

DECISION DOCUMENT

251 Douglass Street
Brownfield Cleanup Program
Brooklyn, Kings County
Site No. C224367
September 2023



**Department of
Environmental
Conservation**

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

DECLARATION STATEMENT - DECISION DOCUMENT

251 Douglass Street
Brownfield Cleanup Program
Brooklyn, Kings County
Site No. C224367
September 2023

Statement of Purpose and Basis

This document presents the remedy for the 251 Douglass Street 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 251 Douglass Street 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 shall be constructed, at a minimum, to meet the 2020 Energy Conservation Construction Code of New York (or most recent edition) to improve energy efficiency as an element of construction.

As part of the remedial design program, to evaluate the remedy with respect to green and sustainable remediation principles, an environmental footprint analysis will be completed. The environmental footprint analysis will be completed using an accepted environmental footprint analysis calculator such as SEFA (Spreadsheets for Environmental Footprint Analysis, USEPA), SiteWise™ (available in the Sustainable Remediation Forum [SURF] library) or similar Department accepted tool. Water consumption, greenhouse gas emissions, renewable and non-renewable energy use, waste reduction and material use will be estimated, and goals for the project related to these green and sustainable remediation metrics, as well as for minimizing community impacts, protecting habitats and natural and cultural resources, and promoting environmental justice, will be incorporated into the remedial design program, as appropriate. The project design specifications will include detailed requirements to achieve the green and sustainable remediation goals. Further, progress with respect to green and sustainable remediation metrics will be tracked during implementation of the remedial action and reported in the Final Engineering Report (FER), including a comparison to the goals established during the remedial design program.

Additionally, the remedial design program will include a climate change vulnerability assessment, to evaluate the impact of climate change on the project site and the proposed remedy. Potential vulnerabilities associated with extreme weather events (e.g., hurricanes, lightning, heat stress and drought), flooding, and sea level rise will be identified, and the remedial design program will incorporate measures to minimize the impact of climate change on potential identified vulnerabilities.

2. Excavation

Excavation and off-site disposal of contaminant source areas ranging in depth from 6 to 8 feet below grade, including:

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

Excavation of site soils to a depth of 4 feet below grade across the entire site which is subject to the in-situ solidification (ISS) treatment described in remedy element 5. Approximately 6,300 cubic yards of soil will be excavated to facilitate ISS implementation. All soils which exceed the restricted residential soil cleanup objectives will be disposed of off-site at a permitted facility. In

addition, all soils in the upper two feet which exceed the restricted residential SCOs will be excavated and transported off-site for disposal in areas not subject to any of the specific excavation requirements outlined above.

Approximately 8,845 cubic yards of contaminated soil will be removed from the site. Collection and analysis of confirmation samples at the remedial excavation depth will be used to verify that SCOs for the site have been achieved. If confirmation sampling indicates that SCOs were not achieved at the stated remedial depth, the Applicant must notify the Department, submit the sample results and, in consultation with the Department, determine if further remedial excavation is necessary. Further excavation for development will proceed after confirmation samples demonstrate that SCOs for the site have been achieved.

To ensure proper handling and disposal of excavated material, waste characterization sampling will be completed for all identified contaminated site material. Waste characterization sampling will be performed exclusively for the purposes of off-site disposal in a manner suitable to receiving facilities and in conformance with applicable federal, state, and local laws, rules, and regulations and facility-specific permits.

3. Backfill

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

4. Cover System

Site redevelopment will require a cover system be maintained to allow for restricted residential use of the site. The site cover may include paved surface parking areas, sidewalks or soil placed over a demarcation layer 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). 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.

The building footprint will extend over a majority of the site. Where the soil cover is required over the ISS treatment area, in the areas outside of the building footprint, it will consist of a minimum of two feet of soil meeting the SCOs for restricted residential use. For areas where solidified material underlies the cover, the solidified material itself will serve as the demarcation layer due to the nature of the material.

5. In-Situ Solidification

In-situ solidification (ISS) will be evaluated for implementation from approximately 4 feet below grade (bgs) to 40 feet bgs across the entire site. The treatment zone will be in areas where grossly contaminated material and/or non-aqueous phase liquid (GCM/NAPL) consisting of coal tar is

present below the groundwater table to a terminal depth of approximately -26 feet to -32 feet NAVD88 (i.e., approximately 40 feet below grade). ISS is a process that binds the soil particles in place creating a low permeability mass. The contaminated soil will be mixed in place together with solidifying agents (typically Portland cement) or other binding agents using an excavator or augers. The soil and binding agents are mixed to produce a solidified mass resulting in a low permeability monolith. The solidified mass will then be covered with a cover system as described in Paragraph 4 to prevent direct exposure to the solidified mass. The resulting solid matrix reduces or eliminates mobility of contamination and reduces or eliminates the matrix as a source of groundwater contamination.

6. Hydraulic Barrier

Installation of a low-permeability hydraulic barrier wall to a depth of 55 feet below grade around the entire site boundary to prevent off-site migration of GCM/NAPL and associated contamination. The treatment zone will be in areas where GCM/NAPL is present below the groundwater table to a terminal depth of approximately -41 feet to -47 feet NAVD88 (i.e., approximately 55 feet below grade).

7. Vapor Mitigation

Any on-site buildings will be required to have a sub-slab depressurization system, or other acceptable measures, to mitigate the migration of vapors into the building from the subsurface.

8. Engineering and Institutional Controls

Imposition of an institutional control in the form of an environmental easement and a Site Management Plan, as described below, will be required. The remedy will achieve a Track 4 restricted residential cleanup at a minimum and will include imposition of a site cover and vapor mitigation system as engineering controls.

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 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 NYCDOH; and
- require compliance with the Department approved Site Management Plan.

9. 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 8 above.
 - Engineering Controls: The cover system discussed in Paragraph 4, hydraulic barrier discussed in paragraph 6, and the sub-slab depressurization system discussed in Paragraph 7 above.

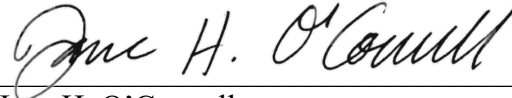
This plan includes, but may not be limited to:

- an Excavation Plan which details the provisions for management of future excavations in areas of remaining contamination;
 - 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 maintained over the ISS treatment area;
 - 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. Monitoring Plan to assess the performance and effectiveness of the remedy. The plan includes, but may not be limited to:
 - monitoring of groundwater, NAPL and indoor air to assess the performance and effectiveness of the remedy; and
 - a schedule of monitoring and frequency of submittals to the Department.
 - 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;
 - 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.

September 13, 2023



Date

Jane H. O'Connell
Regional Remediation Engineer, Region 2

DECISION DOCUMENT

251 Douglass Street
Brooklyn, Kings County
Site No. C224367
September 2023

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=C224367>

Brooklyn Public Library - Carroll Gardens Branch
396 Clinton Street
Brooklyn, NY 11217
Phone: (718) 596-6972

Brooklyn Community Board 6
250 Baltic Street
Brooklyn, NY 11201
Phone: (718) 643-3027

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 situated in an urban area surrounded by primarily industrial properties. The Gowanus Canal, a USEPA National Priorities List (NPL) site, is located approximately 260 feet west of the site and was once a vital cargo transportation hub prior to the mid-20th century. The subject property has a total area of approximately 28,500 square feet (sf) (0.65 acres) and is bounded to the west by Nevins Street, to the south by Douglass Street, to the east by commercial warehouse/industrial buildings and to the north by Butler Street.

Site Features: The main site features are two partial building foundations from one (1) single-story 10,000 sf vacant warehouse structure on the westernmost portion of the site (formerly identified as Lot 1) and one (1) two-story, 2,500 sf vacant commercial structure (easternmost portion of the site formerly identified as Lot 50) which contains a partial cellar accessible through hatch doors in the sidewalk adjacent to Douglass Street. The buildings were demolished in November of 2022, and the site is currently unoccupied.

Current Zoning and Land Use: The site is currently vacant and zoned M1-4/R7X with the northern portion (former lot 15) and zoned M1-4/R6A in the western portion (former lot 1). The zoning designations are representative of light manufacturing zoning with a residential overlay. Prior to a zoning change that went into effect in November 2021 by the New York City Department of City Planning, the site was located within a M1-2 designation. The M1-2 designation is a district characterized by light industrial uses such as woodworking, repair shops, wholesale service and storage facilities. In general, the surrounding parcels were part of the re-zoning and are presently designated as M1-4/R6A and M1-2 to the north, M1-4/R6A and M1-4/R7X to the east, M1-4/R6B to the west with a park to the south.

Past Use of the Site: Based on historic Sanborn Fire Insurance Maps, portions of the site were developed prior to 1900. Between 1886 and 1904, the site was occupied by Bradley & Son Stone Works. By 1915, Scranton & Lehigh Coal Co. occupied the western portion (former lot 1) and Thomas Harrington's Sons Co. Contractors occupied the eastern portion (former lots 15, 50 and 51). According to historic building records, the two (2) on-site buildings were constructed in 1931.

The 1938 Sanborn Map depicts both buildings as garages, each containing one (1) gasoline tank. In 1950, the western structure (former lot 1) was utilized as a motor freight station, and the eastern structure (former lot 50) was used for office space. From 1969 to 1987, the western structure was used as a private garage and automobile repair facility, while former lots 15 and 51 were used for parking or storage.

Site Geology and Hydrogeology: The ground surface at the site slopes slightly to the south toward the intersection of Douglass Street and Nevins Street. The elevation of the property ranges from approximately +15 feet NAVD-88 in the northeastern portion to +11 feet NAVD-88 feet in the southwest. Depth to groundwater ranges between 6.81 to 11.21 feet below grade (bgs) and is likely tidally influenced. Groundwater flows to the west toward the Gowanus Canal, which is located approximately 260 feet west of the site. According to the Federal Emergency Management Agency (FEMA), the site is located within a designated flood plain. A small western portion of the site is located within a Special Flood Hazard Area (SFHA), Zone AE, characterized by having a 1 percent annual chance of flooding, and the remainder of the site is located within a moderate risk floodplain, Zone X, having a 0.2 percent annual chance of flooding.

Investigation reports prepared for the site characterized subsurface soil as historic fill primarily containing slag, brick, and gravel in a brown fine to medium grained sand matrix. The fill material was encountered from grade to depths of 4 to 10 feet bgs throughout the majority of the site. The fill material is underlain by native soil, generally consisting of brown fine to medium sand with gravel, silt and/or clay. Bedrock was not encountered during historic investigations.

A site location map is attached as Figures 1 and 1A.

SECTION 4: LAND USE AND PHYSICAL SETTING

The Department may consider the current, intended, and reasonably anticipated future land use of the site and its surroundings when evaluating a remedy for soil remediation. For this site, alternatives (or an alternative) that restrict(s) the use of the site to restricted residential 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 Applicant does not have an obligation to address off-site contamination. However, the Department in consultation with NYSDOH has determined that this site poses a significant threat to public health and/or the environment; accordingly, an enforcement action is 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
- 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 contaminant(s) of concern identified at this site is/are:

benzene	toluene
n-propylbenzene	naphthalene
1,2,4-trimethylbenzene	coal tar
benzo(a)anthracene	1,3,5-trimethylbenzene
benzo(b)fluoranthene	acenaphthene
benzo(k)fluoranthene	acenaphthylene
chrysene	n-propylbenzene
indeno(1,2,3-cd)pyrene	phenanthrene
perfluorooctanoic acid	pyrene
arsenic	lead
ethylbenzene	mercury
xylene (mixed)	

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.

Nature and Extent of Contamination:

Soil and groundwater were analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), metals, polychlorinated biphenyls (PCBs), per- and polyfluoroalkyl substances (PFAS), and pesticides. Soil vapor was sampled analyzed for VOCs. Based on the

investigations conducted to date, the primary contaminants of concern are coal tar grossly contaminated material/non-aqueous phase liquid (GCM/NAPL), VOCs, SVOCs and metals in soil; coal tar NAPL, VOCs, SVOCs and metals in groundwater; and VOCs in soil vapor.

Soil - GCM/NAPL associated with coal tar contamination from the “K- Fulton Works” Manufactured Gas Plant (site no. 224051) has been encountered in on-site borings and delineated across the entire site. Contaminants in soil were detected above restricted residential soil cleanup objectives (RRSCOs) and/or protection of groundwater soil cleanup objectives (PGSCOs). Petroleum and coal tar-related VOCs were found in soils across the site including naphthalene at 16,000 parts per million (ppm) (RRSCO: 100 ppm, PGSCO: 12 ppm), benzene at 850 ppm (RRSCO: 41 ppm, PGSCO: 1 ppm), ethylbenzene at 1,100 ppm (RRSCO: 4.8 ppm, PGSCO: 1 ppm), n-propylbenzene at 37 ppm (PGSCO: 3.9 ppm), , toluene at 1,600 ppm (RRSCO: 100 ppm, PGSCO: 0.7 ppm), total xylenes at 1,500 ppm (RRSCO: 100 ppm, PGSCOs: 1.6 ppm), 1,2,4-trimethylbenzene at 1,299 ppm (RRSCO: 47 ppm, PGSCO: 3.6 ppm), and 1,3,5-trimethylbenzene at 130 ppm (RRSCO: 47 ppm, PGSCO: 8.4 ppm).

SVOCs were found in soils across the site including naphthalene at 5,100 ppm (RRSCO: 100 ppm, PGSCO: 12 ppm), acenaphthene at 890 ppm (RRSCO: 100 ppm), acenaphthylene at 680 ppm (RRSCO: 100 ppm), benzo(a)anthracene at 200 ppm (RRSCO: 1 ppm), benzo(a)pyrene at 200 ppm (RRSCO: 1 ppm), benzo(b)fluoranthene at 140 ppm (RRSCO: 1 ppm), benzo(k)fluoranthene at 43 ppm (RRSCO: 1 ppm), chrysene at 200 ppm (RRSCO: 1 ppm), dibenz(a,h)anthracene at 15 ppm (RRSCO: 0.33 ppm), fluoranthene at 380 ppm (RRSCO: 100 ppm), phenanthrene at 330 ppm (RRSCO: 100 ppm), and pyrene at 600 ppm (RRSCO: 100 ppm).

Metals were detected in soils including arsenic at 66.2 ppm (RRSCO/PGSCO: 16 ppm), copper at 3,050 ppm (RRSCO: 270 ppm), lead at 3,890 ppm (RRSCO: 400 ppm), and mercury at 91.7 ppm (RRSCO: 0.81 ppm).

No pesticides or PCBs were detected at concentrations exceeding the applicable RRSCOs. Perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS) were reported at concentrations below soil cleanup guidance values for restricted residential use and protection of groundwater.

Data indicates that contaminants in soil have the potential to migrate off-site.

Groundwater - VOCs, SVOCs and metals were detected in groundwater samples exceeding the NYSDEC Ambient Water Quality Standards (AWQS). Separate-phase NAPL has been observed in groundwater monitoring wells installed at the site. Petroleum and coal tar-related VOCs were found in groundwater at the site including naphthalene at 12,000 parts per billion (ppb) (AWQS: 10 ppb), benzene at 20,000 ppb (AWQS: 1 ppb), ethylbenzene at 1,900 ppb (AWQS: 5 ppb), toluene at 15,000 ppb (AWQS: 5 ppb), xylenes at 4,100 ppb (AWQS: 5 ppb), 1,2,4-trimethylbenzene at 450 ppb (AWQS: 5 ppb), 1,3,5-trimethylbenzene at 620 ppb (AWQS: 5 ppb), 2-Butanone at 1,700 ppb (AWQS: 50 ppb), methyl tert butyl ether at 38 ppb (AWQS: 10 ppb), and trichloroethene at 9.3 ppb (AWQS: 5 ppb).

SVOCs were found in groundwater including naphthalene at 9,000 ppb (AWQS: 10 ppb), acenaphthylene at 100 ppb (AWQS: 20 ppb), benzo(a)anthracene at 16 ppb (AWQS: 0.002 ppb), benzo(a)pyrene at 7 ppb (AWQS: 0 ppb), benzo(b)fluoranthene at 11 ppb (AWQS: 0.002 ppb), benzo(k)fluoranthene at 5.3 ppb (AWQS: 0.002 ppb), chrysene at 16 ppb (AWQS: 0.002 ppb), fluorene at 74 ppb (AWQS: 50 ppb), indeno(1,2,3-cd)pyrene at 5.6 ppb (AWQS: 0.002 ppb), phenanthrene at 130 ppb (AWQS: 20 ppb), and pyrene at 56 (AWQS: 50 ppb).

Dissolved metals detected in groundwater include arsenic at 26.8 ppb (dissolved) (AWQS: 25 ppb).

PFOA was detected at a maximum concentration of 215 parts per trillion (ppt) compared to the Ambient Water Quality Guidance Value (AWQGV) of 2.7 ppt, and PFOS was detected at maximum concentration of 44.1 ppt compared to the AWQGV of 6.7 ppt.

Data indicates that contaminants in groundwater have the potential to migrate off-site.

Soil Vapor - Sub slab soil vapor had elevated chlorinated volatile organic compounds (CVOCs) including cis-1,2-dichloroethene at 59 micrograms per cubic meter (ug/m³), trichloroethene at 78.4 ug/m³, methylene chloride at 130 ug/m³, tetrachloroethene at 685 ug/m³, and vinyl chloride at 92.5 ug/m³. Other VOCs detected in sub-slab and soil vapor include acetone at 2,610 ug/m³, benzene at 460 ug/m³, isopropanol at 295 ug/m³, cyclohexane at 41,300 ug/m³, ethylbenzene at 146 ug/m³, heptane at 5,000 ug/m³, toluene at 155 ug/m³ and 1,1,1-trichloroethane at 12,900 ug/m³.

The potential exists for inhalation of site contaminants due to soil vapor intrusion both off-site and for any future on-site development.

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*.

People are not drinking the contaminated groundwater because the area is served by a public water supply that obtains its water from a different source. The site is completely fenced, which restricts public access; however, persons who enter the site may come into contact with contaminants in soils by digging on the site or walking on unpaved portions of the site. Volatile organic compounds in soil vapor (air spaces within the soil) may move into buildings and affect the indoor air quality. There are no buildings on-site so soil vapor intrusion is not a current concern. However, the potential exists for inhalation of site contaminants due to soil vapor intrusion both off-site and 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:

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

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

Soil

RAOs for Public Health Protection

- Prevent ingestion/direct contact with contaminated soil.
- Prevent inhalation of or exposure to 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 use with generic soil cleanup objectives remedy.

The selected remedy is referred to as the Excavation, In-situ Solidification and Vapor Mitigation remedy.

The elements of the selected remedy, as shown in Figures 2 through 5A, 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 shall be constructed, at a minimum, to meet the 2020 Energy Conservation Construction Code of New York (or most recent edition) to improve energy efficiency as an element of construction.

As part of the remedial design program, to evaluate the remedy with respect to green and sustainable remediation principles, an environmental footprint analysis will be completed. The environmental footprint analysis will be completed using an accepted environmental footprint analysis calculator such as SEFA (Spreadsheets for Environmental Footprint Analysis, USEPA), SiteWise™ (available in the Sustainable Remediation Forum [SURF] library) or similar Department accepted tool. Water consumption, greenhouse gas emissions, renewable and non-renewable energy use, waste reduction and material use will be estimated, and goals for the project related to these green and sustainable remediation metrics, as well as for minimizing community impacts, protecting habitats and natural and cultural resources, and promoting environmental justice, will be incorporated into the remedial design program, as appropriate. The project design specifications will include detailed requirements to achieve the green and sustainable remediation goals. Further, progress with respect to green and sustainable remediation metrics will be tracked during implementation of the remedial action and reported in the Final Engineering Report (FER), including a comparison to the goals established during the remedial design program.

Additionally, the remedial design program will include a climate change vulnerability assessment, to evaluate the impact of climate change on the project site and the proposed remedy. Potential vulnerabilities associated with extreme weather events (e.g., hurricanes, lightning, heat stress and

drought), flooding, and sea level rise will be identified, and the remedial design program will incorporate measures to minimize the impact of climate change on potential identified vulnerabilities.

2. Excavation

Excavation and off-site disposal of contaminant source areas ranging in depth from 6 to 8 feet below grade, including:

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

Excavation of site soils to a depth of 4 feet below grade across the entire site which is subject to the in-situ solidification (ISS) treatment described in remedy element 5. Approximately 6,300 cubic yards of soil will be excavated to facilitate ISS implementation. All soils which exceed the restricted residential soil cleanup objectives will be disposed of off-site at a permitted facility. In addition, all soils in the upper two feet which exceed the restricted residential SCOs will be excavated and transported off-site for disposal in areas not subject to any of the specific excavation requirements outlined above.

Approximately 8,845 cubic yards of contaminated soil will be removed from the site. Collection and analysis of confirmation samples at the remedial excavation depth will be used to verify that SCOs for the site have been achieved. If confirmation sampling indicates that SCOs were not achieved at the stated remedial depth, the Applicant must notify the Department, submit the sample results and, in consultation with the Department, determine if further remedial excavation is necessary. Further excavation for development will proceed after confirmation samples demonstrate that SCOs for the site have been achieved.

To ensure proper handling and disposal of excavated material, waste characterization sampling will be completed for all identified contaminated site material. Waste characterization sampling will be performed exclusively for the purposes of off-site disposal in a manner suitable to receiving facilities and in conformance with applicable federal, state, and local laws, rules, and regulations and facility-specific permits.

3. Backfill

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

4. Cover System

Site redevelopment will require a cover system be maintained to allow for restricted residential use of the site. The site cover may include paved surface parking areas, sidewalks or soil placed over a demarcation layer 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). 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.

The building footprint will extend over a majority of the site. Where the soil cover is required over the ISS treatment area, in the areas outside of the building footprint, it will consist of a minimum of two feet of soil meeting the SCOs for restricted residential use. For areas where solidified material underlies the cover, the solidified material itself will serve as the demarcation layer due to the nature of the material.

5. In-Situ Solidification

In-situ solidification (ISS) will be evaluated for implementation from approximately 4 feet below grade (bgs) to 40 feet bgs across the entire site. The treatment zone will be in areas where grossly contaminated material and/or non-aqueous phase liquid (GCM/NAPL) consisting of coal tar is present below the groundwater table to a terminal depth of approximately -26 feet to -32 feet NAVD88 (i.e., approximately 40 feet below grade). ISS is a process that binds the soil particles in place creating a low permeability mass. The contaminated soil will be mixed in place together with solidifying agents (typically Portland cement) or other binding agents using an excavator or augers. The soil and binding agents are mixed to produce a solidified mass resulting in a low permeability monolith. The solidified mass will then be covered with a cover system as described in Paragraph 4 to prevent direct exposure to the solidified mass. The resulting solid matrix reduces or eliminates mobility of contamination and reduces or eliminates the matrix as a source of groundwater contamination.

6. Hydraulic Barrier

Installation of a low-permeability hydraulic barrier wall to a depth of 55 feet below grade around the entire site boundary to prevent off-site migration of GCM/NAPL and associated contamination. The treatment zone will be in areas where GCM/NAPL is present below the groundwater table to a terminal depth of approximately -41 feet to -47 feet NAVD88 (i.e., approximately 55 feet below grade).

7. Vapor Mitigation

Any on-site buildings will be required to have a sub-slab depressurization system, or other acceptable measures, to mitigate the migration of vapors into the building from the subsurface.

8. Engineering and Institutional Controls

Imposition of an institutional control in the form of an environmental easement and a Site Management Plan, as described below, will be required. The remedy will achieve a Track 4 restricted residential cleanup at a minimum and will include imposition of a site cover and vapor mitigation system as engineering controls.

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 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 NYCDOH; and
- require compliance with the Department approved Site Management Plan.

9. 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 8 above.
 - Engineering Controls: The cover system discussed in Paragraph 4, hydraulic barrier discussed in paragraph 6, and the sub-slab depressurization system discussed in Paragraph 7 above.

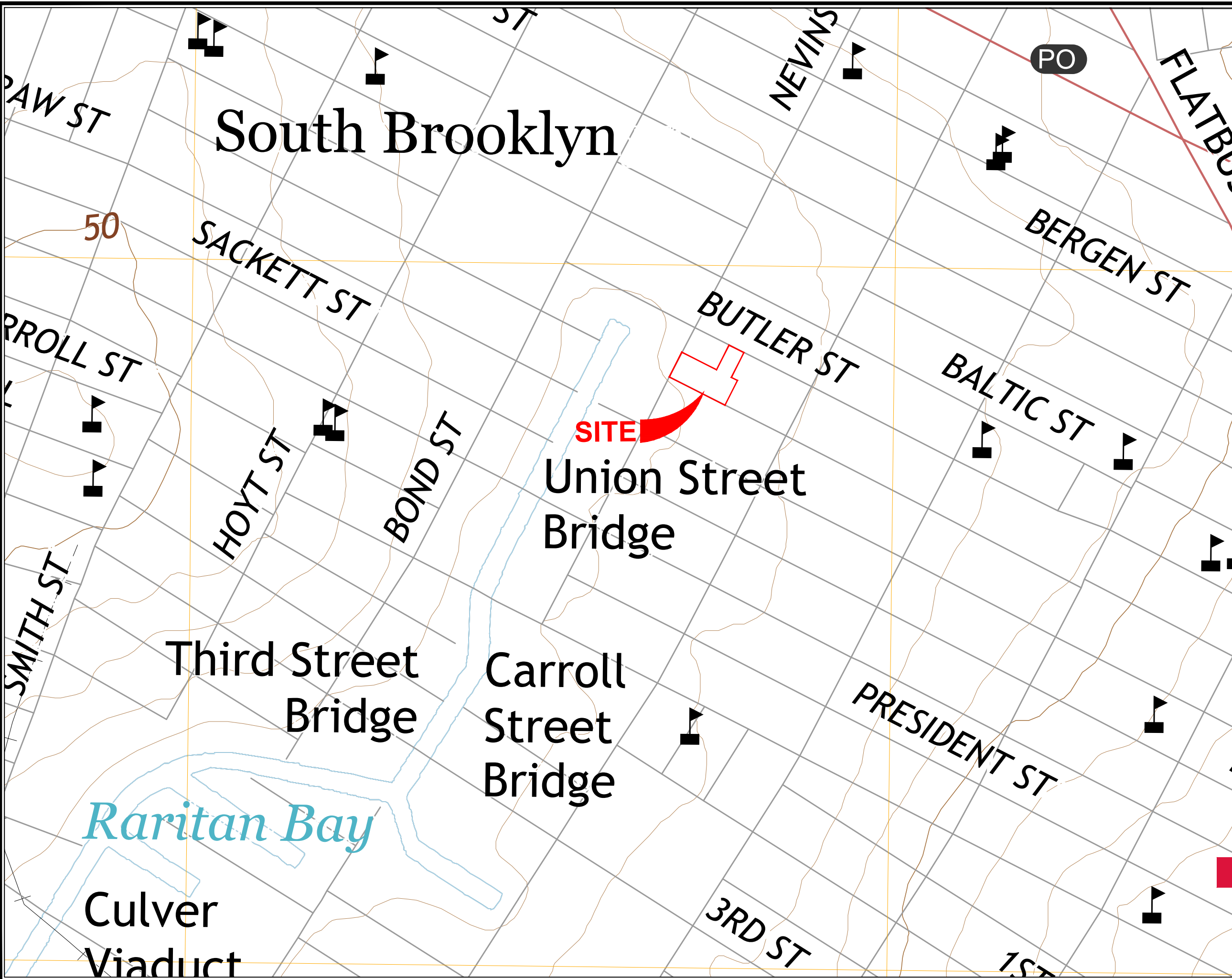
This plan includes, but may not be limited to:

- an Excavation Plan which details the provisions for management of future excavations in areas of remaining contamination;
- 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 maintained over the ISS treatment area;
- 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. Monitoring Plan to assess the performance and effectiveness of the remedy. The plan

includes, but may not be limited to:

- monitoring of groundwater, NAPL and indoor air to assess the performance and effectiveness of the remedy; and
 - a schedule of monitoring and frequency of submittals to the Department.
- 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;
 - maintaining site access controls and Department notification; and
 - providing the Department access to the site and O&M records.



LEGEND

— PROPERTY LINE



NOTES:

**FIGURE 1:
SITE LOCATION**

251 Douglas Street
Brooklyn, New York

Figure No: 01

PROJECT NO:	13028-01
DESIGNED BY:	AB
DRAWN BY:	AB
CHECKED BY:	DP
DATE:	4/14/2023
SCALE:	N.T.S.
REVISIONS	

**IMPACT ENVIRONMENTAL
ENGINEERING & GEOLOGY, PLLC**

170 KEYLAND COURT
BOHEMIA, NEW YORK 11716
TEL (631) 269-8800
FAX (631) 269-1599





SITE:
251 Douglass Street
Block 412
Lot 50



IMPACT ENVIRONMENTAL

170 Keyland Court
 Bohemia, New York 11716
 P: (631) 269-8800 F: (631) 269-1599

Site Plan

251 Douglass Street, Brooklyn, NY
 Block: 412, Lot: 50
 NYSDEC Site No.: C224367

DRAWN BY:	AB
CHECKED BY:	KK
DATE:	7/10/2023
SCALE:	1 in = 100 ft

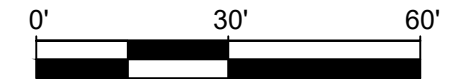
Figure No.
1A

BUTLER STREET

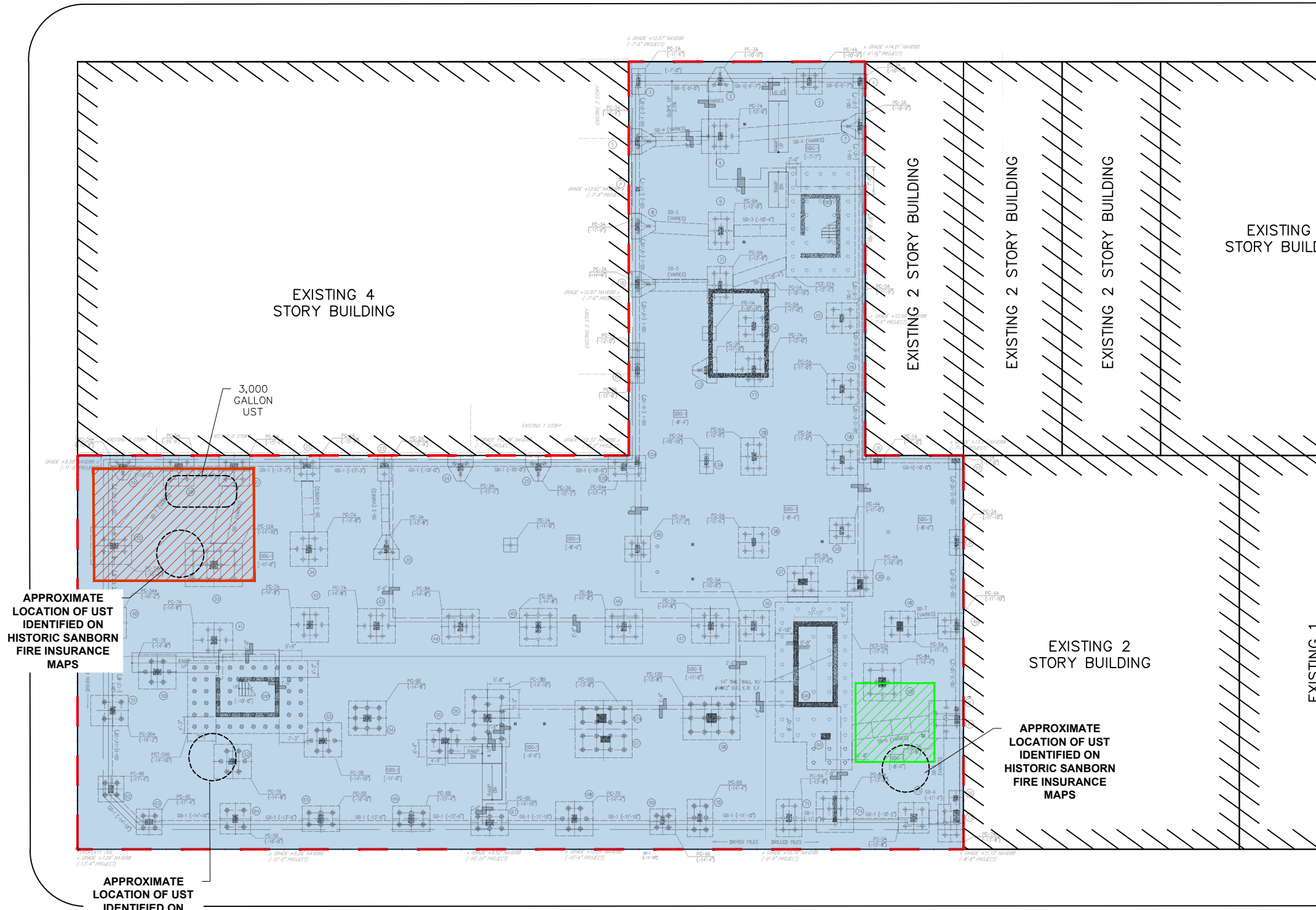


LEGEND

- PROPERTY LINE
- TRACK 4 EXCAVATION TO 2 FBG
- ARSENIC HOT SPOT EXCAVATION TO 6 FBG
- PETROLEUM SOURCE AREA EXCAVATION TO 8 FBG



NEVINS STREET



APPROXIMATE LOCATION OF UST IDENTIFIED ON HISTORIC SANBORN FIRE INSURANCE MAPS

APPROXIMATE LOCATION OF UST IDENTIFIED ON HISTORIC SANBORN FIRE INSURANCE MAPS

APPROXIMATE LOCATION OF UST IDENTIFIED ON HISTORIC SANBORN FIRE INSURANCE MAPS

NOTES:

1. THERE IS THE POTENTIAL THAT USTS WILL BE ENCOUNTERED DURING THE REMEDIAL ACTIVITIES AT THE SITE WHICH WILL BE REMOVED IN ACCORDANCE WITH INDUSTRY STANDARDS, NYSDEC DER-10 AND THE NYSDEC PBS REGULATIONS. SHOULD THESE OR OTHER UNKNOWN UST(S) BE ENCOUNTERED DURING SITE WORK, THE NYSDEC REGION 2 PBS WILL BE NOTIFIED, AND AN UPDATED REGISTRATION SUBMITTED. THE CONTENTS OF THE TANK WILL BE REMOVED, THE TANK WILL BE CLEANED, RENDERED USELESS AND DISPOSED, AS WELL AS ASSOCIATED CONTAMINATED SOIL, AS APPLICABLE. THIS WILL BE COMPLETED IN ACCORDANCE WITH NYSDEC DER-10 AND THE NYSDEC PBS regulations.

**FIGURE 2
REMEDIAL EXCAVATION
(TRACK 4) WITH HOTSPOTS**

251 Douglass Street
Brooklyn, New York

Figure No2	
PROJECT NO:	13028-01
DESIGNED BY:	AB
DRAWN BY:	AB
CHECKED BY:	DP
DATE:	5/24/2023
SCALE:	1" = 30'
REVISIONS	





DOUGLASS STREET

IMPACT ENVIRONMENTAL

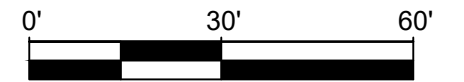
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BOHEMIA, NEW YORK 11716
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FAX (631) 269-1599

BUTLER STREET

LEGEND

-  PROPERTY LINE
-  8' Ø ISS COLUMN
-  8' Ø BARRIER WALL VERTICAL COLUMN
-  ISS TREATMENT AREA

PROJECT



NOTES:

1. IN-SITU STABILIZATION/SOLIDIFICATION (ISS) WILL BE CONDUCTED USING SOIL MIXING TECHNIQUES FROM DEPTHS OF 4 TO 40 FEET BGS USING AMENDMENTS SUCH AS PORTLAND CEMENT AND/OR SLAG.
2. VERTICAL BARRIER WALL COLUMN INSTALLED TO 55 FBG.

FIGURE 3
ISS AND HYDRAULIC BARRIER WALL PLAN

251 Douglass Street
Brooklyn, New York

Figure No: 3

PROJECT NO:	13028-01
DESIGNED BY:	AB
DRAWN BY:	AB
CHECKED BY:	KK
DATE:	5/30/2023
SCALE:	1" = 25'
REVISIONS	

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SEE ISS DETAIL ABOVE

NEVINS STREET

EXISTING 2 STORY BUILDING

EXISTING 2 STORY BUILDING

EXISTING
STORY B

4
DING

OFFSET ROW
OVERLAP
CENTERPOINT
TO CENTERPOINT:
 $0.750 \times 8' = 6'$

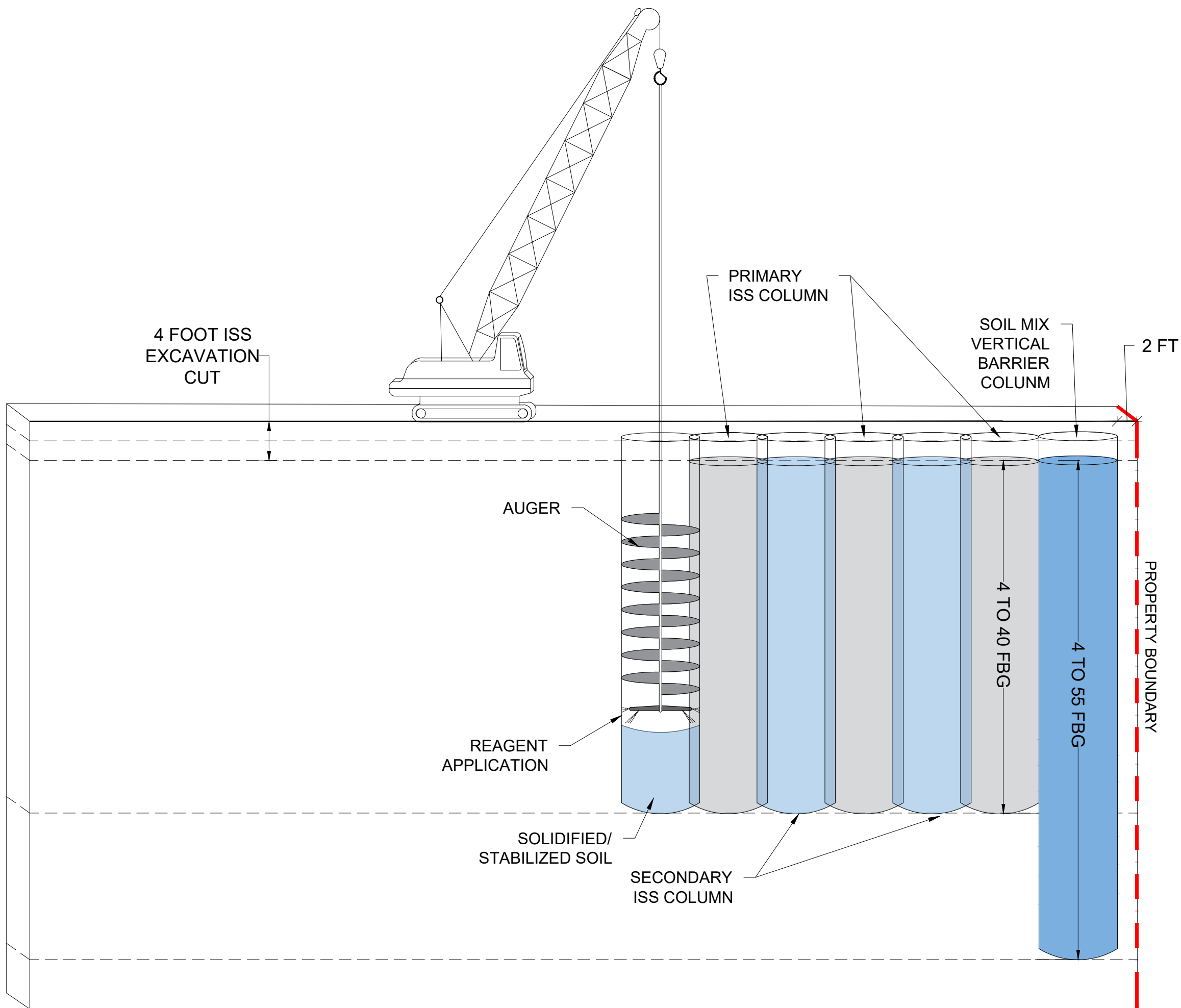
ROW OVERLAP
CENTERPOINT
TO CENTERPOINT:
 $0.866 \times 8' = 6.928'$

8'

2'

PROPERTY LINE

ISS DETAIL
SCALE: 1" = 5'



- NOTES:
1. SOIL MIX VERTICAL COLUMN HAS 13% OVERLAP.
 2. TRACK 4 EXCAVATION: 0-2 FBG.
 3. HOT SPOT EXCAVATION IDENTIFIED ON FIGURE 15.

FIGURE 4
ISS AND HYDRAULIC
BARRIER WALL CROSS
SECTION PLAN

251 Douglass Street
 Brooklyn, New York

Figure No: 4

PROJECT NO:	13028-01
DESIGNED BY:	AB
DRAWN BY:	AB
CHECKED BY:	KK
DATE:	5/30/2023
SCALE:	N.T.S.
REVISIONS	

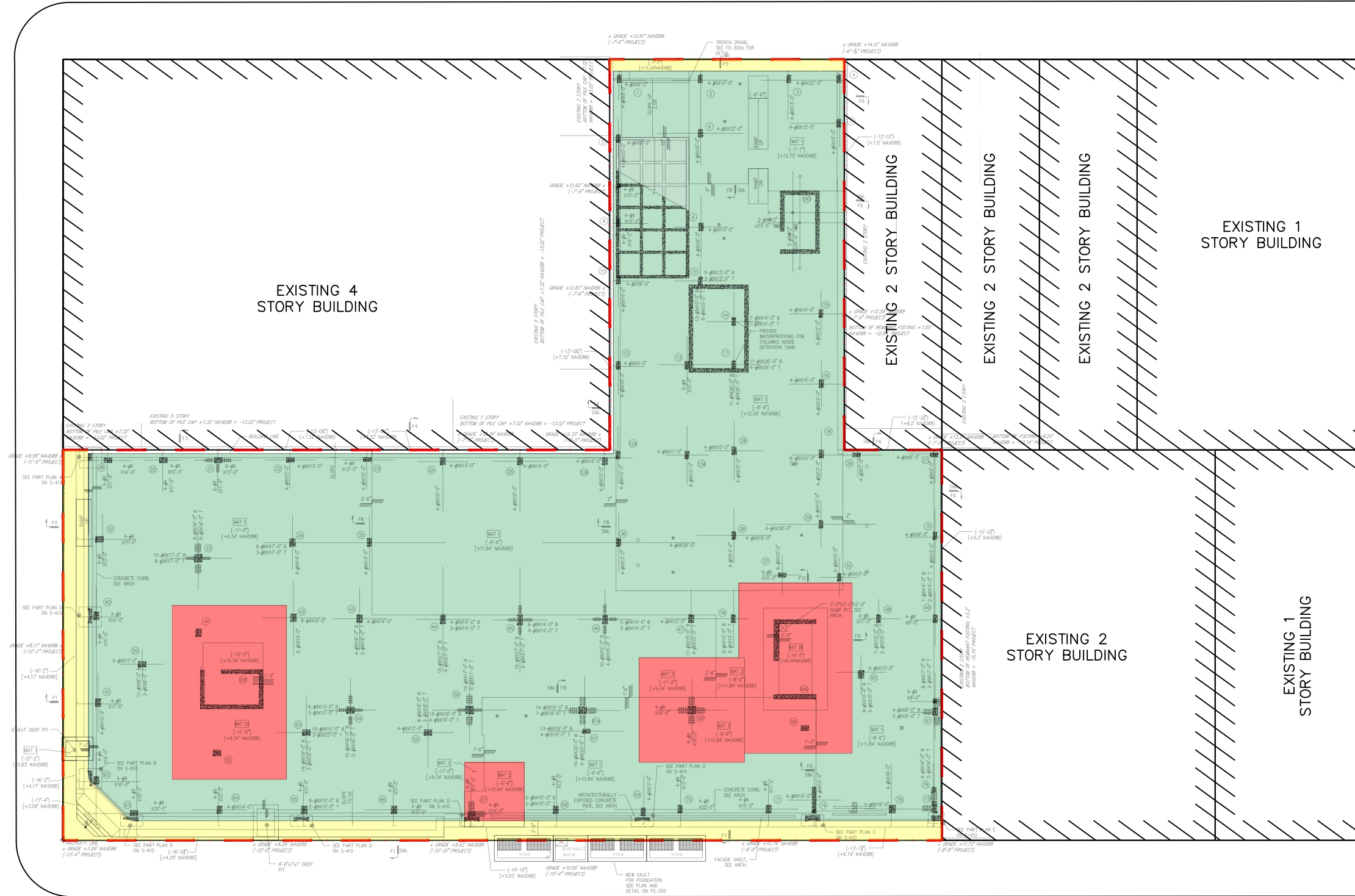
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BUTLER STREET

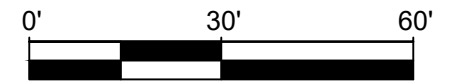
NEVINS STREET

DOUGLASS STREET



LEGEND

- PROPERTY LINE
 - MAT CONCRETE BUILDING SLAB - 38" THICK
 - MAT CONCRETE BUILDING SLAB - 48" THICK
 - CONCRETE COVER SYSTEM - 4" CONCRETE SIDEWALK WITH 6" GRAVEL SUBBASE*
- *SEE NOTES FOR DETAILS



- NOTES:
- IMPERMEABLE CONCRETE SIDEWALK CAP SLOPED 1.5% TO 2.5%.

**FIGURE 5 :
SITE-WIDE COVER SYSTEM
PLAN**

251 Douglass Street
Brooklyn, New York

Figure No: 16

PROJECT NO:	13028-01
DESIGNED BY:	AB
DRAWN BY:	AB
CHECKED BY:	KK
DATE:	8/15/2023
SCALE:	1" = 30'

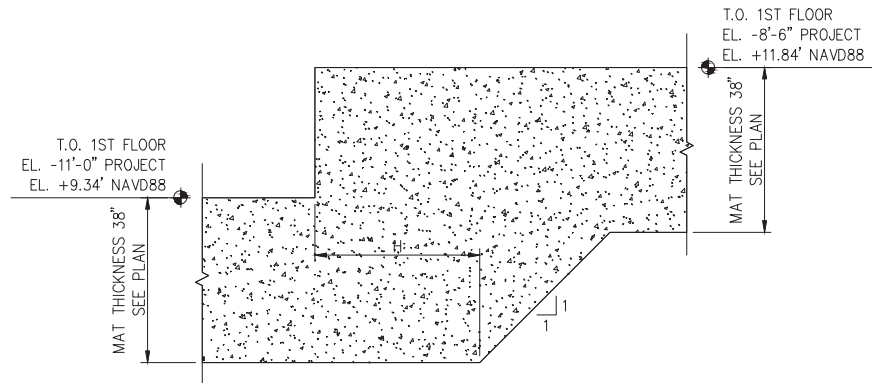
REVISIONS

NO.	DESCRIPTION

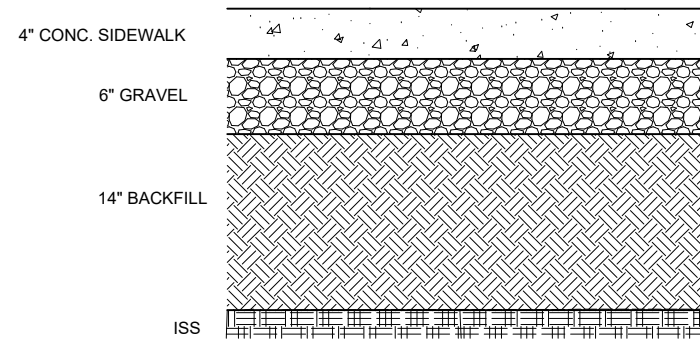
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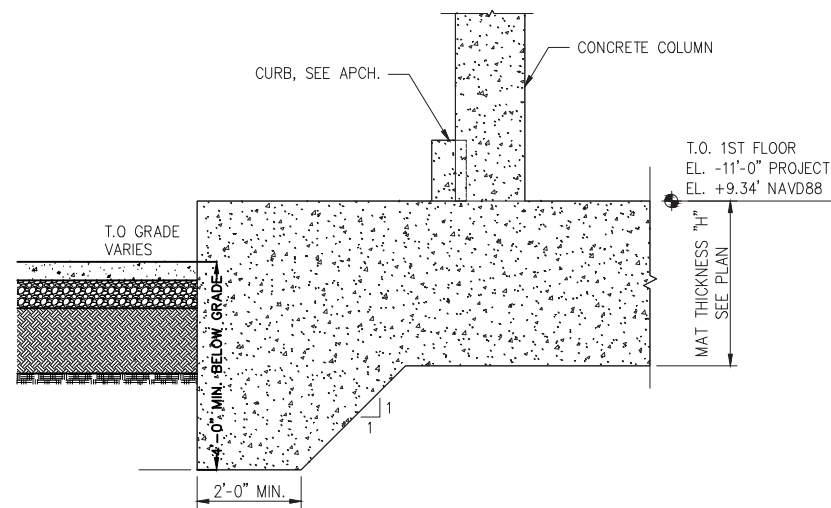




TYPICAL BUILDING SLAB
N.T.S.



CONCRETE COVER
N.T.S.



TYPICAL NON-BUILDING COVERS
N.T.S.

NOTES:

- NON-BUILDING AREAS INCLUDE 4-INCH CONCRETE SIDEWALK AND 6-INCH GRAVEL SUBBASE.

**FIGURE 5A:
TYPICAL COVER DETAIL
FOR ALL COVER TYPES**

251 Douglas Street
Brooklyn, New York

Figure No: 17

PROJECT NO:	13028-01
DESIGNED BY:	AB
DRAWN BY:	AB
CHECKED BY:	DP
DATE:	2/9/2022
SCALE:	N.T.S.
REVISIONS	

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