FAYETTE MANLIUS, LLC

REMEDIAL ACTION WORK PLAN
332 FAYETTE MANLIUS BCP SITE
FAYETTE STREET, MANLIUS, NEW YORK

BCP Site No.: C734153

27 October 2023

Prepared for:

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CERTIFICATION

I, MATTHEW R NAPIERALA certify that I am currently a NYS registered professional engineer and that this Remedial Action Work Plan was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10) and that all activities were performed in full accordance with the DER-approved work plan and any DER-approved modifications.

1.0 INTRODUCTION

The 332 Fayette Manlius BCP Site is comprised of a portion of tax map parcel 024.-01-08.1 and consists of 2.248 acres in a suburban location on Fayette Street in the Village of Manlius, Town of Manlius, Onondaga County ('the Site'). The northwest extent of the Site is located just southeast of the intersection of Fayette Street and Highbridge Road; the southeast extent is adjacent to a small commercial building and vacant lot; and residential property and a vacant grass field are at the Site's northeastern border. The southwestern site border is defined by Fayette Street. A small creek (Perry Springs Brook) is present in the eastern portion of the Site. Refer to Figure 1 (Site Location Map) and Figure 2 (Site Survey with BCP Site Limits); Attachment 1.

Fayette Manlius, LLC (Volunteer), applied for acceptance into the New York State Brownfield Cleanup Program (BCP) and received a Brownfield Cleanup Agreement (BCA) from the New York State Department of Environmental Conservation (NYSDEC) on December 13, 2021. The final Remedial Investigation Workplan (RIWP) was approved by NYSDEC on 3 March 2022. Ambient Environmental, Inc. (Ambient) conducted a Remedial Investigation (RI) for the Site in the summer of 2022. The scope and findings of the RI are presented in the RI Report dated 24 August 2022. NYSDEC issued comments on that RI Report on 26 September 2022, and Ambient conducted additional field work that generated additional data to address NYSDEC comments. A revised RI Report was issued to NYSDEC on 24 February 2023; NYSDEC provided comments on 31 May 2023 and a revised RI Report addressing those comments was provided to NYSDEC on 30 June 2023. NYSDEC approved the RI Report in a letter dated 8 September 2023 (Appendix A).

Ambient issued a Remedial Alternatives Analysis Report (RAAR) on 20 July 2023. The RAAR evaluated various remedial alternatives and recommended the following:
Track 4- In-Situ Chemical Oxidation (ISCO) Injection, Limited Excavation, and Cover System with Subslab Depressurization System (SSDS). NYSDEC approved the RAAR in a letter dated 14 September 2023. The RAAR and associated NYSDEC approval letter are provided as Appendix A.

This Remedial Action Work Plan (RAWP) provides details on how the selected remedial approach will be implemented. A Remedial Action Health and Safety Plan (HASP) which includes a Community Air Monitoring Plan (CAMP) is provided as Appendix C.

2.0 SITE BACKGROUND AND SETTING

2.1 SITE LOCATION

The 332 Fayette Manlius BCP Site consists of 2.248 acres in a suburban location on Fayette Street in the Village of Manlius, Town of Manlius, Onondaga County ('the Site'). The northwest extent of the Site is located just southeast of the intersection of Fayette Street and Highbridge Road; the southeast extent is adjacent to a small commercial building and vacant lot; and residential property and a vacant grass field are at the Site's northeastern border. The southwestern site border is defined by Fayette Street. A small creek (Perry Springs Brook) is present in the eastern portion of the Site.

The Site is situated along Fayette Street, the major thoroughfare in the Village of Manlius. A large parking lot is present to the northwest of the vacant Express Sales building, which is the only on-site structure. The vacant Express Sales building is a brick and concrete block building on a concrete slab. It contains a garage with several large floor drains and sumps, hydraulic lifts with oil reservoirs, a paint booth, offices, restrooms, kitchen area, and a showroom.

2.2 SURROUNDING PROPERTY USAGE

The Site is situated in a mixed retail/residential area in Manlius, New York. Residential homes and buildings are located to the east and north, while retail businesses including a small strip mall are located to the west and south.

A small accounting office building is located immediately adjacent to the southeast portion of the Site. In the past, that building was the location of a carpet and flooring business. A vacant lot (314 Fayette Street) is located immediately southeast of the accounting office. The 314 Fayette Street lot was initially developed in the late 1890s and is currently owned by Lantern Projects LLC, which acquired the property from Hollowick, Inc. in 2015. Lantern Projects LLC never operated at the 314 Fayette Street location. Hollowick manufactured tabletop lighting materials primarily for restaurants

and food service until 2004. Operations ceased in 2004 and the manufacturing building was demolished in 2015.

2.3 PHYSICAL SETTING

2.3.1 Geology

The Site is underlain by variable soil types according to the US Department of Agriculture (USDA) Soil Conservation Survey (SCS). The soil underlying the Site is mainly a silt loam with some gravel and sand that has varied drainage and infiltration rates. The soil on the southern portion of the parcels is considered to have excessive drainage, while the soil on the northern portion of the parcels reportedly has much slower infiltration and drainage rates.

2.3.2 Hydrogeology

Based on water level measurements obtained during the 2022 RI, depth to groundwater at the Site ranges from two to six feet below ground surface (bgs). Groundwater flow across the Site is generally to the south-southeast.

2.3.3 Surface Water and Wetlands

Perry Springs Brook, which flows southeast, is present on the eastern portion of the BCP Site. A small federally regulated freshwater pond, which is part of Perry Springs Park and Fish Hatchery, is located approximately 825 feet northeast of the center of the Site. The freshwater pond (PUBHh) is classified as a palustrine system with an unconsolidated bottom, permanently flooded, and diked/impounded (meaning the wetland was created or modified). At its closest point, Limestone Creek is about 2,000 feet west of the center of the Site.

According to published reports, the Site is not located in the 100-year floodplain as described by the Federal Emergency Management Agency (FEMA). There are no known state or federal mapped wetlands on the Site; however, wetland vegetation is present along the border of Perry Springs Brook on the northern portion of the Site. Groundwater flow is generally to the south-southeast.

2.4 SITE HISTORY

The Site is the location of the former Lincoln Mercury Automobile Dealership, Express Sales (currently owned by Fayette Manlius, LLC) which was developed in 1929, and expanded to include a 20-car capacity automobile garage. This garage remained on the Site through 1950, when it was reportedly converted into an auto detailer, paint and body shop, and the above-referenced automobile dealership. Historical maps indicate that two gasoline underground storage tanks (USTs) were associated with the garage. A representative of the previous owner, Express Sales, stated that a gas pump and buried gas tank were once located near the western overhead door of the automobile service area (along Fayette Street). He believes that the buried tank had been removed but had no record of tank and pump removal. He also stated that a second buried tank may have been located along Fayette Street but that the tank had been removed at the time of the showroom expansion around 1989. The automobile dealership expanded over time resulting in its current configuration. The Express Sales automobile dealership closed in 2009.

2.5 SUMMARY OF PREVIOUS INVESTIGATION

2.5.1 Summary of Previous Investigation and 2022 Remedial Investigation

Previous site investigation work included a 2018 Phase I Environmental Site Assessment (ESA), a 2018 Limited Site Investigation, and a 2022 Remedial Investigation (RI) conducted as part of the BCP. Results of each investigation are summarized below.

2018 Phase I Environmental Site Assessment

A Phase I Environmental Site Assessment (ESA) conducted in March 2018 identified several potential areas of concern. Two former underground storage tanks (USTs) that stored gasoline may have existed at the Site beginning in 1929. These USTs were reportedly removed in 1989, but no records of the subject tanks or their removal were identified. Hydraulic lifts, floor drains, manholes and two subgrade sumps were observed inside the former Express Sales garage area. An unknown subsurface feature

was observed outside the northeast corner of the former Express Sales building. The unknown feature included one four-inch-diameter pipe with a cap at the surface, and the pavement in the immediate vicinity of that four-inch-diameter cap was depressed at a lower elevation than the surrounding pavement.

2018 Limited Site Investigation

Limited Site Investigation activities conducted in August 2018 included advancing 14 soil borings at the Site. Photoionization Detector (PID) screening detected VOC vapors at 11 locations including all interior boring locations (inside the former auto repair area). This indicated an Area of Concern (AOC) due to the potential for source material under the concrete foundation slab. Analyses of soil samples collected at the Site detected VOCs and SVOCs indicative of petroleum residuals in shallow soil at the Site; the vertical extent appears to be limited by a shallow firm clay unit. Indications of affected soil were encountered in the former gasoline UST area immediately south of the repair area. Concentrations of several VOCs in soil sample SB-11, collected in this area, exceeded Restricted Residential Soil Cleanup Objectives (RRSCOs). Indications of affected soils were encountered adjacent to an interior sump and associated exterior feature, and near hydraulic lift pits in the former auto repair area.

Four temporary well points were installed at 332 Fayette Street in 2018. Several VOCs and SVOCs indicative of petroleum residuals were detected in groundwater samples. VOC concentrations exceeded groundwater standards (GWS) at temporary well location TW-4 in the former gasoline UST location. SVOC concentrations exceeded GWS at temporary well location TW-1 in the vicinity of a suspected buried feature. As a result, NYSDEC assigned petroleum spill number 1804927 to the Site.

2022 Remedial Investigation

As stated above, a BCP RIWP was approved by NYSDEC on 3 March 2022. Ambient conducted the RI for the Site between March and December 2022. The scope and findings of the RI are presented in the NYSDEC-approved RI Report in a letter dated 30

June 2023. RI activities and findings are summarized below; the complete RI Report is available in the public repositories.

Site-Wide Ground Penetrating Radar Survey

The initial RI task, consisting of a Ground Penetrating Radar Survey (GPRS) of the entire accessible exterior portion of the Site, was completed in an effort to locate any private utilities, potential tanks, or other buried objects and subsurface features. The GPRS identified an anomaly indicative of a subsurface feature in the vicinity of the eastern end of the automotive repair shop. Through the subsequent field investigation via test pits, this feature was determined to consist of two ten-inch-diameter corrugated metal pipes that were approximately two feet below grade. The corrugated pipes were configured such that they conveyed liquid from the interior drains in the automobile repair shop/body shop and from the former automobile dealer office area to the subsurface soils in the rear (northeast) parking lot. Subsequent test pits showed that the corrugated pipes terminated below the paved parking area and did not extend to Perry Springs Brook. Wood debris was encountered at a depth of two to three feet below grade at this location.

The GPRS also identified a second anomaly extending northeast from near subsurface feature described above towards Perry Springs Brook. The subsequent test pit investigation determined that this feature consisted of two ten-inch-diameter corrugated metal pipes, extending approximately 60 feet northeast, and terminating between test pit TP-3 and TP-4 as shown on Figure 3. Portions of both corrugated pipes associated with were perforated to allow liquids to drain into the subsurface soils. It appears that this feature may be related to an old septic system.

Test Pit Investigation

On 25 October 2022, Ambient and US Ecology mobilized to the Site to advance a series of five test pits (TP) to investigate the anomalies identified by the GPR survey. Test pit locations are shown on Figure 3. As part of this effort, interior features such as the lift pits, floor drains, and interior sumps were also evaluated.

TP-1 was advanced at the center of the initial GPR anomaly and extended east/southeast towards the building, with final (approximate) excavation dimensions of 50 feet long x 30 feet wide at the surface. TP-1 encountered asphalt and gravel sub-base underlain by medium to fine fill material to a depth of 2.5 fbg. A very dark gray layer of medium to fine silt was present from 2 to 2.5 fbg at which point a brown organic layer was encountered. From 3 to 6.5 fbg, a gray silt/clay layer (including possibly cinders/ash) was observed. A soil sample was collected from a depth of 3.0 to 4.0 fbg at TP-1 and analyzed for TCL VOCs (USEPA Method 8260) and TCL SVOCs (USEPA Method 8270).

Test pits TP-2, TP-3 and TP-4 were advanced to characterize the GPR anomaly that extended towards Perry Springs Brook (Figure 3). TP-2 was installed approximately 15 feet northeast of TP-1 and identified two perforated, corrugated metal pipes located approximately two fbg. TP-2 encountered asphalt and gravel sub-base underlain by medium to fine fill material to a depth of approximately two fbg. A dark gray layer of medium to fine silt was present from approximately 2 feet to 2.5 fbg at which point a tan layer of sand/silt was encountered. Elevated PID readings were not recorded in TP-2.

TP-3 was installed approximately 40 feet northeast of TP-1 and identified two perforated, corrugated pipes located approximately two fbg. TP-3 measured 14 feet long x 2 feet wide x 3 feet deep. TP-3 encountered asphalt and gravel sub-base underlain by gray medium to fine fill material to a depth of two fbg. A gray layer of medium to fine silt was present from 2 to 2.5 fbg at which point a tan layer of sand/silt was encountered. Elevated PID readings were not recorded in TP-3.

TP-4 was installed approximately 75 feet northeast of TP-1 and identified one, two-inch-diameter metal conduit located approximately four inches below grade and positioned southwest to northeast. TP-4 measured 12 feet long x 2 feet wide x 2.5 feet deep. TP-4 encountered asphalt underlain by a thin layer of gravel sub-base, and then tan medium to fine sand/silt to a depth of approximately 2.5 fbg. Elevated PID readings were not recorded in TP-4.

It appeared that the two ten-inch-diameter corrugated pipes terminated between TP-3 and TP-4. It appeared that the two-inch-diameter conduit was not associated with the corrugated pipes; rather, it appeared to be an abandoned electrical conduit. PID readings were not recorded in TP-4, including the field screened material contained in the two-inch-diameter conduit. A soil sample was collected at TP-4 from a depth of 0.5 to 1.0 fbg and analyzed for TCL SVOCs (USEPA Method 8270).

TP-5 was installed north/northeast of the of the north side of the former Express Sales building in an effort to further investigate exterior features that might be associated with the interior sump. TP-5 measured 8 feet long x 2 feet wide x 5.5 feet deep, and consisted of a layer of asphalt, a thin layer of gravel subbase, approximately 1.7-ft. of light gray fill material, followed by 1.5 feet of medium gray clay, then 1.5 feet of dark gray silt/clay transitioning to light gray silt/clay. PID readings on soil located two feet below grade along the southwest wall (i.e., the closest point to in TP-5 to sump-2) were observed at 56.0 ppm.

Test pit locations are shown on Figure 3; test pit logs and a photolog of the test pits and certain interior infrastructure components are included in the RI report.

Several 'pits' such as hydraulic lift pits, strip drains, and two sumps are present at the Site inside the former automobile service area. The contents of the pits were sampled and the pits were cleaned and inspected as describe in the RI Report.

Soil Borings

Soil borings were advanced at the Site on 8 March 2022, 9 March 2022, and 31 May 2022. A total of sixteen soil borings were advanced to various depths below ground surface (bgs) based on field screening and site conditions. Thirteen soil borings were advanced on the exterior portion of the Site and three soil borings were advanced within the interior of the automotive repair shop on the southeastern portion of the Site. Details are provided in the RI Report.

Soil borings were advanced to approximately 12 to 16 feet bgs throughout the Site. Saturated soils were encountered between five to seven feet bgs. Generally, a layer of fine to medium grained sand with occasional shale/gravel fragments was encountered between 8 inches to approximately 10 feet bgs. A mix of clay and fine sand was encountered between 10 to 12 feet bgs. A stiff, dense gray clay unit was encountered between 12 to 16 feet bgs. One soil sample was collected per boring (not including borings converted to temporary monitoring well points) for analyses.

Groundwater Monitoring Well Points

On 9 March 2022, and 31 May 2022, Ambient mobilized to the Site to install a series of temporary monitoring well points at the Site. Shallow overburden monitoring wells points were installed at five locations on the Site as follows:

- Immediately east of the unknown subsurface feature that is located at the northeast corner of the former auto repair facility;
- In the parking lot north of the main automobile sales and service building;
- Along Fayette Street at the western boundary of the Site, west of the former gasoline UST;
- Inside the former automobile repair bay near the hydraulic lift area;
- On the northeastern portion of the Site, just south of Perry Springs Brook.

Each of the monitoring well points were constructed using one-inch-diameter PVC riser and ten feet of one-inch-diameter, 0.01-inch slotted PVC well screen. The well screen was installed to "straddle" the top of the water table in the shallow, unconfined groundwater unit. Well points were constructed and developed in accordance with the NYSDEC-approved RIWP. Soil boring grade elevations, and grade and casing elevations for temporary monitoring wells were established by a NYS-licensed surveyor.

Surface Soil Samples

Ambient initially collected surface soil samples at four locations on 6 June 2022 as follows: the northeast corner of the Site (SS-1, SS-2 and SS-12, duplicate of SS-2) and near Perry Springs Brook (SS-3 and SS-4). Surface samples were collected from 0.5-1.0 foot below grade at all locations (below the plant root level). Surface material at location SS-1 consisted primarily of fill material (stone, reworked soil, concrete fragments, metal, glass fragments); what appeared to be native soil was encountered at all other surface soil sampling locations.

In an effort to further characterize the soil in the vicinity of SS-1, five additional surface soil samples were collected in the vicinity of SS-1. A backhoe was used to excavate a shallow test pit and samples were collected from each sidewall at a depth of one foot below grade. Additionally, a bottom surface soil sample was collected at a depth of two feet below grade.

Surface soil samples were analyzed for TCL VOCs (USEPA Method 8260), TCL SVOCs (USEPA Method 8270), TAL metals (Method 6010/7470 for mercury), PCBs (Method 8082), and Pesticides (Method 8081).

Sediment and Surface Water Samples

Sediment and surface water samples were collected from three locations within Perry Springs Brook on 25 October 2022. The downstream samples were collected first, followed by the midstream samples, and finally the upstream sample. Sediment samples were analyzed for TCL VOCs (USEPA Method 8260), TCL SVOCs (USEPA Method 8270), TAL metals (Method 6010/7470 for mercury), and Pesticides (Method 8081). Surface water samples were analyzed for TCL VOCs (USEPA Method 8260), TCL SVOCs (USEPA Method 8270), PFOS/PFASs (EPA Method mod 537.1) and 1,4-Dioxane (Method 8270 SIM).

RI details and results are presented in the 30 June 2023 RI Report; analytical results are summarized below.

2.5.2 Soil Analytical Results and Comparison to SCGs

Based on intended use, the remedial criteria for soil at this Sites is Restricted Residential Soil Cleanup Objectives (RR SCOs).

VOCs and SVOCs

With the exception of surface soil sample SS12 (duplicate of SS2), and the soil sample collected from TP-1, all VOC and SVOC analytes were reported at concentrations below RR SCOs. The surface soil sample SS12, which was a 'blind duplicate' collected at location SS2, contained the SVOC Ideno(1,2,3-cd)pyrene at a concentration that exceeded the Restricted Residential SCO (0.64 ppm with respect to 0.5 ppm). The soil sample collected from the base of TP-1 contained Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Chrysene, Dibenzo(a,h)anthracene, and Indeno(1,2,3-cd)pyrene at concentrations that exceeded RR SCOs.

Metals

The surface soil collected at location SS1 contained cadmium and mercury at concentrations that exceeded RR SCOs. The surface soil collected from SS 1 N 1.0' displayed a detection for arsenic that exceeded RR SCOs. Sampling documented that the extent of affected soil in this area is limited. The soil sample collected from SB3 at a depth of 13-13.5 feet bgs displayed a detection for barium that exceeded Restricted Residential SCOs. Ambient remobilized to the Site on 31 May 2022 and installed four soil borings surrounding SB3, each to 16 feet bgs. Soil samples were collected from depth intervals of 2-3 feet bgs, 5-6 feet bgs, 12-13 feet bgs, and 15-16 feet bgs and were analyzed for Barium. The concentrations of barium in all soil samples collected from SB3A, SB3B, SB3C, and SB3D were below the RR SCO for barium. All other metal analytes (plus cyanide) for the soil samples collected were below RR SCOs or were not present above method detection limits.

PCBs

PCBs were not detected in any of the twelve soil samples collected from interior and exterior soil borings at concentrations exceeding RR SCOs.

PFOA/PFOS

PFOS/PFOA were not detected in any of the soil samples collected from the interior or exterior soil boring locations that were analyzed for those parameters. Per the RIWP, surface soil samples collected from the Site were not analyzed for PFOS/PFOA.

Pesticides

Pesticides were not detected in any of the soil samples collected from the select soil borings on-Site. All other pesticide analytes were below RR SCOs or were not present above method detection limits in the surface soil samples collected at the Site.

2.5.3 Surface Water/Sediment Analytical Results and Comparison to SCGs

The surface water sample from US SW-3 (the upstream surface water sample) displayed three SVOC detections for Benzo(a)anthracene, Benzo(k)fluoranthene, and Indeno(1,2,3-cd)pyrene that slightly exceeded TOGS 1.1.1. Ambient Water Quality Standards. All other analytical results for the surface water samples were either non-detect or below NYSDEC Guideline Standards.

All sediment sample analyses had either 'non-detect' results or concentrations that were below the New York TOGS 5.1.9 Sediment Threshold Values.

2.5.4 Groundwater Analytical Results and Comparison to SCGs

Groundwater analytical results were compared to NYSDEC Groundwater Standards presented in NYSDEC Technical and Operation Guidance Series (TOGS) 1.1.1 dated June 1998 including the most recent updates. The results are summarized as follows.

VOCs and SVOCs

The groundwater sample from MW-4 contained Benzene, Toluene, Ethylbenzene, and Isopropylbenzene at concentrations that exceeded NYSDEC Groundwater Standards. The groundwater sample from MW-5 contained Chlorobenzene and Benzene at

concentrations that exceeded NYSDEC Groundwater Standards, as did sample MW-5DUP. The groundwater sample from MW-4 contained six SVOC (Naphthalene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Chrysene, and Indeno(1,2,3-cd)pyrene) at concentrations that exceeded NYSDEC Groundwater Standards. Sample MW-5 DUP contained Bis (2-ethylhexyl)phthalate, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Chrysene and Indeno(1,2,3-cd)pyrene at concentrations that exceeded NYSDEC Groundwater Standards. All other VOC and SVOC analytes for MW-1 through MW-5 (including 1,4 Dioxane) were either not detected or were reported at concentrations below NYSDEC Groundwater Standards.

Metals

The four unfiltered groundwater samples collected on 21 March 2022 contained elevated concentrations of at least one metal. This was suspected, in part, to be a result of suspended solids in the groundwater samples. Ambient remobilized to the Site with Alpha Analytical personnel on 6 June 2022 to perform low flow sampling and collect both filtered and unfiltered groundwater samples from each of the four previously-sampled monitoring wells on-site plus the interior monitoring well point MW-5. The groundwater sample collected from MW-1 contained barium, iron, and sodium in both the filtered and unfiltered groundwater samples at concentrations that exceeded NYSDEC Groundwater Standards. The groundwater sample collected from MW-2 contained iron and barium in both the filtered and unfiltered groundwater samples at concentrations that exceeded NYSDEC Groundwater Standards. The groundwater sample collected from MW-3 contained iron and manganese in both the filtered and unfiltered groundwater samples at concentrations that exceeded NYSDEC Groundwater Standards. Groundwater samples collected from MW-4 contained iron, manganese and sodium in both the filtered and unfiltered groundwater samples at concentrations that exceeded NYSDEC Groundwater Standards. The sample from MW-5 contained barium, iron, magnesium, manganese, sodium and aluminum in the unfiltered sample and iron, manganese and sodium in the filtered sample, at a concentration that exceeded NYSDEC Groundwater Standards [Note- the duplicate of unfiltered MW-5 exhibited the exceedances of MW-5 and also contained lead at a concentration slightly exceeding the NYSDEC Groundwater Standard].

PCBs

PCBs were detected in the groundwater sample collected from MW-1 at a concentration of 0.068J ppb, which is below the NYSDEC Groundwater Standard of 0.09 ppb. PCBs were not detected in groundwater samples from all other monitoring wells.

PFOA/PFOS

PFOA/PFOS were detected in the groundwater sample collected from MW-1, MW-2, MW-3, MW-4, and MW-5 (including MW-1 DUP). Groundwater samples collected from MW-2 and MW-4 contained elevated concentrations of PFOS, the groundwater sample from MW-5 contained elevated concentrations of PFOA and PFOS

Pesticides

Pesticides were not detected in any of the groundwater samples.

2.5.5 Summary of RI Findings and Conclusions

The RIR presents the following conclusions:

- The Site does not present an immediate threat to human health or the environment;
- The Site is not occupied, and a complete exposure pathway does not exist;
- There does not appear to be a soil vapor issue at the Site;
- At least one analyte of concern (a.k.a. contaminant of concern) is present in soil and groundwater at the Site.
- Subsurface conditions near interior features need to be further evaluated once access is provided (i.e., the building and concrete slab are removed).

3.0 ALTERNATIVES ANALYSIS

Ambient issued a Remedial Alternatives Analysis Report (RAAR) on 20 July 2023. The RAAR evaluated various remedial alternatives and recommended the following: Track 4- ISCO Injection, Limited Excavation and Cover System (with SSDS). The recommended remedial alternative would involve the actions summarized below.

- Perform 'common actions' which would include:
  - Prepare Remedial Action Workplan (RAWP) for submission to, and approval by, NYSDEC (including public comment);
  - Asbestos abatement and hazardous building materials removal as needed followed by building demolition to allow unlimited access for remediation workers;
  - Removal of hydraulic lift pits and a large sump in the existing building, along with concrete necessary to access affected soil and removal of affected soil to approximately the shallow water table (assuming affected soil extends to that depth); and
  - Site security by temporary fencing and temporary facility (e.g.: portajohn) during remediation activities.
- ISCO injections utilizing a colloidal suspension of ferric-based catalyzed sodium/potassium persulfate to reduce petroleum compound concentrations in groundwater to levels that achieve or approach groundwater standards (GWS) and limit the possibility of vapor intrusion into on-Site buildings. Prior to injections, a groundwater sampling event will be performed to obtain current groundwater quality data, and to support final ISCO design. Post-injection groundwater sampling will be performed on an established schedule to monitor the effectiveness of the injections.
- Excavation, characterization, transportation and offsite disposal of a limited amount of affected soil in 'hot spot' areas and to allow for final grade elevation and installation of utilities, storm/sanitary drains, and other subsurface features.
- A cover system, which would include some or all of the following:
  - Installation of two feet of clean soil from an approved source;
  - Installation of impervious asphalt pavement;
  - Installation of foundation features and concrete slab building pad.
- Future sampling events which are required to perform the remedy (e.g., supplemental soil sampling as needed, confirmatory sampling, sample imported backfill) as described in the RAWP.

- Implementation of the Community Air Monitoring Program (CAMP) during Site work involving the disturbance of exterior contaminated soil.
- Engineering Control: Site Cover (hardscape, pavement, soil cover, building slab).
- Institutional Controls:
  - Environmental Easement
  - Site Management Plan (SMP)

The complete RAAR is provided as Appendix A along with the NYSDEC approval letter dated September 14, 2023. Please note that NYSDEC and New York State Department of Health (NYSDOH) have determined that *"... and active SSDS will not likely be needed and, therefore, should not be included as a remedial element in the RAWP"*. Therefore, the SSDS component referenced in the RAAR is not included in the RAWP.

4.0 SIGNIFICANT THREAT DETERMINATION

NYSDEC Part 375-2.7 (a) describe a significant threat as conditions under which the contaminants disposed at the site or coming from the site result in, or are reasonably foreseeable to result in, any of the following:

(i) a significant adverse impact upon endangered species, threatened species, or species of concern, as defined in section 182.2 of this title; or

(ii) a significant adverse impact upon protected streams and navigable waters as defined in section 608.1 of this title, or tidal wetlands as defined in subdivision 661.4(hh) of this title, or freshwater wetlands as defined in subdivision 663.2(p) of this title or significant fish and wildlife habitat areas as defined in subdivision 602.5(a) of 19 NYCRR; or

(iii) a bioaccumulation of contaminants in flora or fauna to a level that causes, or that materially contributes to, significant adverse ecotoxicological effects in flora or fauna or leads, or materially contributes, to the need to recommend that human consumption be limited; or

(iv) contaminant levels that cause significant adverse acute or chronic effects to fish, shellfish, crustacea, and wildlife; or

(v) a significant adverse impact to the environment due to a fire, spill, explosion, or similar incident or a reaction that generates toxic gases, vapors, fumes, mists, or dusts; or

(vi) a significant adverse impact to public health, where the site is near residences, recreational facilities, public buildings or property, school facilities, places of work or worship, or other areas where individuals or water supplies may be present, and the New York State Department of Health has determined that the presence of contaminants on such site pose a significantly increased risk to the public health.

NYSDEC has determined that the Site does not present a ‘significant threat’.

5.0 CONCEPTUAL SITE DETERMINATION

The conceptual site model presents a simplified framework for understanding the distribution of affected media (e.g. soil, groundwater), and potential migration and exposure pathways. Potential sources and distribution of affected media are described in detail in the RIR.

5.1 AREAS OF CONCERN

The RI identified the following Areas of Concern (AOC):

- **AOC-1.** Surface soil in the area of SS-1 (east of the northeast corner of the existing building) contained cadmium, mercury and arsenic in surface fill material at concentrations that exceeded RR SCOs. Anticipated excavation in this area is approximately 10' x 10' x 3' deep resulting in an estimated 11 cubic yards of material that may need to be excavated for off-site disposal.
- **AOC-2**. Soil in the area of TP-1 contained six SVOCs [Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Chrysene, Benzo(a,h)anthracene, and Indeno(1,2,3-cd)pyrene] at concentrations that exceeded RR SCOs. Also, fill material was encountered at TP-5 and a maximum PID reading of 56 ppm was recorded in that area. Although samples with analytes at concentrations exceeding RR SCOs were not collected at TP-5, some excavation may be needed. Anticipated excavation in the TP-1 area is approximately 50' x 50' x 6' deep; TP-5 area is estimated at 10' x 20' x 6'. An estimated total of 600 cubic yards of material may need to be excavated at AOC-2 (north of northern corner of the existing building) for off-site disposal.
- **AOC-3.** Although samples with analytes at concentrations exceeding RR SCOs were not collected at SB-13, elevated PID readings were recorded in this former UST area; therefore, some limited excavation may be needed. This area is located in the southern corner of the Site. Anticipated excavation in this area is approximately 10' x 20' x 6' deep resulting in an estimated 45 cubic yards of material that may need to be excavated for off-site disposal.

- **AOC-4.** Barium was detected at a concentration exceeding RR SCOs in one soil sample collected from SB-3 (located under pavement in the western corner of the Site) at a depth of 13-13.5 feet bgs. Follow-up soil samples collected at various depths immediate adjacent to SB-3 in all directions did not contain barium at concentrations exceeding Unrestricted Use SCOs. This very limited, deep area of soil containing barium will remain in place and covered with impermeable material.
- **AOC-5.** The area below the concrete floor in the former maintenance shop of the existing building is considered AOC-5. It is anticipated that soil containing petroleum residuals will be encountered in the former lift pit area and in the sump 2 area. These locations cannot be fully evaluated until the concrete floor is removed. It is anticipated that a total of 145 cubic yards of material will be excavated from this area for off-site disposal.
- **AOC-6.** Affected groundwater in the southern portion of the Site, in the area of the former UST. VOCs and SVOCs were detected in groundwater samples collected in this area at concentrations exceeding GWS. It is estimated that the affected area is approximately 3,300 square feet. AOC-6 (affected groundwater) will be treated using In-Situ Chemical Oxidation (ISCO).

  Metals and PFOS/PFOA were detected in several groundwater samples at concentrations exceeding GWS; however, the presence of these analytes in groundwater samples do not warrant remediation.

5.2 NATURE AND EXTENT OF CONTAMINATION

As stated above, metals and SVOCs were detected in soil samples at limited locations within the site boundary, mostly in the area of the former automobile sales and service building. The area of groundwater that requires treatment due to VOC and SVOC concentrations is limited to the southern portion of the Site.

5.3 RECEPTOR ANALYSIS

A qualitative human exposure evaluation, which describes the potential for human exposure to site-related constituents, was presented in the RIR. That assessment determined that, based on available information, it is not anticipated that the public would be adversely impacted by the contaminants at the Site.

A Fish and Wildlife Resources Impact Assessment (FWRIA) was presented in the RIR. That assessment determined that, based on available information, it is not anticipated that fish and wildlife would be adversely impacted by the contaminants at the Site.

Potential receptors include remediation workers and site visitors during intrusive remediation activities (exposure will be precluded by implementing a construction Health and Safety Plan). The Site is fenced, the vacant building is locked, and groundwater in the area is not extracted for any use; therefore, there are no known receptors.

6.0 REMEDIAL ACTION OBJECTIVES (RAOs)

6.1 SOIL

The soil RAOs are as follows:

- RAOs for Public Health Protection
  - Prevent ingestion/direct contact with contaminated soil.
- RAOs for Environmental Protection
  - Prevent migration of contaminants that would result in groundwater, surface water or sediment contamination.

6.2 GROUNDWATER

The RAOs for groundwater are as follows:

- 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 groundwater to pre-disposal / pre-release conditions, to the extent practicable;
  - Remove the source of groundwater contamination.

6.3 SOIL VAPOR

The RAOs for soil vapor are as follows:

- 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.

7.0 REMEDIAL ACTIONS

7.1 COMMON ACTIONS

In order to accomplish remedial goals, the following common actions need to be performed:

- Site security by temporary fencing and temporary facility (e.g.: portajohn) during remediation activities.
- Asbestos abatement and hazardous building materials removal followed by building demolition (including concrete floor removal in repair shop and body shop areas) to allow unlimited access for remediation workers (this is required to access contamination in soil and groundwater under the existing building);
- Remove all oily liquids and sediment from lift pits inside the former automobile maintenance shop, remove concrete pits and adjacent concrete floor, remove any remaining equipment, excavate any associated affected soil for proper off-site disposal (after proper characterization and profiling);
- Remove all oily liquids and sediment from large cistern inside the former paint shop, remove the concrete pit, adjacent concrete floor, and any remaining pipes, excavate any associated affected soil for proper off-site disposal (after proper characterization and profiling); and
- Proper waste characterization sampling and analyses to allow for completion of waste profiling to facilitate proper transportation and off-site disposal of certain waste materials (solid, sludge, and liquid).
- The location and elevation of all new monitoring wells and the limits of excavations will be surveyed upon completion by a NYS licensed land surveyor.

Note- as a 'common action', all confirmation samples will be analyzed, validated and reported as described in the RIWP QAPP including preparation of a Data Usability Summary Report (DUSR). Waste characterization samples will not be validated.

7.2 SOIL REMEDATION

7.2.1 Summary of Field Work

Once affected soils are sampled for waste characterization and profiled, soil will be excavated and loaded directly into properly permitted trucks for off-site disposal at a permitted landfill. It is assumed that the material is not hazardous. As stated above, the total amount of soil anticipated for excavation and off-site disposal is as follows:

- AOC-1: 11 CY; AOC-2: 600 CY; AOC-3: 45 CY; AOC-5: 145 CY for a total of 801 total CY (or an estimated 1,200 tons).

Excavation will continue laterally and vertically until observations and PID monitoring indicate that all affected soil (expected to exceed RR SCOs) has been removed.

Direct loading into properly-permitted trucks is anticipated. In the unlikely event that soil is stockpiled on-site, that excavated soil will be handled and stored on-site in such a manner that does not allow contaminated soil to be re-introduced into the environment. The excavated material will be stored on an impervious liner and securely covered to protect against wind and rain until being transported for disposal off-site.

Areas to be excavated and subsequently covered by the various capping materials are shown on Figure 3 (Attachment 1).

7.2.2 Confirmation Sampling

Upon completion of excavation, the floor and sidewalls of the excavated areas will be sampled to confirm that RR SCOs have been achieved. Confirmation sampling is based on the analytes previously detected in each area; as such, confirmation sampling is expected to be as follows:

AOC-1: TCL SVOCS and TAL Metals (estimate two samples);
AOC-2: TCL SVOCS and TAL Metals (estimate six samples);
AOC-3: TCL SVOCS and TAL Metals (estimate five samples);
AOC-5: TCL VOCS and SVOCS, TAL Metals (number of samples to be determined in the field based on extent of excavation and in accordance with NYSDEC DER-10).

Note: if PID monitoring during excavation detect VOCs above background concentrations, confirmation samples in that area will also be analyzed for TCL VOCs.

7.2.3 Backfill Material Testing and Placement

Backfill material will be provided by an approved commercial source according to the specification of the civil engineer in charge of site development design (for example, number 2 crushed stone). Sampling is not required for crushed stone from virgin material from a permitted quarry material. Any soil material to be used as backfill or cover material will be sampled prior to use at the Site in accordance with NYSDEC DER-10 Section 5.4 (e).

7.2.4 Engineering Controls

Exposure to remaining COCs in soil will be prevented by an engineered, composite cover system as described in Section 7.5, below.

7.3 GROUNDWATER REMEDIATION

7.3.1 Baseline Groundwater Sampling

Prior to initiation of groundwater remediation, groundwater samples will be collected from existing monitoring well points MW-1, MW-4 and MW-5 to provide 'baseline' data. Field parameters (pH, temperature, conductivity, dissolved oxygen, oxidation-reduction potential, and turbidity) will be collected from each monitoring well point during sampling. Groundwater samples will be analyzed for TCL VOCs (USEPA Method 8260), TCL SVOCs (USEPA Method 8270), TAL metals (Method 6010/7470 for mercury/9010 for cyanide), total and dissolved iron, and PFASs (PFOA and PFOS by EPA Method 1633). Samples to be analyzed for metals will be filtered prior to analyses. All sample collection, handling and analyses will be performed in accordance with the previously-accepted RIWP.

7.3.2 Introduction of In-Situ Chemical Oxidation Materials

ISCO will consist of remediation area preparation followed by injecting a colloidal suspension of the ferric-based catalyst Provect-OX into the subsurface pathways and voids that were developed during the compressed air injection step, under constant pressure ranging from 10-110 psi. A total of 10,200 pounds of Provect-OX will be injected in accordance with the detailed procedure provided by Innovative Environmental Technologies in Appendix B. The ISCO treatment area is shown on Figure 4.

Any affected unsaturated soil in the area of affected groundwater will be removed by excavation. Affected saturated soil will be remediated by ISCO. Groundwater containing VOCs and SVOCs will be treated with the goal of remediating groundwater to pre-release conditions, including groundwater in the area of existing monitoring well MW-4. As such, the remedial measure will prevent off-site migration of contaminants in the vicinity of MW-4.

7.3.3 Post-injections Groundwater Monitoring

Upon completion of ISCO injection and installation of cover systems in the groundwater treatment area, three new groundwater monitoring wells will be installed (one upgradient and two downgradient; locations are presented on Figure 5 in Attachment 1) and groundwater monitoring will proceed. Permanent groundwater monitoring wells will consist of ten feet of two-inch-diameter screen and riser to the surface. A total well depth of 15 feet is anticipated, with the screened interval from 5 to 15 feet bgs. Well installation, development, purging and sampling will be as described in the NYSDEC-approved RIWP. Groundwater samples will be analyzed for TCL VOCs and SVOCs at intervals of 1, 3, 6 and 12 months after injection. Additional monitoring may be conducted based on the initial 12 months of monitoring. Sample collection, handling, analyses, and evaluation will be as described in the NYSDEC-approved RIWP. However, because the post-injection samples to be collected at 1-, 3-, and 6-month intervals are intended to monitor ISCO effectiveness and will not be used to determine if remediation is complete, data resulting from that sampling will not be accompanied by Category B deliverables and will not be validated. The analytical results for the 12-month monitoring event will be accompanied by Category B deliverables and an electronic data package, and a DUSR will be prepared.

7.4 VAPOR MANAGEMENT

It is anticipated that all sources of VOCs in soil and groundwater will be eliminated by the planned remedial actions. Furthermore, subslab and indoor air sampling conducted during the RI documented that vapor intrusion into the to-be-constructed buildings at the Site is not expected. Therefore, active vapor management measures are not needed.

7.5 ENGINEERING AND INSTITUTIONAL CONTROLS

Soil containing Contaminants of Concern (COCs) at concentrations exceeding the unrestricted use SCOs will remain in place upon completion of remediation. Engineering

Controls (EC) and Institutional Controls (ICs) have been incorporated into the remedy to render the overall site remedy protective of public health and the environment.

Exposure to remaining COCs in soil will be prevented by ECs consisting of an engineered, composite cover system. This composite cover system is comprised of a new four-inch-thick concrete building slab and some exterior areas (e.g., sidewalks and patios). Other areas of the Site will be covered by blacktop paved parking or two feet of clean soil, topsoil and grass. Areas to be covered by the various capping materials are shown on Figure 3. An Excavation Work Plan will be included in the SMP and will outline the procedures to be followed in the event that the composite cover system and underlying remaining affected soil are disturbed after the Remedial Action is complete. Maintenance of this composite cover system will be described in the SMP (see below).

ICs consist of two elements designed to ensure continual and proper management of remaining COCs in perpetuity: an Environmental Easement and a SMP.

A site-specific Environmental Easement (EE) will be recorded with Onondaga County to provide an enforceable means of ensuring the continual and proper management of remaining COCs and protection of public health and the environment in perpetuity or until released in writing by the NYSDEC. The EE will require that the grantor of the EE and the grantor's successors adhere to all ECs/ICs placed on the site by this NYSDEC-approved remedy. ICs provide restrictions on site usage and mandate operation, maintenance, monitoring, and reporting measures for all ECs and ICs.

The IC will mandate that a SMP be implemented at the site. The SMP will describe appropriate methods and procedures to ensure compliance with all ECs and ICs that are required by the EE. Once the SMP has been approved by the NYSDEC, compliance with the SMP is required by the grantor of the EE and grantor's successors and assigns.

7.6 OPERATIONS, MAINTENANCE AND MANAGEMENT

Groundwater treatment by ISCO will not require Operations, Maintenance and Management (OM&M) with the exception of the previously-described groundwater monitoring.

The cover systems to be utilized as part of the remedial approach will require inspection and maintenance.

8.0 DOCUMENTATION

WEEKLY REPORTS

Daily remedial activities will be chronicled in detail in daily logbooks. Weekly reports, summarizing the week's progress and any minor changes or deviations from the RAWP due to field conditions will be sent to the DEC Project Manager ***via email*** no later than the following Monday. Photographs of work items will be provided as appropriate. Weekly reports will also include a Community Air Monitoring Program (CAMP) section presenting the CAMP results, any exceedances, and actions taken in the event of an exceedance.

MONTHLY REPORTS

Monthly reports will be submitted to NYSDEC and NYSDOH Project Managers by the tenth day of the following month of the reporting period and will include the following information, as well as the information required in the BCA:

- Activities relative to the Site during the previous reporting period and those anticipated for the next reporting period, including a quantitative presentation of work performed (i.e. tons of material exported and imported, etc.);
- Description of approved activity modifications, including changes of work scope and/or
- schedule;
- Sampling results received following internal data review and validation, as applicable; and
- An update of the remedial schedule including the percentage of project completion, unresolved delays encountered or anticipated that may affect the future schedule, and efforts made to mitigate such delays.

FINAL ENGINEERING REPORT (FER)

A FER will be submitted to NYSDEC following implementation of the remedial actions defined in this RAWP. The FER will document that the remedial work required under this RAWP has been completed and has been performed in compliance with the RAWP. The FER will provide a description of the changes in the remedial action from the elements provided in the RAWP and associated design documents, if necessary. The FER will be prepared in conformance with DER-10. Before approval of a FER and issuance of a Certificate of Completion, all project reports will be submitted in digital form on electronic media (PDF).

9.0 SCHEDULE

Remedial actions will begin upon receipt of written approval of this RAWP from NYSDEC, assumed to occur on or before 1 January 2024. The anticipated schedule is summarized below.

1/1/24 RAWP Approval
1/15/24 Complete Mobilization
2/29/24 Site Security, Asbestos Abatement, Building Demolition
3/29/24 Excavation AOCs 1, 2, 3, 5 (including clean pits), confirmation sample, backfill
4/12/24 Complete ISCO Injection, install temporary wells if needed
4/19/24 Receive confirmation sample analytical results, begin validation
5/10/24 First post-injection groundwater monitoring event
5/17/24 Data validation complete, issue DUSR
5/31/24 Receive and review first round groundwater data
6/1/24 Submit Environmental Easement (EE) Package
7/12/24 Second post-injection groundwater monitoring event
7/26/24 Engineering controls in place
8/1/24 Issue Draft Site Management Plan (SMP)
8/5/24 Receive and review second round groundwater data
10/1/24 Construction Completed, SMP Approved, Electronic Data Submitted in EQuiS, EE executed, Draft Final Engineering Report (FER) issued
10/11/24 Third post-injection groundwater monitoring event
10/15/24 EE recorded and notices provided
11/4/24 Receive and review third round groundwater data
11/15/24 Submit FER in final form.
Certificate of Completion issued no later than 12/31/24

Ongoing OM&M, reporting as per Sections 7.0 and 8.0 of this RAWP.

ATTACHMENT 1

FIGURES

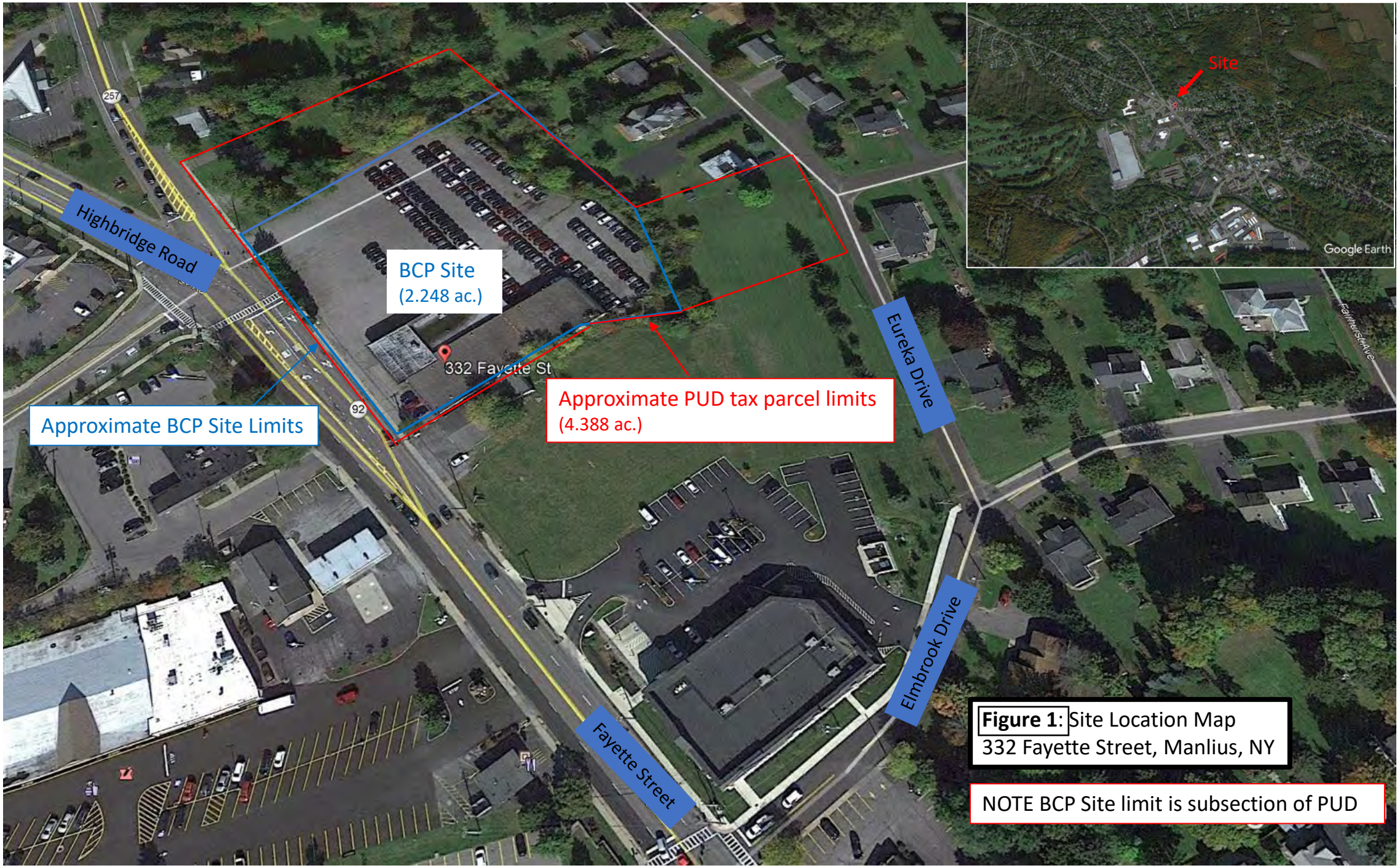


Figure 1: Site Location Map
332 Fayette Street, Manlius, NY

NOTE BCP Site limit is subsection of PUD

BCP SITE LIMITS
97,916 SF (2.248 AC)

INCLUDES ALL OF LOT 2 EXCLUDING
EAST PORTION AS INDICATED

EXCLUDED PORTION OF LOT 2
30,913 SF (0.710 AC)

PARK DRIVE

EUREKA DRIVE

N.Y.S. ROUTE 257 (FKA FAYETTE STREET)

FIGURE 2

NORTH

1"= 30 SCALE 30 0 30 60 FEET

BCP EXHIBIT

EXCEL
ARCHITECTS • ENGINEERS • SURVEYORS
Always a **Better Plan**
100 Camelot Drive
Fond Du Lac, WI 54935
Phone: (920) 926-9800
www.EXCELENGINEER.com

PROJECT INFORMATION

PROPOSED PUD MASTER DEVELOPMENT FOR:
FAYETTE MANLIUS, LLC
332 FAYETTE STREET • MANLIUS, NY 13104

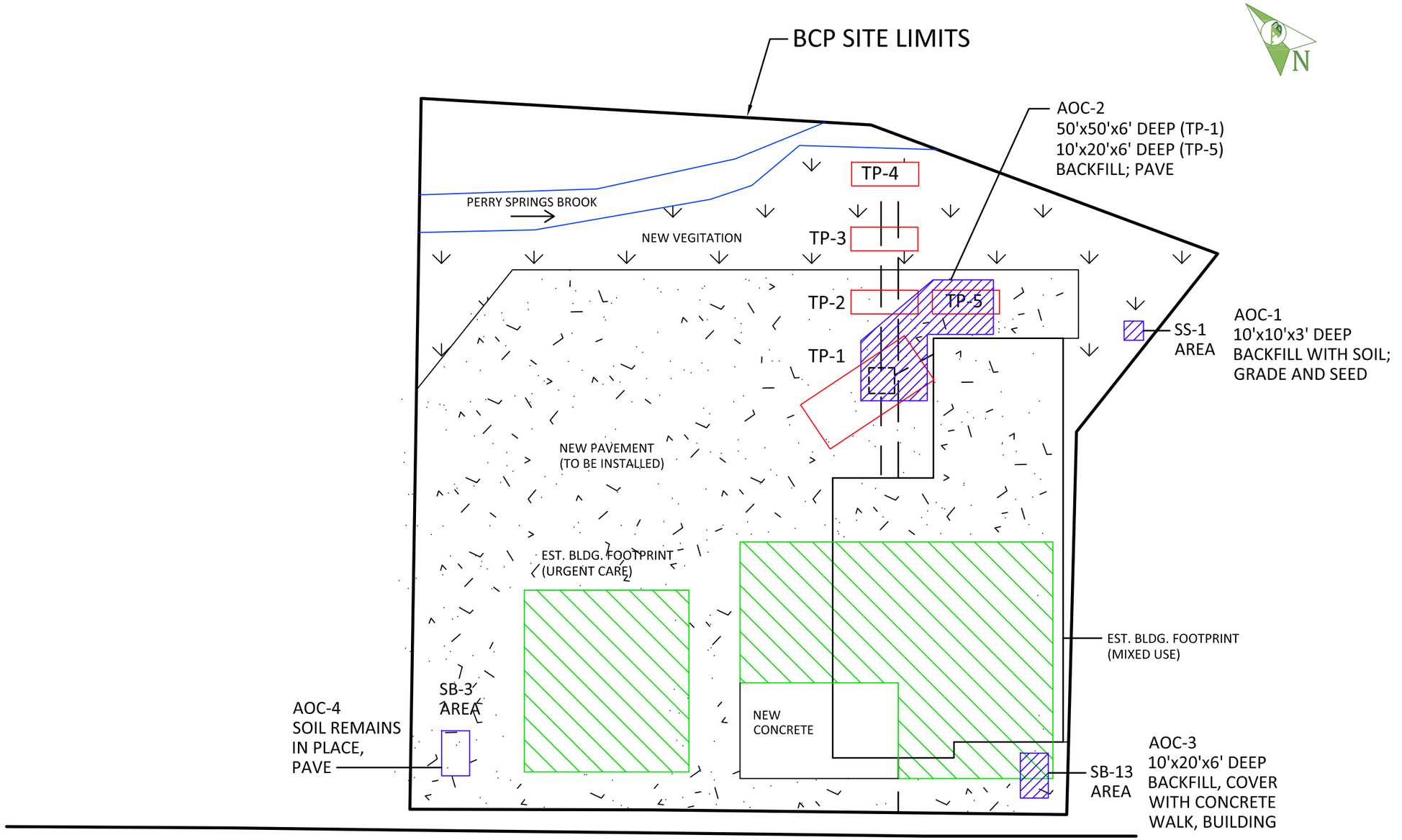
PROFESSIONAL SEAL

PRELIMINARY DATES
JUN. 7, 2021

NOT FOR CONSTRUCTION

JOB NUMBER
1948760

SHEET NUMBER
BCP



50 0 10 20 30 40 50

SCALE IN FEET

Ambient Environmental, Inc.
Building Science and EHS Solutions
828 Washington Avenue, Albany, NY 12203
PH: 518.482.0704 FAX:518.482.0750
www.ambient-env.com

EXCAVATION TOTAL:
AOC-1 = 11 CY
AOC-2 = 600 CY
AOC-3 = 45 CY
656 CY
EST. (984 TONS)

LEGEND

- TP-X — TEST PIT LOCATION
- GPRS BURIED FEATURE
- GPRS DETECTION
- ESTIMATED AREA OF EXCAVATION (EXTERIOR)
- ESTIMATED OUTLINE OF NEW BUILDINGS (TO BE CONSTRUCTED)
- AREA TO BE COVERED WITH GRASS/VEGITATION
- AREA TO BE PAVED

REVISIONS

PROJECT LOCATION

FAYETTE MANLIUS, LLC
332 Fayette Manlius BCP
Manlius, NY

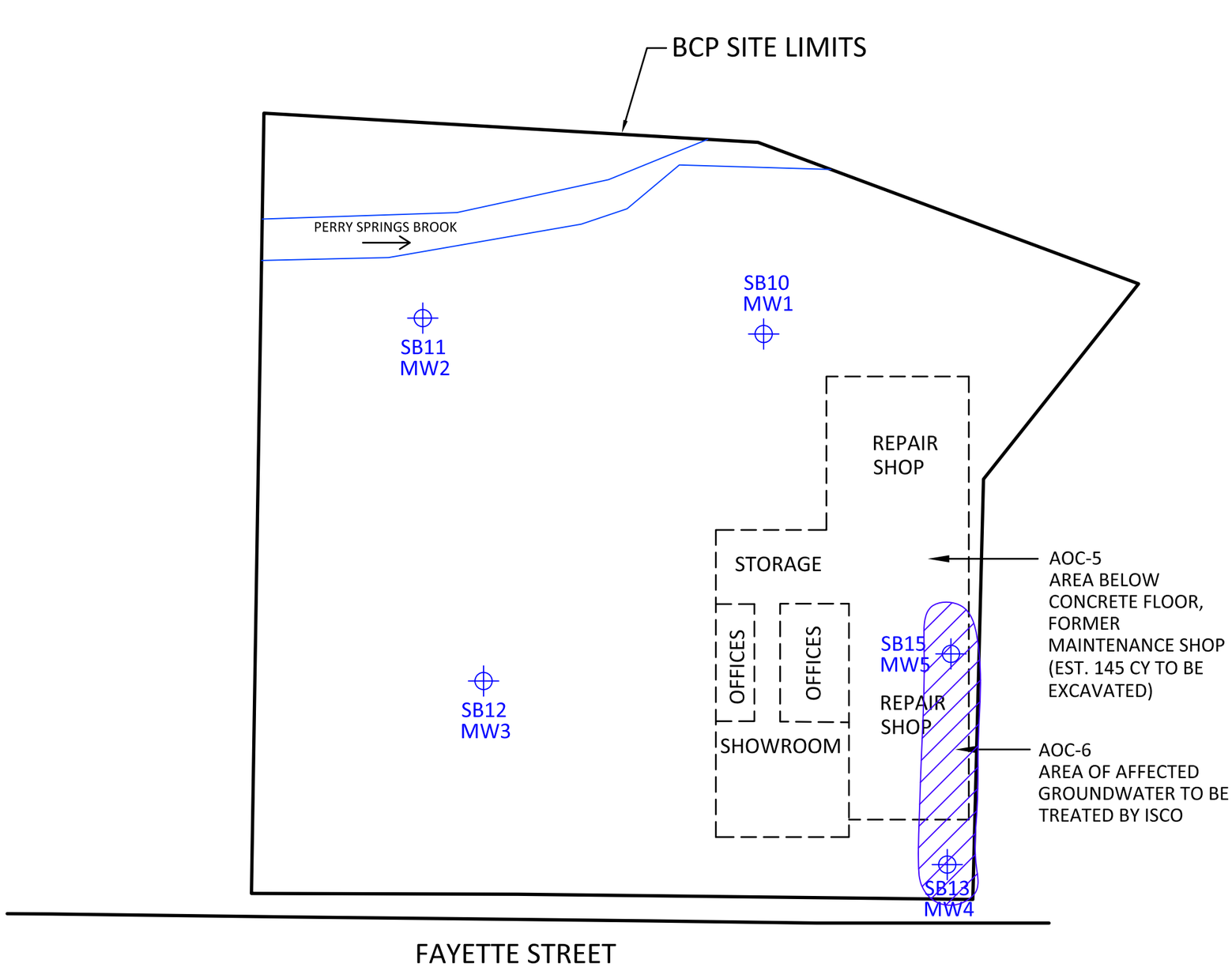
DRAWING TITLE

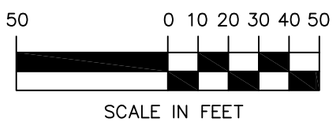
ESTIMATED EXCAVATION AREAS: EXTERIOR; COVER SYSTEM

DATE: 9/15/2023	SCALE: 1"=50'
PROJECT NO.	210603ENVA
DRAWN BY	KAJ
CHECKED BY	LPM

DWG. NO.

Figure 3





Ambient Environmental, Inc.
Building Science and EHS Solutions
828 Washington Avenue, Albany, NY 12203
PH: 518.482.0704 FAX:518.482.0750
www.ambient-env.com

LEGEND

REVISIONS		

PROJECT LOCATION

FAYETTE MANLIUS, LLC
332 Fayette Manlius BCP
Manlius, NY

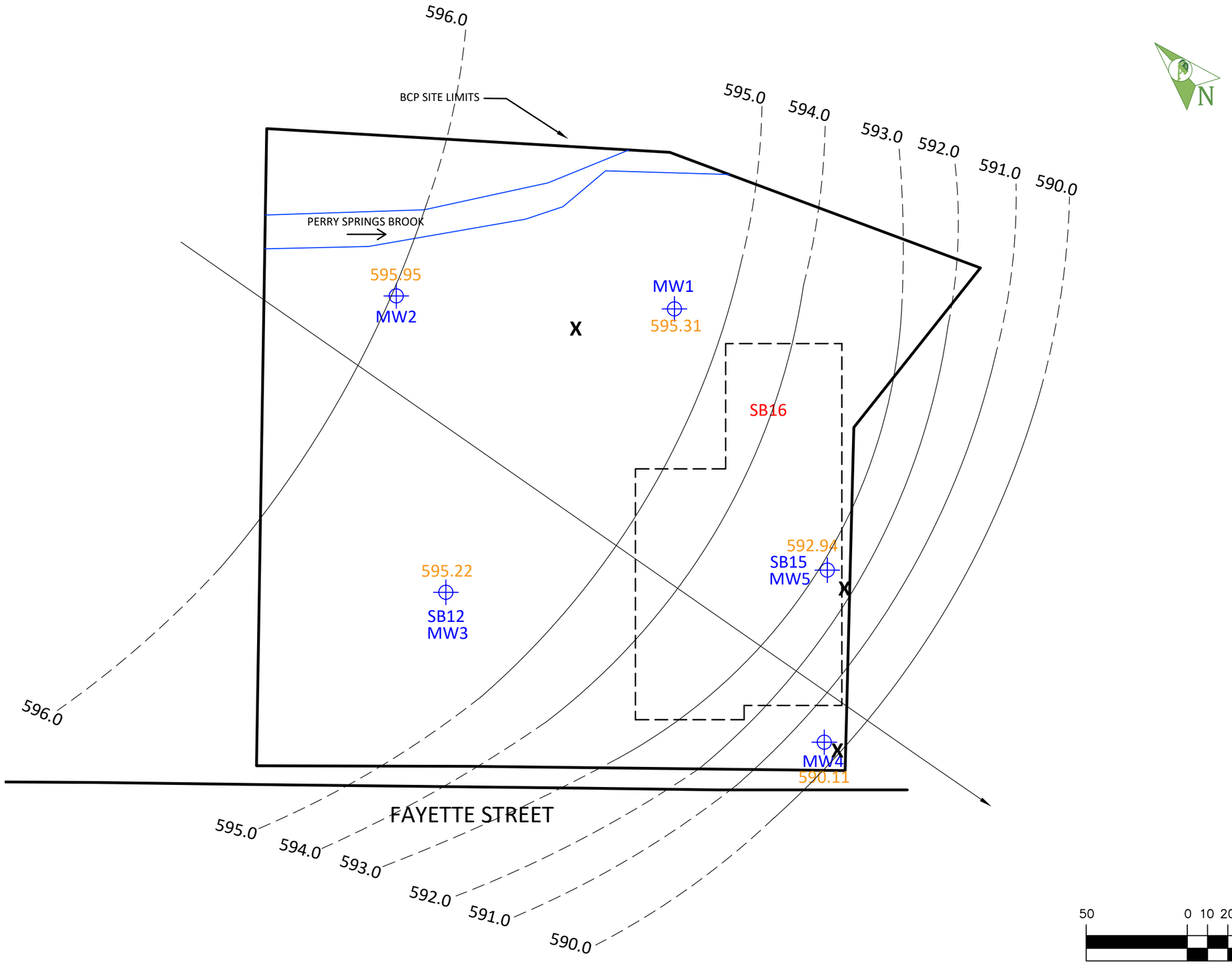
DRAWING TITLE

INTERIOR AOC'S
INCLUDING
GROUNDWATER

DATE: 8/17/2023	SCALE: 1"=50'
PROJECT NO.	210603ENVA
DRAWN BY	KAJ
CHECKED BY	LPM

DWG. NO.

Figure 4



Ambient Environmental, Inc.
Building Science and EHS Solutions
828 Washington Avenue, Albany, NY 12203
PH: 518.482.0704 FAX:518.482.0750
www.ambient-env.com

X- Proposed locations of new 'post injection' monitoring wells

GROUNDWATER ELEVATIONS WERE COLLECTED ON 8/11/2022 BY AMBIENT ENVIRONMENTAL.

LEGEND

- MONITORING WELL POINT
- 94.0 GROUNDWATER CONTOUR
- 595.75 STATIC WATER ELEVATION
- GROUNDWATER FLOW DIRECTION

REVISIONS		

PROJECT LOCATION

FAYETTE MANLIUS, LLC
332 Fayette Manlius BCP
Manlius, NY

DRAWING TITLE

GROUNDWATER FLOW MAP - AUGUST 2022 DATA-AND NEW WELL LOCATIONS

DATE: 6/29/2023	SCALE: 1"=50'
PROJECT NO.	210603ENVA
DRAWN BY	KAJ
CHECKED BY	LPM

DWG. NO.

Figure 5

APPENDIX A

ALTERNATIVES ANALYSES REPORT

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Environmental Remediation, Region 7
5786 Widewaters Parkway, Syracuse, NY 13214-1867
P: (315) 426-7519, (315) 426-7551
www.dec.ny.gov

September 8, 2023

Fayette Manlius, LLC
Matthew Lester
1657 East Avenue
Rochester, New York 14610
mlester@caliberbrokerage.com

Re: 332 Fayette Manlius
NYSDEC Site No. C734153
Remedial Investigation Report Acceptance

Dear Matthew Lester,

The New York State Department of Environmental Conservation (DEC) and Department of Health (DOH) have reviewed the Remedial Investigation Report (RIR) dated June 30, 2023 which was prepared by Ambient Environmental, Inc. on behalf of Fayette Manlius, LLC. The RIR, including modified figures submitted on August 21, 2023, is hereby approved.

Sincerely,

Andrew C. LoFaro, P.E.
Professional Engineer 1 (Environmental)

ec: Gary Priscott, NYSDEC
Daniel Tucholski, NYSDOH
Scarlett McLaughlin, NYSDOH
James Blasting, Ambient Environmental, Inc.

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Environmental Remediation, Region 7
5786 Widewaters Parkway, Syracuse, NY 13214-1867
P: (315) 426-7519, (315) 426-7551
www.dec.ny.gov

September 14, 2023

Fayette Manlius, LLC
Matthew Lester
1657 East Avenue
Rochester, NY 14610
mlester@caliberbrokerage.com

Re: 332 Fayette Manlius
NYSDEC Site No. C734153
Remedial Alternatives Analysis Report

Dear Matthew Lester:

The New York State Department of Environmental Conservation (DEC) and Department of Health (DOH) have reviewed the Remedial Alternatives Analysis Report (RAAR) dated July 20, 2023 which was prepared by Ambient Environmental, Inc. (Ambient) on behalf of Fayette Manlius, LLC. (Volunteer). This letter serves as acceptance of the RAAR provided the following comments and modifications are incorporated into the Remedial Action Workplan (RAWP) looking forward.

1. An active sub-slab depressurization system (SSDS) is discussed as part of the remedy in the RAAR. It is recommended that the piping needed for a SSDS is installed concurrent with the vapor barrier during construction. However, based on the sub-slab and indoor air sampling completed as part of the Remedial Investigation, an active SSDS will not likely be needed in future buildings and, therefore, should not be included as a remedial element in the RAWP.

2. NYSDEC and NYSDOH determined the following remedial action objectives (RAO) are applicable to this site:

- Groundwater
  i. Public Health Protection:
  - Prevent ingestion of groundwater with contaminant levels exceeding drinking water standards
  - Prevent contact with, or inhalation of volatiles, from contaminated groundwater

  Environmental Protection
  - Restore ground water aquifer to pre-disposal/pre-release conditions, to the extent practicable
  - Remove the source of groundwater contamination

- Soil
  i. Public Health Protection

- Prevent ingestion/direct contact with contaminated soil

Environmental Protection

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

- Soil Vapor
  i. Public Health Protection
  - Mitigate impacts to public health resulting from existing, or the potential for, soil vapor intrusion into buildings at a site.

Any future workplans submitted to the Department must refer to these RAOs exactly as written above.

3. The RAWP must describe in detail how the approved remedy, in-situ chemical oxidation (ISCO) and proposed excavation limits, will prevent off-site migration of contaminants in the vicinity of MW-4.

4. Page 4-2 - DEC remedial programs utilize Environmental Easements for site usage restrictions; DEC will not accept a “deed restriction” as an institutional control at this site. Please do not refer to “deed restrictions” in future submittals for this site.

   If you have any questions, please do not hesitate to contact me at (315) 426-7472 or andrew.lofaro@dec.ny.gov.

Sincerely,

Andrew C. LoFaro, P.E.
Professional Engineer 1 (Environmental)

ec: Gary Priscott, RHWRE, Region 7
Daniel Tucholski, NYSDOH
Scarlett Mclaughlin, NYSDOH
James Blasting, Ambient Environmental, Inc.

FAYETTE MANLIUS, LLC

REMEDIAL ALTERNATIVES ANALYSIS REPORT
332 FAYETTE MANLIUS BCP SITE
FAYETTE STREET, MANLIUS, NEW YORK

BCP Site No.: C734153

July 20, 2023

Prepared for:

Fayette Manlius, LLC
1567 East Avenue
Rochester, NY 14610

Prepared by:

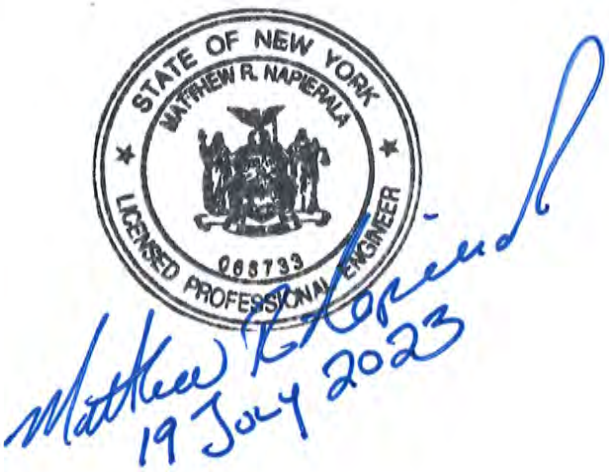
Ambient Environmental, Inc.
828 Washington Avenue
Albany, NY 12203

Ambient Project No. 210603ENVA

TABLE OF CONTENTS

ATTACHMENTS

I Matthew R. Napierala, P.E.certify that I am currently a NYS registered professional engineer and that this Remedial Alternative Analysis was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10).



1.0 INTRODUCTION

1.1 SITE LOCATION, FEATURES AND REMEDIAL INVESTIGATION

The 332 Fayette Manlius BCP Site is comprised of a portion of tax map parcel 024.-01-08.1 and consists of 2.248 acres in a suburban location on Fayette Street in the Village of Manlius, Town of Manlius, Onondaga County ('the Site'). The northwest extent of the Site is located just southeast of the intersection of Fayette Street and Highbridge Road; the southeast extent is adjacent to a small commercial building and vacant lot; and residential property and a vacant grass field are at the Site's northeastern border. The southwestern site border is defined by Fayette Street. A small creek (Perry Springs Brook) is present in the eastern portion of the Site. Refer to Figure 1 (Site Location Map) and Figure 2 (Site Survey with 2.248-acre BCP Site Limits).

The Site is situated along Fayette Street, the major thoroughfare in the Village of Manlius. A large parking lot is present to the northwest of the former Express Sales building, which is the only on-site structure. The former Express Sales building is a vacant brick and concrete block building on a concrete slab. It contains a garage with several large floor drains and sumps, hydraulic lifts with oil reservoirs, a paint booth, subsurface oil/water separator, offices, restrooms, kitchen area, and a showroom.

Fayette Manlius, LLC (Volunteer), applied for acceptance into the New York State Brownfield Cleanup Program (BCP) and received a Brownfield Cleanup Agreement (BCA) from the New York State Department of Environmental Conservation (NYSDEC) on December 13, 2021. The final Remedial Investigation Workplan (RIWP) was approved by NYSDEC on 3 March 2022. Ambient Environmental, Inc. (Ambient) conducted a Remedial Investigation (RI) for the Site in the summer of 2022. The scope and findings of the are presented in the RI Report dated 24 August 2022. Comments were received from NYSDEC on 26 September 2022, and Ambient conducted additional field work that generated additional data to address NYSDEC comments. A revised RI Report was issued to NYSDEC on 24 February 2023; NYSDEC provided comments on 31 May 2023 and a revised RI Report addressing those comments was provided to NYSDEC on 30 June 2023. NYSDEC approval of that RI Report is expected soon. The RI was conducted in accordance with NYS guidance, with regulatory oversight to determine the nature and extent of on-Site contamination and to determine the potential risks to human health and the

environment. Please note that the RI was performed by a 'Volunteer' under the NYSDEC Brownfield Cleanup Program and, as such, investigation of off-site conditions was not included during the RI.

1.2 PURPOSE AND SCOPE OF THIS REPORT

This Remedial Alternatives Analysis Report (RAAR) has been prepared by Ambient to present an evaluation of remedial alternatives for the Site, pursuant to the requirements of the 16 February 2022 BCA made by and between the NYSDEC and Fayette Manlius, LLC, and applicable regulatory guidance. This RAAR follows completion of the RI and was developed consistent with NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation (NYSDEC, May 2010) and the 6 New York Codes, Rules, and Regulations (NYCRR) Part 375 regulations, as applicable. The final RI Report (Ambient Environmental, Inc. 6/30/23) was transmitted to NYSDEC on 6/30/23; NYSDEC acceptance of that RI Report is expected to be issued soon.

The purpose of the RAAR is to document the process for the development and evaluation of remedial alternatives for the Site based in the findings presented in the RI Report.

1.3 SUMMARY OF THE REMEDIAL INVESTIGATION FINDINGS AND CONCLUSIONS

Samples were collected and analyzed from surface soil, subsurface soil, surface water, sediment, groundwater, subslab vapor and ambient air in accordance with the NYSDEC-approved RIWP and addendum thereto. The investigation was designed to characterize the nature, source, and extent of contamination, as well as to identify potential risks to human health and the environment. A final RI Report (RIR) was submitted to NYSDEC on 30 June 2023. A summary of the RIR findings are as follows:

- Surface soil in the area of soil sample SS-1, which includes some fill material, contains concentrations of cadmium, arsenic and mercury above the selected cleanup criteria, delineation sampling in this area indicated that soil with cadmium, arsenic and mercury exceedances is limited to a small area;
- Barium was detected in the soil sample from boring SB3 at a depth of 13-13.5 feet below grade at a concentration exceeding the Restricted Residential SCO, analyses of additional soil samples collected in this area at various locations and depths did not detect additional barium exceedances;
- The soil sample from test pit TP-1 contained six SVOCs at concentrations exceeding Restricted Residential SCO, affected soil appears to be contained to within three to five feet of grade (pavement surface);

- SVOCs were detected only in the upstream water sample from Perry Springs Brook, analytes were not detected in the mid-stream and downstream samples;
- Sediment samples collected from Perry Springs Brook did not contain analytes at concentrations above TOGS 5.1.9 Sediment Threshold Values;
- The Vapor Intrusion (VI) investigation documented that indoor air quality is acceptable and that vapor intrusion is not occurring;
- Groundwater samples from MW-4 and MW-5 contained VOCs at concentrations exceeding NYS Groundwater Standards, the groundwater sample from MW-4 also contained SVOCs at concentrations exceeding NYS Groundwater Standards;
- Groundwater samples collected from all monitoring wells contained elevated concentrations of metals on at least one occasion;
- Groundwater samples collected from MW-2 and MW-4 contained elevated concentrations of PFOS, the groundwater sample from MW-5 contained elevated concentrations of PFOA and PFOS;
- Hydraulic lift pits inside the building are not 'water-tight' and likely introduced petroleum residuals into adjacent soil, although nearby borings did not show evidence of widespread soil contamination.

A review of RI results leads to the following conclusions:

- Hydraulic lift pits inside the building contain oily water and were not water-tight, as such, it is expected that soil immediate adjacent to the lift pits will be affected with oil and will need to be remediated;
- Shallow soil in the vicinity of TP-1 and SS-1 will need to be remediated;
- Groundwater in the vicinity of the former gasoline UST will need to be remediated;
- Deep soil (greater than ten feet deep) at location SB-3 does not need to be remediated but a soil management plan may be appropriate to document the limited barium exceedance detected at 13-13.5 feet below grade (paved surface) at that location;
- The Site is not occupied and a complete exposure pathway does not exist;
- A Fish and Wildlife Resource Impact Analyses was conducted and determined that a Fish and Wildlife Resource Impact Analysis is not needed.

1.4 SITE REGULATORY FRAMEWORK

Fayette Manlius, LLC is a Volunteer in the New York State Brownfield Cleanup Program (BCP). Fayette Manlius, LLC received the Brownfield Cleanup Agreement (BCA) on 13 December 2021 after the public comment period. In conjunction with the Site's entrance into the BCP, NYSDEC issued Brownfield Site No. C734156. As required by the BCA, Fayette Manlius, LLC was obligated to investigate and address the presence of contamination at the Site.

This RAAR has been prepared in accordance with the BCP remedial program rules in 6 New York Codes, Rules, and Regulations (NYCRR) 375-3.8, and with the NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation (NYSDEC, May 2010).

1.5 SITE HISTORY AND SUMMARY OF PREVIOUS INVESTIGATIONS

The Site is the location of the former Express Sales and was developed in 1929, when a 20-car capacity automobile garage was present (historic maps indicate that two gasoline tanks were associated with the garage). This garage remained on the Site through 1950, when it was reportedly turned into an auto detailer, paint and body shop, and a car dealership. The car dealership expanded over time resulting in its current configuration. The auto dealership closed in 2009.

2018 Phase I Environmental Site Assessment Report

A Phase I Environmental Site Assessment (ESA) conducted in March 2018 identified several potential areas of concern. Two former gasoline tanks may have existed at the Site beginning in 1929. These tanks were reportedly removed in 1989, but no records of these tanks or their removal were identified. Hydraulic lifts, floor drains, manholes and pits were observed inside the Express Sales garage area. A feature that appears to be a subsurface oil/water separator or cistern associated with the garage was observed outside the northeast corner of the former Express Sales building.

2018 Limited Site Investigation

Limited Site Investigation activities conducted in August 2018 included advancing 14 soil borings at the Site. Photoionization Detector (PID) screening detected VOC vapors at 11 locations including all of the interior boring locations (inside the former auto repair area). This indicates an Area of Concern (AOC) due to the potential for source material indicative of petroleum residuals in shallow soil at the Site; the vertical extent appears to be limited by a shallow firm clay unit. Indications of affected soils were encountered in the former gasoline underground storage tank (UST) area immediately south of the repair area. Concentrations of several VOCs in soil sample SB-11, collected in this area, exceeded Restricted Residential Soil Cleanup Objectives (RRSCOs). Indications of affected soils were encountered adjacent to an interior sump and associated exterior feature, and near hydraulic lift pits in the former auto repair area.

Four temporary well points were installed at 332 Fayette Street. Several VOCs and SVOCs indicative of petroleum residuals were detected in water samples. VOC concentrations exceeded groundwater standards (GWS) at temporary well location TW-4 in the former gasoline UST location. SVOC concentrations exceeded GWS at temporary well location TW-1 in the suspected oil/water separator location. As a result, NYSDEC assigned petroleum spill number 1804927 to the Site

2.0 SUMMARY OF 2022 REMEDIAL INVESTIGATION & EXPOSURE ASSESSMENT

This section summarizes on-site investigative activities that were completed at the Site between March and December 2022 as part of the RI. A detailed description of all RI activities is presented in the RI Report dated 30 June 2023.

Site-wide Ground Penetrating Radar Survey (GPRS): A Ground Penetrating Radar Survey (GPRS) of the entire accessible, exterior portion of the Site was completed in order to locate any private utilities, potential tanks, dry wells, etc. The GPRS identified a subsurface feature north of the eastern end of the automotive repair shop. The GPRS also identified an unknown feature extending northeast towards Perry Spring Brook. Test pits were advanced to evaluate those anomalies (see below).

Evaluation of Areas of Concern (AOCs): Several 'pits' such as hydraulic lift pits, catch basins and a sump/pit are present at the Site inside the former automobile service area. These AOCs were fully evaluated during supplemental RI activities conducted in fall/winter 2022. Interior trench drains, lift pits and a catch basin were cleaned and inspected. It was determined that the lift pits were not 'water-tight' and it is likely that soil immediately surrounding the lift pits is adversely affected by oily water seeping from the pits. The catch basins appear sound and likely have little or no associated affected soil. The exterior features were evaluated with test pits and appeared to be related to an old septic feature consisting of perforated steel pipes. A soil sampling collected in the vicinity of the perforated pipes at location TP-1 contained six SVOCs at concentrations exceeding Restricted Residential SCOs.

Soil Boring Advancement: A total of sixteen soil borings were advanced to various depths below ground surface (bgs) based on field screening and site conditions. Thirteen soil borings were advanced on the exterior portion of the Site and three soil borings were advanced within the interior of the automotive repair shop on the southeastern portion of the Site. Throughout Site activities, soil borings were continuously screened with a calibrated PID with a 10.6 eV lamp for the presence of VOC vapors by Ambient's on-site environmental professional.

Soil borings were advanced to approximately 12 to 16 feet bgs throughout the Site. Saturated soils were encountered between five to seven feet bgs. Generally, a layer of fine to medium

grained sand with occasional shale/gravel fragments was encountered between 8 inches to approximately 10 feet bgs. A mix of clay and fine sand was encountered between 10 to 12 feet bgs. A stiff, dense gray clay unit was encountered between 12 to 16 feet bgs. One soil sample was collected per boring (not including borings converted to temporary monitoring well points) for analyses. Samples for various analyses were collected at varying depths in order to obtain the volume of soil necessary for sample analyses.

Generally, PID readings collected from the exterior soil boring locations were recorded at background concentrations with the exception of SB10 and SB13. The highest PID reading from SB10 (located near the unknown subsurface feature north of the repair shop) was recorded at 9.9 parts per million (ppm) at a depth of approximately 4 feet bgs. The highest PID reading from SB13 (located in the former gasoline UST area) was recorded at 102 ppm at a depth of approximately 7 feet bgs. PID readings collected from interior soil boring locations were recorded below 2 ppm at all locations.

Monitoring Well Point Installations: On 9 March 2022, and 31 May 2022, Ambient mobilized to the Site to install a series of temporary monitoring well points at the Site. Shallow overburden monitoring wells points were installed at five locations on the Site as follows:

- Immediately east of the unknown subsurface feature that is located at the northeast corner of the former auto repair facility;
- In the parking lot north of the main automobile sales and service building;
- Along Fayette Street at the western boundary of the Site, west of the former gasoline UST;
- Inside the former automobile repair bay near the hydraulic lift area;
- On the northeastern portion of the Site, just south of Perry Springs Brook.

Soil samples from borings associated with monitoring well point installation were logged and field screened with a PID to monitor for the potential presence of VOC vapors as described for soil borings. Each of the monitoring well points were constructed using one-inch-diameter PVC riser and ten feet of one-inch-diameter, 0.01-inch slotted PVC well screen. The well screen was installed to "straddle" the top of the water table in the shallow, unconfined groundwater unit.

Surface Soil Sampling

Almost all of the Site is currently covered with pavement or structures, greatly limiting access for surface soil sampling. Surface soil samples were collected in areas that do not have impervious surfaces (i.e., pavement or concrete). Ambient collected surface soil samples at four locations on 6 June 2022. Samples were collected from 0.5-1 foot below grade at all locations (below the root level). Surface material at location SS-1 consisted primarily of fill material (stone, reworked soil, concrete fragments, metal, glass fragments); what appeared to be native soil was encountered at all other surface soil sampling locations. Based on an evaluation of initial surface soil sampling results, additional soil samples were collected in the vicinity of soil sample SS-1.

Surface Water and Sediment Sampling

Surface water and sediment samples were collected from three locations within Perry Springs Brook, within the northern Site boundary: upstream, mid-stream and downstream of the Site.

Supplemental Soil Sampling

Based on an evaluation of initial surface soil sampling results, additional soil samples were collected in the vicinity of surface soil sample SS-1 and soil boring SB-3. Test pits were excavated in areas identified by GPR as potentially having subsurface features. Soil samples were collected at two test pit locations, where suspect materials were encountered.

Description of on-Site Soils Characteristics: Observations and field screening conducted during the Remedial Investigation identified the soil underlying the Site as mainly a silt loam with some gravel and sand that has varied drainage and infiltration rates. The soil immediately south of the Site is considered to have excessive drainage, while the soil immediately north of the Site reportedly has much slower infiltration and drainage rates. A clay layer was encountered below the silt and gravel unit at all soil boring locations.

Description of on-Site of Groundwater Characteristics: Based on the interpretation of ground surface topography, surface water features, and several rounds of water level measurements collected from temporary well points, the depth to groundwater ranges from approximately 2 to 6 feet below ground surface at the Site. Groundwater flow is generally to the south-southeast.

2.1 ADDITIONAL SITE WORK AND SUPPORT

Surveying The horizontal and vertical locations of all soil borings, monitoring well points, and surface soil samples were surveyed by a New York State (NYS) licensed land surveyor- GPI Engineering, Landscape Architects and Surveying, LLC.

Soil Vapor Evaluation A Soil Vapor Intrusion Investigation was conducted at the Site on 22 December 2022. Sampling ports were installed in the building concrete floor and vapor samples were collected at four locations (as well as one exterior 'below pavement' location). One ambient indoor air sample and one exterior ambient air sample were also collected. The soil gas samples were analyzed by United States Environmental Protection Agency (USEPA) method TO-15 for VOCs. Results of the VI investigation determined that a pathway does not exist between the groundwater that contains detectable concentrations of VOC and potential above-grade receptors.

2.2 NATURE AND EXTENT OF CONTAMINATION

SOIL

Based on intended use, the remedial criteria for soil at this Sites is Restricted Residential Soil Cleanup Objectives (RR SCOs).

VOCs and SVOCs

With the exception of surface soil sample SS12 (duplicate of SS2), and the soil sample collected from TP-1, all VOC and SVOC analytes were reported at concentrations below RR SCOs. The surface soil sample SS12, which was a 'blind duplicate' collected at location SS2, contained the SVOC Ideno(1,2,3-cd)pyrene at a concentration that exceeded the Restricted Residential SCO (0.64 ppm with respect to 0.5 ppm). The soil sample collected from the base of TP-1 contained Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Chrysene, Benzo(a,h)anthracene, and Indeno(1,2,3-cd)pyrene at concentrations that exceeded RR SCOs.

Metals

The surface soil collected at location SS1 contained Cadmium and Mercury at concentrations that exceeded RR SCOs. The surface soil collected from SS 1 N 1.0' displayed a detection for Arsenic that exceeded RR SCOs. Sampling documented that the extent of affected soil in this

area is limited. The soil sample collected from SB3 at a depth of 13-13.5 feet bgs displayed a detection for Barium that exceeded Restricted Residential SCOs. Ambient remobilized to the Site on 31 May 2022 and installed four soil borings surrounding SB3, each to 16 feet bgs. Soil samples were collected from depth intervals of 2-3 feet bgs, 5-6 feet bgs, 12-13 feet bgs, and 15-16 feet bgs and were analyzed for Barium. The concentrations of Barium in all soil samples collected from SB3A, SB3B, SB3C, and SB3D were below the RR SCO for Barium. All other metal analytes (plus cyanide) for the soil samples collected were below RR SCOs or were not present above method detection limits.

PCBs

PCBs were not detected in any of the twelve soil samples collected from interior and exterior soil borings at concentrations exceeding RR SCOs.

PFOA/PFOS

PFOS/PFOA were not detected in any of the soil samples collected from the interior or exterior soil boring locations that were analyzed for those parameters. Per the RIWP, surface soil samples collected from the Site were not analyzed for PFOS/PFOA.

Pesticides

Pesticides were not detected in any of the soil samples collected from the select soil borings on-Site. All other pesticide analytes were below RR SCOs or were not present above method detection limits in the surface soil samples collected at the Site.

SURFACE WATER/SEDIMENT

The surface water sample from US SW-3 (the upstream surface water sample) displayed three SVOC detections for Benzo(a)anthracene, Benzo(k)fluoranthene, and Indeno(1,2,3-cd)pyrene that slightly exceeded TOGS 1.1.1. Ambient Water Quality Standards. All other analytical results for the surface water samples were either non-detect or below NYSDEC Guideline Standards.

All sediment sample analyses had either ‘non-detect’ results or concentrations that were below the New York TOGS 5.1.9 Sediment Threshold Values.

GROUNDWATER

Groundwater samples were collected from each of the five monitoring well points using a disposable bailer or peristaltic pump. Field parameters (pH, temperature, conductivity, dissolved oxygen, oxidation-reduction potential, and turbidity) were collected from each monitoring well point during sampling. Groundwater samples were analyzed for TCL VOCs (USEPA Method 8260), TCL SVOCs (USEPA Method 8270), Total Metals including Cyanide and Mercury (EPA Method 6010/7470), Pesticides (EPA Method 8081), PCBs (EPA Method 8082), PFASs (EPA Method mod 537.1) and 1,4-Dioxane (Method 8270 SIM).

VOCs and SVOC

The groundwater sample from MW-4 contained Benzene, Toluene, Ethylbenzene, and Isopropylbenzene at concentrations that exceeded NYSDEC Groundwater Standards. The groundwater sample from MW-5 contained Chlorobenzene and Benzene at concentrations that exceeded NYSDEC Groundwater Standards. The groundwater sample from MW-4 contained six SVOC (Naphthalene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Chrysene, and Indeno(1,2,3-cd)pyrene) at concentrations that exceeded NYSDEC Groundwater Standards. All other VOC and SVOC analytes for MW-1 through MW-5 (including 1,4 Dioxane) were either not detected or were reported at concentrations below NYSDEC Groundwater Standards.

Metals

The four groundwater samples collected on 21 March 2022 contained elevated concentrations of at least one metal. This was suspected, in part, to be a result of suspended solids in the groundwater samples. Ambient remobilized to the Site with Alpha Analytical personnel on 6 June 2022 to perform low flow sampling and collect filtered and unfiltered groundwater samples from each of the four previously-sampled monitoring wells on-Site plus the interior monitoring well point MW-5. The groundwater sample collected from MW-1 contained Barium, Iron, Magnesium, and Sodium in both the filtered and unfiltered groundwater samples at concentrations that exceeded NYSDEC Groundwater Standards. The groundwater sample collected from MW-2 contained Iron and Magnesium in both the filtered and unfiltered groundwater samples at concentrations that exceeded NYSDEC Groundwater Standards. The

groundwater sample collected from MW-3 contained Iron, Magnesium, and Manganese in both the filtered and unfiltered groundwater samples at concentrations that exceeded NYSDEC Groundwater Standards. Groundwater samples collected from MW-4 and MW-5 contained Iron, Magnesium, Manganese and Sodium in both the filtered and unfiltered groundwater samples at concentrations that exceeded NYSDEC Groundwater Standards. Additionally, MW-5 contained Aluminum in the unfiltered sample at a concentration that exceeded NYSDEC Groundwater Standards.

PCBs

PCBs were detected in the groundwater sample collected from MW-1 at a concentration of 0.068J ppb, which is below the NYSDEC Groundwater Standard of 0.09 ppb. PCBs were not detected in groundwater samples from all other monitoring wells.

PFOA/PFOS

PFOA/PFOS were detected in the groundwater sample collected from MW-1, MW-2, MW-3, MW-4, and MW-5. Groundwater samples collected from MW-2 and MW-4 contained elevated concentrations of PFOS, the groundwater sample from MW-5 contained elevated concentrations of PFOA and PFOS

Pesticides

Pesticides were not detected in any of the groundwater samples.

SOIL VAPOR

The Soil Vapor Intrusion Investigation conducted at the Site on 22 December 2022 determined that vapor intrusion into the existing building is not a concern.

2.3 EXPOSURE PATHWAYS SUMMARY AND POTENTIAL RECEPTORS

A qualitative human exposure evaluation, which describes the potential for human exposure to site-related constituents, was prepared for the Site. An evaluation of the five potential exposure pathways in relation to the Site (as defined in Appendix 3B of DER10) is presented in detail in the RI Report for the Site. The qualitative human exposure evaluation determined that the public is not being adversely impacted by current Site conditions.

2.4 ECOLOGICAL ASSESSMENT

A Fish and Wildlife Resource Impact Analyses was conducted and determined that a Fish and Wildlife Resource Impact Analysis is not needed.

3.0 ALTERNATIVES ANALYSIS

3.1 AREAS OF CONCERN

Areas of concern (AOCs) are summarized below:

- Surface soil in the area of soil sample SS-1, which includes some fill material, contain concentrations of cadmium, arsenic and mercury above the selected cleanup criteria, additional sampling in this area indicated that soil with cadmium, arsenic and mercury exceedances is limited to a small area;
- The soil sample from test pit TP-1 contained six SVOCs at concentrations exceeding Restricted Residential SCO, affected soil appears to be contained to within three to five feet of grade (pavement surface);
- Groundwater samples from MW-4 and MW-5 contained VOCs at concentrations exceeding NYS Groundwater Standards, the groundwater sample from MW-4 also contained SVOCs at concentrations exceeding NYS Groundwater Standards;
- Hydraulic lift pits inside the building are not 'water-tight' and likely introduced petroleum residuals into adjacent soil, although nearby borings did not show evidence of widespread soil contamination.

3.2 OBJECTIVES

The objectives of this RAAR are to evaluate remedial alternatives that could be utilized to address the contamination present in the above-listed AOCs and select the most appropriate remedial actions to address those AOCs. As defined in NYSDEC DER-10 (Section 4.0), remedial alternatives will be evaluated based on the following criteria:

- Overall Protection of Public Health and the Environment: This criterion evaluates exposure and residual risks to human health and the environment during or subsequent to implementation of the alternative.
- Compliance with standards, criteria, and guidance (SCGs): This criterion evaluates whether the remedial alternative will ultimately result in compliance with SCGs, to the extent practicable.
- Long-Term Effectiveness and Permanence: This criterion evaluates if the remedy is effective in the long-term after implementation (e.g., potential rebound). In the event that residual impacts will remain as part of the alternative, then the risks and adequacy/reliability of the controls are also evaluated.
- Reduction of Toxicity, Mobility, or Volume with Treatment: This criterion evaluates the reduction of contaminant toxicity, mobility, or volume as a result of the remedial alternative. In addition, the reversibility of the contaminant destruction or treatment is evaluated.
- Short-Term Effectives: This criterion evaluates if the remedial alternative protects the community, workers, and the environment during implementation.

- Implementability: This criterion evaluates the remedial alternative based on its suitability, implementability at the specific site, and availability of services and materials that will be required.
- Cost: This criterion evaluates the capital, operation, maintenance, and monitoring costs for the remedial alternative. The estimated costs are presented on a present worth basis.
- Land Use: This criterion evaluates the proposed remedial approach against the current, intended, and reasonably anticipated future use of the land and its surroundings.
- Community Acceptance. After the decision document is subject to public comment, the final criterion, community acceptance, is considered. This modifying criterion is evaluated after any public comments on the remedy have been received, prior to NYSDEC selection of the remedy.

3.3 REMEDIAL ACTION OBJECTIVES

Remedial Action Objectives (RAOs) are medium-specific objectives for the protection of public health and the environment and are developed based on contaminant-specific (SCGs) established by NYSDEC and NYSDOH. The site-specific RAOs are based on the anticipated use of the site for restricted residential use.

Soil RAOs

The soil RAOs used in this RAAR are:

- RAOs for Public Health Protection
    - Prevent ingestion/direct contact with contaminated fill.
    - Meet the NYCRR Subpart 375-6 Remedial Program SCOs for Restricted Residential Use.
    - Reduce the toxicity, mobility, or volume of contaminants at the Site.
    - Prevent inhalation exposure to contaminants volatilizing from soil.
- RAOs for Environmental Protection
    - Prevent migration of contaminants that would result in groundwater or surface water contamination.

Groundwater RAOs

The RAOs for groundwater used in this RAAR are:

- RAOs for Public Health Protection
    - Prevent ingestion of groundwater with contaminant levels exceeding drinking water standards; and
    - Prevent contact with, or inhalation of, volatiles from contaminated groundwater.

- RAOs for Environmental Protection
    - Prevent the discharge of contaminants to surface water;
    - Remove the source of groundwater contamination; and
    - Restore groundwater to pre-disposal / pre-release conditions, to the extent practicable.

Soil Vapor RAOs

The RAOs for soil vapor used in this RAAR are:

- RAOs for Public Health Protection
    - Mitigate impacts to public health resulting from the potential for soil vapor intrusion into buildings at a Site.

3.4 FUTURE USE EVALUATION

According to DER-10 Section 4, anticipated future land use should be considered when evaluating remedial alternatives. The Site is located along Fayette Street in the Village of Manlius and is surrounded by commercial, residential, office, and retail properties. The current parking lot area of the Site is anticipated to be developed with an urgent care facility, and the current location of the former automobile dealership will be developed into upper-level residential living units with retail on the first floor.

3.5 DEVELOPMENT OF REMEDIAL ALTERNATIVES

This section identifies potential remedial alternatives being considered to address the Site. The remedial alternatives evaluated are summarized below:

3.5.1 No Action

3.5.1.1 Description

The No Action Alternative is included as a procedural requirement and as a baseline to evaluate other alternatives. Under this alternative, no further remedial or monitoring activities would occur and no environmental easement would be recorded. The soil at the Site would remain virtually as is (except for soil management during Site development). Groundwater would not be treated. Change in use would not be limited except by existing land use controls such as zoning.

3.5.1.2 Assessment

Overall Protection of Public Health and the Environment

The No Action Alternative is not protective of public health and the environment because the Site is not fully covered with an appropriate cover system and exposure pathways would exist.

Compliance with SCGs

The No Action Alternative does not comply with the SCGs for soils because contaminants in the surface soils are present at concentrations above Unrestricted Use SCOs.

Short-term Impacts and Effectiveness

The No Action Alternative is not effective in the short-term because it would leave the Site with soil that exceeds Restricted Residential Use SCOs and groundwater that exceeds NYSDEC Groundwater Standards with no long-term monitoring or treatment. This alternative would increase potential exposure of contamination to workers excavating the contaminated soil during future construction.

Long-term Effectiveness and Permanence

The No Action Alternative is not effective in the long-term or a permanent basis because it would leave the Site with petroleum contaminated soil and groundwater in the long term.

Reduction of Toxicity, Mobility and Volume

The No Action Alternative would not reduce the toxicity, mobility, or volume of contamination. Therefore, this alternative would not follow the RAOs for the fill materials and contaminated soil.

Implementability

The No Action Remedial Alternative can be implemented with no technical or cost concerns.

Cost Effectiveness

There are no costs associated with this alternative. A No Action Alternative would not take any steps to reduce contamination and, therefore, would not incur future remedial costs for the Site.

Land Use

The No Action Alternative would not allow the use of the Site for residential use.

Community Acceptance

The public will likely not accept when invasive activities associated with site redevelopment begin if no action is taken to reduce contamination prior to development.

3.5.1.3 Summary

The No Action Alternative would be the least expensive alternative; however, this alternative would not limit direct human interaction with contamination in the surface soil, subsurface soil, or groundwater. This alternative would leave the soil in place and does not meet remedial goal. Therefore, the No Action Alternative is not the preferred alternative.

3.5.2 Track 4 –ISCO Injection, Limited Excavation, SSDS, and Cover System Alternative

3.5.2.1 Description

Under this Track 4- ISCO Injection, Limited Excavation, and Cover System (with SSDS) Alternative, the Site would be remediated for restricted use with site-specific soil cleanup objectives being Part 375 Restricted Residential Use SCOs. This remedial approach includes addressing affected soil within two feet of ground surface by either removing the soil from the Site for proper off-site disposal as non-hazardous waste; covering affected soil with two feet of clean soil; or covering affected soil with an impermeable surface such as asphalt pavement, concrete, or a concrete building slab. A limited amount of affected soil would be removed to address 'hot spots' or achieve site grade, followed by capping with impermeable surface. The estimated amount of soil to be excavated under this approach would be 1,200 tons. Additional soil sampling would be conducted to evaluate any soil to be excavated. Groundwater would be treated by limited soil removal followed by In-Situ Chemical Oxidation (ISCO) utilizing a colloidal suspension of the ferric-based catalyzed sodium/potassium persulfate.

As with all remedial alternatives, common actions would be performed as described in Section 3.5.4.

In general, remediation would consist of limited sol excavation, capping, and groundwater remediation. Subsurface soils generally do not contain analytes of concern at concentrations requiring remedial action. Surface soils generally do not contain analytes of concern at concentrations requiring remedial action with the exception of surface soil at location SS-1, the only location that produced a surface soil sample with any analytes exceeding Restricted

Residential SCOs (those analytes being arsenic, cadmium and mercury). Furthermore, near-surface soils at test pit locations TP-1 and TP-5 will need to be remediated, and it is expected that soil near the interior sump/hydraulic lift pits will need to be remediated. Remediation will consist of proper waste characterization and profiling followed by excavation and off-site disposal at an approved, licensed facility.

Groundwater contains VOCs and SVOCs at concentrations exceeding GWS, primarily in the southern-most portion of the Site in the suspected area of two former gasoline USTs that were reportedly removed in 1989. The affected groundwater in that area can readily be treated by ISCO, which will also remove the petroleum residuals in saturated soil. Groundwater treatment will also eliminate the potential source of vapor intrusion to newly-constructed buildings in this area. ISCO injections will be used to treat on-site groundwater, targeting the southern-most area of the Site. Post-ISCO groundwater monitoring will be performed to assess the effectiveness of the treatment.

Although the source of potential vapor intrusion will be treated, a subslab depressurization system (SSDS) consisting of horizontal perforated pipe (connected to a vent fan) and overlying vapor barrier will be installed below any buildings (or portion thereof) constructed in this area in the future as a safeguard against any possible vapor intrusion in the future.

Long term environmental protection and control can be managed with a Site Management Plan (SMP), environmental easement, deed restrictions, annual monitoring, and other such institutional and engineering controls.

In summary, the Track 4- ISCO Injection and Cover System (with SSDS) Alternative will include:

- Additional sampling and analyses of any soil to be excavated as part of Site development;
- Addressing affected soil within two feet of ground surface by either removing the soil from the Site for proper off-site disposal as non-hazardous waste; covering affected soil with two feet of clean soil; or covering affected soil with an impermeable surface such as asphalt pavement, concrete, or a concrete building slab;

- If present, excavating affected soil deeper than two feet below grade (but above the water table) near interior sumps and lift pits- this will require removal of the existing building, concrete slab and block lift pit walls;
- Treating affected groundwater with ISCO (including installing a permanent monitoring well network);
- Installing a SSDS below the southernmost portion of the existing building (upon building demolition and removal of the existing concrete slab);
- Ongoing Operation, Maintenance and Monitoring (OM&M) including regularly scheduled groundwater monitoring, inspection of cover systems, SSDS inspection and maintenance, and development and implementation of a Site Management Plan (SMP).

3.5.2.2 Assessment

Overall Protection of Human Health and the Environment

This alternative would be protective of human health and the environment. Contaminated groundwater would be treated in-situ to eliminate groundwater as a mechanism to mobilize contaminants across groundwater or from groundwater to vapor. Contaminated surface and subsurface soil will be isolated by the cover system (some affected soil would be removed from the Site for proper off-site disposal).

Compliance with SCGs

The alternative complies with the SCGs, as soil with contaminant concentrations above Restricted Residential SCOs would be removed from the Site or isolated beneath acceptable cover material. All excavated material would be managed and characterized in accordance with 40 CFR 261 and 6 NYCRR Part 371 regulations to determine off-site treatment/disposal requirements. ISCO injections will treat groundwater to concentrations at or approaching GWS and will eliminate the source of vapor intrusion into future buildings. SSDS will address any residual potential VOC sources that could result in a risk of vapor intrusion.

Short-term Impacts and Effectiveness

This alternative increases the short-term risks for the community and the workers implementing the alternative (i.e., through the surficial disturbance of impacted soil); however, these risks would be minimized through the implementation of appropriate soil handling procedures, air monitoring, and dust suppression techniques. Additionally, this alternative would be effective in the long-term.

Long-term Effectiveness and Permanence

This alternative would be a permanent remedy to address the contaminant concentrations in near-surface soil and in groundwater across the Site. Treatment of the groundwater and SSDS installation would also mitigate the potential for subsequent indoor air quality issues for a future building.

Reduction of Toxicity, Mobility and Volume

This alternative would result in the reduction of toxicity, mobility, and volume of contaminants in the soil and groundwater. Therefore, treatment of the groundwater would be in compliance with the SCGs.

Implementability

This alternative is implementable using existing construction methods and equipment. The expected duration of remedial construction is three months. The expected duration for in-situ groundwater remediation to meet remedial goal is 12 to 18 months. This alternative would result in a Site suitable for redevelopment for residential and/or commercial use.

Cost Effectiveness

The estimated cost of this alternative at $658,005 requires a far greater investment than the No Action Alternative; however, the alternative eliminates exposure to the contaminations through treatment of groundwater and installation of a cover system and prepares the Site for its intended use. This alternative is considerably less expensive that the Track 1 cleanup.

Land Use

This alternative would allow for residential and commercial use of the property, which conforms to current use and development plans for the area.

Community Acceptance

Based on the findings of the studies performed to date, it is anticipated that the results of this alternative would be acceptable to the community.

3.5.2.3 Summary

The Track 4 – ISCO Injection and Cover System Alternative (including SSDS) was designed to remediate the Site to a meet Restricted Residential Use Soil SCOs and prepare the Site for redevelopment for residential and commercial uses.

3.5.3 Track 1 – Unrestricted Use – Complete Fill Removal and Groundwater Treatment

3.5.3.1 Description

Under this Unrestricted Use Alternative, soil impacted at concentrations greater than the Unrestricted Use SCOs would be excavated and disposed of off-site in accordance with applicable regulations. This would include excavation to an estimated 14 feet bgs at location SB-3 to address one barium exceedance. Excavation at other locations that produced soil samples with at least one analyte exceeding Unrestricted Use SCOs, such as SS-4 and SB-5, would also be required. The estimated amount of soil to be excavated under this approach would be approximately 3,000 tons.

Following contaminated soil removal, the subsurface would be injected with an ISCO product to treat groundwater. The effectiveness of the ISCO would be verified by groundwater sampling and analysis. To meet unrestricted goals, a second ISCO injection may be needed.

An SSDS would be installed in a targeted area to address any potential for vapor intrusion.

3.5.3.2 Assessment

Overall Protection of Human Health and the Environment

This alternative would be protective of human health and the environment. All soil with contaminant concentrations above Unrestricted Use SCOs on-site would be removed and disposed of off-site. Groundwater would be treated in-situ to meet GWS. An SSDS would be installed and maintained.

Compliance with SCGs

The alternative complies with the SCGs, as all on-site soil with contaminant concentrations above the SCOs would be removed and disposed of off-site. Groundwater would be treated in-situ to meet TOGS Standards and any potential vapor intrusion concerns would be addressed.

Short-term Impacts and Effectiveness

This alternative increases the short-term risks for the community and the workers implementing the alternative (i.e., through the disturbance of impacted soil), because the Site will undergo complete removal of contaminated soil. However, these risks would be minimized through the implementation of appropriate soil handling procedures, air monitoring, and dust suppression techniques. Furthermore, this alternative would be effective in the long-term.

Long-term Effectiveness and Permanence

The Unrestricted Use Alternative would be a permanent remedy to address the contaminant concentrations in the soil and groundwater throughout the Site.

Reduction of Toxicity, Mobility and Volume

This alternative would result in the reduction of the toxicity, mobility, and volume of contaminants in the soil and groundwater. Therefore, the removal of contaminated soil and treatment of groundwater would be in compliance with the SCGs.

Implementability

This alternative is implementable using existing construction methods and equipment. The expected duration is one construction season. This alternative would result in a Site suitable for redevelopment for any use.

Cost Effectiveness

The estimated cost of this alternative at approximately $1,155,503 requires a greater investment than the ISCO Injection, Limited Excavation, and Cover System with SSDS Alternative but the alternative eliminates the contamination concentrations in the soil and groundwater at the Site and prepares the Site for redevelopment for any use.

Land Use

This alternative would allow for the use of the parcel for redevelopment for any use; therefore, this alternative provides flexibility to determine the highest and best use of the land.

Community Acceptance

Based on the findings of the studies performed to date, it is anticipated that the results of this alternative would be acceptable to the community.

3.5.3.3 Summary

The Unrestricted Use Alternative was designed to remediate the Site to its most restrictive level – Unrestricted Use Soil SCOs – and prepare the Site for redevelopment for any use.

3.5.4 Common Actions

The following common actions are required to accomplish all evaluated alternatives and are include in the scope and cost of all remedial alternatives:

- Prepare Remedial Action Workplan (RAW) for submission to, and approval by, NYSDEC (including public comment);
- Asbestos abatement and hazardous building materials removal followed by building demolition to allow unlimited access for remediation workers;
- Remove all oily liquids and sediment from lift pits inside the former automobile maintenance shop, remove concrete pits and adjacent concrete floor, remove any remaining equipment, excavate any associated affected soil for proper off-site disposal;
- Remove all oily liquids and sediment from large cistern inside the former paint shop, remove the concrete pit, adjacent concrete floor, and any remaining pipes, excavate any associated affected soil for proper off-site disposal;
- Excavate affected shallow soil and abandoned piping immediately north of northwest corner of former paint booth building and properly dispose of soil and debris;
- Excavate affected shallow soil immediately east of northeast corner of former paint booth building and properly dispose of soil and debris; and
- Site security by temporary fencing and temporary facility (e.g.: portajohn) during remediation activities.

3.6 COMPARATIVE EVALUATION OF ALTERNATIVES AND RECOMMENDED ACTIONS

This section of the report compares the remedial alternatives proposed for each of the impacted media and presents the recommended action for each media group.

3.6.1 No Action Alternative

The No Action Alternative will not be protective of human health and the environment, would likely not be acceptable to the community in the long term, and would not allow for reuse for residential purposes. Therefore, this alternative is not the recommended remedy for the Site.

3.6.2 Track 4 – ISCO Injection and Cover System (with SSDS) Alternative

The Track 4- ISCO Injection and Cover System (with SSDS) Alternative would be a long-term remedy and is anticipated to be acceptable to the community. This alternative reduces the toxicity, mobility, and volume of impacted media through:

a) Excavation of a limited amount of affected shallow soil;
b) the in-situ treatment of groundwater and
c) installation of a cover system across the Site, along with SSDS in a targeted area.

This alternative was designed to:

- Remediate the Site to a reasonable level that protects human health and the environment.
- Provide a cost-effective effort that meets SCGs and the future land use of the Site.
- Prepare the Site for redevelopment for commercial and residential use.
- Provide a 'green' remediation by treating contaminants 'in situ' and limiting the amount of transportation and off-site waste disposal.

3.6.3 Track 1 – Complete Removal of Affected Soil and Groundwater Treatment

The Unrestricted Use Alternative would be a long-term remedy and is anticipated to be acceptable to the community; however, the community may be concerned about the amount of soil removal, truck traffic and emissions associate with this approach. This alternative effectively reduces the toxicity, mobility, and volume of impacted media through groundwater treatment and the removal of all contaminated soil from the Site and replacement with clean material and would achieve a cleanup level that would allow the site to be used for any purpose without any restrictions, as described in section 375-1.8(g)(1)(i). While Track 1 – Complete Removal of Affected Soil and Groundwater Treatment Alternative would meet or exceed remedial goals, it would be prohibitively expensive, would not address 'green' remediation goals, and soil would need to be excavated to depths well below the shallow water table in some areas (likely resulting in the need for de-watering and associated cost escalation).

4.0 RECOMMENDED REMEDIAL ALTERNATIVE

Based on the alternative analysis evaluation, the Track 4- ISCO Injection, Limited Excavation, and Cover System (with SSDS) remedy is the recommended final remedial approach for the Site. This alternative is fully protective of public health and the environment; significantly less disruptive to the community; consistent with current and future land use; and represents a more cost-effective approach than the Track 1 remedy, while fully satisfying the RAOs.

The recommended remedial alternative would involve:

- Perform 'common actions' which would include:
  - Prepare Remedial Action Workplan (RAW) for submission to, and approval by, NYSDEC (including public comment);
  - Asbestos abatement and hazardous building materials removal as needed followed by building demolition to allow unlimited access for remediation workers;
  - Removal of hydraulic lift pits and a large sump in the existing building, along with concrete necessary to access affected soil and removal of affected soil to approximately the shallow water table (assuming affected soil extends to that depth); and
  - Site security by temporary fencing and temporary facility (e.g.: portajohn) during remediation activities.
- ISCO injections utilizing a colloidal suspension of ferric-based catalyzed sodium/potassium persulfate to reduce petroleum compound concentrations in groundwater to levels that achieve or approach GWS and limit the possibility of vapor intrusion into on-Site buildings. Prior to injections, a groundwater sampling event will be performed to obtain current groundwater quality data, and to support final ISCO design. Post-injection groundwater sampling will be performed on an established schedule to monitor the effectiveness of the injections.
- Excavation, characterization, transportation and offsite disposal of a limited amount of affected soil in 'hot spot' areas and to allow for final grade elevation and installation of utilities, storm/sanitary drains, SSDS and other subsurface features.
- A cover system, which would include some or all of the following:
  - Installation of two feet of clean soil from an approved source;
  - Installation of impervious asphalt pavement;
  - Installation of foundation features and concrete slab building pad.

- Future sampling events required to perform the remedy (e.g. supplemental soil sampling as needed, confirmatory sampling, import of backfill) as described in a Remedial Action Workplan (RAW).
- Implementation of the CAMP during Site work involving the disturbance of exterior contaminated soil.
- Engineering Control: Site Cover (hardscape, pavement, soil cover, building slab).
- Institutional Controls:
    - Deed restrictions
    - Environmental Easement
    - SMP

This remedy is protective of human health and the environment and is implementable in a construction season. This remedy utilizes a cover system and ISCO injections and fully satisfies the RAOs for the Site. This remedy is significantly less expensive than the Track 1 – Unrestricted Use Cleanup Alternative but is as effective in eliminating potential exposure to contaminated soil and groundwater.

The estimated cost for Track 4 – ISCO Injection, Limited Excavation, SSDS and Cover System Alternative is presented on Table 1, attached. The estimated cost for Track 1 – Unrestricted Use and ISCO Injection Alternative is presented on Table 2, attached, for comparison purposes.

Attachments

Table 1: Summary of Track 4 Remedial Alternatives Cost
ISCO Injection, Limited Excavation, SSDS, and Cover System Alternative

TASK	UNIT COST	UNITS	COST
Remedial Action Work Plan (RAWP) including CAMP	$15,000	1	$15,000
Remedial Design Drawing for Bid Spec.; Bidding	$5,500	1	$5,500
Site Mobilization and Control Measures	$5,000	1	$5,000
Asbestos Abatement, Hazardous Materials Management	$40,000	1	$40,000
Soil Excavation, Transportation, Disposal (tons)	$85	1,200	$102,000
Confirmation Sampling and Analyses	$350	25	$8,750
Backfill Characterization Sampling	$850	3	$2,550
Backfill Procurement, Placement and Compaction (CY)	$23	800	$18,400
SSDS Construction and Startup	$40,000	1	$40,000
ISCO Groundwater Treatment	$135,000	1	$135,000
Groundwater Monitoring Well Network	$25,000	1	$25,000
Groundwater Monitoring	$4,500	8	$36,000
Engineering-Construction and Reporting (inc. FER)	$40,000	1	$40,000
Citizen Participation Activities	$5,000	1	$5,000
Attorney Fees	$15,000	1	$15,000
Site Surveying	$3,000	1	$3,000
Health and Safety	$5,000	1	$5,000
Community Air Monitoring	$10,000	1	$10,000
Site Management Plan	$7,500	1	$7,500
Environmental Easement/Institutional Controls	$10,000	1	$10,000
Subtotal			$528,700
Contingency (15%)			$79,305
Subtotal			$608,005
OM&M; Annual Certification/PRR (Present Worth)	2,500	20	$50,000
Grand Total			**$658,005**

NOTES
Assumes paving and concrete cap area costed as 'backfill'
Assumes 20 years O&M

Table 2: Summary of Track 1 Remedial Alternatives Cost
Unrestricted Use and ISCO Injection Alternative

TASK	UNIT COST	UNITS	COST
Remedial Action Work Plan (RAWP) including CAMP	$20,000	1	$20,000
Remedial Design Drawing for Bid Spec.; Bidding	$8,000	1	$8,000
Site Mobilization and Control Measures	$5,000	1	$5,000
Asbestos Abatement, Hazardous Materials Management	$40,000	1	$40,000
Soil Excavation, Transportation, Disposal (tons)	$125	3,000	$375,000
Confirmation Sampling and Analyses	$350	40	$14,000
Backfill Characterization Sampling	$850	5	$4,250
Backfill Procurement, Placement and Compaction (CY)	$23	2,200	$50,600
SSDS Construction and Startup	$40,000	1	$40,000
ISCO Groundwater Treatment	$195,000	1	$195,000
Groundwater Monitoring Well Network	$30,000	1	$30,000
Groundwater Monitoring	$5,500	8	$44,000
Engineering-Construction and Reporting (inc. FER)	$45,000	1	$45,000
Citizen Participation Activities	$5,000	1	$5,000
Attorney Fees	$15,000	1	$15,000
Site Surveying	$8,000	1	$8,000
Health and Safety	$10,000	1	$10,000
Community Air Monitoring	$30,000	1	$30,000
Site Management Plan	$7,500	1	$7,500
Environmental Easement/Institutional Controls	$10,000	1	$10,000
Subtotal			$961,350
Contingency (15%)			$144,203
Subtotal			$1,105,553
OM&M; Annual Certification/PRR (Present Worth)	2,500	20	$50,000
Grand Total			**$1,155,503**

NOTES
Assumes paving and concrete cap area costed as 'backfill'
Assumes 20 years O&M
Excavation unit cost increase due to depth of excavation, especially at location SB-3 which would require water management.
Assumes second ISCO injection

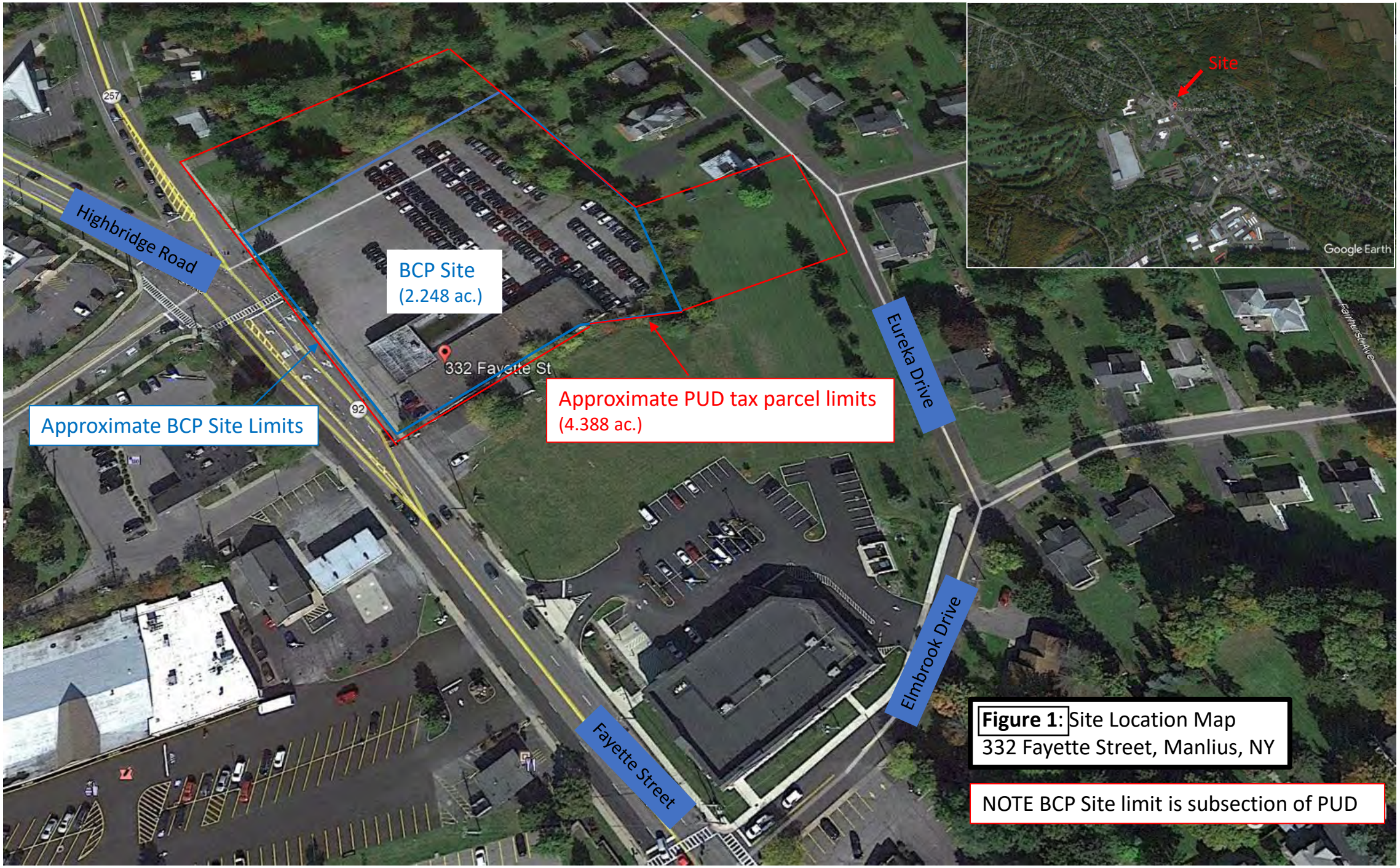
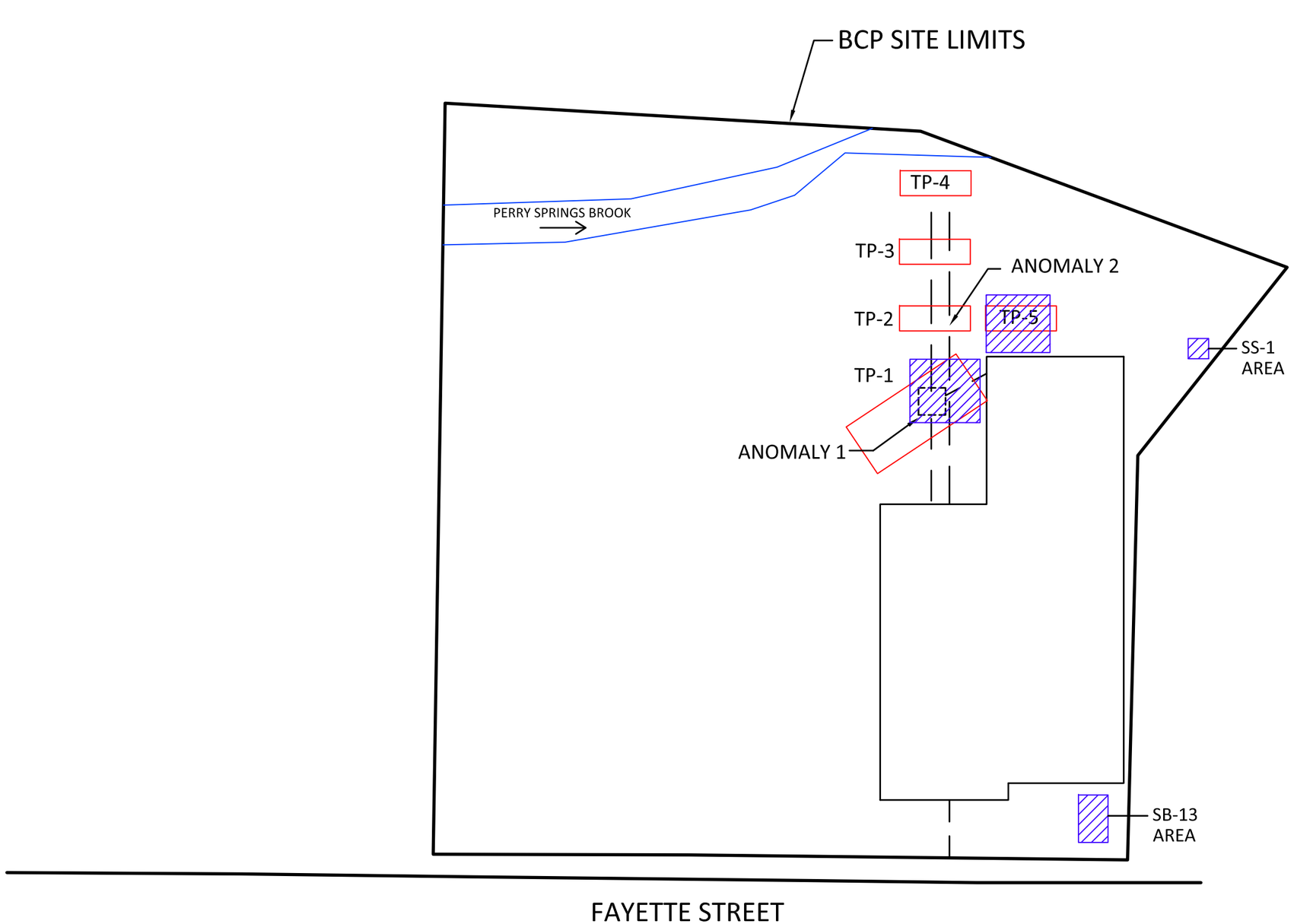


Figure 1: Site Location Map
332 Fayette Street, Manlius, NY

NOTE BCP Site limit is subsection of PUD



50 0 10 20 30 40 50

SCALE IN FEET

Ambient Environmental, Inc.
Building Science and EHS Solutions
828 Washington Avenue, Albany, NY 12203
PH: 518.482.0704 FAX:518.482.0750
www.ambient-env.com

LEGEND

- TP-X — TEST PIT LOCATION
- GPRS BURIED FEATURE
- GPRS DETECTION
- ESTIMATED AREA OF EXCAVATION (EXTERIOR)

REVISIONS

PROJECT LOCATION

FAYETTE MANLIUS, LLC
332 Fayette Manlius BCP
Manlius, NY

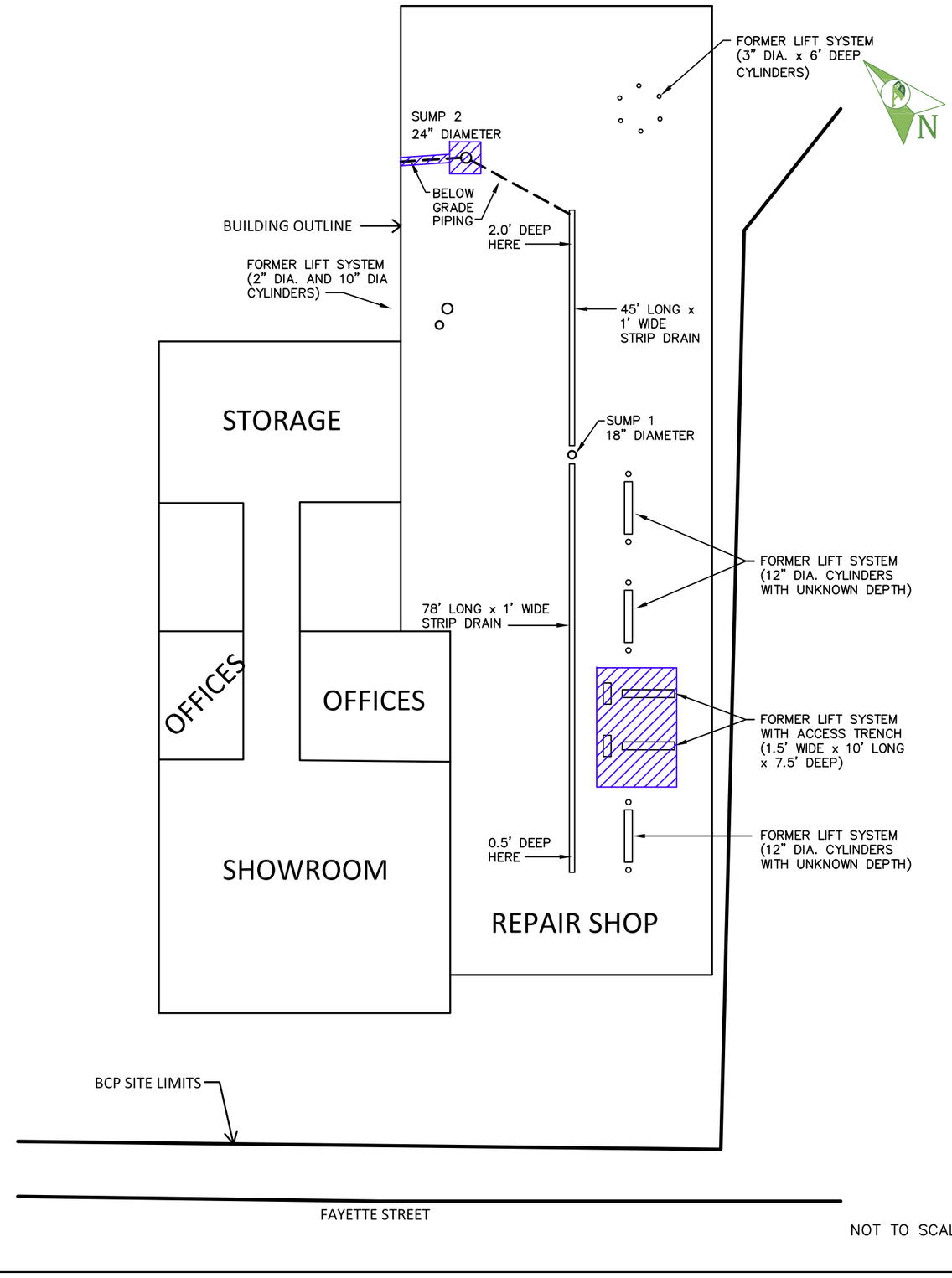
DRAWING TITLE

AA - ESTIMATED EXCAVATION AREAS: EXTERIOR

DATE: 7/14/2023	SCALE: 1"=50'
PROJECT NO.	210603ENVA
DRAWN BY	KAJ
CHECKED BY	LPM

DWG. NO.

Figure 2



Ambient Environmental, Inc.
Building Science and EHS Solutions
828 Washington Avenue, Albany, NY 12203
PH: 518.482.0704 FAX:518.482.0750
www.ambient-env.com

LEGEND

ESTIMATED AREA OF EXCAVATION (INTERIOR)

REVISIONS		

PROJECT LOCATION

FAYETTE MANLIUS, LLC
332 Fayette Manlius BCP
Manlius, NY

DRAWING TITLE

AA - ESTIMATED EXCAVATION AREAS: INTERIOR

DATE: 7/14/2023	SCALE: NONE
PROJECT NO.	210603ENVA
DRAWN BY	KAJ
CHECKED BY	LPM

DWG. NO.

Figure 3

APPENDIX B

ISCO IMPLEMENTATION PLAN

Proposal to Perform In-Situ Chemical Oxidation for the Treatment of Source and Residual Contamination via Provect-OX

To

Ambient Environmental, Inc.

For

Fayette Manlius, LLC
332 Fayette Street
Manlius, NY

July 2023

Innovative Environmental Technologies, Inc.
3958 North State Route 3
Sunbury, OH 43074
(740) 965-6100
www.IET-INC.net

James Blasting, P.G.
Senior Consultant
Ambient Environmental, Inc.

Dear Mr. Blasting:

Innovative Environmental Technologies Inc. (IET) has completed a remedial design and quotation for the 332 Fayette Street site, located in Manlius, NY. The site has been identified by Ambient Environmental, Inc. as having soils and groundwater impacted by the historical release of petroleum hydrocarbons. The primary compounds of concern at the site are BTEX, Chlorobenzene and Naphthalene. The solution shall be applied under IET's United States Apparatus Patent Number 7,044,152.

Chemical oxidation will proceed first and then as the site returns to a reductive environment; facultative biodegradation will occur using the byproducts of the chemical oxidation event. The following proposal will set-forth a lump sum price for the implementation and follow up of the remedial process. All costs included in the lump sum price are listed below.

- All chemicals and materials necessary to complete the proposed plan
- All equipment and personnel required to execute the proposed plan
- Handling and Management of materials on site
- Mobilization/Demobilization of the required crews
- All per diem for the required crews
- Health and Safety Plan for the site
- Site Restoration
- Final field injection report
- Final plot of injection points

Thank you for considering IET for your remediation needs. If you have any questions or concerns, please contact our office.

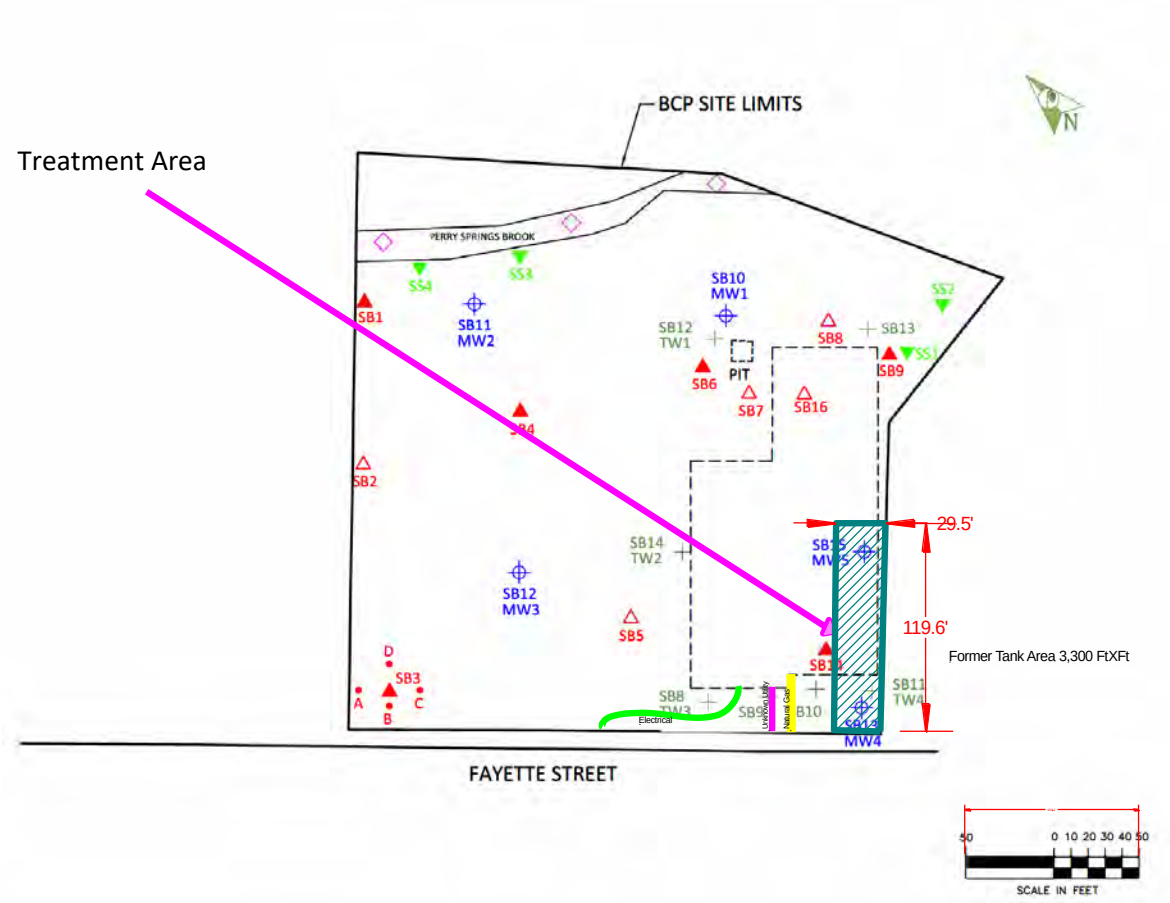
Best Regards,

Wade Meese, Vice President
Innovative Environmental Technologies, Inc.
740-965-6100

Table of Contents

OBJECTIVE

It shall be the objective of IET to conduct a chemical oxidation event at the site located in Manlius, NY. A unique ISCO process will be implemented in order to directly oxidize the contaminants of concern and stimulate a long lasting in-situ bioremediation process. The treatment area is designed to treat residual contamination present in the site's groundwater. The proposed treatment area is located below.



TREATMENT AREA

The treatment area will target a 3,300-square-foot area and will require 17 injection locations based on the injection radii of 8 feet proposed, treating between 5 and 16 feet below ground surface. Two injection intervals will be required to treat the 11 foot vertical impacted zone at 8-10 and 14-16 feet below ground surface (bgs.) The soil Freundlich absorbsion correction is assumed moderate in order account for the clayey formation targeted (IET has assumed the value to be 20%). The Freundlich equation is an adsorption isotherm that relates the concentration of a solute on the surface of an adsorbent to the concentration of the solute in a liquid. The Freundlich equation is used to determine the theoretical mass of contamination adsorbed to the soil. The mass of contaminant in the soil was determined using the soil adsorption correction (item 1). The K constant is a figure relating the capacity of the adsorbent for an

adsorbate and the 1/n constant is a function of the strength of adsorption (*American Water Works Association*, Water Quality and Treatment, 1999). The Freundlich equation is listed below:

$$q_e=KC_e^{1/n}$$

The theoretical values of K and 1/n are found in the following references: (Dobbs and Cohen, 1980/Faust and Aly, 1983).

Treatment area calculations are located below in Appendix 2. IET estimates that this injection event will take **3.0** day(s) to implement.

TECHNOLOGY DISCUSSION

Advanced Oxidation

Oxidation is defined as a chemical process in which electrons are transferred from an atom, ion or compound. The *in-situ* chemical oxidation process is designed to destroy organic contaminants either dissolved in groundwater, sorbed to the aquifer material, or present as free product. Oxidants most frequently used in chemical oxidation include hydrogen peroxide (H_2O_2), potassium permanganate ($KMnO_4$), persulfate ($Na_2O_8S_2$) and ozone (O_3). Peroxone, a combination of ozone and hydrogen peroxide, and Fenton's Reagent, a hydrogen peroxide mixed with a metal catalyst (commonly an iron catalyst) can also be used. *In-situ* chemical oxidation (ISCO) can be accomplished by introducing chemical oxidants into the soil or aquifer at a contaminated site using a variety of injection and mixing apparatuses. Normally, vertical or horizontal injection wells are used to deliver chemical oxidants. *Ex-situ* oxidation is accomplished by pumping groundwater from extraction wells and treating the groundwater above ground. In the recirculation approach, oxidants can be mixed with the extracted groundwater, which is subsequently pumped back into the aquifer through injection wells.

What are the advantages and disadvantages of chemical oxidation?

Chemical oxidation offers several advantages over other *in-situ* or *ex-situ* remediation technologies for petroleum compounds:

- The greatest advantages are the rapid treatment time and the ability to treat contaminants present at high concentrations.
- It is effective on a diverse group of contaminants and can often achieve maximum clean-up results.

What contaminants can be treated with chemical oxidation?

Common contaminants treated by chemical oxidation are amines, phenols, chlorophenols, cyanides, halogenated aliphatic compounds, mercaptans, BTEX compounds, MTBE and certain pesticides in liquid waste streams. Oxidation effectiveness depends on the organic compound.

Is chemical oxidation safe?

While the use of chemical oxidation can be quite safe if done properly, there are significant potential hazards. Most oxidants are corrosive. This means that they have the ability to burn the skin and wear away certain materials. Chemical oxidation also has some disadvantages. The disadvantages are as follows:

• Oxidation is nonselective. As such, the oxidant will not only react with the target contaminants but also with substances found in the soil that can be readily oxidized. In the case of gaseous ozone, the ozone can react with water and decompose to oxygen. Oxygen production can lead to serious problems such as the development of high pressures below the ground surface and possible explosions.

• Control of pH, temperature, and contact time is important to ensure the desired extent of oxidation.

How long does chemical oxidation take?

The time required to clean up a contaminated site using chemical oxidation is dependent on the reactivity of the contaminant with the oxidant, the size and depth of the contaminated zone, the speed and direction of groundwater flow and type of soils and the conditions present at the contaminated facility. Generally, chemical oxidation is more rapid than other treatment technologies. The time scale is usually measured in months, rather than years.

In-situ oxidation uses contact chemistry of the oxidizing agent to react with volatile organic compounds, munitions, certain pesticides and wood preservatives. The most common oxidizers used in soil and groundwater remediation are hydrogen peroxide (and the hydroxyl radical), potassium permanganate, and ozone, which are non-selective oxidizers. Other oxidants are available, but are used less due to cost, time or potential toxic by-products.

Technology Selection

Persulfate is activated by Fe III (pre-mixed formulation: Provect-OX) which requires a lower activation energy than alternative mechanisms while not consuming the persulfate oxidant. The mechanism is believed to elevate the oxidation state of the iron transiently to a supercharged iron ion which, in itself, may act as an oxidant. As this supercharged iron cation is consumed, the resulting ferric species can act as a terminal electron acceptor for biological attenuation. Coincidentally, the generated sulfate ion from the decomposition of the persulfate provides a terminal electron acceptor for sulfate reducers which may further remediate the targeted compounds in the groundwater and soils. The reactions that occur in the chemical oxidation include persulfate radicals and ferrate, as summarized below (Equation 1):

$$S_2O_8^{-2} + Fe^{+3} \text{ ---------> } Fe(^{+4 \text{ to} +6}) + SO_4^{2-} + SO_4^{2-\bullet} \qquad \text{(Eq. 1)}$$

Secondary Attenuation Processes

After dissolved oxygen has been depleted in the treatment area, sulfate (a by-product of the persulfate oxidation) may be used as an electron acceptor for anaerobic biodegradation by indigenous microbes. This process is termed sulfidogenesis and results in the production of sulfide. Stoichiometrically, each 1.0

mg/L of sulfate consumed by microbe's results in the destruction of approximately 0.21 mg/L of BTEX compounds. Sulfate can play an important role in bioremediation of petroleum products, acting as an electron acceptor in co-metabolic processes as well. For example, the basic reactions for the mineralization of benzene and toluene under sulfate reducing conditions are presented in equations 2 and 3:

$$C_6H_6 + 3.75\ SO_4^{2-} + 3\ H_2O \rightarrow 0.37\ H^+ + 6\ HCO_3^- + 1.87\ HS^- + 1.88\ H_2S^- \quad \text{(Eq. 2)}$$

$$C_7H_8 + 4.5\ SO_4^{2-} + 3\ H_2O \rightarrow 0.25\ H^+ + 7\ HCO_3^- + 2.25\ HS^- + 2.25\ H_2S^- \quad \text{(Eq. 3)}$$

Ferric iron is also used as an electron acceptor during anaerobic biodegradation of many contaminants, sometimes in conjunction with sulfate. During this process, ferric iron is reduced to ferrous iron, which is soluble in water. Hence, ferrous iron may be used as an indicator of anaerobic activity. As an example, Stoichiometrically, the degradation of 1 mg/L of BTEX results in the average consumption of approximately 22 mg/L of ferric iron (or "production" of ferrous iron) as shown below (equations 4-6).

$$C_6H_6 + 18\ H_2O + 30\ Fe^{3+} \text{-------} > 6\ HCO_3^- + 30\ Fe^{2+} + 36\ H^+ \text{ (Eq. 4)}$$

$$C_7H_8 + 21\ H_2O + 36\ Fe^{3+} \text{-------} > 7\ HCO_3^- + 36\ Fe^{2+} + 43\ H^+ \text{ (Eq. 5)}$$

$$C_8H_{10} + 24\ H_2O + 42\ Fe^{3+} \text{-------} > 8\ HCO_3^- + 42\ Fe^{2+} + 50\ H^+ \text{ (Eq. 6)}$$

While ferrous iron is formed because of the use of the ferric species as a terminal electron acceptor, residual sulfate is utilized as a terminal electron acceptor by facultative organisms thereby generating sulfide under these same conditions. Together, the ferrous iron and the sulfide promote the formation of pyrite as a remedial byproduct (equation 7). This reaction combats the toxic effects of sulfide and hydrogen sulfide accumulation on the facultative bacteria, while also providing a means of removing targeted organic and inorganic COIs via precipitation reactions. Moreover, pyrite possesses a high number of reactive sites that are directly proportional to both its reductive capacity and the rate of decay for the target organics.

$$Fe^{2+} + 2S^{2-} \text{-------} > FeS_2 + 2e \text{ (Eq. 7)}$$

SCOPE OF WORK

Subsurface Pathway Development

Initially, compressed air shall be delivered to the subsurface via IET proprietary injection trailer system. This process step allows for confirmation of open delivery routes while enhancing horizontal injection pathways. The confirmation of open and viable subsurface delivery pathways ensures that upon introduction of the oxidizer(s) injections will occur freely thus minimizing health and safety risks associated with oxidant full injection lines and injection tooling when no subsurface delivery route has been established. Confirmation of open and free pathways is accomplished via observed pressure drops and fee moving compressed gases to the subsurface.

Oxidant Injection

A colloidal suspension of the ferric-based catalyst Provect-Ox is immediately injected into the subsurface pathways and voids that were developed during the compressed air injection step, under constant pressure ranging from 10-110 psi. A small amount of water follows this step to rinse the injection equipment. IET expects the need of the liquid pressures to fall in the range of **30-75** psi to introduce the material into the lithology documented onsite.

Post Liquid Injection – Compressed Air Injection

Lastly, the injection lines are cleared of liquids and all injectants are forced into the created formation and upward into the vadose zone. This step ensures that all material is injected outward into the formation and minimizes any surface excursions of injectants following the release of the injection pressure. Once the injection cycle is complete, the injection point is temporarily capped to allow for the pressurized subsurface to accept the injectants.

Equipment Description

The injections shall occur via IET's mobile injection trailer and IET's direct-push equipment as described:

Injection Lines: High Pressure Stainless Steel Braided Rubber one inch injection hose

Injection Trailer: IET Self-contained injection trailer, consisting of: two 200 gallon conical tanks capable of maintaining unto 30% solids as a suspension via lightning mixers; on-board generator, all stainless steel piping system, 2" pneumatic diaphragm pump with an operating pressure of 110 psi.; on-board 37 CFM/175 psi compressor with 240 gallons of air storage; self-contained eye wash and safety shower. All injection piping is 316 welded stainless steel.

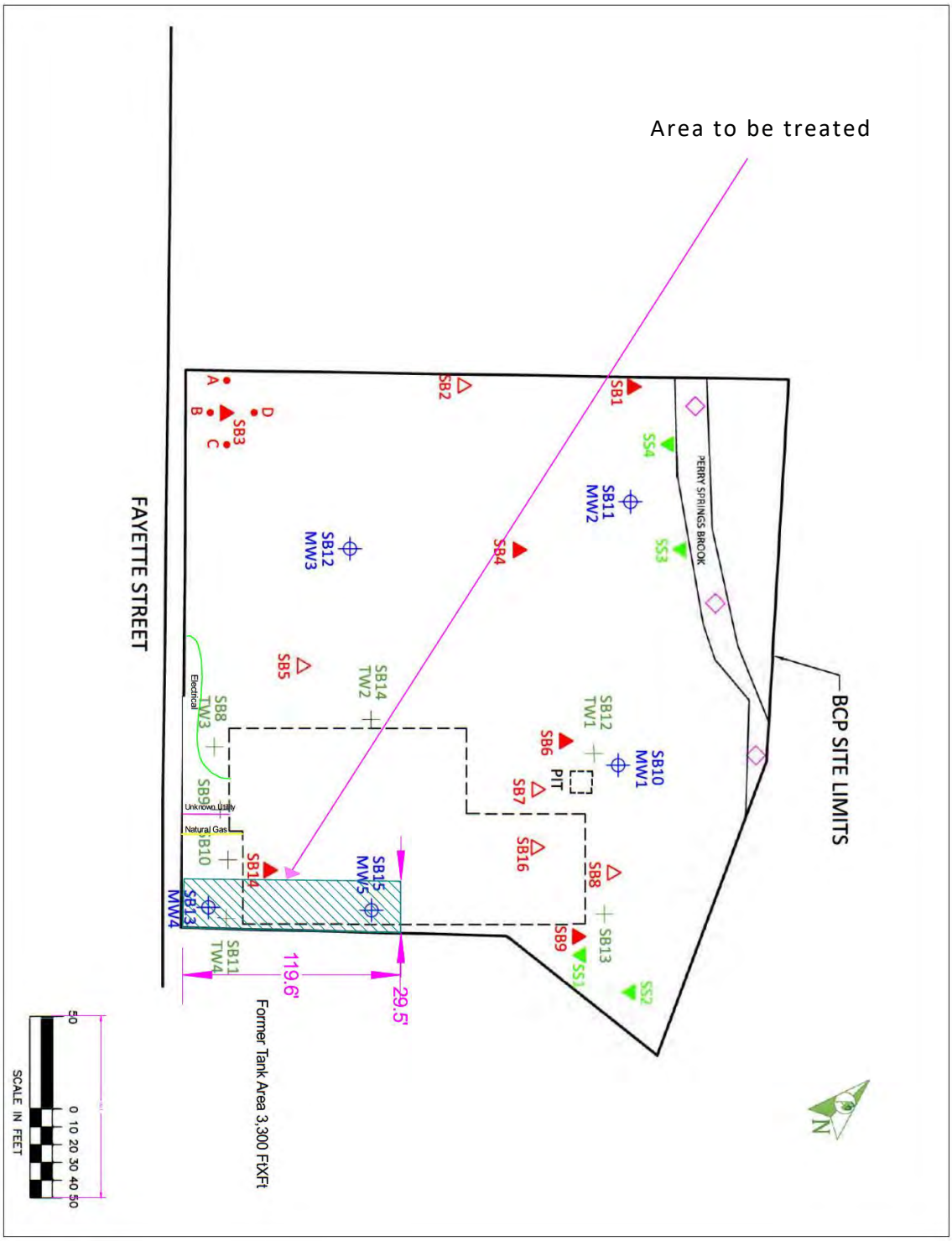
Injection Rods: IET proprietary injection rods with retractable injection zones and backflow protection Injection zones of 18 inches are to be used in combination with 24-inch injection AWJ-Rods where appropriate.

IET INJECTION SYSTEM
UNITED STATES PATENT 7,044,152

Injection Trailers Include: Multiple Liquid Feed Systems, Stainless Steel Piping, Isolated Compressed Gas Containment, Safety Shower, Eyewash Station, Onboard Generator, Chemical Resistant Construction, Mobile Office Space

APPENDICES

APPENDIX 1: SITE MAP



APPENDIX 2: DOSAGE CALCULATIONS

Ambient:Fayette Street	Area 1	Saturated Zone				
Manlius, NY						
Parameters	**Units**	**Assumptions**				
Target Area	Ft.X Ft.	3300				
Injection Radii	Ft	8				
Soil Absorbsion Correction for GAC Constant	%	20				
Area of influence of Remediation Injection(s)	Sq. Ft.	201.1				
Estimated Number of Injections to Treat Area	# Injections	17				
vertical impacted zone	Ft.	11				
Target Zone		5-16'				
Total Volume Targeted	Cu. Yd.	1344				
Porosity	%	15.00%				
Mass of soil to be targeted	lbs	3.43E+06				
Mass of soil to be targeted	grams	1.56E+09				
Volume of Groundwater targeted	gals	4.08E+04				
		Benzene	**ChloroBenzene**	**Napthalene**	**Xylenes**	**COD**
Contaminant Conc.	ppm	0.05	0.1	0.02	0.001	2000
Mass of Contaminant - water	lb.	0.0	0.0	0.0	0.0	682.0
Mass of Contaminant -water	Grams	**7.7**	**15.5**	**3.1**	**0.2**	**309621.8**
Mass of Contaminant -soil	lb.	7.0	30.6	13.2	4.6	1356.0
Mass of Contaminant -soil	Grams	**3181.2**	**13904.9**	**5990.2**	**2107.3**	**615639.2**
Mass of Contaminent Targeted	Grams	**3189.0**	**13920.4**	**5993.3**	**2107.4**	**925261.0**
Mass of Contaminent Targeted	lbs	**7.0**	**30.7**	**13.2**	**4.6**	**2038.0**
Calculated soil conc.	ppm	**2.0**	**8.9**	**3.9**	**1.4**	**594.5**
Ratio of S2O3 to targeted Compouns	Ratio	**45**	**45**	**45**	**25**	**1**
Grams of sodium persulfate	grams	**143503.0**	**626418.6**	**269696.5**	**52685.4**	**925261.0**
Pounds of Sodium Persulfate Required	Pounds	**316.1**	**1379.8**	**594.0**	**116.0**	**2038.0**
Allocation per compound (persulfate)	%	**7.1%**	**31.0%**	**13.4%**	**2.6%**	**45.9%**
Total Pounds of Sodium Persulfate Required	Pounds	**4444.0**				
Decomposition Rate of Sodium Persulfate	%/day	1.10%				
Targeted Longevity of Persulfate	days	82				
Total Persulfate Calcualted dosage	pounds	8500				
Total Pounds of Ferric Oxide Required	Pounds	**1700**				
Injection Summary						
Number of Injection Locations		**17.00**				
Injection Intervals		**8-10, 14-16'**				
Injection Depth		**5-16'**				
Pounds of Provect-OX		**10200**				

Cost Basis Summary	**Units**		
Pounds of Provect-OX Required	**10200.00**		
Number of Injection Points per Event	**17.00**		
Mob/Demob	**1.00**		
Days of Injection Trailer (3 Man Crew)	**3.00**		
Days of Probe	**3.00**		
Per Diem	**3.00**		
Administrative Costs (HAZMAT Shipping, forklift, report)	**1.00**		
		Total	

APPENDIX C

REMEDIAL ACTION HEALTH AND SAFETY PLAN

FAYETTE MANLIUS, LLC

REMEDIAL ACTION HEALTH & SAFETY PLAN
332 FAYETTE MANLIUS BCP SITE
FAYETTE STREET, MANLIUS, NEW YORK

BCP Site No.: C734153

27 October 2023

Prepared for:

Fayette Manlius, LLC
1657 East Avenue
Rochester, NY 14610

Prepared by:

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828 Washington Avenue
Albany, NY 12203

Ambient Project No. 210603ENVA

HEALTH AND SAFETY PLAN

PREPARED BY: Jim Blasting, Ambient

APPROVED BY:

_____ Date: 10/24/23

Mark Dugas, Health and Safety Officer

_____ Date: 10/24/23

Jim Blasting, Project Manager

_____ Date: 10/24/23

Luke McKenney, Site Manager

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1.0 INTRODUCTION

This document represents the Health and Safety Plan (HASP), which is Appendix C of the Remedial Action Work Plan (RAWP) for the 332 Fayette Manlius Brownfield Cleanup Program (BCP) site on Fayette Street in the Village of Manlius (hereinafter the "Site").

This HASP summarizes the intended field activities at the Site and chemicals of concern expected to be present. The HASP then describes the procedures to be followed in conducting the field operations, given the existing data concerning the Site.

2.0 FIELD ACTIVITIES AND CHEMICALS OF CONCERN

The field activities to be conducted are described in the associated RAWP. Planned Site activities include building demolition, remediation of soil by excavation, cleaning pits and sumps, cover installation (paving, concrete, soil, etc.), groundwater remediation by in-situ chemical oxidation (ISCO), well installation, and multi-media sampling. Site activities are planned for the fall/winter of 2023.

Remedial Investigation (RI) activities performed at the Site in 2018 identified Volatile Organic Compounds (VOCs) and Semi-Volatile Organic Compounds (SVOCs) as the primary chemicals of concern.

Principal VOCs identified in one or more site matrices (soil, groundwater) include: benzene, toluene, ethylbenzene, p/m-xylene, naphthalene, n-propylbenzene, 1,3,5-trimethylbenzene, 1,2,4-trimethylbenzene, and isopropylbenzene.

The SVOCs identified in these same matrices include various SVOCs, including chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, and other pyrene and anthracene-based compounds.

A summary of the specific compounds, the concentrations, and the corresponding matrices are presented in RI report and in the RAWP.

3.0 POTENTIAL CHEMICAL AND PHYSICAL HAZARDS

VOCs and SVOCs are the main contaminants of concern related to the Site. Since the field activities involve subsurface disturbance, inhalation (volatiles and dust particles), dermal contact and ingestion are considered the potential pathways of concern.

A **VOCs Action Limit of 20 ppm** is established for the inhalation pathway. The 20-ppm limit is based on measurement by a PID or similar direct reading instrument near the breathing zone of workers. The VOC Action Limit is based on the VOCs identified and their respective concentrations in the soil and water matrices identified during site characterization investigation.

A **dust/particulate Action Limit of 100 mg/m3** has been established for site activities. Measurement for dust/particulate shall be conducted near a worker's breathing zone with particulate direct reading instrumentation.

These Action Limits are based on the compounds and their respective concentrations in the soil and water matrices identified during the RI. The SSO, project manager or project health professional may change these limits when warranted. Any changes in Action Limits must be clearly documented in field notes.

To address potential dermal contact & ingestion, a **"No Skin Contact Policy"** will also be followed for all site activities. This policy requires that there shall be no direct skin contact with any soils, sediments or water including items or equipment that may have contacted soils, sediments or water unless they have been properly decontaminated. Gloves and other protective equipment (pants, long sleeve shirts, etc.), based on specific activities, shall be worn whenever there is a potential for contact or contamination. Additionally, no potentially contaminated or soiled items, PPE, or footwear shall be taken off site unless properly decontaminated. It is anticipated that rubber over boots or disposable shoe covers will be worn by all on-site personnel within established exclusion and contamination reduction zones. This policy may be modified at the discretion of the

SSO, project manager or project health professional. Any changes in the policy must be clearly documented in field notes.

Physical hazards may also be encountered at the Site, especially during drilling and excavation activities. Table 3-1 lists potential physical hazards that may be encountered during the field activities. This list has been compiled based on planned activities and potential site conditions.

Table 3-1
Physical Safety Concerns
332 Fayette Manlius BCP Site, Fayette Street, Manlius, NY

Hazard	Description	Location	Procedures Used to Monitor/Reduce Hazard
Underground Utilities	Electric, Gas, Sanitary and Storm Sewer	Throughout	Verify number and location of all utilities prior to site operations.
Heat Stress	Hot Weather Activities	Throughout	Protections and monitoring as designated in this HASP
Cold Weather	Frost-bite, Hypothermia	Throughout	Wear appropriate clothing. Provide warm shelter area and liquids. Monitor worker physical conditions.
Heavy Equipment	Drill Rig and Excavator	Select Areas	All personnel should be cautious around heavy equipment. Make eye contact with operator prior to entering the work area.
Weather	Lightning, Heavy Rain or Snow	Throughout	During lightning, cease all heavy equipment activities. During cold weather, beware of wet and slippery conditions.
Noise	Heavy Equipment	Select Areas	Use appropriate earplugs or earmuffs, during equipment operation.
Overhead Electrical Equipment	Overhead Lines	Select Areas with Heavy Equipment	Maintain at least ten feet of clearance from any overhead lines.
Struck by Vehicle	Work in Traffic Areas	Parking Lots	Block all work areas off with reflective cones.

4.0 HAZARDS EVALUATION

Details pertaining to site activities are outlined in the RAWP.

4.1 SITE MONITORING FOR CHEMICAL HAZARDS

The primary compounds of concern in the work areas are VOCs and SVOCs. Air monitoring (where applicable) and good work practices will be used during the field activities to ensure that appropriate personal protection is used and to minimize potential exposure. Appropriate monitoring equipment to be used during site activities is described herein. All field monitoring will be conducted by or under the supervision of the Site Safety Officer (SSO). The SSO will properly maintain and calibrate all monitoring instruments throughout the field activities to ensure their accuracy and reliability. The SSO will keep a written record of all calibration activities.

4.1.1 VOC Monitoring

Direct reading instrumentation for VOCs shall be used to monitor exposure potentials during activities involving potentially contaminated soil and water, as determined necessary by the SSO. Direct reading instrumentation, such as a photoionization detector (PID) detector will be utilized. Based on the exposure levels in the breathing zone of personnel, the SSO will determine if an upgrade in respiratory protection is warranted. These upgrade levels are presented in the following table.

Table 4-1
Personal Protection Action Levels – VOCs
332 Fayette Manlius BCP Site, Fayette Street, Manlius, NY

Total Concentration	Required Action and/or Personal Protection
Monitor during all operations with the potential to release VOCs*	
VOC: Detection Limit to 20 ppm	Level D personal protection
20 ppm to 50 ppm	Upgrade to Level C personal protection with full-face air purifying respirators with combination P100/Organic Vapor cartridges. Change cartridges after each daily use.
Over 50 ppm	Notify the Site Safety Officer for Level B provisions or implement means to control exposure levels.
	*All concentrations are sustained in the breathing zone

4.1.2 Dust Monitoring

Dust or particulate may be generated during activities at the Site. It will be at the discretion of the SSO to determine the need for formal dust monitoring during Site activities. Generally speaking, if continuous visible dust is being generated and is present in the employee work area, formal monitoring will be conducted. Monitoring will be conducted with a direct-reading dust monitor. ***The action level for dust/particulate will be 100 mg/m^3*** (Note: based on P10 detection limits). If this level is exceeded, a filter device provided by or in accordance with the manufacturer recommendations will be utilized for field screening equipment, controls will be implemented to minimize dust exposure, and/or employees will utilize Level C respiratory protection.

4.2 PHYSICAL HAZARDS

To minimize hazards, standard safety procedures will be followed at all times. The primary physical safety hazards for this project include, but are not limited to:

- common slip, trip, and fall hazards;

- overhead and buried hazards;
- drill rig and heavy equipment operation;
- excavation safety;
- electrical and power equipment;
- vehicular traffic;
- lifting excessive weights;
- sampling hazards;
- excessive noise levels;
- heat and cold stress; and
- other hazards.

4.2.1 Common Slip, Trip, Fall Hazards

Personnel should be aware of common slip, trip or fall hazards that are encountered frequently in industrial and project environments. Heightened awareness and emphasis on good housekeeping are the most effective ways to prevent accidents.

4.2.2 Overhead and Buried Hazards

Utility lines, both above and below ground, may pose a safety hazard for site personnel during soil boring or other heavy equipment operations. If overhead utilities have been identified on site as a hazard, the equipment operator must maintain a safe clearance between the lines and the equipment at all times during work operations. High voltage lines require greater clearance distances. As a safe work practice, equipment operators will maintain a 10-foot clearance between equipment and power lines or other energized sources unless the source is greater than 350 KV, in which case 29CFR 1910.180(j) must be applied. The location of buried utilities lines must be determined prior to the start of work activities. Overhead and buried utility and electrical lines may be a concern during all activities. These concerns will be addressed as part of the daily safety meeting.

4.2.3 Drill Rig and Heavy Equipment Operation

Truck-mounted drill rigs and heavy equipment presents multiple hazards while in operation. Excessive noise, boom raising, lowering and swing, cable and hook damage and operator error may result in injuries. To minimize potential accidents, the following safety measures will be required for all operations:

- All operators of equipment used on site will be familiar with the requirement for inspection and operation of such equipment. The operator will be required to demonstrate proficiency in safe operation of the equipment.
- All drilling and excavation shall be performed from a stable ground position, if unable to locate on level ground, the drill rig shall be appropriately checked, blocked and braced prior to the derrick being raised.
- Daily inspections of the drilling or excavation area shall be made by a person competent in heavy equipment safety. The inspector shall note the safety of the area and confirm the location of utilities.
- Before drilling or excavation, the existence and location of utility lines (electric and gas) will be determined by the Site owner. If the knowledge is not available, an appropriate device, such as a cable avoiding tool, will be used to locate the services line(s).
- If drilling equipment is located in the vicinity of overhead power lines, a distance of ten-feet must be maintained between the lines and any point on the equipment.
- Daily inspection of the drill rig and heavy machinery must be conducted and documented by the operator prior to each day's operation.
- In the event repairs to the drilling rig derrick are required, personnel climbing the derrick to affect such repairs must wear restraint system, including full body harness and lifeline, to prevent an accidental fall.

4.2.4 Excavation Safety

This task involves removing earthen materials from a designated area, thereby creating a man-made cut, trench, or depression in the earth's surface.

Physical Hazards: The physical hazards involved in the excavation of soils are related to the excavation itself and the operation of heavy equipment. The presence of overhead utilities such as power lines requires careful positioning of the excavating equipment in order to maintain a safe distance between the lines and the closest part of the equipment. The presence of underground utilities such as gas lines, power lines, water lines and sewer pipes must be determined prior to beginning the excavation.

Excavations pose significant hazards to employees if they are not carefully controlled. There exists a chance for the excavation to collapse if it is not dug properly, sloped, benched or shored as required by 29 CFR 1926 Subpart P. Protective systems, as required by 29 CFR 1926 Subpart P, must be utilized if the potential for hazardous cave-ins exist. The excavation also is a fall hazard, and employees must pay careful attention to what they are doing or they risk a fall into the excavation. Fall protection, as required by 29 CFR 1926 Subpart M, may be required.

No activities will require personnel to enter an excavation. No employees are permitted to enter any excavation. Equipment placement and other activities shall be done remotely, without entering the excavation.

Control

Before any digging can be done, all underground utilities must be located and identified. The underground utilities will be located and identified by contacting Dig Safely New York, reviewing available drawings showing locations of on-site underground utilities, and by contacting the appropriate client representative to mark the location of underground utilities. The Site Manager will meet with utility locators on site prior to marking out the underground utilities. During the on-site meeting, the Site Manager will provide the utility locator with a site figure, which shows the locations where excavation

activities will be completed during site activities. The Site Manager will conduct a site walkover with utility locators, as necessary, to visually identify each location where excavation activities are to be completed during activities (as shown on the site figure to be provided to the locators).

General Requirements

No person shall be permitted underneath loads handled by lifting or digging equipment. Site personnel must be required to stand away from any vehicle being loaded or unloaded to avoid being struck by any spillage or falling materials. Operators may remain in the cabs of vehicles being loaded or unloaded when the vehicles are equipped, in accordance with 1926.601(b)(6), to provide adequate protection for the operator during loading and unloading operations.

If excavation work interrupts the natural drainage of surface water (such as streams), diversion ditches, dikes, or other suitable means must be used to prevent surface water from entering the excavation and to provide adequate drainage of the area adjacent to the excavation. Excavations subject to runoff from heavy rains will require an inspection by a competent person.

Where the stability of adjoining buildings, walls, or other structures is endangered by excavation operations, support systems such as shoring, bracing, or underpinning must be provided to ensure the stability of such structures for the protection of employees. Excavation below the level of the base or footing of any foundation or retaining wall that could be reasonably expected to pose a hazard to employees is not permitted except when:

- A support system designed by a competent person, such as underpinning, is provided to ensure the safety of employees and the stability of the structure; or
- The excavation is in stable rock; or

- A registered professional engineer has approved the determination that the structure is sufficiently removed from the excavation so as to be unaffected by the excavation activity; or
- A registered professional engineer has approved the determination that such excavation work will not pose a hazard to employees.

Sidewalks, pavement and appurtenant structures must not be undermined unless a support system or another method of protection is provided to protect from the possible collapse of such structures. Adequate protection must be provided to protect from loose rock or soil that could pose a hazard by falling or rolling from an excavation face. Such protection must consist of scaling to remove loose material; installation of protective barricades at intervals as necessary on the face to stop and contain falling material; or other means that provide equivalent protection.

Employees must be protected from excavated or other materials or equipment that could pose a hazard by falling or rolling into excavations. Protection must be provided by placing and keeping such materials or equipment at least 2 feet (.61 m) from the edge of excavations, or by the use of retaining devices that are sufficient to prevent materials or equipment from falling or rolling into excavations, or by a combination of both if necessary.

Inspections by Competent Person

Daily inspections of excavations, the adjacent areas, and protective systems must be made by a competent person for evidence of a situation that could result in possible cave-ins, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions. An inspection must be conducted by the competent person prior to the start of work and as needed throughout the shift.

Inspections also must be made after every rainstorm or other hazard-increasing occurrence. These inspections are only required when employee exposure can be

reasonably anticipated. Where the competent person finds evidence of a situation that could result in a possible cave-in, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions, exposed employees must be removed from the hazardous area until the necessary precautions have been taken to ensure their safety.

Walkways must be provided where employees or equipment are required or permitted to cross over excavations. Guardrails which comply with 1926.502(b) must be provided where walkways are 4 feet (1.2 m) or more above lower levels. Adequate barrier protection must be provided at all remotely located excavations. All wells, pits, shafts, etc., must be barricaded or covered. Upon completion of exploration and other similar operations, temporary wells, pits, shafts, etc., must be backfilled.

4.2.5 Tools - Hand and Power

Hand and power tools may be utilized as part of this remedial action. All tools used during field activities will conform to the standards set both in OSHA 29CFR-1926.300 - 1926.305. To minimize the potential for any safety related accidents, the following measures will be required:

- All hand and power tools shall be maintained in a safe condition;
- Power operated tools shall be equipped with protective guard when in use;
- All hand-held power tools shall be equipped with a constant pressure switch that will shut off the power when the pressure is released;
- Hand tools shall be kept free of splinters or cracks;
- Electrical power tools shall have double-insulated type grounding;
- Electrical tools used in wet environments should have ground fault circuit interrupters (GFCI) in place;
- Electrical cords are not permitted for hoisting or lowering tools;
- All fuel powered tools shall be stopped while being refueled or maintained; and,
- When fuel powered tools are used in enclosed spaces the ambient air will be measured for oxygen and toxic gases.

4.2.6 Vehicular Traffic

Vehicular traffic in and around the facility may pose a hazard to project personnel. Precaution, including reflector vests and cones, should be taken when fieldwork is occurring near traveled areas.

4.2.7 Lifting Excessive Weights

Personnel should exercise caution when lifting any object that weighs greater than 50 pounds. For objects which weigh less than 50 pounds, proper lifting technique is essential to minimize the potential for injury. No excessively bulky objects should be lifted without assistance.

4.2.8 Sampling Hazards

Field activities will consist of collecting waste, soil and water samples for analysis and evaluation. The hazards of this operation are primarily associated with the sample collection methods and procedures utilized.

The RAWP outlines the standard methods and procedures that will be utilized for sampling activities. Of these specific procedures, none present hazards that are unique to sampling. Potential hazards that may be encountered are described in other sections of the HASP.

4.2.9 Excessive Noise Levels

Noise generated by heavy equipment may present a hazard during site operations. Excessive noise can physically damage the ear, hinder communications and startle or annoy the workers. All on-site personnel will wear hearing protection (earplugs or

earmuffs) when working near heavy equipment and when noise levels may exceed 85dBA.

4.2.10 Heat Stress

Heat stress is the aggregate of environmental and physical work factors that make up the total heat load imposed on the body. The environmental factors of heat stress include air temperatures, humidity, radiant heat exchange, wind and water vapor pressure (related to humidity). Physical work adds to the total heat stress by producing metabolic heat in the body, proportional to the intensity of work.

Heavy physical labor can greatly increase the likelihood of heat fatigue, heat exhaustion and heatstroke, the latter being a life-threatening condition. Heat stress monitoring of personnel shall commence when the ambient temperature is 80°F (70°F if chemical protective clothing is worn) or above. Frequency of monitoring shall increase as the ambient temperature rises. Various control measures shall be employed if heat stress becomes a problem. These include:

- Provision for liquids to replace lost body fluids;
- Establishment of a work/rest schedule that allows for rest periods to cool down; and
- Training workers in the recognition and prevention of heat stress.

Specific steps to implement should ambient temperatures pose a hazard include:

- Site workers will be encouraged to drink plenty of water (or nutrient replacement drinks, such as Gatorade) throughout the day.
- On-site drinking water will be kept cool (50°-60°F) to encourage personnel to drink frequently;
- A work/rest schedule that will provide adequate rest periods for cooling down will be established as required;

- All personnel will be advised of the dangers and symptoms of heat stroke, heat exhaustion and heat cramps;
- Employees should be instructed to monitor themselves and co-workers for signs of heat stress and to take breaks as necessary;
- A shaded rest area must be provided. All breaks should take place in the shaded area;
- Employees shall not be assigned to other tasks during breaks;
- All employees shall be informed of the importance of adequate rest, acclimation and proper diet in the prevention of heat stress disorders; and
- The buddy system shall be practiced at all times on site.

The signs of heat stress disorders are described below.

Heat Cramps

Heat cramps are caused by heavy sweating and inadequate electrolyte replacement. Signs and symptoms include muscle spasms and pain in the hands, feet, and abdomen.

Heat Exhaustion

Heat exhaustion occurs from increased stress on various body organs, signs and symptoms include:

- Pale, cool, moist skin;
- Heavy sweating; and
- Dizziness, nausea, fainting.

Heat Stroke

Heat stroke is the most serious form of heat stress and should always be treated as a medical emergency. The body's temperature regulation system fails and the body

temperature rapidly rises to critical levels. Immediate action must be taken to cool the body before serious injury or death occurs. Signs and symptoms of heat stroke include:

- Red, hot, unusually dry skin;
- Lack of, or reduced, perspiration;
- Nausea;
- Dizziness and confusion;
- Strong, rapid pulse and confusion; and,
- Coma.

4.2.11 Cold Stress

Cold and/or wet environmental conditions can place workers at risk of cold related illness. Hypothermia can occur whenever temperatures are below 45°F. It is most common during wet windy conditions, with temperatures between 40° to 30°F. The principal cause of hypothermia in these conditions is loss of insulating properties of clothing due to moisture, coupled with heat loss due to wind and evaporation of moisture on the skin.

Frostbite, the other hazard associated with exposure to the cold, is the freezing of body tissue, which ranges from superficial freezing of surface skin layers to deep freezing of underlying tissue. Frostbite will only occur when ambient temperatures are below 32°F. The risk of frostbite increases as the temperature drops and the wind speed increases. Most cold-related worker fatalities have resulted from failure to escape low environmental temperatures or from immersion in low temperature water. The single most important aspect of life-threatening hypothermia is a fall in the deep core temperature of the body.

Site workers should be protected from exposure to cold so that the deep core temperature does not fall below 97°F. Lower body temperatures will very likely result in reduced mental alertness, reduction in rational decision making or loss of consciousness with the

threat of fatal consequences. To prevent such occurrence the following measures are recommended:

- Site workers shall wear warm clothing, such as mittens, heavy socks, etc. when the air temperature is below 45°F. Protective clothing or coveralls may be used to shield employees from the wind;
- When the air temperature is below 35°F, clothing for warmth, in addition to chemical protective clothing will be worn by employees. This will include:
- Insulated suits, such as whole-body thermal underwear;
- Wool socks or polypropylene socks to keep moisture off the feet;
- Insulated gloves and boots;
- Insulated head cover such as hard hat winter liner or knit cap; and
- Insulated jacket with wind and water-resistant outer layer.

At air temperatures below 35°F the following work practices are recommended:

- If the clothing of a site worker might become wet on the job site, the outer layer of clothing should be water impermeable;
- If a site worker's underclothing becomes wet in any way, they should change into dry clothing immediately. If the clothing becomes wet from sweating (and the employee is not comfortable) the employee may finish the task at hand prior to changing into dry clothing;
- Site workers should be provided with a warm (65°F or above) break area;
- Hot liquids such as soups or warm drinks should be provided in the break area. The intake of coffee and tea should be limited, due to their circulatory and diuretic effects;
- The buddy system shall be practiced at all times on site. Any site worker observed with severe shivering shall leave the work area immediately; and
- Site workers should be dressed in layers, with thinner lighter clothing next to the body.

5.0 PERSONNEL RESPONSIBILITIES

A Health and Safety Management Team has been developed for the site remediation field activities. The following responsibilities will be assigned to designated project personnel for all activities.

The Site Manager will act in a supervisory capacity over all employees who participate in the field activities specified in this work plan. The Site Manager is responsible for ensuring that health and safety responsibilities are carried out in conjunction with the work plan. As part of these responsibilities, the Site Manager will distribute the HASP to all field team personnel and discuss the HASP prior to the start of field activities. All field personnel will sign the Health and Safety Plan Review Record shown in Figure 5-1, verifying that they have read and are familiar with the contents of this HASP.

The Site Safety Officer (SSO) will be responsible for oversight, implementation and compliance of applicable health and safety regulations on-site. The SSO has the following authority and responsibilities:

- responsibility for the field implementation, evaluation and any necessary field modifications of this HASP;
- responsibility for maintaining adequate supplies of all personal protective equipment, as well as calibration and maintenance of all HASP monitoring instruments;
- authority to suspend field activities due to imminent danger situations;
- responsibility to initiate emergency response activities;
- presentation and documentation of field safety briefings;
- maintain daily log of all on-site safety activities; and
- oversight of health and safety practices for subcontractors;
- The SSO shall conduct daily tailgate safety meetings with site personnel and contractors prior to commencement of each day's activities.

Figure 5-1
Remedial Action HASP Plan Review Record
332 Fayette Manlius BCP Site, Fayette Street, Manlius, NY

HEALTH AND SAFETY PLAN REVIEW RECORD

I have read the Health and Safety Plan for the Site and have been briefed on the nature, level and degree of exposure likely as a result of participation in this project. I agree to follow all the requirements in the Health and Safety Plan.

Employee Signature	Date
Name	
Site Manager Signature	Date
Name	

Subcontractors will be provided with a copy of this HASP and will be informed of health and safety concerns, as well as environmental monitoring data collected during field activities. This information will be shared with the subcontractors to assist them in implementing the appropriate health and safety measures. Contractors will be required to prepare and implement their own HASP that is at least as stringent as this project HASP. The consultant/contractor is not responsible for the health and safety of subcontractors or other site or facility personnel.

6.0 HEALTH AND SAFETY TRAINING

All personnel working at the Site will participate in daily safety briefings. The SSO will also conduct daily briefings with all site employees covering the activities and safety procedures. The daily briefings shall review the days planned activities and discuss potential hazards and proper controls to minimize hazards. The content of briefings and personnel present shall be documented in field notes.

7.0 PERSONAL PROTECTIVE EQUIPMENT

7.1 PURPOSE/APPROACH

A critical aspect of field crew safety is appropriate personal protective equipment (PPE). PPE refers to the types of footwear, headwear, eyewear, ear wear, coveralls, gloves and respiratory protection each individual will wear while performing a specific task(s) and exposed to a particular chemical(s) at a given concentration(s). The levels of PPE are referred to as Level D, Level C and Level B; with Level D requiring the least amount of PPE and Level B the most.

The SSO will decide when it is necessary to upgrade, downgrade or modify the existing level of protection based on field monitoring and action levels described in Section 4.0. The SSO will make entries in the health and safety field book detailing each days PPE, task and if the level of PPE is modified, the reason for each change. Each level's PPE requirements may be modified by the SSO as needed. The different levels of PPE and equipment required at each level are described in the following sections and is based on 29 CFR 1910.120.

7.2 LEVEL D PROTECTION

Minimum level of protection for any field activities.

Level D PPE will consist of the following:

- Coveralls or a work uniform affording protection for nuisance contamination.
- Steel-toe, steel-shank work boots.
- Safety glasses.
- Hard hat (if working around equipment or machinery).

Note: Hand washing is imperative following any contact with soil, water and waste.

Optional Equipment or as Required by the SSO

- Disposal Tyvek® or rubber outer boots.
- Chemical resistant gloves (recommend nitrile or neoprene).
- Disposable outer chemical coveralls, such as Tyvek®, poly coated Tyvek® or Saranex®.
- Hearing protection.

No site activities where there is potential for contacting soils, waste or water may be conducted without proper gloves and/or other PPE as necessary.

7.3 LEVEL C PROTECTION

Minimum level of protection when respirators are required.

Level C PPE will consist of:

- Full-face air purifying respirator (APR) equipped with appropriate P100 (HEPA equivalent) and/or organic vapor cartridges. Note: All personnel requiring respiratory protection must be medically approved and "fit-tested" with the respirator to be used. Appropriate powered air-purifying respirators (PAPR) may be utilized if specified by the SSO. Only with the approval of the SSO can half-mask air purifying respirators be donned. Chemical cartridges will be changed on a daily basis.
- Chemical-resistant clothing such as Tyvek®, poly-coated Tyvek® or Saranex®.
- Outer chemical-resistant (recommend nitrile or neoprene) gloves and inner latex surgical gloves. Outer gloves should be tapped to the clothing sleeve.
- Steel-toe, steel-shank work boots with Tyvek® or rubber boot coverings. Over boots should be taped to clothing leg.
- Hard hat (if working around equipment or machinery).

Optional Equipment as Required by the SSO

- Escape SCBA
- Hearing protection

7.4 LEVEL B PROTECTION

Level B PPE will consist of:

- Self-contained breathing apparatus (SCBA) in a pressure demand mode or supplied air with escape SCBA in the pressure demand mode.
- Chemical-resistant clothing such as Tyvek®, poly-coated Tyvek® or Saranex®.
- Outer chemical-resistant (recommend nitrile or neoprene) gloves and inner latex surgical gloves. Outer gloves should be tapped to the clothing sleeve.
- Steel-toe, steel-shank work boots with rubber over boots. Over boots should be taped to clothing leg.
- Hard hat (if working around equipment or machinery).

8.0 SITE OPERATION AREAS AND DECONTAMINATION

Site operation areas will be formally set up for all field activities. Personal decontamination procedures will be closely adhered to upon entering or leaving all work areas. Section 8.1 describes the three zones used to control site operation areas and Section 9.0 describes decontamination procedures.

8.1 SITE OPERATION AREAS

A three-zone control system will be used during activities as determined necessary by the SSO. The purpose of the zones is to control the flow of personnel to or from potentially contaminated work areas. Guidelines for establishing these zone/areas are as follows:

Exclusion Zone (EZ): Primary exclusion zones will be established around each field activity and, at a minimum, this zone will radiate to a distance of 25 feet from the point of operations. Appropriate personal protective equipment must be worn in this zone. This zone will be separated from the contaminant reduction zone by cones or barrier tape to prevent personnel from entering the exclusion zone boundary without appropriate protective equipment or leaving without proper decontamination.

Contaminant Reduction Zone (CRZ): The CRZ is the transition area between the EZ and the Support Zone (clean area). All personnel and equipment must be decontaminated in the CRZ upon exiting the EZ and before entering the Support Zone. The CRZ will be set up along the perimeter of the EZ at a point upwind of field activities.

Support Zone (SZ): The support zone is considered to be uncontaminated; as such, protective clothing and equipment are not required but should be available for use in emergencies. All equipment and materials are stored and maintained within this zone. Protective clothing is donned in the support zone before entering the contaminant reduction zone.

9.0 DECONTAMINATION GUIDELINES

In the situation where work areas are controlled using the three-zone concept, all personnel must exit the EZ through an established CRZ. At a minimum, CRZ provisions will include a potable water supply, wash buckets or sprayers, cleaning tools, hand soap and clean towels. The applicable CRZ sequence of events should include:

- Wash outer boots, coveralls and outer gloves;
- Remove any outer boot or glove tape;
- Remove outer boots. Either store or properly dispose of outer boots;
- Re-clean and remove outer gloves. If gloves will be reused, inspect and stage the gloves; otherwise properly dispose of the gloves;
- Remove chemical resistant coveralls with care so that hands or inner clothing do not come in contact with any contaminated surfaces. Properly dispose of coveralls;
- Remove respirator and stage in CRZ area. Respirators shall be cleaned and disinfected with a sanitizing agent between uses;
- Remove and dispose of inner gloves; and
- Thoroughly wash hands and face.

All contaminated equipment (such as the drill rig, excavator/back-hoe, tools and sampling equipment, etc.) will be thoroughly decontaminated prior to leaving the EZ. The extent of the decontamination (such as a separate decontamination pad) will be determined by the SSO. The SSO will be responsible for inspecting the decontamination of all equipment prior to leaving the EZ and the Site.

For fieldwork not using the three-zone concept (e.g., soil and groundwater sampling with hand-operated equipment), portable wash stations will be utilized for easy and efficient access. The wash station shall consist of a potable water supply, hand soap and clean

towels. Portable sprayer units filled with Alconox® solution and potable water will also be available to wash and rinse off grossly contaminated boots, gloves and equipment. The SSO will monitor decontamination procedures to ensure their effectiveness. Modifications of the decontamination procedure may be necessary as determined by the SSO.

9.1 MANAGEMENT OF GENERATED WASTES

All discarded health and safety equipment and discarded sampling equipment will be segregated and placed in appropriate containers, as required. These containers will be properly labeled and stored in a secure area on site while arrangements are made for disposal.

10.0 SITE ACCESS AND SITE CONTROL

Access to site activities will be limited to authorized personnel and should be coordinated with the site Owner. Such authorized personnel include contractor's employees, subcontractors and representatives of the site Owner. However, access into the established contaminant reduction and exclusion zones will be limited to those authorized personnel with required certifications and wearing appropriate personal protective equipment. The exclusion zones will be monitored by the SSO to ensure personnel do not enter without proper personal protection equipment.

All work zones will be clearly marked with barrier tap and/or cones to ensure that non-authorized personnel are kept at a safe distance. Excavations or trenches/ditches will be secured during off-hours and any stockpiled soil will be covered with secured plastic.

11.0 EMERGENCY RESPONSE

In the event of an emergency, the SSO will coordinate response activities. Appropriate authorities will be notified immediately of the nature and extent of the emergency. Table 11-1 provides emergency telephone numbers that will be posted within the support zone or any other visible location. Directions to the nearest hospital are also included on Table 11-1.

11.1 RESPONSIBILITIES

The SSO will be responsible for initiating response to all emergencies, and will:

1. Notify appropriate individuals, authorities and health care facilities of the activities and hazards of the field activities.

2. Ensure that the following safety equipment is available: eyewash provisions, first aid supplies and fire extinguisher.

3. Have working knowledge of all safety equipment.

4. Ensure that directions of the most direct route to the nearest hospital is present with the emergency telephone numbers.

5. For a release incident or major vapor emission, determine safe distances and places of refuge.

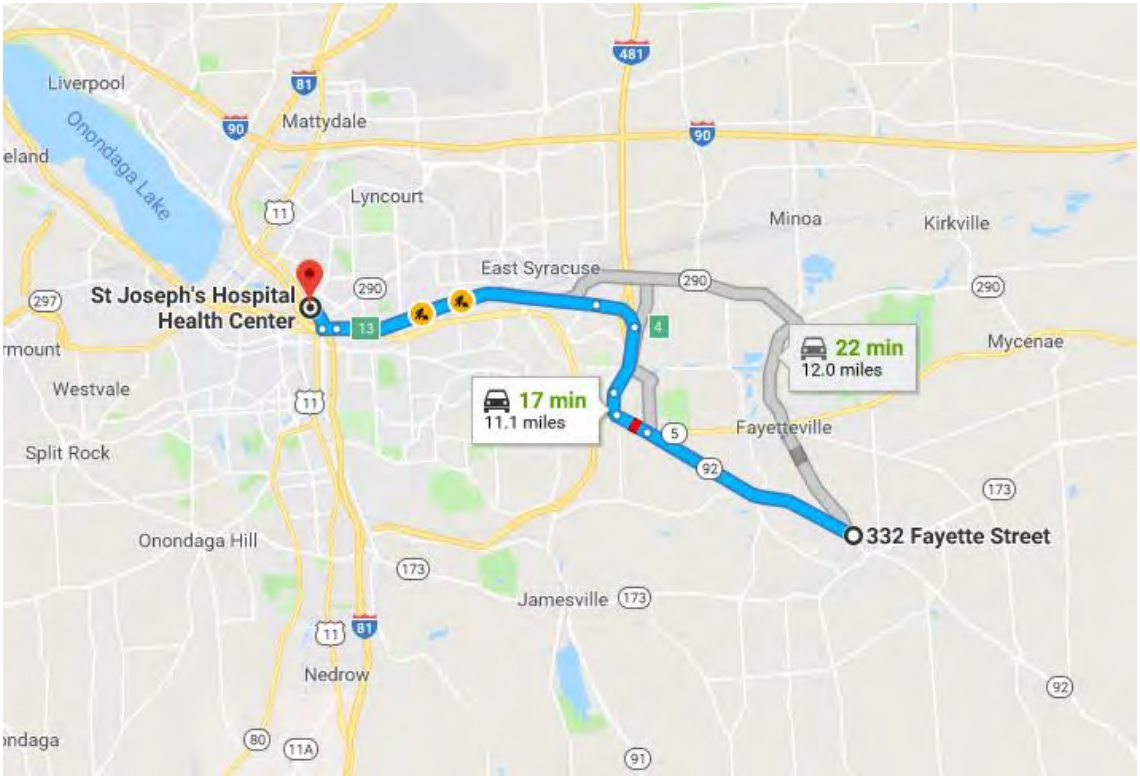
6. For a release incident or major vapor emission, contact the local emergency response coordinator (Fire Department) and NYSDEC Spill Response (if appropriate).

Table 11-1
Emergency Contacts
332 Fayette Manlius BCP Site, Fayette Street, Manlius, NY

Project Health and Safety Coordinator: Rachel Oltmer	(607) 341-5404
Project Director: James F. Blasting, P.G.	(315) 263-3388
Project Manager: Luke McKenney	(315) 439-0772
Ambulance (Rural/Metro Medical Services)	911 or (315) 471-0102
Hospital (St. Joseph's Hospital)	(315) 448-5111
Fire Dept. (Manlius Fire Department – **EMERGENCY**)	911 or (315) 682-8318
NYSDEC Spill Hotline	1-800-457-7362
Police (Manlius Police Department)	911 or (315) 471-3257

Directions to Hospital: From Manlius Location

Figure 11-1 Directions to Hospital



From:	332 Fayette Street Manlius, NY 13104
To:	Prospect Ave Syracuse, NY 13203

Directions	**Distance**
1: Head northwest on Fayette St toward Stickley Dr	226 feet
2: Use the right 2 lanes to turn slightly left onto Highbridge Rd	3.5 miles
3: Continue onto NY-5 W/NY-92 W	0.5 miles
4: Use the right 2 lanes to take the Interstate 481 N ramp to Interstate 90/Syracuse	0.4 miles
5: Merge onto I-481 N	1.1 miles
6: Use the left 2 lanes to take exit 4 for Interstate 690 W towards Syracuse	
7: Continue onto I-690 W	0.7 miles
8: Take exit 13 for Townsend St toward Downtown	
9: Turn right onto N Townsend St	4.1 miles
10: Turn left onto Union Ave	0.2 miles
11: Arrive	0.3 miles 348 feet

Total Distance:	11.1 miles

11.2 ACCIDENTS AND INJURIES

In case of a safety or health emergency at the Site, appropriate emergency measures will immediately be taken to assist those who have been injured or exposed and to protect others from hazards. The SSO will be immediately notified and will respond according to the seriousness of the injury.

11.3 SITE COMMUNICATIONS

Telephones (either temporary landlines or cellular) will be located prior to the start-up of field activities and will be used as the primary off-site communication network.

11.4 RESPONSE EVALUATION

The effectiveness of response actions and procedures will be evaluated by the SSO. Improvements will be identified and incorporated into this and future plans.

12.0 ADDITIONAL SAFETY PRACTICES

The following safety precautions will be enforced during the field activities:

1. Eating, drinking, chewing gum or tobacco, smoking or any practice that increases potential hand-to-mouth transfer and possible ingestion of material is prohibited in areas designated as contaminated by the SSO.

2. Hands and face must be thoroughly washed upon leaving the work area and before eating, drinking or any other activity.

3. Whenever decontamination procedures for outer garments are in effect, the entire body should be thoroughly washed as soon as possible after the protective garment is removed.

4. No facial hair that may interfere with the effectiveness of a respirator will be permitted on personnel required to wear tight fitting respiratory protection. The respirator must seal against the face so that the wearer receives air only through the air purifying cartridges. Fit-testing shall be performed prior to respirator use to ensure a proper seal is obtained.

5. Even when wearing protective clothing, contact with potentially contaminated surfaces should be avoided when possible. One should not walk through puddles; mud or other discolored surfaces; kneel on ground; lean, sit or place equipment on drums, containers, vehicles or the ground.

6. Medicine and alcohol can enhance the effect from exposure to certain compounds. Alcoholic beverages will not be consumed during work hours by personnel involved in the project. Personnel using prescription drugs during the project may be precluded from performing specific tasks (e.g. operating heavy equipment) without authorization from a physician.

7. Personnel and equipment in the work areas will be minimized.

8. Work areas and decontamination procedures will be established based on prevailing site conditions.

9. Respirators will be issued for the exclusive use of one worker and will be cleaned and disinfected after each use.

10. Cartridges for air-purifying respirators in use will be changed on a frequency determined by the SSO, with detectable odor/breathing resistance or after each day's use, whichever is shorter.

ATTACHMENT A

COMMUNITY AIR MONITORING PROGRAM

Community Air Monitoring Plan

(Intrusive Activities)

The community air monitoring plan (CAMP) will be implemented during all exterior ground intrusive work during the remedial activities. Continuous monitoring will be performed for all exterior ground intrusive activities including demolition of contaminated or potentially contaminated structures, soil/waste excavation and handling, test pitting or trenching, and the installation of soil borings. Continuous air monitoring will be conducted when work is taking place near potentially exposed individuals, such as near a busy street or residence, and the CAMP equipment will be capable of calculating 15-minute running average concentrations.

Real-time air monitoring for VOCs and particulate levels at the perimeter of the exclusion zone or work area will be necessary.

Continuous monitoring will be conducted for all exterior ground intrusive activities and during the demolition of contaminated or potentially contaminated structures. Ground intrusive activities include soil/waste excavation and handling, test pitting or trenching, and the installation of soil borings.

Periodic monitoring for VOCs will be conducted during non-intrusive activities such as the collection of soil samples or the collection of groundwater samples from existing monitoring wells. Periodic monitoring during sample collection will consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or overturning soil, monitoring during well baling/purging, and taking a reading prior to leaving a sample location.

<u>VOC Monitoring, Response Levels, and Actions</u>

Volatile organic compounds (VOCs) will be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis or as otherwise specified by the Site Safety Officer (SSO). Upwind concentrations will be measured at the start of each workday and periodically thereafter to establish background conditions, particularly if wind direction changes. Monitoring work will be performed using equipment appropriate to measure the types of contaminants known or suspected to be present (one upwind, two downwind). The equipment will be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment will be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

1. If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities will be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.

2. If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities will be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.

3. If the organic vapor level is above 25 ppm at the perimeter of the work area, activities will be shut down and corrective measures will be implemented before work resumes.

4. All 15-minute readings will be recorded and be available for State (DEC and NYSDOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

Particulate Monitoring, Response Levels, and Actions

Particulate concentrations will be monitored continuously at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations (one upwind, two downwind). The particulate monitoring will be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment will be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration will be visually assessed during all work activities.

1. If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques will be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 mcg/m3 above the upwind level and provided that no visible dust is migrating from the work area.

2. If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m3 above the upwind level, work will be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/m3 of the upwind level and in preventing visible dust migration.

3. All readings will be recorded and be available for State (DEC and NYSDOH) and County Health personnel to review.