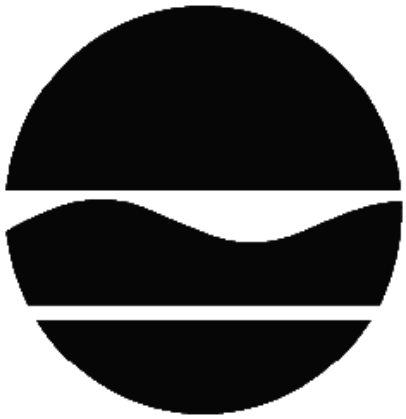
DECISION DOCUMENT

1199 Sutter Avenue
Brownfield Cleanup Program
Brooklyn, Kings County
Site No. C224141
November 2018



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

DECLARATION STATEMENT - DECISION DOCUMENT

1199 Sutter Avenue
Brownfield Cleanup Program
Brooklyn, Kings County
Site No. C224141
November 2018

Statement of Purpose and Basis

This document presents the remedy for the 1199 Sutter Avenue 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 1199 Sutter Avenue 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; and
- Integrating the remedy with the end use where possible and encouraging green and sustainable re-development.

2. Cover System
A site cover currently exists and will be maintained to allow for restricted residential use of the site. Any site redevelopment will maintain the existing site cover, which consists either of the structures such as buildings, pavement, sidewalks or soil where the upper two feet of exposed surface soil meets the applicable soil cleanup objectives (SCOs) for restricted residential use. Any fill material brought to the site will meet the requirements for the identified site use as set forth in 6NYCRR part 375-6.7(d).

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

4. Air Sparge with Soil Vapor Extraction (SVE)
Air sparging will be implemented to address the groundwater plume contaminated by volatile organic compounds (VOCs). 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.

At this site it is estimated three air injection wells will be installed in the area of the site to be treated: in the basement of the laundromat, in the sidewalk in front of the laundromat, and immediately behind the laundromat in the parking lot to a depth of approximately 20 feet below grade, which is approximately eight feet below the water table. To capture the volatilized contaminants, two SVE wells will be installed in the vadose zone at a depth of approximately four feet below ground surface. The sub-slab depressurization system will continue to operate along with the SVE to prevent vapor infiltration into the building. The air containing VOCs extracted from the SVE wells will be treated as necessary by passing the air stream through activated carbon which removes the VOCs from the air prior to it being discharged to the atmosphere.

5. Monitored Natural Attenuation
Off-site groundwater contamination (remaining after active remediation) will be addressed with monitored natural attenuation (MNA). Groundwater will be monitored for site related contamination and also for MNA indicators which will provide an understanding of the (biological activity) breaking down the contamination. It is anticipated that contamination will decrease by an order of magnitude in a reasonable period of time. Reports of the attenuation will be provided in the periodic review reports as per the Site Management Plan.

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

- require the remedial party or site owner to complete and submit to the Department a periodic certification of institutional and engineering controls in accordance with Part 375-1.8 (h)(3);

- allow the use and development of the controlled property for restricted residential as defined by Part 375-1.8(g), although land use is subject to local zoning laws;
- restrict the use of groundwater as a source of potable or process water, without necessary water quality treatment as determined by the NYSDOH or NYCDOH; and
- require 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, the sub-slab depressurization system and the air sparge/soil vapor extraction system, discussed above in Paragraphs 2, 3 and 4 respectively.

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 any new buildings developed on the site or for buildings in off-site areas of contamination, including a provision for implementing actions recommended to address exposures related to soil vapor intrusion;
- a provision that should the owners of properties where sampling was previously declined request to have their properties sampled in the future, the site owner shall consult with the NYSDEC and the NYSDOH regarding the need for soil vapor intrusion sampling. If the NYSDEC and the NYSDOH agree that sampling is the appropriate course of action, the site owner shall perform soil vapor intrusion sampling and take appropriate action based upon the results;
- maintaining site access controls and Department notification;
- the steps necessary for the periodic reviews and certification of the institutional and/or engineering controls; and
- a provision that should a building foundation or building slab be removed in the future, a cover system consistent with that described in Paragraph 3, above will be placed in any areas where the upper two feet of exposed surface soil exceeds the applicable soil cleanup objectives (SCOs).

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

- monitoring of sub-slab vapor, indoor air and 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 occupied existing or future buildings off-site, as well as at potentially impacted areas off-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.

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

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 16, 2018

Date

Gerard Burke, Director
Remedial Bureau B

DECISION DOCUMENT

1199 Sutter Avenue
Brooklyn, Kings County
Site No. C224141
November 2018

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, the redevelopment or reuse of which may be complicated by the presence or potential presence of a contaminant.

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:

Cypress Hills Branch
Attn: Ms. Lisa Goldstein
Brooklyn Public Library
1197 Sutter Ave. at Crystal St.
Brooklyn, NY 11208
Phone: 718-277-6004, ext 116

Brooklyn Community Board 5
Attn: Melinda Perkins
404 Pine Street, 3rd Floor
Brooklyn, NY 11208
Phone: 929-221-8261

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 1199-1221 Sutter Avenue in a mixed residential / commercial area of Brooklyn. The site is bounded by Sutter Ave. to the south, Chestnut St. to the east, a residential area to the north and Crystal St. to the west.

Site Features:
An asphalt parking lot covers the northern portion of the site and a single-story building is located along the southern portion of the site abutting Sutter Avenue. The building is underlain with a basement segmented for each retail/office unit with utilities, storage and service rooms. The building contains a laundromat, grocery store, salon, and restaurant.

Current Zoning and Land Use:
The active site, along with other properties along the north side of a seven-block stretch of Sutter Avenue, is zoned C1-2 (commercial) within a larger R5 (residential) zoned area.

Past Use of the Site:
The structures on the site were constructed in 1957 and were the original development on the property. Spanish American Dry Cleaners occupied the eastern-most unit from September 1988 to May 1995. The former location of the dry cleaner is presently occupied by a self-service laundromat.

Site Geology and Hydrogeology:
The property is located within the Pavement and Buildings-Flatbush-Riverhead Series Soil Map Unit, which is described as anthropogenic urban fill overlying glacial out wash deposits and characterized as a sandy loam. The groundwater table is approximately 13 feet below grade and flows south. Groundwater is not utilized as a source of potable water at the site.

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, an alternative that restricts 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) 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 under the Brownfield Cleanup Agreement is a Participant. The Applicant has an obligation to address on-site and off-site contamination. Accordingly, no enforcement actions are necessary.

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
- indoor air
- sub-slab vapor

6.1.1: Standards, Criteria, and Guidance (SCGs)

The remedy must conform to promulgated standards and criteria that are directly applicable or that are relevant and appropriate. The selection of a remedy must also take into consideration guidance, as appropriate. Standards, Criteria and Guidance are hereafter called SCGs.
To determine whether the contaminants identified in various media are present at levels of concern, the data from the RI were compared to media-specific SCGs. The Department has developed SCGs

for groundwater, surface water, sediments, and soil. The NYSDOH has developed SCGs for drinking water and soil vapor intrusion. 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 contaminants of concern identified at this site are:

tetrachloroethene (PCE)	cis-1,2-dichloroethene (DCE)
trichloroethene (TCE)	vinyl chloride

The contaminants of concern exceed the applicable SCGs for:

- groundwater
- soil
- soil vapor intrusion
- indoor air

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 IRMs, documented in the March 2018 Interim Measures Report, have been completed at this site based on conditions observed during the RI.

A sub-slab depressurization system

The interim remedial measure consisted of the construction and operation of a sub-slab depressurization system (SSDS) in the basements of the laundromat and adjacent grocery store. The SSDS mitigates the vapor migration of site-related contaminants into the laundromat (former drycleaner) and the adjacent grocery store.

In-situ chemical oxidation

The IRM also included in-situ chemical oxidation (ISCO) injections into the sub-surface to facilitate the degradation of the soil and groundwater contamination immediately behind the laundromat and under the basement. The ISCO injections facilitate the destruction of volatile organic compounds (VOCs) beneath the laundromat basement slab.

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), and pesticides. A limited Phase II conducted in 2009 found the dry cleaning solvent tetrachloroethene (PCE) and its degradation products trichloroethene (TCE) and cis-1,2-dichloroethene (DCE) at elevated concentrations in groundwater. A site characterization investigation was conducted under Department oversight in July 2011. A remedial investigation (RI) that focused on soil vapor intrusion (SVI) and groundwater migration was conducted in 2014 and 2015.

Soil
Soil samples obtained and analyzed for VOCs in 2009 found PCE contamination in two areas at 37.5 parts per million (ppm) beneath the asphalt parking lot behind the laundromat and beneath the laundromat basement at 5.1 ppm; as compared to the groundwater protection soil cleanup objective (SCO) of 1.3 ppm and the restricted residential SCO of 19 ppm.

A supplemental remedial investigation conducted in 2016 included soil analyses for semi volatile organic compounds (SVOCs), PCBs, pesticides, herbicides and metals. No metals concentrations were detected in excess of their respective Restricted Residential SCOs. Three SVOCs were detected in one location below their respective Unrestricted Use SCOs. No pesticides, herbicides nor PCBs were detected in any soil sample. The data do not indicate any site-related impacts to off-site soil. The soil data are presented in Figure 2.

Groundwater
During the 2011 site characterization investigation, PCE, TCE and DCE were found to remain above groundwater standards in the existing monitoring wells. Vinyl chloride was not observed in any groundwater samples. PCE concentrations ranged from below its standard of 5 parts per billion (ppb) to a maximum concentration of 470 ppb in MW-4. MW-4 is located in the basement of the former location of the dry cleaner. TCE and DCE were present in some wells (up to 14 ppb and 5.8 ppb respectively, vs. a standard of 5 ppb for each) and were non-detect in others. The groundwater standards for TCE and DCE are both 5 ppb. A downgradient monitoring well located across Sutter Avenue had PCE, TCE and DCE at respective concentrations of 98 ppb, 5.2 ppb and 9.8 ppb. The groundwater data are presented in Figures 3 and 4.

Existing wells and newly constructed monitoring wells were sampled during the RI in March 2015 and have since been monitored periodically. The most recent sampling round (August 2017) found PCE, TCE and DCE at the respective concentrations of 719 ppb, 16.2 ppb and 5.3 ppb. Data from an off-site, downgradient well showed DCE to be undetectable, while PCE was found at 258 ppb and TCE at 9.6 ppb. The groundwater data are presented in Figures 3 and 4.

Soil Vapor / Indoor Air

The investigation found PCE and TCE in indoor air in the basement of the laundromat (former dry cleaner). The indoor air sample had PCE and TCE at 68.5 micrograms per cubic meter ($\mu g/M^3$) and 1.27 $\mu g/M^3$, respectively. Respective sub-slab concentrations of PCE, TCE, DCE and vinyl chloride were 428,000 $\mu g/M^3$, 9,730 $\mu g/M^3$, 4,220 $\mu g/M^3$ and 795 $\mu g/M^3$. The elevated concentrations of these chlorinated VOCs in soil vapor indicate the presence of an on-site source. The data also indicate the need for SVI mitigation as per the New York State Department of Health, Guidance for Evaluating Soil Vapor Intrusion. The vapor data are presented in Figure 5.

The RI included further SVI sampling in other businesses within the same strip mall. The additional data show significant impact to the sub-slab vapor in the adjacent grocery store with PCE at 20,100 $\mu g/M^3$ and TCE at 677 $\mu g/M^3$. The data showed no impacts to the three other businesses in the strip mall. Near the northern border of the site, a soil vapor point with PCE at 214 $\mu g/M^3$ raised a concern for off-site impacts. Further off-site investigations may be conducted by the BCP participant as part of site management. Appropriate actions will be taken as necessary to address any exposures associated with soil vapor intrusion.

6.4: Summary of Human Exposure Pathways

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

Direct contact with contaminants that may be present in the soil is unlikely because the site is covered with building foundations and concrete pavement. Contaminated groundwater at the site is not used from drinking or other purposes and the site is served by a public water supply that obtains water from a source 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 my 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. Soil vapor intrusion sampling has indicated that mitigation is warranted for the on-site laundromat. There is also a potential for vapor intrusion into commercial spaces adjacent to the drycleaner. Additional investigation is warranted to evaluate the potential for off-site vapor intrusion and subsequent exposures in nearby 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 exposure from contaminants volatilizing from 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 Residential use with generic soil cleanup objectives remedy.

The selected remedy is referred to as the soil vapor extraction / air sparge remedy.

The elements of the selected remedy, as shown in Figure 7, 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;
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- Integrating the remedy with the end use where possible and encouraging green and sustainable re-development.

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

- require the remedial party or site owner to complete and submit to the Department a periodic certification of institutional and engineering controls in accordance with Part 375-1.8 (h)(3);
- allow the use and development of the controlled property for restricted residential as defined by Part 375-1.8(g), although land use is subject to local zoning laws;
- restrict the use of groundwater as a source of potable or process water, without necessary water quality treatment as determined by the NYSDOH or NYCDOH; and
- require 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, the sub-slab depressurization system and the air sparge/soil vapor extraction system, discussed above in Paragraphs 2, 3 and 4 respectively.

This plan includes, but may not be limited to:

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- 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 new buildings developed on the site or for buildings in off-site areas of contamination, including a provision for implementing actions recommended to address exposures related to soil vapor intrusion;
- a provision that should the owners of properties where sampling was previously declined request to have their properties sampled in the future, the site owner shall consult with the NYSDEC and the NYSDOH regarding the need for soil vapor intrusion sampling. If the NYSDEC and the NYSDOH agree that sampling is the appropriate course of action, the site owner shall perform soil vapor intrusion sampling and take appropriate action based upon the results;
- maintaining site access controls and Department notification;
- the steps necessary for the periodic reviews and certification of the institutional and/or

engineering controls; and

- a provision that should a building foundation or building slab be removed in the future, a cover system consistent with that described in Paragraph 3, above will be placed in any areas where the upper two feet of exposed surface soil exceeds the applicable soil cleanup objectives (SCOs).

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- monitoring for vapor intrusion for any occupied existing or future buildings off-site, as well as at potentially impacted areas off-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.

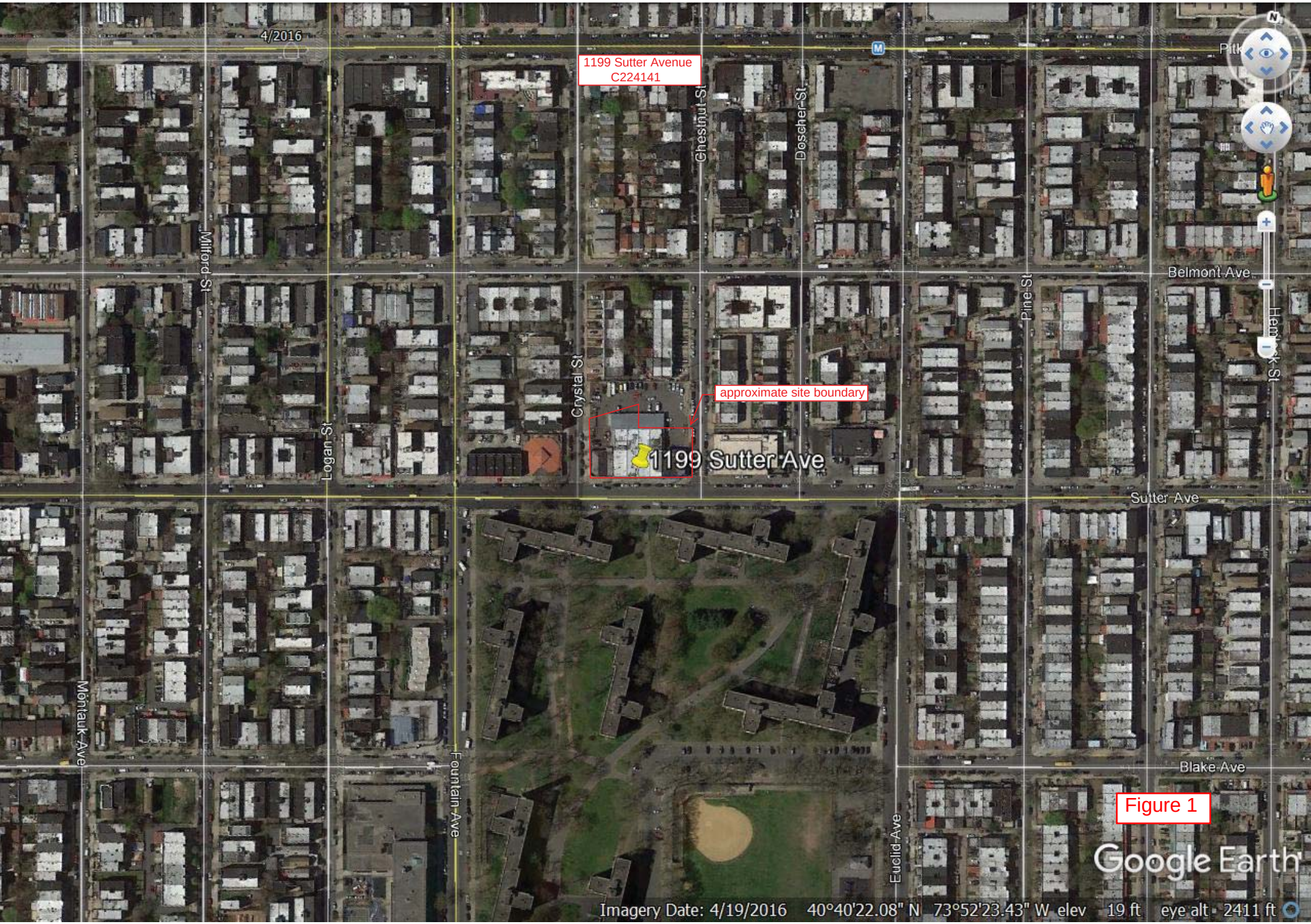
4/2016
1199 Sutter Avenue
C224141
Chestnut St
Doscher St
Milford St
Logan St
Crystal St
approximate site boundary
1199 Sutter Ave
Pine St
Belmont Ave
Hemlock St
Sutter Ave
Montauk Ave
Fountain Ave
Euclid Ave
Blake Ave
Google Earth
Imagery Date: 4/19/2016 40°40'22.08" N 73°52'23.43" W elev 19 ft eye alt 2411 ft

Figure 1

S-3 (10')	1/6/2009
Tetrachloroethene	37,500

S-4 (11-12')	7/19/2011
Tetrachloroethene	15,000

B-7 (0-5')	4/1/2009
Tetrachloroethene	5,100

S-4 (2009)
S-1
S-5
B-1
B-12
B-9
S-3
S-2
(2016)
B-3
B-11
B-10
B-8
B-4
B-7
B-5
B-6
SUPERMARKET
DELICATESSEN
NAIL SALON
DENTIST OFFICE
CRYSTAL STREET
CHESTNUT STREET
SIDEWALK
SUTTER AVENUE
FORMER DRY CLEANERS
(CURRENT LAUNDROMAT)
SIDEWALK
NYC HOUSING
AUTHORITY PROPERTY
APARTMENT
BUILDING
APARTMENT
BUILDING

LEGEND:

- BCP AGREEMENT SITE PROPERTY OUTLINE
- SOIL BORING

NOTES:

RESULTS SHOWN EXCEED NYDEC UNRESTRICTED USE SOIL CLEANUP OBJECTIVES (UUSCO).

ALL RESULTS IN PARTS PER BILLION (ug/kg)

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DATE: 6/20/2018

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1199 SUTTER AVENUE
BROOKLYN, NEW YORK

SOIL DATA DETECTED ABOVE NYSDEC SCOs

FIGURE #
2

		MW-4S					MW-4D
PARAMETERS	AWQS	8/27/2009	11/2/2009	2/25/2010	7/20/2011	4/6/2016	8/27/2009
2-Butanone	50	24.4	<10	<10	<12	3.7	<10
Acetone	50	577	<50	<50	<12	<5	<50
Chloroform	7	97.7	<5	<5	15	3.0 J	<5
cis-1,2-Dichloroethene	5	<5	16.9	<5	4.3	2.6	<5
Tetrachloroethene	5	51	359	348	470	390	23.1
Trichloroethene	5	<5	20.4	11.9	14	14	<5

		MW-3S	
PARAMETERS	AWQS	11/2/2009	7/20/2011
Chloroform	7	<5	14
Tetrachloroethene	5	14.9	0.73

		MW-9S
PARAMETERS	AWQS	4/6/2016
Chloroform	7	0.50 J
Tetrachloroethene	5	0.90 J

		MW-1S				MW-1D
PARAMETERS	AWQS	8/27/2009	11/2/2009	2/25/2010	7/20/2011	7/20/2011
Chloroform	7	<5	<5	<5	30	0.9
cis-1,2-Dichloroethene	5	<5	<5	5.82	0.71	<0.5
Tetrachloroethene	5	98.3	48.2	172	84	6.8
Trichloroethene	5	<5	<5	8.37	3.2	1.7

		MW-2S			MW2D
PARAMETERS	AWQS	8/27/2009	2/25/2010	7/20/2011	7/20/2011
Chloroform	7	<5	<5	13	1.1
cis-1,2-Dichloroethene	5	<5	5.82	0.20	<0.5
Tetrachloroethene	5	18.9	<5	10	9.6

		MW-6S
PARAMETERS	AWQS	3/20/2015
Acetone	50	4
Chloroform	7	0.54
Tetrachloroethene	5	1.4
Trichloroethene	5	0.66

		MW-6D
PARAMETERS	AWQS	3/20/2015
Acetone	50	6.9
Chloroform	7	0.58
Tetrachloroethene	5	0.32

		MW-7S
PARAMETERS	AWQS	3/20/2015
Acetone	50	3.7
Chloroform	7	1.4
Tetrachloroethene	5	8.2
Trichloroethene	5	0.52

		MW-7D
PARAMETERS	AWQS	3/20/2015
Acetone	50	2.7
Chloroform	7	2.3
cis-1,2-Dichloroethene	5	1.8
Tetrachloroethene	5	1.9
Trichloroethene	5	3.2

		MW-8S	MW-8D
PARAMETERS	AWQS	3/20/2015	4/6/2016	3/20/2015
Tetrachloroethene	5	11	12	3.5

		MW-5S		MW-5D		
PARAMETERS	AWQS	7/20/2011	4/6/2016	PARAMETERS	AWQS	3/20/2015
Chloroform	7	29	2.4 J	Acetone	50	6
cis-1,2-Dichloroethene	5	9.8	5.1	Chloroform	7	0.88
Tetrachloroethene	5	98	200	cis-1,2-Dichloroethene	5	0.44
Trichloroethene	5	5.2	10	Tetrachloroethene	5	1.9
				Trichloroethene	5	1.8

CRYSTAL STREET

CHESTNUT STREET

SUPERMARKET

DELICATESSEN

NAIL SALON

DENTIST OFFICE

SIDEWALK

FORMER DRY CLEANERS (CURRENT LAUNDROMAT)

R AVENUE

SIDEWALK

NYC HOUSING AUTHORITY PROPERTY

APARTMENT BUILDING

APART BUILI

MW-1S MW-1D MW-2D MW-2S MW-3S MW-3D MW-4S MW-5S MW-5D MW-6S MW-6D MW-7S MW-7D MW-8S MW-8D MW-9S MW-10S MW-11S

LEGEND:

- BCP AGREEMENT SITE PROPERTY OUTLINE
- MONITORING WELL
- 98.3 HIGHLIGHTED CONCENTRATION EXCEEDS NYDEC AMBIENT WATER QUALITY STANDARDS

NOTES:

ALL RESULTS IN µg/L.

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1199 SUTTER AVENUE
BROOKLYN, NEW YORK

GROUNDWATER ABOVE STANDARDS MAP
JANUARY 2009 – APRIL 2016

FIGURE #
3

Sample ID	MW-10S				NYSDEC Groundwater Standards
Sample Date	5/17/2017	6/27/2017	7/27/2017	8/29/2017	
Volatile Organic Compounds *(in micrograms per liter)*					
cis-1,2-Dichloroethylene	ND	**6.1**	**5.1**	**5.3**	5*
Tetrachloroethene	**575**	**363**	**441**	**719**	5*
Trichloroethene	**21.0**	**16.2**	**13.4**	**16.2**	5*

Sample ID	MW-11S				NYSDEC Groundwater Standards
Sample Date	5/17/2017	6/27/2017	7/27/2017	8/29/2017	
Volatile Organic Compounds *(in micrograms per liter)*					
cis-1,2-Dichloroethylene	ND	1.5	3.5	2.5	5*
Tetrachloroethene	**24.1**	**37.4**	**86.7**	**105**	5*
Trichloroethene	1.1	2.0	3.4	4.7	5*

Sample ID	MW-1S				NYSDEC Groundwater Standards
Sample Date	5/17/2017	6/27/2017	7/27/2017	8/29/2017	
Volatile Organic Compounds *(in micrograms per liter)*					
cis-1,2-Dichloroethylene	ND	ND	ND	ND	5*
Tetrachloroethene	**49.5**	**46.1**	**24.9**	**21.7**	5*
Trichloroethene	2.1	2.8	1.3	ND	5*

Sample ID	MW-2S				NYSDEC Groundwater Standards
Sample Date	5/17/2017	6/27/2017	7/27/2017	8/29/2017	
Volatile Organic Compounds *(in micrograms per liter)*					
cis-1,2-Dichloroethylene	ND	ND	ND	ND	5*
Tetrachloroethene	2.2	1.1	2.9	1.5	5*
Trichloroethene	ND	ND	ND	ND	5*

Sample ID	MW-5S				NYSDEC Groundwater Standards
Sample Date	5/17/2017	6/27/2017	7/27/2017	8/29/2017	
Volatile Organic Compounds *(in micrograms per liter)*					
cis-1,2-Dichloroethylene	ND	**5.3**	4.8	ND	5*
Tetrachloroethene	**122**	**128**	**136**	**258**	5*
Trichloroethene	**7.4**	**8.2**	**7.3**	**9.6**	5*

Sample ID	MW-8S				NYSDEC Groundwater Standards
Sample Date	5/17/2017	6/27/2017	7/27/2017	8/29/2017	
Volatile Organic Compounds *(in micrograms per liter)*					
cis-1,2-Dichloroethylene	ND	ND	ND	ND	5*
Tetrachloroethene	**5.5**	4.3	4.4	**8.4**	5*
Trichloroethene	ND	ND	ND	ND	5*

LEGEND:

- BCP AGREEMENT SITE PROPERTY OUTLINE
- MONITORING WELL
- ND NOT DETECTED
- * THE PRINCIPAL ORGANIC COMPOUND STANDARD APPLIES

NOTES:

ONLY DETECTED ANALYTES ARE REPORTED.

BOLD VALUES INDICATE AN EXCEEDANCE OF THE NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION (NYSDEC) CLASS GA AMBIENT WATER QUALITY STANDARDS.

RESULTS GIVEN IN MICROGRAMS PER LITER (µg/L).

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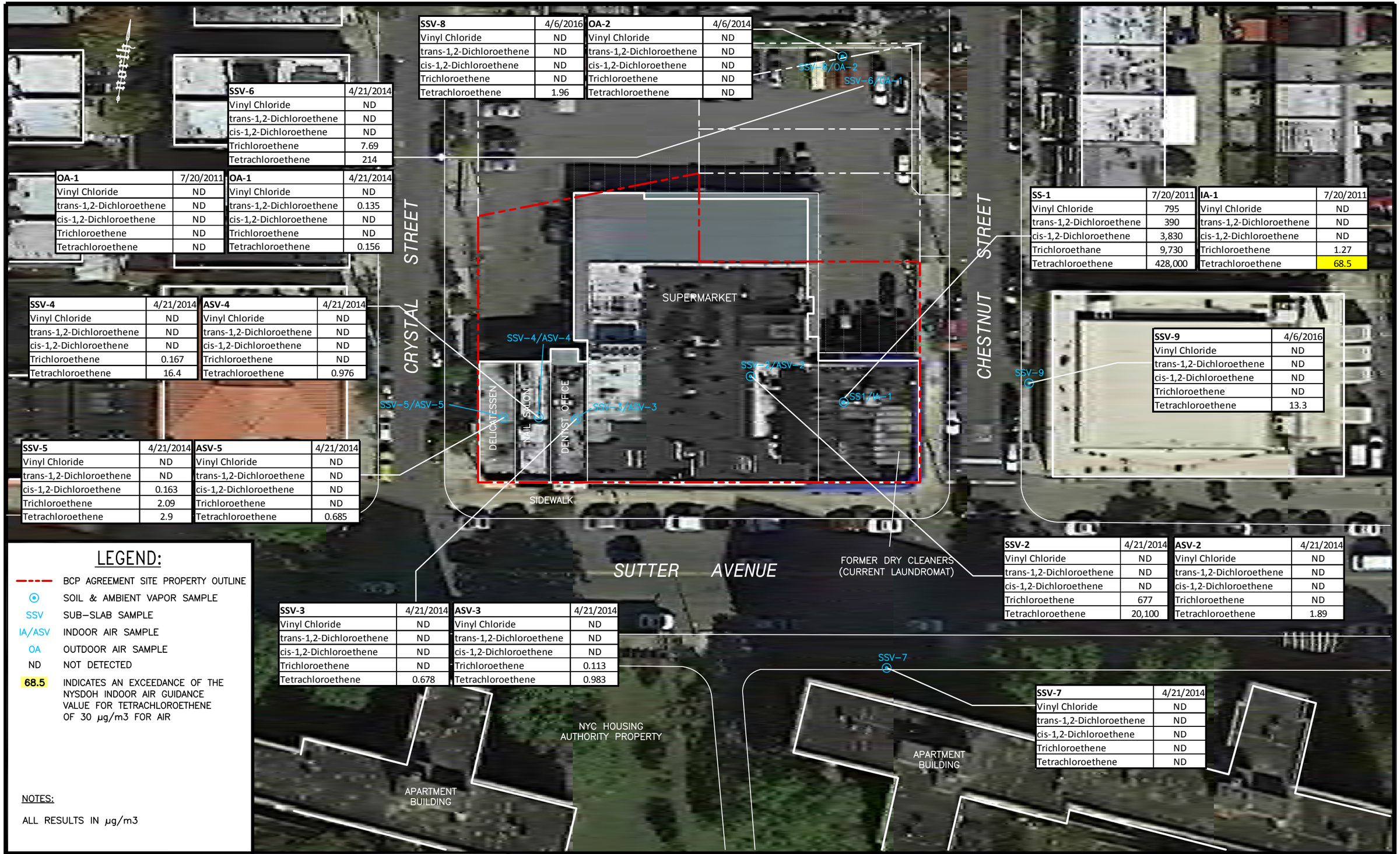
1199 SUTTER AVENUE
BROOKLYN, NEW YORK

GROUNDWATER ABOVE STANDARDS MAP
MAY 2017 – AUGUST 2017

FIGURE #
4



SSV-8	4/6/2016
Vinyl Chloride	ND
trans-1,2-Dichloroethene	ND
cis-1,2-Dichloroethene	ND
Trichloroethene	ND
Tetrachloroethene	1.96

OA-2	4/6/2014
Vinyl Chloride	ND
trans-1,2-Dichloroethene	ND
cis-1,2-Dichloroethene	ND
Trichloroethene	ND
Tetrachloroethene	ND

SSV-6	4/21/2014
Vinyl Chloride	ND
trans-1,2-Dichloroethene	ND
cis-1,2-Dichloroethene	ND
Trichloroethene	7.69
Tetrachloroethene	214

OA-1	7/20/2011
Vinyl Chloride	ND
trans-1,2-Dichloroethene	ND
cis-1,2-Dichloroethene	ND
Trichloroethene	ND
Tetrachloroethene	ND

OA-1	4/21/2014
Vinyl Chloride	ND
trans-1,2-Dichloroethene	0.135
cis-1,2-Dichloroethene	ND
Trichloroethene	ND
Tetrachloroethene	0.156

SS-1	7/20/2011
Vinyl Chloride	795
trans-1,2-Dichloroethene	390
cis-1,2-Dichloroethene	3,830
Trichloroethane	9,730
Tetrachloroethene	428,000

IA-1	7/20/2011
Vinyl Chloride	ND
trans-1,2-Dichloroethene	ND
cis-1,2-Dichloroethene	ND
Trichloroethene	1.27
Tetrachloroethene	68.5

SSV-4	4/21/2014
Vinyl Chloride	ND
trans-1,2-Dichloroethene	ND
cis-1,2-Dichloroethene	ND
Trichloroethene	0.167
Tetrachloroethene	16.4

ASV-4	4/21/2014
Vinyl Chloride	ND
trans-1,2-Dichloroethene	ND
cis-1,2-Dichloroethene	ND
Trichloroethene	ND
Tetrachloroethene	0.976

SSV-9	4/6/2016
Vinyl Chloride	ND
trans-1,2-Dichloroethene	ND
cis-1,2-Dichloroethene	ND
Trichloroethene	ND
Tetrachloroethene	13.3

SSV-5	4/21/2014
Vinyl Chloride	ND
trans-1,2-Dichloroethene	ND
cis-1,2-Dichloroethene	0.163
Trichloroethene	2.09
Tetrachloroethene	2.9

ASV-5	4/21/2014
Vinyl Chloride	ND
trans-1,2-Dichloroethene	ND
cis-1,2-Dichloroethene	ND
Trichloroethene	ND
Tetrachloroethene	0.685

SSV-2	4/21/2014
Vinyl Chloride	ND
trans-1,2-Dichloroethene	ND
cis-1,2-Dichloroethene	ND
Trichloroethene	677
Tetrachloroethene	20,100

ASV-2	4/21/2014
Vinyl Chloride	ND
trans-1,2-Dichloroethene	ND
cis-1,2-Dichloroethene	ND
Trichloroethene	ND
Tetrachloroethene	1.89

SSV-3	4/21/2014
Vinyl Chloride	ND
trans-1,2-Dichloroethene	ND
cis-1,2-Dichloroethene	ND
Trichloroethene	ND
Tetrachloroethene	0.678

ASV-3	4/21/2014
Vinyl Chloride	ND
trans-1,2-Dichloroethene	ND
cis-1,2-Dichloroethene	ND
Trichloroethene	0.113
Tetrachloroethene	0.983

SSV-7	4/21/2014
Vinyl Chloride	ND
trans-1,2-Dichloroethene	ND
cis-1,2-Dichloroethene	ND
Trichloroethene	ND
Tetrachloroethene	ND

LEGEND:

- BCP AGREEMENT SITE PROPERTY OUTLINE
- SOIL & AMBIENT VAPOR SAMPLE
- SSV — SUB-SLAB SAMPLE
- IA/ASV — INDOOR AIR SAMPLE
- OA — OUTDOOR AIR SAMPLE
- ND — NOT DETECTED
- 68.5 — INDICATES AN EXCEEDANCE OF THE NYSDOH INDOOR AIR GUIDANCE VALUE FOR TETRACHLOROETHENE OF 30 µg/m3 FOR AIR

NOTES:

ALL RESULTS IN µg/m3

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SOIL VAPOR/AMBIENT AIR DATA MAP
JULY 2011 – MARCH 2017

FIGURE # 5

Sample ID	SSV-10			
Sample Date	5/17/2017	6/27/2017	7/27/2017	8/29/2017
Volatile Organic Compounds ***(in micrograms per cubic meter of air)***				
Tetrachloroethylene	2.43	9.99	17.70	14.40
Vinyl Chloride	ND	ND	ND	ND

Sample ID	SSV-11			
Sample Date	5/17/2017	6/27/2017	7/27/2017	8/29/2017
Volatile Organic Compounds ***(in micrograms per cubic meter of air)***				
Tetrachloroethylene	ND	ND	ND	ND
Vinyl Chloride	19.60	ND	25.8 D	24.3 D

LEGEND:

- BCP AGREEMENT SITE PROPERTY OUTLINE
- SOIL & AMBIENT VAPOR SAMPLE
- SSV — SUB–SLAB SAMPLE
- ND — NOT DETECTED
- D — RESULTS FOR DILUTION

NOTES:

ONLY DETECTED ANALYTES ARE REPORTED.

RESULTS GIVEN IN MICROGRAMS PER CUBIC METER OF AIR.

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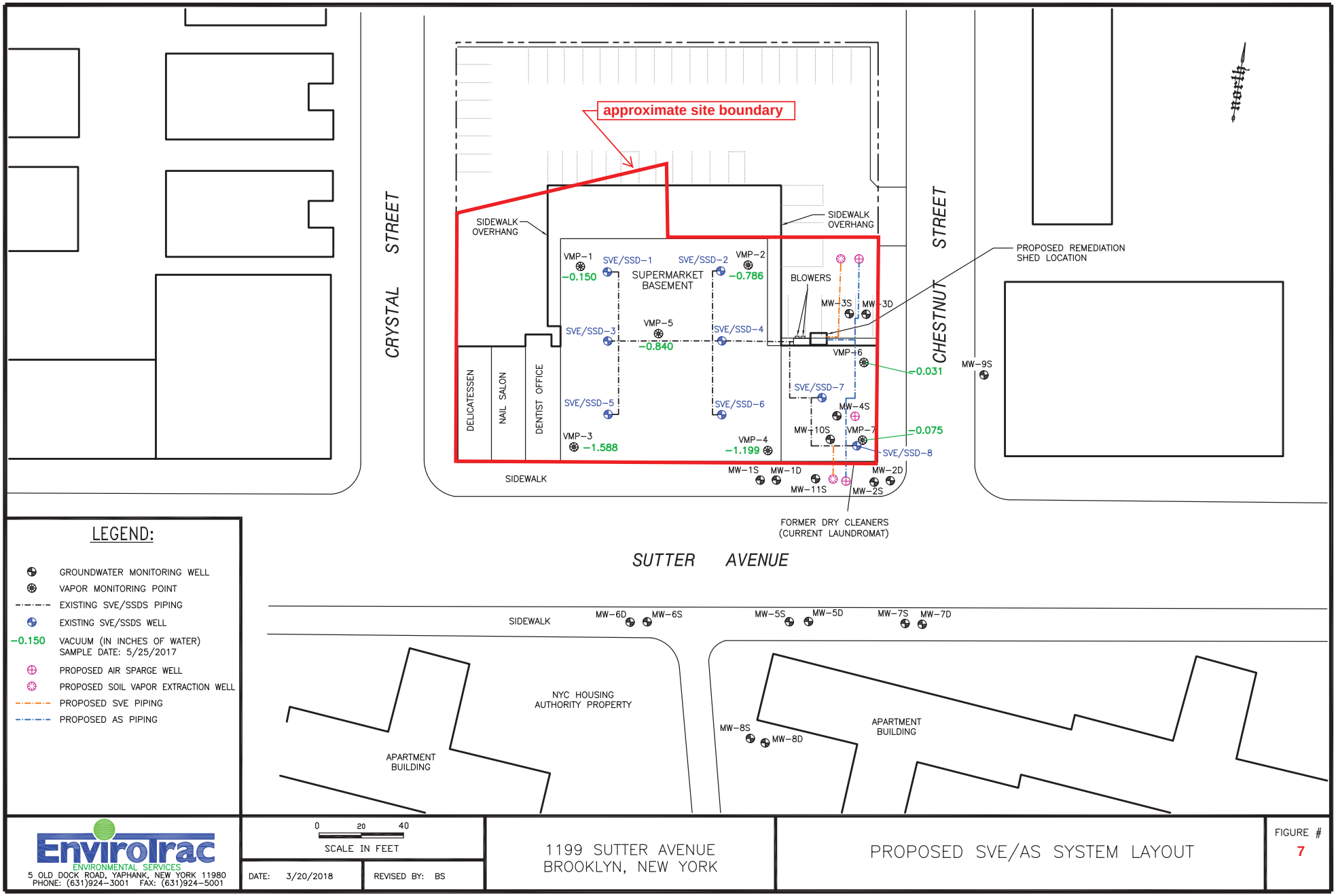
1199 SUTTER AVENUE
BROOKLYN, NEW YORK

SOIL GAS WELL DATA MAP
MAY 2017 – AUGUST 2017

FIGURE #
6



LEGEND:

- GROUNDWATER MONITORING WELL
- VAPOR MONITORING POINT
- EXISTING SVE/SSDS PIPING
- EXISTING SVE/SSDS WELL
- -0.150 VACUUM (IN INCHES OF WATER) SAMPLE DATE: 5/25/2017
- PROPOSED AIR SPARGE WELL
- PROPOSED SOIL VAPOR EXTRACTION WELL
- PROPOSED SVE PIPING
- PROPOSED AS PIPING

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SCALE IN FEET

DATE: 3/20/2018

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1199 SUTTER AVENUE
BROOKLYN, NEW YORK

PROPOSED SVE/AS SYSTEM LAYOUT

FIGURE # 7