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REMEDIAL INVESTIGATION REPORT
817 BEDFORD AVENUE
BROOKLYN, NEW YORK

Prepared by
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Prepared for

NYC Office of Environmental Remediation
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Mazel Mit Brucha 104 LLC
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Monroe, NY 10950

Date:
August 2022

OER Project Number: 22TMP1712K

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Acronyms and Abbreviations

AOC	Area of Concern
AGV	Alternative Guidance Value
CEQR	City Environmental Quality Review
CREC	Controlled Recognized Environmental Condition
CVOC	Chlorinated Volatile Organic Compound
ESA	Environmental Site Assessment
ESI	Environmental Site Investigation
HASP	Health and Safety Plan
HAZWOPER	Hazardous Waste Operations and Emergency Response
HDPE	High Density Polyethylene
HREC	Historical Recognized Environmental Condition
NNO	Notice of No Objection
NOS	Notice of Satisfaction
NTP	Notice to Proceed
NAPL	Non-aqueous Phase Liquid
NYC DOB	New York City Department of Buildings
NYC OER	New York City Office of Environmental Remediation
NYCRR	New York Codes, Rules and Regulations
NYSDEC	New York State Department of Environmental Conservation
NYS DOH ELAP	New York State Department of Health Environmental Laboratory Accreditation Program
OSHA	Occupational Safety and Health Administration
PCE	Perchloroethene
PFAS	Per- and perfluoroalkyl substances
PFOA	Perfluorooctanoic Acid
PFOS	Perfluorooctanesulfonic Acid
PID	Photoionization Detector

Acronyms and Abbreviations (continued)

PVC	Polyvinyl Chloride
QA/QC	Quality Assurance/Quality Control
QEP	Qualified Environmental Professional
REC	Recognized Environmental Condition
RRSCO	Restricted-Residential Soil Cleanup Objective
SCO	Soil Cleanup Objective
SVOC	Semi-Volatile Organic Compound
TCE	Trichloroethene
TCLP	Toxicity Characteristic Leaching Procedure
TOGS	Technical and Operational Guidance Values
UUSCO	Unrestricted Use Soil Cleanup Objectives
UST	Underground Storage Tank
VOC	Volatile Organic Compound

CERTIFICATION

I, James Bellew, am a Qualified Environmental Professional, as defined in RCNY § 43-1402(ar). I have primary direct responsibility for implementation of the Remedial Investigation for the 817 Bedford Avenue Site, (NYC OER Site 22TMP1712K). I am responsible for the content of this Remedial Investigation Report (RIR), have reviewed its contents and certify that this RIR is accurate to the best of my knowledge and contains all available environmental information and data regarding the property.

James M. Bellew 25 August 2022

Qualified Environmental Professional Date Signature

EXECUTIVE SUMMARY

The Remedial Investigation Report (RIR) provides sufficient information for establishment of remedial action objectives, evaluation of remedial action alternatives, and selection of a remedy pursuant to RCNY§ 43-1407(f). The remedial investigation (RI) described in this document is consistent with applicable guidance.

Site Location and Current Usage

The site is in the Bedford-Stuyvesant neighborhood of Brooklyn and is identified as Block 1734 and Lot 62. Currently, the site is developed with a vacant one-story building previously occupied by an auto body repair shop. The site is approximately 2,500-square-feet and is listed with an environmental E-Designation (E-102) for hazardous materials resulting from a City Environmental Quality Review (CEQR) effective 9 May 2001 (CEQR # 00DCP015K) for the Flushing Bedford Rezoning Action. Satisfaction of the E-Designation requirements is subject to review and approval by the New York City Office of Environmental Remediation (NYC OER) prior to redevelopment. The Site will need to apply for a Notice of No Objection (NNO) and/or complete the NYCOER E-Designation requirements for Hazardous Materials to obtain a Notice to Proceed (NTP) on the foundation and support of excavation filling set. Upon receipt of the approved NNO/NTP from NYCOER, the permits will be released by the New York City Department of Buildings (NYCDOB).

Summary of Proposed Redevelopment Plan

The development project consists of partial demolition of the existing on-site structures, closure and removal of on-site Underground Storage Tanks (USTs), if any, and construction of a new four-story mixed-use building with a 2,500 sf cellar encompassing the entire lot. The new development is anticipated to include one cellar level requiring remedial excavations extending to approximately 12 feet below ground surface (ft bgs). The proposed site use includes commercial use for the cellar-level and first floor and four residential units on second through fourth floors. The proposed development encompasses the entire Site footprint. The proposed site is identified on the New York City tax map in a commercial and residential M1-2/R6A zone. The proposed use is consistent with existing zoning for the property.

The site is approximately 30 feet above mean sea level.

Summary of Past Uses of Site and Areas of Concern

The Site was formerly developed as early as 1897 through at least 1947 with a residential property including tenant occupants noted between 1929 to 1934. By 1948, the lot was improved with the current structure for commercial use. Commercial uses at the property have included Belmar Sales Co, wholesale grocers (1949), Surplus Paper Stock Co (1970-1985), and most recently Putnam Auto Repairs (1992-2021), the lot has been vacant since late 2021.

The Site owner, Mazel Mit Brucha 104, LLC, purchased the property from Maria Iannarelli and Angelo Iannarelli in March 2022. The Iannarelli's owned the property since September 1987, which was previously owned by Marvin and Lenore Silverman from June 1978, and owned by Murray and Bessie Kesh prior to June 1978.

The AOCs identified for this site include:

- Current and Former Use of Subject Site as an Automotive Repair Business:
  Historic records indicate former use of the Site as an automotive repair business since as early as 1987 with a floor drain identified in the northwest portion of the building. The historical use and the presence of floor drain is considered a REC as potential or undocumented releases of petroleum products, solvents, and/or other hazardous materials may have adversely affected groundwater, soil and/or soil vapor at the Site.

- New York Environmental (E) Designation:
  The Site is listed with a NY E Designation due to location within the Flushing/Bedford Rezoning area (E-102; CEQR # 00DCP015K). The E designation for the Site is due to the potential for hazardous materials as related to the historical use of the subject property. The presence of a NY E Designation is considered a REC as the NYC OER would need to be contacted to either waive the NY E Designation requirements for the specific project or to ensure that the requirements for a Notice of Satisfaction (NOS) are met.

Summary of the Work Performed under the Remedial Investigation

1. Conducted a Site inspection to identify AOCs and physical obstructions (i.e., structures, buildings, etc.);

2. Installed four soil borings across the entire project Site to depths of between 15 and 40 ft bgs, and collected nine soil samples, including one duplicate, from depths representing shallow urban fill (0 to 2 ft bgs) and the proposed development depth (12 to 14 ft bgs). Soil samples were submitted for chemical analysis to evaluate soil quality;

3. Installed one 1-inch-diameter temporary groundwater monitoring well to a depth of approximately 40 ft bgs and collected two groundwater samples, including one duplicate, for chemical analysis to evaluate groundwater quality. It is noted that due to access and the depth to groundwater, only one temporary well point was installed. Post demolition and prior to construction, the remaining two temporary monitoring wells will be installed and sampled; and,

4. Installed four soil vapor probes around Site perimeter, specifically, one on the west and two on the east sides of the Site near the property boundaries and one in the central region of the Site, to depths of approximately 12 to 14 ft bgs. Four samples were collected for chemical analysis.

Summary of Environmental Findings

1. The surface elevation on the Site is approximately 30 ft amsl (Brooklyn 2019, USGS 7.5 Minute Topographic Map).
2. Depth to groundwater at the Site, as measured in TW-2, is 29.95 ft bgs. Groundwater beneath the Site is inferred to flow to the northwest, consistent with regional groundwater flow. Groundwater flow beneath the Site could not be determined due to multiple drilling refusals during monitoring well installation attempts in the western region of the property.
3. Bedrock was not encountered during this investigation. Depth to bedrock is expected to be greater than 100 ft bgs at the Site.
4. The stratigraphy of the Site, from the surface to the maximum boring completion depth of 40 ft bgs, consists of approximately 5 to 14 feet of urban fill material, comprised of light brown to brown to grey fine sand with varying amounts of silt, coarse/medium sand, fine gravel, concrete, brick and coal ash. The historical fill interval is underlain by a potential native layer consisting of light brown to brown fine sand with varying amounts of silt, medium sand and fine gravel.
5. Soil/fill samples were compared to New York State Department of Environmental Conservation (NYSDEC) 6 New York Codes, Rules and Regulations (6NYCRR) Part 375 Unrestricted Use Soil

Cleanup Objectives (UUSCOs) and Restricted-Residential Soil Cleanup Objectives (RRSCOs). In addition, soil samples were compared to the NYSDEC published soil guidance values for perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS) in October 2020 (latest revision June 2021). Soil/fill samples collected during the RI revealed the following:

- Volatile organic compounds (VOCs) were not detected above UUSCOs or RRSCOs in soil samples analyzed.
- Semi-Volatile Organic Compounds (SVOCs) were not detected above UUSCOs or RRSCOs in soil samples analyzed.
- Five metals were detected at concentrations above UUSCOs, two of which also exceed RRSCOs in two soil samples analyzed, including: copper above the UUSCO in two soil samples with a maximum concentration of 158 mg/kg in B-4(12-14') (UUSCO of 50 mg/kg); lead above the UUSCO in two soil samples and above the RRSCO is two soil samples with a maximum concentration of 1,980 mg/kg in B-1(0-2') (UUSCO of 63 mg/kg and RRSCO of 400 mg/kg); mercury above the UUSCO in three soil samples and above the RRSCO in one soil sample with a maximum concentration of 2.01 mg/kg in B-1(0-2') (UUSCO of 0.18 mg/kg and RRSCO of 0.81 mg/kg); nickel above the UUSCO in one soil sample with a maximum concentration of 31.1 mg/kg in B-2(12-14') (UUSCO of 30 mg/kg); and, zinc above the UUSCO in three soil samples with a maximum concentration of 178 mg/kg in B-3(0-2'), (UUSCO of 109 mg/kg). No other metals were detected above UUSCOs or RRSCOs in soil samples analyzed.
- One pesticide, 4,4'-DDT, was detected at a concentration of 0.00358 mg/kg in B-3(0-2'), exceeding the UUSCO of 0.0033 mg/kg. No other pesticides were detected above UUSCOs or RRSCOs in soil samples analyzed.
- Polychlorinated Biphenyls were not detected above UUSCOs or RRSCOs in soil samples analyzed.
- 1-4, Dioxane was not detected above the laboratory detection limits in soil samples analyzed.
- One soil sample, B-4(0-2'), was analyzed for emerging contaminants: Per- and Polyfluoroalkyl Substances (PFAS) including PFOA, PFOS and 1,4-dioxane. PFAS

compounds were not detected above the laboratory detection limits in the soil sample analyzed. No other PFAS compounds were detected above UUSCOs or RRSCOs in soil samples analyzed.

It should be noted that, although concentrations were below UUSCOs and RRSCOs, one chlorinated VOC (CVOC), Tetrachloroethene (PCE), was detected in both shallow and deep soil at the site, specifically, B-2(12-14'), B-3(0-2'), DUP-SOIL (parent sample B-4[0-2']) and B-4(12-14').

6. Groundwater analytical results were compared to NYSDEC Technical and Operational Guidance Series (TOGS) 1.1.1 Ambient Water Quality Standards (AWQSs) and Part 375 Remedial Programs Guidelines for Sampling and Analysis of PFAS NYSDEC June 2021 guidance value. Currently, a groundwater cleanup regulatory criterion does not exist for 1,4-dioxane in New York State. Concentrations of 1,4-dioxane were compared to New York State's drinking water maximum contaminant level (MCL) of 1 µg/L. Groundwater samples collected during the Phase II ESI showed:

    - One VOC, specifically a CVOC, was detected above the AWQS in groundwater samples analyzed. PCE was detected at a concentration of 48 µg/L in TW-2 and 47 µg/L in DUP_GW, (duplicate sample collected from TW-2) (AWQS of 5 µg/L). No other VOCs were detected above the AWQSs in groundwater samples analyzed.
    - SVOCs were not detected above AWQSs in groundwater samples analyzed.
    - Two total metals were detected in both groundwater samples collected (TW-2 and DUP-GW) at concentrations exceeding AWQSs, including: iron at a maximum concentration 861 µg/L in TW-2 (AWQS of 300 µg/L); and, sodium at a maximum concentration of 96,600 µg/L in DUP_GW (AWQS of 20,000 µg/L). Two dissolved metals were detected at concentrations exceeding AWQSs in groundwater samples collected, including: dissolved iron in TW-2 at a concentration of 313 µg/L (AWQS of 300 µg/L); and, dissolved sodium both groundwater samples collected, at a maximum concentration of 105,000 µg/L in DUP-GW (AWQS of 20,000 µg/L). No other metals were detected above the AWQSs in groundwater samples analyzed.
    - PCBs were not detected above laboratory method detection limits in groundwater samples analyzed.

- 1,4-dioxane was not detected above the MCL of 1 µg/L in groundwater samples analyzed.
- One groundwater sample (TW-2) was analyzed for emerging contaminants. Two PFAS compounds, PFOS and PFOA, were detected at concentrations exceeding the NYSDEC June 2021 guidance value of 0.01 µg/L in the groundwater sample analyzed, specifically, PFOS at a concentration of 0.0277 µg/L, and PFOA at a concentration of 0.0965 µg/L. The concentration of total PFOA/PFAS was 0.211 µg/L in the groundwater sample analyzed, which is below the NYSDEC June 2021 guidance value of 0.5 µg/L. No other PFAS compounds were detected above MCLs in groundwater samples analyzed.

It should be noted that, although concentrations were below AWQSs, two CVOCs (in addition to PCE) were detected in both groundwater samples collected, specifically, trichloroethene (TCE) at a maximum concentration of 1.5 µg/L TW-2 (AWQS of 5 µg/L) and cis-1,2-dichloroethene at a maximum concentration of 1.4 µg/L in TW-2 (AWQS of 5 µg/L).

7. No standard currently exists for soil vapor samples in New York State. Soil vapor analytical results were compared to the New York State Department of Health (NYSDOH) Alternative Guidance Values (AGVs) specified in the NYSDOH guidance document.
    - Three VOCs were detected in one or more soil vapor samples at concentrations above NYSDOH AGVs, including: methylene chloride in one soil vapor sample, SV-4, with a concentration of 65.7 µg/m^3 (NYSDOH AGV of 60 µg/m^3); PCE in two soil vapor samples, with a maximum concentration of 58.3 µg/m^3 in SV-4 (NYSDOH AGV of 30 µg/m^3); and, TCE in one soil vapor sample, SV-2, at a concentration 3.43 µg/m^3 (NYSDOH AGV of 2 µg/m^3).
    - Total VOC concentrations in soil vapor samples ranged from 1,912.23 micrograms per cubic meter (µg/m^3) in SV-4 to 2,745.06 µg/m^3 in SV-1.
    - Total benzene, toluene, ethylbenzene, and xylenes (BTEX) concentrations ranged from 392.5 µg/m^3 in SV-4 to 561.8 µg/m^3 in SV-2.
    - Total CVOC concentrations ranged from 9.13 µg/m^3 in SV-1 to 124 µg/m^3 in SV-4. Four CVOCs, including cis-1,2-dichloroethene, methylene chloride, PCE and TCE, were

detected above laboratory detection limits in one or more soil vapor samples analyzed, including three at concentrations above NYSDOH AGVs (methylene chloride, TCE and PCE), as discussed above.

1.0 SITE BACKGROUND

Enrollee has enrolled in the New York City Voluntary Cleanup Program (NYC VCP) to investigate and remediate a 0.057-acre site located at 817 Bedford Avenue in Bedford-Stuyvesant section of Brooklyn, New York. Mixed commercial residential use is proposed for the property. The RI work was performed on 19 July 2022. This RIR summarizes the nature and extent of contamination and provides sufficient information for establishment of remedial action objectives, evaluation of remedial action alternatives, and selection of a remedy that is protective of human health and the environment consistent with the use of the property pursuant to RCNY§ 43-1407(f).

1.1 SITE LOCATION AND CURRENT USAGE

The site is in the Bedford-Stuyvesant neighborhood of Brooklyn and is identified as Block 1734 and Lot 62. Currently, the site is developed with a vacant one-story building previously occupied by an auto body repair shop and includes a partial cellar, approximately 220 sf in size, located about 12 ft bgs in the northwest corner of the site along Bedford Avenue. The partial cellar houses the natural gas meter for the building and was formerly used as a workshop/office space. The site is approximately 2,500-square-feet and is listed with an environmental E-Designation (E-102) for hazardous materials resulting from a City Environmental Quality Review (CEQR) effective 9 May 2001 (CEQR # 00DCP015K) for the Flushing Bedford Rezoning Action. Satisfaction of the E-Designation requirements is subject to review and approval by the New York City Office of Environmental Remediation (NYC OER) prior to redevelopment. The Site will need to apply for a Notice of No Objection (NNO) and/or complete the NYCOER E-Designation requirements for Hazardous Materials to obtain a Notice to Proceed (NTP) on the foundation and support of excavation filling set. Upon receipt of the approved NNO/NTP from NYCOER, the permits will be released by the New York City Department of Buildings (NYCDOB). A site location map is provided as Figure 1 and a site plan showing the property boundaries and adjacent properties is provided as Figure 2.

1.2 PROPOSED REDEVELOPMENT PLAN

The development project consists of partial demolition of the existing on-site structures, closure and removal of on-site Underground Storage Tanks (USTs), if any, and construction of a new four-story

mixed-use building with a 2,500 sf cellar encompassing the entire lot. The new 6-7 story mixed-use building is anticipated to include one cellar level requiring remedial excavations extending to approximately 12 feet below ground surface (ft bgs). The proposed site use includes commercial use for the cellar-level and first floor and four residential units on second through fourth floors. The proposed development encompasses the entire Site footprint. Layout of the proposed site development is presented in Figure 2. The proposed site is identified on the New York City tax map in a commercial and residential M1-2/R6A zone. The proposed use is consistent with existing zoning for the property.

The site is approximately 30 feet above mean sea level.

1.3 DESCRIPTION OF SURROUNDING PROPERTY

The Site is located within an urban area characterized by low-rise commercial and residential buildings. Three sensitive receptors are present within a 500-foot radius of the Site including the following: Bnos Square Williamsburg (public school) located at 80 Skillman Street, Brooklyn, NY 11205, approximately 300 feet west of the site; Asisa Community Urgent Care located at 667 Myrtle Avenue, Brooklyn, NY 11205, approximately 350 feet southwest of the site; and Park Avenue Health Care Center located at 517 Park Avenue, Brooklyn, NY 11205, approximately 300 feet north of the site.

No other sensitive receptors such as libraries, parks and plazas, higher education schools, K-12, daycare, pre-K, healthcare facilities are located within 500 feet of the Site.

Direction	Adjacent Property	Surrounding Properties
North	A four-story multi-family residential condominium (815 Bedford Avenue)	Residential buildings
South	A two-story mixed-use residential and commercial building (819 Bedford Avenue)	Mixed-use commercial and residential buildings
East	Two six-story multi-family residential condominiums (90 and 94 Spencer Street)	Multi-family residential buildings
West	Bedford Avenue beyond which are a five-story multi-family residential building (840 Bedford Avenue) and a two-story two-family residential building (844 Bedford Avenue)	Multi-family residential buildings

Figure 3 shows the surrounding land usage.

2.0 SITE HISTORY

2.1 PAST USES AND OWNERSHIP

The Site was formerly developed as early as 1897 through at least 1947 with a residential property including tenant occupants noted between 1929 to 1934. By 1948, the lot was improved with the current structure for commercial use. Commercial uses at the property have included Belmar Sales Co, wholesale grocers (1949), Surplus Paper Stock Co (1970-1985), and most recently Putnam Auto Repairs (1992-2021), the lot has been vacant since late 2021.

The Site owner, Mazel Mit Brucha 104, LLC, purchased the property from Maria Iannarelli and Angelo Iannarelli in March 2022. The Iannarelli's owned the property since September 1987, which was previously owned by Marvin and Lenore Silverman from June 1978, and owned by Murray and Bessie Kesh prior to June 1978.

2.2 PREVIOUS INVESTIGATIONS

A Phase I Environmental Site Assessment (ESA) completed by Partner Assessment Corporation (Partner) in October 2021 identified the following Recognized Environmental Conditions (REC) associated with the site:

1. Former use of the site as an automotive repair facility and a floor drain in the northwest portion of the building
2. New York City E-Designation (E-102) for hazardous materials

The Phase I ESA did not identify any Controlled Recognized Environmental Conditions (CRECs) or Historical Recognized Environmental Conditions (HRECs) associated with the site. The Phase I ESA is included in Appendix A.

2.3 SITE INSPECTION

Ilyssa Sealove of Haley & Aldrich performed a site inspection on 14 July 2022 prior to commencing the Phase II investigation. The results of the site inspection identified minor surface staining on the concrete slab in the vicinity of the former waste oil storage area.

2.4 AREAS OF CONCERN

The AOCs identified for this site include:

- Current and Former Use of Subject Site as an Automotive Repair Business:

  Historic records indicate former use of the Site as an automotive repair business since as early as 1987 with a floor drain identified in the northwest portion of the building. The historical use and the presence of floor drain is considered a REC as potential or undocumented releases of petroleum products, solvents, and/or other hazardous materials may have adversely affected groundwater, soil and/or soil vapor at the Site.

- New York City Environmental (E) Designation:

  The Site is listed with a NYC E Designation due to location within the Flushing/Bedford Rezoning area (E-102; CEQR # 00DCP015K). The E designation for the Site is due to the potential for hazardous materials as related to the historical use of the subject property. The presence of a NYC E Designation is considered a REC as the NYC OER would need to be contacted to either waive the NY E Designation requirements for the specific project or to ensure that the requirements for a Notice of Satisfaction (NOS) are met.

Phase 1 Report is presented in Appendix A. A map showing areas of concern is presented in Figure 4.

3.0 PROJECT MANAGEMENT

3.1 PROJECT ORGANIZATION

The Qualified Environmental Profession (QEP) responsible for preparation of this Phase II is Elizabeth Scheuerman. In this role, Ms. Scheuerman managed the day-to-day tasks, including coordination and supervision of field engineers and scientists, adherence to the OER-approved Phase II Investigation, oversight of project schedule, and preparation of the Phase II Investigation report.

Ilyssa Sealove was the field engineer responsible for implementing the field effort for this work. Ms. Sealove's responsibilities included implementing the OER-approved Phase II Investigation activities and directing the subcontractors to ensure successful completion of field activities.

The drilling subcontractor utilized for this investigation included Lakewood Environmental Services, Corp. (Lakewood). Lakewood performed pre-drilling activities and provided a track mounted Geoprobe® and operator to implement the majority of the Phase II scope of work including advancement of soil borings, installation of groundwater monitoring wells, and installation of soil vapor probes.

GPRS Inc. (GPRS) performed a geophysical survey of the Site using ground penetrating radar (GPR) and electromagnetic detection equipment to delineate anomalies and identify subsurface structures.

Soil and groundwater samples were collected into laboratory prepared sample bottles (pre-preserved when appropriate), placed in ice-packed coolers maintained at approximately 4 degrees Celsius under standard chain of custody procedures and transported to Alpha Analytical Laboratories, Inc. (Alpha) of Westborough, Massachusetts (Certification No. 07010T). Soil vapor samples were collected in laboratory-supplied batch certified-clean 2.7-liter SUMMA canisters with 2-hour flow controllers and transported under standard chain of custody to Alpha. Alpha is a New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program (ELAP)-certified laboratory (ELAP No. 11148) and was responsible for analyzing the samples as per the analyses and methods identified in this Phase II Investigation.

3.2 HEALTH AND SAFETY

All work described in this RIR was performed in full compliance with applicable laws and regulations, including Site and OSHA worker safety requirements and HAZWOPER requirements. Work was performed in accordance with the Site-specific Health & Safety Plan (HASP) included herein as Appendix B and previously included in the OER-approved Phase II Investigation work plan.

3.3 MATERIALS MANAGEMENT

All material encountered during the RI was managed in accordance with applicable laws and regulations. Following sample collection, boreholes were backfilled with non-impacted soil cuttings and an upper bentonite plug. Boreholes were restored to grade with the surrounding area and capped with concrete. Groundwater purged from the temporary monitoring well during development and sample collection and decontamination fluids were placed into a DOT-approved 55-gallon drum pending off-site disposal. One drum was produced during the Phase II. The drum is currently labeled and staged on-site in a manner that prevents leakage, deterioration or release of waste. The drum will be transferred to an approved facility for disposal at a later date during implementation of the remedy.

4.0 REMEDIAL INVESTIGATION ACTIVITIES

Haley & Aldrich of New York, on behalf of Mazel Mit Brucha 104 LLC, performed the following scope of work:

1. Conducted a Site inspection to identify AOCs and physical obstructions (i.e., structures, buildings, etc.);
2. Installed four soil borings across the entire project Site to depths of between 15 and 40 ft bgs, and collected nine soil samples, including one duplicate, from depths representing shallow urban fill (0 to 2 ft bgs) and the proposed development depth (12 to 14 ft bgs). Soil samples were submitted for chemical analysis to evaluate soil quality;
3. Installed one 1-inch-diameter temporary groundwater monitoring well to a depth of approximately 40 ft bgs and collected two groundwater samples, including one duplicate, for chemical analysis to evaluate groundwater quality. It is noted that due to access and the depth to groundwater, only one temporary well point was installed. Post demolition and prior to construction, the remaining two temporary monitoring wells will be installed and sampled; and,
4. Installed four soil vapor probes around site perimeter, specifically, one on the west and two on the east sides of the site near the property boundaries and one in the central region of the Site, to depths of approximately 12 to 14 ft bgs. Four samples were collected for chemical analysis.

Haley & Aldrich performed the Phase II ESI in accordance with the OER-approved July 2022 Phase II Investigation work plan. A sample collection summary is provided in Table 1. Sample locations are shown on Figure 5.

4.1 GEOPHYSICAL INVESTIGATION

A geophysical survey was performed by GPRS across the entire Site on 14 July 2022 to pre-clear boring locations and identify any subsurface anomalies. Gas, water, electric, and sewer lines were all confirmed

to enter the cellar from Bedford Avenue. The sanitary line was the only line to extend beneath and into the garage area. No USTs were located. The GPRS findings report is provided in Appendix C.

4.2 BORINGS AND MONITORING WELLS

Drilling and Soil Logging

On 19 July 2022, four soil borings (B-1 through B-4) were installed using a direct-push track-mounted Geoprobe® drill rig (6610DT) operated by Lakewood. Borings were installed with 5-foot-long steel macro-core® samplers with dedicated acetate liners. Soil was continuously observed and screened using a calibrated photoionization detector (PID) and inspected for visual and olfactory evidence of impact such as staining and odors.

The four soil borings were installed throughout the Site to depths between 15 and 40 ft bgs. PID readings were non-detect in all soil cores. No petroleum-like odors or staining were observed in the soil borings advanced during the Phase II Investigation.

Boring logs were prepared by a field geologist are attached in Appendix D. A map showing the location of soil borings and monitor wells is shown in Figure 5.

Groundwater Monitoring Well Construction

On 19 July 2022, Lakewood installed one 1-inch diameter temporary polyvinyl chloride (PVC) monitoring well (TW-2) with twenty feet of 0.020-inch slot screen to 40 ft bgs at the B-2 location. The temporary monitoring well was constructed so that the well screen straddled the observed groundwater table. The screened interval of the monitoring well was packed with #2 filter sand and partially backfilled with clean drill cuttings. Following sampling activities, the temporary well was removed, and the borehole was backfilled with clean cuttings and the surrounding impervious cover was restored to grade. The temporary monitoring well location is shown on Figure 5 and a well construction log is provided in Appendix E. It is noted that due to access and the depth to groundwater, only one temporary well point was installed. Post demolition and prior to construction, the remaining two temporary monitoring wells will be installed and sampled.

Soil Vapor Probe Installation

On 19 July 2022, four soil vapor points (SV-1 through SV-4) were installed by Lakewood to a depth of 12 ft bgs, targeting the area in the vicinity of the proposed development depth. The vapor implants were installed with a direct-push drill rig (e.g., Geoprobe®) to install ¼" polyethylene tubing fitted with a polyethylene implant at 12 ft bgs. The opening around the probe was backfilled with #2 sand to approximately six inches above the top of the probe. The annulus around the inert sampling tube was filled with sand or hydrated bentonite up to a bentonite surface seal.

To confirm the integrity of the soil vapor point installation and bentonite seal at the surface, a helium leak check was completed in accordance with NYSDOH protocols as a quality assurance/quality control (QA/QC) measure. Approximately three volumes of air was purged from each soil vapor point at a flow rate of less than 0.2 Liters per minute (L/m) within a shrouded, helium enriched atmosphere of >10%. Following purging, helium concentrations were not detected in any of the soil vapor points, confirming the integrity of the seals prior to testing. The helium leak check was performed on the same day as the sampling of the soil vapor points. Soil vapor point locations are shown on Figure 5 and the soil vapor purging and sampling log is provided in Appendix F.

Survey

Soil boring, temporary groundwater monitoring well and soil vapor point locations were located with respect to two or more pertinent Site features (i.e., select property boundary lines, adjacent structures) and were measured in the field using a handheld measuring tape and a measuring wheel.

Water Level Measurement

The approximate groundwater level measurement was collected using a Solinst oil/water interface probe. No free product (i.e., light, non-aqueous phase liquid [LNAPL]) was observed in the temporary monitoring well. Groundwater was encountered at 29.95 ft bgs in TW-2.

Water level data is included in Appendix E.

4.3 SAMPLE COLLECTION AND CHEMICAL ANALYSIS

Sampling performed as part of the field investigation was conducted for all Areas of Concern and also considered other means for bias of sampling based on professional judgment, area history, discolored soil, stressed vegetation, drainage patterns, field instrument measurements, odor, or other field indicators. All media including soil, groundwater and soil vapor have been sampled and evaluated in the RIR. Discrete (grab) samples have been used for final delineation of the nature and extent of contamination and to determine the impact of contaminants on public health and the environment. The sampling performed and presented in this RIR provides sufficient basis for evaluation of remedial action alternatives, establishment of a qualitative human health exposure assessment, and selection of a final remedy. Due to the presence of CVOCs at concentrations exceeding groundwater criteria, following building demolition, additional groundwater investigation will be necessary to determine the extent of CVOC contamination in groundwater at the Site.

Soil Sampling

Nine soil samples, including one duplicate, were collected from four soil borings for chemical analysis during this RI. Laboratories and analytical methods are shown below. Samples were collected directly into laboratory provided glassware via nitrile gloves. Non-disposable sampling materials were decontaminated between uses with Alconox and water. A surface soil sample (from the 0 to 2 ft bgs interval) and subsurface soil sample (from the 12 to 14 ft bgs interval) were collected from each soil boring location. Following sample collection, samples were immediately placed on ice in coolers and transported under standard chain of custody protocols to Alpha for analysis.

Data on soil sample collection for chemical analyses, including dates of collection and sample depths, is reported in Table 1. Soil sample collection data is reported in Tables 2A through 2G. Figure 5 shows the location of samples collected in this investigation. Laboratories and analytical methods are shown below.

Groundwater Sampling

Two groundwater samples, including one duplicate, were collected for chemical analysis during this RI. Groundwater sample collection data is reported in Tables 3A through 3E. Sampling was conducted in

accordance with NYSDEC Draft DER-10 Technical Guidance for Site Investigation and Remediation, dated May 2010, and Sampling Guidelines and Protocols, dated March 1991. Prior to purging, the temporary groundwater well was gauged with a Solinst interface probe to record a depth to groundwater reading and to determine the presence of free product. Water quality parameters were collected during low-flow purging of the well with a submersible bladder pump fitted with dedicated high density polyethylene (HDPE) tubing. Samples were collected directly into laboratory provided glassware. Non-disposable sampling materials were decontaminated between uses with Alconox and water. Following sample collection, samples were immediately placed on ice in coolers and transported under standard chain of custody protocols to Alpha for analysis.

Sampling logs with information on purging and sampling of groundwater monitor wells is included in Appendix E. Figure 5 shows the location of groundwater samples collected. Laboratories and analytical methods are shown below.

Soil Vapor Sampling

Four soil vapor probes were installed and four soil vapor samples were collected into 2.7-L Summa canisters for chemical analysis during this RI. Sampling occurred for the duration of 2 hours. At the conclusion of the sampling round, tracer monitoring was performed a second time to confirm the continued integrity of the probe seals. Flow rates for both purging and sampling did not exceed 0.2 L/min.

Soil vapor sampling locations are shown in Figure 5. Soil vapor sample collection data is reported in Table 4. Soil vapor sampling logs are included in Appendix F. Methodologies used for soil vapor assessment conform to the *NYS DOH Final Guidance on Soil Vapor Intrusion, October 2006*.

Chemical Analysis

Chemical analytical work presented in this RIR has been performed in the following manner:

Factor	Description
Quality Assurance Officer	The chemical analytical quality assurance is directed by Jim Todaro of Alpha.
Chemical Analytical Laboratory	Chemical analytical laboratory(s) used in the RI is NYS ELAP certified and were Alpha
Chemical Analytical Methods	Soil analytical methods: • TAL Metals by EPA Method 6010C (rev. 2007); • VOCs by EPA Method 8260C (rev. 2006); • SVOCs by EPA Method 8270D (rev. 2007); • Pesticides by EPA Method 8081B (rev. 2000); • PCBs by EPA Method 8082A (rev. 2000); • Per- and Polyfluoroalkyl Substances (PFAS) by EPA Methods 537 and 1,4-dioxane 8270DSIM (*one soil sample only) • Toxicity Characteristic Leaching Procedure (TCLP) lead (select soil samples based on lead concentrations detected) Groundwater analytical methods: • TAL Metals by EPA Method 6010C (rev. 2007); • VOCs by EPA Method 8260C (rev. 2006); • SVOCs by EPA Method 8270D (rev. 2007); • Pesticides by EPA Method 8081B (rev. 2000); • PCBs by EPA Method 8082A (rev. 2000); • PFAS by EPA Methods 537 and 1,4-dioxane 8270DSIM (* one groundwater sample only) Soil vapor analytical methods: • VOCs by TO-15 VOC parameters.

Results of Chemical Analyses

Laboratory data for soil, groundwater and soil vapor are summarized in Tables 2A through 2G, Tables 3A through 3E, and Table 4, respectively. Analytical results for soil, groundwater, and soil vapor sampling are summarized in Figures 6 through 9. Laboratory data deliverables for all samples evaluated in this RIR are provided in digital form in Appendix G.

5.0 ENVIRONMENTAL EVALUATION

5.1 GEOLOGICAL AND HYDROGEOLOGICAL CONDITIONS

Stratigraphy

The stratigraphy of the Site, from the surface to the maximum boring completion depth of 40 ft bgs, consists of approximately 5 to 14 feet of urban fill material, comprised of light brown to brown to grey fine sand with varying amounts of silt, medium sand, coarse sand, fine gravel, concrete, brick, and coal ash. The historical fill interval is underlain by a native layer consisting of light brown to brown fine sand with varying amounts of silt, medium sand, and fine gravel.

Hydrogeology

The depth to groundwater is 29.95 ft bgs. Groundwater at the Site is inferred to be towards the northwest. A groundwater contour map could not be constructed due to subsurface refusals limiting advancement of deeper borings to install proposed additional wells.

5.2 SOIL CHEMISTRY

Soil analytical results were compared to NYSDEC 6NYCRR Part 375 UUSCOs and RRSCOs. Note that no standards for PFAS in soil currently exist in New York State; however, NYSDEC published soil guidance values for PFOA and PFOS in October 2020 (latest revision June 2021). PFOA and PFOS soil sample results are compared to the UU and RRU soil guidance values outlined in the Part 375 Remedial Programs Guidelines for Sampling and Analysis of PFAS guidance.

- ***VOCs***

  VOCs were not detected above UUSCOs or RRSCOs in soil samples analyzed.

- ***SVOCs***

  SVOCs were not detected above UUSCOs or RRSCOs in soil samples analyzed.

- ***Metals***

  Five metals were detected at concentrations above UUSCOs, two of which also exceed RRSCOs in two soil samples analyzed, including: copper above the UUSCO in two soil samples with a maximum concentration of 158 mg/kg in B-4(12-14') (UUSCO of 50 mg/kg); lead above the UUSCO in two soil samples and above the RRSCO is two soil samples with a maximum concentration of 1,980 mg/kg in

B-1(0-2') (UUSCO of 63 mg/kg and RRSCO of 400 mg/kg); mercury above the UUSCO in three soil samples and above the RRSCO in one soil sample with a maximum concentration of 2.01 mg/kg in B-1(0-2') (UUSCO of 0.18 mg/kg and RRSCO of 0.81 mg/kg); nickel above the UUSCO in one soil sample with a maximum concentration of 31.1 mg/kg in B-2(12-14') (UUSCO of 30 mg/kg); and, zinc above the UUSCO in three soil samples with a maximum concentration of 178 mg/kg in B-3(0-2'), (UUSCO of 109 mg/kg).

No other metals were detected above UUSCOs or RRSCOs in soil samples analyzed.

Based on the concentrations of lead detected in four soil samples, including B-1(0-2'), B-1(12-14'), B-3(0-2') and B-4(12-14'), subsequent TCLP testing was performed to determine if the material is characteristically hazardous. TCLP lead concentrations ranged from 1.3 mg/L in B-1(0-2') to a maximum of 3.31 mg/L in B-4(12-14'), which are below the USEPA Resource Conservation and Recovery Act (RCRA) Characteristics of Hazardous Waste limit of 5 mg/L for lead.

- ***Pesticides***

  One pesticide, 4,4'-DDT, was detected at a concentration of 0.00358 mg/kg in B-3(0-2'), exceeding the UUSCO of 0.0033 mg/kg. No other pesticides were detected at concentrations exceeding the UUSCOs or RRSCOs in soil samples analyzed.

- ***PCBs***

  PCBs were not detected above UUSCOs or RRSCOs in soil samples analyzed.

- ***1,4-Dioxane***

  1-4, Dioxane was not detected above the laboratory detection limits in soil samples analyzed.

- ***PFOA/PFAS***

  One soil sample, B-4(0-2'), was analyzed for emerging contaminants: Per- and Polyfluoroalkyl Substances (PFAS) including PFOA, PFOS and 1,4-dioxane. PFAS compounds were not detected above the laboratory detection limits in the soil sample analyzed.

Data collected during the RI is sufficient to delineate the vertical and horizontal distribution of contaminants in soil/fill at the Site. A summary table of data for chemical analyses performed on soil samples is included in Tables 2A through 2G. Figure 6 shows the location and posts the values for soil/fill that exceed the 6NYCRR Part 375-6.8 Track 2 Soil Cleanup Objectives.

5.3 GROUNDWATER CHEMISTRY

Groundwater analytical results were compared to NYSDEC Technical and Operational Guidance Series (TOGS) 1.1.1 Ambient Water Quality Standards (\ (AWQS) and Part 375 Remedial Programs Guidelines for Sampling and Analysis of PFAS NYSDEC June 2021 guidance value. Currently, groundwater cleanup regulatory criteria do not exist for 1,4-dioxane in New York State. Concentrations of 1,4-dioxane were compared to New York State's drinking water maximum contaminant level (MCL) of 1 µg/L.

- ***VOCs***

  One VOC, specifically a CVOC, was detected above the AWQS in groundwater samples analyzed. PCE was detected at a concentration of 48 µg/L in TW-2 and 47 µg/L in DUP_GW, (duplicate sample collected from TW-2) (AWQS of 5 µg/L).

  No other VOCs were detected above the AWQSs in groundwater samples analyzed.

- ***SVOCs***

  SVOCs were not detected above AWQSs in groundwater samples analyzed.

- ***Total Metals***

  Two total metals were detected in both groundwater samples collected (TW-2 and DUP-GW) at concentrations exceeding AWQSs, including: iron at a maximum concentration 861 µg/L in TW-2 (AWQS of 300 µg/L); and, sodium at a maximum concentration of 96,600 µg/L in DUP_GW (AWQS of 20,000 µg/L).

  No other total metals were detected above AWQSs in groundwater samples analyzed.

- ***Dissolved Metals***

  Two dissolved metals were detected at concentrations exceeding AWQSs in groundwater samples collected, including: dissolved iron in TW-2 at a concentration of 313 µg/L (AWQS of 300 µg/L); and, dissolved sodium both groundwater samples collected, at a maximum concentration of 105,000 µg/L in DUP-GW (AWQS of 20,000 µg/L).

  No other dissolved metals were detected above AWQSs in groundwater samples analyzed.

- ***PCBs***

  PCBs were not detected above laboratory method detection limits in groundwater samples analyzed.

- ***1,4-Dioxane***

  1,4-Dioxane was not detected above the MCL of 1 µg/L in groundwater samples analyzed.

- ***PFOA/PFOS***

  One groundwater sample (TW-2) was analyzed for emerging contaminants. Two PFAS compounds, PFOS and PFOA, were detected at concentrations exceeding the NYSDEC June 2021 guidance value of 0.01 µg/L in the groundwater sample analyzed, specifically, PFOS at a concentration of 0.0277 µg/L, and PFOA at a concentration of 0.0965 µg/L. The concentration of total PFOA/PFAS was 0.211 µg/L in the groundwater sample analyzed, which is below the NYSDEC June 2021 guidance value of 0.5 µg/L.

  No other PFAS compounds were detected above MCLs in groundwater samples analyzed.

It should be noted that, although concentrations were below AWQSs, two CVOCs (in addition to PCE) were detected in both groundwater samples collected, specifically, trichloroethene (TCE) at a maximum concentration of 1.5 µg/L TW-2 (AWQS of 5 µg/L) and cis-1,2-dichloroethene at a maximum concentration of 1.4 µg/L in TW-2 (AWQS of 5 µg/L).

Due to the presence of CVOCs at concentrations exceeding groundwater criteria, following building demolition, additional groundwater investigation will be necessary to determine the extent of CVOC contamination in groundwater at the Site. A summary table of data for chemical analyses performed on groundwater samples is included in Tables 3A through 3E. Exceedances of applicable groundwater standards are shown.

Figures 7 and 8 shows the location and posts the values for groundwater that exceed AWQSs and PFAS guidance values.

5.4 SOIL VAPOR CHEMISTRY

No standard currently exists for soil vapor samples in New York State. Soil vapor analytical results were compared to the NYSDOH AGVs specified in the NYSDOH guidance document.

- Three VOCs were detected in one or more soil vapor samples at concentrations above NYSDOH AGVs, including: methylene chloride in one soil vapor sample, SV-4, with a concentration of 65.7 µg/m^3 (NYSDOH AGV of 60 µg/m^3); PCE in two soil vapor samples, with a maximum concentration of 58.3 µg/m^3 in SV-4 (NYSDOH AGV of 30 µg/m^3); and, TCE in one soil vapor sample, SV-2, at a concentration 3.43 µg/m^3 (NYSDOH AGV of 2 µg/m^3).
- Total VOC concentrations in soil vapor samples ranged from 1,912.23 micrograms per cubic meter (µg/m3) in SV-4 to 2,745.06 µg/m3 in SV-1.
- Total benzene, toluene, ethylbenzene, and xylenes (BTEX) concentrations ranged from 392.5 µg/m3 in SV-4 to 561.8 µg/m3 in SV-2.
- Total CVOC concentrations ranged from 9.13 µg/m3 in SV-1 to 124 µg/m3 in SV-4. Four CVOCs, including cis-1,2-dichloroethene, methylene chloride, PCE and TCE, were detected above laboratory detection limits in one or more soil vapor samples analyzed, including three at concentrations above NYSDOH AGVs (methylene chloride, TCE and PCE), as discussed above.

Data collected during the RI is sufficient to delineate the distribution of contaminants in soil vapor at the Site. A summary table of data for chemical analyses performed on soil vapor samples is included in Table 4. Figure 9 shows the location and posts the values for soil vapor samples with detected concentrations.

5.5 PRIOR ACTIVITY

Based on an evaluation of the data and information from the RIR, disposal of significant amounts of hazardous waste is not suspected at this site.

5.6 IMPEDIMENTS TO REMEDIAL ACTION

There are no known impediments to remedial action at this property.