PROPOSED REMEDIAL ACTION PLAN

Former NuHart Plastic Manufacturing
State Superfund Project
Brooklyn, Kings County
Site No. 224136
September 2018

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

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SECTION 1: SUMMARY AND PURPOSE OF THE PROPOSED PLAN

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

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

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

SECTION 2: CITIZEN PARTICIPATION

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

Brooklyn Community Board No. 1
435 Graham Avenue
Brooklyn, NY 11211
Phone: 718-389-0009

NYSDEC Region 2 Headquarters
Attn: Bryan Wong

47-40 21st Street
Long Island City, NY 11101
Phone: 718-482-4905

North Brooklyn Development Corporation
148-150 Huron Street
Brooklyn, NY 11222
Phone: 718-349-9044

A public comment period has been set from:

9/20/2018 to 10/20/2018

A public meeting is scheduled for the following date:

10/4/2018 at 7:00 PM

Public meeting location:

Polish Slavic Center, 176 Java Street, Brooklyn, NY 12222

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

Written comments may also be sent through 10/20/18 to:

Bryan Wong
NYS Department of Environmental Conservation
Division of Environmental Remediation
One Hunters Point Plaza 47-40 21st Street
Long Island City, NY 11101
yukyin.wong@dec.ny.gov

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

Receive Site Citizen Participation Information By Email

Please note that the Department's Division of Environmental Remediation (DER) is "going paperless" relative to citizen participation information. The ultimate goal is to distribute citizen participation information about contaminated sites electronically by way of county email listservs.

Information will be distributed for all sites that are being investigated and cleaned up in a particular county under the State Superfund Program, Environmental Restoration Program, Brownfield Cleanup Program, Voluntary Cleanup Program, and Resource Conservation and Recovery Act Program. We encourage the public to sign up for one or more county listservs at http://www.dec.ny.gov/chemical/61092.html

SECTION 3: SITE DESCRIPTION AND HISTORY

Location:
The site is located at 280 Franklin Street in the Greenpoint section of Brooklyn, Kings County, New York. The approximately one-acre site is identified on the tax map as Block 2487, Lots 1, 10, 12, 72 and 78. The site is bordered immediately to the north by Clay Street followed by commercial/industrial buildings, to the east by remaining portions of the NuHart Plastic Manufacturing facility that are not associated with this NYS Inactive Hazardous Waste Disposal site, to the south by Dupont Street followed by multi-family residential structures, and to the west by Franklin Street followed by a New York City playground.

Site Features:
The dimensions of the site are approximately 240 feet by 200 feet. The site is entirely covered by a complex of industrial buildings that were constructed at different times.

Current Zoning and Land Use:
The site is zoned M1-2/R6, which designates the site as manufacturing with a residential overlay. The on-site building is currently vacant.

Past Use of the Site:
The site has been in used for various manufacturing and commercial purposes since 1887. It has been used for manufacturing, as an office, for storage, and for shipping and receiving. Prior to the late 1940s, the site and the surrounding lots were used as a boiler shop for Logan Ironworks, two stables, a gas and light fixture factory, a sheet metal works, a soap factory, a waterproofing factory, and a scrap metal facility. The subject property was developed for plastic manufacturing purposes in the late 1940s to early 1950s, and has remained relatively unchanged since that time. From 1983 to 2004, NuHart and Company made vinyl siding and sheeting at the site. After 2004, NuHart vacated the on-site buildings.

There are 12 underground storage tanks (USTs) located on the site. According to records, these tanks were emptied and closed. There are also two large aboveground silos on site. The Petroleum Bulk Storage (PBS) facility number is 2-608875, and the Chemical Bulk Storage (CBS) facility number is 2-000444. Liquid plasticizers stored included bis(2-ethylhexyl)phthalate, bis(2-ethylhexyl)adipate, and palatinol 711P phthalate.

Operable Units:
The site was divided into two operable units. An operable unit represents a portion of a remedial program for a site that for technical or administrative reasons can be addressed separately to investigate, eliminate or mitigate a release, threat of release or exposure pathway resulting from the site contamination.

Operable unit 1 (OU1) is the on-site source area and associated contamination. OU2 consists of the off-site groundwater and soil vapor plumes.

Operable Unit (OU) Numbers 01 and 02 are the subject of this document.

Site Geology and Hydrogeology:
Soil at the site consists of a layer of urban fill extending from the surface to about 8 feet below the onsite slab, underlain by sand, silty sand and/or sandy silt. Groundwater is encountered at a depth of approximately 10 to 15 feet below grade surface and flows generally westerly to northwesterly towards the East River.

A site location map is attached as Figure 1.

SECTION 4: LAND USE AND PHYSICAL SETTING

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

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

SECTION 5: ENFORCEMENT STATUS

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

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

49 Dupont Realty Corp.

NuHart and Company

Dupont Street Developers LLC

The Department and 49 Dupont Realty Corp. entered into a Consent Order on January 18, 2011. The Order was amended on February 7, 2014 to add a new owner (Dupont Street Developers LLC). The Order obligates the responsible parties to implement a full remedial program.

SECTION 6: SITE CONTAMINATION

6.1: Summary of the Remedial Investigation

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

The following general activities are conducted during an RI:

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

The analytical data collected on this site includes data for:

- groundwater
- soil
- soil vapor

6.1.1: Standards, Criteria, and Guidance (SCGs)

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

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

6.1.2: RI Results

The data have identified contaminants of concern. A "contaminant of concern" is a hazardous waste that is sufficiently present in frequency and concentration in the environment to require evaluation for remedial action. Not all contaminants identified on the property are contaminants of concern. The nature and extent of contamination and environmental media requiring action are

summarized in Exhibit A. Additionally, the RI Report contains a full discussion of the data. The contaminant(s) of concern identified at this site is/are:

For OU: 01

bis(2-ethylhexyl)phthalate
dioctyl phthalate
trichloroethene (TCE)
dichloroethene (cis-1,2-)
vinyl chloride

For OU: 02

bis(2-ethylhexyl)phthalate
dioctyl phthalate
trichloroethene (TCE)
vinyl chloride
dichloroethene (cis-1,2-)

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

- groundwater
- soil
- soil vapor intrusion

6.2: Interim Remedial Measures

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

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

IRM - LNAPL Recovery

An Interim Remedial Measure (IRM) consisting of light non-aqueous phase liquid (LNAPL) recovery at the site was initiated under the spill program in November 2006. The IRM consists of the removal of LNAPL from recovery wells via manual bailing and automated product-seeking equipment. An Operation, Maintenance and Monitoring (OM&M) Plan for the IRM was prepared to describe the implementation, management, and performance evaluation activities under the IRM. IRM activities are monitored on a monthly basis.

6.3: Summary of Environmental Assessment

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

Based upon the resources and pathways identified and the toxicity of the contaminants of ecological concern at this site, a Fish and Wildlife Resources Impact Analysis (FWRIA) was deemed not necessary for OUs 01 and 02.

Nature and Extent of Contamination:
Soil and groundwater samples from both on-site and off-site were analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), PCBs, pesticides and metals. Based upon investigation conducted to date, the primary contaminants of concern for both OU1 and OU2 include phthalates (specifically bis(2-ethylhexyl) phthalate and di-n-octyl phthalate) and VOCs (specifically trichloroethylene and its decomposition products).

Soil - VOCs in soil are found both on and off-site at levels above unrestricted use soil cleanup objectives (UUSCOs) in a limited area in the northeast portion of the site and extending off-site beneath the sidewalk on the south side of Clay Street. The highest soil contamination concentration of trichloroethylene (TCE) was reported at 14 parts per million (ppm) compared to the UUSCO of 0.47 ppm. Other VOCs detect above the UUSCOs include: cis-1,2-dicholoretheylene (DCE) with maximum concentration of 2.4 ppm (UUSCO is 0.25 ppm). SVOCs in soil were identified both onsite and off-site above UUSCOs, including bis(2-ethylhexyl) phthalate (DEHP) at a concentration of 59,200 ppm (UUSCO is 50 ppm) and di-n-octyl phthalate (DOP) at a concentration of 3,010 ppm (UUSCO is 100 ppm). The following site-specific chemicals were identified in soil exceeding the restricted residential SCOs: bis(2-ethylhexyl) phthalate, di-n-octyl phthalate, cis-1,2-dichloroethene, and TCE.

Groundwater - Phthalates are present as an LNAPL plume floating on the groundwater surface beneath most of the site and extending off-site to the west and southwest. Dissolved-phase phthalates were detected above NYSDEC groundwater standards in several wells generally located on the periphery of the LNAPL plume. The maximum concentration of DEHP was reported at 1,750 parts per billion or “ppb”(compared to the groundwater standard of 5 ppb) and DOP at 87.1 ppb (compared to the groundwater standard of 50 ppb). Dissolved-phase TCE and its associated breakdown product DCE were found in the northeast portion of the site and extending a short distance off-site to the northwest at concentrations exceeding the groundwater standards of 5 ppb. The maximum concentrations of TCE was reported at 33,000 ppb, and DCE at 2,700 ppb.

Soil Vapor - VOCs were detected in on-site sub-slab soil vapor beneath the northeastern portion of the site building with the greatest impacts coinciding with the chlorinated VOC-impacted groundwater in this area. Sub-slab vapor contaminant concentrations were detected up to a maximum of 43,000 micrograms per cubic meter (ug/m3) for TCE, 2,500 ug/m3 for PCE, and 3,700 ug/m3 for DCE.

6.4: Summary of Human Exposure Pathways

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

Direct contact with contaminants in the soil is unlikely because the site is covered with buildings and pavement. People are not drinking the contaminated groundwater because the area is served by a public water supply that is not affected by this contamination. Volatile organic compounds in the groundwater may move into the soil vapor (air spaces within the soil), which in turn may move

into overlying buildings and affect the indoor air quality. This process, which is similar to the movement of radon gas from the subsurface into the indoor air of buildings, is referred to as soil vapor intrusion. The potential exists for the inhalation of site contaminants due to soil vapor intrusion for any future on-site redevelopment or occupancy. Furthermore, the potential for off-site soil vapor intrusion should be evaluated, as appropriate, if off-site property owners grant access.

6.5: Summary of the Remediation Objectives

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

The remedial action objectives for this site are:

For OU 01:

Groundwater

RAOs for Public Health Protection

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

RAOs for Environmental Protection

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

Soil

RAOs for Public Health Protection

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

RAOs for Environmental Protection

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

Soil Vapor

RAOs for Public Health Protection

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

For OU 02:

Groundwater

RAOs for Public Health Protection

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

RAOs for Environmental Protection

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

Soil

RAOs for Public Health Protection

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

RAOs for Environmental Protection

- Prevent migration of contaminants that would result in groundwater or surface water contamination.
- Prevent impacts to biota from ingestion/direct contact with soil causing toxicity or impacts from bioaccumulation through the terrestrial food chain.

Soil Vapor

RAOs for Public Health Protection

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

SECTION 7: SUMMARY OF THE PROPOSED REMEDY

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

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

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

For OU 01 remedial Program, the proposed remedy is referred to as the Excavation, Air Sparge/Soil Vapor Extraction, Vapor Mitigation, and LNAPL Migration Barrier remedy.

For OU 02 remedial Program, the proposed remedy is referred to as the Air Sparge/Soil Vapor Extraction, Vapor Mitigation, LNAPL Migration Barrier and Recovery remedy.

The estimated present worth cost to implement the combined OU 01 and OU 02 remedy is $30,700,000. The cost to construct the remedy is estimated to be $20,300,000 and the estimated average annual cost is $1,380,000.

The elements of the proposed remedy are as follows:

1. Remedial Design

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

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

2. Excavation (OU1)

The existing on-site building(s) will be demolished and materials which can't be beneficially reused on site will be taken off-site for property disposal in order to implement the remedy. Excavation and off-site disposal of contaminant source areas, including:

- Grossly contaminated soil as defined in 6NYCRR Part 375-1.2(u);
- Concentrated soil or semi-solid hazardous substance per 6 NYCRR Part 375-1.2(au);
- Non-aqueous phase liquids;
- Soil with visual waste material or non-aqueous phase liquid;
- Soil which exceeds the protection of groundwater soil cleanup objectives (PGWSCOs), as defined by 6 NYCRR Part 375-6.8 for those contaminants found in the site groundwater above standards;
- Soil that creates a nuisance condition, as defined in Commissioner Policy CP-51 section G;
- Grossly contaminated soil that may be present in proximity to the Underground Storage Tanks (USTs) and piping trench systems formerly used to store and convey phthalates and lubricating oil during the former plastic manufacturing process;

- VOC-impacted soil that are above the water table in the northeastern corner of the site; and
- Excavation and removal of any underground storage tanks (USTs), fuel dispensers, underground piping or other structures associated with a source of contamination.

Approximately 22,500 cubic yards of soil will be excavated in total. An estimated 6,600 cubic yards is expected to be disposed off-site as hazardous waste, and the remaining material is anticipated to be non-hazardous historic fill and un-impacted native soil.

3. Backfill (OU-1)

Clean fill meeting the requirements of 6 NYCRR Part 375-6.7(d) will be brought in to replace the excavated soil and/or to complete backfilling of the excavation and establish the designed grades at the site.

4. LNAPL Physical Barriers (OU-1 and OU-2)

Installation of two physical barriers to support the on-site excavation and prevent further off-site LNAPL migration.

- Shoring will be installed as a physical barrier around the entire perimeter of the on-site excavation area down to about 30 feet below grade
- Installation of a physical barrier to prevent LNAPL migration onto the off-site property located to the southwest of the site.

5. Cover System (OU-1)

A site cover will be required to allow for restricted residential use of the site in areas where the upper two feet of exposed surface soil will exceed the applicable soil cleanup objectives (SCOs). Where a soil cover is to be used it will be a minimum of two feet of soil placed over a demarcation layer, with the upper six inches of soil of sufficient quality to maintain a vegetative layer. Soil cover material, including any fill material brought to the site, will meet the SCOs for cover material for the use of the site as set forth in 6 NYCRR Part 375-6.7(d). Substitution of other materials and components may be allowed where such components already exist or are a component of the tangible property to be placed as part of site redevelopment. Such components may include, but are not necessarily limited to: pavement, concrete, paved surface parking areas, sidewalks, building foundations and building slabs.

6. LNAPL Recovery (OU-2)

Installation and operation of a network of recovery wells and/or trenches located off-site to recover mobile LNAPL from the subsurface. The number, depth, type and spacing of the recovery wells and/or trenches will be determined during the design phase of the remedy. LNAPL will be collected periodically from each well; however, if wells are determined by the Department to accumulate large quantities of LNAPL over extended time periods, they can be converted to automated collection. Enhancement of the recovery via surfactant injection to increase the mobility of the LNAPL may also be considered. A monitoring program will be implemented for groundwater and LNAPL to monitor the effectiveness of the LNAPL recovery effort.

7. Air Sparging/ Soil Vapor Extraction (OU-1 and OU-2)

Air sparging will be implemented to address the groundwater plume contaminated by volatile organic compounds (VOCs) identified in the northeast portion of the site and in the downgradient

vicinity of the site. VOCs will be physically removed from the groundwater and soil below the water table (saturated soil) by injecting air into the subsurface. The injected air rising through the groundwater will volatilize and transfer the VOCs from the groundwater and/or soil into the injected air. The VOCs are carried with the injected air into the vadose zone (the area below the ground surface but above the water table) where a soil vapor extraction (SVE) system, designed to remove the injected air, will be installed. The SVE system will apply a vacuum to wells that have been installed into the vadose zone to remove the VOCs along with the air introduced by the sparging process. The air extracted from the SVE wells will be treated as necessary prior to being discharged to the atmosphere.

The number, depth, type and spacing of the AS/SVE wells will be determined during the design phase of the remedy.

8. Vapor Mitigation (OU-1 and OU-2)

Any on-site and off-site buildings impacted by the contaminants migrating from the site will be required to have a sub-slab depressurization system, or other acceptable measure, to mitigate the migration of vapors into the building from soil or groundwater. The sub-slab depressurization system will be installed in the on-site buildings to be constructed at the site. An evaluation will be conducted, as discussed in paragraph 11 below, to determine whether sub-slab depressurization systems are necessary in off-site properties north of Clay Street pending site access from the owner(s)

9. Treatment Remedy Shutdown

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

10. Institutional Controls (OU-1)

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

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

11. Site Management Plan (OU-1 and OU-2)

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

a. an Institutional and Engineering Control Plan that identifies all use restrictions and engineering controls for the site and details the steps and media-specific requirements

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

- Institutional Controls: The Environmental Easement discussed in paragraph 10 above.
- Engineering Controls: The migration barriers, site cover, LNAPL recovery, AS/SVE, and vapor mitigation systems discussed in paragraphs 4 through 8 above

This plan includes, but may not be limited to:

- an Excavation Plan which details the provisions for management of future excavations in areas of remaining contamination;
- descriptions of the provisions of the environmental easement including any land use, and groundwater use restrictions;
- a provision for evaluation of the potential for soil vapor intrusion for buildings in off-site areas of contamination, including provision for implementing actions recommended to address exposures related to soil vapor intrusion;
- a provision that should a building foundation or building slab be removed in the future, a cover system consistent with that described in paragraph 8 above will be place in any area where the upper two fee of exposed surface soil exceed the applicable soil cleanup objectives (SCOs)
- provisions for the management and inspection of the identified engineering controls;
- maintaining site access controls and Department notification; and
- the steps necessary for the periodic reviews and certification of the institutional and/or engineering controls.

b. a Monitoring Plan to assess the performance and effectiveness of the remedy. The plan includes, but may not be limited to:
    - monitoring of LNAPL, groundwater and soil vapor to assess the performance and effectiveness of the remedy;
    - a schedule of monitoring and frequency of submittals to the Department;
    - monitoring for vapor intrusion for any buildings on the site, as may be required by the Institutional and Engineering Control Plan discussed above.

c. an Operation and Maintenance (O&M) Plan to ensure continued operation, maintenance, optimization, monitoring, inspection, and reporting of any mechanical or physical components of the remedy. The plan includes, but is not limited to
    - procedures for operating and maintaining the remedy;
    - compliance monitoring of treatment systems to ensure proper O&M as well as providing the data for any necessary permit or permit equivalent reporting;
    - maintaining site access controls and Department notification; and
    - providing the Department access to the site and O&M records.

Exhibit A

Nature and Extent of Contamination

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

For each medium for which contamination was identified, a table summarizes the findings of the investigation. The tables present the range of contamination found at the site in the media and compares the data with the applicable SCGs for the site. The contaminants are arranged into four categories: volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides/polychlorinated biphenyls (PCBs), and inorganics (metals and cyanide). For comparison purposes, the SCGs are provided for each medium that allows for unrestricted use. For soil, if applicable, the Restricted Use SCGs identified in Section 4 and Section 6.1.1 are also presented.

Waste/Source Areas

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

Wastes are defined in 6 NYCRR Part 375-1.2(aw) and include solid, industrial and/or hazardous wastes. Source areas are defined in 6 NYCRR Part 375(au). Source areas are areas of concern at a site were substantial quantities of contaminants are found which can migrate and release significant levels of contaminants to another environmental medium. Wastes and source areas were identified at the site in areas where former industrial operations occurred, around the former solvent underground storage tanks, and around the piping/trench system. The phthalates and lubricating oil were most likely released from the tanks and piping/trench systems. Phthalates and phthalate/oil mixtures are present in soil and as a light non-aqueous-phase liquid (LNAPL) plume floating on the groundwater surface. Figure 2 presents the extent of the LNAPL plume both on- and off-site. PCBs were identified in waste profiles during the disposal of the LNAPL recovered from the on-site recovery system in 2015. In order to identify the source of the PCBs, LNAPL from various wells and the temporary storage containers were sampled and tested for PCBs in 2015. Those results indicate that low levels of PCBs were detected (ranging from ND to 6 ppm).

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

Groundwater

Groundwater samples were collected from wells to assess the groundwater conditions both on- and off-site. The samples were analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), and metals to determine the nature and extent of contamination related to the historical operations at the site. Soil sample results from investigations completed under the spill program circa 2006 indicated no pesticides were detected, and only trace levels (0.05 to 0.07 ppm) of PCBs were detected. Based on the soil results from the 2006 investigation, pesticides and PCBs were not considered to be contaminants of concern for this site, and therefore groundwater sample were not analyzed for PCBs or pesticides. The investigation results indicate that contamination in the groundwater at the site exceeds the SCGs for VOCs, SVOCs and metals.

The primary groundwater contaminants are chlorinated solvents, which are present in groundwater beneath the northeastern portion of the site and extend offsite to the north-northwest. Figure 3 provides a generalized representation of the area of groundwater contamination that exceeds drinking water standards. SVOCs and metals have been reported above SCGs but are a lesser concern due to their location, nature, relatively low concentration, and/or low occurrence frequency.

Table 1 – Groundwater

Detected Constituents	Concentration Range Detected (ppb)	SCG (ppb)	Frequency Exceeding SCG
SVOC NYS CLASS GA			
Benzo(A)Anthracene	0.0500-4.40	0.002	20/20
Benzo(A)Pyrene	0.0500-5.24	0	20/20
Benzo(B)Fluoranthene	0.0500-4.45	0.002	20/20
Benzo(K)Fluoranthene	0.0500-3.74	0.002	20/20
Bis(2-Ethylhexyl) Phthalate	0.500-1,750	5	11/20
Chrysene	0.0500-4.49	0.002	20/20
Indeno(1,2,3-C,D)Pyrene	0.0500-2.97	0.002	20/20
Nitrobenzene	0.250-2.13	0.4	15/20
Pentachlorophenol	0.250-3.76	1	10/15
Phenol	1.13-3.27	1	15/15
VOC NYS CLASS GA			
1,1,2-Trichloroethane	0.200-50.0	1	19/35
1,2,3-Trichloropropane	0.730-2.50	0.04	13/13
1,2-Dibromo-3-Chloropropane	0.200-50.0	0.04	35/35
1,2-Dibromoethane (Ethylene Dibromide)	0.200-50.0	0.0006	35/35
1,2-Dichloroethane	0.200-50.0	0.6	22/35
1,2-Dichloropropane	0.200-50.0	1	17/35
1,4-Dichlorobenzene	0.200-50.0	3	9/48
Benzene	0.200-50.0	1	17/35
Cis-1,2-Dichloroethylene	0.200-2,700	5	9/35
Cis-1,3-Dichloropropene	0.200-50.0	0.4	20/35
Dibromochloromethane	0.200-50.0	50	1/35
Hexachlorobutadiene	0.430-3.58	0.5	28/33
Methylene Chloride	1.00-250	5	9/35
Trans-1,3-Dichloropropene	0.200-50.0	0.4	25/35
Trichloroethylene (TCE)	0.160-33,000	5	12/35
Vinyl Chloride	0.200-120	2	19/35
Xylenes, Total	0.550-150	5	17/35

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

Based on the findings of the RI, the presence of chlorinated solvents has resulted in the contamination of groundwater. The site contaminants that are considered to be the primary contaminants of concern which will drive the remediation of groundwater to be addressed by the remedy selection process are: trichloroethene (TCE) and associated degradation products.

Soil

Soil samples were collected at the site during the RI, and during prior site activities. Soil sample results from investigations completed under the spill program in 2006 indicated that no pesticides were detected and only trace levels (0.05 and 0.07 ppm) of PCBs were detected. Based on the 2006 soil results, pesticides and PCBs were not considered to be contaminants of concern for this site and therefore additional soil samples under the RI did not analyzed for these chemicals. The samples were analyzed for VOCs, SVOCs, and metals to determine the nature and extent of contamination related to historical operation at the site. Soil samples were collected at different depths from the surface to a maximum depth of 30 feet below grade both on-site and off-site. The sample results indicated that on-site soil contamination exceeds the SCGs for chlorinated VOCs (TCE and associated degradation products) in a limited area in the northeastern portion of the site and extends off-site to the north beneath the sidewalk on the south side of Clay Street. The impacted soil has been identified at depths from 10 to 25 feet below grade surface. SVOCs detected on site are limited to bis (2-ethylhexyl) phthalate (DEHP) and di-n-octyl phthalate (DOP) in soil located at and near the groundwater interface in the area where LNAPL is present. DEHP and DOP are also found in off-site soil at and near the groundwater interface where LNAPL is present. The DEHP and DOP concentrations exceed the unrestricted use SCOs. Various metals were detected in excess of the unrestricted use SCOs in both on-site and off-site locations, however, these detections are most likely related to materials in historical fill and are characteristic of historic fill commonly found in the New York City metropolitan area. The sampling result for soil samples for the RI are presented in Table 2. Figure 4 shows the location of soil samples collected during the RI and prior studies.

Table 2 - Soil

Detected Constituents	Concentration Range Detected (ppm)	Unrestricted Use SCG (ppm)	Frequency Exceeding Unrestricted Use SCG	Restricted Residential Use SCG (ppm)	Frequency Exceeding Restricted Use SCG
Pesticides/PCBs PART 375					
Hexachlorobenzene	0.0281-767	0.33	21/54	1.2	20/54
SVOC PART 375					
Bis (2-ethylhexyl) phthalate	0-59,200			50[e]	18/53
Di-N-Octyl phthalate	0-3,010			100[e]	11/53
2-Methylphenol (O-Cresol)	0.0281-1,730	0.33	18/47	100	6/47
Acenaphthene	0.0281-2,730	20	12/54	100	8/54
Acenaphthylene	0.0281-1,320	100	7/54	100	7/54
Anthracene	0.0281-1,170	100	7/54	100	7/54
Benzo(A)Anthracene	0.0281-1,820	1	20/54	1	20/54
Benzo(A)Pyrene	0.0281-1,230	1	20/54	1	20/54

Benzo(B)Fluoranthene	0.0281-1,790	1	21/54	1	21/54
Benzo(G,H,I)Perylene	0.0281-1,410	100	7/54	100	7/54
Benzo(K)Fluoranthene	0.0281-1,820	0.8	21/54	3.9	19/54
Chrysene	0.0281-1,900	1	20/54	3.9	19/54
Dibenz(A,H)Anthracene	0.0281-1,190	0.33	21/54	0.33	21/54
Dibenzofuran	0.0281-1,520	7	14/54	59	8/54
Fluoranthene	0.0281-2,730	100	8/54	100	8/54
Fluorene	0.0281-1,320	30	8/54	100	7/54
Indeno(1,2,3-C,D)Pyrene	0.0281-1,730	0.5	21/54	0.5	21/54
Naphthalene	0.000600-1,410	12	11/121	100	7/121
Pentachlorophenol	0.0281-1,320	0.8	18/47	6.7	12/47
Phenanthrene	0.0281-1,740	100	7/54	100	7/54
Phenol	0.0281-1,880	0.33	18/47	100	6/47
Pyrene	0.0281-1,690	100	7/54	100	7/54
VOC PART 375					
1,2-Dichlorobenzene	0.000530-2,060	1.1	21/94	100	7/94
1,3-Dichlorobenzene	0.000540-2,240	2.4	19/94	49	8/94
1,4-Dichlorobenzene	0.000780-1,610	1.8	19/94	13	12/94
Cis-1,2-Dichloroethylene	0.000350-2.40	0.25	4/68	0.25[d]	4/68
Trichloroethylene (TCE)	0.000600-14.0	0.47	9/68	0.47[d]	9/68
Vinyl Chloride	0.000330-0.270	0.02	5/68	0.02[d]	5/68

a - ppm: parts per million, which is equivalent to milligrams per kilogram, mg/kg, in soil;
b - SCG: Part 375-6.8(a), Unrestricted Soil Cleanup Objectives.
c - SCG: Part 375-6.8(b), Restricted Use Soil Cleanup Objectives for the Protection of Public Health for Restricted Residential Use, unless otherwise noted.
d - SCG: Part 375-6.8(b), Restricted Use Soil Cleanup Objectives for the Protection of Groundwater.
e – SCG: final Commissioner Policy CP-51

Based on the findings of the Remedial Investigation, the past disposal of hazardous waste has resulted in the contamination of soil. The site contaminants identified in soil which are considered to be the primary contaminants of concern, to be addressed by the remedy selection process are, chlorinated VOCs (TCE and associated degradation products) and phthalates (DEHP, DOP).

Soil Vapor

The evaluation of the potential for soil vapor intrusion resulting from the presence of site related soil or groundwater contamination was evaluated by the sampling of soil vapor. At this site, due to the presence of buildings in the impacted area, a full suite of samples was collected to evaluate whether soil vapor intrusion was occurring.

Samples were collected on-site and off-site locations, and one off-site property where access were granted. The results from these samples indicated the chlorinated VOC contamination related to the on-site disposal of

hazardous wastes was detected in soil vapor and is present beneath the northeastern portion of the site building, with the greatest impacts coinciding with chlorinated VOC-impacted groundwater in this area. The chlorinated VOCs in soil vapor have migrated off-site to the east and north of the site generally consistent with groundwater flow and vapor phase dispersion. The site-related chlorinated VOC soil vapor impacts extend off-site to the east beneath a portion of the adjoining former NuHart facility, but do not extend to the east end of this building or to the off-site residential properties to the east of the site. The chlorinated VOC soil vapor impacts extend to the north, across Clay Street, but do not extend as far northward as the north side of Commercial Street, as demonstrated by soil vapor data from the nearby Greenpoint Landing property. Figure 5 provides the soil vapor chlorinated VOC plume both on-site and off-site.

Based on the concentration detected, the primary soil vapor contaminants are PCE and TCE which are associated with the former site operations. Actions are needed to address exposure at the on-site structure, in the off-site adjoining former NuHart facility structure to the east of the site, and at least three adjacent off-site properties on the north side of Clay Street.

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

Exhibit B

Description of Remedial Alternatives

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

Alternative 1: No Further Action

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

Present Worth: *$0*
Capital Cost: *$0*
Annual Costs: *$0*

Alternative 2: AS/SVE, Off-Site Barrier, LNAPL Extraction/Disposal, Limited On-Site Source Removal, Groundwater/LNAPL Monitoring, Soil Vapor/SVI Monitoring, and ECs/ICs

This alternative includes limited excavation and off-site disposal of on-site source infrastructure and associated soils. The area of excavation under this alternative consists of the USTs and piping trench system formerly used to store and convey phthalates and lubricating oil during the former manufacturing process, and impacted soils that directly overlie or underlie these structures. The soil removal would be limited to one foot below the depth of the structures. This alternative also calls for installation of an air sparging/soil vapor extraction (AS/SVE) system to address the VOC impacted soil and groundwater identified on the northeastern portion of the site and in the downgradient vicinity of the site. On-site and off-site LNAPL extraction would be accomplished using either high viscosity product pumps or belt skimmers to reduce LNAPL mass. The installation of off-site groundwater cutoff wall is proposed to protect the property designated as a proposed public school and prevent any migration of LNAPL onto that property.

A monitoring program would be implemented for groundwater, LNAPL, and soil vapor. The groundwater monitoring program will be used to confirm that the impacts continue to be limited to the immediate proximity of the site. The LNAPL monitoring will document the anticipated reduction of the LNAPL extent and apparent thickness over time. Soil vapor monitoring will be used to assess the soil vapor conditions over time and serve as a trigger for implementing SVI mitigation measure should the need arise.

This alternative also employs site management, including institutional and engineering controls (IC/EC), to ensure the remedy continues to be protective and to ensure the safe reuse of the property where contamination will remain in place.

Present Worth: *$11,400,000*
Capital Cost: *$2,870,000*
Annual Costs: *$1,000,000*

Alternative 3: AS/SVE, Off-Site Barrier with LNAPL Extraction/Disposal, Targeted On-Site Source Removal and ISCO, Off-Site SSDS, Option for On-Site ISS, Groundwater/LNAPL Monitoring, and ICs/ECs

This alternative includes targeted excavation and off-site disposal of on-site soil impacted by LNAPL and in the VOC source area to a depth of approximately 10 feet below grade. The soil targeted for excavation under this alternative consists of LNAPL-statured soil that is present in proximity to the USTs and piping/trench systems, and the VOC-impacted soil above the water table in the northeast corner of the site.

This alternative includes two options for addressing on-site LNAPL below the excavation depth, as follows:

Option 1 - On-site LNAPL extraction using either high viscosity product pumps or belt skimmers to reduce LNAPL mass in the on-site plume.

Option 2 – On-site in-situ stabilization (ISS) of LNAPL in lieu of on-site recovery to treat LNAPL identified between 10 and 18 feet below grade. Details of the ISS would be defined under the remedial design prior to implementation.

This alternative also calls for the installation of an AS/SVE system to address the VOC-impacted soil (below the water table) and groundwater identified on the northeastern portion of the site and in the downgradient vicinity of the site. It also includes enhanced treatment for VOC-impacted soil and groundwater by application of in-situ chemical oxidants (ISCO) to the exposed soil/groundwater surface in the open excavation prior to backfilling. Selection and design of the ISCO treatment would be made during the remedial design process.

Off-site LNAPL extraction would be accomplished using either high viscosity product pumps or belt skimmers to reduce LNAPL mass off-site under Franklin Street. The installation of the off-site groundwater cutoff wall is proposed to protect the property designated as a proposed public school and prevent any migration of LNAPL onto that property. Sub-slab depressurization (SSD) systems and/or vapor barriers would be installed to mitigate soil vapor intrusion (SVI) for the off-site buildings on the north side of Clay Street (48 Commercial Street, 15 and 19 Clay Street, assuming access is granted by owners) and adjoining NuHart facility building to the east in proximity to the area where TCE-impacted soil vapor had been identified and potential for SVI had been documented.

A monitoring program will be implemented for groundwater, LNAPL, and soil vapor. The groundwater monitoring program will be used to confirm that the impacts continue to be limited to the immediate proximity of the site. The LNAPL monitoring will document the anticipated reduction of the LNAPL extent and apparent thickness over time. The soil vapor monitoring will be used to assess the soil vapor conditions over time and to assess whether the SVI mitigation measure are effective.

This alternative also employs site management, including institutional and engineering controls (IC/EC), to ensure the remedy continue to be protective and to ensure the safe reuse of the property where contamination will remain in place.

Present Worth (with ISS Option): *$24,300,000*
Capital Cost (with ISS Option): *$4,330,000*
Annual Costs (with ISS Option): *$1380,000*

Present Worth: *$15,100,000*

Capital Cost: *$4,330,000*
Annual Costs: *$1,380,000*

Alternative 4: AS/SVE, On-Site and Off-Site Barrier, On-Site Soil and LNAPL Excavation, Off-Site LNAPL Recovery, Vapor Mitigation, and ICs/ECs

This alternative will include full excavation of on-site LNAPL and VOC-impacted soil. This will be accomplished by excavation and off-site disposal of soil to a depth of approximately 16 feet below the site building floor. The soil targeted under this alternative consists of the majority of the Class 2 site. As part of the support for the on-site excavation, shoring will be installed around the entire perimeter of the excavation area. It is anticipated that the shoring to the south, north and west would remain in place following the completion of excavation to prevent LNAPL that may remain outside of the excavation from re-entering the remediated area. AS/SVE will be used to address the remaining dissolved VOCs and VOC-impacted soil.

Off-site LNAPL extraction would be accomplished using either high viscosity product pumps or belt skimmers to reduce LNAPL mass off-site under Franklin Street. The installation of the off-site groundwater cutoff wall is proposed to protect the property designated as a proposed public school and prevent any migration of LNAPL onto that property. Sub-slab depressurization (SSD) systems and/or vapor barriers would be installed to mitigate soil vapor intrusion (SVI) for the off-site buildings on the north side of Clay Street (48 Commercial Street, 15 and 19 Clay Street, assuming access is granted by owners) and adjoining NuHart facility building to the east in proximity to the area where TCE-impacted soil vapor had been identified and potential for SVI had been documented.

A monitoring program will be implemented for groundwater, LNAPL, and soil vapor. The groundwater monitoring program will be used to confirm that the remedy is effective. The LNAPL monitoring will document the anticipated reduction of the off-site LNAPL extent and apparent thickness over time. The soil vapor monitoring will be used to assess the soil vapor conditions over time and to assess whether the SVI mitigation measure are effective.

This alternative also employs site management, including institutional and engineering controls (IC/EC), to ensure the remedy continues to be protective and to ensure the safe reuse of the property where contamination will remain in place.

Present Worth: *$30,700,000*
Capital Cost: *$20,300,000*
Annual Costs: *$1,380,000*

Alternative 5: AS/SVE, Off-Site Barrier, On-Site Barrier, In-Situ Thermal Treatment with LNAPL Recovery, Targeted On-Site Source Removal, Vapor Mitigation and ICs/ECs

This alternative will consist of off-site LNAPL extraction using either high viscosity product pumps or belt skimmers to reduce LNAPL mass off-site under Franklin Street. Targeted excavation and off-site disposal of on-site soil impacted by LNAPL and VOCs would be conducted to a depth of approximately 10 feet below grade. The soil targeted under this alternative consists of LNAPL-saturated soil that is present in proximity to the USTs and piping trench systems formerly used to store and convey phthalates and lubricating oil during the former

manufacturing process, and the VOC-impacted soil (above the water table) in the northeast corner of the site. In addition, a groundwater cutoff wall is proposed to protect the property designated as a proposed public school and prevent any migration of the LNAPL onto that property.

On-site LNAPL will be addressed through thermal conductive heating (TCH) to enhance LNAPL recovery. The removal of on-site LNAPL will reduce any potential subsequent migration of LNAPL mass off-site. In addition, a groundwater cutoff wall will be installed on the site around the LNAPL mass to further reduce the potential for off-site migration and aid the TCH enhanced recovery efforts. The TCH may also address a portion of the dissolved VOC plume where it overlaps the LNAPL footprint. AS/SVE will be used to address the remaining VOCs in soil and groundwater.

Off-site LNAPL extraction would be accomplished using either high viscosity product pumps or belt skimmers to reduce LNAPL mass off-site under Franklin Street. The installation of the off-site groundwater cutoff wall is proposed to protect the property designated as a proposed public school and prevent any migration of LNAPL onto that property. Sub-slab depressurization (SSD) systems and/or vapor barriers would be installed to mitigate soil vapor intrusion (SVI) for the off-site buildings on the north side of Clay Street (48 Commercial Street, 15 and 19 Clay Street, assuming access is granted by owners) and adjoining NuHart facility building to the east in proximity to the area where TCE-impacted soil vapor had been identified and potential for SVI had been documented.

A monitoring program will be implemented for groundwater, LNAPL, and soil vapor. The groundwater monitoring program will be used to confirm that the remedy is effective. The LNAPL monitoring will document the anticipated reduction of the off-site LNAPL extent and apparent thickness over time. The soil vapor monitoring will be used to assess the soil vapor conditions over time and to assess whether the SVI mitigation measure are effective.

This alternative also employs site management, including institutional and engineering controls (IC/EC), to ensure the remedy continue to be protective and to ensure the safe reuse of the property where contamination will remain in place.

Present Worth: *$18,600,000*
Capital Cost: *$8,250,000*
Annual Costs: *$1,340,000*

Exhibit C

Remedial Alternative Costs

Remedial Alternative	Capital Cost ($)	Annual Costs ($)	Total Present Worth ($)
1. **No Action**	0	0	0
2. **AS/SVE, Off-Site Barrier, LNAPL Extraction/Disposal, Limited On-Site Source Removal, Groundwater/LNAPL Monitoring, Soil Vapor/SVI Monitoring, and ECs/ICs**	$2,870,000	$1,000,000	$11,400,000
3. **AS/SVE, Off-Site Barrier with LNAPL Extraction/Disposal, Targeted On-Site Source Removal and ISCO, Off-Site SSDS, Option for On-Site ISS, Groundwater/ LNAPL Monitoring, and ICs/ECs**	$4,330,000	$1,380,000	$15,100,000 ($24,300,00)
4. **AS/SVE, On-Site and Off-Site Barrier, On-Site Soil and LNAPL Excavation, Off-Site LNAPL Recovery, Vapor Mitigation, and ICs/ECs**	$20,300,000	$1,380,000	$30,700,000
5. **AS/SVE, Off-Site Barrier, On-Site Barrier, In-Situ Thermal Treatment with LNAPL Recovery, Targeted On-Site Source Removal, Vapor Mitigation and ICs/ECs**	$8,250,000	$1,340,000	$18,600,000

Exhibit D

SUMMARY OF THE PROPOSED REMEDY

The Department is proposing Alternative 4, **AS/SVE, On-Site and Off-Site Barrier, On-Site Soil and LNAPL Excavation, Off-Site LNAPL Recovery, Off-Site SSDS, and ICs/ECs** as the remedy for this site. Alternative 4 would achieve the remediation goals for the site by using multiple technologies to remove the contamination from the soil and groundwater, preventing off-site NAPL migration, destroying the contamination in the groundwater, monitoring the soil vapor and groundwater to ensure the concentration of the contaminants continues to decrease, and managing remaining contamination and associated human exposures. The elements of this remedy are described in Section 7. The proposed remedy is depicted in Figures 6 through 10.

Basis for Selection

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

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

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

Alternative 1 does not provide any protection to public health and the environment and will not be evaluated further.

Alternatives 2, 3, and 5 comply with this criterion but to a lesser degree or with lower certainty, specifically as it relates to the time-frame to achieve the remedial action objectives.

The proposed remedy Alternative 4 will satisfy this criterion by removing the on-site contaminated soils, removing on-site and off-site LNAPL, treating any on-site groundwater contamination, thereby preventing the further migration of the groundwater plume, capturing soil vapor, and managing remaining contamination to prevent human exposures. The on-site and off-site physical barrier will prevent further migration of the LNAPL plume both on and off-site. This alternative, once fully completed, is more protective than Alternatives 1, 2, 3 and 5.

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

Alternatives 2 and 3 would achieve the SCGs on-site and off-site to the extent practicable, but over a longer time frame. Alternatives 2 and 3 would include on-site excavation only to a limited depth or in targeted areas, and would rely on longer-term remedial elements to address the remaining on-site source areas. Alternative 4 complies with SCGs on-site, and to the extent practicable off-site. For the on-site source, Alternative 4 will achieve compliance by fully excavating the on-site LNAPL and VOC contaminated source areas. Alternative 5 may

achieve the SCGs; however, this alternative includes the use of technology that is relatively new, and is unproven for use in treating phthalates.

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

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

Alternatives 2 through 5 all provide adequate long-term effectiveness but at varied timeframes, and all require engineering controls and institutional controls to achieve long-term permanence. Long-term effectiveness is best accomplished by Alternative 4, which provides the most significant reduction the volume of the LNAPL source and VOC impacted soil contamination, which would in turn reduce both the potential for soil vapor intrusion and off-site migration of the VOC plume. Alternative 5 would use heat to enhance the LNAPL recovery for the on-site LNAPL, which can help in speed up the on-site LNAPL recovery process. Alternative 2 and 3 will be the least effective at quickly reducing the on-site source area LNAPL contamination.

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

Alternative 4 will quickly and permanently remove on-site LNAPL contamination and provide a reduction in toxicity, mobility and volume. The removal of the source area contamination will also significantly limit the continued source area contribution to the off-site plume and reduce the potential for VOC soil vapor intrusion. Alternatives 3, 4 and 5 will provide additional reduction in toxicity, mobility and volume by treating the off-site portion of the source area contamination. Alternative 2 and 3 will provide a much slower reduction in on-site LNAPL contaminant toxicity, mobility and volume as compared to the other alternatives.

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

All the alternatives would be expected to have some short-term impacts associated with their activities. Each alternative involves some degree of intrusive activities which may temporarily disrupt the surrounding residential community via noise, odor, and increased truck traffic. These impacts may be minimized with careful coordination with the municipality and surrounding landowners during remedial design. A community air monitoring plan (CAMP) and health and safety plan (HASP) would be required during remediation activities for each of the alternatives presented.

Alternatives 2 would be expected to have less short-term impacts than alternatives 3, 4and 5 due to the limited volume of soil that would be removed from the site. The time needed to achieve the remediation goals is the shortest for Alternative 4 and 5. Alternatives 2 and 3 will takes the longer to achieve the remediation goals.

6. Implementability. The technical and administrative feasibility of implementing each alternative are evaluated. Technical feasibility includes the difficulties associated with the construction of the remedy and the ability to monitor its effectiveness. For administrative feasibility, the availability of the necessary personnel and materials

is evaluated along with potential difficulties in obtaining specific operating approvals, access for construction, institutional controls, and so forth.

Alternatives 2, 3 and 4 are considered implementable from a technical standpoint, since they all use proven technologies for treating contamination. The on-site LNAPL and soil excavated under Alternative 4 would necessitate increased truck traffic on local roads for several months. Alternative 5 is also implementable, but the on-site thermal enhanced LNAPL recovery and ISCO injection to treat phthalates would require careful monitoring to assess its effectiveness. The results of the thermal treatability study indicate some uncertainty regarding the implementability of Alternative 5. Alternatives 2 through 5 all have similar off-site implementability by use of similar technologies (i.e., off-site barrier, AS/SVE, LNAPL extraction via recovery wells, SSDS) for treating groundwater, LNAPL, and soil vapor identified off-site

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

The relative costs of the alternatives vary significantly. Alternative 2 has the lowest cost, but the remedy does not account for off-site soil vapor mitigation. Alternative 4 is expected to be the most expensive but would provide the most effective remedy for on-site contaminant sources. The capital cost for Alternatives 2, 3 and 5 would be less than Alternative 4, but the annual maintenance cost for all of these alternatives is similar since the off-site remedy elements are similar. While Alternative 5 has a lower capital cost than Alternative 4, uncertainty about the effectiveness of the technology as indicated by the treatability study means the cost estimate may not be accurate wince this alternative may not be as effective.

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

The site is currently vacant; however, the anticipated future use of the site is commercial and residential.

It is expected that Alternatives 3 through 5 would each provide an acceptable level of cleanup for future site redevelopment. Alternatives 2, 3 and 5 are the least desirable because in addition to being the slowest remedial methods they would most likely leave on-site LNAPL source(s). Alternative 4 is the most desirable since it will permanently remove or treat the entire on-site source area in the shortest time. Alternatives 2 through 5 all require that remaining contamination be monitored and controlled with a site management plan, and institutional and engineering controls.

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

9. Community Acceptance. Concerns of the community regarding the investigation, the evaluation of alternatives, and the PRAP are evaluated. A responsiveness summary will be prepared that describes public comments received and the manner in which the Department will address the concerns raised.

Alternative 4 is being proposed because, as described above, it satisfies the threshold criteria and provides the best balance of the balancing criterion.

100 50 0 100

Feet

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Figure 1 - Site Boundary Map
Former NuHart Plastic Manufacturing
Site No. 224136

Legend

- Former NuHart Property Boundary
- Superfund Site Boundary

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Figure 2 - Areal Extent of LNAPL In Groundwater

Legend

- LNAPL Extent
- Superfund Site Boundary

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Figure 3 - TCE Groundwater Plume

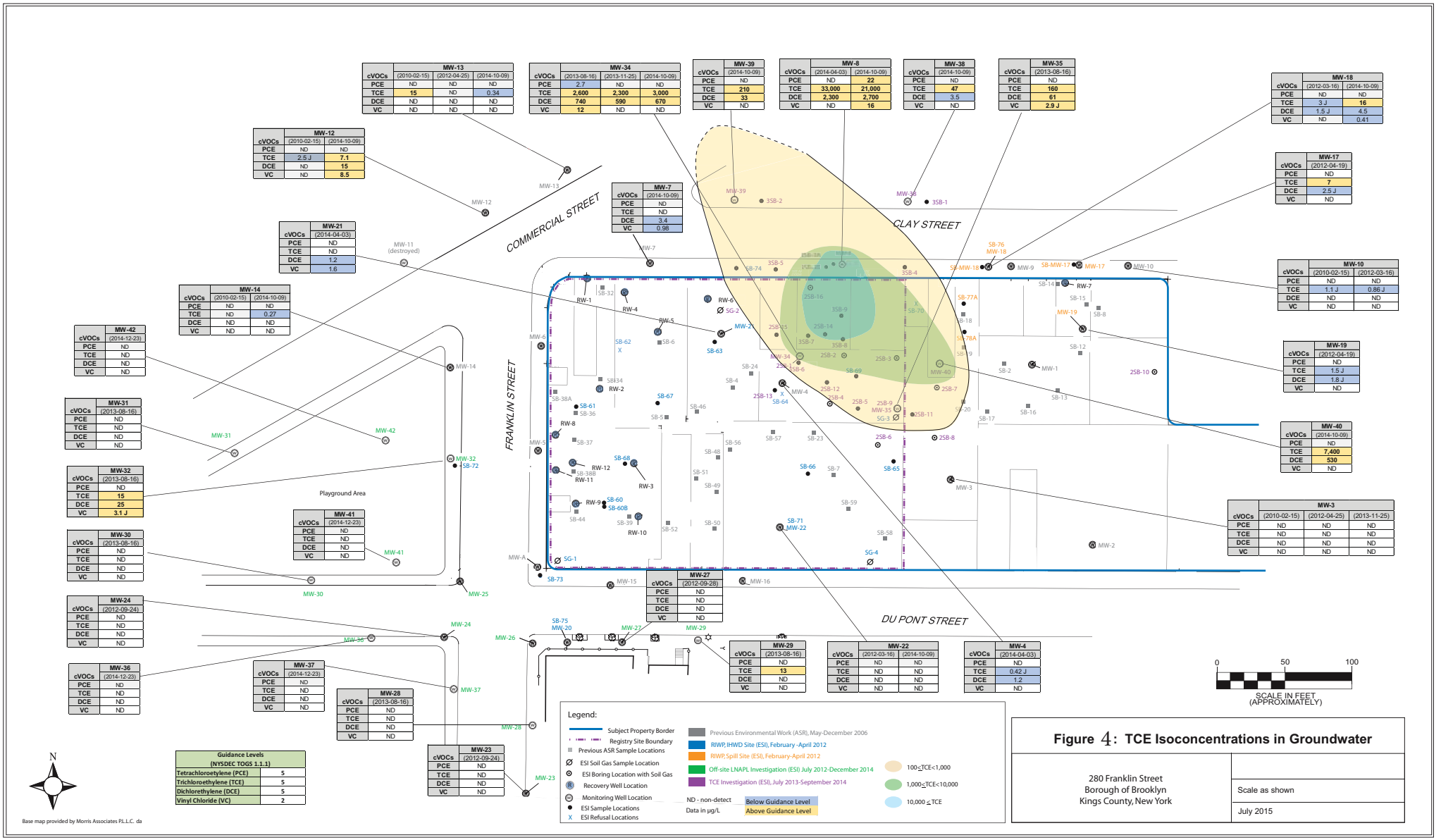

Figure 4: TCE Isoconcentrations in Groundwater

280 Franklin Street
Borough of Brooklyn
Kings County, New York

Scale as shown

July 2015

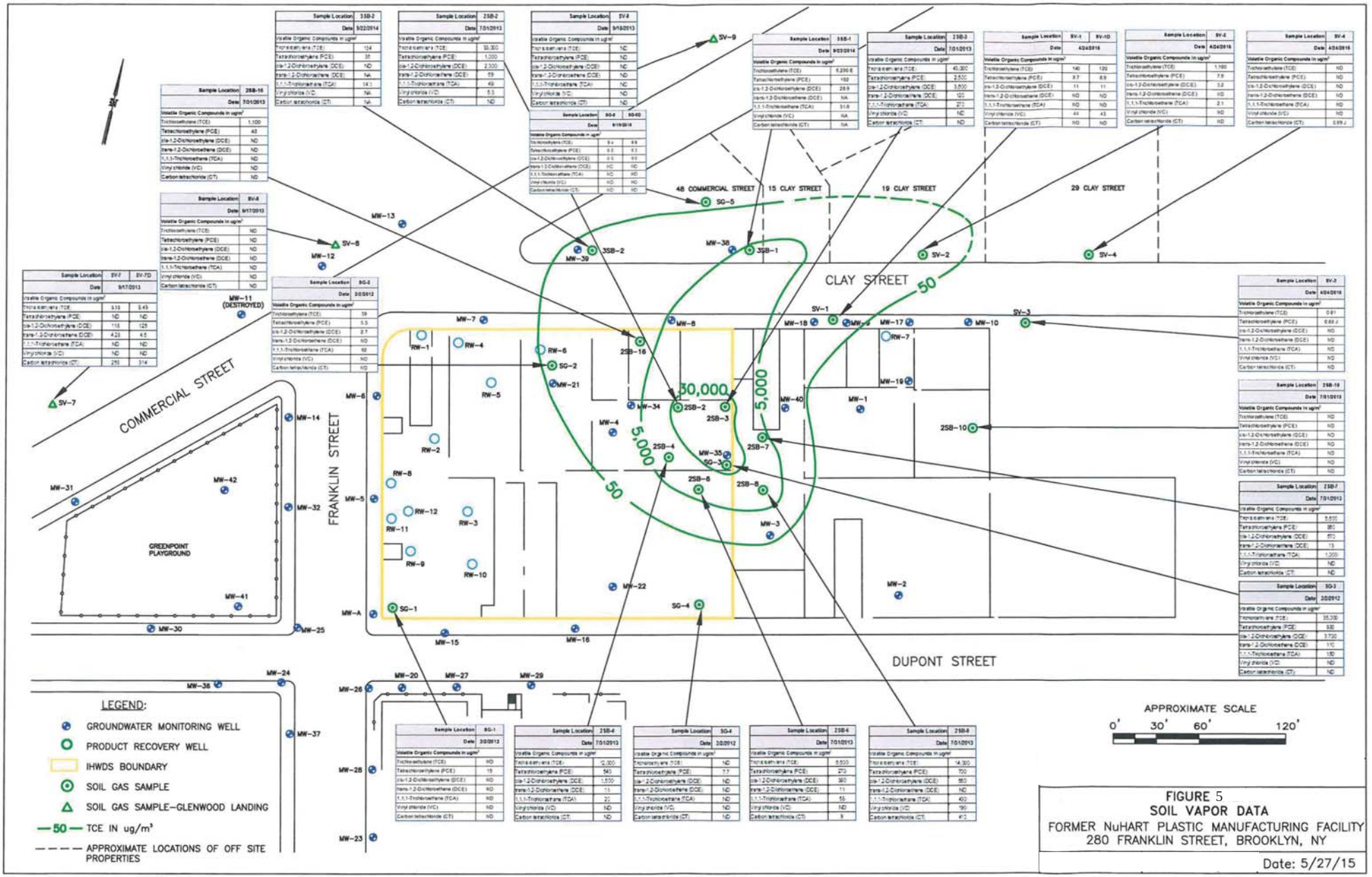

FIGURE 5
SOIL VAPOR DATA
FORMER NuHART PLASTIC MANUFACTURING FACILITY
280 FRANKLIN STREET, BROOKLYN, NY

Date: 5/27/15

80 40 0 80

Feet

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Figure 6 - On-Site Excavation Area

Legend

- LNAPL Extent
- Superfund Site Boundary
- Excavation Area

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Figure 7 - Physical Barriers/ Off-Site LNAPL Extraction Area

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Figure 8 - AS/SVE Treatment Area

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Figure 9 - Groundwater/LNAPL Monitoring Area

Legend

- GW and LNAPL Monitoring Area
- Superfund Site Boundary

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Figure 10 - Vapor Mitigation Area

Legend

- Vapor Mitigation Area
- Superfund Site Boundary