September 20, 2022

Mr. Aaron Fischer
New York State Department of Environmental Conservation
Section B, Remedial Bureau B
Division of Environmental Remediation
625 Broadway, 12th Floor
Albany, NY 12233-7016

RE: Remedial Design Modification Memorandum
Ebenezer Plaza II
589 Christopher Ave., Brooklyn, New York
BCP Site No. C224241

Dear Mr. Fischer:

LaBella Associates (LaBella) has prepared this remedial design modification to the February 2020 Remedial Action Work Plan (RAWP) for the above referenced site pursuant to the NYSDEC-approved Decision document dated September 2020. As a part of its site preparation, the Volunteer has removed the majority of contaminated soil to a depth of 6 ft below ground surface (ft bgs), as well as an additional 2 ft of construction and demolition debris (C&D) that was above ground surface. This site preparation work has been completed for remedial purposes pursuant the September 2020 Decision Document as required to achieve a Track 4 cleanup. The property is serviced with municipal water.

In order to explore additional response actions to achieve a Track 2 clean up, LaBella has performed supplemental delineation of soil from 7 to 15 feet below ground surface in order to determine the extent of additional soil remediation of soil containing residual constituents of concern (COCs) above the applicable restricted-residential soil cleanup objectives (RRSCOs), as well as the extent of source material in a petroleum hot spot which must be treated, contained, or removed, as required to achieve a Track 2 cleanup, pursuant to the June 8, 2022, NYSDEC-approved Remedial Action Delineation Work Plan.

This Remedial Design Modification Memorandum presents the extent of additional voluntary remediation to achieve a Track 2 cleanup, including excavation of contaminated soil where practicable and treatment below the water table in order to address the detection of residual petroleum hydrocarbons in saturated soil that exceeds Protection of Groundwater Standard Soil Cleanup Objectives (PGWSCOs) for those contaminants found in site groundwater above standards, as per the June 2020 Decision Document. The proposed treatment below the water table involves in- situ chemical oxidation (ISCO) using activated sodium persulfate (ASP) and catalyzed hydrogen peroxide / Modified Fenton's Reagent (MFR).

A. Summary of Activities Performed Prior to March 2022

The following is a summary of investigations and remedy-relevant activities performed at the site prior to March 2022.

- **2009 Phase II Environmental Site Assessment**

A Phase II Environmental Site Assessment was performed in 2009 during which soil samples were collected from nine borings including SB-12, SB-13, SB-14, SB-16, SB-17, SB-18, SB-19, SB-20, and SB22.

- 2011 Remedial Investigation

A Remedial Investigation was performed in November 2011 to further characterize and delineate the extent of known impacts to soil and groundwater related to NYSDEC Spill No. 09-06674. The Remedial Investigation Report (RIR) was submitted to NYSDEC in April 2012. Soil samples were collected from twelve borings including SB-49, SB-41, SB-42, SB-43, SB-44, SB-45, and SB-46 which were advanced to the water table and SS-1 through SS-4 which were advanced to 2 feet below ground surface (bgs). Soil samples were analyzed for the full list of VOCs via USEPA Method 8260 and semi-volatile organic compounds (SVOCs) via USEPA Method 8270, except shallow soil samples SS-1 through SS-4 and SB-37 (0 to 2 feet) collected in former auto dismantling areas, which were only analyzed for RCRA metals. The results indicated the presence of lead and barium in near-surface soils are in a small area of the site that was used for vehicle storage.

- November 2011 In-situ Chemical Oxidation Remediation Pilot Test

In 2011, a small-scale pilot test was conducted using ISCO via iron-activated hydrogen peroxide to remediate hydrocarbon-impacted groundwater and saturated soil in the vicinity of former petroleum USTs.

Two injection wells (IW-1 and IW-2) were installed in the vicinity of the petroleum hot spot in the northern portion of the Site for the purpose of conducting a remedial pilot test using in-situ chemical oxidation techniques. These wells were installed using five-foot well screens placed approximately 2 to 3 feet below the water table with vertical annular seals prepared using a slurry of Portland cement and bentonite. Injection well construction details are documented in the RIR. IW-2 was strategically positioned and over-drilled in the location of historical soil boring SB-14, which exhibited the highest total VOC groundwater concentration reported during the 2009 Phase II investigation. IW-1 was located along New Lots Avenue.

On November 23, 2011, two-hundred gallons a field prepared solution of 10.2% iron-activated hydrogen peroxide was gravity infused into the subsurface at injection well IW-2. The planned injection at IW-1 was cancelled due to access and time constraints. Pre and post-injection groundwater samples were collected on November 28, 2011, from the two monitoring wells (MW-18 and MW-20) in closest proximity to IW-2. The post-injection sampling results confirmed a significant reduction in the concentration of total VOCs in MW-18 (from 8,827 ug/L to 6,453 ug/L, a 27% reduction) and MW-20 (from 3,462 ug/L to 1,882 ug/L, a 46% reduction) compared to pre-injection concentrations. The change in concentration of individual compounds varied with some compounds showing no change or an increase in concentration. Dilution effects were negligible. The injection volume (200 gallons) is less than 3% of the calculated volume of water in the area from IW-2 to MW-18, and less than 1% of the volume from IW-2 to MW-20. The highest observed concentration reductions were in those compounds representing the highest percentage of the total original concentration. This strongly indicates the effectiveness of the ISCO process for the primary contaminants of concern. This suggests that ISCO is a practical and effective remedial technology that could be used for future in-situ site remediation work. In addition, in-situ remedial action is consistent with Green Remediation guidance.

The location of injection wells and groundwater sampling results from before and after the November 2011 ISCO injections are presented on **Figure 1.**

- 2017 Remedial Investigation

A Remedial Investigation Report (RIR) summarizing the historical analytical data for the Subject Property and Remedial Action Work Plan to complete Subject Property-wide remediation under the New York State Brownfield's Clean-up Program was prepared and submitted to NYSDEC in February 2017. The 2017 sampling results confirmed the presence of SVOCs and select metals, primarily in the fill material and with concentrations decreasing with depth.

- 2017 Supplemental Remedial Investigation

Supplemental soil sampling was performed in May 2017 to characterize soil for disposal purposes. Six supplemental soil borings were advanced at site including WC1 and WC4 through WC8 in the locations depicted on Figure 2. The interior locations of proposed borings WC2 and WC3 were not accessible during the investigation. Continuous soil cores were collected from grade to the final depth of each boring, passing the urban fill-native sand boundary. The final boring depths ranged from 8 to 24 feet below grade. A total of twelve soil samples, two from each of the six borings, were collected from variable depth intervals representing the urban fill or underlying native material. A subset of six samples, representing the fill material planned for removal as part of site remediation and redevelopment, were additionally analyzed for two or more of the following waste characterization parameters. The SRI confirmed the presence of a heterogeneous layer of urban fill across the entire Subject Property impacted with semi-volatile organic compounds and heavy metals. Historical releases of gasoline constituents (BTEX), chlorinated solvents (CVOCs), and polyfluorinated compounds (PFCs) from the use of historical underground storage tanks and at grade from surface spills, and likely off-site sources.

- 2017 – 2018 Demolition

On-structures were demolished between September 2017 and February 2018 as part of, and in preparation for, additional site remediation and redevelopment.

According to the 2020 RAWP, the buildings were razed and the floor slabs broken for easy removal but left in place. A temporary demarcation barrier was placed across in the courtyard open areas. Soft building materials (non-brick/block/stone/cement) were segregated from the building block/stone during demolition and removed from the Site for off-site disposal.

The remaining obvious construction and demolition (C&D) debris was crushed/broken into manageable pieces and spread as needed in a layer across the site to act as a dust suppression and/or fugitive VOC emissions barrier during the scheduled delay between demolition activity and commencement of site remediation.

- 2018 Supplemental Remedial Investigation

A second Supplemental Remedial Investigation (SRI) Report was performed in 2018 to address data gaps regarding the depth of urban fill throughout the Site below 5 ft bgs, as well as groundwater and soil vapor. Soil samples were collected from twelve borings, SB-101 through SB-111, which were advanced to an average depth of 20 feet below ground surface. The SRI Report states that the exact depth of the urban fill/native soil horizon could not be positively determined due to limited recovery of the very loose soils. The estimated average thickness of the urban fill estimated at 7 feet below current grade.

- 2020 Remedial Action Work Plan

A Remedial Action Work Plan was submitted to NYSDEC by the Chazen Companies in February 2020 and has been approved by NYSDEC. The Decision Document was published by NYSDEC in September 2020.

- 2020 – 2022 Groundwater Monitoring

Results from the June 2020 groundwater sampling event for on-site wells indicated the absence of VOCs in groundwater above applicable standards at on-site wells MW-22 and MW-23 and perimeter wells MW-24, MW-25, and MW-26 while MW-27 contained 4,396 ug/L Total VOCs.

The most recent groundwater sampling event, performed on March 24, 2022, indicated the absence of VOCs in groundwater above applicable standards at perimeter monitoring wells MW-24, MW-25, and MW-26. The on-site monitoring wells, as well as MW-24, have been lost or destroyed.

The location of these monitoring wells is presented on **Figure 2**.

B. Summary of Activities Performed Since March 2022

The following is a summary of remedy-relevant activities that have been performed at the Site since March 2022.

- **C&D Debris Excavation and Removal**

On March 23rd and 24th, 2022, LaBella personnel provided field oversight to characterize C&D material at the Site within approximately the top 2-feet of current Site cover. A 5-point composite sample was collected from test pits of C&D debris advanced in five grids across the site. Composite samples were analyzed for TCL+30/TAL, Cyanide, TCLP RCRA 8 Metals, EPH, and RCRA characteristics. In addition, one (1) grab soil sample was collected from each grid area using a Terracore and analyzed for VOCs at approximately 0.5 - 1 ft bgs. Soil samples were analyzed by York Analytical Lab in Stratford, CT.

Between May 17 and May 26, the top 2 ft of construction and demolition C&D debris was removed and properly disposed off-site. 4511.32 tons of C&D debris were transported to Bayshore Soil Management LLC for disposal between. This material was present above-grade and had overlain the 6 feet of contaminated historic fill material (CHFM) that was identified in the Remedial Investigation Report (RIR) and Remedial Action Work Plan (RAWP).

- **Geophysical Investigation**

Following the removal of the approximately top 2 feet of C&D debris, a geophysical investigation performed on March 20th, 23rd, 25th, 31st and June 20th, 2022, by contractor ePhase2 identified the presence of underground storage tanks (USTs) in the vicinity of the two gasoline USTs identified on Sanborn maps in the northeast portion of the Site. There was no evidence of any tanks anywhere else on the site, including to the west, where Sanborn maps had indicated the potential presence of former USTs.

The location of these USTs is presented on **Figure 2.**

- **UST Removal**

Following the geophysical investigational, the presence of two 550-gallon gasoline USTs was confirmed. On June 17th and 20th, 2022, Brookside Environmental (FDNY License No. 81350266) completed the cleaning and removal of four 550 gallon underground gasoline tanks in accordance with the provisions of the New York City Fire Code, Chapter 34, Section FC3404.2.l 3 and FC3404.2.l 4.

During the removal of the tanks, Brookside:

- Pumped and disposed of 1,845 gallons of gas/water mixture.
- Removed and disposed of 2 drums of tank sludge.
- Cleaned and removed the tanks.
- Disposed of the tanks as scrap metal.
- Removed and disposed of all piping associated with the tanks.

Petroleum, contaminated soil was stockpiled on plastic and covered with plastic until the material could be properly disposed.

The tanks will be properly closed and documented in the Final Engineering Report (FER).

- Supplemental Soil Delineation Sampling

Supplemental delineation sampling was performed throughout the Site in order to determine the extent of additional soil remediation of soil containing constituents of concern (COCs) above the applicable restricted-residential soil cleanup objectives (RRSCOs), as well as the extent of source material in a petroleum hot spot which must be treated, contained, or removed, as required to achieve a Track 2 cleanup, pursuant to the June 8, 2022, NYSDEC-approved Remedial Action Delineation Work Plan. Soil samples were collected from remedial delineations sampling locations RD-1 through RD-22 at two foot intervals, from approximately 7 to 15 ft bgs and analyzed for the Full Part 375 List with Category B deliverables. Step-out samples were collected for sampling locations at which COCs exceeded RRSCOs to delineate the vertical and horizontal extent of SCO exceedances.

Exceedances of restricted residential soil cleanup objectives (RRSCO) for soil samples collected at RD-1 through RD-22, and associated step-out samples, are presented in **Table 1**, **Figure 3**, and **Appendix A.** As per discussions with NYSDEC, restricted residential and protection of groundwater soil cleanup objectives (RRSCO and PGWSCO) exceedances for the primary site-related constituents of concern (COCs) and key remedy drivers associated with the petroleum hot spot, 1,2,4 trimethylbenzene (1,2,4-TMB) and 1,3,5 trimethylbenzene (1,3,5-TMB), are presented in **Figure 3.** RRSCO and PGWSCO exceedances for additional petroleum-related constituents are also presented at depths and locations at which 1,2,4-TMB and 1,3,5-TMB did not exceed applicable SCOs.

The results of the supplemental soil delineation indicates the presence of shallow hot spots of polyaromatic hydrocarbons (PAHs) at RD-01 (7 to 9 ft bgs) and RD-02 (7 to 11 ft bgs). A shallow hot spot of polyaromatic hydrocarbons (PAHs) is present at RD-16C and RD-16D (7 to 9 ft bgs). A hot spot of polyaromatic hydrocarbons (PAHs) and metals is present at RD-10 (7 to 9 ft bgs) and RD-10A (11 to 13 ft bgs). A hot spot of metals is present to RD-15 (7 to 11 ft bgs) and RD-15C (7 to 9 ft bgs).

Supplemental delineation soil sampling was also performed in the vicinity of the former gasoline USTs to characterize the vertical and horizontal extent of the petroleum hot spot. Soil samples were collected from Tank Boring TB-1 through TB-13 and TB-15 through TB-22 at two foot intervals, from approximately 7 to 15 ft bgs, and deeper as necessary. TB-14 was located in the vicinity of suspect USTs to the west, as indicated on Sanborn maps. However, the geophysical investigation did not reveal evidence of tanks at this location.

Samples were analyzed for the Full Part 375 List with Category B deliverables, with the exception of tank borings TB-15 through TB-22, which were analyzed for VOCs and SVOCs only, as approved by NYSDEC, beginning at 12 ft bgs. For saturated soil samples collected below the water table, the reported soil concentrations include both contaminants in pore water and soil-adsorbed contaminants. In sandy soils observed at the site, a higher fraction of the contaminants is assumed present in the pore water, which is favorable for remediation by ISCO which preferentially degrades aqueous-phase contaminants.

The following is a summary of the vertical intervals of petroleum-contaminated material based on RRSCO and PGWSCO exceedances in connection with the 2022 Supplemental Soil Delineation Sampling at the Former Petroleum UST Hot Spot.

Boring ID	Petroleum-Contaminated Interval (ft bgs)
TB-01	7 - 23
TB-02	13 - 19
TB-06	13 - 31
TB-07	13 - 15
TB-12	15 - 17
TB-13	15 - 17

TB-17	16 - 20
TB-18	14 - 32
TB-19	14 - 20
TB-20	14 - 16
TB-22	16 – 22

Additional source area treatment of the former petroleum UST hot spot is required to achieve a COC under the BCP, as presented below.

- High Concentration Lead Area Sampling

The RI results indicated that the soil in central portion of the site that was formerly used as an auto salvage yard contained high concentrations of lead (High Concentration Lead Area, or HCLA). The former salvage yard was contained on all sides by an approximately 2 foot thick foundation wall that extended to approximately 5 ft bgs. LaBella performed verification and delineation soil sampling to verify historical soil sampling results at locations that previously indicated the presence of lead at concentrations greater than approximately 100 mg/kg for waste characterization purposes in order to obtain disposal facility approval. Soil at these locations was resampled at the same intervals and analyzed for TCLP RCRA 8 metals. Additional soil sampling was performed to delineate lead concentrations, including the vertical and horizontal extent of hazardous concentrations of lead, as necessary, for waste characterization purposes in order to obtain disposal facility approval.

Discrete soil grab samples were collected from 0 to 2, 2 to 4, and 4 to 6 ft bgs, and deeper as necessary, from 36 sampling locations, including P-1 through P33 plus P-18.1, P-18.2 and P-18.3) and analyzed for Total RCRA 8 metals as well as TCLP RCRA 8 metals if lead concentrations were greater than approximately 100 mg/kg. Several portions of the HCLA were determined to be characteristic hazardous and disposed of accordingly.

The results of verification and delineation sampling of the HLCA are presented in **Table 2**, **Figure 4**, and **Appendix B.**

- Off-Site Soil Disposal

As a site preparation measure pursuant to the NYSDEC-approved Decision Document dated September 2020, in addition to the 2 feet of C&D mentioned above, the Volunteer has removed and properly disposed of the majority of material from zero to approximately 6 ft bgs.

A total of approximately 4511.32 tons of C&D has been excavated and transported for disposal to Bayshore Soil Management, LLC

A total of approximately 11,436.89 tons of soil has been excavated and transported for disposal to approved facilities as indicated below:

- Approx. 2602.31 tons of soil were transported to PPark for disposal between July 14th and August 2nd,
- 6010.59 tons of soil were transported to Farmingdale Wash Plant for disposal between July 15th and August 10th,
- 2300.37 tons of soil were transported to Clean Earth of Carteret for disposal between July 25th and July 29th, and
- 523.48 tons of soil were transported to ACV for disposal between August 9th and August 10th.

- **Post-Excavation Confirmation Soil Sampling**

To-date, post-excavation confirmation soil samples have been collected at 29 locations from grids at which the depth of remediation does not exceed 6 ft bgs. The results of post-excavation confirmation soil sampling performed to date confirm that there are no COCs above the applicable RRSCOs.

The results of post-excavation confirmation soil sampling are presented in **Table 3, Figure 5, and Appendix C.**

C. Summary of Proposed Remedial Design Modifications

Based on the soil sampling performed to date, we have defined the following zones of petroleum-contaminated material.

Zone 1 - 15 to 17 ft bgs,
Zone 2 - 13 to 22 ft bgs,
Zone 3 - 7 to 23 ft bgs, and
Zone 4 - 13 to 32 ft bgs.

In addition, hot spots of polyaromatic hydrocarbons (PAHs) and / or metals are present at RD-01 (7 to 9 ft bgs) and RD-02 (7 to 11 ft bgs), RD-10 (7 to 9 ft bgs) and RD-10A (11 to 13 ft bgs), RD-15 (7 to 11 ft bgs) and RD-15C (7 to 9 ft bgs), and RD-16C and RD-16D (7 to 9 ft bgs).

The proposed modification of the remedial design to achieve a Track 2 Cleanup are as follows, as presented in **Figure 6.**

1. Unsaturated Zone – Excavation

Soil in the vicinity of the former petroleum USTs, including all soil in Zone 1, will be excavated to a depth of approximately 17 ft bgs to remove soil containing COCs above applicable SCOs.

Hot spots of polyaromatic hydrocarbons (PAHs) and / or metals in the unsaturated at RD-01 (7 to 9 ft bgs) and RD-02 (7 to 11 ft bgs), RD-10 (7 to 9 ft bgs) and RD-10A (11 to 13 ft bgs), RD-15 (7 to 11 ft bgs) and RD-15C (7 to 9 ft bgs), and RD-16C and RD-16D (7 to 9 ft bgs) will be removed through excavation.

2. Saturated Soil / Groundwater - In-situ Chemical Oxidation

Following excavation to 17 ft bgs throughout Zone 1, the saturated petroleum-contaminated soil that remains in Zones 2 and 3 (17 to 23 ft bgs) and Zone 4 (17 to 32 ft bgs), will be treated through ISCO.

ISCO is the process of designing and injecting strong chemical oxidant(s) into the subsurface to directly destroy organic contaminants through chemical reaction. In order to reduce the toxicity, mobility, and volume of petroleum hydrocarbons in saturated zone soil at concentrations that exceed the PGWSCO, an in-situ treatment plan has been prepared for remediation of impacted soil and groundwater below 17 ft bgs. This treatment plan includes ISCO for treatment of targeted areas identified through soil sampling performed in 2022 in the vicinity of former petroleum USTs.

Activated sodium persulfate (ASP) and catalyzed hydrogen peroxide / Modified Fenton's Reagent (MFR) are effective ISCO treatment technologies for the targeted petroleum hydrocarbons, notably BTEX (benzene, toluene, ethylbenzene, and xylenes) and trimethylbenzenes (1,2,4- and 1,3,5-TMB) found at the subject site. The iron-activated hydrogen peroxide that was used for the 2011 ISCO injection is the "classic" Fenton's reagent. This version results in short-lived hydroxyl radical production with likelihood of significant temperature increase, poorly controlled reaction kinetics, and active reagent residence time of a few hours. Modified Fenton's Reagent (MFR) uses iron-based catalyst, hydrogen peroxide, and a variety of buffering/stabilization compounds to slow the reaction

kinetics, resulting in longer generational time for hydroxyl radical production, slight to no temperature increase, and active reagent residence time closer to 2-3 days. ASP is the proposed ISCO technology for the initial injection event based in its similar effectiveness as MFR for the target COCs and its persistence.

A network of vertical injection wells will be installed for the injection of chemicals. Each vertical injection well will be constructed of #10 slotted 1-inch or 2-inch diameter schedule 40 Flush Joint PVC. Injection wells will target the treatment zone between 17 feet bgs and 32 feet bgs based on soil sampling performed in 2022. Injection wells will have screened intervals of 6 to 10 feet for treatment across the target vertical interval of 17 to 23 feet bgs (Zones 2 and 3) and 23 to 32 feet bgs in Zone 4. Injection wells be placed in a grid with spacing of approximately 12 to 15 feet between points, with spacing determined in the field based on current and future site features above and below ground surface and relative COC concentrations. Approximately 15 shallow injection wells (screened from 17 to 23 feet bgs) will be installed, and five of which also have a deep couplet injection well (screened from 23 to 32 feet bgs), will be installed. The coverage of the ISCO injection well network is conservative and intended to address potential data gaps along the horizontal and vertical perimeter of the hot spot. Each injection well will be piped back to a common location using horizontal conveyance pipe (1" PVC or polyethylene tubing) to a common location in the basement of the building and manifolded for potential future use for re-injection.

For the 9 shallow injection wells in the northern portion (closer spacing), a proposed injection volume of approximately 400 gallons will be applied to each shallow injection well. For the 6 shallow injection wells in the southern portion (wider spacing), a proposed injection volume of approximately 800 gallons will be applied to each shallow injection well. Approximately 725 gallons each is proposed for injection into the deep injection wells. This volume is inclusive of 70 to 100 gallons of chase water that will be applied to each injection well to flush the horizontal piping and vertical well screen clear of oxidant solution. Applying ASP first will allow the installed wells to be injection tested and achieve initial degradation of contaminants. The ASP process utilizes sodium persulfate (Na2S2O8) oxidant with the addition of an activator chemical to generate reactive free radicals, including the sulfate free radical. Activators can include base (pH>10.5, using sodium hydroxide (NaOH)), iron catalyst, food grade carbohydrate, or hydrogen peroxide. Sodium persulfate is a more persistent oxidant (weeks to months) compared with MFR (hours to days) and exhibits a moderate rate of reaction, which translates into longevity in the subsurface. This persistent oxidant can continue to migrate with groundwater encountering and oxidizing dissolved contaminants that desorb after initial oxidation of dissolved organic contaminants, thus mitigating groundwater rebound.

An oxidation reaction product of sodium persulfate is sulfate which can enhance activity of anaerobic bacteria that biodegrade petroleum hydrocarbons. For activator chemical, a combination of carbohydrate and base (NaOH) is proposed based on demonstrated effectiveness of this activation chemistry on the target site contaminants, as achieved in numerous bench-scale testing and field ISCO programs. A benefit of carbohydrate activated sodium persulfate (CHASP) over base-activated persulfate (BASP) alone is that activating conditions do not stall after loss of alkaline pH conditions. In addition, there are less health and safety concerns compared to using a strong base as the primary activator. Note that it is normal to include small volumes of NaOH with CHASP, to prevent corrosion of injection equipment and to buffer groundwater pH drop as a result of sulfuric acid that is a product of sodium persulfate oxidation.

It is anticipated that a follow-up injection event may take place. The follow-up injection event may incorporate use of MFR as a standalone ISCO approach or in combination with ASP. The MFR process combines hydrogen peroxide with a stabilizer and chelated iron catalysts to generate powerful free radicals, including hydroxyl radicals, superoxide radicals and hydroperoxide anions. All are very effective in treating a wide range of organic contaminants. Incorporating MFR into the treatment program offers additional benefits. MFR enhances desorption of organic contaminants, and increased desorption is important to reducing overall contaminant mass in soils. Dissolved oxygen is a product

of hydrogen peroxide reactions that can enhance aerobic biodegradation after oxidants are consumed. Based on our review of the location of subsurface utilities for the proposed redevelopment, we do not believe the chemical injections will have an adverse impact.

The ISCO injections will be performed upon the completion of dewatering activities to ensure that the chemicals achieve their targeted distribution areas and to eliminate the potential for ISCO chemicals to be discharged into the storm water system. The performance of the saturated soil / groundwater treatment will be measured using temporary well installed prior to injections in the vicinity of former MW-18, which contained the highest concentrations of volatile organic compounds (VOCs) in groundwater during previous investigations, as well as a second temporary monitoring well in the interior of the site located approximately halfway between this new monitoring well (MW-18R) and the replacement of former MW-24 (MW-24R).

Additional monitoring wells to be installed along Sackman St. along the property boundary, including one to replace former MW-24 and another well approximately 65 feet to the north will also be used. Groundwater sampling at these monitoring wells will be performed prior to injection, to confirm that concentrations of site-related COCs in groundwater are above standards, immediately following injection, and bi-annually thereafter. Samples will be analyzed for VOCs according to EPA method 8260.

The location of the ISCO injection and monitoring wells and anticipated radius of influence is presented in **Figure 7.**

3. Sub-Slab Depressurization System

The Decision Document requires that a soil vapor intrusion evaluation be performed following excavation. As a proactive measure not required by the Decision Document, a sub-slab depressurization system (SSDS) will be installed by the Volunteer from 15 to 16 ft bgs to mitigate the potential for soil vapor intrusion in the event that the water table drops under future conditions. The interval from 16 to 17 ft bgs will be backfilled with clean sand removed from elsewhere on the site, or with clean imported fill material.

The SSDS design documents are included as **Appendix D.**

4. Schedule

Upon approval, permits will be obtained from FDNY for the storage and handling of the chemicals selected for injection. The injection and interior monitoring wells are scheduled to be installed in September / October 2022, after the gravel has been laid for the sub-slab depressurization system that is being proactively installed at a depth of 15 to 16 ft bgs. The injections are scheduled to be performed during the first quarter of 2023 (Q 2023) upon the completion of dewatering activities and installation of the foundation cover system. Underground injection control (UIC) permits will be filed 30 days prior to injection. The HDPE will not be adversely affected by the injected chemicals.

In addition, the following activities will be performed:

- The HASP and CAMP that are currently in-place and approved will be implemented during the performance of this work.
- Submission of a FER that describes the remedial activities, certifies that the remedial requirements have been achieved, defines the Site boundaries, lists any changes from this RAWP Addendum, and describes the Engineering and Institutional Controls to be implemented at the Site,
- Submission of an approved Site Management Plan (SMP) in the FER for long-term management of residual contamination, if any, including plans for operation, maintenance,

monitoring, inspection and certification of Engineering and Institutional Controls and reporting at a specified frequency,

- Establishment of Engineering Controls and Institutional Controls; a requirement that management of these controls must be in compliance with an approved SMP. Institutional Controls will include prohibition of the following: (1) vegetable gardening and farming; (2) use of groundwater without treatment rendering it safe for the intended use; (3) disturbance of residual contaminated material unless it is conducted in accordance with the SMP; and (4) higher level of land usage without NYSDEC- approval, and
- Performance of the activities required for the remedial action, including permitting requirements and pretreatment requirements, in compliance with applicable laws and regulations.

If you have any questions, please contact me at (917) 280-6364.

Respectfully submitted,

LABELLA ASSOCIATES, D.P.C.

Richard T. Kampf, PG, LEP
NYC Regional Manager

Attachments
Figure 1 – Pre-and Post-Injection Groundwater VOC Concentration Contour Maps (from RIR)
Figure 2 – Site Plan with Historical Sampling and UST Locations
Figure 3 – Supplemental Soil Delineation Sampling Locations and Results
Figure 4 – High Concentration Lead Area Sampling Locations and Results
Figure 5 – Post-Excavation Confirmation Soil Sampling Locations and RRSCO Exceedances
Figure 6 – Revised Extent of Remediation
Figure 7 - Conceptual Saturated Soil and Groundwater Treatment Plan

Table 1 - Supplemental Soil Delineation Sampling Analytical Results
Table 2 – High Concentration Lead Area Soil Sampling Analytical Results
Table 3 – Post-Excavation Confirmation Soil Sampling Analytical Results

Appendix A – Laboratory Analytical Report – Supplemental Soil Delineation Sampling
Appendix B – Laboratory Analytical Report – High Concentration Lead Area Soil Sampling
Appendix C – Laboratory Analytical Report – Post-Excavation Confirmation Soil Sampling
Appendix D – SSDS Design Drawings

cc via email:
Eamonn M O'Neil (NYSDOH)
Heidi M Dudek (NYSDEC)
Jacquelyn Nealon (NYSDOH)
Scarlett McLaughlin (NYSDOH)
Gerard Burke (NYSDEC)
Peter Procida