ANALYSIS OF BROWNFIELD CLEANUP ALTERNATIVES

8920 LAISY AVENUE &
3420 EAST 93RD STREET
CLEVELAND, OHIO 44104

AUGUST 2024

PREPARED FOR:

OHIO ENVIRONMENTAL PROTECTION AGENCY
DIVISION OF ENVIRONMENTAL RESPONSE AND REVITALIZATION
50 W. TOWN STREET, SUITE 700
COLUMBUS, OHIO 43216

AND

CUYAHOGA COUNTY LAND REUTILIZATION CORPORATION
812 HURON ROAD E, SUITE 800
CLEVELAND, OHIO 44115

PREPARED BY:

THE MANNIK & SMITH GROUP, INC.
1800 INDIAN WOOD CIRCLE
MAUMEE, OHIO 43537

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PREPARED BY: _____

CLIFTON WHEELER
SENIOR PROJECT MANAGER

REVIEWED AND
APPROVED BY: _____

MATTHEW S. PESCI, CP, CPG
SENIOR ASSOCIATE / SENIOR PROJECT MANAGER

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1.0 INTRODUCTION

The Mannik & Smith Group, Inc. (MSG) was retained by the Ohio Environmental Protection Agency (EPA) to prepare this Analysis of Brownfield Cleanup Alternatives (ABCA) for two contiguous Cuyahoga County parcels (127-13-004 and 127-13-031) addressed as 3420 East 93rd Street and 8920 Laisy Avenue, Cleveland, Cuyahoga County, Ohio (hereinafter referred to as the "Subject Property"). A Subject Property Location Map is presented as Figure 1, which is included in Appendix A.

In preparing this ABCA, MSG, the Ohio EPA, and the Cuyahoga County Land Reutilization Corporation (Land Bank) considered Subject Property specific conditions, technical feasibility, and intended future use(s) for the Subject Property to identify cleanup objectives and an analysis of cleanup alternatives.

1.1 Site Description

The Subject Property consists of a combined 11.75 acres of vacant commercial land situated between East 88th Street and East 93rd Street, both of which provide access to and from the Subject Property. No buildings are presently developed at the Subject Property. Concrete building foundations are present in the northwest, central, and eastern portions of the Subject Property and the remainder of the Subject Property consists of wooded and/or vacant land.

1.2 Forecasted Climate Conditions

According to the U.S. Global Change Research Program (USGCRP), climate trends for the Midwest region of the United States include increased temperatures, increased precipitation with greater variability, increased extreme precipitation events, decreased biodiversity, and increased ground-level ozone concentrations (USGCRP, 2018). Some of these factors, most specifically increased precipitation that may affect storm water runoff and floodwaters, are most applicable to the cleanup of the Subject Property.

According to the Federal Emergency Management Agency (FEMA) Flood Zone Maps 39035C0184E and 39035C0203E, the Subject Property is located within an area of minimal flood hazard (Zone X) of the City of Cleveland-Cuyahoga River watershed. However, greater storm frequency and intensity in a changing climate may result in more frequent and more powerful floodwaters within the City of Cleveland-Cuyahoga River watershed, which may result in changes to the flood zone and increased risk of flooding of the Subject Property.

Based on the nature of the Subject Property and its proposed reuse, changing temperature, increased precipitation with greater variability, and increased storm water runoff and flood waters are not likely to significantly affect the Subject Property.

1.3 Site History

The Subject Property was first developed for industrial purposes circa 1922 and utilized by the National Bronze & Aluminum Foundry Company (8920 Laisy Avenue). By the early 1950s, industrial development expanded in this area and the Subject Property was subsequently utilized by the Harshaw Chemical Company. In addition, by 1952, the central and east portions of the Subject Property were developed with a large industrial building, which was utilized by the Cleveland Transit System. Various industries occupied the buildings from the 1970s to the 1990s when the buildings were razed in the late 1970s to early 1980s (8920 Laisy Avenue) and in the mid to late 1990s (3420 East 93rd Street).

Additionally, historical Sanborn Maps depict three oil underground storage tanks (USTs) in the southeast corner of the Subject Property and a gasoline UST in the west-central portion of the Subject Property from at least 1951 through at least 1973.
The possible presence of USTs was confirmed in March 2024 when a combined electromagnetic induction (EM) and ground penetrating radar (GPR) survey was completed within these areas of the Subject Property, which identified strong EM in-phase (metal) anomalies that were interpreted to be potential orphan USTs.

1.4 Previous Environmental Investigations

MSG completed a Phase I ESA at the Subject Property in October 2023 that identified the following Recognized Environmental Conditions (RECs) / Identified Areas (IAs):

REC-1/IA-1: The likely release of petroleum products at the Subject Property associated with historical on-property petroleum USTs on the southeast portion of the Subject Property.

REC-2/IA-2: The likely release of petroleum products at the Subject Property associated with historical on-property gasoline UST on the southwest portion of the Subject Property.

REC-3/IA-3 & IA-4: The likely release of polychlorinated biphenyls (PCBs) associated with former transformer houses/transformers located on the northern portion of the Subject property.

REC-4/IA-5: The likely release of hazardous and/or petroleum products associated with the long-term industrial uses of the Subject Property (entire property).

REC-5/IA-5: The likely presence of hazardous and/or petroleum products at the Subject Property associated with the placement of historical fill material throughout the Subject Property (entire property).

REC-6/IA-6: The likely presence of PCBs and/or petroleum products on the southern portion of the Subject Property due to a release/spill of transformer oil in August 1985.

Subsequently, MSG also completed a Phase II ESA of the Subject Property in June 2024 and identified soil and groundwater samples above applicable Bureau of Underground Storage Tank Regulations (BUSTR) Closure Action Levels and/or Ohio EPA Voluntary Action Program (VAP) standards, as described below:

Soil Analytical Results – IAs 1 & 2

- Naphthalene was detected above the BUSTR Closure Action Level, but below the VAP Residential, Commercial/Industrial, and Construction/Excavation Worker Generic Numeric Standards (GNS) in SB-2 (2-4') within IA-1; and,
- Low levels of several other volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons (PAHs), and/or total petroleum hydrocarbons (TPH) diesel range organics (DRO) and oil range organics (ORO) were detected in the submitted soil samples collected from IAs 1 and 2; however, all detections are below their respective BUSTR Closure Action Levels and/or Ohio VAP Residential (unrestricted use) GNS.

Soil Analytical Results – IAs 3 & 4

- Benzo(a)anthracene, benzo(b)fluoranthene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene were detected above the VAP Residential (unrestricted use), but below the Commercial/Industrial and Construction/Excavation Worker GNS in SB-15 (0-2') within IA-3;
- Benzo(a)pyrene was also detected in SB-15 (0-2') above both the VAP Residential and Commercial/Industrial GNS;
- Aroclor 1260 was detected above the VAP Residential (unrestricted use), but below the Commercial/Industrial and Construction/Excavation Worker GNS in SB-14 (0-2') and above the VAP Residential and Construction/Excavation Worker, but below the Commercial/Industrial GNS in SB-15 (0-2') within IA-3; and,
- Low levels of several other metals, VOCs, and/or semi-volatile organic compounds (SVOCs) were detected in the submitted soil samples collected from IAs 3 and 4; however, all detections are below their respective GNS.

Soil Analytical Results – IA-5

- Lead was detected above the VAP Residential and Construction/Excavation Worker GNS, but below the Commercial/Industrial GNS in SB-8 (5-7') and SB-20 (0-2');
- Benzo(a)anthracene, benzo(b)fluoranthene, dibenz(a,h)anthracene, and/or indeno(1,2,3-cd)pyrene were detected above the VAP Residential (unrestricted use), but below the Commercial/Industrial and Construction/Excavation Worker GNS in SB-7 (0-2'), SB-8 (10-12'), SB-8 (5-7'), SB-20 (0-2'), and SB-24 (0-2');
- Benzo(a)pyrene was detected above both the VAP Residential and Commercial/Industrial GNS in SB-7 (0-2'). Benzo(a)pyrene was also detected above the VAP Residential (unrestricted use), but below the Commercial/Industrial and Construction/Excavation Worker GNS in SB-8 (10-12'), SB-8 (5-7'), SB-20 (0-2'), and SB-24 (0-2'); and,
- Low levels of several other metals, VOCs, and/or SVOCs were detected in the submitted soil samples collected from IA-5; however, all detections are below their respective Ohio VAP Residential (unrestricted use) GNS.

Soil Analytical Results – IA-6

- PCBs were not detected above their respective laboratory reporting limits in any of the samples collected from IA-6.

Groundwater Analytical Results

- 1,2,4-trimethylbenzene, 1-methylnaphthalene, and/or naphthalene were detected in MW-2 and MW-16 above their respective Ohio VAP Unrestricted Potable Use Standards (UPUS) and/or BUSTR Drinking Water Action Level; and,
- Low levels of several other metals, VOCs, and PAHs were detected in groundwater samples from across the Subject Property; however, all detections are below their respective Ohio VAP UPUS.

Soil Vapor Point Sampling Results

MSG used the U.S. EPA VISL Calculator to evaluate the soil vapor analytical results. MSG entered the maximum concentration of each detected VOC compound into the VISL Calculator to identify if the detected VOCs pose a potential risk to indoor air via the vapor intrusion pathway. The attached Table 7 presents the analytical results of identified constituents in the collected soil vapor samples, which are summarized as:

- Low levels of VOCs were detected at each location below their respective US EPA VISL Target Sub-Slab & Near-Source Soil Gas Concentrations for both Residential and Commercial Land Use;

- The calculated indoor air concentrations were below both their respective VAP Residential and Commercial / Industrial Indoor Air Standards; and,
- The calculated cumulative carcinogenic risk and non-carcinogenic hazard quotients are below their respective target threshold risk and hazard values for both residential and commercial receptors.

1.5 Current Environmental Concerns

As noted above, select metals, VOCs, PAHs, and PCBs are present in soil and/or groundwater underlying the Subject. Moreover, several USTs are suspected to be present in the southwest and southeast corner of the Subject Property. Accordingly, the Cuyahoga County Land Bank intends to mitigate the soil and groundwater impacts and remove the petroleum USTs at the Subject Property prior to site redevelopment.

2.0 APPLICABLE REGULATIONS AND CLEANUP STANDARDS

As described in Section 1.4, select PAHs, RCRA Metals, VOCs, and PCBs were detected at levels of concern in soil and/or groundwater at the Subject Property. The following is a summary of the applicable regulations and cleanup standards (BUSTR and Ohio EPA VAP) that will apply to the cleanup of the Subject Property.

2.1 Soil Cleanup Standards

Table 2.1 summarizes exceedances to applicable BUSTR and Ohio VAP generic direct-contact soil chemicals of concern (COCs) associated with the former use of the Subject Property and the maximum concentrations detected in Subject Property soils.

Table 2.1 Chemicals of Concern – Applicable Soil Cleanup Standards

Parameter	Applicable Ohio VAP Soil Cleanup Standards (mg/Kg)			BUSTR Closure Action Levels (mg/Kg)	Max Detected Site Conc. (mg/kg)	Sample ID and Depth (ft)
	Residential	Commercial / Industrial	Construction / Excavation			
Lead	400	800	400	--	520	SB-8 (5'-7')
Naphthalene	96	420	560	0.511	0.53	SB-2 (2'-4')
Benzo(a)anthracene	23	610	9,600	--	210	SB-15 (0'-2')
Benzo(a)pyrene	2.3	62	230	--	160	SB-15 (0'-2')
Benzo(b)fluoranthene	23	620	10,000	--	210	SB-15 (0'-2')
Dibenz(a,h)anthracene	2.3	62	1,000	--	17	SB-15 (0'-2')
Indeno(1,2,3-cd)pyrene	23	620	10,000	--	58	SB-15 (0'-2')
Aroclor 1260	4.8	28	450	--	37	SB-15 (0'-2')

2.2 Groundwater Cleanup Standards

Table 2.2 summarizes exceedances to applicable BUSTR and Ohio VAP UPUS for COCs associated with the former use of the Subject Property and the maximum concentrations detected in Subject Property groundwater.

Table 2.2 Chemicals of Concern – Applicable Groundwater Standards

Parameter	Ohio VAP UPUS (ug/L)	BUSTR Drinking Water Action Level (ug/L)	Max Detected Site Concentration (ug/L)	Sample ID
1,2,4-Trimethylbenzene	15	15	24	MW-2
Naphthalene	1.4	1.4	320	MW-2
1-Methylnaphthalene	11	--	110	MW-2

3.0 EVALUATION OF CLEANUP ALTERNATIVES

The following sections summarize the objectives of the proposed remedial actions, alternative remedial options, the recommended remedial alternative, and justification for the recommendation.

3.1 Remedial Objectives

The existing subsurface contamination poses a direct threat to the city's most sensitive impoverished residents. Accordingly, the Cuyahoga County Land Bank plans to complete sub-surface remediation of hazardous substances to help prepare the Subject Property for redevelopment. The Cuyahoga County Land Bank plans to use grant funding opportunities to finance:

- The removal of impacted soil from the Subject Property; and,
- The closure and removal of petroleum USTs (if determined to be present) at the Subject Property under BUSTR guidelines.

Completing these remedial tasks will reduce hazardous substance exposure pathways for future occupants of the Subject Property, thereby facilitating redevelopment of the Subject Property. Because the redevelopment plans of the Subject Property are not yet final, the Ohio VAP Residential GNS for soil cleanup standards discussed in Section 2.0 will be the target cleanup standards for the Subject Property.

3.2 Potential Remedial Alternatives – BUSTR Regulated Subsurface Contamination (RECs/IAs 1 &2)

3.2.1 Alternative No. 1 – No Action

The no action alternative would be the lowest cost alternative. However, the no action alternative would not mitigate the potential threats to human health and the environment that are known to exist at the Subject Property. In addition, the no action alternative would not facilitate preparation of the Subject Property for the planned redevelopment.

3.2.2 Alternative No. 2 – Permanent UST Closure & Removal

This alternative includes the proper closure and removal of the petroleum USTs and the removal of contaminated soil surrounding the USTs under BUSTR guidelines.

Naphthalene was detected in soil boring SB-2 from two-feet below ground surface (bgs) to four-feet bgs near the UST system. SB-2 was advanced on the west side of the suspected UST cavity.

Additionally, 1,2,4-trimethylbenzene and naphthalene were detected in groundwater near the suspected UST cavity from MW-2, which was installed on the west side of the suspected UST cavity.

Therefore, to facilitate the remediation of subsurface soils and groundwater within REC-1/IA-1, the USTs will be removed from the Subject Property, along with contaminated soils, in accordance with BUSTR UST closure guidelines.

Although subsurface impacts were not identified in soil or groundwater samples (SB-9, SB-10, SB-11, MW-10) collected proximate to the former reported gasoline UST in the west portion of the Subject Property, the UST should be removed, if present, in accordance with BUSTR guidelines.

An environmental consulting firm would oversee soil removal activities, collect confirmation samples from excavation sidewalls and bottoms for laboratory analysis, document final quantities of soil removed and backfilled placed, and prepare a remedial actions completion report following the soil removal activities. On-going groundwater monitoring may be required.

One consideration that may make excavation slightly more difficult to implement is the increased frequency of heavy rainfall events that has been experienced in recent years in Cleveland, Ohio. Although efforts will be made to schedule the work in the dry weather months, the amount of precipitation over a short period of time from one of these heavy rainfall events could cause delays in the implementation of the excavation work.

Cost: The cost to complete the UST closure and soil removal activities is estimated to be approximately $83,000.

- $3,000 (estimated) for developing a Quality Assurance Project Plan (QAPP) in accordance with U.S. EPA guidelines;
- $70,000 (estimated) for removal of USTs, load, transport, and dispose of up to 100 tons of impacted soil and to import and place clean backfill;
- $10,000 (estimated) for soil removal oversight, testing, and final remediation reporting.

This alternative would remove the source of the petroleum contamination at the Subject Property near the suspected UST and would meet the remediation objectives. Human health and environmental risks posed by the petroleum impacts would be mitigated and the impediments to site redevelopment would be removed. This alternative has the greatest ability to meet the objectives of the redevelopment plans for the Site for REC-1/IA-1.

3.3 Potential Cleanup Alternatives – Hazardous Subsurface Contamination (Soil – contaminated areas throughout the entire Subject Property)

3.3.1 Alternative No. 1 – No Action

The no action alternative would be the lowest cost alternative. However, the no action alternative would not mitigate the potential threats to human health and the environment that are known to exist at the Subject Property. In addition, the no action alternative would not facilitate preparation of the Subject Property for redevelopment and therefore the hazardous substance subsurface impact would remain an impediment for the planned redevelopment.

3.3.2 Alternative No. 2 – Capping

Capping is an effective way to prevent potential receptors from coming into direct contact with contaminated soils, if the cap is maintained. However, capping is not an effective way to control other exposures, such as the direct contact risks for potential residential land use scenarios (the end land use scenario for the Subject Property has yet to be determined). In addition, an institutional control would need to be recorded on the deed to prevent residential use of the property, or portions of the property (to meet the objective of eliminating the direct contact pathway for residents).

Capping would consist of transporting clean fill material to the Subject Property and capping the impacted areas with at least two-feet of clean material. Contaminated areas include soil borings SB-7, SB-14, SB-15, SB-20, and SB-24.

Cost: The cost to leave contaminated soils in place and cap the area with clean fill material is estimated to be approximately $115,000.

- $3,000 (estimated) for developing a Quality Assurance Project Plan (QAPP) in accordance with U.S. EPA guidelines;
- $12,000 (estimated) for approximately 120 tons of clean fill material, including transportation and spreading, plus mobilization and demobilization of equipment; and,
- $100,000 for soil testing and remediation reporting, and preparation of a No Further Action (NFA) letter and supporting documents in accordance with Ohio VAP rules and guidance.

3.3.3 Alternative No. 3 – Soil Removal Activities

This alternative includes the removal of shallow surface soils (0'-2' below ground surface) located proximate to soil borings SB-7, SB-14, SB-15, SB-20, and SB-24 and shallow surface soils (5'-7' below ground surface) located proximate to soil boring SB-8 under Ohio EPA VAP guidelines.

Accordingly, four separate areas (proximate to SB-14/SB-15, SB-7, SB-20, and SB-24) would be excavated to a depth of approximately two-feet bgs and one separate area (proximate to SB-8) would be excavated to a depth of approximately seven-feet bgs.

A total of approximately 100 tons of impacted soil from all areas would be removed. An environmental consulting firm would oversee soil removal activities, collect confirmation samples for laboratory analysis, document final quantities of soil removed and backfilled placed, and prepare a remedial actions completion report following the soil removal activities.

Cost: The cost to complete the soil removal project is estimated to be approximately $125,000.

- $25,000 to load, transport, and dispose of up to 100 tons of impacted soil and to import and place clean backfill (includes mobilization and demobilization of equipment); and,
- $100,000 for soil removal oversight, testing, remediation reporting, and preparation of a NFA letter and supporting documents in accordance with Ohio VAP rules and guidance.

This alternative would remove the source of the contamination at the Subject Property and would meet the remediation objectives. Human health and environmental risks posed by the subsurface impacts would be mitigated and the impediments to site redevelopment would be removed. This alternative would present the greatest ability to meet unrestricted use criteria objectives of the redevelopment plans for the Subject Property.

3.4 Potential Cleanup Alternatives – Hazardous Subsurface Contamination (Groundwater)

3.4.1 Alternative No. 1 – No Action

The no action alternative would be the lowest cost alternative. The Subject Property is located within an Urban Setting Designation (USD) and therefore, remediating groundwater to UPUS is not necessary as potential receptors are not drinking the groundwater. Although, an institutional control would likely need to be recorded on the deed to prevent the installation of potable water wells at the Subject Property, this alternative would present the greatest ability to meet redevelopment objective plans for the Subject Property.

3.4.2 Alternative No. 2 – Groundwater Remediation

Groundwater remediation can be employed through a wide variety of state-of-the-art remediation technologies. These technologies can include the following, but not limited to dual-phase extraction (DPE), bio-enzyme application, air sparging, groundwater pump and treat, and in-situ chemical oxidation. Although groundwater remediation technologies can enjoy exceptional success, the Subject Property is located within an USD and therefore, remediating groundwater to UPUS is not necessary, as potential receptors are not drinking the groundwater.

Accordingly, costs to remediation groundwater through remediation technologies were not calculated.

3.5 Recommended Brownfield Cleanup Alternatives

Potential Cleanup Alternatives – BUSTR Regulated Subsurface Contamination (RECs/IAs 1 &2):

Alternative No. 2 (Permanent UST Closure & Removal) would meet the project objectives by removing suspect USTs and by mitigating human health and environmental risks posed by the petroleum contamination present in sub-surface soils and groundwater prior to planned redevelopment activities. This alternative has the greatest ability to meet the objectives of the redevelopment plans for the Subject Property.

Potential Cleanup Alternatives – (Soil contaminated areas throughout the entire Subject Property)

Alternative No. 3 (Soil Removal Activities) would meet the project objectives by mitigating human health and environmental risks posed by the hazardous substance contamination present in sub-surface soils prior to planned re-development activities. This alternative has the greatest ability to meet the objectives of the redevelopment plans for the Subject Property.

Potential Cleanup Alternatives – Hazardous Subsurface Contamination (Groundwater):

Alternative No. 1 (No Action) would meet the project objectives posed by sub-surface groundwater contamination. Although, an institutional control would likely need to be recorded on the deed to prevent the installation of potable water wells at the Subject Property, this alternative would present the greatest ability to meet redevelopment objective plans for the Subject Property.

3.6 Green and Sustainable Remediation Measures for the Selected Alternatives

To make the selected alternatives greener or more sustainable, several techniques are planned. The most recent Best Management Practices (BMPs) issued under ASTM Standard E-2893: Standard Guide for Greener Cleanups will be used as a reference in the cleanup efforts. The Cuyahoga County Land Bank will recommend that the cleanup contractors follow an idle-reduction policy and use heavy equipment with advanced emissions controls operated on ultra-low sulfur diesel. The excavation work will be completed during the dry-weather months (i.e. summertime) in order to minimize potential groundwater infiltration into the excavation area, thereby reducing potential dewatering needs and the amount of dewatering liquids requiring disposal/treatment. The number of mobilizations to the Subject Property will be minimized to reduce the amount of vehicle exhaust from project vehicles and erosion control measures will be used to minimize runoff into environmentally sensitive areas.

4.0 CONCLUSIONS

The remedial alternatives were evaluated based on effectiveness in meeting the remedial objectives, ability to be implemented, cost-effectiveness, ability to meet project time constraints, and the intended future use of the Subject Property. We consider the following remedial alternatives to be the most technically feasible, the most likely to protect human health and the environment, and the most timely options to meet the project goals:

- BUSTR Regulated Subsurface Contamination (RECs/IAs 1 &2) – Alternative No. 2
- Soil contaminated areas throughout the entire Subject Property – Alternative No. 3
- Hazardous Subsurface Contamination (Groundwater) – Alternative No. 1

5.0 REFERENCES

ASTM E2893-16e1, Standard Guide for Greener Cleanups, ASTM International, West Conshohocken, PA, 2016, www.astm.org.

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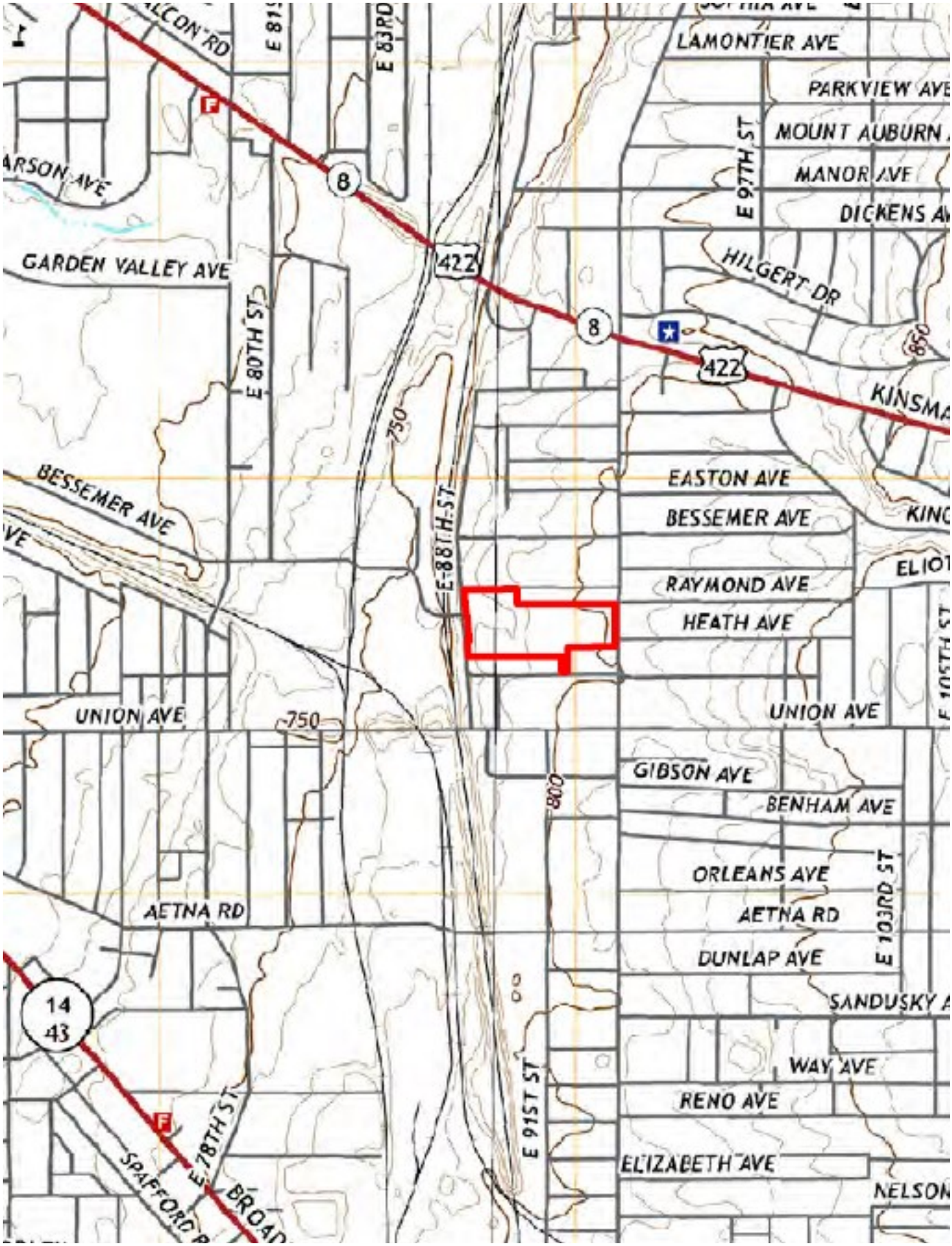
MSG. Phase I Environmental Site Assessment, 8920 Laisy Avenue and 3420 East 93rd Street, Cleveland, Cuyahoga County, Ohio, October 2023.

MSG. Phase II Environmental Site Assessment, 8920 Laisy Avenue and 3420 East 93rd Street, Cleveland, Cuyahoga County, Ohio, June 2024.

USGCRP, 2018: Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II [Reidmiller, D.R., C.W. Avery, D.R. Easterling, K.F. Kunkel, K.L.M. Lewis, T.K. Maycock, and B.C. Stewart (eds.)]. U.S. Global Change Research Program, Washington, DC, USA, 1515 pp. doi: 10.7930/NCA4.2018.

APPENDIX A
FIGURES



Mannik Smith GROUP

Figure 1: Subject Property Location – 8920 Laisy Ave & 3420 East 93rd Street

Notes
USGS Quadrangle, The National Map
Shaker Heights, OH 2019

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