DECISION DOCUMENT

Queens Animal Shelter and Care Center
Brownfield Cleanup Program
Queens, Queens County
Site No. C241230
November 2019

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

DECLARATION STATEMENT - DECISION DOCUMENT

Queens Animal Shelter and Care Center
Brownfield Cleanup Program
Queens, Queens County
Site No. C241230
November 2019

Statement of Purpose and Basis

This document presents the remedy for the Queens Animal Shelter and Care Center 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 Queens Animal Shelter and Care Center 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

The existing on-site buildings will be demolished and materials which can't be beneficially reused on site will be taken off-site for proper disposal in order to implement the remedy. Excavation and off-site disposal of soils in the upper one foot below ground surface across the entire site and 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);
- 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 3,300 cubic yards (CY) of contaminated soil will be removed from the site for remediation, including approximately 200 CY of source material from one area where benzene, toluene, ethylbenzene and xylene (BTEX) concentrations exceed PGWSCOs and/or commercial use SCOs.

3. Backfill

Clean fill meeting the requirements of 6 NYCRR Part 375-6.7(d) will be brought in to backfill the excavation as necessary for construction and to establish the designed grades at the site.

4. Cover System

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

a. In-situ chemical oxidation
After remedial excavation and prior to construction, in-situ chemical oxidation (ISCO) will be implemented to treat petroleum-related VOCs, specifically benzene, toluene, ethylbenzene and xylene (BTEX) and methyl tert-butyl ether (MTBE) in groundwater. A chemical oxidant will be injected via direct push methods into the subsurface to destroy the contaminants in an approximately 6,100 square foot area located in the central portion of the site where gasoline-related compounds were elevated in the groundwater, targeting a 10-foot interval from the top of the capillary fringe down into the groundwater.

Prior to the full implementation of this technology, laboratory and on-site pilot scale studies will be conducted to more clearly define design parameters. Between the pilot and the full-scale implementations, it is estimated that 23 injection points will be installed. It is estimated that the chemical oxidant will be a conducted during a single injection event.

b. Biosparge
After building construction is complete, biosparging will be implemented to address the groundwater plume contaminated by MTBE via wells that will be incorporated into the building construction. MTBE will be biodegraded in groundwater and soil below the water table (saturated soil) by injecting air into the subsurface. The injected air will increase the biological activity of the indigenous microorganisms and degrade the MTBE in the groundwater and/or soil. At this site it is estimated that 23 air injection wells will be installed in two rows as depicted on Figure 5, to a depth of approximately 10 to 15 feet into the water table.

c. Enhanced Bioremediation
In-situ enhanced biodegradation will be employed to treat MTBE in groundwater in the area depicted on Figure 3. The biological breakdown of contaminants through biosparging will be enhanced by nutrient addition and bioaugmentation via injection into the 23 biosparge wells prior to start-up of the biosparge system.

d. Monitoring
Monitoring will be required and conducted within and downgradient of the treatment zone for VOCs.

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 commercial use as

defined by Part 375-1.8(g), although land use is subject to local zoning laws;
- Restrict the use of groundwater as a source of potable or process water, without necessary water quality treatment as determined by the NYSDOH or NYCDOHMH; and
- Require compliance with the Department-approved Site Management Plan.

7. Site Management Plan

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

i. 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 soil cover and groundwater treatment systems discussed in Paragraphs 4 and 5, 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/or 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.

ii. 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;
- monitoring for vapor intrusion for any buildings on the site, as may be required by the Institutional and Engineering Control Plan discussed above.

iii. an Operation and Maintenance (O&M) Plan to ensure continued operation, maintenance, optimization, monitoring, inspection, and reporting of any mechanical or physical components (e.g., cover system) of the remedy. The plan includes, but is not limited to:
   - procedures for inspecting and maintaining the site cover system;
   - maintaining site access controls and Department notification; and
   - providing the Department access to the site and O&M records.

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 18, 2019

Date

Gerard Burke, Director
Remedial Bureau B

DECISION DOCUMENT

Queens Animal Shelter and Care Center
Queens, Queens County
Site No. C241230
November 2019

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:

Queens Library - Ridgewood Branch
20-12 Madison Street
Ridgewood, NY 11385
Phone: 718-821-4770

Queens Community Board 5
61-23 Myrtle Avenue
Glendale, NY 11385
Phone: 718-366-1834

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 151 Woodward Avenue in the Ridgewood neighborhood of Queens, NY. The approximately 1.0-acre site is bounded to the north by a shelving warehouse and distribution facility; to the east by Troutman Street, followed by a parking lot, unspecified storage, and multi-family residential buildings; to the south by Woodward Avenue, followed by residential and commercial buildings and a gasoline station; and to the west by Flushing Avenue, followed by mixed-use buildings with street-level commercial uses (auto repair/tire shop and deli) and an auto storage/junk yard.

Site Features
Currently, the site is vacant. It was previously occupied by an automobile wrecking yard, auto parts facility; and a tire and auto glass shop. The one-story masonry and wood frame garage used for storage, vehicle dismantling, and repairs and a one-story masonry and steel frame garage building with a mezzanine were recently demolished. The site is entirely covered with pavement and concrete. The surrounding area includes an automobile wrecking yard, a commercial warehouse, a gasoline filling station, and auto repair shops.

Current Zoning and Land Use
The current zoning designation of the site is M1-1 (manufacturing), and the site is currently vacant. The surrounding area is largely M1-1 to the north, east, and west. Properties south of the site include multi-family residential and mixed-use buildings zoned as R5B and R6B (residential) and a commercial overlay (C1-3) on the south- and east-adjacent blocks. Linden Hill Methodist Cemetery is located approximately 300 feet east of the site.

Past Use of the Site
In 1902, the site was occupied by commercial (retail) and residential buildings. Between 1914 and 1939, the site was primarily identified as commercial-use, including retail and a restaurant. In 1962 the site was listed as an automobile wrecking corporation and operated as such until approximately 2005. The site was used for automobile maintenance and wrecking, a salvage yard, and tire and windshield repairs until 2019.

Site Geology and Hydrology
The site elevation is about 34 to 40 feet above sea level. Both the site and regional surface

topography slope downward to the northwest. Subsurface materials consist of historic fill comprised of sand, silt, and gravel with varying amounts of concrete, brick, wood, coal, ash, metal shards, and roots extending from grade to between 6 and 24 feet below ground surface (bgs). The historic fill is underlain by native sand, gravel, and silt to boring termination depths (up to 24.5 feet bgs).

Groundwater was encountered from 19 and 23 feet bgs and generally flows in a northwesterly direction toward Newtown Creek, which is located approximately 1,600 feet northeast of the Site. Groundwater in Queens is not used as a potable water source.

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 under the Brownfield Cleanup Agreement is a Volunteer. The Volunteer does not have an obligation to address off-site contamination. However, the Department has determined that this site does not pose a significant threat to public health or the environment; 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

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:

benzene	o-xylene
1,2-dichloroethane	xylene (mixed)
acetone	MTBE (methyl-tert-butyl ether)
ethylbenzene	lead
xylene (mixed)	polychlorinated biphenyls (PCB)
methyl ethyl ketone	toluene

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.

There were no IRMs performed at this site during the RI.

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.

Soil and groundwater were analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides, polychlorinated biphenyls (PCBs), metals and per- and polyfluoroalkyl substances (PFAS). Soil vapor has been analyzed for VOCs.

Soil: The primary contaminants in site soils are VOCs and metals, typically found in shallow soils, between 0-2 feet bgs, at the site. Petroleum related VOCs detected in soil samples at levels above protection of groundwater soil cleanup objectives (PGWSCOs) but below commercial SCOs include: benzene (max. 13 parts per million (ppm), ethylbenzene (max. 39 ppm), toluene (max. 230 ppm) and xylene (max. 490 ppm). Lead (max. 2,090 ppm) was the only metal found significantly above the commercial SCOs. lead (max. 2,090 ppm), and PCBs were found in soil above both commercial SCOs with a maximum detection of 5.4 ppm. Data does not indicate any off-site impacts in soil related to this site.

Groundwater: Ten groundwater samples were collected and analyzed. VOCs were detected in groundwater above ambient water quality standards (AWQS) or guidance values, and include acetone up to 96 parts per billion (ppb) (standard 50 ppb), benzene up to 6.8 ppb (standard 1 ppb), xylene (mixed) up to 17 ppb (standard 5 ppb), methyl ethyl ketone up to 93 ppb (standard 50 ppb), o-xylene up to 11 ppb (standard 5 ppb), methyl tert-butyl ether (MTBE) up to 4,300 ppb (standard 10 ppb), and toluene up to 49 ppb (standard 5 ppb). Three additional groundwater samples were collected off-site in sidewalk areas adjacent to the site which produced one detection over AWQS. MTBE was detected in the sidewalk west of and adjacent to the site at 56 ppb (standard 10 ppb).

Soil Vapor: Seven soil vapor samples were collected and analyzed. Several petroleum-related VOCs were detected in soil vapor samples throughout of the site. The western portion of the site exhibited the highest concentrations with total petroleum-related VOCs totaling to approximately 4,000,000 micrograms per cubic meter ($\mu g/m^3$). Three additional soil vapor samples were collected off-site in sidewalk areas adjacent to the site. The three additional locations all detected petroleum-related VOCs, but levels were below those of the highest on-site point.

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.*

The site is completely fenced, which restricts public access. However, persons who enter the site could contact contaminants in the soil by walking on the site, digging or otherwise disturbing the soil. Contaminated groundwater at the site is not used for drinking or other purposes and the site is served by a public water supply that obtains drinking water from a different 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 may move into future 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. Because there is no on-site building at this time, inhalation of site contaminants in indoor air due to soil vapor intrusion does not currently represent an exposure concern for the site. However, the potential exists for the inhalation of site contaminants due to soil vapor intrusion for any future on-site development.

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:

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 Alternatives 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 Cover System remedy.

The elements of the selected remedy, as shown in Figures 2 through 5, 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;
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   - 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.

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The existing on-site buildings will be demolished and materials which can't be beneficially reused on site will be taken off-site for proper disposal in order to implement the remedy. Excavation and off-site disposal of soils in the upper one foot below ground surface across the entire site and 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);
- 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
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3. Backfill

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4. Cover System

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

e. In-situ chemical oxidation
After remedial excavation and prior to construction, in-situ chemical oxidation (ISCO) will be implemented to treat petroleum-related VOCs, specifically benzene, toluene, ethylbenzene and xylene (BTEX) and methyl tert-butyl ether (MTBE) in groundwater. A chemical oxidant will be injected via direct push methods into the subsurface to destroy the contaminants in an approximately 6,100 square foot area located in the central portion of the site where gasoline-related compounds were elevated in the groundwater, targeting a 10-foot interval from the top of the capillary fringe down into the groundwater.

Prior to the full implementation of this technology, laboratory and on-site pilot scale studies will be conducted to more clearly define design parameters. Between the pilot and the full-scale implementations, it is estimated that 23 injection points will be installed. It is estimated that the chemical oxidant will be a conducted during a single injection event.

f. Biosparge
After building construction is complete, biosparging will be implemented to address the groundwater plume contaminated by MTBE via wells that will be incorporated into the building construction. MTBE will be biodegraded in groundwater and soil below the water table (saturated soil) by injecting air into the subsurface. The injected air will increase the biological activity of the indigenous microorganisms and degrade the MTBE in the groundwater and/or soil. At this site it is estimated that 23 air injection wells will be installed in two rows as depicted on Figure 5, to a depth of approximately 10 to 15 feet into the water table.

g. Enhanced Bioremediation
In-situ enhanced biodegradation will be employed to treat MTBE in groundwater in the area depicted on Figure 3. The biological breakdown of contaminants through biosparging will be enhanced by nutrient addition and bioaugmentation via injection into the 23 biosparge wells prior to start-up of the biosparge system.

h. Monitoring
Monitoring will be required and conducted within and downgradient of the treatment zone for VOCs.

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 commercial use as

defined by Part 375-1.8(g), although land use is subject to local zoning laws;
- Restrict the use of groundwater as a source of potable or process water, without necessary water quality treatment as determined by the NYSDOH or NYCDOHMH; and
- Require compliance with the Department-approved Site Management Plan.

7. Site Management Plan

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

iv. 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 soil cover and groundwater treatment discussed in Paragraphs 4 and 5, 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/or 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.

v. 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;
- monitoring for vapor intrusion for any buildings on the site, as may be required by the Institutional and Engineering Control Plan discussed above.

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

- procedures for inspecting and maintaining the site cover system;
- maintaining site access controls and Department notification; and
- providing the Department access to the site and O&M records.

N

0 75 150

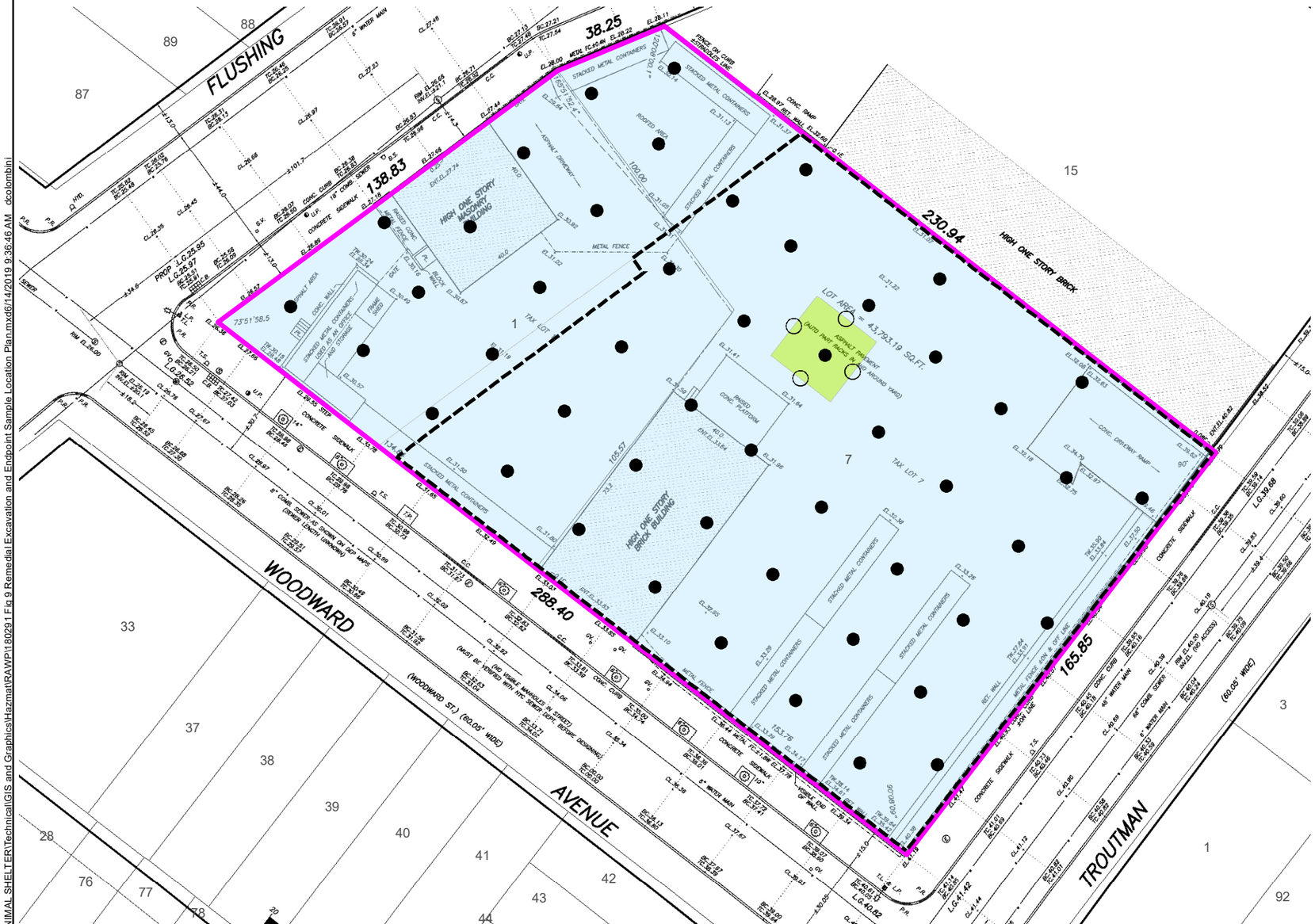
Feet

Figure 1
Site Map

Queens Animal Shelter and Care Center
Queens, NY
Site No. C224280

NEW YORK STATE OF OPPORTUNITY

Department of Environmental Conservation



LEGEND

- BCP PROJECT SITE BOUNDARY
- PROPOSED NEW BUILDING FOOTPRINT
- EXCAVATION TO APPROXIMATELY 1 FOOT BELOW EXISTING GRADE
- EXCAVATION TO APPROXIMATELY 7 FEET BELOW EXISTING GRADE
- LOT BOUNDARY AND TAX LOT NUMBER
- PROPOSED APPROXIMATE BOTTOM DOCUMENTATION SAMPLE LOCATION
- PROPOSED APPROXIMATE SIDEWALL DOCUMENTATION SAMPLE LOCATION

0 20 40 80

SCALE IN FEET

Survey Source:
Based on Land Survey at Ridgewood, Queens County, N.Y.
Tax Block 3376 Tax Lot(s) 1 & 7
Ref. NO. Q3376-1
Prepared by Empire State Land Surveyor, P.C.
Glen Head, NY
May 3, 2018

Elevations Are Based Upon North American Vertical Datum (NAVD) of 1988.

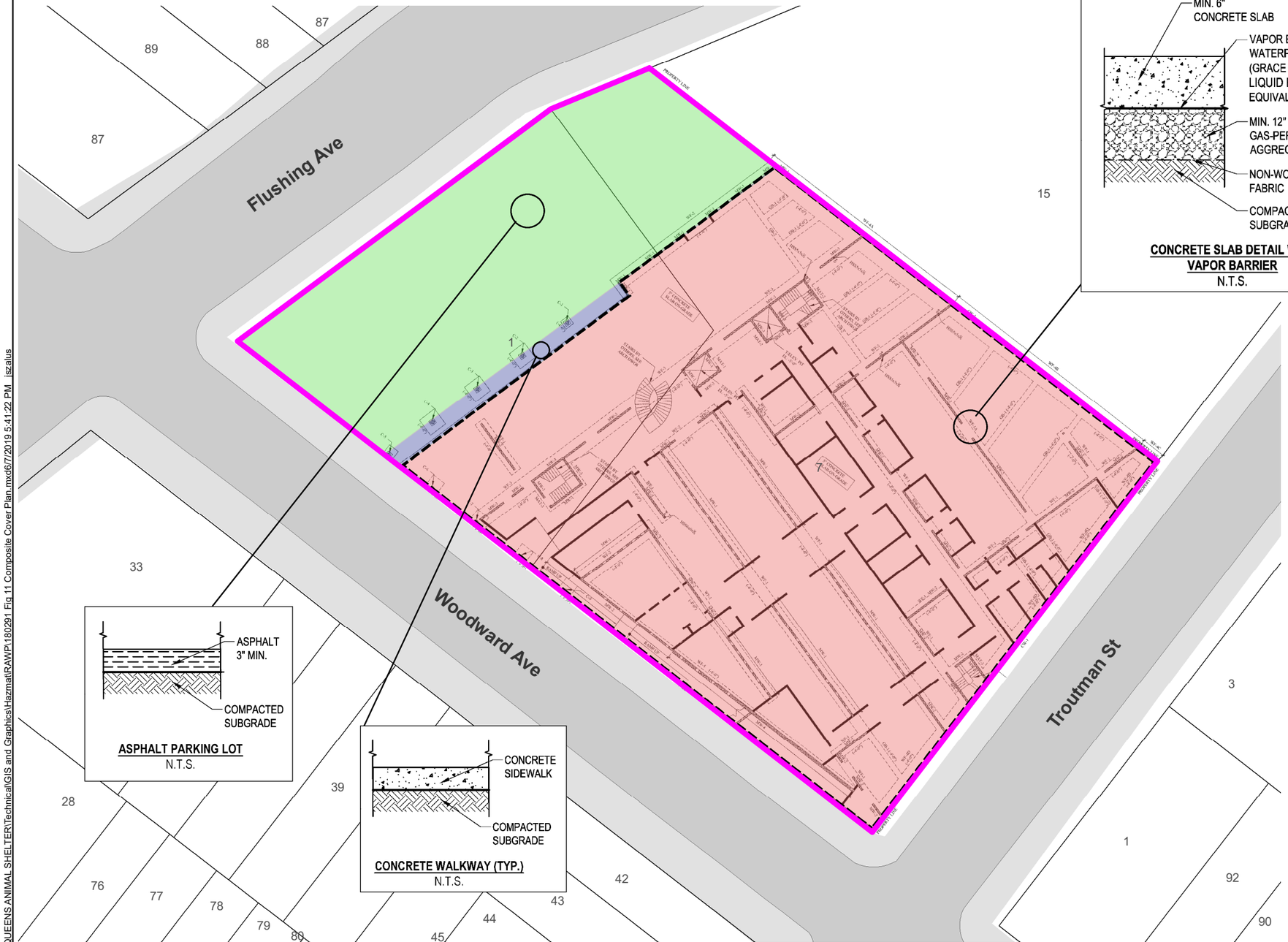
AKRF
440 Park Avenue South, New York, NY 10016

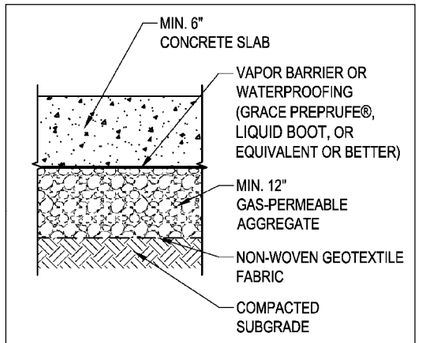
Queens Animal Shelter and Care Center
151 Woodward Avenue
Queens, New York

REMEDIAL EXCAVATION AND DOCUMENTATION SAMPLE LOCATION PLAN

DATE
6/14/2019

FIGURE
2





CONCRETE SLAB DETAIL WITH VAPOR BARRIER
N.T.S.

ASPHALT PARKING LOT
N.T.S.

CONCRETE WALKWAY (TYP.)
N.T.S.

LEGEND

- BCP PROJECT SITE BOUNDARY
- PROPOSED NEW BUILDING FOOTPRINT
- ASPHALT - PAVED PARKING LOT
- CONCRETE SLAB
- CONCRETE WALKWAY
- LOT BOUNDARY AND TAX LOT NUMBER

0 20 40 80
SCALE IN FEET

Source:
OCV Architects "First Floor Foundation Plan", Dated 2-15-2019.

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Queens Animal Shelter and Care Center
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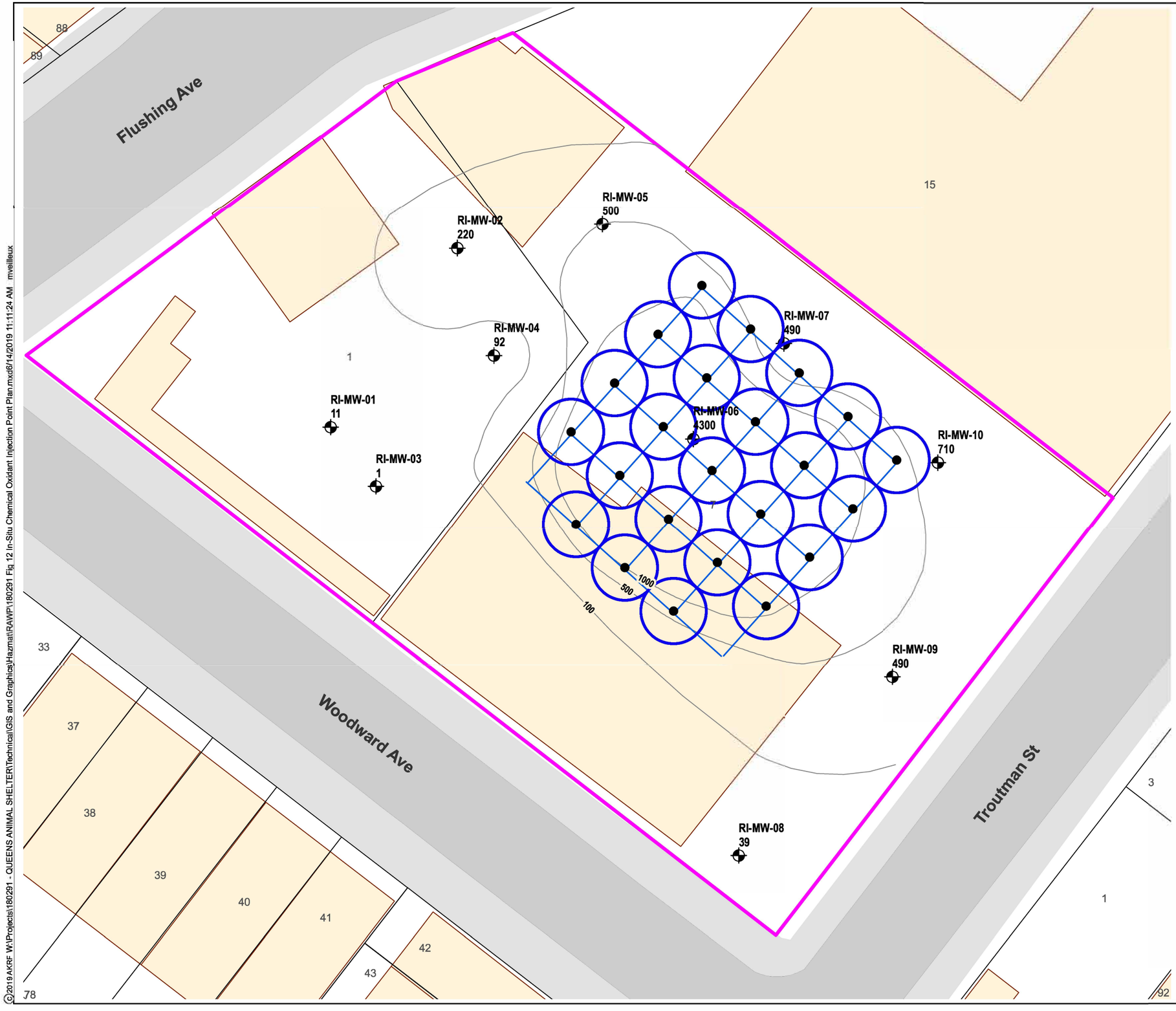
COMPOSITE COVER SYSTEM PLAN

DATE
6/7/2019

FIGURE
3



LEGEND

- BCP PROJECT SITE BOUNDARY
- LOT BOUNDARY AND TAX LOT NUMBER
- EXISTING SITE STRUCTURE
- GROUNDWATER SAMPLE LOCATION
- MTBE CONCENTRATION
- 20' X 20' GRID
- IN-SITU INJECTION POINTS WITH 10' RADIUS OF INFLUENCE

NOTE:
Methyl Tert Butyl Ether (MTBE) contours are shown in µg/L.

Map Source:
NYCDCP (NYC Dept. of City Planning) GIS database

0 15 30 60
SCALE IN FEET

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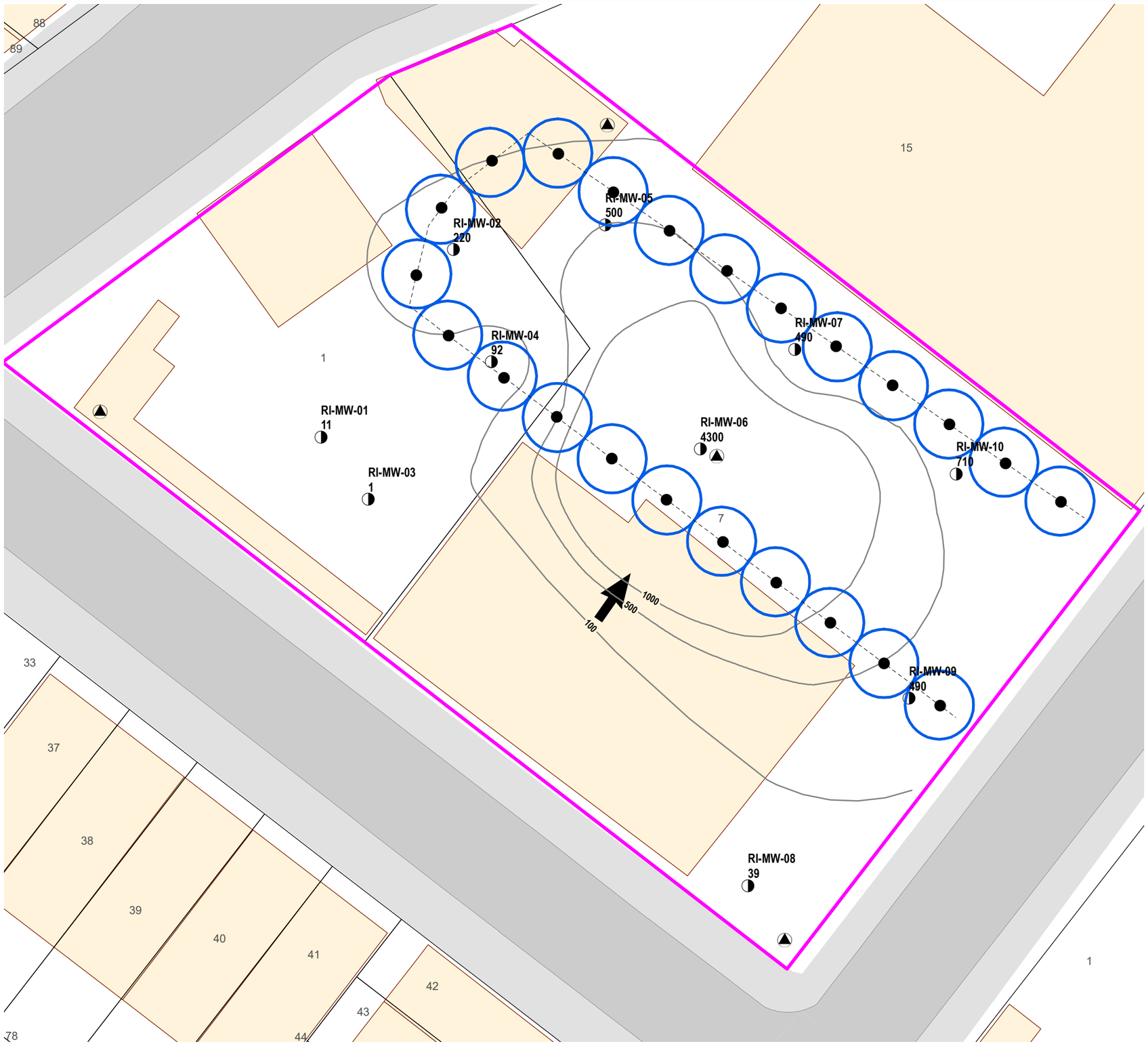
IN-SITU CHEMICAL OXIDANT INJECTION WELL LOCATION PLAN

DATE
6/14/2019

FIGURE
4



LEGEND

- BCP PROJECT SITE BOUNDARY
- LOT BOUNDARY AND TAX LOT NUMBER
- MTBE CONCENTRATION ISOCONTOURS
- RI GROUNDWATER SAMPLE LOCATION
- PERMANENT GROUNDWATER MONITORING WELL LOCATION
- GROUNDWATER FLOW DIRECTION
- DISCHARGE TREATMENT WELL WITH 10' RADIUS OF INFLUENCE

NOTE:
Methyl Tert Butyl Ether (MTBE) contours are shown in µg/L.

0 15 30 60
SCALE IN FEET

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BIOSPARGE TREATMENT SYSTEM WELLS

DATE
6/14/2019

FIGURE
5