DECISION DOCUMENT

23-30 Borden Avenue Development
Brownfield Cleanup Program
Long Island City, Queens County
Site No. C241238
November 2021

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

DECLARATION STATEMENT - DECISION DOCUMENT

23-30 Borden Avenue Development
Brownfield Cleanup Program
Long Island City, Queens County
Site No. C241238
November 2021

Statement of Purpose and Basis

This document presents the remedy for the 23-30 Borden Avenue Development site a brownfield cleanup site. The remedial program was chosen in accordance with the 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 decision is based on the Administrative Record of the New York State Department of Environmental Conservation (the Department) for the 23-30 Borden Avenue Development site and the public's input to the proposed remedy presented by the Department.

Description of Selected Remedy

The elements of the selected 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;
- Integrating the remedy with the end use where possible and encouraging green and sustainable re-development; and
- Additionally, to incorporate green remediation principles and techniques to the extent

feasible in the future development at this site, any future on-site buildings will include, at a minimum, a 20-mil vapor barrier/waterproofing membrane on the foundation to improve energy efficiency as an element of construction.

2. Excavation
Excavation and off-site disposal of contaminant source areas, including:

- any underground storage tanks (USTs), fuel dispensers, underground piping or other structures associated with a source of contamination;
- grossly contaminated soil, as defined in 6 NYCRR Part 375-1.2(u);
- soil with visual waste material or non-aqueous phase liquid;
- soils which exceed the protection of groundwater soil cleanup objectives (PGWSCOs), as defined by 6 NYCRR Part 375-6.8 for those contaminants found in site groundwater above standards; and
- soils that create a nuisance condition, as defined in Commissioner Policy CP-51 Section G.

Approximately 420 cubic yards of contaminated soil will be removed from the site. The areas targeted for soil removal are depicted in Figure 2.

3. Backfill
Clean fill meeting the requirements of 6 NYCRR Part 375-6.7(d) will be brought in to replace the excavated soil and establish the designed grades at the site. On-site soil which does not exceed the excavation criteria may be used to backfill the excavation to establish the designed grades at the site below the cover system described in remedy element 4.

4. Site Cover
A site cover will be required to allow for commercial use of the site in areas where the upper one foot 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 one foot 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.

5. Groundwater Treatment
In-situ chemical reduction (ISCR) with enhanced biodegradation will be implemented to treat chlorinated volatile organic compounds (CVCOs) in groundwater. A combination of Zero-valent iron (ZVI), emulsified vegetable oil (EVO), a bioaugmentation culture SDC-9, diammonium phosphate (DAP), and yeast extract will be injected into the subsurface to destroy the contaminants in two separate areas located in the southern portion of the site, as depicted on Figure 2, where CVOCs were elevated in the groundwater via direct push technology. The depth of injection will be determined during the remedial design If groundwater monitoring does not reveal sufficient reduction in groundwater contamination, additional chemical treatment agent

injections will be conducted. Monitoring will be conducted for contaminants of concern within the treatment zone.

Prior to the full implementation of this technology, a laboratory study will be conducted to more clearly define design parameters. Between the study and the full scale implementations, it is estimated that 48 injection points will be installed. It is estimated that the chemical treatment agent will be injected during one event.

Installation and operation of petroleum recovery wells in the south-central portion of the site to remove petroleum from the subsurface. The number, depth, type and spacing of the recovery wells will be determined during the design phase of the remedy. Petroleum will be collected periodically from each well; however, if wells are determined by the Department to accumulate large quantities of petroleum over extended time periods, they can be converted to automated collection.

In addition to the work above PFAS compounds in groundwater will be monitored during the site management phase.

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

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

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

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

Institutional Controls: The Environmental Easement discussed in Paragraph 6 above.

Engineering Controls: The Cover System discussed in Paragraph 4 above.

This plan includes, but may not be limited to:

a) 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 any occupied buildings on the site, 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 4 above will be placed in any areas where the upper two feet 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 groundwater to assess the performance and effectiveness of the remedy;
- a schedule of monitoring and frequency of submittals to the Department; and
- monitoring for vapor intrusion for any buildings developed on the site, as may be required by the Institutional and Engineering Control Plan discussed above.

Declaration

The remedy conforms with promulgated standards and criteria that are directly applicable, or that are relevant and appropriate and takes into consideration Department guidance, as appropriate. The remedy is protective of public health and the environment.

November 09, 2021

Date

Gerard Burke, Director
Remedial Bureau B

DECISION DOCUMENT

23-30 Borden Avenue Development
Long Island City, Queens County
Site No. C241238
November 2021

SECTION 1: SUMMARY AND PURPOSE

The New York State Department of Environmental Conservation (the Department), in consultation with the New York State Department of Health (NYSDOH), has selected a remedy for the above referenced site. The disposal of contaminants at the site has resulted in threats to public health and the environment that would be addressed by the remedy. The disposal or release of contaminants at this site, as more fully described in this document, has contaminated various environmental media. Contaminants include hazardous waste and/or petroleum.

The New York State Brownfield Cleanup Program (BCP) is a voluntary program. The goal of the BCP is to enhance private-sector cleanups of brownfields and to reduce development pressure on "greenfields." A brownfield site is real property, where a contaminant is present at levels exceeding the soil cleanup objectives or other health-based or environmental standards, criteria or guidance, based on the reasonably anticipated use of the property.

The Department has issued this document in accordance with the requirements of New York State Environmental Conservation Law and 6 NYCRR Part 375. This document is a summary of the information that can be found in the site-related reports and documents.

SECTION 2: CITIZEN PARTICIPATION

The Department seeks input from the community on all remedies. A public comment period was held, during which the public was encouraged to submit comment on the proposed remedy. All comments on the remedy received during the comment period were considered by the Department in selecting a remedy for the site. Site-related reports and documents were made available for review by the public at the following document repositories:

DECInfo Locator - Web Application
https://gisservices.dec.ny.gov/gis/dil/index.html?rs=C241238

Queens Library at Court Square
25-01 Jackson Avenue
Queens, NY 11101
Phone: (718) 937-2790

Queens Community Board 2
43-22 50th Street, Room 2B
Queens, NY 11377
Phone: (718) 533-8773

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 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 23-30 Borden Avenue in Long Island City, Queens, NY, and is identified as Block 68 and Lot 38 on the New York City Tax Map.

Site Features:
The site consists of approximately 4.67 acres. The site previously contained a two-story warehouse building with one mezzanine level, and an asphalt paved parking lot, located between Borden Avenue and the central setback portion of the site building. The building was demolished between 2020 and 2021. Since that time, the site has remained vacant. The proposed site redevelopment will include six-story building with loading docks, structured parking landing and storage. The building will include warehouse space on the first through third floors and multipurpose light industrial spaces production studio space and maker space on the fourth and fifth floors; the sixth floor will consist of rooftop parking.

Current Zoning and Land Use:
The site is located in a M3-2 manufacturing district. The site is within the Long Island City Industrial Business Zone. The property is designated for warehouse use (E1). The adjoining parcels and surrounding area are used for industrial, public facilities and institutions, and transportation utility facilities.

Past Use of the Site:
Historical operations at the site include an LIRR switch yard between the years 1898 and 1950. Additionally, coal gas associated structures, including a gasometer, a purifier house and gas holders, were identified on the northern portion of the site between the years 1898 and 1928. The site has been used for warehouse purposes since 1970.

Site Geology and Hydrogeology:
The subsurface strata beneath the site consists of historic fill generally consisting of fine to

coarse sand with varying amounts of gravel, silt, clay, brick, concrete, asphalt, wood fragments, and miscellaneous debris to depths that ranged from depths of approximately 5.5 to 16-feet below ground surface (bgs). The fill layer is underlain by either a native sand or clay layer. The clay layer was observed to continue to 34-feet bgs in some borings. In borings where sand was encountered beneath the fill material, it was observed to continue to the soil boring termination depth. Bedrock was encountered at depths that ranged from 30 to 34-feet bgs. Groundwater was encountered at depths ranging from about 6.5 to 10.5-feet bgs. Based on the proximity of the site to the Newtown Creek, groundwater is inferred to flow to the south-southwest towards Newtown Creek.

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 commercial use (which allows for industrial use) as described in Part 375-1.8(g) were/was evaluated in addition to an alternative which would allow for unrestricted use of the site.

A comparison of the results of the Remedial Investigation (RI) to the appropriate standards, criteria and guidance values (SCGs) for the identified land use and the unrestricted use SCGs for the site contaminants is available in the RI Report.

SECTION 5: ENFORCEMENT STATUS

The Applicant(s) under the Brownfield Cleanup Agreement is a/are Volunteer(s). The Volunteer(s) does/do not have an obligation to address off-site contamination. The Department has determined that this site poses a significant threat to human health and the environment and there are off-site impacts that require remedial activities; accordingly, enforcement actions are necessary.

The Department will seek to identify any parties (other than the Volunteer) known or suspected to be responsible for contamination at or emanating from the site, referred to as Potentially Responsible Parties (PRPs). The Department will bring an enforcement action against the PRPs. If an enforcement action cannot be brought, or does not result in the initiation of a remedial program by any PRPs, the Department will evaluate the off-site contamination for action under the State Superfund. The PRPs are subject to legal actions by the State for recovery of all response costs the State incurs or has incurred.

SECTION 6: SITE CONTAMINATION

6.1: Summary of the Remedial Investigation

A remedial investigation (RI) serves as the mechanism for collecting data to:

- characterize site conditions;
- determine the nature of the contamination; and
- assess risk to human health and the environment.

The RI is intended to identify the nature (or type) of contamination which may be present at a site and the extent of that contamination in the environment on the site, or leaving the site. The RI reports on data gathered to determine if the soil, groundwater, soil vapor, indoor air, surface water or sediments may have been contaminated. Monitoring wells are installed to assess groundwater and soil borings or test pits are installed to sample soil and/or waste(s) identified. If other natural resources are present, such as surface water bodies or wetlands, the water and sediment may be sampled as well. Based on the presence of contaminants in soil and groundwater, soil vapor will also be sampled for the presence of contamination. Data collected in the RI influence the development of remedial alternatives. The RI report is available for review in the site document repository and the results are summarized in section 6.3.

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. For a full listing of all SCGs see: http://www.dec.ny.gov/regulations/61794.html

6.1.2: RI Results

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

polycyclic aromatic hydrocarbons (PAHS), total	zinc
nickel	1,1,1-Trichloroethane(TCA)
lead	1,2,4-trimethylbenzene
	cis-1,2-dichloroethene

tetrachloroethene (PCE)	benzene, toluene, ethylbenzene and xylenes
trichloroethene (TCE)	(BTEX)
vinyl chloride	petroleum products

The contaminant(s) of concern exceed the applicable SCGs for:

- groundwater
- soil

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 Decision Document.

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

Slab & Foundation Removal, and Surface Stabilization

IRM activities completed to date include concrete building slab removal, testing of existing timber piles, installation and testing of index piles, exploratory test pits, installation of support -of-excavation systems, and crushed concrete placement as a temporary stabilization measure.

The results of the IRM will be documented in the Final Engineering Report.

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. The RI report presents a detailed discussion of any existing and potential impacts from the site to fish and wildlife receptors.

Nature and Extent of Contamination:
Soil and groundwater were analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), metals, polychlorinated biphenyls (PCBs), pesticides, and per- and polyfluoroalkyl substances (PFAS). Soil vapor was analyzed for VOCs. The primary contaminants of concern at the site include metals, SVOCs and VOCs in the soil, groundwater and/or soil vapor.

Soil:
Data results from soils sampling reported several metals, petroleum VOCs, and SVOCs (primarily polycyclic aromatic hydrocarbon, or PAHs). The PAHs and most metals contamination in soils are likely related to the presence of historic fill or historical operations at the site. Petroleum-related VOCs are attributed to historical operations at the site. Maximum detections in comparison to applicable protection of groundwater or commercial use soil cleanup

objectives (PGSCO/CSCO) are as follows: lead at 3,810 parts per million (ppm) compared to the CSCO of 1,000 ppm, benzo(a)anthracene at 171 ppm (CSCO of 5.6 ppm), benzo(a)pyrene at 226 ppm (CSCO of 1 ppm), benzo(b)fluoranthene at 66.5 ppm (CSCO of 5.6 ppm), benzo(k)fluoranthene at 82.8 ppm (CSCO of 56 ppm), chrysene at 152 ppm (CSCO of 56 ppm), 1,2,4-trimethylbenzene at 170 ppm (PGSCO of 3.6 ppm, CSCO of 190 ppm), benzene at 11 ppm (PGSCO of 0.06 ppm, CSCO of 44 ppm), ethylbenzene at 1,300 ppm (PGSCO of 1.0 ppm, CSCO of 390 ppm), o-xylene at 210 ppm (PGSCO of 1.6 ppm, CSCO of 500 ppm), and toluene at 10 ppm (PGSCO of 0.7 ppm, CSCO of 500 ppm).

PFAS were detected in one of thirty-five soil samples analyzed for the compounds, with perfluorooctane sulfonic acid (PFOS) detected at 6.6 parts per billion (ppb), which is below the commercial use guidance value of 440 ppb and above the protection of groundwater guidance value of 3.7 ppb.

Data does not indicate any off-site impacts in soil related to this site.

Groundwater:
Groundwater sampling found metals, VOCs, SVOCs (PAHs) contamination above Class GA Ambient Water Quality Standards (AWQS). Some metals were found at relatively low levels in groundwater and are likely related to the presence of historic fill. Maximum detections are as follows: 1,1,1-trichloroethane 82.7 ppb (AWQS is 5 ppb), tetrachloroethene (PCE) at 12.3 ppb (AWQS is 5 ppb), trichloroethene (TCE) at 13.9 ppb (AWQS is 5 ppb), vinyl chloride at 524 ppb (AWQS is 2 ppb), cis-1,2-dichloroethylene at 318 ppb (AWQS is 5 ppb), 1,2,4-trimethylbenzene at 95.8 ppb (AWQS is 5 ppb), benzene at 308 ppb (AWQS is 1 ppb), ethylbenzene at 1,370 ppb (AWQS is 5 ppb), o-xylene at 254 ppb (AWQS is 5 ppb), and toluene at 17 ppb (AWQS is 5 ppb).

PFOS and perfluorooctanoic acid (PFOA) were reported at concentrations of up to 313 and 552 parts per trillion (ppt), respectively, exceeding the Maximum Contaminant Level (drinking water standard, or MCL) of 10 ppt for each. 1,4-dioxane was reported at concentrations up to 6.2 ppb (MCL of 1 ppb). Based on the soil data, there is no apparent on-site source for 1,4-Dioxane in site groundwater.

Petroleum impacts including observations of non-aqueous phase liquids (NAPL) were predominantly encountered in native material in the northwestern portion of the site and the southern central portion of the site.

Additional sampling is needed to determine is there any off-site impacts in groundwater-related to this site.

Soil Vapor:
VOCs were detected in soil vapor during the remedial investigation. The maximum concentrations of 1,1,1-trichloroethane, tetrachloroethene, trichloroethene and carbon tetrachloride in soil vapor were detected primarily in the south-central portion of the site at the respective concentrations of 8,500 micrograms per cubic meter (ug/m3), 4,800 ug/m3, 1,200 ug/m3 and 60 ug/m3.

Data indicated there is potential for off-site migration of VOCs in soil vapor. Additional sampling is needed to determine whether actions are needed to address soil vapor intrusion off-site.

6.4: Summary of Human Exposure Pathways

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

Access is restricted by a fence. People who enter the site may come into contact with site-related soil and groundwater contamination if they dig below the surface. 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 soil vapor (air spaces within the soil) may move into structures 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 structures, is referred to as soil vapor intrusion. Because there is no on-site structure, inhalation of site contaminants in indoor air due to soil vapor intrusion does not represent a concern for the site in its current condition. Environmental sampling indicates that soil vapor intrusion may present a concern for off-site structures.

6.5: Summary of the Remediation Objectives

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

The remedial action objectives for this site are:

Groundwater

RAOs for Public Health Protection

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

RAOs for Environmental Protection

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

Soil

RAOs for Public Health Protection

- Prevent ingestion/direct contact with contaminated soil.

- Prevent inhalation of or exposure from contaminants volatilizing from
- contaminants in soil.

RAOs for Environmental Protection

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

Soil Vapor

RAOs for Public Health Protection

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

SECTION 7: ELEMENTS OF THE SELECTED REMEDY

The alternatives developed for the site and the evaluation of the remedial criteria are presented in the Alternative Analysis. The remedy is selected pursuant to the remedy selection criteria set forth in DER-10, Technical Guidance for Site Investigation and Remediation and 6 NYCRR Part 375.

The selected remedy is a Track 4: Restricted use with site-specific soil cleanup objectives remedy.

The selected remedy is referred to as the Excavation and In-situ Chemical Treatment remedy.

The elements of the selected remedy, as shown in Figure 2, 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;
- Integrating the remedy with the end use where possible and encouraging green and sustainable re-development; and
- Additionally, to incorporate green remediation principles and techniques to the extent feasible in the future development at this site, any future on-site buildings will

include, at a minimum, a 20-mil vapor barrier/waterproofing membrane on the foundation to improve energy efficiency as an element of construction.

2. Excavation
Excavation and off-site disposal of contaminant source areas, including:

- any underground storage tanks (USTs), fuel dispensers, underground piping or other structures associated with a source of contamination;
- grossly contaminated soil, as defined in 6 NYCRR Part 375-1.2(u);
- soil with visual waste material or non-aqueous phase liquid;
- soils which exceed the protection of groundwater soil cleanup objectives (PGWSCOs), as defined by 6 NYCRR Part 375-6.8 for those contaminants found in site groundwater above standards; and
- soils that create a nuisance condition, as defined in Commissioner Policy CP-51 Section G.

Approximately 420 cubic yards of contaminated soil will be removed from the site. The areas targeted for soil removal are depicted in Figure 2.

3. Backfill
Clean fill meeting the requirements of 6 NYCRR Part 375-6.7(d) will be brought in to replace the excavated soil and establish the designed grades at the site. On-site soil which does not exceed the excavation criteria may be used to backfill the excavation to establish the designed grades at the site below the cover system described in remedy element 4.

4. Site Cover
A site cover will be required to allow for commercial use of the site in areas where the upper one foot 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 one foot 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.

5. Groundwater Treatment
In-situ chemical reduction (ISCR) with enhanced biodegradation will be implemented to treat chlorinated volatile organic compounds (CVCOs) in groundwater. A combination of Zero-valent iron (ZVI), emulsified vegetable oil (EVO), a bioaugmentation culture SDC-9, diammonium phosphate (DAP), and yeast extract will be injected into the subsurface to destroy the contaminants in two separate areas located in the southern portion of the site, as depicted on Figure 2, where CVOCs were elevated in the groundwater via direct push technology. The depth of injection will be determined during the remedial design If groundwater monitoring does not reveal sufficient reduction in groundwater contamination, additional chemical treatment agent

injections will be conducted. Monitoring will be conducted for contaminants of concern within the treatment zone.

Prior to the full implementation of this technology, a laboratory study will be conducted to more clearly define design parameters. Between the study and the full scale implementations, it is estimated that 48 injection points will be installed. It is estimated that the chemical treatment agent will be injected during one event.

Installation and operation of petroleum recovery wells in the south-central portion of the site to remove petroleum from the subsurface. The number, depth, type and spacing of the recovery wells will be determined during the design phase of the remedy. Petroleum will be collected periodically from each well; however, if wells are determined by the Department to accumulate large quantities of petroleum over extended time periods, they can be converted to automated collection.

In addition to the work above PFAS compounds in groundwater will be monitored during the site management phase.

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

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

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

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

Institutional Controls: The Environmental Easement discussed in Paragraph 6 above.

Engineering Controls: The Cover System discussed in Paragraph 4 above.

This plan includes, but may not be limited to:

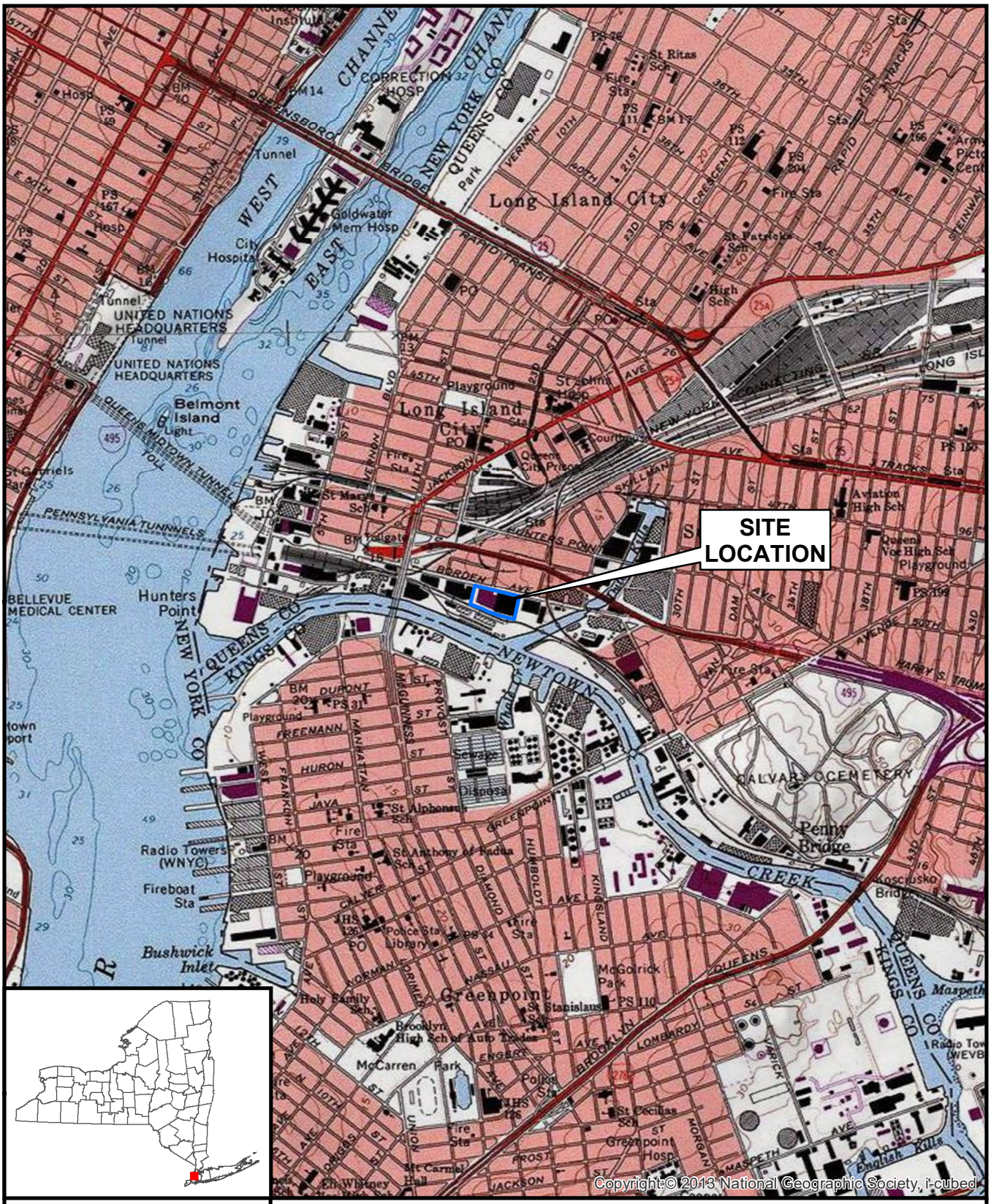
a) An Excavation Plan which details the provisions for management of future excavations in areas of remaining contamination;

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 any occupied buildings on the site, 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 4 above will be placed in any areas where the upper two feet 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 groundwater to assess the performance and effectiveness of the remedy;
- a schedule of monitoring and frequency of submittals to the Department; and
- monitoring for vapor intrusion for any buildings developed on the site, as may be required by the Institutional and Engineering Control Plan discussed above.



N
W E
S

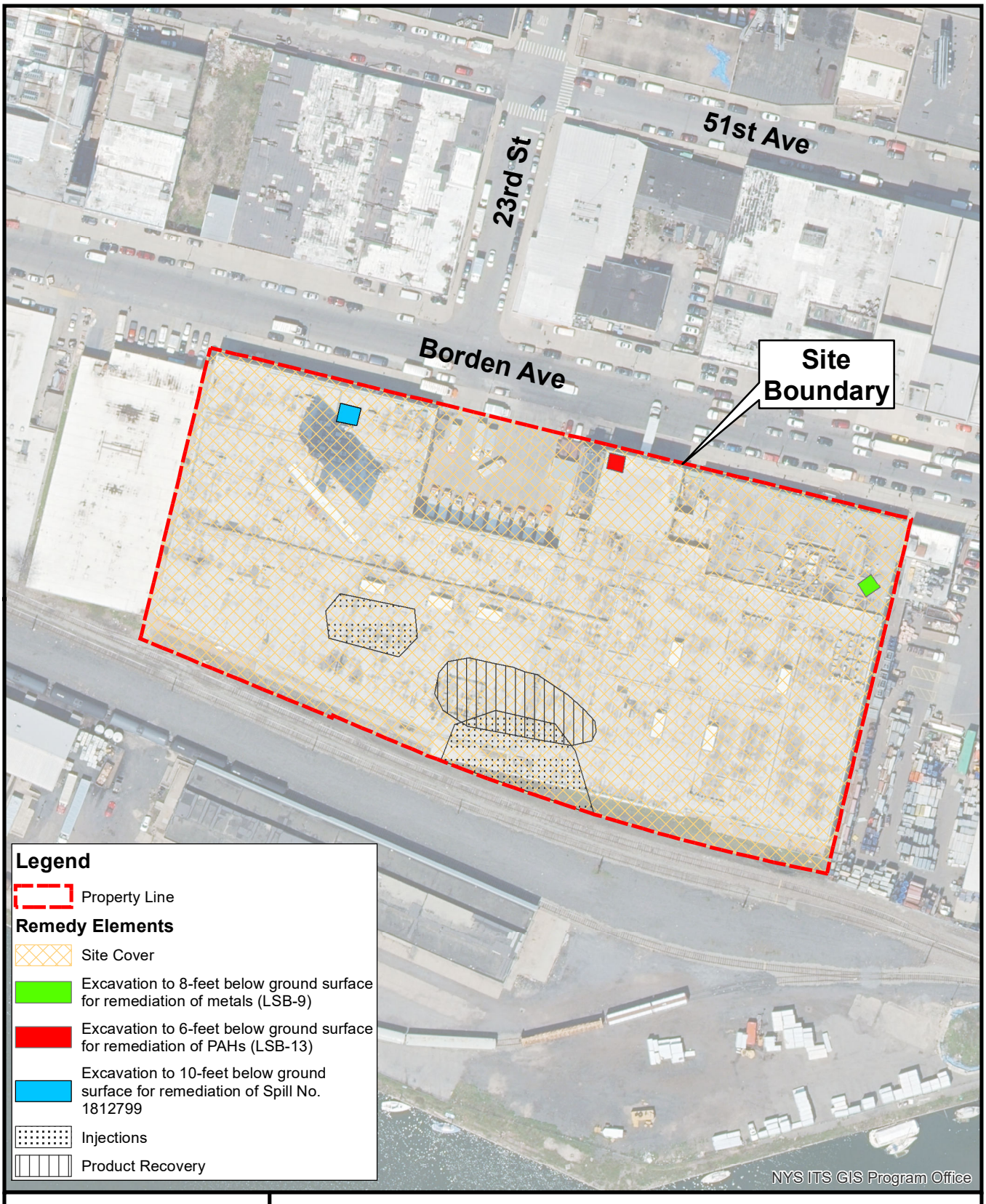
0 1,000 2,000
Feet

Figure 1

Site Location Map

23-30 Borden Avenue
Developement
Long Island City, Queens County
Site No. C241238

NEW YORK STATE OF OPPORTUNITY
Department of Environmental Conservation



N
W E
S

0 50 100
Feet

Figure 2
Conceptual Remedy

23-30 Borden Avenue Development
Long Island City, Queens County
Site No. C241238

NEW YORK STATE OF OPPORTUNITY
Department of Environmental Conservation