explosions, fires, etc. when storing hazardous wastes.
RCRA 90-Day Accumulation Rule for Hazardous Waste	42 U.S.C.§§ 6906, 6912, 6922-6925, 6937, and 6938; 40 CFR Part 262	Allows generators of hazardous waste to store and treat hazardous waste at the generation site for up to 90 days in tanks, containers and containment buildings without having to obtain a RCRA hazardous waste permit.
General Requirement for Site Remediation (continued)		
RCRA Hazardous Waste Permit Program	42 U.S.C. §6925; 40 CFR Part 270	Covers the basic permitting, application, monitoring and reporting requirements for off-site hazardous waste management facilities.
Superfund Green Remediation Strategy	www.epa.gov/superfund/greenremediation/sf-gr-strategy.pdf	Provides the EPA's strategy to clean up hazardous waste sites in ways that use natural resources and energy efficiently and reduces negative impacts on human health and the environment.

Table 13 Action-Specific ARARs, TBCs, and Other Guidance		
REGULATION/ AUTHORITY	**CITATION**	**REQUIREMENT SYNOPSIS**
Green Remediation	DER-31	Provides concepts and techniques of green remediation and guidance on how to apply them to remedial programs under DER.
New York Hazardous Waste Management System - General	ECL, Article 27; 6 NYCRR Part 370	Outlines criteria for determining if a solid waste is a hazardous waste and is subject to regulation under 6 NYCRR Parts 371-376.
Identification and Listing of Hazardous Wastes	ECL, Article 27; 6 NYCRR Part 371	Outlines criteria for determining if a solid waste is a hazardous waste and is subject to regulation under 6 NYCRR Parts 371-376.
New York Regulations for Hazardous Waste Management Facilities	ECL, Article 27; 6 NYCRR Part 373.1.1 - 373.1.8	Provides requirements and procedures for obtaining a permit to operate a hazardous waste treatment, storage and disposal facility. Also lists contents and conditions of permits.
Waste Transportation		
U.S. Department of Transportation (USDOT) Rules for Transportation of Hazardous Materials	49 CFR Parts 107 and 171.1-172.558	Outlines procedures for the packaging, labeling, manifesting and transporting of hazardous materials.
RCRA- Standards Applicable to Transporters of Applicable Hazardous Waste	42 U.S.C.§§ 6906, 6912, 6922-6925, 6937, and 6938; 40 CFR Part 263	Establishes the responsibility of off-site transporters of hazardous waste in the handling, transportation and management of the waste. Requires manifesting, recordkeeping and immediate action in the event of a discharge.
New York State Hazardous Waste Manifest System and	ECL, Article 27; 6 NYCRR Part 372	Provides guidelines relating to the use of the manifest

Table 13 Action-Specific ARARs, TBCs, and Other Guidance		
REGULATION/ AUTHORITY	**CITATION**	**REQUIREMENT SYNOPSIS**
Related Standards for Generators, Transporters, and Facilities		system and its recordkeeping requirements. It applies to generators, transporters and facilities in New York State.
Waste Transporter Permits	ECL, Article 27, Titles 3, 9, and 15; 6 NYCRR Part 364	Governs the collection, transport and delivery of regulated waste within New York State.
Disposal		
New York Standards for Universal Waste and Land Disposal Restrictions	ECL, Article 27; 6 NYCRR Part 374-3 6 NYCRR Part 376	These regulations establish standards for treatment and disposal of hazardous wastes.
Off-Gas Management		
Clean Air Act-National Ambient Air Quality Standards	42 U.S.C. §§7401-7671q; 40 CFR Parts 50-52 60 and 40	Establishes ambient air quality standards for protection of public health.
Federal Directive – Control of Air Emissions from Superfund Air Strippers	OSWER Directive 9355.0-28	These provide guidance on the use of controls for Superfund site air strippers as well as other vapor extraction techniques in attainment and non-attainment areas for ozone.
New York Air Quality Standards/	DER-10 6 NYCRR Part 257	This regulation requires that maximum 24-hour concentrations for particulate matter not be exceeded more than once per year. Fugitive dust emissions from site excavation activities must be maintained below 250 micrograms per cubic meter (µg/m3).
NYSDEC Guidelines for the Control of Toxic Ambient Contaminants	DAR-1 Air Guide 1	This policy provides guidance for the control of toxic ambient air contaminants and outlines the procedures for evaluating sources.
New York Emissions Verification	6 NYCRR Part 202	Specifies the sampling and documentation requirements for off-gas emissions.

Table 13 Action-Specific ARARs, TBCs, and Other Guidance		
REGULATION/ AUTHORITY	**CITATION**	**REQUIREMENT SYNOPSIS**
New York General Prohibitions	6 NYCRR Part 211	Prohibition applies to any particulate, fume, gas, mist, odor, smoke, vapor, pollen, toxic or deleterious emissions.
New York General Process Emission Sources	6 NYCRR Part 212	Sets the treatment requirements for certain emission rates.

APPENDIX III

ADMINISTRATIVE RECORD INDEX

ADMINISTRATIVE RECORD INDEX OF DOCUMENTS

FINAL
06/09/2017

REGION ID: 02

Site Name: PENINSULA BOULEVARD GROUNDWATER PLUME
CERCLIS ID: NYN000204407
OUID: 02
SSID: 02TV
Action:

DocID:	Doc Date:	Title:	Image Count:	Doc Type:	Addressee Name/Organization:	Author Name/Organization:
510507	6/9/2017	ADMINISTRATIVE RECORD INDEX FOR OU2 FOR THE PENINSULA BOULEVARD GROUNDWATER PLUME SITE	2	Administrative Record Index		(US ENVIRONMENTAL PROTECTION AGENCY)
510522	4/23/2015	QUALITY ASSURANCE PROJECT PLAN - REVISION 5 FOR OU2 FOR THE PENINSULA BOULEVARD GROUNDWATER PLUME SITE	74	Work Plan	(US ENVIRONMENTAL PROTECTION AGENCY)	BLAZE,STEPHEN (US ENVIRONMENTAL PROTECTION AGENCY)|BOLDUC,JEAN (LOCKHEED MARTIN TECHNOLOGY SERVICES)|CATANZARITA,JEFF (US ENVIRONMENTAL PROTECTION AGENCY)|KILLEEN,DEBORAH,A (LOCKHEED MARTIN INC)|TAYLOR,KEVIN (LOCKHEED MARTIN INFORMATION SYSTEMS & GLOBAL SOLUTIONS)
510523	11/10/2015	QUALITY ASSURANCE PROJECT PLAN - REVISION 6 FOR OU2 FOR THE PENINSULA BOULEVARD GROUNDWATER PLUME SITE	104	Work Plan	(US ENVIRONMENTAL PROTECTION AGENCY)	BLAZE,STEPHEN (US ENVIRONMENTAL PROTECTION AGENCY)|BOLDUC,JEAN (LOCKHEED MARTIN TECHNOLOGY SERVICES)|CATANZARITA,JEFF (US ENVIRONMENTAL PROTECTION AGENCY)|KILLEEN,DEBORAH,A (LOCKHEED MARTIN INC)|TAYLOR,KEVIN (LOCKHEED MARTIN INFORMATION SYSTEMS & GLOBAL SOLUTIONS)
510521	3/22/2016	FINAL REPORT FOR SAMPLES RECEIVED ON 02/23/20106 - 02/24/2016 FOR PROJECT NO. 1602011 FOR OU2 FOR THE PENINSULA BOULEVARD GROUNDWATER PLUME SITE	88	Report	CATANZARITA,JEFF (US ENVIRONMENTAL PROTECTION AGENCY)	BOURBON,JOHN (US ENVIRONMENTAL PROTECTION AGENCY)
510524	5/26/2016	QUALITY ASSURANCE PROJECT PLAN - REVISION 7 FOR OU2 FOR THE PENINSULA BOULEVARD GROUNDWATER PLUME SITE	102	Work Plan	(US ENVIRONMENTAL PROTECTION AGENCY)	BLAZE,STEPHEN (US ENVIRONMENTAL PROTECTION AGENCY)|BOLDUC,JEAN (LOCKHEED MARTIN TECHNOLOGY SERVICES)|CATANZARITA,JEFF (US ENVIRONMENTAL PROTECTION AGENCY)|KILLEEN,DEBORAH,A (LOCKHEED MARTIN INC)|TAYLOR,KEVIN (LOCKHEED MARTIN INFORMATION SYSTEMS & GLOBAL SOLUTIONS)
510525	7/8/2016	TRANSDUCER STUDY 2016 FOR OU2 FOR THE PENINSULA BOULEVARD GROUNDWATER PLUME SITE	3	Chart/Table		
458520	7/15/2016	RISK ASSESSMENT SCREENING (POTENTIAL SOURCE SITES) FOR OU2 FOR THE PENINSULA BOULEVARD GROUNDWATER PLUME SITE	148	Report	SOSA,GLORIA,M (US ENVIRONMENTAL PROTECTION AGENCY)	ABRAHAM,MAYBLE,M (HDR INCORPORATED)|MUSSO,MICHAEL (HDR ENGINEERING INCORPORATED)

ADMINISTRATIVE RECORD INDEX OF DOCUMENTS

FINAL
06/09/2017

REGION ID: 02

Site Name: PENINSULA BOULEVARD GROUNDWATER PLUME
CERCLIS ID: NYN000204407
OUID: 02
SSID: 02TV
Action:

DocID:	Doc Date:	Title:	Image Count:	Doc Type:	Addressee Name/Organization:	Author Name/Organization:
458521	3/21/2017	FINAL FEASIBILITY STUDY REPORT FOR OU2 FOR THE PENINSULA BOULEVARD GROUNDWATER PLUME SITE	406	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	MUSSO,MICHAEL (HDR ENGINEERING INCORPORATED)|WILLIAMS,BRADLEY (HDR)
510520	5/1/2017	REMEDIAL INVESTIGATION REPORT FOR OU2 FOR THE PENINSULA BOULEVARD GROUNDWATER PLUME SITE	854	Report		
510560	6/9/2017	PROPOSED PLAN FOR OU2 FOR THE PENINSULA BOULEVARD GROUNDWATER PLUME SITE	19	Publication		(US ENVIRONMENTAL PROTECTION AGENCY)

APPENDIX IV

STATE LETTER OF CONCURRENCE

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Environmental Remediation, Office of the Director
625 Broadway, 12th Floor, Albany, New York 12233-7011
P: (518) 402-9706 | F: (518) 402-9020
www.dec.ny.gov

September 28, 2017

Mr. John Prince, Acting Director
Emergency and Remedial Response Division
United States Environmental Protection Agency
Region 2
290 Broadway
New York, NY 10007-1866

Re: Record of Decision
Peninsula Boulevard,
Source Delineation, EPA Operable Unit No. 2
NYSDEC Site No. 130117

Dear Mr. Prince:

The New York State Department of Environmental Conservation (DEC) and the New York State Department of Health (DOH) have reviewed the Record of Decision, dated September 2017, for the referenced site. We understand that the selected remedy for Operable Unit 2 for this site addresses the contamination from two dry-cleaners which have impacted the groundwater and soil.

The United States Environmental Protection Agency (EPA) is proposing in-situ bioremediation with heat-enhanced plume attenuation as the remedy to address Area of Concern (AOC) 1, the Cedarwood Dry Cleaners and the Former Vacant Lot across from it and in-situ bio remediation as the remedy to address AOC 2, the Piermont Dry Cleaners.

The common elements for both AOC 1 and AOC 2 include the following:

- Long-term monitoring to ensure that the soil and groundwater quality improve following implementation of this remedy.

- During the remedial design, measures will be evaluated to mitigate potential impacts to properties at or nearby AOC 1 and AOC 2 from vapors (such as the installation and operation of vapor recovery wells) that may be generated by the treatment processes. If the evaluation indicates any measures are necessary, they will be implemented as part of the remedy

- A plan will be developed which specifies those institutional controls to be utilized to ensure that the remedy is protective. Institutional controls regarding impacts to groundwater and soil use may include, as determined to be appropriate, existing

governmental controls, such as well permit requirements, and restrictive covenants or environmental easements.

- A Site Management Plan will be developed to provide for the proper management of the Site remedy post-construction including long-term groundwater monitoring, periodic review, and certifications.

- A review of the site conditions will be conducted as part of the regularly scheduled five (5) year review.

Based on this information, DEC and DOH concur with the remedial alternative selected in the Record of Decision for Peninsula Boulevard OU-2, Source Delineation.

Sincerelv.

Robert W. Schick, P.E.
Director
Division of Environmental Remediation

ec: Gloria Sosa, USEPA
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APPENDIX V

RESPONSIVENESS SUMMARY

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INTRODUCTION

This Responsiveness Summary provides a summary of the significant comments and concerns submitted by the public on the U.S. Environmental Protection Agency's (EPA's) June 2017 Proposed Plan (Proposed Plan) for the Peninsula Boulevard Groundwater Plume Superfund Site (Site), Operable Unit 2 (OU2), and EPA's responses to those comments and concerns. All comments summarized in this document were considered by EPA in reaching a final decision as to the remedy for OU2 at the Site.

SUMMARY OF COMMUNITY RELATIONS ACTIVITIES

The Proposed Plan for OU2 was released to the public on June 15, 2017, along with the Remedial Investigation, the Feasibility Study, and the Screening-Level Human Health Risk Assessment reports for OU2. These documents were made available to the public at information repositories maintained at the Hewlett-Woodmere Public Library, located at 1125 Broadway, Hewlett, New York; the EPA Region 2 Office in New York City; and EPA's website for the Peninsula Boulevard Groundwater Plume Site at https://www.epa.gov/superfund/peninsula-groundwater.

On June 15, 2017, EPA published a notice in *The Long Island Herald* informing the public of the commencement of the public comment period for the Proposed Plan and of an upcoming public meeting. The notice also provided a description of the preferred alternative, as set forth in the Proposed Plan, the contact information for EPA personnel, and a notification of the availability of the above-referenced documents. The public comment period ran from June 15, 2016 to July 17, 2017. EPA held a public meeting on June 22, 2017 at 7:00 P.M. at the Hewlett Fire House at 25 Franklin Avenue, Hewlett, New York. The purpose of this meeting was to inform officials and interested citizens about the Superfund process, to present the Proposed Plan for OU2 at the Site, including an explanation of the remedial alternatives considered by EPA and its preferred alternative, and to respond to questions and comments from the attendees. Responses to the comments and questions received at the public meeting, and to those received in writing during the public comment period, are included in this Responsiveness Summary.

SUMMARY OF COMMENTS AND EPA RESPONSES

EPA received the majority of the comments and questions on the Proposed Plan at the public meeting on June 22, 2017. Two written comments were received during the comment period. Copies of the comment letters are provided in Attachment D of this Responsiveness Summary. A summary of significant comments provided at the public meeting and in writing, as well as EPA's responses to them, are provided below.

The comments and responses have been organized into the following topics:

- **Nature and Extent of Contamination**
- **Human Health Issues**
- **Site Cleanup**
- **Other Issues**

NATURE AND EXTENT OF CONTAMINATION

Comment # 1: What is the source of the groundwater contamination?

Response to Comment # 1: EPA has identified two dry cleaners that are sources of the groundwater contamination. One source area (AOC 1) consists of Cedarwood Cleaners, the former vacant lot at 1244 West Broadway ("former Vacant Lot"), 1245 West Broadway, the LIRR Substation, and sections of West Broadway and Hewlett Parkway adjacent to Cedarwood Cleaners. The second separate source area, referred to as AOC 2 consists of Piermont Cleaners, which is located within a commercial strip mall at the northeastern intersection of Broadway and Piermont Avenue.

Comment # 2: Are the Piermont Cleaners and Cedarwood Cleaners still using the chemicals that caused the groundwater contamination?

Response to Comment # 2: The Piermont Cleaners and Cedarwood Cleaners use tetrachloroethylene (PCE), the primary contaminant of concern at the Site, in closed loop systems which minimize the potential for releases to the environment as part of the dry cleaning operations.

Comment # 3: Are other dry cleaners in the area being investigated?

Response to Comment # 3: Beginning in 1991 an investigation was conducted at the former Grove Cleaners, located at 1274 Peninsula Boulevard, under New York State Department of Environmental Conservation oversight. Based on the results of the investigation, contaminated soils related to the discharge to a dry well were removed. The results of the investigation suggested source areas other than the former Grove Cleaners property were contributing to the groundwater contaminant plume. As part of EPA's investigation of the area-wide groundwater plume, dry cleaners in the area, in addition to Cedarwood Cleaners and Piermont Cleaners, were evaluated. The results of this evaluation did not identify any additional dry cleaners as sources of the groundwater contamination at the Site.

Comment # 4: Has the contamination affected the creek next to the Hewlett-Woodmere Middle School.

Response to Comment # 4: As part of the OU1 remedial investigation, EPA sampled the surface water and sediments in Motts Creek, its unnamed tributary (next to the middle school), and the Doxey Brook Drain (behind the middle school). The surface water sampling results did not reveal concentrations of contaminants exceeding New York State's surface water quality standards, indicating that the creeks near the middle school were not affected by Site contaminants. The sediment sampling results did not reveal Site-related contaminants above the New York State Department of Environmental Conservation Technical Guidance for Screening Contaminated Sediments.

Comment # 5: Several commenters inquired about the vapor intrusion sampling conducted by EPA at various properties at the Site. Specifically, commenters inquired about the sampling at Piermont Cleaners, the Hewlett-Woodmere Middle School, and individual residential properties. In addition to the sampling results, commenters inquired whether properties should be resampled.

Response to Comment # 5: In 2005, as part of the OU1 RI, EPA conducted vapor intrusion sampling at fifteen residences and the Hewlett-Woodmere Middle School. The sub-slab sampling results were compared to Vapor Intrusion Screening Levels (VISLs) developed by EPA. VISLs are used to help EPA determine whether it is necessary to undertake measures to eliminate the intrusion of contaminated vapors from the sub-slab into a home or commercial business. Based on the results of the 2005 sampling, EPA installed a sub-slab depressurization system at one residence. The sampling results for the Hewlett-Woodmere Middle School revealed no detectable concentrations of contaminants in the indoor air samples.

As part of the OU2 RI, EPA collected sub-slab soil gas samples at the Piermont Cleaners. The sampling revealed PCE and TCE at a maximum concentration of 10.17 $\mu g/m^3$ and 2.58 $\mu g/m^3$, respectively. The results at the Piermont Cleaners were considerably below the corresponding sub-slab commercial use VISLs for PCE (1,600 $\mu g/m^3$) and TCE (100 $\mu g/m^3$), and therefore do not present a health concern.

Pending obtaining access, EPA will conduct additional vapor intrusion sampling at the Site, including the individual businesses and residences in the area. In addition, residents whose properties were previously sampled may request to have their properties resampled.

Comment # 6: How is the vapor intrusion sampling conducted?

Response to Comment # 6: To determine whether vapor intrusion is a concern, vapor samples from the soil under a home's foundation, often referred to as sub-slab samples, are collected. Sub-slab vapor sampling involves the drilling of a small hole in the basement floor, or slab, and the installation of a dime-sized sampling port. The following day, a small collection canister is connected to the port, which slowly draws in air over a twenty-four hour period. Similar canisters may also be placed in living spaces within the home. These canisters draw in indoor air from the room and do not require drilling. After twenty-four hours, the canisters are removed and sent to a laboratory for analysis. At the conclusion of the testing, the small hole in the floor is filled in.

Comment # 7: Trees on Hewlett Parkway are dying. Is this due to the contamination?

Response to Comment # 7: Soil sampling conducted along Hewlett Parkway did not reveal soil contamination. The groundwater contamination in this area is at depths that would not impact the root system of these trees. In addition, EPA would not expect the low-level concentrations of contaminants detected in some of the soil gas results to have an impact on vegetation, including trees. As a result, EPA expects that the dying trees along Hewlett Parkway are not a result of the contamination at the Site.

Comment # 8: A commenter noted that water from the New York American Water Company well field # 5 is treated for volatile organic compounds, indicating in his opinion that the plume has migrated further north and west than depicted in the presentation. The commenter expressed concern that too little is being done too late.

Response to Comment # 8: The commenter correctly notes that groundwater pumped from this well field is treated by the water company prior to distribution. However, the New York American Water Company Plant # 5 well field adjacent to the Site utilizes the Jameco Aquifer as its source for water production and does not utilize the upper glacial aquifer, the focus of this decision document. Although there is the potential for significant hydraulic connection between the two

units, groundwater monitoring wells installed in the Jameco Aquifer at the Site as part of the OU1 remedial design did not reveal PCE and TCE in the groundwater samples collected from these wells. To address this potential concern, the OU1 ROD calls for, as a remedial action objective, the reduction or elimination of the potential for migration of contaminants towards the well field from the Site. The remedial design for OU1, which was completed in 2016, includes provisions to meet this objective.

HUMAN HEALTH ISSUES

Comment # 9: How does the contamination and the cleanup affect the health of my family?

Response to Comment # 9: For residents in the area, the risks identified in the human health risk assessment for the Site are related to the potential future consumption of the contaminated groundwater. Since all the residences in the area of the Site are currently connected to the public water supply, exposure to the contaminated groundwater is not expected under current conditions. The cleanup will prevent potential future exposure to the contaminated groundwater.

When chemicals such as PCE and TCE are spilled on the ground or leak from underground storage tanks, they can give off gases, or vapors that have the potential to migrate into buildings. The vapors may move through the soil and pass through cracks in basements, foundations, sewer lines and other openings. The vapors may accumulate within a building to a point where the health of residents or workers in that building could be at risk. The cleanup at the Site will prevent or minimize the potential exposures via inhalation to volatile organic compounds that migrate from groundwater.

As mentioned in Response to Comment # 5, above, pending obtaining access, EPA intends to conduct vapor intrusion sampling at residences and business in the area. If determined necessary, EPA will install sub-slab depressurization systems or conduct other appropriate actions to address potential threats posed by vapor intrusion.

Comment # 10: Is it currently safe to work at the strip mall where Piermont Cleaners is located?

Response to Comment # 10: The human health risk assessment screening conducted by EPA as part of the OU2 remedial investigation did not identify any current, unacceptable exposure pathways for occupants of the businesses at the strip mall. As mentioned in Response to Comment # 9, above, pending obtaining access, EPA will conduct vapor intrusion sampling at the individual structures on the property.

Comment # 11: Is it safe to have a garden?

Response to Comment # 11: As part of the OU1 remedial investigation, EPA collected surface soil samples along rights-of-way south of West Broadway. The sampling results did not reveal surficial soil contamination. In addition, the results of sampling activities conducted as part of OU2 show that soil contamination is present at the sources areas (AOC 1 and AOC 2) at depths below the water table, indicating that the sources of the groundwater contamination are not present at the surface. Therefore, the results of the remedial investigation indicate that surface soils at nearby residential properties have not been impacted by the Site and, as such, restrictions on gardening are not necessary.

Comment # 12: Is it safe to drink water from the garden hose?

Response to Comment # 12: As mentioned in Response to Comment # 8, above, an air stripper attached to NYAWC Well # 5 has been in operation since 1991 and sampling results from the NYAWC indicate that the system effectively treats water to prior to public distribution.

Comment # 13: A commenter noted that many residents living on Hewlett Parkway have died of cancer.

Response to Comment # 13:

Unfortunately, one of every two men and one of every three women will be diagnosed with cancer at some time in their life. The New York State Department of Health (NYSDOH) collects information on all patients diagnosed and/or treated for cancer in New York State. This information is used to allow for the evaluation of cancer rates and changes in rates over time. More information may be found at https://www.health.ny.gov/diseases/cancer/.

Comment # 14: How many women have developed breast cancer over the past 20 years?

Response to Comment # 14: Refer to the Response to Comment # 13, above. Additional information may be found at the New York State Department of Health website (https://www.health.ny.gov/statistics/cancer/registry).

Comment # 15: A commenter noted that soil was excavated and removed as part of the recent construction activities at the former Vacant Lot. The commenter asked whether exposures resulted from this work. The commenter questioned how the previous property owner sold the property, given the contamination present there, and asked whether EPA should have taken measures to prevent the sale of contaminated properties.

Response to Comment # 15: Soil sampling conducted by EPA at the former Vacant Lot revealed contamination at depths greater than those expected to be necessary to construct the structure or install utilities.

Typically, EPA does not place deed restrictions on properties while performing the remedial investigation, since we are still collecting information. The selected remedy calls for restrictive covenants or environmental easements at AOC 1 and AOC 2. EPA intends to pursue the creation of environmental easements at the appropriate properties in AOC 1 and AOC 2 and to file such environmental easements in the property records of Nassau County until such time that remedial action objectives are attained.

Comment # 16: Why does the Proposed Plan state in the summary of the human health risk assessment section that the cancer risk to the resident is five times greater than average?

Response to Comment # 16: The cancer risks discussed in the Proposed Plan are associated with the potential future consumption of contaminated groundwater at the source areas. Because all residences and businesses in the area are currently connected to the public water supply, which is treated prior to distribution, there are no current risks associated with this pathway.

Comment # 17: A commenter raised a concern that residents in the area may use private wells for irrigation purposes.

Response to Comment # 17: As part of the OU1 remedial investigation at the Site, EPA conducted a well inventory search, which did not identify any private wells in the area. Residents at the Site with a private well should contact EPA to have the well sampled.

Comment # 18: A commenter stated that a radon mitigation system was installed at the bank located in the strip mall. The commenter asked whether that system provides adequate protection against vapor intrusion from volatile organic contamination.

Response to Comment # 18: As mentioned in Response to Comment # 5, above, pending obtaining access, EPA intends to conduct vapor intrusion sampling at residences and business in the area, including each business within the strip mall. If determined necessary, EPA will install sub-slab depressurization systems or conduct other appropriate actions to address potential threats posed by vapor intrusion. Sub-slab depressurization and radon systems are similar since both systems are designed to remove soil vapors from below basements or foundations to prevent the vapors from entering homes. Vapors are vented outside of the homes where they become dispersed and harmless. If sampling results indicate that a mitigation system is needed at the bank, EPA would need to evaluate whether the existing system at the bank would provide adequate mitigation or if additional measures are warranted.

SITE CLEANUP

Comment # 19: When does EPA anticipate beginning the remedial cleanup?

Response to Comment # 19: EPA must first complete the remedial design of the remedy. During the remedial design phase the plans and specifications for the remedy are developed. EPA anticipates that the remedial design phase for OU2 could take two to three years to complete. Because it is unlikely that those parties responsible for the contamination at the Site will be able to pay for the entire remedy (Refer to the Response to Comment # 27, below), EPA will likely need to use federal funds to pay for the construction of the remedy. Pending the availability of funds for construction of the remedy, the remedy could be implemented shortly after completion of the remedial design.

Comment # 20: How safe is it to work at the Piermont Cleaners strip mall during the cleanup?

Response to Comment # 20: The possibility of exposure of workers, the surrounding community, and the local environment during the implementation of the remedy is present, but minimal. The remedy will include monitoring, which will provide the data necessary for the proper management of the remedial processes and for the mitigation of any potential impacts to the community, remediation workers, and the environment. At AOC 2, where Piermont Cleaners is located, implementation of the remedy will produce vapors. Extraction wells will be used to collect vapors generated in the subsurface thereby minimizing the impact of vapors to adjacent parcels. Measures would be implemented to mitigate exposure risks, including the installation of fencing to restrict access to above-grade treatment components.

Comment # 21: With respect to the groundwater pump and treat system (OU1 remedy), when does the 30-year cleanup actually start?

Response to Comment # 21: The 30-year timeframe is an estimate of the time required for the selected remedy to meet the remedial action objectives. With respect to OU1, the timeframe refers to the time required to construct the treatment system and to restore the impacted aquifer to beneficial use as a source of drinking water by reducing contaminant levels in groundwater to federal and state maximum contaminant levels.

Comment # 22: A commenter asked whether EPA would have another meeting and say that the remedy is not working if after a period of time there is no change in the concentrations of contaminants.

Response to Comment # 22: As part of the remedy, long-term monitoring of groundwater and soil in AOC 1 and AOC 2 will be conducted. In addition, CERCLA requires that a review of conditions at the Site be conducted no less often than once every five years until such time as cleanup levels are achieved. EPA provides notice to the public of the initiation of the five-year review process. If justified by the review, additional response actions may be implemented. If EPA determines that the remedy is not functioning as designed, EPA will evaluate other remedial measures.

Comment # 23: What is the efficacy of the four remedial alternatives?

Response to Comment # 23: The four active remedial alternatives were developed to address the sources of groundwater contamination at the Site in order to protect human health and the environment. A summary of the rationale for the selected remedy is included in Section 12 of the Record of Decision.

Comment # 24: A representative for Dachs Insurance, located on West Broadway within AOC 1, noted that West Broadway is a main artery and expressed a concern about traffic because it appeared to him that the street would be blocked off for a period of time due to the number of wells that are planned for installation. The representative questioned how the business can close down for a significant period of time without a plan of action. In addition, the representative questioned whether EPA has met with the local government to discuss the road closures and suggested that EPA do so quickly.

Response to Comment # 24: Implementation of the remedy is expected to result in temporary road closures. During the remedial design phase, the plans and specifications for conducting the work will be developed and efforts will be made to minimize disruption to the community. In addition, EPA expects to discuss the road closures with the appropriate authorities as additional details become available. To the extent practicable, activities will be coordinated with impacted businesses.

Comment # 25: Are the two dry cleaners going to be shut down?

Response to Comment # 25: Implementation of the remedy will require, at a minimum, the total suspension of commercial operations at the Cedarwood Cleaners property since injection and/or treatment wells would have to be installed under the Cedarwood Cleaners facility, which may lead to the creation of VOC vapors that could possibly accumulate inside the building. Although

measures would be implemented to mitigate the potential impact of VOC vapors that may be released to other nearby properties, these measures would be insufficient to guard against the potential VOC vapor releases to the Cedarwood Cleaners facility.

At the former Vacant Lot property, construction of a new structure on the property has begun. Injection and/or treatment wells will also have to be installed at the former Vacant Lot property, which may lead to the creation of VOC vapors. Depending on the proximity to the new structure, the potential exists for the generation of heat close to the building floor and, therefore occupancy may not be permitted during active treatment. Depending on the use of the property at the time of the implementation of the remedy, a temporary shutdown of commercial operations or other long-term prohibitions at the former Vacant Lot property may be necessary. During the remedial design, measures would be evaluated to minimize disruptions to operations at the property.

At Piermont Cleaners, which is part of an active strip mall with multiple other businesses, it is anticipated that the remedy can be implemented without significant disruption to Piermont Cleaners or the other businesses located in the strip mall. To the extent practicable, construction activities would be performed during weekends or after hours, and injection and/or treatment wells could be installed near the front and potentially the rear of the building, rather than inside. During the remedial design, measures would be evaluated to minimize disruptions to the businesses.

Comment # 26: At the strip mall, will disruptions due to implementation of the cleanup be limited to the parking lot?

Response to Comment # 26: EPA expects to coordinate with the owners and operators of the businesses at the strip mall. To the extent practicable, efforts will be made to minimize the impacts of the remediation activities on the businesses.

Comment # 27: Who will cover the costs of the remedy implementation? Will the owners of the properties in the source areas contribute to the cleanup or does the funding come from the Superfund?

Response to Comment # 27: A person is liable under CERCLA if that person is the owner or operator of a facility from which there is a release of a hazardous substance that necessitates a response action or causes the incurrence of response costs. In accordance with EPA's "enforcement first" policy, EPA seeks to obtain a commitment from potentially responsible parties to conduct remedial actions whenever possible. In the event that EPA is unable to identify a viable potentially responsible party to perform the cleanup work at the Site, EPA may seek federal funds to perform this work. If EPA undertakes the implementation of the selected OU2 remedy at the Site, EPA may seek reimbursement of some or all of its response costs from potentially responsible parties.

Comment # 28: Are the owners of the properties of the dry cleaners responsible for the cleanup if they're only leasing?

Response to Comment # 28: Refer to Response to Comment # 27, above.

OTHER ISSUES

Comment # 29: A commenter noted the difficulty in determining the parties at fault for the contamination since the dry cleaner operators and the ownership of the properties may have changed.

Response to Comment # 29: EPA has various tools available to evaluate operational and ownership history at properties of potential concern, including the issuance of written requests for information pursuant to Section 104(e) of CERCLA. EPA has used the information received in response to such information requests, in conjunction with data collected as part of investigations and inspections, to inform EPA's decision regarding releases at the Site.

Comment # 30: Two commenters requested that EPA consider holding a second public meeting since the public meeting was held the same evening as Hewlett High School graduation and that the public meeting was not well-publicized.

Response to Comment # 30: On June 15, 2017, EPA issued a press release titled "EPA Proposes Plan for Second Phase of Cleanup of the Peninsula Boulevard Superfund Site in Hewlett, Nassau County, N.Y." Notice of the June 15, 2017 start of the public comment period, the June 22, 2017 public meeting, and the availability of Site-related documents was published in the *Long Island Herald* on June 15, 2017. Notice of the June 22, 2017 public meeting and EPA's presentation was additionally posted on EPA's Peninsula Boulevard Groundwater Plume website: https://www.epa.gov/superfund/peninsula-groundwater.

Although EPA recognizes the conflict posed by the high school graduation, notice of the public comment period and the public meeting was well-publicized and information about the Site and the Proposed Plan was readily available. At this time, residents may request to join the EPA's Site mailing list to receive updates related to the Site.

Comment # 31: A commenter inquired whether the results of the vapor intrusion sampling are public records. This commenter and others questioned whether the sampling EPA's work in the area would trigger a "red flag" in the event a homeowner were to sell his or her property. The commenters also raised concerns about the number of properties in the area that are in foreclosure and the potential for decreases in property values due to the contamination at the Site.

Response to Comment # 31: Vapor intrusion sampling results are typically a matter of public record. While EPA does not generally publicize vapor intrusion sampling results, these records may be disclosed upon request. EPA may redact certain personal information from these public records if the disclosure of such information would constitute an unwarranted invasion of personal privacy.

Information concerning EPA's work in the area is made available to the public, both online and at the local information repositories at Hewlett-Woodmere Public Library and the EPA Region 2 office in New York City. With respect to the transfer of property, state and local disclosure laws address what information a seller must communicate to a prospective buyer regarding conditions at his or her property.

As to property values, the Superfund program's primary objective is the protection of human health and welfare and the environment. EPA's mission under the Superfund program does not include monitoring housing prices or foreclosures in the area of a particular Superfund site, nor does EPA

compensate property owners for decreases in property values caused by the presence of contamination at a site.

Comment # 32: The residence on Hewlett Parkway with a sub-slab depressurization system installed by EPA is abandoned and the power has been turned off. What is the status of the system?

Response to Comment # 32: Sub-slab depressurization systems require electricity to operate. Since no one is currently residing at the property and the electricity is turned off, the system is not operating.

Comment # 33: A commenter questioned why he was not informed of the Site when he purchased his house five years ago. The commenter noted that it was not until two days prior to the public meeting that he became aware of the Site.

Response to Comment # 33: Information regarding Superfund sites, including the Peninsula Boulevard Groundwater Contamination Site, is available on EPA's website: https://www.epa.gov/superfund/search-superfund-sites-where-you-live. In addition, EPA has previously sent fact sheets and informational mailings to residents in the area in an attempt to inform them about the status of activities.

Comment # 34: Will liens be placed on all properties in the area?

Response to Comment # 34: A plan will be developed that will specify institutional controls to ensure that the selected remedy remains protective until remedial action objectives are achieved. For example, EPA intends to pursue the granting of environmental easements at appropriate properties at AOC 1 and AOC 2 until such time that RAOs are attained. EPA has notified the property owners at AOC 1 and AOC 2 of their potential liability with respect to the Site, and EPA has incurred response costs there, therefore a lien has arisen with respect to these commercial properties. These are the only properties where a CERCLA lien has arisen at the Site.

Comment # 35: Can an example be provided of a groundwater plume on Long Island where the contamination was removed successfully? Was there a change in the home values in those areas?

Response to Comment # 35: While long-term groundwater treatment and monitoring is on-going at numerous Superfund sites on Long Island, the Pasley Solvents & Chemicals, Inc. and SMS Instruments Superfund sites are two examples of federal Superfund sites where the groundwater remediation has been completed. These sites have been deleted from the National Priorities List. Refer to Response to Comment # 31, above regarding home values.

ATTACHMENT A

PROPOSED PLAN

Peninsula Boulevard Groundwater Plume Superfund Site
Operable Unit 2—Source Delineation
Nassau County, New York

June 2017

EPA ANNOUNCES PROPOSED PLAN

This Proposed Plan describes the remedial alternatives considered to address the sources of groundwater contamination at the Peninsula Boulevard Groundwater Plume Superfund Site (Site), referred to herein as Operable Unit 2 (OU2), and it identifies the preferred remedial alternative and provides the rationale for this preference.

This Proposed Plan was developed by the U.S. Environmental Protection Agency (EPA), the lead agency for the Site, in consultation with the New York State Department of Environmental Conservation (NYSDEC). EPA is issuing this Proposed Plan as part of its public participation responsibilities under Section 117(a) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended, 42 U.S.C. §117(a) (CERCLA) (also known as Superfund), and Sections 300.430(f) and 300.435(c) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP).

The nature and extent of the contamination at OU2 at the Site and the remedial alternatives summarized in this Proposed Plan are described in EPA's Remedial Investigation (RI) Report, dated May 2017; EPA's Feasibility Study (FS) Report, dated March 2017; as well as other documents that are contained in the Administrative Record of this action.

The purpose of this Proposed Plan is to inform the public of EPA's preferred remedy and to solicit public comments pertaining to all of the remedial alternatives evaluated, including the preferred remedy. Based on the results of EPA's investigation, EPA has identified two dry cleaners that are sources of the groundwater contamination. The preferred remedy to address one source area (AOC 1) consists of in-situ bioremediation with heat enhanced plume attenuation, long-term monitoring, and institutional controls. The preferred remedy to address the second source area (AOC 2) consists of in-situ bioremediation, long-term monitoring, and institutional controls. (These two areas are defined below).

MARK YOUR CALENDAR

PUBLIC COMMENT PERIOD:
June 15, 2017 – July 17, 2017
EPA will accept written comments on the Proposed Plan during the public comment period.

PUBLIC MEETING: June 22, 2017 at 7:00 pm
EPA will hold a public meeting to explain the Proposed Plan and all of the alternatives presented in the Feasibility Study. Oral and written comments will also be accepted at the meeting. The meeting will be held at the Hewlett Fire House, located at 25 Franklin Avenue, Hewlett, NY.

COMMUNITY ROLE IN SELECTION PROCESS

EPA relies on public input to ensure that the concerns of the community are considered in selecting an effective remedy for each Superfund site. To this end, this Proposed Plan is available to the public for a public comment period that begins on June 15, 2017 and concludes on July 17, 2017.

A public meeting will be held during the public comment period at the Hewlett Fire House in Hewlett on June 22, 2017 at 7 p.m. to present the conclusions of the RI/FS, to elaborate further on the reasons for recommending the preferred alternative, and to receive public comments.

Comments received at the public meeting, as well as written comments received during the public comment period, will be documented in the Responsiveness Summary section of the Record of Decision (ROD), the document that formalizes the selection of the remedy.

Written comments on the Proposed Plan should be addressed to:

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INFORMATION REPOSITORIES

Copies of the Proposed Plan and supporting documentation are available at the following information repositories:

Hewlett-Woodmere Public Library
1125 Broadway
Hewlett, New York 11557-0903
Telephone: (516) 374-1967
Hours of operation:
Mon-Thurs 9 am – 9 pm
Fri 9-6, Sat 9 am – 5 pm, Sun 12:30 pm – 5 pm

USEPA – Region II
Superfund Records Center
290 Broadway, 18th Floor
New York, New York 10007-1866
(212) 637-4308
Hours: Monday – Friday: 9 am to 5 pm

EPA's website for the Peninsula Boulevard Groundwater Plume Site:
https://www.epa.gov/superfund/peninsula-groundwater

SCOPE AND ROLE OF ACTION

Site remediation activities are sometimes segregated into different phases, or operable units (OUs), so that remediation of different, discrete environmental media or geographic areas of a site can proceed separately, whether sequentially or concurrently. EPA has designated two OUs for the Peninsula Boulevard Groundwater Plume Site. OU1 addresses the cleanup of contaminated groundwater; a remedy for OU1 was selected in 2011. This Proposed Plan concerns OU2, the final planned phase of response activities at the Site, and addresses the sources of the contamination found in the groundwater.

The primary objectives of this action are to remediate the groundwater and soil contamination associated with the sources of the volatile organic contamination (VOC) groundwater plume at the Site, and to minimize the migration of these contaminants.

SITE BACKGROUND

Site Description

The Site consists of the area within and around a groundwater plume located in the Village of Hewlett, Town of Hempstead, Nassau County, New York. John F. Kennedy International Airport is located approximately three miles to the west of the Site. A Site location map is provided as Figure 1.

The area consists of a mix of commercial and residential properties, with the majority of the commercial properties being located along Mill Road, Peninsula Boulevard, Broadway, and West Broadway. Woodmere Middle School is located along the western Site boundary. Portions of Motts Creek, Doxey Brook Drain, and an unnamed tributary leading to Motts Creek are located within the Site.

The residences in the area of the Site are serviced by the New York American Water Company (NYAWC). The NYAWC operates a well field approximately 1,000 feet north of the Site. The water delivered to these residences is a blend of water from several well fields, including the well field north of the Site. Since 1991, NYAWC has been treating groundwater pumped from this well field with an air stripper prior to distribution. Based on a review of water supply well records in the area, private wells are not utilized for drinking water in the area.

Site History

Under NYSDEC oversight, a series of investigations were conducted from 1991 to 1999 at the former Grove Cleaners, located at 1274 Peninsula Boulevard. The investigations revealed an extensive groundwater contaminant plume extending both to the north and south of Peninsula Boulevard, primarily consisting of tetrachloroethylene (PCE) and its breakdown products, including trichloroethylene (TCE). The results of the investigation suggested source areas other than the former Grove Cleaners property were contributing to the groundwater contaminant plume. Following the implementation of interim remedial measures, which consisted of the removal of impacted soils related to solvent discharges to a dry well, a No Further Action remedy was selected by NYSDEC in March 2003, under state authorities, for the former Grove Cleaners facility, and NYSDEC requested that EPA address the area-wide groundwater plume.

On March 7, 2004, EPA proposed the Site for inclusion on the National Priorities List (NPL), and on July 22, 2004, EPA included the Site on the NPL.

As mentioned earlier, the Site is being addressed by EPA in two separate OUs. EPA conducted an RI/FS for OU1 at the Site from 2005 through 2010. The RI identified groundwater contaminated with PCE, PCE breakdown products, and low levels of other VOCs. The source of the PCE groundwater contamination was not able to be identified during the OU1 RI.

EPA issued a ROD for OU1 in September 2011 which called for the extraction and treatment of contaminated groundwater, in-situ chemical treatment in targeted areas, and institutional controls. EPA completed the remedial design for the OU1 remedy in September 2016. Construction of the OU1 remedy has not yet begun.

EPA initiated the RI for OU2 in 2012 with the purpose of identifying the source(s) of the groundwater contamination. The results of the RI are discussed below.

Site Hydrogeology

The Upper Glacial Aquifer (UGA) underlies the Site. Groundwater flow in the UGA is dominated by a groundwater divide located approximately 2,000 feet south of Peninsula Boulevard, along a low ridge trending southwest to northeast. North of the divide, groundwater flow is both north and west, depending upon depth. South of the divide, groundwater flow within the UGA is southward toward Macy Channel.

North of the Site, the UGA overlies the Jameco Aquifer. In this area of Long Island, the Jameco Aquifer is limited in extent, but is an important water-bearing zone because of its high hydraulic conductivity on the order of 200 feet per day. The NYAWC Plant #5 well field adjacent to the Site utilizes the Jameco Aquifer as its source for water production and does not utilize the UGA. Given the similar hydraulic properties of the UGA and Jameco Aquifer, there is the potential for significant hydraulic connection between the two units. However, data obtained as a result of the RI activities indicate that the Gardiners Clay (which separates the UGA from the Jameco Aquifer) acts as a confining unit in the area of the Site.

The inter-bedded nature of sediments in the UGA suggests significant vertical and horizontal variability in hydraulic conductivity values. The "20-foot clay" is a discontinuous, semi-confining layer within the UGA that separates the UGA into an upper and lower zone in some areas of the Site.

The depth to groundwater within the unconfined portion of the UGA ranges from approximately 3 to 15 feet below grade surface (bgs), while ranging from 6 to 17 feet bgs in the semi-confined portion of aquifer. Saturated thickness of the unconfined UGA above the "20-foot clay" layer ranges from 10 to 30 feet. Saturated thickness of the deeper portion of the UGA below the "20-foot clay," including the pressure head component caused by the semi-confined conditions, is approximately 55 to 65 feet.

RESULTS OF THE REMEDIAL INVESTIGATION

The RI Report, dated May 2017, provides the analytical results of surface soil, subsurface soil, soil gas, and groundwater samples collected from 2012 to 2016 at Cedarwood Cleaners, Mill Road Cleaners, Piermont Cleaners, the former Vogue French Cleaners, and a former vacant lot located at 1255 West Broadway (former Vacant Lot), including adjacent parcels. Sampling was not conducted at the former Grove Cleaners property because previous investigations failed to provide sufficient evidence to conclude it was a source of the groundwater plume.

Sampling activities during this RI were conducted at the Site in phases. In 2012, EPA installed and sampled exterior and sub-slab soil gas monitoring wells and temporary groundwater monitoring wells at Cedarwood Cleaners, Mill Road Cleaners, Piermont Cleaners, and the former Vogue French Cleaners. Based on these findings, in 2013, EPA utilized a Membrane Interface Probe with Hydraulic Profiling Tool (MiHPT) to characterize subsurface geologic/hydrogeologic conditions and survey for the presence of VOCs at Cedarwood Cleaners, Piermont Cleaners, and the former Vogue French Cleaners.

In 2014, EPA conducted soil sampling and groundwater profiling at the Cedarwood Cleaners, Piermont Cleaners, and the former Vogue French Cleaners. Based on the 2014 results, in early 2015, EPA conducted additional soil sampling and groundwater profiling at Cedarwood Cleaners and Piermont Cleaners. In addition, the sampling program was expanded to conduct soil sampling and groundwater profiling at the former Vacant Lot, including adjacent parcels and public right-of-ways in the immediate area.

Using this data, in late 2015 and early 2016, EPA installed permanent groundwater monitoring wells in the area and conducted further soil sampling and two rounds of groundwater sampling from the permanent groundwater monitoring wells.

In June and July of 2016, EPA conducted a transducer study involving certain monitoring wells at Cedarwood Cleaners, Piermont Cleaners, the former Vacant Lot, and a stilling well in the Macy Channel, a nearby inlet of the Great South Bay. A transducer study involves measuring water levels to obtain a better understanding of the direction of groundwater flow.

Data collected by EPA during this period, in addition to aerial imagery and a digital elevation model from the United States Geographical Survey, were used to develop localized, three-dimensional models of the PCE plumes in soil and groundwater at OU2 of the Site. The model also resulted in an estimate of the PCE mass in soil and groundwater for each stratigraphic layer sampled during drilling, profiling, or monitoring activities.

Soil Sampling Results

PCE and TCE were the only VOCs detected in soil at concentrations exceeding the NYSDEC Subpart 375-6 Protection of Groundwater Soil Cleanup Objectives

(SCOs). SCOs for PCE and TCE are 1.3 and .470 milligrams per kilogram (mg/kg), respectively.

Cedarwood Cleaners

Soil sampling revealed subsurface soil contamination at depths up to approximately 80 feet bgs. Maximum concentrations of PCE and TCE were detected in subsurface soil at 1,350 mg/kg and 1.8 mg/kg at depths of 33 feet bgs and 67.5 feet bgs, respectively. In addition, testing revealed the presence of dense non-aqueous phase liquid (DNAPL)[1] in the southern portion of the property at a depth of approximately 35 feet bgs. OIL IN SOIL™ test results and visual observations indicated that DNAPL was present at depths between 33 and 35.5 feet bgs and light non-aqueous phase liquid (LNAPL)[2] was present at depths between 17 and 18 feet bgs.

Former Vacant Lot at 1255 West Broadway, 1245 West Broadway, and Long Island Rail Road Substation (LIRR) Right-of-Way (ROW)

At the former Vacant Lot, soil sampling revealed PCE contamination at a maximum concentration of 118 mg/kg at a depth of 60 feet bgs. At 1245 West Broadway, soil sampling revealed PCE contamination at a maximum concentration of 11,100 mg/kg at a depth of 41.5 feet bgs. Generally, concentrations of TCE at these two properties were detected below 1 mg/kg.

At the LIRR Substation ROW, soil sampling did not reveal significant concentrations of PCE or TCE.

Piermont Cleaners

Soil sampling revealed PCE at a maximum concentration of 2.7 mg/kg at a depth of 35.5 feet bgs. TCE was generally not detected in soil samples from the Piermont Cleaners property.

Former Vogue French Cleaners

PCE and TCE were not detected in soil samples collected at this property.

Mill Road Cleaners

PCE and TCE were not detected in soil samples collected at this property.

Groundwater Sampling Results

Cedarwood Cleaners

Groundwater samples collected from the shallow UGA, "20-foot clay," and deep UGA between depths of 22 and 71 feet bgs revealed PCE and TCE at concentrations up to 65,000 micrograms per liter (µg/L) and 5,000 µg/L, respectively. Other VOCs detected included: 1,1,2-trichloro-1,2,2-trifluoroethane (150 µg/L); 1,2,3-trichlorobenzene (18 µg/L); benzene (570 µg/L); methylene chloride (2,500 µg/L); and *cis*-1,2-dichloroethene (*cis*-1,2-DCE) (42 µg/L).

Former Vacant Lot at 1255 West Broadway, 1245 West Broadway, and LIRR Substation ROW

Groundwater samples collected from the shallow UGA, 20-foot clay, and deep UGA revealed PCE and TCE concentrations up to 800,000 µg/L and 2,000 µg/L, respectively. Other VOCs detected included: 2- butanone (50 µg/L); benzene (100 µg/L); 1,1-dichloroethene (15 µg/L); *cis*-1,2-DCE (520 µg/L); methyl tert-butyl ether (140 µg/L); and, vinyl chloride (12 µg/L).

Piermont Cleaners

Groundwater samples collected from the shallow UGA, "20-foot clay," and deep UGA revealed PCE and TCE concentrations up to 1,200 µg/L and 21J µg/L, respectively. Other VOCs detected from included: benzene (3.5 µg/L); *cis*-1,2-DCE (51 µg/L); methylene chloride (4,900 µg/L); and vinyl chloride (12 µg/L).

Former Vogue French Cleaners

PCE and TCE were not detected in any of the groundwater samples collected at the former Vogue French Cleaners property. Benzene, ranging from 1.2 µg/L to 3.5 µg/L, was detected in samples collected immediately downgradient of the property.

[1] A dense non-aqueous phase liquid or DNAPL is a liquid that is both denser than water and is immiscible or has low solubility in water.

[2] LNAPL is a groundwater contaminant that is not soluble in water and has lower density than water, in contrast to a DNAPL which has higher density than water. Once a LNAPL infiltrates the ground, it will stop at the height of the water table because the LNAPL is less dense than water.

Jameco Aquifer

As part of the remedial design for OU1, EPA installed three groundwater monitoring wells in the Jameco Aquifer, the aquifer underlying the UGA, to determine whether Site-related contaminants have impacted the Jameco Aquifer. As part of this effort, one well was installed upgradient of the Site, one downgradient of the source areas, and one within the Site. Based on the sampling results, no Site-related VOCs (e.g., PCE and TCE) were detected in the groundwater samples collected from these wells, indicating that the contaminants have not migrated through the Gardiners Clay and into the Jameco Aquifer.

Soil-Gas Sampling Results

Cedarwood Cleaners

PCE was detected in outdoor, or exterior, soil gas samples at Cedarwood Cleaners at concentrations ranging from 22 micrograms per cubic meter ($\mu g/m^3$) to 59,000 $\mu g/m^3$, and TCE was detected at concentrations ranging from undetected, or "non-detect," to a level of 4,500 $\mu g/m^3$. Soil gas samples were also collected from beneath the concrete floor slab of the building. In those sub-slab soil gas samples, PCE was detected at concentrations ranging from 6,820 $\mu g/m^3$ to 5,500,000 $\mu g/m^3$, and TCE was detected at concentrations ranging from 50 $\mu g/m^3$ to 36,000 $\mu g/m^3$. Indoor-air samples were not collected because of the indoor use of PCE at the dry cleaner.

Piermont Cleaners

PCE was detected in exterior soil gas samples at Piermont Cleaners at concentrations of approximately 1,017 $\mu g/m^3$, and TCE was detected at concentrations of approximately 1 $\mu g/m^3$. In the sub-slab soil gas samples, PCE was detected at concentrations ranging from 1 $\mu g/m^3$ to 21 $\mu g/m^3$, and TCE was detected at concentrations up to 2.6 $\mu g/m^3$. Indoor-air samples were not collected because of the indoor use of PCE at the dry cleaner.

Vapor Intrusion

VOC vapors released from contaminated groundwater and/or soil have the potential to move through the soil and seep through cracks in basements, foundations, sewer lines, and other openings. As part of the OU1 RI, EPA conducted vapor intrusion sampling at fifteen residences. The results of the analyses indicated that one residence had concentrations of VOCs at or above EPA Region 2 acceptable screening levels for sub slab and indoor air. In 2009, EPA installed a sub-slab depressurization system at this residence, and subsequent sampling has indicated that VOCs were no longer detected in indoor air.

WHAT IS A "PRINCIPAL THREAT?"

The NCP establishes an expectation that EPA will use treatment to address the principal threats posed by a Site wherever practicable (Section 300.430(a)(1)(iii)(A) of the NCP). The "principal threat" concept is applied to the characterization of "source materials" at a Superfund site. A source material is material that includes or contains hazardous substances, pollutants or contaminants that act as a reservoir for migration of contamination to ground water, surface water or air, or acts as a source for direct exposure. Contaminated ground water generally is not considered to be a source material; however, Non-Aqueous Phase Liquids (NAPLs) in groundwater may be viewed as source material. Principal threat wastes are those source materials considered to be highly toxic or highly mobile that generally cannot be reliably contained, or would present a significant risk to human health or the environment should exposure occur. The decision to treat these wastes is made on a site-specific basis through a detailed analysis of the alternatives using the nine remedy selection criteria. This analysis provides a basis for making a statutory finding that the remedy employs treatment as a principal element.

EPA anticipates conducting vapor intrusion sampling near the two source areas identified during the OU2 RI, pending obtaining permission for access. As indicated in the OU1 ROD, EPA intends to address existing or potential future exposure through inhalation of vapors migrating from contaminated groundwater into buildings at the Site, as determined necessary.

PRINCIPAL THREAT WASTE

Principal threat wastes are those source materials considered to be highly toxic or highly mobile that generally cannot be reliably contained or would present a significant risk to human health or the environment should exposure occur. They include liquids and other highly mobile materials (e.g., solvents) or materials having high concentrations of toxic compounds. No threshold level of toxicity/risk has been established to equate to "principal threat" A detailed explanation of principle threat wastes can be found in the box, "What is a "Principle Threat?'"

EPA's findings to date indicate the presence of principal threat wastes. Results from the investigation showed maximum concentrations of PCE of 1,350 mg/kg in subsurface soil at Cedarwood Cleaners and 11,100 mg/kg at 1245 West Broadway. In addition, the DNAPL at the Cedarwood Cleaners is considered a principal threat waste.

Human Health Risk Assessment

EPA conducted a four-step, baseline human health risk assessment (HHRA) as part of OU1 to assess Site-related cancer risks and noncancer health hazards. The four-step process is comprised of the following: Hazard Identification, Exposure Assessment, Toxicity Assessment, and Risk Characterization (see box on page 7, "What is Risk and How is it Calculated?"). As a result, PCE, TCE, *cis*-1,2-DCE, and vinyl chloride were identified as the primary, Site-related contaminants of concern contributing most significantly to elevated cancer risk and noncancer hazard based on the potential for direct contact exposure to groundwater.

A risk screening evaluation, serving as a streamlined HHRA, was conducted for OU2 to assess the potential for these Site-related contaminants to pose current or future risks to human health and the environment in the absence of any remedial action. Therefore, the chemicals of potential concern (COPCs) evaluated included PCE, TCE, *cis*-1,2-DCE, and vinyl chloride.

For the purposes of conducting the OU2 risk screening, the two source areas were evaluated separately. The area comprised of Cedarwood Cleaners, the former Vacant Lot, 1245 West Broadway, the LIRR Substation, and sections of West Broadway and Hewlett Parkway adjacent to Cedarwood Cleaners is referred to as Area of Concern 1 (AOC 1). Piermont Cleaners is referred to as AOC 2. The current and future land use scenarios assessed within the risk screening evaluation included the following populations and exposure pathways:

- Resident (child and adult): ingestion, dermal contact, and inhalation of soil particles and vapors from surface soils (0-2 feet) and ingestion, dermal contact, and inhalation of tap water (under a future-use scenario where groundwater is an untreated source of tap water);
- Site Worker (adult): ingestion, dermal contact, and inhalation of soil particles and vapors from surface soils; and
- Construction Worker (adult): ingestion, dermal contact and inhalation of soil particles and vapors from both surface and subsurface soil (0-10 feet).

The OU2 risk screening used exposure point concentrations (EPCs) and available risk-based screening levels, i.e., USEPA May 2016 Regional Screening Levels (RSLs) at a target risk of 1 x 10^{-6} and target hazard quotient (HQ) of 1 to calculate facility-specific cancer risks and noncancer HQs. The RSLs incorporate assumptions on potential exposure scenarios and human receptors, along with contaminant-specific toxicological information. The EPCs were estimated using either the maximum detected concentration of a contaminant or the 95% upper-confidence limit (UCL) of the average concentration. Chronic daily intakes were calculated based on the reasonable maximum exposure (RME), which is the highest exposure reasonably anticipated to occur at the Site. The RME is intended to estimate a conservative exposure scenario that is still within the range of possible exposures. A more detailed discussion of the exposure pathways can be found in the risk assessment screening of the Site in the information repository.

Summary of the Human Health Risk Assessment

Soil

Risks and hazards were evaluated for current and future exposure to surface and subsurface soil. The populations of interest included adult and child residents and adult Site workers for surface soil and adult construction workers for surface and subsurface soil. The cancer risks for all of the receptor populations evaluated within each AOC were below the acceptable EPA risk range of 1 x 10^{-6} to 1 x 10^{-4} for exposure to OU2 soils. The HI for each receptor population was below the EPA acceptable value of 1, as well.

Table A. Summary of risks and hazards associated with soil.

Receptor	Hazard Index	Cancer Risk
AOC 1		
Resident	0.015	5.0E-08
Site Worker	0.0031	1.2E-08
Construction Worker	0.0026	1.3E-09
AOC 2		
Resident	0.00019	7.8E-10
Site Worker	0.00004	1.3E-10
Construction Worker	0.00018	3.5E-11

Groundwater

Risks and hazards were evaluated for current and future exposure to groundwater for the on-Site child and adult resident only. The cancer risk and noncancer hazard both exceeded the applicable EPA thresholds described above at each AOC. PCE was the primary driver of elevated risk and hazard at AOC 1, although *cis*-1,2-DCE, TCE, and vinyl chloride contributed as well. PCE and vinyl chloride were the primary risk drivers at AOC 2, although only PCE contributed to the elevated hazard.

Table B. Summary of hazards and risks associated with groundwater.

Receptor	Hazard Index	Cancer Risk
AOC 1		
Resident	4,600	1.9E-02
AOC 2		
Resident	18	1.5E-04

Ecological Risk Assessment

EPA conducted a Screening Level Ecological Risk Assessment (SLERA) as part of OU1. The SLERA was conducted to evaluate the potential for ecological effects from exposure to surface water, interstitial water, and/or sediments. In the SLERA, EPA concluded that the risk to potential receptors through either direct contact or ingestion of media containing contaminants was below EPA's acceptable hazard index of 1, indicating that there would be no adverse ecological impacts. Based on the results of the OU2 RI, concentrations of contaminants detected in soil at OU2 of the Site are at depth and, as such, unlikely to pose any unacceptable risks to aquatic or terrestrial ecological receptors.

Conclusion

The results of the risk screening indicate that the contaminated groundwater presents an unacceptable risk to human health at each of the two AOCs. Therefore, EPA has determined that actual or threatened releases of hazardous substances from the Site, if not addressed by the preferred remedy or one of the other active measures considered, may present a current or potential threat to human health. It is EPA's current judgment that the preferred remedy identified in this Proposed Plan is necessary to protect human health from actual or threatened releases of hazardous substances into the environment.

REMEDIAL ACTION OBJECTIVES

Remedial action objectives (RAOs) are specific goals to protect human health and the environment. These objectives are based on available information and standards such as applicable or relevant and appropriate requirements (ARARs), to-be-considered guidance, and site-specific, risk-based levels.

The following RAOs have been established for contaminated groundwater at OU2:

- Prevent or minimize current and potential future human exposure (via inhalation, ingestion, and dermal contact) to VOCs in-groundwater at

WHAT IS RISK AND HOW IS IT CALCULATED?

A Superfund baseline human health risk assessment is an analysis of the potential adverse health effects caused by hazardous substance releases from a site in the absence of any actions to control or mitigate these releases under current- and anticipated future-land uses. A four-step process is utilized for assessing site-related human health risks for reasonable maximum exposure scenarios.

Hazard Identification: In this step, the chemicals of potential concern (COPCs) at the site in various media (*i.e.*, soil, groundwater, surface water, and air) are identified based on such factors as toxicity, frequency of occurrence, and fate and transport of the contaminants in the environment, concentrations of the contaminants in specific media, mobility, persistence, and bioaccumulation.

Exposure Assessment: In this step, the different exposure pathways through which people might be exposed to the contaminants identified in the previous step are evaluated. Examples of exposure pathways include incidental ingestion of and dermal contact with contaminated soil and ingestion of and dermal contact with contaminated groundwater. Factors relating to the exposure assessment include, but are not limited to, the concentrations in specific media that people might be exposed to and the frequency and duration of that exposure. Using these factors, a "reasonable maximum exposure" scenario that portrays the highest level of human exposure that could reasonably be expected to occur is calculated.

Toxicity Assessment: In this step, the types of adverse health effects associated with chemical exposures and the relationship between magnitude of exposure and severity of adverse effects are determined. Potential health effects are chemical-specific and may include the risk of developing cancer over a lifetime or other non-cancer health hazards, such as changes in the normal functions of organs within the body (*e.g.*, changes in the effectiveness of the immune system). Some chemicals are capable of causing both cancer and non-cancer health hazards.

Risk Characterization: This step summarizes and combines outputs of the exposure and toxicity assessments to provide a quantitative assessment of site risks for all COPCs. Exposures are evaluated based on the potential risk of developing cancer and the potential for non-cancer health hazards. The likelihood of an individual developing cancer is expressed as a probability. For example, a 10^{-4} cancer risk means a "one-in-ten-thousand excess cancer risk"; or one additional cancer may be seen in a population of 10,000 people as a result of exposure to site contaminants under the conditions identified in the Exposure Assessment. Current Superfund regulations for exposures identify the range for determining whether remedial action is necessary as an individual excess lifetime cancer risk of 10^{-4} to 10^{-6}, corresponding to a one-in-ten-thousand to a one-in-a-million excess cancer risk. For non-cancer health effects, a "hazard index" (HI) is calculated. The key concept for a non-cancer HI is that a "threshold" (measured as an HI of less than or equal to 1) exists below which non-cancer health hazards are not expected to occur. The goal of protection is 10^{-6} for cancer risk and an HI of 1 for a noncancer health hazard. Chemicals that exceed a 10^{-4} cancer risk or an HI of 1 are typically those that will require remedial action at a site and are referred to as chemicals of concern, or COCs, in the final remedial decision document or Record of Decision.

concentrations in excess of federal and state standards;
- Restore the impacted aquifer to its most beneficial use as a source of drinking water by reducing contaminant levels to the more stringent of federal and state standards; and,
- Minimize the potential for further migration of groundwater containing VOC concentrations greater than federal and State standards.

The preliminary remediation goals (PRGs) for groundwater are identified in Table 1.

Table 1: PRGs for Groundwater

Chemicals of Potential Concern (COPCs)	**NYS Groundwater Quality Standards (µg/L)**	NYS Drinking Water Quality Standards (µg/L)	National Primary Drinking Water Standards (µg/L)
cis-1,2-DCE	**5**	5	70
trans-1,2-DCE	**5**	5	10
TCE	**5**	5	5
PCE	**5**	5	5
Vinyl Chloride	**2**	2	2

Note: PRGs for groundwater are highlighted in bold.

The following RAOs have been established for contaminated soil at OU2:

- Prevent impacts to groundwater resulting from soil contamination with concentrations greater than preliminary remediation goals; and,
- Reduce or eliminate the potential for soils with VOCs exceeding preliminary remediation goals to be a continued source of contamination to the aquifer.

To satisfy these RAOs, PRGs for contaminated soil are identified in Table 2.

Table 2: PRGs for Soil

Chemicals of Potential Concern (COPCs)	**Soil PRGs*(mg/kg)**
cis- 1,2-DCE	0.25
trans-1,2-DCE	0.19
Vinyl Chloride	0.02
TCE	0.47
PCE	1.3

* NYSDEC soil cleanup objectives 6 NYCRR Subpart 375-6.5

SUMMARY OF REMEDIAL ALTERNATIVES

Section 121(b)(1) of CERCLA, 42 U.S.C. § 9621(b)(1), mandates that remedial actions must be protective of human health and the environment, cost-effective, comply with ARARS, and utilize permanent solutions and alternative treatment technologies and resource recovery alternatives to the maximum extent practicable. Section 121(b)(1) of CERCLA also establishes a preference for remedial actions that employ, as a principal element, treatment to reduce permanently and significantly the volume, toxicity, or mobility of the hazardous substances, pollutants, and contaminants at a site. Section 121(d) of CERCLA, 42 U.S.C. § 9621(d), further specifies that a remedial action must attain a level or standard of control of the hazardous substances, pollutants, and contaminants that at least attains ARARs under federal and state laws, unless a waiver can be justified pursuant to Section 121(d)(4) of CERCLA, 42 U.S.C. § 9621(d)(4).

Detailed descriptions of the remedial alternatives presented in this Proposed Plan for addressing the contamination in soil and groundwater are provided in the FS, dated March 2017.

The construction time for each alternative reflects only the actual time required to construct or implement the action and does not include the time required to design the remedy, negotiate the performance of the remedy with any potentially responsible parties, and procure the contracts for design and construction.

Remediation Areas

As mentioned previously, the OU2 RI identified two separate source areas, referred to as AOC 1 and AOC 2. AOC 1 consists of Cedarwood Cleaners, the former Vacant Lot, 1245 West Broadway, the LIRR Substation, and sections of West Broadway and Hewlett Parkway adjacent to Cedarwood Cleaners. AOC 2 consists of Piermont Cleaners, which is located within a commercial strip mall at the northeastern intersection of Broadway and Piermont Avenue. Refer to Figures 2 and 3.

Contaminated soil in AOC 1 and AOC 2 is present at depths below the water table, where the pores between soil particles are filled with water. This contaminated soil, often referred to as saturated soil in the OU2 RI/FS, in conjunction with contaminated groundwater is the focus of the remedial alternatives evaluated.

Common Elements

All of the alternatives, with the exception of the no action alternative, include common components. Alternatives 2, 3, 4A, and 4B include long-term monitoring to ensure that the soil and groundwater quality improves following implementation of these alternatives until cleanup levels are achieved. The groundwater sampling would also monitor groundwater quality including degradation by-products generated by the treatment processes and to

address the potential migration of vapors resulting from the *in-situ* treatment of contaminants in soil and groundwater. During the remedial design, measures would be evaluated to mitigate potential impacts to nearby properties (such as the installation and operation of vapor recovery wells) from vapors which may be potentially generated by these alternatives.

Alternatives 2, 3, 4A, and 4B also all include the implementation of institutional controls for soil and groundwater use restrictions until RAOs are achieved to ensure the remedy remains protective. Institutional controls for groundwater and soil use may include, as determined to be appropriate, existing governmental controls, such as well permit requirements, and deed restrictions. EPA intends to pursue the creation of environmental easements at the Cedarwood Cleaners and Piermont Cleaners properties and to file such environmental easements in the property records of Nassau County until such time that RAOs are attained.

A site management plan (SMP) will be developed to provide for the proper management of the Site remedy post-construction, such as through the use of institutional controls until RAOs are met, and will also include long-term groundwater monitoring, periodic reviews, and certifications.

Additionally, because it will take longer than five years to achieve cleanup levels under any of the alternatives, CERCLA requires that a review of conditions at the Site be conducted no less often than once every five years until such time as cleanup levels are achieved. This review is not considered part of the remedy; it is an independent requirement required by the law.

Alternative 1: No Action

The NCP requires that a "No Action" alternative be developed and considered as a baseline for comparing other remedial alternatives. Under this alternative, there would be no remedial action conducted at the Site. This alternative does not include any monitoring or institutional controls.

As mentioned above, because this alternative would result in contaminants remaining at the Site that are above levels that would otherwise allow for unrestricted use and unlimited exposure, CERCLA requires that the Site be reviewed at least once every five years. If justified by the review, additional response actions may be implemented.

Capital Cost:	$0
O&M Costs:	$0
Present-Worth Cost:	$0
Construction Time:	Not Applicable

Alternative 2: Air Sparging/Soil Vapor Extraction (AS/SVE); Long-Term Monitoring; Institutional Controls

AOC 1

Capital Cost:	$2,899,086
Total O&M Costs:	$7,211,883
Present-Worth Cost:	$10,492,429
Construction Time:	6 months to 1 year

AOC 2

Capital Cost:	$1,736,759
Total O&M Costs:	$4,422,318
Present-Worth Cost:	$6,399,321
Construction Time:	6 months to 1 year

Under this alternative, an AS/SVE system would be built including the installation of a network of vertical air injection or sparging wells into the saturated zone of the aquifer and a network of vapor extraction wells installed into the unsaturated zone. A stream of air under pressure would be injected into the subsurface via the sparging well, and extraction wells would be used to remove contaminants in the vapor phase. VOCs in the vapor phase would be collected from each vacuum extraction well and pumped to a treatment system that would utilize activated granular carbon.

In-well air stripping can be implemented in different system configurations. For the purposes of developing a conceptual design and cost estimate for comparison with other technologies, the FS estimated the installation of approximately 59 AS wells and 53 SVE wells to remediate groundwater and soil contamination in AOC 1. In AOC 2, the FS estimated the installation of approximately 14 AS wells and 10 SVE wells.

An asphalt cap would also be installed at the former Vacant Lot to improve the effectiveness of the AS/SVE system by minimizing short circuiting of air flow from the ground surface. The entire footprint of Cedarwood Cleaners and Piermont Cleaners are each currently covered with asphalt, concrete pavement, and a concrete slab-on-grade building. This conceptual design would require further evaluation during the remedial design if chosen to be implemented. Additional wells would have to be installed to monitor the progress of the remediation.

Alternative 3: In-Situ Thermal Remediation; Long-Term Monitoring; Institutional Controls

AOC 1

Capital Cost:	$21,632,524
Total O&M Costs:	$18,722,129
Present-Worth Cost:	$41,048,610
Construction Time:	6 months to 1 year

AOC 2

Capital Cost:	$7,256,345
Total O&M Costs:	$6,015,498
Present-Worth Cost:	$13,548,991
Construction Time:	6 months to 1 year

Under this alternative, an in-situ thermal treatment method, such as Electric Resistivity Heating (ERH), would be employed to treat contaminated groundwater and soil. ERH uses the heat generated by the resistance of the soil matrix to the flow of electrical current between electrodes to raise subsurface temperatures up to 100°C. ERH applies electricity into the ground using heavy cables that connect the power control unit and electrodes. Electricity flows evenly between electrodes within the treatment volume. The water in the subsurface conducts electricity between electrodes. Soil is naturally resistant to the flow of electrical current, thereby heating the soil and groundwater. Heat causes the underground contaminants and water to evaporate, creating in-situ steam and vapor. Contaminated vapor and steam are extracted using vacuum extraction wells, captured and treated above-ground with granular activated carbon.

The conceptual design for AOC 1 estimates that approximately 221 electrodes co-located with 221 vacuum extraction wells would be installed. The conceptual design for AOC 2 estimates the installation of approximately 33 electrodes co-located with 33 vacuum extraction wells.

Each electrode boring would be 12-inches in diameter and installed vertically to a depth of 81 feet bgs. Each vacuum recovery well would be co-located with an electrode and installed to a depth of 10 feet bgs as groundwater is anticipated between 12 and 15 feet bgs. The average distance between electrodes would be approximately 16 feet. At each AOC, the recovery wells would be connected to a blower/treatment system. A temporary building or treatment trailer would be constructed at each AOC to house the treatment equipment. The exact location of the treatment buildings would be determined during the remedial design.

This conceptual design would require further evaluation during the remedial design if chosen to be implemented.

Alternative 4A: In-Situ Bioremediation; Long-Term Monitoring; Institutional Controls

AOC 1

Capital Cost:	$3,798,403
Total O&M Costs:	$1,783,220
Present-Worth Cost:	$5,866,084
Construction Time:	6 months to 1 year

AOC 2

Capital Cost:	$1,589,854
Total O&M Costs:	$1,382,456
Present-Worth Cost:	$3,186,371
Construction Time:	6 months to 1 year

Under this alternative, in-situ bioremediation would be implemented to transform VOC contamination into non-toxic compounds. Enhanced anaerobic biodegradation (EAB) involves the injection of an electron donor, nutrients, and/or dechlorinating microorganisms as necessary into the subsurface. Electron donors include lactate, whey, and emulsified vegetable oil (EVO). The electron donors are delivered via injection wells or direct push technology into the subsurface, creating strong reducing conditions where anaerobic biodegradation transforms chlorinated VOCs (CVOCs) through reductive dechlorination into innocuous compounds, such as carbon dioxide, ethene, ethane, and chloride.

The addition of soluble carbon to the subsurface supports the growth of indigenous microbes in groundwater. As bacteria feed on the soluble carbon, they consume dissolved oxygen and other electron acceptors (contaminants), thereby reducing the potential for oxidation reduction, or redox, in groundwater. As bacteria ferment the organic portion of the oil, they release various volatile fatty acids that diffuse and serve as electron donors for other bacteria.

The conceptual design for the implementation of this alternative at AOC 1 consists of a grid of approximately 63 injection wells and a treatment zone from 15 feet bgs to 80 feet bgs. At AOC 2, seven injection wells would be installed along the front of the building, near the area of highest groundwater contamination.

A pilot study would be conducted during the remedial design to determine a suitable, site-specific amendment and to develop site-specific engineering parameters, such as radius of injection, dosage, and frequency of injections.

Alternative 4B: In-Situ Bioremediation with Heat Enhanced Plume Attenuation; Long-Term Monitoring; Institutional Controls

AOC 1

Capital Cost:	$15,768,864
Total O&M Costs:	$5,332,620
Present Worth Cost:	$21,552,450
Construction Timeframe:	6 months to 1 year

The alternative uses a hybrid approach, combining the EAB treatment described under Alternative 4A with heat enhancement. Under this approach, the injection of the bioremediation amendment would be followed by gently heating the saturated soil and groundwater with Heat

Enhanced Plume Attenuation (HEPA) to approximately 40°C to enhance the bioremediation rates in the subsurface.

At AOC 1, it is estimated that in addition to the installation of 63 injection wells for the delivery of the amendment, approximately 91 electrodes, 12 inches in diameter, would also be installed vertically to a depth of approximately 81 feet bgs to heat the soil and groundwater. The average distance between electrodes would be approximately 25 feet and would be connected to the power supply present in the area. No such HEPA process would be used regarding AOC 2 because the contaminant levels are not as high as AOC 1.

A pilot study would be conducted during the remedial design to determine a suitable, site-specific amendment and to evaluate the effectiveness of heat enhancement. Site-specific engineering parameters, such as radius of influence, operating temperatures, dosage, and frequency of injections would also be developed.

EVALUATION OF ALTERNATIVES

In evaluating the remedial alternatives, each alternative is assessed against nine evaluation criteria set forth in federal regulation, namely overall protection of human health and the environment, compliance with ARARs, long-term effectiveness and permanence, reduction of toxicity, mobility, or volume through treatment, short-term effectiveness, implementability, cost, and state and community acceptance. Refer to the table on this page for a more detailed description of these evaluation criteria. This section of the Proposed Plan evaluates the relative performance of each alternative against the nine criteria, noting how each compares to the other options under consideration. A detailed analysis of alternatives can be found in EPA's FS Report, dated March 2017.

Overall Protection of Human Health and the Environment

Alternative 1 (No Action) would not meet RAOs and would not be protective of human health and the environment since no action would be taken. Alternatives 2, 3, 4A, and 4B are active remedies that address soil and groundwater contamination and would restore groundwater quality over the long-term. Protectiveness under Alternatives 2, 3, 4A, and 4B requires a combination of actively reducing contaminant concentrations and limiting exposure to residual contaminants through institutional controls until RAOs are met.

EVALUATION CRITERIA FOR SUPERFUND REMEDIAL ALTERNATIVES

Overall Protectiveness of Human Health and the Environment evaluates whether and how an alternative eliminates, reduces, or controls threats to public health and the environment through institutional controls, engineering controls, or treatment.

Compliance with Applicable or Relevant and Appropriate Requirements (ARARs) evaluates whether the alternative meets federal and state environmental statutes, regulations, and other requirements that pertain to the Site, or whether a waiver is justified.

Long-term Effectiveness and Permanence considers the ability of an alternative to maintain protection of human health and the environment over time.

Reduction of Toxicity, Mobility, or Volume (TMV) of Contaminants through Treatment evaluates an alternative's use of treatment to reduce the harmful effects of principal contaminants, their ability to move in the environment, and the amount of contamination present.

Short-term Effectiveness considers the length of time needed to implement an alternative and the risks the alternative poses to workers, the community, and the environment during implementation.

Cost includes estimated capital and annual operations and maintenance costs, as well as present worth cost. Present worth cost is the total cost of an alternative over time in terms of today's dollar value. Cost estimates are expected to be accurate within a range of +50 to -30 percent.

State/Support Agency Acceptance considers whether the state agrees with EPA's analyses and recommendations, as described in the RI/FS and Proposed Plan.

Community Acceptance considers whether the local community agrees with EPA's analyses and preferred alternative. Comments received on the Proposed Plan are an important indicator of community acceptance.

Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)

EPA and the New York State Department of Health (NYSDOH) have promulgated health-based protective maximum contaminant levels (MCLs) (40 CFR Part 141; 10 NYCRR § 5-1.51), which are enforceable standards for various drinking water contaminants (and are chemical-specific ARARs). If more than one such requirement applies to a contaminant, compliance with the more stringent ARAR is required.

The aquifer at the Site is classified as Class GA (6 NYCRR § 701.18), meaning that it is designated as a potable drinking water supply. As groundwater within OU2 is a source of drinking water, achieving MCLs in the groundwater is an ARAR.

EPA has identified NYSDEC's unrestricted use soil cleanup objectives (6 NYCRR § 375-6.3(b)) as an ARAR, a "to-be considered," or other guidance to address contaminated soil at the Site. Refer to Table 2 for the preliminary remediation goals for soils.

Alternative 1 would not comply with ARARs for soil and groundwater. Action-specific ARARs do not apply to this alternative since no remedial action would be conducted.

Under Alternatives 2, 3, 4A, and 4B, it is intended that ARARs would be achieved. Alternatives 2, 3, 4A, and 4B would meet RAOs through the active treatment of source material that would eliminate the exposure pathways to human receptors. Implementation of in-situ treatment processes are expected to significantly reduce contaminant concentrations within the saturated treatment area. Concentrations of contaminants outside the active treatment area would gradually reduce to meet PRGs through natural processes in the long-term. Alternatives 2, 3, 4A, and 4B would meet the action-specific ARARs by following the health and safety regulations and waste handling and disposal regulations, as applicable.

Alternatives 2, 4A, and 4B are expected to achieve RAOs in 30 years, compared to 3 years for Alternative 3. Under Alternative 4A, RAOs would not be achieved in a reasonable timeframe in AOC 1 due to the presence of elevated contaminant concentrations and silty-clay layers.

There are no location-specific ARARs associated with OU2.

Long-Term Effectiveness and Permanence

Alternative 1 does not provide long-term effectiveness or permanence as no active remedial measures are proposed. Alternatives 2, 3, 4A, and 4B are considered effective technologies for treatment and/or containment of contaminated soil and groundwater, if designed and constructed properly.

Alternatives 2, 3, 4A, and 4B rely on a combination of treatment and institutional controls. Institutional controls for groundwater and soil use in AOC 1 and AOC 2 may include, as determined to be appropriate, existing governmental controls, such as well permit requirements, and deed restrictions. EPA intends to pursue the creation of environmental easements at the Cedarwood Cleaners and Piermont Cleaners properties and to file such environmental easements in the property records of Nassau County until such time that RAOs are attained.

Alternative 2, AS/SVE, may be effective in removing VOC contamination in saturated soil and groundwater. However, the effectiveness of this technology in areas with clay/silty soils may be limited. The effectiveness of Alternative 2 is limited in scope to the extraction of contaminants in the saturated zone. Alternative 4A would be more reliable than Alternative 2 since bioremediation has been proven effective in OU1 pre-design investigations. Alternative 4B allows for a combination of bioremediation and heat enhancement to target and treat areas containing VOC contamination at elevated concentrations that are sorbed to the silty clay.

Alternative 3 is expected to be more effective and reliable in significantly removing VOC contamination in saturated soil and groundwater because the high temperatures used in in-situ thermal remediation significantly enhance soil vapor extraction. Among Alternatives 2, 3, 4A, and 4B, it is anticipated that Alternative 3, using in-situ thermal remediation, would provide the highest mass reduction of soil and groundwater contamination in the shortest period of time, followed by Alternative 4B using bioremediation and HEPA (not applicable for AOC 2). Alternative 4A, using bioremediation alone, would enhance degradation of contaminants, but we estimated that it would require a longer remedial timeframe.

As mentioned previously, the effectiveness of each of these technologies is contingent upon the proper design, including the installation of infrastructure such as electrodes, injection wells, extraction wells, and vacuum extraction wells in the most appropriate locations to treat the contamination. Because the areas requiring remediation are located in a densely populated urban area with little or no available space for construction, adjustments that could impact the effectiveness of the technology may need to be taken into consideration. Among the alternatives, the challenges posed by the densely populated area to the effectiveness of the technology are greatest for Alternative 3 and would require further evaluation during the remedial design.

Alternatives 2, 3, 4A, and 4B would provide adequate control of risk to human health through the implementation of institutional controls until PRGs are achieved.

Reduction of Toxicity, Mobility, or Volume Through Treatment

Alternative 1 would not provide any reduction of toxicity, mobility, or volume of contaminants because no remedial action would be conducted, and the alternative does not include long-term monitoring of soil or groundwater conditions.

Alternatives 2, 3, 4A, and 4B would reduce the toxicity, mobility, and volume of contaminants through treatment of soil and groundwater.

Alternative 3, using in-situ thermal remediation, is anticipated to be the most reliable mass reduction technology since the high temperatures achieved in the subsurface volatilize the contaminants, including those sorbed to the silty clay.

Alternative 4B, using in-situ bioremediation and HEPA, provides the next most reliable means of mass reduction because heating the subsurface to approximately 40°C enhances the bioremediation rates in silty soils.

Alternative 4A, using in- situ bioremediation, provides the next best mass removal technology. The treatability study conducted as part of the remedial design for OU1 demonstrated significant reduction of contaminant concentrations within the treatment area using LactOil®, an emulsified vegetable oil, as the bioremediation amendment. Since the subsurface would not be heated under this alternative, bioremediation rates would not be enhanced.

Alternative 2, using AS/SVE system, would be the least reliable mass reduction technology because of the limitations of this technology in clay/silty soils.

Short-Term Effectiveness

Alternative 1 would not have short-term impacts since no action would be implemented.

Alternatives 2, 3, 4A, and 4B would have significant short-term impacts on remediation workers and the public during implementation.

Based on the extent of contamination present at AOC 1, the presence of contamination beneath West Broadway, and the challenges of implementing a remedy in a densely populated urban area with little or no available space for construction, Alternatives 2, 3, 4A, and 4B would have a significant negative impact on certain local businesses, privately owned properties, and transportation infrastructure. The implementation of any of these alternatives would specifically impact the property and business operation of Cedarwood Cleaners, as well as the privately owned former Vacant Lot across the street. Implementation of these alternatives would require, at a minimum, the total suspension of commercial operations at the Cedarwood Cleaners property, with the associated, resulting loss of income and employment at this small business for a period of six months or more. Injection and/or treatment wells would have to be installed under the Cedarwood Cleaners facility, which may lead to the creation of VOC vapors that could possibly accumulate inside the building. Although measures would be implemented to mitigate the potential impact of VOC vapors that may be released to other nearby properties, these measures would be insufficient to guard against the potential VOC vapor releases to the Cedarwood Cleaners facility. Because of the significantly higher temperatures employed, Alternative 3 has the potential to produce more vapors than Alternatives 2, 4A and 4B and would require significant vapor management.

Until recently, the former Vacant Lot property was operated as a parking lot. The owner of the former Vacant Lot property obtained a building permit from the local municipality and has begun construction of a new structure on the property. Under Alternatives 2, 3, 4A, and 4B, injection and/or treatment wells would have to be installed at the former Vacant Lot property, which may lead to the creation of VOC vapors. In addition, Alternative 3 generates heat during the treatment process. Depending on the proximity to the new structure, the potential exists for the generation of heat close to the building floor and, therefore occupancy may not be permitted during active treatment. Depending on the use of the property at the time of the implementation of any of the active alternatives (2, 3, 4A, or 4B), a temporary shutdown of commercial operations or other long-term prohibitions at the former Vacant Lot property may be necessary. During the remedial design, measures would be evaluated to minimize disruptions to operations at the property.

At Piermont Cleaners, which is part of an active strip mall with multiple other businesses, it is anticipated that Alternative 2, 3, and 4A would be implemented without significant disruption to Piermont Cleaners or the other businesses located in the strip mall. To the extent practicable, construction activities would be performed during weekends or after hours, and injection and/or treatment wells could be installed near the front and potentially the rear of the building, rather than inside. However, under Alternative 3 heat would likely be

generated close to the building floor during the treatment process, therefore tenants would not be permitted to occupy Piermont Cleaners and the immediately adjacent businesses during active treatment. During the remedial design, measures would be evaluated to minimize disruptions to the businesses.

The implementation of any of Alternatives 2, 3, 4A, or 4B regarding AOC 1 would require street closings (full and partial) for extended periods. Efforts could be taken to minimize traffic disruption, such as the development during remedial design of a traffic plan to re-route the traffic through alternate streets. Coordination and access would be required from the municipality and County and/or New York State Department of Transportation for work that requires any road-closures.

The possibility of exposure of workers, the surrounding community, and the local environment to contaminants during the implementation of Alternatives 2, 3, 4A, and 4B is present, but minimal. VOC vapors may be generated by the remedial activities. Alternative 3 would produce more vapors than the other alternatives because higher temperatures would be generated in the aquifer. Extraction wells could be used to collect vapors generated in the subsurface thereby minimizing the impact of vapors to adjacent parcels.

Drilling activities, including the installation of monitoring, extraction, and injection wells, could produce contaminated liquids that present some risk to remediation workers at OU2 of the Site. However, measures would be implemented to mitigate exposure risks, including the installation of fencing to restrict access to above-grade treatment components.

Alternatives 2, 3, 4A, and 4B include monitoring that would provide the data needed for proper management of the remedial processes and a mechanism to address any potential impacts to the community, remediation workers, and the environment. Risk from exposure to contaminated saturated soil and groundwater during any construction activities would require management through occupational health and safety controls.

The implementation timeframe required for Alternative 2 is estimated to be 10 years. For Alternative 3, the implementation timeframe is estimated to be 18 months. For Alternative 4A, a timeframe of 10 years is estimated. The time estimated for Alternative 4B is estimated to be 20 years.

Implementability

All the alternatives are implementable. Alternative 1 would be easiest both technically and administratively to implement as there are no activities to implement. Alternatives 2, 3, 4A, and 4B are all implementable, although each present significant challenges.

Alternatives 2, 3, 4A, and 4B would be technically implementable since services, materials, and experienced vendors would be readily available. Pilot studies would be necessary during the design phase to obtain site-specific design parameters for Alternatives 2, 3, 4A, and 4B.

Although technically implementable, Alternatives 2, 3, 4A and 4B would have a notable impact on certain local businesses, privately owned properties, transportation infrastructure, and other operations in the vicinity of the Site. They will require traffic re-routing and management in the vicinity of West Broadway and the Hewlett Parkway because the installation of injection and extraction wells would impact adjacent areas because of the limited space. The alternatives would also impose onerous restrictions on the operations of Cedarwood Cleaners, as discussed above. As for the former Vacant Lot, the property owner of the former Vacant Lot has obtained a building permit from the local municipality and has begun construction of a structure on the property. Implementation of Alternatives 2, 3, 4A, and 4B would be adversely affected by these construction activities.

The use of in-situ thermal remediation under Alternative 3 is a well-established technology to address the elevated levels of contamination in the clay/silty layers, followed by Alternative 4B, using in-situ bioremediation via HEPA, and then Alternative 4A, using in-situ bioremediation. As mentioned previously, significant contamination reduction was observed during the treatability study conducted as part of the remedial design for OU1. The limitations of AS/SVE in clay/silty layers and concentrations of contaminants in the source area, make the successful implementation of Alternative 2 less likely than the other alternatives. Although technically implementable, the densely populated area, with little or no available space for construction, poses significant implementability challenges for each of the active alternatives. These challenges, which are discussed above, are greatest under Alternative 3, followed by Alternative 4B, and then Alternatives 4A and 2.

Cost

The estimated capital cost, operation and maintenance (O&M), and present worth cost are discussed in detail in the OU2 FS. The cost estimates are based on the best available information. Alternative 1 (No Action) has no cost because no activities would be implemented. The present worth cost for Alternatives 2, 3, 4A and 4B are provided below. The estimated capital, O&M, and present-worth cost for each of the alternatives are as follows:

Alternative	Capital Cost ($)	Total O&M Cost ($)	Present Worth ($)
1	0	0	0
2 AOC 1	2,899,086	7,211,883	10,492,429
2 AOC 2	1,736,759	4,422,318	6,399,321
3 AOC 1	21,632,524	18,722,129	41,048,610
3 AOC 2	7,256,345	6,015,498	13,548,991
4A AOC 1	3,798,403	1,783,220	5,866,084
4A AOC 2	1,589,854	1,38 2,456	3,186,371
4B AOC 1	15,768,864	5,332,620	21,552,450

State/Support Agency Acceptance

NYSDEC, in consultation with NYSDOH, concurs with the preferred alternative.

Community Acceptance

Community acceptance of the preferred alternative will be evaluated after the public comment period ends and all comments are reviewed. Comments received during the public comment period will be addressed in the Responsiveness Summary section of the ROD for this OU. The ROD is the document that formalizes the selection of the remedy for an OU.

PREFERRED REMEDY

Based upon an evaluation of the remedial alternatives, EPA, with the concurrence of NYSDEC, proposes a combination of Alternatives 4A and 4B. EPA proposes Alternative 4B to address AOC 1, namely through in-situ bioremediation with heat enhanced plume attenuation, long-term monitoring, and institutional controls, and Alternative 4A to address AOC 2, namely through in-situ bioremediation, long-term monitoring, and institutional controls as the preferred remedial alternative for OU2.

Alternative 4A has the following key components: the in-situ treatment of contaminated groundwater and soil through anaerobic bioremediation at AOC 2, long-term monitoring, implementation of institutional controls, and development of a SMP.

As described above, under Alternative 4A, electron donors, nutrients, and/or dechlorinating microorganisms would be injected into the subsurface at AOC 2. Electron donors include lactate, whey, and emulsified vegetable oil. The electron donors are delivered via injection wells or direct push technology into the subsurface, creating strong reducing conditions where anaerobic biodegradation transforms CVOCs through reductive dechlorination into innocuous compounds, such as carbon dioxide, ethene, ethane, and chloride.

The addition of soluble carbon to the subsurface supports the growth of indigenous microbes in groundwater. As bacteria feed on the soluble carbon, they consume dissolved oxygen and other electron acceptors (contaminants), thereby reducing the redox potential in groundwater. As bacteria ferment the organic portion of the oil, they release various volatile fatty acids that diffuse and serve as electron donors for other bacteria. A pilot study would be conducted during the remedial design to determine a suitable site-specific amendment and to develop site-specific engineering parameters, such as radius of injection, dosage, and frequency of injections.

A long-term groundwater monitoring program would be implemented to track and monitor changes in soil and groundwater contamination in OU2 to ensure the RAOs are attained. The results from the long-term monitoring program would be used to evaluate the migration and changes in VOC contaminants over time.

Institutional controls to ensure that the remedy remains protective until RAOs are achieved are incorporated into this proposed alternative for protection of human health over the long term. A plan would be developed that would specify institutional controls to ensure that the proposed alternative is protective. Institutional controls for groundwater and soil use may include, as determined to be appropriate, existing governmental controls, such as well permit requirements, and deed restrictions. EPA intends to pursue the creation of environmental easements at the Cedarwood Cleaners and Piermont Cleaners properties and to file such environmental easements in the property records of Nassau County until such time that RAOs are attained.

An SMP would be developed to provide for the proper management of the Site remedy for OU2 post-construction, such as the use of institutional controls until RAOs are met, and will also include long-term groundwater monitoring and certifications.

The major components of the preferred remedy for AOC 1 are the same as those identified for AOC 2 above, but also include the heating of contaminated soil and groundwater with ERH to approximately 40°C to increase the bioremediation rates (Alternative 4B). Alternative 4B has the following key components: the in-situ treatment of contaminated groundwater and saturated soil through in-situ anaerobic bioremediation with heat enhancement, long-term monitoring, implementation of institutional controls, and development of an SMP.

Pilot studies would be conducted during the remedial design to develop site-specific engineering parameters.

The environmental benefits of the preferred remedial alternative may be enhanced by giving consideration, during the design, to technologies and practices that are sustainable in accordance with EPA Region 2's Clean and Green Energy Policy[3]. This would include consideration of green remediation technologies and practices, including GAC regeneration.

The total estimated, present-worth cost for the selected remedy is $24,738,821. Further detail of the cost is present in Appendix A of the FS Report. This is an engineering cost estimate that is expected to be within the range of plus 50 percent to minus 30 percent of the actual project cost.

While this alternative would ultimately result in reduction of contaminant levels in groundwater and saturated soil such that levels would allow for unlimited use and unrestricted exposure, it is anticipated that it would take longer than five years to achieve these levels. As a result, in accordance with CERCLA, the Site is to be reviewed at least once every five years until performance standards are achieved and unrestricted use is permissible.

Basis for the Remedy Preference

While Alternative 2, AS/SVE, and Alternative 3, in-situ thermal remediation, are both proven technologies to actively remediate VOC-contaminated groundwater and saturated soils, Site-specific considerations at OU2 of this Site present impediments that make these alternatives less suitable for addressing Site soil and groundwater than the proposed use of Alternative 4A for AOC 2 and Alternative 4B for AOC 1.

Under Alternative 2, the presence of fine grained clay/silt layers is expected to affect the performance of the AS/SVE system by limiting the migration of air and thereby limiting the effectiveness of air delivery and vapor recovery. Extracted vapor could be trapped within the remediation area depending on the continuity of the clay/silt layer.

Although in-situ thermal remediation under Alternative 3 would be effective in removing the contamination in the fine grained clay/silt layer, controlling vapors generated during implementation of this technology is expected to be challenging and the vapors would have the potential to migrate and impact the surrounding community.

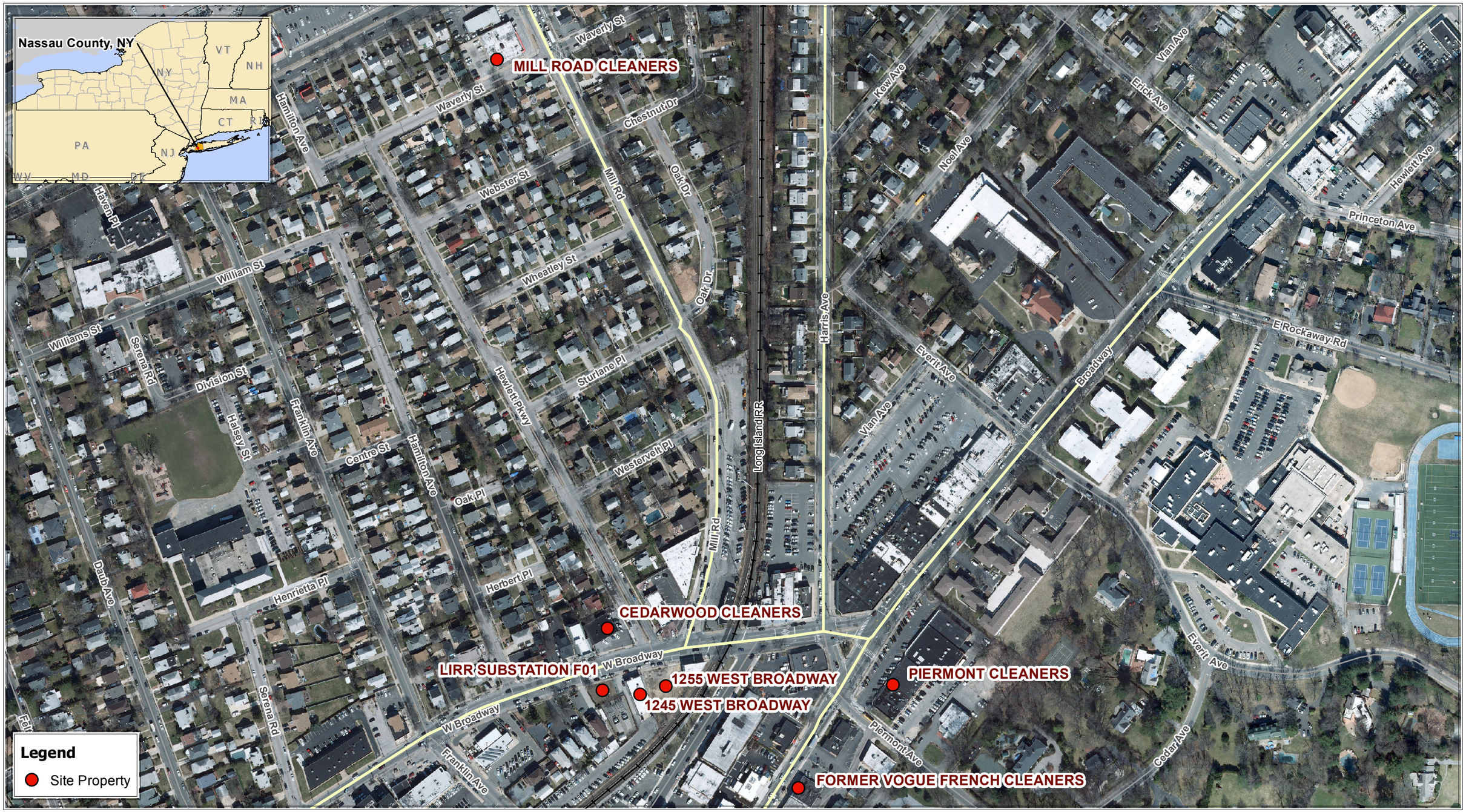
Utilizing heat enhancement in AOC 1 increases bioremediation rates thereby increasing the effectiveness for in-situ anaerobic bioremediation to remove elevated concentrations of VOC-contamination in the saturated soils.

These are among the reasons why EPA is proposing a combination of Alternative 4A for AOC 2 and Alternative 4B for AOC 1. The proposed remedy will result in substantial risk reduction by treating the heavily contaminated sources constituting principal threat wastes at the Site.

Furthermore, treatability studies conducted for OU1 at the Site have demonstrated the effectiveness of treating elevated concentrations of VOCs in groundwater by injecting amendments to treat the groundwater.

Based upon the information currently available, EPA believes the aspects of the preferred alternatives best meet the threshold criteria and provide the best balance of tradeoffs among the other alternatives with respect to the balancing criteria. EPA expects the preferred alternative to satisfy the following statutory requirements of Section 121(b) of CERCLA: 1) the proposed remedy is protective of human health and the environment; 2) it complies with ARARs; 3) it is cost effective; 4) it utilizes permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable; and 5) it satisfies the preference for treatment. Long-term monitoring would be performed to assure the protectiveness of the remedy. With respect to the two modifying criteria of the comparative analysis, state acceptance and community acceptance, NYSDEC concurs with the preferred alternative, and community acceptance will be evaluated upon the close of the public comment period.

[3] See http://www.epa.gov/greenercleanups/epa-region-2-clean-and-green-policy and http://www.dec.ny.gov/docs/remediation_hudson_pdf/der31.pdf



Map created using 2010 orthoimagery data from NY state.

Map Creation Date: 04 April 2016

Coordinate system: State Plane New York Long Island
FIPS: 3104
Datum: NAD83
Units: Feet

Figure 1: Map
Peninsula Boulevard Site
Hewlett, NY

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Area of Concern 1

Area of Concern 2

Figure 2: Area of Concern 1 (AOC 1) and Area of Concern 2 (AOC 2)

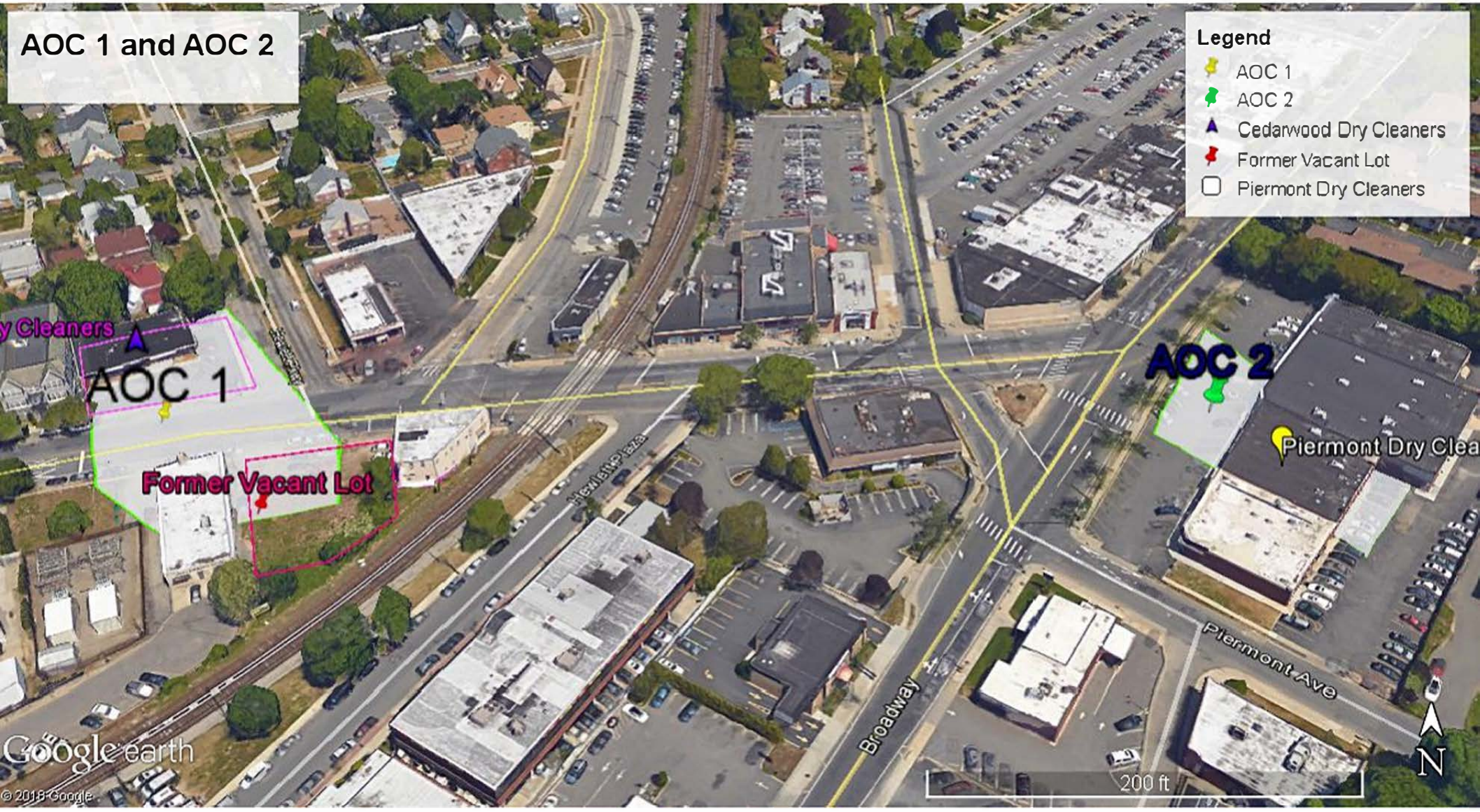

Figure 3: AOC 1 and AOC 2

ATTACHMENT B

PUBLIC NOTICE

COMMUNITY UPDATE

still open. Contact Sharona Arbeit for registration information and fee schedule at (516) 569-6733 or sharona.arbeit@guraljcc.

Kadima Group
On Wednesday, June 21 from 7 to 9 p.m., the Kadima Support Group for Single Moms with Jill Alper. Free of charge. For more information, contact Rachayle Deutsch at (516) 569-6733 x 222 or rachayle.deutsch@guraljcc.org.

Healthy Grilling
On Wednesday, June 21 from 9:30 a.m. to noon. Grilling for a healthy summer start off with all the tools and tricks for your healthiest grill season yet. Focus is on techniques for grilling leaner foods without sacrificing flavor or overcooking. Learn no fails tricks for bone-in chicken, cedar plank salmon, grilled vegetables and more. Location to be announced. $45. Contact Rachayle Deutsch at rachayle.deutsch@guraljcc.org or (516) 569-6733 x 222.

Mommy and Me
Mommy and Me, eight classes starting Thursday, July 6. Mondays or Thursdays at 9:30 a.m. or Wednesdays at 1 p.m. Join us for playtime, music and socialization. The interaction will enrich physical, mental and emotional development. The classes are held in our Nursery School building with a JCC teacher. Meet and greet other parents/caregivers in a loving, warm and nurturing environment. To register, email sharon.levine@guraljcc.org or call (516) 239-1354.

Pilates For All
On Tuesdays and Thursday from 8 to 9 a.m., a full body workout for strengthening the core and lengthening all muscle groups, with Barbara Weinberg. Increase flexibility. All levels welcome. $15. Contact Rachayle Deutsch at rachayle.deutsch@guraljcc or (516) 569-6733 x 222.

Traumatic Brain Injury
On Mondays from 10 a.m. to 1 p.m., Traumatic Brain Injury group ($10) at 207 Grove Ave., Cedarhurst. Exercise, counseling, lunch and guest speakers. On Fridays, 10 a.m. to noon cognitive rehab ($5). Call Lisa Barnett at (516) 569-6733 x210.

Shalom Club
On Mondays from 11 a.m. to 1 p.m. at Temple Hillel, 1000 Rosedale Rd. North Woodmere. Retired professionals take part for intellectual stimulation and Jewish enrichment. Variety of speakers. Lively discussions. For more information call Jaclyn Bieber at (516) 569-6733 x21.

Parkinson's Support
On Tuesdays from 11 a.m. to 2 p.m., the group brings together Parkinsonians, spouses and their caregivers. Call Cathy Byrne at (516) 569-6733 x220.

Center for Adult Life Enrichment

37 East Rockaway Rd., Hewlett
(516) 374-4747

■ On Thursday, June 15 at 1 p.m., danish and coffee and Northwell Health lecture at 2 p.m., Glorious Women Never Age video — Seven steps to growing, older, better and smarter.
■ Help CALE prepare for the White Elephant Sale by donating small items in good condition — no clothing or shoes. The sale will take place from June 22-26.
■ On Tuesday, June 27 trip to the Nassau County Museum. Call (516) 374-4747 for more information and to sign up.
■ On Wednesday, June 28 from 11 a.m. to 4 p.m., catered hot lunch. Benefits CALE programs.

Mondays
At 10 a.m., flexercise. At 11 a.m., social and major topics. At noon, canasta/mah jong. At 12:30 p.m., intermediate bridge. At 2 p.m., intermediate French.

Tuesdays
At 10 a.m., current events with Carol. At 11 a.m., creative writing. At 11:15 a.m., new exercise program through the Arthritis Foundation with Barrie Miller. Stretching, strength and stability.

Wednesdays
At 10 a.m., range of motion. At noon, canasta and mah jong. At 12:30 p.m., social bridge. At 1 p.m., beginners mah jong and conversational French.

Thursdays
At 10 a.m., singing group. At 11:30 a.m., chair yoga.

Fridays
At 9:30 a.m., painting & drawing. At 10:30 a.m., tai chi. At 11:30 a.m., Hebrew. At noon, canasta & mah jong. At 12:30 p.m., word games & duplicate bridge.

NCJW, Peninsula Section

342 Central Ave., Lawrence, (516) 569-3660, ncjwpeninsula.org, office@ncjwpeninsula.org

■ Head to the NCJW Thrift store at 342 Central Ave. in Lawrence for summer merchandise.

Chabad of the Five Towns

74 Maple Ave., Cedarhurst
(516) 295-2478

■ On Friday, June 16 at 10 a.m. the preschoolers graduation parade. They sing songs and dance with their teachers.
■ On Saturday, June 17 at 7:45 a.m., Reb Leibel Zisman's tehillam minyan. Recite the book of Psalms before morning services. After morning services, birthday Shabbat for children who celebrate in Tammuz. Cake included.
■ On Monday, June 19 at 8:30 p.m., Friendship Circle Mom's Night Out. Relax, network and socialize with other moms. Learn the art of French macaroons with Carrie Hawk. Suggested donation $5.

EPA Invites Public Comment on Proposed Plan for Cleanup of the Peninsula Boulevard Groundwater Plume Superfund Site Nassau County, New York

The U.S. Environmental Protection Agency has issued a Proposed Plan for the Peninsula Boulevard Groundwater Plume Superfund Site in Nassau County, New York. A 30-day public comment period on the Proposed Plan, which identifies the EPA's preferred cleanup plan and other cleanup options that were considered by the EPA, begins on June 15 and ends on July 17, 2017.

The EPA's preferred cleanup plan consists of a combination of in-situ bioremediation, heat enhanced plume attenuation, long-term monitoring, and institutional controls to address soil and groundwater contamination at the source areas.

During the public comment period, the EPA will hold a public meeting in Hewlett, New York to receive comments on the preferred cleanup plan and other options that were considered. The meeting will be held on Thursday, June 22, 2017 at 7 PM at Hewlett Fire House – 25 Franklin Avenue, New York 11557.

The Proposed Plan is available at www.epa.gov/superfund/peninsula-groundwater or by calling Cecilia Echols, EPA's Community Involvement Coordinator, at (212) 637-3678 and requesting a copy by mail.

Written comments on the Proposed Plan, postmarked no later than July 17, 2017, may be mailed to Gloria Sosa, EPA Project Manager, U.S. EPA, 290 Broadway, 20th floor, New York, NY 10007-1866 or emailed no later than July 17, 2017 to sosa.gloria@epa.gov.

The Administrative Record file containing the documents used or relied on in developing the alternatives and preferred cleanup plan is available for public review at the following information repositories:

Hewlett-Woodmere Public Library, 1125 Broadway, Hewlett, NY 11557

EPA Region 2 Superfund Records Center located at 290 Broadway, 18th Floor, New York, NY 10007.

918149

ATTACHMENT C

PUBLIC MEETING TRANSCRIPT

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 2
- -X

PENINSULA BOULEVARD GROUNDWATER PLUME

SUPERFUND SITE - OPERABLE UNIT 2

PUBLIC MEETING

- -X

Hewlett Firehouse
25 Franklin Avenue
Hewlett, York

June 22, 2017
7:00 p.m.

P R E S E N T:

CECILIA ECHOLS,
Community Involvement Coordinator

GLORIA SOSA,
Remedial Project Manager

PETE MANNINO,
Western New York Remedian Section Chief

NICK MAZZIOTTA,
Human Health Risk Assessor

MARGO LUDMER,
EPA Attorney

MELISSA SWEET, NYSDEC

JOHN SWARTWOUT, NYSDEC

Peninsula Boulevard Superfund

MS. ECHOLS: Hi, everyone, good night. We're ready to begin now.

My name is Cecilia Echols. Many of you may know me. I am the community involvement coordinator for this site. This is the Peninsula Boulevard Groundwater Plume Superfund Site.

And we're going to be discussing Operable Unit 2. And as part of the remedial investigation/feasibility study, proposed plan, tonight is a public meeting where we have a stenographer. It is an official document, and we would like for all of the questions and answers to be asked at the end of Gloria's presentation.

Gloria Sosa is the project manager. She's overseeing the whole entire project.

I'm Cecilia Echols again.

Pete Mannino is her supervisor. He's with the Western New York Remedial Section.

And then we have Nick Mazziotta.

He is the risk assessor for the site.

Then we have Margo Ludmer. She is the attorney.

We have Melissa Sweet. She is a project manager with the DEC.

And John Swartwout, he's with the DEC as well.

Tonight's meeting is to discuss EPA's plans of cleaning up the plume of contamination at the site. And we're going to be discussing and looking at the soil and groundwater contamination.

The public comment period began on June 15 and it ends on July 17. After all of the comments, a record of decision will be signed by our regional administrator or the acting regional administrator.

We have a PowerPoint presentation, and it can be found on the Peninsula website. Copies were not made in order to save the trees or what have you, but you can go on the website. The name of the website will be at the end

of the presentation, and you'll be able to download it and read through it at your leisure.

We hope that everyone has turned off their ringers so they won't disturb the presentation. I hope everyone has signed in. We'll add you to our mailing list.

And after the presentation -- again, Gloria will start. After her presentation, she will then open up for questions.

Thank you, and here's Gloria.

MS. SOSA: Thank you so much for coming this evening. I'm going to go over the Superfund process but really quickly because I know that we don't have a lot of time.

The timeline for the remedial process starts with when the site is discovered. And then we use the hazard ranking system. That's a way to look at the contamination posed by the site and see if it should be placed on the

Peninsula Boulevard Superfund National Priorities List, which is a list of Superfund sites that will then take EPA's attention.

Once the site is placed on the National Priorities List, the EPA can perform a remedial investigation -- that's where we go out and we find the contamination that's present -- and we can do a feasibility study. And that feasibility study looks at the different cleanup alternatives that are available for that kind of contamination.

Can everyone hear me? Please raise your hand if you can't.

Then once we finish the remedial investigations, the feasibility study we propose a remedy. And that's where we are now, we've issued a preferred plan with EPA's preferred remedy.

The next step is we write a record of decision, and that selects the remedy for the site.

Then once that's done, we perform a remedial design, where we

Peninsula Boulevard Superfund actually scope out all of the particulars of the remedy. Right now, we just have a conceptual design.

And then the remedial action phase is when we implement the cleanup and do the construction.

Once the cleanup goals for the site are met, then the site could be delisted from the National Priorities List.

So, EPA listed this site on the National Priorities List in 2004, when we conducted a remedial investigation to determine the nature and the extent of the contamination at the site and to identify hazards, potential hazards, both to human health and the environment.

We found a groundwater plume during this remedial investigation but we never found the source of the groundwater contamination. So, we issued a record of decision for the groundwater plume and we selected a

Peninsula Boulevard Superfund groundwater extraction and treatment system with some additional in situ bioremediation. And we completed that remedial design in 2006, but that remedy has not yet been constructed.

So, this is the plume that we found. This is the corner of West Broadway and Mill Road, and it travels to the north and to the west. This is an area of contamination of dry cleaning fluid, of perchloroethylene, or PCE for short. The red is the higher concentrations.

As you can see, this is the Hewlett-Woodmere Middle School and this is the North American Well Field NO. 5.

So, since we couldn't find the source of the groundwater contamination, we opened up another phase, which we call an operable unit. You can think of it as phase two.

And we conducted a remedial investigation looking for the source of the groundwater contamination, the

source of that groundwater plume. And we did that from 2012 to 2016. And then in May of 2017, we completed a feasibility study which looked at the different cleanup options that could be applied to this contamination.

When we did our field sampling for the remedial investigation, we did a lot of field characterization screening. We took a lot of soil samples, we took groundwater samples, we looked at soil gas around some buildings and under two buildings, and we took water level measurements to determine the direction of the groundwater flow.

So, the results of the remedial investigation are that PCE, perchloroethylene, or dry cleaning fluid, was detected at groundwater at concentrations of 80,000 micrograms per liter, and TCE, which is an associated contaminant, at 5,000 micrograms per liter.

For you to put that into some

kind of context or comparison, the drinking water standard for PCE and TCE is 5 micrograms per liter. So you can see that we're way over this drinking water standard. That's also called a maximum -- the drinking water standard is also called a maximum contaminant level or MCL. You'll see that notation and that means it's a drinking water standard.

In soil, we found PCE was detected at 11,000 milligrams per kilogram and TCE at 1.8. And New York State Department of Environmental Conservation has what they call protection of groundwater soil cleanup objectives. And for PCE, it's 1.3 milligrams per kilogram, compared to the 11,000 which is the highest concentration. And the soil cleanup objective for TCE is 0.47.

So, this is just a quick slide on the geology of this site. This is the aquifer that we're looking at, the

topmost aquifer. It's called the upper glacial aquifer.

Underneath that is this area called the Gardiners clay, and that divides the upper glacial aquifer from down here, the next layer -- the next layer down here is called the Jameco aquifer, and that's where the drinking water comes from, the Jameco aquifer.

There is some activity between the upper glacial aquifer and the Jameco because the Gardiners clay is not contiguous throughout.

And then within the upper glacial aquifer itself, we have this 20-foot clay, which is an area of silty clay that -- it's not throughout the whole aquifer, but it's in a lot of parts of the site and it separates the aquifer into two parts; into an upper part and a lower part.

So, this time north is this way, and here is the school and the well field. I just want to show you that

Peninsula Boulevard Superfund

we're over here, that the direction of the groundwater flow is to the north and to the west.

We performed a screening evaluation, a screening level risk assessment, for Operable Unit 2 for looking for the sources. And that served as a streamlined human health risk assessment because we performed one of those for the first part, for Operable Unit 1.

And the results of the risk assessment was that there is an elevated risk for drinking the groundwater. I want to make a distinction; that's between drinking the contaminated groundwater as it is in the aquifer, it's not the drinking water that comes out of your faucets. If you drank the contaminated groundwater, there's both a cancer risk and a noncancer risk.

And we performed a screening level ecological risk assessment, and that showed that there was no risks to

any ecological receptors.

Another risk that can come from the contamination is what we call soil vapor intrusion. You have soil contamination down here or groundwater contamination, and vapors come off of the groundwater or the soil. And they can migrate into your basements, into crawlspaces, or they can collect under the slabs of buildings.

And, so, EPA has conducted vapor intrusion sampling at some properties at the site. And we will perform more sampling next winter once we obtain access to several properties.

So, based on the results of the remedial investigation, we identified two areas of concern. We can call them remediation areas or cleanup areas. So, two of these were identified.

The first area of concern, this is West Broadway here and then Mill Road is here, the train tracks. So, it's the Cedarwood Cleaners and this area that

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goes across the street. That's area of concern one.

Then area of concern two, this is Broadway -- so it's a little bit down the street -- and this is the strip mall that has the Piermont Cleaners. So, area of concern two is this area around the Piermont Cleaners.

So, you can see them one in comparison to the other. This is area of concern one and then two. You can see it's an area of high density and lots of traffic.

So, we looked at five remedial alternatives to address the contamination at the site: The first one is no action, we do nothing; the second one is air sparging and soil vapor extraction; the third one is in-situ thermal remediation; 4A is in-situ bioremediation; and 4B is in-situ bioremediation with some heating. And I will go through what these means.

So, there are some common elements to all of these remedial alternatives. One of them is that there's going to be long-term groundwater and soil monitoring to make sure that the cleanup actions actually improve the quality of the soil and the groundwater. And that monitoring will be done until cleanup levels at the site are reached.

Another thing in common that they have is the implementation of what we call institutional controls, and those are restrictions on the use of soil and groundwater. So, examples are deed restrictions, environmental easements, or well permit restrictions that allow you -- that do not allow you to install any wells for drinking water. And these institutional controls will also last until the cleanup levels are achieved.

Another thing that the remedial alternatives have is that they have

Peninsula Boulevard Superfund impacts to this community. There may be temporary road closures in the areas of high traffic, there may be temporary shutdowns of local businesses. And EPA will work to minimize or to mitigate these impacts during the remedial design.

The first alternative is no action. And by law, we look at that and we compare it to the other alternatives. No action is taken, the contaminated groundwater and soil remain in place, and there are no institutional controls.

Alternative 2 is air sparging and soil vapor extraction. And that would be the installation of a network of wells, of vertical wells. They're called sparging wells, but think of them as air injection wells.

And they're put into the saturated zone of the aquifer -- that's the wet part, where the water is -- and a network of vapor extraction wells is placed in the unsaturated zone that's

above the water. So, one would inject a stream of air into these wells and then the volatile organic compounds would be he exacted in there, in vapor, and they'd be treated aboveground.

Alternative 3 involves in-situ thermal treatment. So, to use an example, it's called electric resistent heating. You'd install a network of electrodes into the soil and then you would generate a current, and the heat that's generated by the resistance of the soil to the flow of the groundwater from one electrode to the other raises the temperature of the aquifer to approximately 100 degrees Centigrade.

Alternative 3, it causes the contaminants to become steam and vapor, and then these are extracted and treated aboveground.

Alternative 4A is in-situ bioremediation. Bioremediation would be used to turn these volatile organic compounds into nontoxic compounds.

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Bioremediation is -- I guess the best way to explain it is that you'd be using organisms or bacteria that reside in the ground, and they basically would eat these contaminants.

So, we would add materials to the subsurface. They're called electron donors because the contaminants in the soil and the groundwater, they're electron receptors. And then you can also add food for the bacteria and you can add additional bacteria if there are not enough of them.

In this case, it's anaerobic biodegradation, and that means that there's no oxygen present. And what comes out at the end, again, are nontoxic compounds.

4B is the same in-situ bioremediation but we would heat the aquifer to -- only this one is a gentle heating. It's about to 40 degrees Centigrade.

And the reason that you would

want to heat it is because some of these contaminants are sorbed or stuck on to silts and to clays in the subsurface and it would be difficult for the materials to get down to them. So, heating the aquifer would assist in this.

I made a table of the remedial costs to compare. The first one is zero, no action.

Alternative 2, in area of concern one the present worth of it is about ten and a half million. Alternative 2 for the AOC2, which is the Piermont, that is approximately 6,400,000.

I'm just rounding them off.

Alternative 3 in area of concern one is 41 million, and then in area of concern two, it's 13 and a half million.

Alternative 4A in AOC1 is almost 6 million; in AOC2, it's 3 million.

And then the last one, 4B, in AOC1 is 21 and a half million.

So, EPA uses nine evaluation

criteria to compare the different remedial alternatives that are presented in the feasibility study.

The first two we call the threshold criteria. And number one is the overall protection of human health and the environment, the second one is compliance with applicable or relevant and appropriate requirements. So that means all the applicable laws, regulations, and cleanup standards.

Then we have what we call balancing criteria: What's the long-term effectiveness and permanence of the remedy? Is there a reduction in either the toxicity, the ability of contaminants to move in the aquifer, or reduction of volume through treatment? What's the short-term effectiveness of the remedy? How do we implement it? Is it implementable? And the costs.

The final two criteria we call the modifying criteria. The first one is state acceptance. New York State

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Department of Environmental Conservation, in consultation with the New York State Department of Health, concurs with EPA's preferred remedy.

The final criteria we look at is community acceptance, and this is part of the process. So community acceptance will be assessed at the end of the public comment period.

So, the preferred remedy that EPA prefers for area of concern one is Alternative 4B. It's the in-situ bioremediation with the heat enhancement, the long-term monitoring, and the institutional controls.

And for area of concern two, it's 4A, which is just the in-situ bioremediation.

So, I've already gone over this: The in-situ bioremediation will be used to transform these toxic compounds into nontoxic compounds.

And electron donors could include nontoxic things like lactate,

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whey, or emulsified vegetable oil. During the treatability study for Operable Unit 1, we used emulsified vegetable oil and had very good results.

And then the materials would be injected into the grounds through a series of injection wells, through a network of injection wells, and then there would be associated vapor extraction wells, monitoring wells, piping, electrical equipment.

This is a schematic, a conceptual design, for operable unit two, which is the Piermont Cleaners. And here, you can see in yellow these would be the injection wells. And we have them lined up in the front of the building. So, while these were being installed, we wouldn't be -- traffic would not be able to use this portion of the parking lot.

So, the cost for Alternative 4A and AOC2, the capital cost, is 3.7 million, the total operation and

Peninsula Boulevard Superfund maintenance costs are 1.7 million, the present worth cost is almost 6 million. And the construction time would take about six months to a year.

Alternative 4B, with the heat enhancement, is the one that we've preferred for area of concern one because of the -- these contaminants are found at depth and they're more difficult to get to. The aquifer is heated up to 40 degrees C, and, again, the materials are injected through a network of injection wells.

This is a schematic, a conceptual design, area of concern one. And you can see we have here a network of these injection wells.

When this thing was done, this was a vacant lot. Right now there is a building here, so we'll have to take all of that into consideration during our remedial design, when we actually design the system.

The cost for Alternative 4B at

AOC1, the capital cost, 15.7 million, the total operation and maintenance cost is 5.3 million, the present worth is 21 and a half million. And the construction time frame is, again, six months to a year.

That concludes my presentation. At this time, I'd like to take your questions. All your questions will be captured by the stenographer and they will be -- EPA will provide a response in the responsiveness summary.

MS. ECHOLS: Please state your name.

MS. RIEMAN: Audrey Rieman.

I work in that shopping center where the Piermont Cleaners is. So, the first question that I have is how safe is it to work there now?

The second question that I have is how safe is it when they do the remedial cleanup, and when do they anticipate the remedial cleanup?

MS. SOSA: I'll take that last

one first. Once EPA issues its record of decision, which should be within a month and a half or so, then we would start a remedial design period. And that normally takes about a year and a half to design the remedy. So, after the record of decision is issued, it takes about a year and a half to design the remedy.

Then when we are in remedial design, that's when we'll know if there has to be any temporary closures, if we have to remove any employees for any time being because of any effects of this remediation.

MS. RIEMAN: And how safe is it working there now?

MS. SOSA: Right now, the risks are to drinking the contaminated groundwater. And you're drinking public drinking water.

MS. RIEMAN: So, there's no risk of working in that strip mall?

MS. SOSA: You're not drinking

Peninsula Boulevard Superfund contaminated groundwater.

MR. RIEMAN: You said something about the contaminants rising up, possibly vapors.

MS. SOSA: Yes. We did some vapor intrusion sampling at the Piermont Cleaners and we plan to do more at the stores to either side.

MS. RIEMAN: And your findings were?

MS. SOSA: We found very low levels in the soil gas underneath the building --

MS. RIEMAN: So it's safe?

MS. SOSA: -- and we'll know more when we conduct the remedial design.

MR. PENN: David Penn.

I've been a resident for well over 25 years. I've got a whole file on this site. I've been following it since the problem became public record and I have several questions.

Number one, who is the source?

At the time, there were five dry cleaners. It was originally thought it was Grove Dry Cleaners, next to the school.

MS. SOSA: Right. I didn't go into any of that because of the time of this.

Originally, it was the Grove Dry Cleaners on Peninsula Boulevard. The DEC did an investigation there and they couldn't find the source of contamination. They referred it to EPA and that's when we placed it on the National Priorities List.

And we went through that whole area, and that's where we came up with the plume, but we never found a source for that contamination. And then when we did Operable Unit 2, we went to all of the dry cleaners in the area.

MR. PENN: Do we know now? Because you seem to be concentrating on Piermont Cleaners --

MS. SOSA: The results of the

Peninsula Boulevard Superfund remedial investigation show that at area of concern two and area of concern one, that's where we had elevated levels of soil and groundwater contamination.

MR. PENN: But nobody wants to name exactly who the source is? That's what I'm trying to get at here because we're looking at millions of dollars here for remediation.

I've been at this since 2004. I have a letter here from Howard Kopel, our legislator, in 2011 saying that there would be a program starting in 2011, six years ago. Almost six years to the month.

MS. SOSA: That's when we started to do the source --

MR. PENN: But there was actually going to be some action, not an impact study or anything like that.

So, my question -- one of my questions is who is the source of it or is it multiple sources? Were multiple dry cleaners the source of this PCE

Peninsula Boulevard Superfund contamination?

Number two, you didn't really discuss the efficacy of the four methods that you laid out to us, and I'd like to know what the efficacy is because if one is chosen and it's not as efficient as another alternative, that should be discussed as well.

And also -- I'll start with that for now.

MS. SOSA: Well, as I said --

And I don't know, Pete, if you want to add anything when I finish.

-- we use the nine criteria to look at the different remedial alternatives, would they meet the cleanup objectives that we need?

The first one, no action, went right out the door because that does not protect human health and the environment.

Then we looked at the others. We looked at how could they be implemented, what would be the impact,

Peninsula Boulevard Superfund would they be able to remove the contamination. And balancing all of those, we thought that the in-situ bioremediation was the best bet.

We use that -- in that plume that I showed you, we used that method and we dropped the levels of contamination substantially. And that was during a treatability study for the design for that first part of the remedy.

MR. PENN: What percentage of --

MS. SOSA: Off the top of my head, I don't recall what's the percentage.

MR. PENN: That plume affects the creek next to the middle school.

MS. SOSA: The creek next to the middle school, we sampled there. This is part of operable unit one. And I didn't go into that, again, because of lack of time; we were concentrating on the sources.

But we put some bags, Tedlar

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bags in the stream and we left them there for days and we didn't find contamination in the stream itself.

MR. PENN: According to your earlier findings --

MS. SOSA: Earlier, yes. Then we also had monitoring wells that we installed behind the school, to the side of the school. And where they've put some new buildings behind the school, we had monitoring wells all through there and we did not find anything.

MR. PENN: That's strange because at the treatment plant, which is further north and west, there is VOC stripping going on there.

MS. SOSA: There has been since --

MR. PENN: For at least 15 years that I know of.

MS. SOSA: Yes, since 1991, perhaps.

MR. PENN: Yes. So, my point is that this problem has been existing for

20 years. And my concern is that, first of all, it's 20 years too late, number one; but more to the point, if they're stripping water that we're drinking at that location, which, by the way, is the only location that I know have in the area that's getting VOC treatment, that tells me that the plume has migrated further north and west than what your slide is indicating.

MS. SOSA: Perhaps at some time that was true because you're correct, they are using an air stripper and they have been.

But I've sampled right near there. And when they installed new wells, we also sampled those before they were chlorinated and cleaned for drinking water use, and we also did not find contamination.

So, perhaps at one time the plume was there. But right now, my sampling shows that it's not reaching there at this moment.

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MR. PENN: I'll be honest with you, Miss, I appreciate you coming down and giving the presentation, but there's more questions than answers and I just think that we're getting some information but not the pertinent information; the pertinent information that we need to hear.

I'm sorry, I'm just very frustrated with the whole process and I just think that it's too little too late because that plume is growing and --

MS. SOSA: The plume has remained pretty much -- since I've been reviewing it, pretty much steady state.

MR. PENN: Not according to what I -- the information supplied to me by Long Island American Water. At the time, Jeff Toback, who was the representative before Howard Kopel --

MS. SOSA: I recall him.

MR. PENN: I'm sorry, I have a lot of doubts.

MR. KATZ: Yariu Katz.

Peninsula Boulevard Superfund

My first question is who's going to be covering these costs once the decision is made that the remedial work is going to be done?

And, two, are the owners of the properties, are they going to contribute or is that something from the Superfund?

MS. SOSA: Right now, we will submit -- once the record of decision is selected, we would rank the sites according to their costs and submit them to the Superfund for their evaluation.

And we still don't know about responsible parties paying for parts or we have not entered into any negotiations to determine that.

MR. KATZ: Are you doing anything with the dry cleaners? Are they going to be shut down?

Are they going to be responsible if they're only leasing?

If they're the source of the problem, are they going to be shut down or if they're following EPA regulations

Peninsula Boulevard Superfund

or whatever regulations are you just going to leave it alone?

MS. SOSA: We plan to implement these remedies, if those are the chosen remedies at the site, so that would impact the dry cleaners. At this point, I don't know whether there would be closures or not. That would come out in remedial design, whether we would need to close the dry cleaners for a certain period of time while --

MR. KATZ: Historically, do the owners of the properties contribute towards the cleanup or is it all covered by federal or state government?

MS. SOSA: It all depends. It's site specific. Sometimes there are no responsible parties that are found or sometimes there are no responsible parties that have the wherewithal, the financial means, to fund a remediation or to pay for a remediation. So, it depends.

MR. KATZ: Thank you.

MS. SOSA: Sir?

MR. COOPER: Hi. Ed Cooper. I have three questions.

Number one, are the contaminants no longer being in the water? Has all of this been stopped?

MS. SOSA: In the public drinking water?

MR. COOPER: No. Are these cleaners no longer using these chemicals?

MS. SOSA: Yes, the cleaners are no longer using -- they're no longer disposing. Everything is a closed system nowadays, so there's no continuing disposal.

MR. COOPER: Do you have any idea when it first started?

MS. SOSA: No, we don't.

MR. COOPER: Because the original dry cleaners, I'm sure they've changed hands God knows how many times, along with possibly the property owners. So, it's very difficult to determine

who's at fault.

MS. SOSA: Most of this contamination was probably disposed of in the past, distant past.

MR. COOPER: The third question is based upon what I saw there, it looks like you're going to be wiping out just about all of Mill Road from Peninsula Boulevard up to West Broadway to do these different treatments.

MS. SOSA: Are you talking about the map I showed with the big red line?

MR. COOPER: Yes.

MS. SOSA: That is the groundwater plume that's underneath the ground. We will not be shutting all of that down --

MR. COOPER: You show that you'll put these various wells --

MS. SOSA: For that part, for the plume, the general plume that goes up --

MR. COOPER: Right down into the middle of the street?

MS. SOSA: Right. The remedy we chose for that is groundwater extraction, so there would be about six extraction wells not on Mill Road itself but in that neighborhood. I have a schematic somewhere that shows it would be throughout the neighborhood. And then there will be piping.

MR. COOPER: The reason why I'm asking that is because we live -- the side of our house is on Mill Road.

So, are you going to be coming on to my property?

MS. SOSA: I do not plan to install wells on Mill Road.

MR. COOPER: No, on private property.

MS. SOSA: Right. Not on Mill Road.

We may need to -- usually, we place the wells in the right-of-way of either the Town of Hempstead or Nassau County.

MR. COOPER: Okay.

Peninsula Boulevard Superfund

MS. SOSA: When I did my remedial investigation in that neighborhood, that's where we placed all of our wells. But you probably saw us in the neighborhood taking samples.

MR. COOPER: Okay.

MR. FRIEDMAN: David Friedman. I'm president of the Hewlett Business Association.

First of all, I want to tell you that we were just notified of this meeting a couple of days ago. As I told your associate on the phone, we wanted to have more residents as well as school district officials. The school district also would have housed the meeting. We were just told of this fairly recently.

Today was middle school graduation this morning, tonight the entire district officials, as far as I know -- I don't know if anyone is here from the district office at all. I was with Dr. Marino this morning and he said they said they were unaware of this

until Monday afternoon, and everyone is at the Tillis Center for Hewlett High School graduation there. So, there are many are interested people as well as local officials who are not able to be here at all.

Two questions they asked me to ask you. One, is there any current testing results underneath the Woodmere Middle School?

They were supposed to be doing something in terms of around the foundation --

MS. SOSA: We tested in -- I don't recall the year. We tested the entire Hewlett-Woodmere Middle School. We bought a mobile laboratory and we took a very long teflon hose, about a thousand feet long, and we went over the entire school. We put canisters in the basement that suck up -- under vacuum, they suck up the air over a 24-hour period to see if there are any exposures. They don't have a basement

but there's a dirt floor down there.

We also put air monitoring canisters outside the buildings in the school and we did not detect anything.

MR. FRIEDMAN: Has there been any current --

MS. SOSA: Since then, no. We did not find anything, so we have not tested again.

MR. FRIEDMAN: The second part of the question that they asked is Hewlett Parkway has homes there that -- some of the homes have been either abandoned or foreclosed --

MS. SOSA: There's one they abandoned.

MR. FRIEDMAN: -- and there's one home there that as a vent that you installed there. The power has since been turned off.

So, what is the status? How are they venting any of --

MS. SOSA: They're not venting it at the time. There's no one living

in the home.

MR. FRIEDMAN: So it's totally disconnected.

MS. SOSA: If the electricity is not functioning --

What he's talking is on the Hewlett Parkway, we did some vapor intrusion sampling. We did find one home that had elevated levels in their basement. So, EPA installed a system on it that's similar to a radon system; it's a big fan on the side of the building, it's attached to the subslab, and it pulls the gas so that it doesn't come into the building.

And what happened was that house was abandoned, it went into foreclosure, the bank owns it now, so no one is operating the system, but, also, no one is living in the home.

And I apologize about the school. We reached out to the school for over a month and they didn't return our calls. We would not have had this

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meeting tonight if we knew that it was the graduation.

MR. FRIEDMAN: I don't know what happened here, but I spoke to Dr. Marino, as well as others --

MS. SOSA: Is he the principal?

MR. FRIEDMAN: Dr. Marino is the Superintendent of Schools for the entire district.

MS. SOSA: I had reached out to the vice principals, and no one returned our calls. Maybe they were busy with the end of the semester.

MR. FRIEDMAN: There are dozens and dozens of activities.

MS. SOSA: And my community involvement colleagues also reached out to the schools. But that's where we had the public meeting last time, at the high school.

MR. FRIEDMAN: Yes. When we schedule the activities, the business association, the school district, the endowment funds, we all work together.

And when we do these, we have meetings a year and a half in advance. And the first thing we do is we look at the district schedule and the holiday schedule. We have two graduations in one day. Basically, most of the resources are out the door and up at the Tillis Center.

MR. SHEININ: Daniel Sheinin. I live off of Hewlett Parkway. I have a few questions.

One of them, I noticed that the job site, the first one that you were specifically looking at, recently was just sold and they're building new buildings there.

MS. SOSA: You mean that former vacant lot.

MR. SHEININ: On the first area.

So my question is, how are they able to sell the property knowing that that is the deepest and most contaminated area?

Secondly, that whole strip on

Hewlett Parkway -- I've been in my house 22 years. My father-in-law owned the house another 30 years. The neighbor across the street from me has been there over 67 years, and he can probably tell you every house that everybody died on Hewlett Parkway from cancer.

And now the second -- I'm just going on.

So, now the ground contamination is along Hewlett Parkway. And I don't know if this is a weird question or not, but if all the trees that are all in that area, supposed to give us oxygen, are they being contaminated from the soil that's underground from the gases?

And now we're doing all this testing. If I were to sell my house, is there going to be a red flag that you guys are doing all this work in this area, my house now goes from one point something million to I'm just going to walk away from my house?

Because there are numerous

Peninsula Boulevard Superfund houses right now, as we speak, in foreclosure. People are walking away from the house.

So, now, I know in the beginning when you did this testing, you were asking people: If you want your house tested for radon, it has to be out in the public. So if you go to sell your house, the real estate has to disclose --

MS. SOSA: Right. New York is a disclosure state.

MR. SHEININ: So, now everyone is saying I don't want my house tested. But now when the people buy the house and they find out there's a plume, they're having a heart attack.

MS. SOSA: My experience has been, in other Superfund sites, that the property values are always affected by the proximity to the Superfund site or by being within the limits of a Superfund site.

MR. SHEININ: I'm in it.

MS. SOSA: You're within it.

And that's been my experience, that banks sometimes do not want to issue mortgages to people who live within a Superfund site and property values are affected. I don't know specifically here or how much, but that has been my experience.

MR. SHEININ: So, what do we do when my houses 1.2 million, and I have three kids, and I turn around and I want to move and they say your house is worth 30 bucks?

Who justifies the difference when I bought my house to what all the other houses are that aren't on Hewlett Parkway?

I mean, at what point -- we definitely need to set up another meeting because, like David said, numerous people wanted to come but are not here. And there are thousands of questions.

And my biggest concern that I

spoke to you about it when you guys were there in the RV, how many women have breast cancer on Hewlett Parkway to this day and passed away from breast cancer?

So, saying that you're testing the waters, it could have been from 30, 40, 50 years ago. But I'm just trying to understand, doing this testing and trying to do this heat thing, if you're taking it out -- for every action, there's a reaction. What other side effect could be happening from doing all this testing or the cleanup, the cleanup?

MS. SOSA: The cleanup, if there are -- the cleanup will produce vapors, and that's where we then will use the vapor extraction wells to make sure we control all of the vapors and that the community is not exposed to those. We will do extensive air monitoring to make sure that no one is being exposed and it will be part of the cleanup action.

MR. SHEININ: Because if you go

down Hewlett Parkway now, you're going to think I'm crazy, but there are numerous trees dying left and right. We had a tree fall yesterday. The kid just got on the bus, two minutes later a tree fell.

It's just weird that directly down Hewlett Parkway all the trees are dying. I don't know if anyone has ever tested the trees. I know you did the soil underneath, but...

MS. SOSA: Along the Hewlett Parkway, we never found soil near the surface that was contaminated. The contaminated soil that we did find --

MR. SHEININ: Yes, I saw the map.

MS. SOSA: -- was deep.

MR. SHEININ: You're saying the flow is going from there down to --

MS. SOSA: The flow is going towards the north in the groundwater at various depths. But we didn't find soil contamination along the Hewlett Parkway.

MR. SHEININ: Okay.

MR. KATZ: How long before the work is actually started?

You said you identified this in 2004; from 2005 to 2010, you've been doing the research. It's 2017, we're having discussion today.

When is the work going to actually be done; and, when it's done, will the property values be able to go up again?

MS. SOSA: I can't answer about the property values.

Once the site is cleaned up, then I would assume that the property values would go up again.

MR. KATZ: What's the time?

MS. SOSA: I'm getting to that.

We would issue a record of decision. Say we issue it some time in August or September. Then we start a remedial design, and that takes about a year and a half, could take up to two years, to actually do the engineering

Peninsula Boulevard Superfund plans that then we would send out to bid.

If EPA is doing the work, we need to find funding. So, that also -- we don't know if funding will be available.

So, there are many unknowns as to when actual ground breaking --

MR. KATZ: That was my first question: Who is responsible for paying? The business owners that own the properties today, are they going to be responsible for it? Is the federal government paying for it?

MR. MANNINO: I'm Pete Mannino. I work with Gloria Sosa.

In the Superfund program, we try to recover costs from the responsible parties to perform the work. In the event that the responsible parties don't have sufficient funds or are not capable of doing the work, we have the ability to tap into the Superfund and use public funds in order to do perform the work.

MR. COOPER: That's provided you know who the guilty party is.

MR. MANNINO: No, regardless. There are cases where we are not aware of who the responsible parties are. There are sites where responsible parties are unable to fund or perform the work. And in those cases, the Superfund is used in order to pay and perform the work. And, so, that community is not held --

MR. COOPER: Liable.

MR. MANNINO: Well, it's not waiting for the responsible parties to perform or pay for the work.

MR. COOPER: Can some of that money be set aside for a specific area or do you have to -- you know, once you know that you have to do this work and how much it cost, can you earmark, let's say, two-thirds of what the cost is from the Superfund and then -- do you have a formula for this?

MR. MANNINO: We've been doing

this for quite some time. So, as you saw, this is not -- this is an expensive project. So, typically, what we do at these types of projects is we incrementally fund the work.

This is not work that will be done within a period of six months to a year. Most of the construction will be done in the year to two year time frames, but the reality of it is when you read the proposed plan you'll see that the time frame to finish the remediation, where the remediation goals that Gloria identified will take numerous years to achieve; in some cases, up to 30 years.

What we do is we have a process. As we go through the remedial design process, as we're getting ready to have a project that's shovel ready, we work were our headquarters folks to line up the funding in order to do the work. And we budget and schedule what our needs are going to be over the years and

we work with our colleagues in Washington to line up the funding.

So, there's a process in place. We work through that process in order to perform the work. Regardless of whether or not the responsible parties, able or willing to do the work.

Okay?

MR. KATZ: Again, you're saying "responsible parties." I'm looking at Area A. That was the Cedarwood and that whole lot. Not only the dry cleaners, but the owners of that.

If they owned the property for two, three, four, five years, they didn't cause the contamination that happened 20, 35 years ago. Are they considered the responsible parties?

MR. MANNINO: Under CERCLA, the owners and operators at the time of the release are the potentially responsible parties as well as the current owners and operators of the property. And there are other parties that can be

Peninsula Boulevard Superfund responsible under CERCLA; transporters, for example, and some other parties.

But in this particular case, we are looking at the owners and operators at the time of disposal, at the time of release, and also the current owners and operators to answer your question.

MR. RIEMAN: My name is Barry Rieman. My wife is the manager of the bank that's next to the Piermont Cleaners.

If I understand correctly, according to the remediation that you're choosing, the inconvenience will be limited to the parking lot?

MS. SOSA: Is that the new bank that's all the way on the corner?

MS. RIEMAN: Yes.

MS. SOSA: I don't believe that that's going to be affected by the work because it's over to the side. This work will be more in front of the area of the Piermont Cleaners.

But there will be some issues

with -- you know how that parking lot is one way through? So, there will be some issues.

MR. RIEMAN: But the businesses will not be closed?

MS. SOSA: The bank not be effected on the corner.

MS. RIEMAN: How safe is it when you're exposing the air and doing your --

MS. SOSA: Again, while we're doing these remedies, we will do extensive air monitoring to ensure that there are no vapors that escape into the community.

MS. RIEMAN: I think also there's a radon detector in the basement in that bank. And it's never -- you know, the dial or whatever, the meter has never changed or wavered.

What was explained to me is that it was just an added precaution just in case and that the vapors would go up and out of the building.

MS. SOSA: Exactly. In many buildings, they build these just in case so that later on there are no issues with soil vapor intrusion. So, in many new constructions, also they put in vapor barriers and other things to prevent vapors coming in.

MS. RIEMAN: To your knowledge, there isn't any vapors in that location right now, right?

MS. SOSA: And we will be doing more sampling during this heating season. We can only sample indoors I think it's November to February, November to March, during heating season.

MS. RIEMAN: But that safety precaution, that you think is an adequate safety precaution?

MS. SOSA: That is added by them at their choice.

MS. RIEMAN: Right.

MS. SOSA: No one has instructed them.

MS. RIEMAN: You feel that's a safety --

MS. SOSA: And we did not sample in the basement of the bank.

MR. MANNINO: Gloria, if I could just add something with respect to the safety issues.

MS. SOSA: Yes.

MR. MANNINO: Two points I'd like to make.

First, with respect to the work, we have a great deal of expertise performing this type of work. And we ensure that the work is done safely for the community and, also, our contractors who are doing the work. If we can't do the work safely, we won't do it. That's first and foremost.

Second is with respect to the questions regarding vapor intrusion. Gloria has been working very hard for numerous years trying to obtain access from various homes and properties in order to perform vapor intrusion

Peninsula Boulevard Superfund sampling. I recognize that it's a voluntary program and a person can deny Gloria's request to perform a sampling.

If anyone has concerns with respect to indoor air quality, all they simply have to do is tell Gloria, yes, I'd like my property sampled, and this winter she will have your property sampled.

So, if anyone has concerns that the agency has not done enough or is not doing enough, all you have to do is when Gloria asks is say yes.

Those are the two points I wanted to cover.

Yes, Aaron?

MR. GERSHONOWITZ: I'm Aaron Gershonowitz, and I wanted to just express a concern about traffic.

It looks like Mill Road is going to be -- or not Mill Road, West Broadway is going to be blocked off for a period of time because of a number of wells there. My client has a business on West

Broadway. I'm just not sure -- I mean, West Broadway is a major artery. I'm not sure how it can close down for a significant period of time without a plan of action.

The feasibility study says you're going to create a traffic plan, but --

MS. SOSA: And that will all be done. During the remedial design is when we would locate that network of wells. What I showed you is a conceptual design and the building wasn't even there. So, it's just where would these go? And now we have to determine exactly where they will go.

I'm not saying I'm going to close West Broadway, but there may be lane closures. It's one lane each way. There may be some lane reduction, there may be no closures at all, but that is a potential.

MR. GERSHONOWITZ: Have you gotten together with local government to

talk about that?

MS. SOSA: No. We will during the remedial design talk to the Town of Hempstead and talk to Nassau County, the Five Towns. We will be working closely with the local governments.

MR. GERSHONOWITZ: Okay. Because I think I've mentioned to you that I'm familiar with a site further out on Long Island where the local government, because of a well in a street, has been blocking a remediation for up to a year.

So, meet with them as fast as soon as you can.

MS. SOSA: We will meet with them and meet closely with them.

MR. KATZ: The vacant land that you're going to put a whole bunch of wells in, how --

MS. SOSA: Well, that land is no longer vacant.

MR. KATZ: I understand.

Given the fact that you did

Peninsula Boulevard Superfund research or investigation for five years, knowing your proposed plan was to put all these wells in it, how come there was no restriction on the sale or anything --

MS. SOSA: First of all, I believe that that land sold several years ago. And there are no deed restrictions. We did not know that there was contamination in what we call the former vacant lot until more recently.

We were basically chasing the contamination. So, we were at the Cedarwood cleaners and we were in the front and in the back taking samples. And we found, much to our surprise, that the concentrations were higher in the front. So, then we said, well, what's across the street? And that's how we went over there and looked for this contamination, because there was no dry cleaners there, there was no history.

UNIDENTIFIED SPEAKER: There was

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a gas station.

MS. SOSA: There was a gas station and I believe a Jiffy Lube, but those are different contaminants from a gas station that from a dry cleaner.

MR. MANNINO: Mr. Katz?

MR. KATZ: I know there are no deed restrictions; I'm a real estate attorney, so I know that. But given the fact that you're investigating the entire area, couldn't you put a injunction or something to stop the sales or something -- was there anything that you could have done in order to prevent it, given the fact that you guys were already doing the diligence on this contamination?

And there's nothing you could have done to stop it?

MS. SOSA: As far as I know -- and I could be wrong -- we couldn't do that until we sign our record of decision with a selected remedy. Then we could put liens on properties and we

Peninsula Boulevard Superfund could place deed restrictions, environmental easements. But before then, I don't believe that we have a basis to.

MR. LUDMER: While we're performing the investigation, we generally wouldn't put an easement on the site. We're still collecting the information to determine the extent of contamination. We just now sort of reached our final decision on the site. So, it would be too early --

MR. KATZ: At this point, any future developments you're putting liens or restrictions on Mill Road and the entire area?

MR. MANNINO: No, not on the entire area.

MS. SOSA: On the areas of concern.

MR. KATZ: Area one and --

MS. SOSA: And area two.

MR. PERLMAN: The fact that they dug down 20 feet during the

Peninsula Boulevard Superfund construction --

Robert Perlman.

-- there was no -- you were aware of it and you didn't even -- the permits that are handed out, that are going to be handed out?

What's our exposure that's already been done?

MR. MANNINO: I think I could answer this.

Prior to the beginning of construction, Gloria and her contractor did extensive sampling on the property. And that included soil sampling and groundwater collection. And I believe, for example, the top 20 feet or the top 10 feet where construction activity would occurred, she did not find --

MS. SOSA: We did not find soil contamination closer to the surface.

MR. MANNINO: If your concern was that material was there and was moved to someplace else, we have data to indicate that soil was not contaminated.

MR. PERLMAN: Why in the handout does it say in the summary of the human health risk assessment section that the cancer risk of the residents is five times greater than average?

MS. SOSA: That's, again, from if a resident were to drink the contaminated groundwater, not the drinking water from your faucet. But if you were to drink what's down there, that's what the elevated risk is.

MS. RIEMAN: So if you took the hose from your house --

MS. SOSA: No. All of the water that comes into your home -- all of it, hose, indoor, outdoors -- all comes from the public drinking water supply, not from a well in the ground.

MS. RIEMAN: What about if you have a garden?

MS. SOSA: The same thing. Your water is coming from --

MS. RIEMAN: I'm saying the soil.

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MS. SOSA: The soil is also -- I mean, that's effected by the rain. But there isn't -- we have not found surficial soil contamination that would effect gardens in the neighborhood.

MR. ROVOLO: My name is Joe Rovolo.

How about private wells, wells that were sung by a sprinkler company, that tap into different aquifers at different levels?

MS. SOSA: My understanding is in this area, there's no wells of that type.

MR. ROVOLO: That's totally incorrect. Whether they were permitted properly or not, I know of at least five.

If you walk in the neighborhood and you see certain people have sprinkler systems and they have a rust formation on their property, concrete, fences, things like that, that would indicate that the sprinkler company put

a well in, didn't go deep enough, is in the wrong aquifer, and is now spreading would-be contaminated water airborne.

If this contaminated water was airborne on my neighbor's property, would we be susceptible to exposure?

MR. MANNINO: Let me try to answer.

As part of the process, part of the investigation that we do at all sites, we do a well search. And we work with the county and the local offices to see who had previously obtained permits to install wells. And we use those records to determine whether or not we need to take a look at those individual properties.

As Gloria indicated, as far as our knowledge, no one historically obtained permits or still has an active well.

Two, if a resident tried to install a well today, they would have to go to the county or the state and obtain

a permit to do so. And my belief is that the sanitation code would prevent a resident from stalling a well at their residence.

MR. ROVOLO: In this affected area?

MR. MANNINO: Yes.

MR. ROVOLO: What happens with wells that predate the spill?

MR. MANNINO: If there are wells that predate the spill and someone would like to tell us about them, we'll gladly take that information.

MR. PERLMAN: You talk about that they would restrict the permit for that kind of sprinkler system.

What about I purchased my house five years ago and I had no knowledge of any of this until actually two days ago. And I didn't even receive anything in the mail and neither did anyone on my block, which is right off of Hewlett Parkway.

When I purchased my house,

there's no education, there's no information. Whether the town or you guys, whoever dropped the ball, my entire block has not received any notification. I just happen to be a fireman and knew there was a meeting tonight.

MS. SOSA: I'm sorry, what street do you live on, sir?

MR. PERLMAN: Wheatley.

MS. SOSA: Wheatley.

MR. PERLMAN: And the plume --

MS. SOSA: Kind of goes near it, but I've done sampling on Wheatley.

MR. PERLMAN: Now if I want to sell my house, trying to start a family now, I just spent all this money on this house, I can't get it back, who is responsible? Who can compensate the decreased property value?

MR. MANNINO: I don't want to go into too much detail with respect to property values because I think there have been a couple of different studies

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out there that have different information with respect to property values. And there are various factors that impact property values, as you know.

But we maintain a website, and anyone can go on the website and see where our sites are. It's a very good tool and it has a lot of information. It's actually called Superfund Sites Near Where You Live.

So, we try to do as much as we can with respect to informing the communities of the work we do through sending out mailers when appropriate. For this process, we're required to put a notice in the paper. Gloria posted a notice in --

MS. SOSA: Long Island Herald.

MR. MANNINO: -- Long Island Herald, we issued a press release, and our information is on our website.

I know in the past, Gloria has knocked on doors. And I recognize

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people buy and sell in that neighborhood, but --

MS. SOSA: I'm sorry that you did not receive a mailing yourself. You should have on Wheatley.

MR. MANNINO: Please spread the word to your friends and people in the neighborhood.

But keep in mind Gloria is here tonight with a plan to address the problem. We can't solve what happened in the past. We're looking for a path forward. And she is presenting tonight a plan to address a complex problem due to the various factors that have been laid out.

And, so, I recognize the concerns that homeowners and residents have. They're legit concerns. There are certain boundaries that we need to work, and Gloria and the folks here do not have the ability to address your property value issue.

What we do have is the ability

to come up with a plan that fixes the problem. And if you want your home sampled for vapor intrusion issues, provide Gloria your information and --

MS. SOSA: It might be something you want to do just for your own information.

MR. PERLMAN: If you discover something now, I'm legally responsible for notifying the next --

MR. SHEININ: Yes.

MR. PERLMAN: So I'm screwing myself.

MS. SOSA: Sometimes it goes both ways, sometimes -- you know, it all depends. Some people take samples and find nothing and others take it and they find something.

Some people have said to me no, I don't want sampling, but then there's the unknown. Some people have questions because you have no sampling.

MR. MANNINO: Keep in mind we are here tonight offering that sampling.

If you want to voluntarily accept that, please do. If you decline, I cannot make you perform that sampling. That's between you, your wife, and family. I cannot make you do that sampling.

MS. RIEMAN: What do they do with the sampling?

MS. SOSA: The way they do it is we install a hole in the basement floor about the size of a quarter. We drill it with a hand drill. And then we put a hose in there and we attach a canister that sucks up air slowly over 24 hours. Then we take that canister away to a laboratory and we have it analyzed. And we can do that either -- well, that's the subslab. That's pulling the vapors through the basement floor.

The other thing that we do is we put one of these canisters in the basement itself to look at the quality of the indoor air. So, there's the two issues: The what's outside of the slab and what's actually made its way inside.

MS. RIEMAN: And then you have a hole in basement floor.

MS. SOSA: No. We plug it up so it's all flat, the size of a quarter. I could show you pictures, if you send me an e-mail, of what the sampling looks like.

MR. COOPER: Gloria, you're also saying that now this becomes a public record.

MR. SHEININ: Yes.

MS. SOSA: We don't disclose -- please go ahead.

MR. MANNINO: What happens is --

MR. COOPER: No, no, I didn't say that you have to disclose it. But there's a -- someone can research and find that --

MR. PERLMAN: Cat's out of the bag now.

MR. MANNINO: We take measures when we collect the data to ensure that the privacy of the homeowner is protected.

Yes, we're spending federal funds. And once we're in a remedial action, the state has a cost contribution component to it. But while we're studying, those federal funds, all the documentation is available to the public. And what we do is, to the extent that we can, we redact the information to protect the privacy of the homeowner.

But at end of the day, the information is in a document in the repository.

MS. SOSA: So, instead of having your address, it would say unit five or unit seven so we would know what it is in our table but it's not released to the public so privacy is maintained.

MR. SHEININ: Now, the 30-year program start, when does that actually start, 30-year cleanup?

I believe a while ago from --

MS. SOSA: From the extraction of the groundwater, we cost it out for

30 years and that's from the day we turn on the system.

It doesn't mean that it will take 30 years, but we've costed it out in case it does and we project how long it's going to take. So, I think for the groundwater pump and treat, we projected it would be 30 years --

MR. SHEININ: In eight years you see there's no difference and you're at your top level of testing, at that point do we have another meeting and say this is not working?

MS. SOSA: If it's not working, then we need to reevaluate it.

And Pete, do you want to say something.

MR. MANNINO: What I would add is as part of our process, we do what's called five-year reviews.

MR. SHEININ: Yes.

MR. MANNINO: So, periodically Gloria will be collecting data on the projects and evaluating the performance.

And we use the five-year review as an opportunity to look at the data, evaluate it, share it with the public, and then come out with any recommendations that need to be done.

These are technologies that have proven to work on the island and we feel that this is the best approach to deal with this problem.

MR. SHEININ: I follow a lot of what she puts up. I understand that. I'm just wondering, when does the 30-year actually start?

MS. SOSA: It starts from the day we turn --

MR. MANNINO: When we turn the system on. It does not include the time we've spent sampling and investigating the site.

MS. ECHOLS: Any more questions?

MR. SHEININ: Will you try to set up another, I guess, meeting?

MS. SOSA: I would like to set up another meeting for informational

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purposes. I was told today that we need to have a stenographer at any official meeting.

MR. SHEININ: Yes.

MS. SOSA: So, that's what we're going to have to work on.

MR. SHEININ: Okay.

MR. MANNINO: Anyone can get in touch with Gloria by e-mail. And if they have any questions or comments, we will follow up with them.

MS. SOSA: So, you can mail me your comments if you want by snail mail and they have to be postmarked by July 17. And if not, just send them to my e-mail.

And you can also contact me with questions.

MS. ECHOLS: Please make sure you signed in so we can add your name to the mailing list.

MS. SOSA: And also, I'm going to advance this page because this is the website for Peninsula Boulevard. And

you can get it through Google too by just putting in Peninsula Boulevard, but that has a link to all the results of the remedial investigation, the feasibility study itself, the proposed plan.

This presentation is already on the website, and as more documents are formed they will be loaded onto the website. All right?

Sir?

UNIDENTIFIED SPEAKER: Why are the other dry cleaners being checked --

MS. SOSA: We checked all the dry cleaners in the area. I had a map when I started.

American has a small plume that is being managed by New York State. That kind of goes across the street into the Foodtown shopping center. And that's a voluntary cleanup by American.

And then we went to the Mill Bright Cleaners, different cleaners in the area, and we sampled there, and we

Peninsula Boulevard Superfund

did not find evidence of contamination. So, that's why they didn't turn into one of those areas of concern. Those were the areas that had elevated levels.

Do you live on Mill Road also?

UNIDENTIFIED SPEAKER: I live on Mill and Waverly.

MS. SOSA: By the Mill bright Cleaner.

UNIDENTIFIED SPEAKER: On the other side of American.

MS. SOSA: Right.

MS. ECHOLS: We have another question from this gentleman.

MR. PERLMAN: You've been working with the Town of Hempstead or are you independent? Do you keep them apprised? The town government, have you dealt with them at all?

MS. SOSA: We've dealt with them throughout the years but we have not met with them recently. But we will be meeting with them closely during the remedial design.

MR. PERLMAN: When do you plan on letting them know where the issues are; that somebody goes to buy a house, to get information about the title or get a permit, that this information should come up?

Why isn't that provided to them already since you've been on the site since 1991.

MS. SOSA: 2005.

MR. PERLMAN: The DEC --

MS. SOSA: I understand. Yes, we've been investigating for a very long time.

MR. PERLMAN: I don't understand how I couldn't have found out when I bought my house when meanwhile you've been working on it for 30 years.

MR. MANNINO: Yes?

UNIDENTIFIED SPEAKER: Are you aware that there was also a dry cleaner Velvet Touch Dry Cleaner?

MS. SOSA: Your name, for the stenographer.

MR. JORDAN: Dennis Jordan.

MS. SOSA: The former Velvet Touch was one of the ones that we --

MR. JORDAN: The dry cleaner there was called Velvet Touch.

MS. SOSA: We had that in our records so that was one of the things that we knew about.

And we also talk to a lot of people in the neighborhood who gave us a lot of information; people like yourself who have been around for a while.

Any other questions?

I'd like to thank you all very much for coming out this evening.

MS. ECHOLS: Yes, thank you very much.

MS. SOSA: We appreciate it.

(Time noted: 8:22 p.m.)

C E R T I F I C A T E

STATE OF NEW YORK)
) ss.
COUNTY OF NEW YORK)

I, LINDA A. MARINO, RPR, CCR, a Shorthand (Stenotype) Reporter and Notary Public of the State of New York, do hereby certify that the foregoing transcription of the public meeting held at the time and place aforesaid is a true and correct transcription of my shorthand notes.

I further certify that I am neither counsel for nor related to any party to said action nor in any way interested in the result or outcome thereof.

IN WITNESS WHEREOF, I have hereunto set my hand this 5th day of July, 2017.

_____
LINDA A. MARINO, RPR, CCR

ATTACHMENT D

WRITTEN COMMENTS

6/29/2017 11:23 PM
Randi Goodman goodman519@aol.com
Re: Peninsula Ground Water Plume

Hello Gloria,
Thank you for taking the time to respond to me. I'm disappointed to learn that you will not be holding another public meeting to discuss the proposed plan since I'm unclear as to what will be done to rectify this situation and remove the toxins. I'm also unclear as to the effect that this has on my home value. Can you give me an example of a plume on Long Island where the contamination was removed successfully? Was there a change in the home values in those areas?
The EPA conducted a soil vapor sampling in my home years ago. Is that something that needs to be repeated? I'm sure you are aware that there is a home on Hewlett Parkway that needed the home filtration system after having the vapor sampling done. That house is now in foreclosure, abandoned. I would hate to see that happen to more houses in this neighborhood. As a parent and homeowner, this situation worries me.
Any additional information you can provide would be great.
Thank you,
Randi Goodman
516-698-0791

From: Randi Goodman [mailto:goodman519@aol.com]
Sent: Friday, June 23, 2017 5:21 PM
To: Sosa, Gloria <Sosa.Gloria@epa.gov>
Subject: Peninsula Ground Water Plume

Hello Gloria,
I was not able to attend the meeting at the Hewlett Firehouse last night. I understand that there was a dismal turnout and I can only imagine that this was because of the short notice and neighborhood conflicts on the evening that was selected for this important meeting. I am hoping that there would be another opportunity to hear what the EPA plans are for the Peninsula Ground Water Plume site. I own my home on Hewlett Parkway and I am extremely concerned about the effect that this will have both on the heath and safety of my family as well as the value of my home.
Please consider another neighborhood meeting in Hewlett.
Thank you
Randi Goodman
516-698-0691

Wed 7/12/2017 10:23 PM
steph decicco <saskmd5@yahoo.com>
Question re: plume

Hi

I was hoping you can tell me the statistics of how many women have developed breast cancer over the past 20 years?

Thank you.
Stephanie