DECISION DOCUMENT

19, 21, & 23 Academy Street
Brownfield Cleanup Program
Poughkeepsie, Dutchess County
Site No. C314126
July 2023

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

DECLARATION STATEMENT - DECISION DOCUMENT

19, 21, & 23 Academy Street
Brownfield Cleanup Program
Poughkeepsie, Dutchess County
Site No. C314126
July 2023

Statement of Purpose and Basis

This document presents the remedy for the 19, 21, & 23 Academy Street, 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 19, 21, & 23 Academy 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 remedial design program will include:

- 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.

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$^{(TM)}$ (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 all on-site soil from the former building footprint at 19 Academy St and at the rear of the former dry-cleaner at 21 Academy St which exceed the protection of groundwater soil cleanup objectives (PGWSCOs) for volatile organic compounds (VOCs), or restricted-residential SCOs for semi-volatile organic compounds (SVOCs) and metals as defined by 6 NYCRR Part 375-6.8. Additional minor excavation is to occur beneath the existing on-site structures to remove the former sewer connection lines that are acting as preferential pathways for the migration of contaminated groundwater.

Approximately 3,000 cubic yards of contaminated soil will be removed from the site from depths ranging from 5 feet below ground surface (bgs) to 15 feet bgs at 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 DEC, submit the sample results and, and in consultation with DEC, 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.

3. Backfill

Clean fill meeting the requirements of 6 NYCRR Part 375-6.7(d) will be brought in to replace the excavated soils. The site will be re-graded to accommodate installation of a cover system as described in remedy element 4.

4. Cover System

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

5. In-situ Chemical Oxidation

In-situ chemical oxidation (ISCO) will be implemented to treat VOCs including tetrachloroethene (PCE), trichloroethene (TCE), and their respective breakdown products in groundwater. A chemical oxidant will be placed in the approximately 700 square-foot excavation area behind the former dry cleaner as noted in remedial element 2 above prior to backfill. Future oxidant injections may be required to reduce groundwater contaminant concentrations to levels that are acceptable to the Department.

6. In-Situ Treatment using Activated Carbon

Liquid activated carbon (LAC) will be added to the subsurface in two areas of the site to capture and prevent the off-site migration of chlorinated volatile organic compounds (CVOCs) and perfluoroalkyl substances (PFAS). LAC will be injected along the hydraulically downgradient eastern site boundary and on the west side of the site where preferential pathways exist for contaminated groundwater to travel hydraulically upgradient. In the area of the captured contamination, conditions will be maintained that will allow for anaerobic degradation of the chlorinated contaminants of concern to occur. LAC treatment will take place a period of time after the excavation and ISCO application to ensure no interference between the ISCO and LAC. Additional rounds of LAC injections may be required to reduce groundwater contaminant concentrations to levels that are acceptable to the Department.

The method and depth of injection will be determined during the remedial design.

Groundwater monitoring will be required up-gradient of the western LAC barrier and down-gradient of the eastern LAC barrier. Monitoring will be conducted for CVOCs and PFAS.

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 soil and/or groundwater.

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.

8a. 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 County DOH; and
- require compliance with the Department approved Site Management Plan.

8b. Site Management Plan

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

1. 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 8a above.

Engineering Controls: The cover system as discussed in Paragraph 4, groundwater treatment as discussed in Paragraphs 5 and 6, and the vapor mitigation system as discussed in Paragraph 7 above.

This Site Management Plan (SMP) includes, but may not be limited to:
- an Excavation Plan which details the provisions for management of future excavations in areas of remaining contamination;
- descriptions of the provisions of the environmental easement including any land use, and groundwater use restrictions;
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- 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 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, if any;

- maintaining site access controls and Department notification; and
- the steps necessary for the periodic reviews and certification of the institutional and/or engineering controls.

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

- monitoring groundwater to assess the performance and effectiveness of the groundwater treatment implemented, and to inform the need for additional groundwater treatment;
- a schedule of monitoring and frequency of submittals to the Department; and
- monitoring for vapor intrusion for any buildings on the site, as may be required by the Institutional and Engineering Control Plan discussed above.

b. an Operation and Maintenance (O&M) Plan to ensure continued operation, maintenance, inspection, and reporting of any mechanical or physical components of vapor mitigation system(s), if any. The plan includes, but is not limited to:
- procedures for operating and maintaining the system(s), the groundwater remedy and contingent groundwater (if needed); and
- compliance inspection of the system(s) to ensure proper O&M as well as providing the data for any necessary reporting;
- 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.

July 20, 2023

Date

Scott Deyette, Director
Remedial Bureau C

DECISION DOCUMENT

19, 21, & 23 Academy Street
Poughkeepsie, Dutchess County
Site No. C314126
July 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 repository:

DECInfo Locator - Web Application
https://www.dec.ny.gov/data/DecDocs/C314126/

Poughkeepsie Public Library
93 Market Street
Poughkeepsie, NY 12601
Phone: 845-485-3445, extension 3306

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 in an urban area at 19, 21 and 23 Academy Street in the City of Poughkeepsie, Dutchess County. The site is an irregular-shaped, 0.216-acre parcel which has 90 feet of frontage on the eastern side of Academy Street.

Site Features: The site currently contains two, multi-story, commercial, residential and mixed-use (commercial and residential) buildings with a small, rear gravel parking lot, located at 21 and 23 Academy Street. 23 Academy Street also has an existing excavation for a future elevator base and utilities. Both buildings are currently vacant but are undergoing extensive renovation activities. The structure formerly on 19 Academy Street was damaged, torn down, and the parcel is currently vacant with a grassy surface.

Current Zoning and Land Use: The site properties are zoned C-2, Central Commercial District and consists of two vacant buildings that were previously utilized for commercial and residential uses.

Past Uses of the Site: The site was developed sometime prior to 1887 and has a long history of commercial uses, including the operation of a garage and machine shop, dry cleaning and printing facilities, paint storage area, and tire vulcanization. The portion of the site at 21 Academy Street is listed on the was formerly in the Environmental Protection Agency’s Resource Conservation and Recovery Act identified by generator number NYD106619604 as a site formerly handling halogenated solvents (likely due to historical dry-cleaning operations).

Site Geology and Hydrogeology: Subsurface soils generally consist of sandy fill to a depth of 4 to 5 feet below ground surface (bgs), overlying native variable texture sands and underlying silts. Soil under the basement slabs (to a depth of 2 feet, corresponding to approximately 12 feet below the sidewalks) consisted of sand overlying silt or silty clay. Competent or weathered bedrock was encountered from approximately 32 to 39 feet bgs during installation of monitoring wells (MW-02D, MW-03D, MW-07D and MW-09D).

Wet to saturated soil was generally encountered in soil borings in the 9 to 15 feet bgs interval. Depth to groundwater (from top of well casings) during groundwater sampling ranged from approximately 10 to 13 feet bgs, with groundwater elevations ranging from 162.51 (MW-03D) to 165.11 (MW-10) feet above mean sea level (amsl). The direction of groundwater flow, based on

static depth to water during sampling in September 2021, has been inferred to be east-southeast.

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 that restrict the use of the site to restricted-residential use (which allows for commercial use and industrial use) as described in Part 375-1.8(g) were 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 Applicants under the Brownfield Cleanup Agreement are Volunteers. The Volunteers do not have an obligation to address off-site contamination. The Department has determined that this site poses a significant threat to human health and the environment and there are off-site impacts that require remedial activities; accordingly, enforcement actions are necessary.

However, the Department will seek to identify any parties (other than the Volunteers) 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:

tetrachloroethene (PCE)
trichloroethene (TCE)
cis-1,2-dichloroethene
benzo(a)anthracene
benzo(a)pyrene
benzo(b)fluoranthene
benzo(k)fluoranthene
dibenz[a,h]anthracene
indeno(1,2,3-cd)pyrene
chrysene
lead
arsenic
copper
mercury
perfluorooctanoic acid
perfluorooctane sulfonic acid

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

- groundwater
- soil
- soil vapor

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 samples were analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), polychlorinated biphenyls (PCBs), pesticides, metals, cyanide, and the emerging contaminants per-and poly fluoroalkyl substances (PFAS) and 1,4-dioxane. Soil vapor samples were analyzed for VOCs. Based on investigations conducted to date, the primary contaminants of concern include VOCs, SVOCs, metals, and PFAS in soil; VOCs and PFAS in the groundwater; and VOCs in soil vapor.

Soil - A total of 14 soil samples were collected during the remedial investigation from overburden beneath the site. Several constituents were identified at concentrations that exceed their Restricted Residential Soil Cleanup Objectives (RRSCOs). The following is a list of those compounds and their maximum exceedances: tetrachloroethene (PCE) 160 parts per million (ppm) (RRSCO of 19 ppm), benzo(a)anthracene 10.2 ppm (RRSCO of 1 ppm), benzo(a)pyrene 18.1 ppm (RRSCO of 1 ppm), benzo(k)fluoranthene 14.8 ppm (RRSCO of 3.9 ppm), benzo(b)fluoranthene 16.6 ppm (RRSCO of 1 ppm), chrysene 12 ppm (RRSCO of 3.9 ppm, dibenzo(a,h)anthracene 4.08 ppm (RRSCO of 0.33 ppm), indeno(1,2,3-cd)pyrene 10.2 ppm (RRSCO of 0.5 ppm), copper 424 ppm (RRSCO of 270 ppm), lead 1,960 ppm (RRSCO of 400 ppm), mercury 7.94 ppm (RRSCO of 0.81 ppm), arsenic 21 ppm (RRSCO of 16 ppm). PCE also exceeded the protection of groundwater (PGW) SCO of 1.3 ppm PCE breakdown products were not found in on-site soils above PGWSCOs.

PCBs and Pesticides were found in on-site soils above their unrestricted soil cleanup objectives (USCOs), but below the RRSCOs. Cyanide was detected but below the USCOs in on-site soils and 1,4-dioxane was not detected.

Perfluorooctanesulfonic acid (PFOS) was detected in soil samples collected throughout the site at levels typically below 1 part per billion (ppb); however, two samples exceeded the anticipated protection of groundwater PFOS guidance value of 3.7 ppb, at concentrations of 44.9 and 100 ppb. Perfluorooctanoic acid (PFOA) was also detected in samples collected throughout the site with a maximum detection of 2.97 ppb compared to the anticipated PGW guidance value of 1.1 ppb. Data does not indicate any off-site impacts in soil.

Groundwater – A total of twelve monitoring wells were installed during the remedial investigation. The following VOCs were identified exceeding their groundwater standards: PCE at 950 ppb (Ambient Water Quality Standards (AWQS) of 5 ppb), trichloroethene (TCE) at 32 ppb (AWQS of 5 ppb), cis-1,2-dichlorothene (cis-1,2-DCE) at 31 ppb (AWQS of 5 ppb), chloroethane at 5.5 ppb (AWQS of 5 ppb), and chloromethane at 15 ppb (AWQS of 5 ppb).

The concentrations of sodium, manganese, and magnesium appear to be background levels with no distinction between upgradient and downgradient monitoring wells. These compounds are typically naturally occurring or related to road salt application.

For PFAS, perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS) were reported at concentrations of up to 120 and 101 parts per trillion (ppt), respectively, exceeding the groundwater standard of 6.7 ppt and 2.7 ppt, respectively.

SVOCs, 1,4-dioxane, PCBs, and pesticides were detected in various monitoring wells, but below standards.

Groundwater is migrating off-site based on samples collected in off-site monitoring wells containing levels of VOCs in exceedance of their groundwater standards.

Soil Vapor - Three soil vapor and four sub-slab soil vapor samples were collected from locations across the site. Elevated levels of chlorinated VOCs (CVOCs) were detected in all samples. The following is a list of compounds and their maximum detections: PCE 42,700 micrograms per cubic meter (ug/m3), TCE 3,330 ug/m3, and cis-1,2-DCE 730 ug/m3.

Soil vapor impacts extend off-site as evidenced from soil vapor intrusion sampling associated with the off-site State Superfund project (C314126A).

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

turn may move into overlying buildings and affect the indoor air quality. This process, which is similar to the movement of radon gas from the subsurface into the indoor air of buildings, is referred to as soil vapor intrusion. The site is vacant so inhalation of site contaminants in indoor air via soil vapor intrusion in not a current concern. However, the potential exists for inhalation of site contaminants due to soil vapor intrusion for any future on-site development. Environmental sampling indicates soil vapor intrusion is a concern for off-site buildings. Additional off-site sampling for soil vapor intrusion is recommended.

6.5: Summary of the Remediation Objectives

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

The remedial action objectives for this site are:

Groundwater

RAOs for Public Health Protection

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

RAOs for Environmental Protection

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

Soil

RAOs for Public Health Protection

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

RAOs for Environmental Protection

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

Soil Vapor

RAOs for Public Health Protection

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

SECTION 7: ELEMENTS OF THE SELECTED REMEDY

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

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

The selected remedy is referred to as the Soil Excavation, Groundwater Treatment, and Site Cover remedy.

The elements of the selected remedy, as shown in Figures 2a and 2b, 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 remedial design program will include:

- 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.

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$^{(TM)}$ (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 all on-site soil from the former building footprint at 19 Academy St and at the rear of the former dry-cleaner at 21 Academy St which exceed the protection of groundwater soil cleanup objectives (PGWSCOs) for volatile organic compounds (VOCs), or restricted-residential SCOs for semi-volatile organic compounds (SVOCs) and metals as defined by 6 NYCRR Part 375-6.8. Additional minor excavation is to occur beneath the existing on-site structures to remove the former sewer connection lines that are acting as preferential pathways for the migration of contaminated groundwater.

Approximately 3,000 cubic yards of contaminated soil will be removed from the site from depths ranging from 5 feet below ground surface (bgs) to 15 feet bgs at 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 DEC, submit the sample results and, and in consultation with DEC, 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.

3. Backfill

Clean fill meeting the requirements of 6 NYCRR Part 375-6.7(d) will be brought in to replace the excavated soils. The site will be re-graded to accommodate installation of a cover system as described in remedy element 4.

4. Cover System

A site cover will be required in areas where the upper two feet of exposed surface soil will exceed the applicable soil cleanup objectives (SCOs), to allow for future restricted residential use of the site. Where a soil cover is to be used it will be a minimum of two feet of soil placed over a demarcation layer, with the upper six inches of soil of sufficient quality to maintain a vegetative layer. Soil cover material, including any fill material brought to the site, will meet the SCOs for

cover material for the use of the site as set forth in 6 NYCRR Part 375-6.7(d). Substitution of other materials and components may be allowed where such components already exist or are a component of the tangible property to be placed as part of site redevelopment. Such components may include, but are not necessarily limited to: pavement, concrete, paved surface parking areas, sidewalks, building foundations and building slabs.

5. In-situ Chemical Oxidation

In-situ chemical oxidation (ISCO) will be implemented to treat VOCs including tetrachloroethene (PCE), trichloroethene (TCE), and their respective breakdown products in groundwater. A chemical oxidant will be placed in the approximately 700 square-foot excavation area behind the former dry cleaner as noted in remedial element 2 above prior to backfill. Future oxidant injections may be required to reduce groundwater contaminant concentrations to levels that are acceptable to the Department.

6. In-Situ Treatment using Activated Carbon

Liquid activated carbon (LAC) will be added to the subsurface in two areas of the site to capture and prevent the off-site migration of chlorinated volatile organic compounds (CVOCs) and perfluoroalkyl substances (PFAS). LAC will be injected along the hydraulically downgradient eastern site boundary and on the west side of the site where preferential pathways exist for contaminated groundwater to travel hydraulically upgradient. In the area of the captured contamination, conditions will be maintained that will allow for anaerobic degradation of the chlorinated contaminants of concern to occur. LAC treatment will take place a period of time after the excavation and ISCO application to ensure no interference between the ISCO and LAC. Additional rounds of LAC injections may be required to reduce groundwater contaminant concentrations to levels that are acceptable to the Department.

The method and depth of injection will be determined during the remedial design.

Groundwater monitoring will be required up-gradient of the western LAC barrier and down-gradient of the eastern LAC barrier. Monitoring will be conducted for CVOCs and PFAS.

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 soil and/or groundwater.

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.

8a. 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 County DOH; and
• require compliance with the Department approved Site Management Plan.

8b. Site Management Plan

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

1. 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 8a above.

Engineering Controls: The cover system as discussed in Paragraph 4, groundwater treatment as discussed in Paragraphs 5 and 6, and the vapor mitigation system as discussed in Paragraph 7 above.

This Site Management Plan (SMP) includes, but may not be limited to:
• an Excavation Plan which details the provisions for management of future excavations in areas of remaining contamination;
• descriptions of the provisions of the environmental easement including any land use, and groundwater use restrictions;
•
• a provision that should a building foundation or building slab be removed in the future, a cover system consistent with that described in Paragraph 4 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, if any;
• maintaining site access controls and Department notification; and
• the steps necessary for the periodic reviews and certification of the institutional and/or engineering controls.

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

• monitoring groundwater to assess the performance and effectiveness of the groundwater treatment implemented, and to inform the need for additional groundwater treatment;
• a schedule of monitoring and frequency of submittals to the Department; and
• monitoring for vapor intrusion for any buildings on the site, as may be required by the

Institutional and Engineering Control Plan discussed above.

b. an Operation and Maintenance (O&M) Plan to ensure continued operation, maintenance, inspection, and reporting of any mechanical or physical components of vapor mitigation system(s), if any. The plan includes, but is not limited to:

- procedures for operating and maintaining the system(s), the groundwater remedy and contingent groundwater (if needed); and
- compliance inspection of the system(s) to ensure proper O&M as well as providing the data for any necessary reporting;
- maintaining site access controls and Department notification; and
- providing the Department access to the site and O&M records.

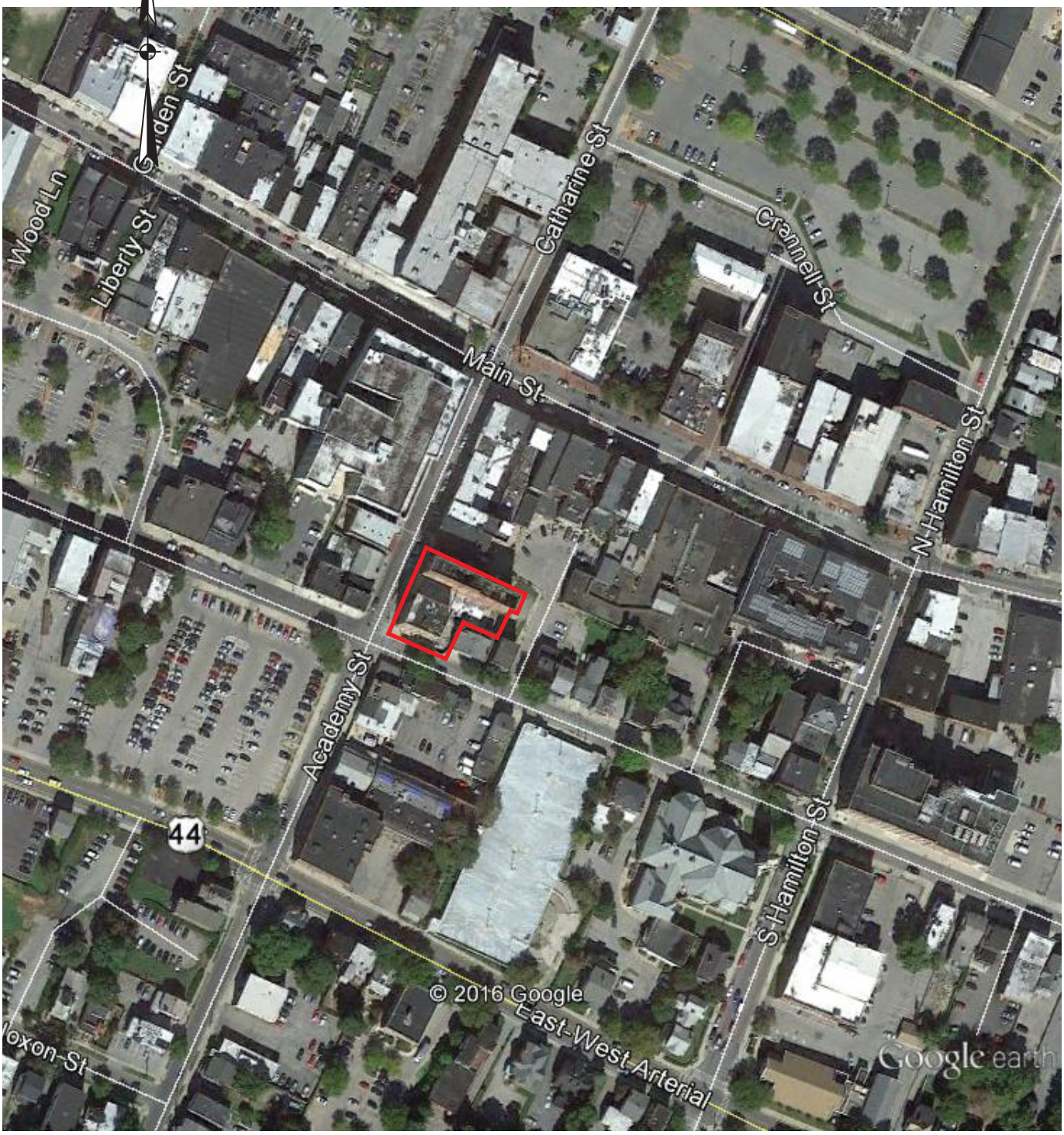

Figure 1: Site Location Map

19, 21 & 23 Academy Street
City of Poughkeepsie
Dutchess County, New York

Legend:
proposed subject property border
Longitude = -73° 55' 32.35" N
Latitude = 41° 42' 7.14" W

0 100 200
SCALE IN FEET

File: AP10039.40

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Figures

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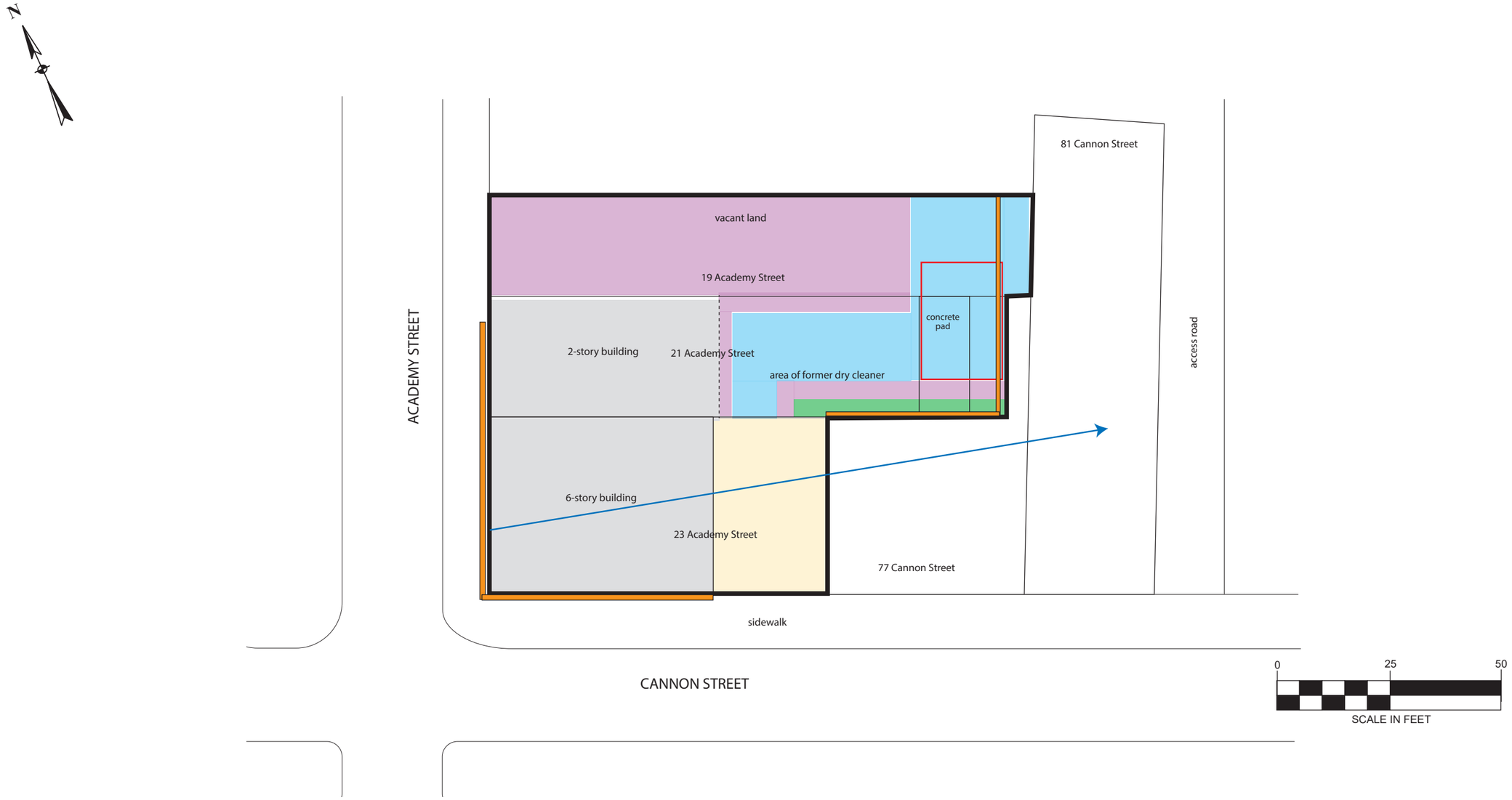

Legend:

- subject property border and BCP site border
- existing excavation area
- excavation to 5 feet
- excavation to 10 feet
- excavation to 15 feet
- general area of in situ treatment of CVOCs
- PRB injection
- direction of groundwater flow

All feature locations are approximate. This map is intended as a schematic to be used in conjunction with the associated report, and it should not be relied upon as a survey for planning or other activities.

Figure 2a: Soil Excavation, ISCO, and PRB Plan

NYSDEC BCP Site: C314126
19, 21 & 23 Academy Street
City of Poughkeepsie
Dutchess County, New York

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Scale as shown

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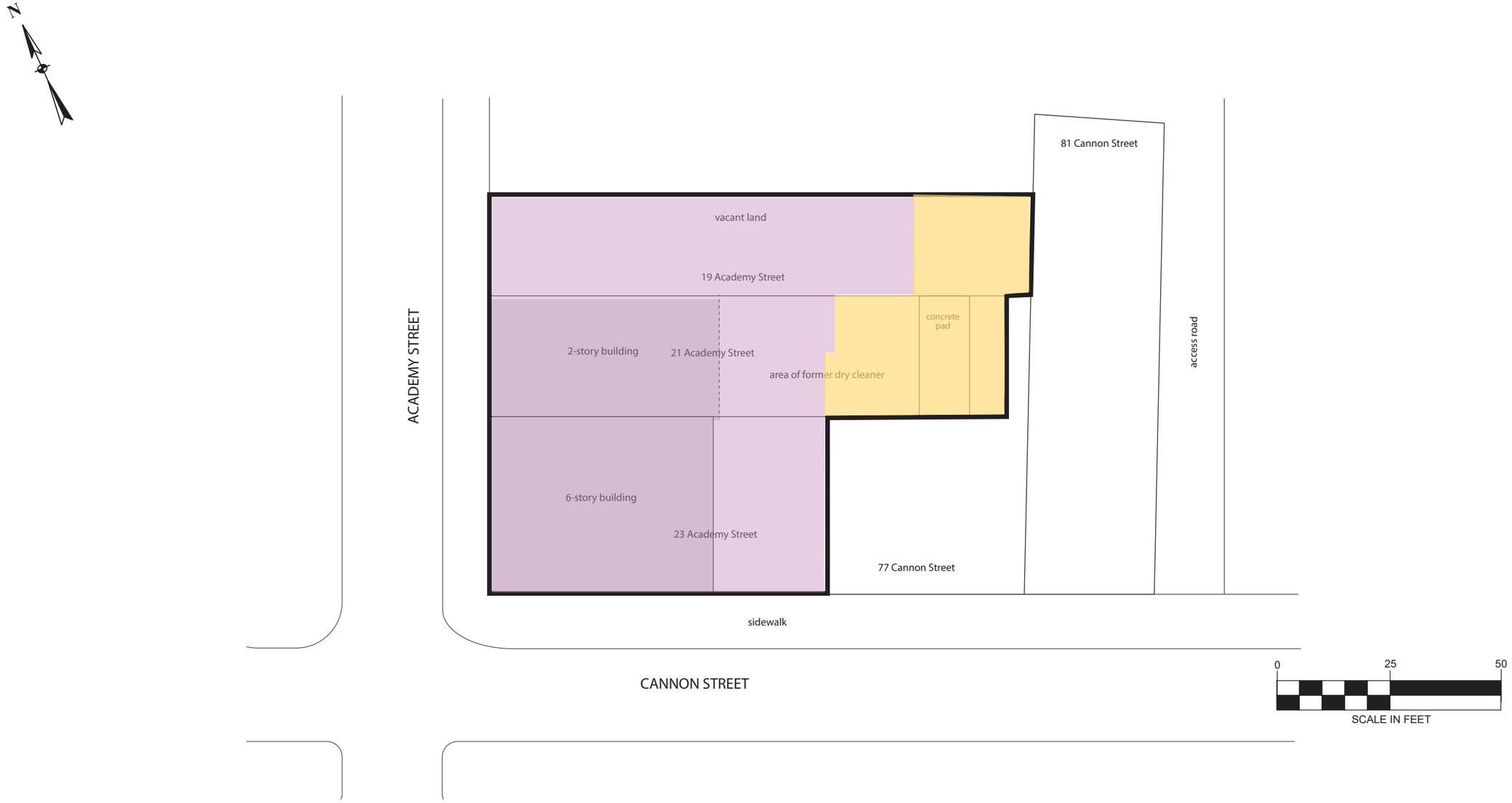

Legend:
- subject property border
- proposed building slab site cover
- 2' clean fill above demarcation layer

All feature locations are approximate. This map is intended as a schematic to be used in conjunction with the associated report, and it should not be relied upon as a survey for planning or other activities.

Figure 2b: Site Cover Map

NYSDEC BCP Site: C314126
19, 21 & 23 Academy Street
City of Poughkeepsie
Dutchess County, New York

File: AP10039.40

Scale as shown

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