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February 24, 2025

Andrew Murray
City of Memphis and Shelby County Community Redevelopment Agency
850 North Manassas Street
Memphis, Tennessee 38107

Re: Phase I Environmental Site Assessment Report
Former Ibrahim "Chism Trail" Site — Memphis, Tennessee

Dear Mr. Murray:

EnSafe Inc. is pleased to provide the enclosed Phase I Environmental Site Assessment (ESA) Report for the above-referenced subject property. Recognized environmental conditions, as defined by ASTM E1527-21 and further discussed in the Phase I ESA report, were identified for the subject property.

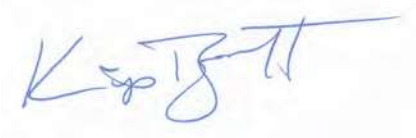
Because the last groundwater sampling event for the subject property was in 2018, existing onsite monitoring wells should be sampled to assess current site conditions. Based on the findings, remedial alternatives may be evaluated and a remedial action plan developed.

Additionally, the City of Memphis and Shelby County Community Redevelopment Agency should continue to pursue regulatory closure under the Tennessee Department of Environment and Conservation (TDEC) Division of Remediation – Voluntary Cleanup Oversight and Assistance Program (VOAP). The site was entered into the State Remediation Program on April 15, 2011, and TDEC has subsequently been performing oversight under VOAP.

If you have any questions or require additional information, please contact me at 901-372-7962 or kbarnett@ensafe.com.

Respectfully submitted,

EnSafe Inc.



By: Kip Barnett
Associate Principal

PHASE I ENVIRONMENTAL SITE ASSESSMENT REPORT

FORMER IBRAHIM "CHISM TRAIL" SITE
544 AND 645 JACKSON AVENUE
MEMPHIS, TENNESSEE 38105

EnSafe Project Number
0888840019

Prepared for:

City of Memphis and Shelby County Community Redevelopment Agency
850 North Manassas Street
Memphis, Tennessee 38107

Issue Date: February 24, 2025

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Memphis, Tennessee 38134
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850 North Manassas Street
Memphis, Tennessee 38107

Report Issue Date: February 24, 2025

Griffin Heard
Environmental Professional

Griffin Heard
Signature

Environmental Professional Statement:
We declare that, to the best of our professional knowledge and belief, we meet the definition of Environmental Professional as defined in 40 Code of Federal Regulations (CFR) Part 312.10. We have the specific qualifications based on education, training, and experience to assess a property of the nature, history, and setting of the subject property. We have developed and performed the all appropriate inquiries in conformance with the standards and practices set forth in 40 CFR Part 312.

Prepared by:
EnSafe Inc.
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Memphis, Tennessee 38134
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APPENDICES

EXECUTIVE SUMMARY

EnSafe Inc. performed a Phase I Environmental Site Assessment (ESA) of the former Ibrahim "Chism Trail" site at 544 and 645 Jackson Avenue in Memphis, Shelby County, Tennessee (subject property), in conformance with the ASTM International (ASTM) *Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process* Designation E1527-21 (ASTM E1527-21). This executive summary provides an overview of the Phase I ESA findings with sufficient information to understand the conclusions and environmental professional opinion that resulted from interviews, records review, and a site reconnaissance on January 22, 2025.

Subject Property

- The 3.31-acre subject property is developed with a 25,900-square-foot vacant former grocery store building. A recessed concrete loading dock is on the north side of the building and a fenced asphalt-paved parking lot with a manned security gate is west of the building. The asphalt-paved parking area is leased to American Lebanese Syrian Associated Charities, Inc. The northwest and southwest portions of the subject property are grass-covered.

- Based on historical records, the subject property was residential as early as 1897, with portions remaining residential until 1960. By 1932, the southwest corner of the subject property was developed with a gas station that operated until at least the 1990s. Additional occupants of the southwest portion of the subject property reportedly include a dry cleaner, convenience store, and liquor store. By 1960, the east portion of the subject property was developed with a grocery store building, operating as Kroger from 1963 until 1992 and Chism Trail from 1997 until 2003. By April 2008, the building on the southwest portion of the subject property was razed. By 2014, additional asphalt paving and fencing around the parking area were added. By 2020, a guard house was added to the north parking lot entrance.

- At the time of EnSafe's site assessment, the grocery store building was vacant and empty except for a pile of tires and wood pallets in the entry way. Rust-colored and white stains were observed on the concrete floor throughout the building interior; however, the concrete floor was observed in good physical condition.

- Groundwater monitoring wells were observed on the subject property, one on the west portion of the asphalt-paved parking lot and two in the grassy area west of the asphalt lot. Based on review of Tennessee Department of Environment and Conservation (TDEC) records, there are at least five active monitoring wells on the subject property. The observed monitoring wells appeared to be in overall good condition.

- The southwest portion of the subject property operated as a gas station from approximately 1932 to 1990 and was registered with three 12,000-gallon gasoline underground storage tanks (USTs). The USTs were removed from the subject property in January 1992 after a release was discovered along the underground fuel lines in March 1990. Groundwater sampling conducted at the site between 1992 and 1997 identified total petroleum hydrocarbons (TPH) in groundwater; however, by May 1997, TPH detections were below site-specific risk criteria, and the release was issued case closure by TDEC on August 15, 1997.

- The subject property is listed on the State Remediation Program (SRP) and Voluntary Cleanup Program (VCP) databases. TDEC files indicate that most activities and investigations at the subject property have been mostly limited to the west/southwest portion of the subject property, including the removal of additional USTs and subsurface structures, installation and sampling of groundwater monitoring wells, and soil vapor sampling. Sample results indicate the presence of tetrachloroethene (PCE) in groundwater and soil vapor in the southwest portion of the subject property. Groundwater flow is reported generally to the southwest.

Surrounding Area Properties

- The subject property is in a commercial and residential area of Memphis, Tennessee. Based on historical sources reviewed, the surrounding area was developed with residential and commercial properties by 1897. Adjoining properties were identified with environmental database records, including the west-adjoining property which was identified on the VCP and Remediation databases. However, based on the information reviewed, including TDEC Closure status and presumed groundwater flow direction, the adjoining properties do not appear to have impacted the subject property.

Environmental Professional Opinion

This assessment has identified the following *recognized environmental condition* in connection with the subject property:

- Chlorinated solvent-contaminated groundwater and soil vapor impacts on the southwest portion of the subject property from historical use as a gas station and/or dry cleaner are considered *recognized environmental conditions.*

EnSafe identified the following *historical recognized environmental condition* and *de minimis condition*:

- The UST removal and closure between January 1992 and August 1997 on the southwest portion of the subject property is considered a *historical recognized environmental condition* based on petroleum-related concentrations not exceeding site-specific action levels for groundwater, removal of the USTs, and the TDEC issuance of case closure without land use controls and/or continuing obligations.

- Rust and white-colored staining observed on the concrete floor throughout the subject property building is considered a *de minimis condition* due to the limited extent and the overall good condition of the concrete floor.

EnSafe identified a *business environmental risk* associated with the subject property.

- At the request of the City of Memphis and Shelby County Community Redevelopment Agency, EnSafe conducted a Tier I Vapor Encroachment Screening of the subject property in general conformance with ASTM E2600-22. The subject property has documented detections of chlorinated solvents in soil gas on the south portion of the property from historical subject property operations, including a gas station and dry cleaner, which represents a Vapor Encroachment Condition (VEC). The VEC identified for the subject property represents a *business environmental risk* based on the potential for indoor-air hazards that could impact future property development/use plans.

This executive summary is an excerpt of a detailed Phase I ESA report that includes elements necessary for proper interpretation, including definitions, limitations, exceptions, and deviations to ASTM E1527-21 and established scope of work. As such, the executive summary should not be used independently of the Phase I ESA report.

1.0 INTRODUCTION

EnSafe Inc. was retained by the City of Memphis and Shelby County Community Redevelopment Agency (CRA) to conduct a Phase I Environmental Site Assessment (ESA) of the former Ibrahim "Chism Trail" site at 544 and 645 Jackson Avenue in Memphis, Shelby County, Tennessee (subject property), as shown in Figure 1 (Appendix A) Site Location Map.

Figure 2 (Appendix A) is a Site Layout Map that shows the subject property layout. Details of the subject property layout are further described in the table below. Significant features of the subject property are detailed in Sections 2 and 3.

Parcel Identification	Address	Size (Acres)	Building/Area (Name), Size, Use(s), Major Occupant(s)
001107 00001	544 Jackson Avenue	2.76	• Owned by the City of Memphis and Shelby County CRA • Developed with a 25,900-square-foot vacant supermarket building
001106 00001	645 Jackson Avenue	0.35	• Owned by the City of Memphis & Shelby County CRA • Vacant grass parcel
001096 A00099	0 Danny Thomas Boulevard	0.20	• Owned by the City of Memphis & Shelby County CRA • Vacant grass parcel

CRA = Community Redevelopment Agency

Figure 3 (Appendix A) is a Site Vicinity Map that depicts the below-referenced adjoining properties.

Direction	Parcel Identification	Address	General Description (e.g., type of property, uses, occupants)
Northwest	001096 A00097	374 Mill Avenue	• Owned by Memphis Housing Authority • Developed with residences • 4.10 acres
North	001096 A00096	0 North Thomas Street	• Owned by Memphis Housing Authority • Developed with residences • 2.04 acres
North	001105 00024	684 Jackson Avenue	• Owned by Mahmoud Jaber • Developed with commercial retail building – Village Mart • 0.27 acre
North	001104 00015C	696 Jackson Avenue	• Owned by the Salvation Army • Developed with offices and residence center • 2.54 acres
East	001109 00001	715 Jackson Avenue	• Owned by American Lebanese Syrian Associated Charities, Inc. • Developed as an asphalt-paved parking lot • 0.63 acre
East	001109 00021	710 North Parkway	• Owned by Bermar Associates IV LLC • Developed as an asphalt-paved parking lot • 0.54 acre

Direction	Parcel Identification	Address	General Description (e.g., type of property, uses, occupants)
South	001108 00009	721 North Parkway Boulevard	• Owned by American Lebanese Syrian Associated Charities, Inc. • Developed with a commercial building occupied by Island Community Church • 0.83 acre
South	001108 00005C	483 North Manassas Street	• Owned by American Lebanese Syrian Associated Charities, Inc. • Developed with two warehouse buildings • 11.65 acres
South	001108 00004	661 North Parkway Boulevard	• Owned by American Lebanese Syrian Associated Charities, Inc. • Developed with a warehouse building • 3.11 acres
Southwest	001118 00002C	590 Danny Thomas Place	• American Lebanese Syrian Associated Charities, Inc. • Developed with St. Jude campus office building • 3.83 acres
West	001096 00029	Auction Street	• Owned by Memphis Housing Authority • Vacant grassy lot • 1.36 acres

1.1 Purpose

The subject property was assessed with respect to the range of contaminants within the scope of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), and petroleum products. The ASTM International (ASTM) *Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process* Designation E1527-21 (ASTM E1527-21) is the current industry standard used to define good commercial and customary practice for conducting an environmental site assessment of a parcel of commercial real estate. In accordance with ASTM E1527-21, this Phase I ESA is intended to identify evidence of the following.

- *Recognized environmental condition* (REC) — "(1) the presence of hazardous substances or petroleum products in, on, or at the subject property due to a release to the environment; (2) the likely presence of hazardous substances or petroleum products in, on, or at the subject property due to a release or likely release to the environment; or (3) the presence of hazardous substances or petroleum products in, on, or at the subject property under conditions that pose a material threat of a future release to the environment."

- *Controlled recognized environmental condition* (CREC) — "a *recognized environmental condition* affecting the subject property that has been addressed to the satisfaction of the applicable regulatory authority or authorities with hazardous substances or petroleum

products allowed to remain in place subject to implementation of required controls (for example, activity and use limitations or other property use limitations)."

- *Historical recognized environmental condition* (HREC) — "a previous release of hazardous substances or petroleum products affecting the subject property that has been addressed to the satisfaction of the applicable regulatory authority or authorities and meeting unrestricted use criteria established by the applicable regulatory authority or authorities without subjecting the subject property to any controls (for example, activity and use limitations or other property use limitations). A *historical recognized environmental condition* is not a *recognized environmental condition*."

- *De minimis condition* — "a condition related to a release that generally does not present a threat to human health or the environment and that generally would not be the subject of an enforcement action if brought to the attention of appropriate governmental agencies. A condition determined to be a *de minimis condition* is not a *recognized environmental condition* nor a *controlled recognized environmental condition*."

1.2 Scope of Services

The Phase I ESA includes the following elements:

- Reconnaissance of the subject property on January 22, 2025, by Griffin Heard of EnSafe. Select photographs taken during the site reconnaissance are in a Photo Log in Appendix B.

- Interviews with personnel by Ms. Heard of EnSafe are discussed in Section 2.

- Review of the following standard historical resources for the subject and adjoining properties; select copies are provided in Appendix C or as noted in Table 1.

Table 1
Standard and Other Historical Sources

Historical Resource	Date(s) and Source(s)	SP	AP	Appendix [or NA/NP]
Topographic maps	1916 - 2019 — third party topographic map report	☒	☒	C
Aerial photographs	1937 – 2023 — third party aerial photo report	☒	☒	C
	1938 – 2024 — aerial imagery from alternate sources (e.g., local government Geographic Information System [GIS] website, Google Earth) not already included in the aerial photo report	☒	☒	NP
Local street directories	1924 – 2023 — third party city directory report	☒	☒	C

Table 1 Standard and Other Historical Sources				
Historical Resource	**Date(s) and Source(s)**	**SP**	**AP**	**Appendix [or NA/NP]**
Fire insurance maps	1897 - 1952 — third party fire insurance map report	☒	☒	C
Property tax files	Records obtained on January 20, 2025, from Shelby County Assessor of Property, included: Parcel information for the subject and adjoining parcels	☒	☒	G
	Purchase and sale information	☒	☒	G

Notes:
SP = Subject property
AP = Adjoining property
NA = Not available from resources researched
NP = Not provided as an Appendix

- Review of physical setting resources provided by a commercial database search company, which included the most recent United States Geological Survey 7.5-Minute topographic map in Appendix D.

- Review of standard and additional federal, state, and local government records for the subject property and properties within ASTM E1527-21 approximate minimum search distances (AMSDs). Database search information is provided in Appendix E.

- Review of regulatory information available from the United States Environmental Protection Agency (U.S. EPA) Envirofacts and Enforcement and Compliance History Online (ECHO) websites, and from the Tennessee Department of Environment and Conservation (TDEC). Select information is provided in Appendix F.

- Review of *Phase I Environmental Site Assessment, 544 Jackson Avenue, Memphis, Tennessee* (Fisher & Arnold Environmental, July 2011), provided in Appendix G.

- Review of *Former Ibrahim Property – 2016 Groundwater Sampling Report, 645 Jackson Avenue, Memphis, Tennessee* (EnSafe, July 2016), provided in Appendix G.

- Review of *Former Ibrahim Property – 2018 Monitoring Well and Groundwater Sampling Report, 645 Jackson Avenue, Memphis, Tennessee* (EnSafe, June 2018), provided in Appendix G.

- Review of *Active Soil-Gas Sampling Report – Former Ibrahim Property – 645 Jackson Avenue, Memphis, Tennessee* (EnSafe, January 2020), provided in Appendix G.

- Review of information from other sources listed in Section 6, excerpted information is provided in Appendix G.

- Review of chain of title and lien searches for the subject property parcels provided by a commercial database search company, provided in Appendix G.

1.3 Client Information and User Responsibilities

EnSafe was retained by the City of Memphis and Shelby County CRA to conduct the Phase I ESA. According to ASTM, the user shall make known the reason for the Phase I ESA. In contracting EnSafe for the Phase I ESA, and documented in the User Questionnaire included in Appendix G, Emma Turri, of City of Memphis and Shelby County CRA, indicated the Phase I ESA was being conducted to establish the innocent landowner defense to CERCLA liability; site characterization and assessment with the use of a CERCLA grant (Brownfields); in anticipation of a property/business ownership transaction; and establishing baseline conditions at a property.

This assessment is intended to constitute all appropriate inquiries (AAI) into the previous ownership and uses of the property consistent with good commercial and customary practice as defined in 42 United States Code Section 9601 (35)(B) and promulgated at 40 Code of Federal Regulations Part 312 (AAI Final Rule). As such, the assessment is intended to permit the designated user to satisfy one of the requirements to qualify for the innocent landowner, bona fide prospective purchaser, or contiguous property owner limitations on CERCLA liability (hereinafter, the Landowner Liability Protection).

The AAI Final Rule and ASTM E1527-21 Section 6 describe tasks to be performed by or on behalf of a party seeking to qualify for a Landowner Liability Protection. The information that results from those tasks should be provided to the environmental professional to consider with respect to identifying RECs. Appendix G contains a questionnaire provided to the User outlining those tasks.

- Information provided by the User is discussed in Section 2.2.

1.4 Non-Scope Items

EnSafe's Phase I ESA scope of work was expanded to include consideration of environmental issues that are beyond the scope of ASTM E1527-21. These *non-scope* considerations can identify *business*

environmental risks (BERs), defined in ASTM E1527-21 as "a risk which can have a material environmental or environmentally-driven impact on the business associated with the current or planned use of commercial real estate, not necessarily related to those environmental issues required to be investigated in this practice." At the request of the City of Memphis and Shelby County CRA, and as documented in Appendix G, the following *non-scope* consideration has been included in the Phase I ESA:

- Tier 1 Vapor Encroachment Screening (VES) within the scope of ASTM E2600-22, Standard Guide for Vapor Encroachment Screening on Property Involved in Real Estate Transactions; results of the VES are summarized in Section 5.0

1.5 Qualifications

Appendix H includes a resume that documents the qualifications of the Environmental Professional responsible for this Phase I ESA.

2.0 INTERVIEWS

2.1 Owners, Operators, Occupants, Key Site Manager, Local Officials

Table 2 lists personnel interviewed, indicates their association with the subject property or this Phase I ESA, and summarizes topics discussed and information provided.

Table 2
Summary of Interviews

Interviewee Name and Title or Affiliation	ASTM E1527-21 Association with Subject Property	Date	Content/Section Discussed
Emma Turri City of Memphis and Shelby County Community Redevelopment Agency	Key Site Manager/Current Owner	January 22, 2025	Provided information regarding historical and current subject property uses. Information is discussed throughout the report.
Andrew Murray City of Memphis and Shelby County Community Redevelopment Agency	Current Owner	January 22, 2025	Provided information regarding historical and current subject property uses. Information is discussed throughout the report.
Luretha Phillips Memphis Housing Authority	Former Owner	February 3, 2025	Provided information regarding historical subject property uses. Information is discussed throughout the report.
Merrie Salyers Manager, Tennessee Department of Environment and Conservation, Division of Remediation	State/Local Official	February 7, 2025	Provided information regarding the status and future of the subject property. Information discussed is in Section 3.4.

2.1.1 Interview Data Gaps

The following data gaps relative to interviews were encountered:

- EnSafe did not interview former occupants of the subject property because contact information was not identified. This is not considered a *significant data gap* because information likely to be obtained is duplicative of information already obtained from other sources or resources.

2.2 Helpful Documents

EnSafe requested the following helpful documents on January 22, 2025, from the User, subject property owner, and key site manager. Table 3 summarizes the interviewed person's knowledge of the availability of such documents and if copies were provided to EnSafe for review.

Table 3 Helpful Documents				
	Available (Yes/No)			Reviewed (Yes/No/Not Applicable)
Document or Report Type	User	Subject Property Owner	Key Site Manager	
Environmental site assessments	**Yes**	**Yes**	**Yes**	**Yes**
Environmental site investigations	**Yes**	**Yes**	**Yes**	**Yes**
Environmental compliance audits	**Yes**	**Yes**	**Yes**	**Yes**
Environmental permits	No	No	No	Not Applicable
Storage tank registrations	No	No	No	Not Applicable
Safety data sheets	No	No	No	Not Applicable
Community right-to-know plans	No	No	No	Not Applicable
Safety plans	No	No	No	Not Applicable
Facility response plans	No	No	No	Not Applicable
Spill prevention, control, and countermeasures plan	No	No	No	Not Applicable
Storm water pollution prevention plans	No	No	No	Not Applicable
Hydrogeologic condition reports	No	No	No	Not Applicable
Cleanup activities	**Yes**	**Yes**	**Yes**	**Yes**
Notices/correspondence from government agency relating to past or current violations of environmental laws	**Yes**	**Yes**	**Yes**	**Yes**
Hazardous waste generator notices	No	No	No	Not Applicable
Geotechnical studies	No	No	No	Not Applicable
Risk assessments	No	No	No	Not Applicable
Recorded activity and use limitations/environmental liens	No	No	No	Not Applicable
Pending, threatened, or past litigation, administrative proceedings, and notices from government entity regarding violation of environmental laws or liability relating to hazardous substances or petroleum products	No	No	No	Not Applicable

2.2.1 2011 Phase I Environmental Site Assessment Report, 544 Jackson Avenue, Memphis, Tennessee

In July 2011, Fisher & Arnold Environmental prepared a Phase I ESA for the 544 Jackson Avenue portion of the subject property. According to the Phase I ESA, the 544 Jackson Avenue portion of the subject property operated as a grocery store as early as 1963, operating as Kroger from at least 1963 to 1992 and Chism Trail Supermarket from at least 1997 to 2003. Fisher & Arnold identified the following four RECs:

- A leaking underground storage tank (LUST) was discovered in 1990 on the west portion of the subject property (645/653 Jackson Avenue). Three underground storage tanks (USTs) were removed in 2002, and TDEC required no further action.

- Apparent dry cleaner-related impacts were discovered on the western portion of the subject property during property development.

- The historical presence of USTs on the east-adjoining property, which were removed in 1990 and received a closure letter from TDEC. The approximate 30-year operation of the property as a gasoline station and auto repair garage was considered "a risk of impairment."

- A LUST site 0.4 miles east of the subject property; however, the ESA states "due to the small size of the tank and distance from the subject property...does not appear to present a significant threat to the subject property."

Fisher & Arnold Environmental concluded that "additional environmental information is recommended…" to evaluate the identified RECs.

2.2.2 Former Ibrahim Property – 2016 Groundwater Monitoring Report, 645 Jackson Avenue, Memphis, Tennessee

Groundwater samples were collected by EnSafe in March 2016 from onsite and offsite monitoring wells and analyzed for volatile organic compounds (VOCs). Results were compared to U.S. EPA regional screening levels (RSLs) for tap water and maximum contaminant levels (MCLs). Tetrachloroethene (PCE), trichloroethene (TCE), and cis-1,2-dichloroethene (DCE) exceeded both the U.S. EPA RSLs for tap water and the MCLs in MW04, which is along the south portion of the 645 Jackson Avenue portion of the subject property. Benzene exceeded both the RSL and MCL and PCE exceeded its MCL in MW02 which is just north of MW04. Additionally, TCE, ethylbenzene, and chloroform exceeded their RSLs in MW02. MW03, which is on the southwest corner of the 645 Jackson Avenue portion of the subject property, had no VOCs in groundwater with concentrations that exceeded RSLs or MCLs. The 2016 report states that groundwater concentrations were generally decreasing.

A groundwater contour map included in the report shows a groundwater mound around MW03 in the southwest corner of the subject property, producing a radial flow pattern with northwesterly to east/southeasterly components.

2.2.3 2018 Monitoring Well Installation and Groundwater Sampling Report – 645 Jackson Avenue, Memphis, Tennessee

In January and February 2018, three additional permanent monitoring wells were installed by EnSafe, two on the subject property and one offsite, to depths of 18 to 23 feet below ground surface (bgs).

Groundwater samples were collected from the new and existing wells on March 1 and March 2, 2019, and analyzed for VOCs. PCE, TCE, and cis-1,2-DCE exceeded both the U.S. EPA RSLs for tap water and the MCLs in MW04. TCE exceeded its RSL and PCE exceeded its MCL in MW02. MW07, which is farther north of MW02, had detected concentrations of VOCs; however, they were below the RSLs and MCLs. MW08 which is on the western portion of the asphalt parking lot had no detected concentrations of VOCs. MW03 also had no detected concentrations of VOCs. The groundwater contour is mounded in the southwest corner of the subject property around MW03 and MW02, resulting in localized radial flow to the south, southwest, and northwest.

2.2.3 Active Soil-Gas Sampling Report – Former Ibrahim Property – 645 Jackson Avenue, Memphis, Tennessee

In October 2019, seven active soil-gas samples were collected by EnSafe from the subject property and adjoining properties to evaluate the potential for vapor intrusion. Four soil-gas samples were located on the western portion of the subject property (SG04 – SG07) and three were on the south-adjoining property (661 North Parkway [SG01-SG03]). Forty-one VOCs were detected in the soil-gas samples. TCE and PCE were detected at concentrations exceeding the U.S. EPA commercial Vapor Intrusion Screening Levels (VISLs) in only SG06 near MW04 along the south property border. 1,3-butadiene slightly exceeded its commercial VISL in SG01, SG02, and SG03; however, EnSafe concluded that these detections are not likely associated with Former Ibrahim property use but rather from historical urban use of the area. TDEC guidance requires the evaluation of cumulative risks and hazards to determine appropriate mitigation responses where potential vapor intrusion is identified. The soil-gas sample collected at SG06 exhibits risk exceeding TDEC's guidance risk threshold under commercial scenarios.

3.0 SUBJECT PROPERTY

Subject property information discussed below was obtained from historical resources identified in Section 1.2 and referenced in Section 6.

3.1 Historical Records Review

The historical records review was conducted to identify evidence of RECs in connection with past uses of the subject property.

3.1.1 Historical Development and Uses

Table 4 summarizes subject property development and uses based on review of historical resources listed in Section 1.2/Table 1.

Table 4
Historical Development

Date Range	Resource(s) Used	Observations
1897-1927	Fire insurance maps, city directories	The subject property is developed as residential with multiple residences throughout the property. Jackson Avenue (formerly Johnson Avenue) is depicted crossing through the north portion of the subject property. Peyton Street (formerly Bender Street) is also depicted crossing north-south through the west portion of the subject property. City directory listings appear to be residential starting in 1924 through at least 1927.
1932-1952	Aerial photographs, fire insurance maps, city directories	A small gas station is visible on the southwest corner of the subject property (west of Peyton Street). Gas tanks are depicted on the north and south ends of the gas station property on the 1951 and 1952 fire insurance maps. The remainder of the subject property appears to be residential. City directories list a gas station at 653 Jackson Avenue in 1932.
1953-1960	Aerial photographs, city directories	The small gas station structure has been replaced by a larger rectangular building parallel to Peyton Street. The east portion of the property appears to remain residential. City directories list Success Laundry-Cleaners at 645 Jackson in 1954 and 1960.
1960-2008	Aerial photographs, property assessor's website, city directories	The residences on the east portion of the subject property have been razed and a grocery store building with asphalt parking to the north, south, and west has been constructed. The southwest portion of the subject property remains unchanged. By 1984, a loading dock area has been added along the north side of the grocery store building. City Directories list a grocery store (Kroger and Chism Trail) at 544 Peyton Street from 1960 to 2003. City directories also list a liquor store from 1966 to 1980, a dry cleaner in 1966, H&R Block from 1985 to 2000, and a children's clothing retailer in 2008 at 645 Jackson Avenue. At the 653 Jackson Avenue address city directories list Handy Pantry No 24 in 1966; 7-Eleven from 1970 to 1990; Rent A Center in 1995; Dollar Mania from 2000 to 2008; U-Haul in 2003; and Dollar Discount in 2008.

Table 4 Historical Development		
Date Range	**Resource(s) Used**	**Observations**
2008-2011	Aerial photographs, Google Earth imagery, and Google Street View	By January 2008, Jackson Avenue has been rerouted north and is no longer traversing the subject property, thereby closing Peyton Street. By April 2008, the building on the southwest portion of the subject property had been razed; however, the concrete paved area remains. Based on historical aerials, Street View, and interviews, the Kroger/Chism Trail grocery store building appears to be vacant.
2011-present	Aerial photographs, Google Earth imagery, and Google Street View	The concrete paved area on the southwest corner of the subject property had been removed by 2011, and the area was mostly grass-covered by 2013. City directories still list Kids Club at 645 Jackson Avenue in 2012 and Dollar Discount at 653 Jackson Avenue in 2012, despite the building being razed before 2008. By 2014, additional asphalt paving, painted parking spots, and fencing surrounding the asphalt-paved parking area are visible with gated entrances on the north and south sides of the subject property. A guard house has been added at the north parking lot entrance by the 2020 Google Earth aerial photograph. The subject property remains relatively unchanged in subsequent aerials and imagery. City directories do not list the 544 Jackson Avenue address.

3.1.3 Data Failure

ASTM E1527-21 Section 8.3.8 requires identifying all obvious uses of the subject property from the present, back to the property's first developed use, or back to 1940, whichever is earlier. The earliest useful historical resource that shows the subject property developed is the 1897 fire insurance map which identified the property as residential. As the first developed use of the subject property was not identified, a data failure has occurred; however, based on the predominantly residential development of the subject property and vicinity in the early 1900s, prior industrial development indicative of RECs is unlikely. Therefore, the data failure is not considered a significant data gap, as it is unlikely to have limited EnSafe's ability to identify RECs in connection with the subject property.

Table 5 identifies standard historical resources that were not obtained or reviewed and explains why.

Table 5 Historical Resources Not Reviewed	
Standard Historical Source	**Reason(s) Not Reviewed**
Interviews with former occupants	Contact information was not identified for former occupants of the subject property.

3.2 Site Reconnaissance — Current Subject Property Uses

The subject property was visually assessed on January 22, 2025, by Ms. Heard of EnSafe accompanied by Ms. Turri. The purpose of the reconnaissance was to determine current uses and to identify evidence of RECs in connection with the subject property. EnSafe personnel walked

throughout the interior and exterior portions of the subject property. The subject property was also viewed from adjacent public thoroughfares. Observations made of adjoining properties during the reconnaissance of the subject property are discussed in Section 4.1.

At the time of EnSafe's site assessment, there was no active electricity provided for the subject property building and windows were covered; the lack of power and poor lighting within the building limited interior observations. Representative photographs taken during the site visit are in Appendix B.

The 3.31-acre subject property is developed with a 25,900-square-foot vacant grocery store building with adjoining asphalt and concrete paving on all sides. A recessed concrete loading dock is on the north side of the building and an asphalt-paved parking lot is west of the building. The paved parking lot is fenced to the northeast and southeast corners of the building with a manned security gate and driveway along the north side of the subject property. The asphalt-paved parking area is leased to American Lebanese Syrian Associated Charities, Inc. The west portion of the subject property along Danny Thomas Boulevard is grass-covered.

The subject property building interior has an entry way, two former restroom spaces along the east wall (no restroom fixtures remain), and a loading dock warehouse area in the northeast corner. At the time of EnSafe's site assessment, the subject property building was vacant and empty except for a pile of tires and wood pallets in the entry way. Additionally, various bits of refuse (i.e., hotel shampoo bottles, cups, etc.) were observed on the concrete floor in the former grocery store portion of the building.

According to Ms. Turri, utilities at the subject property (i.e., electricity, natural gas, and water), if connected, would be supplied by Memphis Light, Gas and Water, and sanitary sewer would be provided by the City of Memphis. No transformers were observed around the building.

3.3 Interior and Exterior Observations

Table 6 lists features, activities, uses, and conditions applicable to the subject property based on EnSafe's visual observations of the interior and exterior and interviews.

Table 6 Site Reconnaissance — Summary of Observations and Interviews			
Features, Activities, Uses, and Conditions	**Observed Yes/No**	**Identified by Interview Yes/No**	**Comment/Report Section**
Hazardous substances and petroleum products	No	No	
Storage tanks	No	**Yes**	Section 3.4.1
Strong, pungent, or noxious odors and their sources	No	No	
Standing surface water, pools, or sumps	No	No	
Drums, totes, and intermediate bulk containers	No	No	
Unidentified substance containers	No	No	
Electrical or hydraulic equipment known to contain or likely to contain polychlorinated biphenyls	No	No	
Means of heating and cooling subject property buildings including fuel source(s)	**Yes**	**Yes**	Natural gas
Stains or corrosion on floors, walls, and ceilings	**Yes**	No	Section 3.3.1
Drains and sumps	**Yes**	No	Section 3.3.1
Pits, ponds, or lagoons	No	No	
Stained soil or pavement	No	No	
Stressed vegetation	No	No	
Solid waste	**Yes**	**Yes**	Section 3.2
Water/wastewater	**Yes**	No	Stormwater not infiltrating ground surfaces is expected to flow southwest across the subject property towards North Parkway.
Wells	**Yes**	**Yes**	Section 3.3.2
Septic systems or cesspools	No	No	

3.3.1 Staining and Drains

Rust-colored stains (approximately 2 square feet or less) were observed on the concrete floor throughout the subject property building interior, primarily along the west portion. White-colored stained areas (approximately 4 square feet or less) were also observed on the interior concrete floor throughout the building.

At least eight floor drains were observed near the former restrooms in the southwest portion of the building. An additional floor drain was observed in front of one of the overhead bay doors in the loading dock area. The aforementioned rust-colored staining was observed around some of the floor drains. A trench drain was observed in the recessed loading dock area on the north exterior side of the building. No staining or other evidence of a hazardous substance or petroleum product release was observed near the trench drain. Site contacts were not aware of drain connections or associated discharge points.

3.3.2 Wells

Groundwater monitoring wells were observed on the subject property at the time of EnSafe's site assessment. One was observed on the west portion of the asphalt-paved parking area and at least two were observed in the grassy area on the west portion of the subject property. Based on EnSafe's review of TDEC records, there are at least five active monitoring wells on the subject property which are further discussed in Section 3.4. The observed monitoring wells appeared to be in overall good condition.

3.4 Environmental Records Review

EnSafe obtained standard environmental record resource information directly from a commercial service, the U.S. EPA Envirofacts and ECHO websites, and TDEC. The subject property is listed on environmental databases researched for this assessment, including LUSTs, LUST TRUST, UST, State Remediation Program (SRP), Resource Conservation and Recovery Act (RCRA) Very Small Quantity Generator (VSQG), and Voluntary Cleanup Program (VCP). The subject property is also listed on the Historic Potential Business Activity Risk database.

EnSafe requested regulatory records/files for the subject property from agencies listed in Table 7. Table 7 lists the agency from which information was requested, date of request, date of response, and information provided or not available, as indicated by the agency response.

Table 7
Summary of Records Requests

Agency	Records Requested	Request Date	Response Date	Response/Section Discussed
Tennessee Department of Environment and Conservation – Division of Remediation	Related to voluntary cleanup program and remediation sites	January 23, 2025	January 23, 2025	Records identified related to subject property (Section 3.4) and adjoining and surrounding properties (Sections 4.2 and 4.3).
Tennessee Department of Environment and Conservation — Division of Underground Storage Tanks	Related to leaking underground storage tank sites	January 23, 2025	January 24, 2025	Records identified related to subject property (Section 3.4) and adjoining and surrounding properties (Sections 4.2 and 4.3).
Tennessee Department of Environment and Conservation — Division of Solid Waste Management	Records of solid and hazardous waste sites.	January 23, 2025	January 24, 2025	Records identified related to subject property are discussed in Section 3.4.

Table 7
Summary of Records Requests

Agency	Records Requested	Request Date	Response Date	Response/Section Discussed
City of Memphis — Division of Fire Service	Records of hazardous storage, spills, releases, and/or storage tanks related to subject property	January 28, 2025	January 29, 2025	No records of hazardous storage, spills, releases, and/or storage tanks were identified for the subject property.

3.4.1 Underground Storage Tanks and Leaking Underground Storage Tanks

The subject property was identified in the environmental database report as Mapco Express #3254, 7-Eleven #12893, and Williams Express Inc. No. 3254 at 653 Jackson Avenue on the UST, LUST, and LUST TRUST databases. Based on TDEC records reviewed, the subject property was registered with three 12,000-gallon gasoline USTs. Records indicate a release from one of the underground fuel lines was discovered and reported in March 1990. Investigation activities at the site included soil sampling and the installation and sampling of groundwater monitoring wells on the 653/645 Jackson Avenue portion of the subject property in 1991. Groundwater sample results in three of the five wells had concentrations of benzene and total petroleum hydrocarbons (TPH) exceeding the TDEC action levels. In January 1992, the three USTs were permanently removed from the site with holes discovered in one of the USTs. In November 1992, an offsite monitoring well was installed on the west adjoining property. Additional groundwater sampling was conducted between January 1993 and May 1997. By May 1997, benzene and TPH were below their site-specific standards of 0.07 milligrams per liter (mg/L) and 3.4 mg/L in each onsite and offsite well. The release associated with the USTs was issued case closure by TDEC on August 15, 1997.

3.4.2 State Remediation Program and Voluntary Cleanup Program

The environmental database identifies the subject property on the SRP and VCP databases under the Ibrahim Property at 645 Jackson Avenue (Facility ID: SRS791204) and Memphis Uptown Mixed Use Center 645 and 544 Jackson Avenue (Facility ID: SRS791079).

Based on TDEC records reviewed, the Memphis Uptown Mixed Use Center encompasses the entire subject property; however, no records pertaining to investigations at the subject property were associated with the Facility ID number. TDEC files indicate that most activities and investigations at the subject property have been completed under the Ibrahim Property Facility ID and have been mostly limited to the west/southwest portion of the subject property.

In December 2007, EnSafe performed a Phase II investigation of the southwest portion of the subject property (645/653 Jackson Avenue) to evaluate RECs identified in the 2011 Fisher & Arnold

Environmental Phase I ESA. EnSafe installed four soil borings from 13 to 28 feet bgs. Soil and groundwater samples were collected from each boring and analyzed for VOCs. Only 1,1,2,2-tetrachloroethane and 1,1,2-trichloroethane exceeded the U.S. EPA Region 9 soil screening level in one soil sample collected. Two groundwater samples had concentrations of four VOCs exceeding the U.S. EPA tap water preliminary remediation goals.

TDEC records indicate that during the removal of the former building on the southwest portion of the subject property, the following structures were identified onsite: vertical UST possibly containing PCE, buried product lines, UST containing Stoddard Solvent, buried 55-gallon drum of kerosene and motor oil, and two 4-foot by 4-foot by 3-foot concrete boxes (one containing contaminated soil). These structures and impacted soil around the structures were reportedly removed from the site for offsite disposal. In August 2011, additional groundwater sampling was conducted in the southwest portion of the subject property. Groundwater samples were analyzed for VOCs, polycyclic aromatic hydrocarbons (PAHs), RCRA 8 metals, and polychlorinated biphenyls. Several chlorinated VOCs, PAHs, and arsenic exceeded their respective RSLs and/or MCLs in TW-01, TW-02, TW-03, and TW-04.

In April 2013, three permanent groundwater monitoring wells (MW02, MW03, and MW04) were installed on the southwest portion of the subject property, and groundwater samples were analyzed for VOCs. PCE, benzene, and ethylbenzene exceeded their respective RSLs and/or MCLs in MW02, MW03, and MW04. Groundwater appears to be mounded in the southwest corner of the subject property, but groundwater flow during this event was generally estimated to the southwest.

As previously discussed in Section 2.2, additional groundwater sampling, monitoring well installation, and soil-vapor sampling were conducted onsite by EnSafe. The highest concentrations of VOCs in groundwater and soil-vapor appear near MW04.

According to Ms. Salyers at TDEC, the site is a priority, and additional groundwater sampling is needed. Additionally, Ms. Salyers stated that there is still a concern of a source area at the site and additional remedial actions will be needed.

3.4.3 Resource Conservation and Recovery Act

The subject property is listed at the 645 Jackson Avenue address on the RCRA database as a very small quantity generator of hazardous waste. Based on TDEC records reviewed, the subject property was first registered in 2011 under the name Former Ibrahim Site/MLB-Uptown LLC as a large quantity generator of PCE-contaminated soil resulting from remediation activities. In 2020, the ownership

changed to the City of Memphis and Shelby County CRA, and the site was registered as a very small quantity generator.

3.4.4 Historic Potential Business Activity Risk

The subject property was listed at multiple addresses as potentially having engaged in business activity that poses "higher than normal" risk of contamination; the database includes businesses such as dry cleaners, gas stations, and auto repair shops as identified through historical records. Neott Cleaners (clothes pressers and cleaners) was listed in historical city directories for the year 1945 at 695 Jackson Avenue. Pennsylvania Oil Co (gas station) was listed in historical city directories for the years 1930 and 1935 at 653 Jackson Avenue. Duncan Service Station (gas station) was listed for the year 1950 at 660 North Parkway. Each of these addresses appears to be associated with the southwest portion of the subject property.

3.5 Physical Setting Resources

Based on review of the Shelby County Assessor website, the subject property elevation is between 243 and 254 feet above mean sea level. Overall topography at the subject property and surrounding area is relatively flat, with a slight downward slope towards the south/southwest.

No wetlands were identified on the subject property. The subject property is mapped in Zone X, an area of minimal flood hazard and outside the 100- and 500-year floodplain.

Based on TDEC records, soil underlying the subject property consists of clayey silt, silty clay, and sandy silt to 18 feet bgs.

3.6 Activity and Use Limitations

EnSafe reviewed federal, state, and tribal standard environmental record resources obtained directly from a commercial service. The subject property is not listed with activity and use limitations (AULs).

The User requested that EnSafe obtain an environmental lien search report for each subject property parcel number. The environmental lien search report did not identify AULs or environmental liens for the subject property. The chain of title and lien searches are provided in Appendix G.

4.0 AREA RECONNAISSANCE

The current and historical uses of adjoining and surrounding area properties described in this section are based upon visual observations during the site reconnaissance and information obtained from interviews and historical and environmental records review. Historical records obtained for the subject property, listed in Section 1.2/Table 1, that also cover adjoining properties include aerial photographs, topographic maps, city directories, and fire insurance maps.

4.1 Adjoining Properties — Historical Development and Uses

During EnSafe's site reconnaissance, discussed in Sections 3.2 and 3.3, adjoining properties were visually assessed from the subject property boundaries and nearby roads and driveways.

Table 8 provides a summary of development and current and historical uses of adjoining properties, including date ranges, features, activities, and conditions; uses/activities with the potential for releases to have occurred may be discussed here, with supporting regulatory research discussed in Section 4.2.

Table 8
Current and Historical Development and Uses of Adjoining Properties

Date Range	Development	Uses, Activities, Features, and Conditions
NORTHWEST/001096 A00097/374 MILL AVENUE		
1897-1952	Residential	Property is developed with numerous single-family and some multi-tenant residences.
1953-1997	Residential	Property is redeveloped with multi-unit residential housing.
2003	Vacant/cleared for development	Property is vacant and appears to be cleared for development.
2004 – present	Residential	Property is developed with residences, multi-unit residences.
NORTH/001096 A00096/0 NORTH THOMAS STREET		
1897-1952	Residential	Property is developed with numerous single-family and multi-tenant residences.
1953-1997	Residential	Property is redeveloped with multi-unit residential housing.
2003-2004	Vacant/cleared for development	Property is vacant and appears to be cleared for development.
2004 – present	Residential	Property is developed with residences, multi-unit residences.
NORTH/001105 00024/684 JACKSON AVENUE		
1897-1966	Residential	The property is developed with a residence. City directories indicate the property is residential from at least 1924 until 1966.
1973	Vacant	The structure has been razed and the property appears to be a vacant grassy parcel.

Table 8 Current and Historical Development and Uses of Adjoining Properties		
Date Range	**Development**	**Uses, Activities, Features, and Conditions**
1975-present	Commercial/retail	The property is developed with a commercial/retail structure (690 Jackson Avenue). Occupants include Corner Deli/Corner Grocery from 1980-1985, Payless Cashways 1990, Payless Shoe Source 1995 and 2008, and the Village Mart/New York Fashions (retail clothing) 2000-present.
NORTH/001104 00015C/696 JACKSON AVENUE		
1859-1910	Residential	The property was developed as residential in 1859 according to the Memphis Heritage website.
1910-1972	Hospital	According to the Memphis Heritage website, the residence after some additions and renovations was converted into a hospital (Gartley-Ramsay Hospital) in 1910, and in the early 1950s, the facility became a psychiatric hospital. Reportedly, the hospital closed in 1972.
1987-1998	Senior Citizen Housing	According to the Memphis Heritage website, the facility reopened after some renovations and additions in 1987 as senior citizen housing. The facility was demolished in 1998.
2001-present	Salvation Army offices and residence center	The current facility was constructed on the property in 2001 by the Salvation Army as offices and residential center.
EAST/001109 00001/715 JACKSON AVENUE		
1897-1953	Residential	The property is developed as residential.
1966-2003	Nursing Home and guest home	Aerial photographs show what appears to be a multi-unit residential building on the property. City directories indicate a nursing home (Oakhaven Nursing Home) operated at the property from at least 1966 until 1970 and a guest home (Hardin's Guest House) from 1975 until 2003.
2006-2018	Vacant grass lot	Structures previously on the property have been razed and the property appears to be a vacant grass-covered lot.
2020-present	Asphalt-paved parking lot	The property is a fenced asphalt-paved parking lot which is connected to the property paving to the east and south.
EAST/001109 00021/710 NORTH PARKWAY		
1897-1953	Residential	The property is developed as residential.
1963-2018	Commercial	The 1963 aerial photograph shows a commercial structure on the property. City directories indicate that U-Haul and Bill & Jims Gulf Service occupied the property in 1970, Mathis Garage & Wrecker from 1975-1990, Bond Auto Service from 1995-2000, Crawley Motors from 2003-2012, and Nationwide Collision Sales in 2016.
2020-present	Asphalt-paved parking lot	By 2020, the structure on the property has been razed, and the property is a fenced asphalt-paved parking lot which is connected to the property paving to the north.
SOUTH/001108 00009/721 NORTH PARKWAY		
1897-1953	Residential	The property is developed as residential with Dunscomb Place intersecting the property. In addition, by 1937, North Parkway has been constructed adjacent to the subject property's south border.
1962-1963	Vacant lot	Existing structures have been razed and the property is part of a larger vacant grassy lot with no structures.
1964-present	Commercial and religious	The property is developed with a commercial building. City directories list Kents Stores from 1970-1980, Dollar General Store from 1985-2008, Gator's Discount Store from 2003-2012, and Island Community Church from 2016-present.

Table 8
Current and Historical Development and Uses of Adjoining Properties

Date Range	Development	Uses, Activities, Features, and Conditions
SOUTH/001108 00005C/483 NORTH MANASSAS STREET		
1897	Residential and commercial	The property is developed primarily as residential with a mill (Anthony Planing Mill) on the southwest portion of the property, at least two shops along the east portion of the property, and the Quimby Bayou intersecting the northeast and southeast portions of the property (in areas not adjacent to the subject property).
1907	Residential and commercial	More residential buildings are constructed on the property, the planing mill has been razed, and the Quimby Bayou only intersects the south portion of the property. At least two shops remain along the east portion of the property and an additional shop is visible on the southwest portion of the property.
1937-1953	Residential and commercial	By 1937, North Parkway has been constructed adjacent to the subject property's south border. The south-adjoining property remains primarily residential; however, a central portion is used as lumber storage for the Tennessee Lumber & Building Materials Co. with shops on the east portion of the property.
1962-1963	Vacant	The property is a vacant grassy lot.
1965-present	Commercial	Two warehouse buildings are constructed on the property.
SOUTH/001108 00004/661 NORTH PARKWAY		
1897-1907	Residential	The property is developed with multiple residential homes throughout.
1937-1960	Residential and commercial	By 1937, North Parkway has been constructed adjacent to the subject property's south border. Residential homes are along the west portion of the south-adjoining property while the east portion of the property is developed as the Tennessee Lumber & Building Material Co. City directories list Tennessee Lumber & Building Material Co. at the property from at least 1937 to 1960.
1962-1973	Vacant	The property is a vacant grassy lot.
1975-present	Commercial	The property is developed with a warehouse building. City directories list the following tenants at 649 North Parkway: National Temperature Control from 1980 to 1995, Pameco Corp from 2000 to 2003, and Baker Distributing Co (heating and cooling equipment and supplies) from 2008-2016. The property was purchased by the American Lebanese Syrian Associated Charities Inc in 2003.
SOUTHWEST/001118 00002C/590 DANNY THOMAS PLACE		
1897 -1963	Residential, commercial, and railroad	The property is primarily developed with residences with some shops (at the north end) and the railroad along the south portion of the property. By 1937, North Parkway has been constructed adjacent to the subject property's south border.
1962-1963	Vacant	The property is vacant except for a sign on the northeast corner of the property.
1963-present	Commercial	The property is developed with a commercial warehouse building. The railroad is no longer visible on the south portion of the property by 1990.
WEST/001096 00029/AUCTION STREET		
1897-1907	Residential and commercial	The property is primarily developed with residences and is intersected by Johnson/Jackson Avenue; however, the southern portion of the site is developed partially with shops.

Table 8
Current and Historical Development and Uses of Adjoining Properties

Date Range	Development	Uses, Activities, Features, and Conditions
1937-1952	Residential and commercial	The property is mixed-use residential and commercial. A gas station is developed on the southeast corner of the property.
1952-1997	Residential	The property is developed with multi-unit residential buildings. The gas station was razed by 1962, with the widening of the roads in this area and construction of Danny Thomas Boulevard (north/south). Jackson Avenue intersects the south portion of the property.
2003-2007	Vacant	The property is a vacant grassy lot with Jackson Avenue intersecting the south portion of the property.
2008-present	Vacant	By 2008, Jackson Avenue had been reconfigured and no longer intersects the property. The vacant grassy parcel is now bound to the north by Mill Avenue, to the east by Danny Thomas Boulevard, to the south by A.W. Willis Avenue, and by 2010 bound to the west by Uptown Street.

4.2 Adjoining Properties — Regulatory Agency File and Environmental Records Review

EnSafe used a commercial service company to obtain an environmental database search report that made environmental records reasonably ascertainable for adjoining and surrounding area properties. Standard environmental records source listings and regulatory agency files and records reviewed for adjoining properties are discussed in this section. Surrounding area sites identified on standard environmental records resources within ASTM-defined AMSDs are discussed in Section 4.3.

East — 715 Jackson Avenue

Hardin's Guest Home is listed on the RCRA generator database. The site reported as a non-generator of hazardous waste in 1980. No other environmental records were identified for this property.

East — 710 North Parkway

Old Garage is listed on the UST database (Facility ID: 9792340). Based on TDEC records reviewed, the site was registered with three USTs, two 8,000-gallon gasoline, and one 8,000-gallon waste oil, which were removed from the site in September 1990. TPH-contaminated soil was excavated from the tank pit area and disposed of offsite. Confirmation samples reportedly collected from the tank pit corners had detections of TPH, benzene, toluene, ethylbenzene, and xylenes that were below action levels. Records do not indicate if piping associated with USTs was removed and the areas sampled during closure activities. The site was issued case closure by TDEC on February 2, 1995.

South — 750 Galloway (483 North Manassas Street)

Custom Craft (750 Galloway) is listed on the RCRA generator database. The site reported as a non-generator of hazardous waste in 1980. No TDEC records were identified for this facility.

West — Auction Street/Avenue/632 North Parkway

The west-adjoining property is listed on the VCP and Remediation databases as Former North Parkway Fill (Facility ID: 79977). Based on TDEC records reviewed, the southeast corner of the site operated as a gas station from at least 1937 to approximately 1952, and the north portion of the property was residential as early as 1897 until 2002.

A 2021 site investigation included the installation of borings and temporary monitoring wells to 24 feet bgs, with associated soil and groundwater samples analyzed for VOCs, PAHs, RCRA 8 metals, and extractable petroleum hydrocarbons (EPH). Additionally, four soil-gas samples were collected from the site. Concentrations of arsenic and chromium exceeded both their residential and industrial RSLs in all soil samples collected; however, concentrations were below the TDEC background concentrations except for arsenic and chromium in two sample locations. Concentrations of VOCs and PAHs in soil were reported below their respective residential and industrial RSLs. Detected concentrations of diesel range organics and EPH in soil were reported below the Tennessee UST initial screening level (ISL). Arsenic was detected in groundwater at concentrations exceeding its tap water RSL but below the MCL. Lead was detected at a concentration equal to its tap water RSL in a single temporary well but below the MCL. Reportedly, benzene, ethylbenzene, and naphthalene exceeded their respective RSLs in two temporary wells at the south end of the site, with the concentration of benzene also exceeding its MCL. Detected concentrations of diesel range organics, oil range organics, and TN EPH did not exceed RSLs or MCLs. Additionally, naphthalene concentrations in three of the four soil gas samples reportedly exceeded the residential VISL but were below the commercial VISL.

In September 2023, surface soil samples were collected from the site and analyzed for VOCs, PAHs, RCRA 8 Metals, and EPH. Arsenic was reportedly detected in soil exceeding the industrial RSL but below the Tennessee background concentration. Other detected metals were at concentrations below their industrial RSLs. VOCs were reportedly detected at concentrations below their respective industrial RSLs. Benzo(a)pyrene was reportedly detected at concentrations exceeding the industrial RSL at four locations, three of which were at the south end of the site. Detected concentrations of EPH were below the ISLs.

A notice of land use restriction was signed for the site on January 14, 2025, which restricts land use to industrial and prohibits potable use of groundwater.

Based on information reviewed and presumed groundwater flow direction, the adjoining properties do not appear to have impacted the subject property.

4.3 Surrounding Area Properties

The environmental database search identified 45 sites beyond the subject property and adjoining properties. Of those sites, 14 are within the ASTM-defined AMSDs for their respective listings. Based on information obtained from standard government environmental record sources, regulatory agency files, and/or records review, none of the sites were identified as having releases that have migrated, have likely migrated, or have the potential to migrate to the subject property.

4.4 Unmapped Sites

The environmental database search identified 57 sites with environmental records that it could not map due to poor or inadequate address information. Using internet mapping tools and review of database information, EnSafe determined the sites are outside the ASTM-defined AMSDs for the databases on which they are listed.

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5.0 VAPOR ENCROACHMENT SCREENING

At the request of the City of Memphis and Shelby County CRA, EnSafe conducted a Tier I VES of the subject property in general accordance with ASTM E2600-22. EnSafe's VES consisted of the following:

- Soliciting and reviewing available regulatory records and information from a commercial environmental database provider for the subject property and adjoining/surrounding area properties, to identify documented releases of chemicals of concern (COCs), as defined by ASTM E2600-22, with potential for vapor encroachment at the subject property. The AMSDs are generally defined by the ASTM E2600-22 as one-third of a mile for COCs and one-tenth of a mile for petroleum hydrocarbon COCs.

Environmental Records Review

In addition to environmental records obtained and reviewed for this Phase I ESA (summarized in Table 7), EnSafe used an online Vapor Screening tool provided by Environmental Risk Information Services to identify sites listed in environmental regulatory databases with documented releases to soil or groundwater which could represent potential for a vapor encroachment condition (VEC) at the subject property (Appendix G). The ERIS Vapor Screening tool incorporates the AMSDs listed in the ASTM International Standard E2600-22.

Subject Property

The environmental database information included multiple listings for the subject property, including SRP, VCP, and LUST listings. These listings are all related to releases of either chlorinated solvents and/or petroleum to the southwest portion of the subject property as discussed in Sections 3.4.1 and 3.4.2.

As previously discussed in Section 2.2.3, EnSafe conducted a soil-gas survey which included the southwest portion of the subject property and the south-adjoining property (661 North Parkway). During this investigation, TCE and PCE were detected at concentrations exceeding the U.S. EPA commercial VISLs in SG06 near MW04 along the south subject property border. TDEC guidance requires evaluation of cumulative risks and hazards to determine appropriate mitigation responses where potential vapor intrusion is identified. The soil-gas sample collected at SG06 exhibits risk exceeding TDEC's guidance risk threshold under commercial scenarios.

Adjoining/Surrounding Area Properties

Several adjoining and surrounding area properties were identified with environmental records and in environmental database information listings with releases to soil and/or groundwater. Of the sites,

the nearest to the subject property and west-adjoining property, Former North Parkway Fill (Facility ID: 79977), is listed on the VCP and Remediation databases. As previously discussed in Section 4.2, investigations at the site have involved soil, groundwater, and soil-gas vapor sampling. Naphthalene was detected in three of the four soil gas samples exceeding the residential VISL but below the commercial VISL. However, based on the upgradient location of the subject property and presumed groundwater flow direction to the southwest, the COC impacts associated with the west-adjoining property are not considered a VEC for the subject property.

Goodyear ASC (726 North Parkway) is approximately 200 feet east of the subject property and is listed on the LUST database. In November 1995, one waste oil UST was removed from the site; soil sampled during the removal was found to have petroleum impacts and was stockpiled. Additional soil testing found that detections were below applicable action levels, and the site was issued closure by TDEC on July 11, 1997. Based on the TDEC records reviewed, this site is unlikely to represent a VEC for the subject property based on its closure status and limited petroleum impacts to soil.

Jackson Quick Stop (766 Jackson Avenue) is approximately 740 feet east-northeast of the subject property and is listed on the LUST database. Petroleum-impacted soil was discovered during the removal of three USTs from the site in June 2004. Petroleum impacts were also identified in groundwater at the site, with an estimated flow direction to the north. Site-specific cleanup levels were established for soil and groundwater at the site and TDEC issued case closure on September 3, 2010. Based on environmental database information and TDEC records reviewed, this site is unlikely to represent a VEC for the subject property based on the TDEC closure status and the reported groundwater flow direction.

Conclusion

The subject property has documented detections of chlorinated solvent VOCs in soil-gas on the south portion of the property from historical subject property operations, including gas station and dry cleaner, which represents a VEC.

Based on the environmental database information reviewed, including TDEC closure status, the limited petroleum impacts from adjoining and surrounding area properties to soil and groundwater appear unlikely to represent a significant source for a VEC at the subject property.

6.0 RESULTS OF THE PHASE I ENVIRONMENTAL SITE ASSESSMENT

EnSafe performed a Phase I ESA of the former Ibrahim "Chism Trail" site at 544 and 645 Jackson Avenue in Memphis, Shelby County, Tennessee, in conformance with the scope and limitations of ASTM E1527-21. Any exceptions to, or deletions from, this practice mentioned throughout the report are described in Section 5.3.

6.1 Findings and Environmental Professional Opinion

This Phase I ESA identified the following:

- The 3.31-acre subject property is developed with a 25,900-square-foot vacant grocery store building with adjoining asphalt and concrete paving. A recessed concrete loading dock is on the north side of the building and an asphalt-paved parking lot is west of the building. The paved parking lot is fenced, with a manned security gate and driveway along the north side. The asphalt-paved parking area is leased to ALSAC. The west portion of the subject property along Danny Thomas Boulevard is grass-covered.

- Based on historical records, the subject property was residential as early as 1897, with portions remaining residential until 1960. By 1932, the southwest corner of the subject property was developed with a gas station that operated until at least the 1990s. Additional occupants of the southwest portion of the subject property include a dry cleaner, convenience store, and liquor store. By 1960, the east portion of the subject property was developed with a grocery store building, operating as Kroger from 1963 until 1992 and Chism Trail from 1997 until 2003. In January 2008, Jackson Avenue was rerouted north and off of the subject property, resulting in the closing of Peyton Street. By April 2008, the building on the southwest portion of the subject property was razed. By 2014, additional asphalt paving, painted parking spots, and fencing around the parking area were added, along with gated entrances on the north and south sides of the subject property. By 2020, a guardhouse was added to the north parking lot entrance.

- The remaining former grocery store building on the subject property has an entryway, two former restroom spaces along the east wall (no restroom fixtures remain), and a loading dock area in the northeast corner of the building interior. At the time of EnSafe's site assessment, the grocery store building was vacant and empty except for a pile of tires and wood pallets in the entryway.

- Rust-colored stains (approximately 2 square feet and less) and white-colored stains (approximately 4 square feet and less) were observed on the concrete floor throughout the building's interior. The integrity of the concrete flooring was observed in good condition.

- Eight floor drains were observed near the former restrooms along the southwest portion of the building interior. Rust-colored staining was observed around some of the floor drains. An additional floor drain was observed in front of one of the overhead bay doors in the interior loading dock area and a trench drain was observed in the recessed loading dock area on the north exterior side of the building. No staining or other evidence of a hazardous substance or petroleum product release was observed around the loading dock area drains. Site contacts were not aware of subject property drain connections or associated discharge points.

- Groundwater monitoring wells were observed on the subject property at the time of EnSafe's site assessment. One was observed on the west portion of the asphalt-paved parking area and two were observed in the grassy area on the west portion of the subject property. Based on review of TDEC records, there are at least five active monitoring wells on the subject property. The observed monitoring wells appeared to be in overall good condition.

- The southwest portion of the subject property operated as a gas station from approximately 1932 until the 1990s and was registered with three 12,000-gallon gasoline USTs. The USTs were removed from the subject property in January 1992 after a release was discovered along the underground fuel lines in March 1990. Groundwater sampling conducted at the site between 1992 and 1997 identified TPH in groundwater; however, by May 1997, TPH detections were reported below site-specific risk criteria, and the release was issued case closure by TDEC on August 15, 1997.

- The subject property is listed on the SRP and VCP databases. TDEC files indicate that most activities and investigations at the subject property have been done under the Ibrahim Property Facility ID and have been mostly limited to the west/southwest portion of the subject property. Investigations at the west/southwest portion of the subject property have included the removal of additional USTs and subsurface structures, installation and sampling of groundwater monitoring wells, and soil-vapor sampling. Analytical results indicate the presence of PCE in groundwater and soil vapor in the southwest portion of the subject property. Groundwater flow is reported generally to the southwest.

- The subject property is in a commercial and residential area of Memphis, Tennessee. Based on historical sources reviewed, the surrounding area was developed with residential and commercial properties by 1897. Adjoining properties were identified with environmental database records, including the west-adjoining property which was identified on the VCP and Remediation databases. However, based on information reviewed, including TDEC Closure status and presumed groundwater flow direction, the adjoining properties do not appear to have impacted the subject property.

- In October 2019, EnSafe conducted a soil-gas survey which included the southwest portion of the subject property and the south-adjoining property. During this investigation, TCE and PCE were detected on the subject property at concentrations exceeding the U.S. EPA commercial VISLs and TDEC's risk threshold for commercial property use. As such, chlorinated solvent VOCs in onsite soil gas from historical subject property operations, including a dry cleaner, represent a VEC for the subject property.

6.2 Conclusions

6.2.1 Recognized Environmental Conditions, Controlled Recognized Environmental Conditions and Significant Data Gaps

This assessment has revealed the following RECs in connection with the subject property:

- Chlorinated solvent-contaminated groundwater and soil vapor impacts on the southwest portion of the subject property from historical use as a gas station and/or dry cleaner.

6.2.2 Historical Recognized Environmental Conditions and *de minimis conditions*

EnSafe identified the following *historical recognized environmental condition* and *de minimis condition*:

- The UST removal and closure between January 1992 and August 1997 on the southwest portion of the subject property is considered a *historical recognized environmental condition* based on petroleum-related concentrations not exceeding site-specific action levels for groundwater, removal of the USTs, and the TDEC issuance of case closure without land use controls and/or continuing obligations.

- Rust and white-colored staining observed on the concrete floor throughout the subject property building is considered a *de minimis condition* due to the limited extent and the overall good condition of the concrete floor.

6.2.3 Business Environmental Risks

EnSafe identified a *business environmental risk* associated with the subject property.

- The VEC identified for the subject property represents a *business environmental risk* based on the potential for indoor-air hazards that could impact future property development/use plans.

6.3 Data Gaps, Limiting Conditions, and Deviations

EnSafe's Phase I ESA conforms to ASTM E1527-21. EnSafe did not sample soil, soil vapor, groundwater, or surface water as part of the Phase I ESA. Assessment of these items is based upon visual observations and sources as referenced throughout the report. This report should not be construed as verifying the present property owner or operator's compliance with federal, state, and local regulations or as a recommendation to purchase, sell, or develop the subject property. The following data gaps, limiting conditions, and deviations apply to this Phase I ESA:

- EnSafe did not interview former occupants of the subject property because contact information was not identified.

- The lack of power and poor lighting within the building limited observation of the building's interior.

6.4 Significant Assumptions

This report is a prudent, reasonable evaluation of the subject property's observed environmental condition. EnSafe assumes no responsibility for conditions or information not practically reviewable, or information not accurately disseminated by any party. The following significant assumptions were used to formulate the conclusions and opinions contained in this report:

- Environmental database information is accurate and complete.

- Conditions at the time of the site visit were representative of ordinary conditions at the subject property.

- Persons interviewed answered questions in good faith and to the extent of their knowledge.

- The subject property boundaries depicted on figures and described herein are accurate.

6.5 User Reliance and Continued Viability of Environmental Site Assessment

The assessment was prepared under contract for the exclusive use of the City of Memphis and Shelby County CRA. Any other party's reliance on this report is at risk unless EnSafe grants authorization. In accordance with ASTM E1527-21, this Phase I ESA is presumed to be viable for 180 days before the date of acquisition or intended transaction (e.g., lease or refinance). An ASTM-compliant Phase I ESA may be used for 1 year from the date of acquisition or intended transaction provided all the components listed in Table 9 are conducted or updated within 180 days before the date of acquisition or intended transaction.

Table 9
Report Viability Dates

Component	Date(s) or Date Range Completed	Indicate the Reason if Not Completed
Interviews with owners, operators, occupants	January 22, 2025, and February 3, 2025	
Reviews of federal, tribal, state, and local government records	February 7, 2025	
Environmental Lien Search	January 28, 2025	
Visual inspection of the subject and adjoining properties	January 22, 2025	
Declaration by the Environmental Professional responsible for the assessment or update	February 24, 2025	

7.0 REFERENCES

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EnSafe Inc. *Former Ibrahim Property*

- *Phase II Environmental Site Assessment, 645 Jackson Avenue Property, Memphis, Tennessee.* December 31, 2007
- *2016 Groundwater Sampling Report, 645 Jackson Avenue, Memphis, Tennessee*. July 29, 2016.
- *Former Ibrahim Property – 2018 Monitoring Well and Groundwater Sampling Report, 645 Jackson Avenue, Memphis, Tennessee.* June 15, 2018.
- *Active Soil-Gas Sampling Report – Former Ibrahim Property – 645 Jackson Avenue, Memphis, Tennessee.* January 15, 2020.

Environmental Risk Information Systems. *Database Report. Former Ibrahim "Chism Trail" Site.* Order No: 25012000253. 266 Elmwood Avenue, Box 930, Buffalo, New York 14222. 866-517-5204. 2025, January 21.

- *City Directory*. Order No: 25012000253. 2025, January 23.
- *Fire Insurance Maps*. Order No: 25012000253. 2025, January 21.
- *Historical Aerials*. Order No: 25012000253. 2025, January 21.
- *Physical Setting Report*. Order No: 25012000253. 2025, January 20.
- *Topographic Maps*. Order No: 25012000253. 2025, January 20.
- *Chain of Title and Lien Searches*. Order No: 25012000253-COTEL1, -COTEL2, and -COTEL3. 2025, January 28.

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— Envirofacts (website). Regulatory information research. 2025, January 28. Retrieved from: https://enviro.epa.gov/envirofacts

Appendix A
Figures

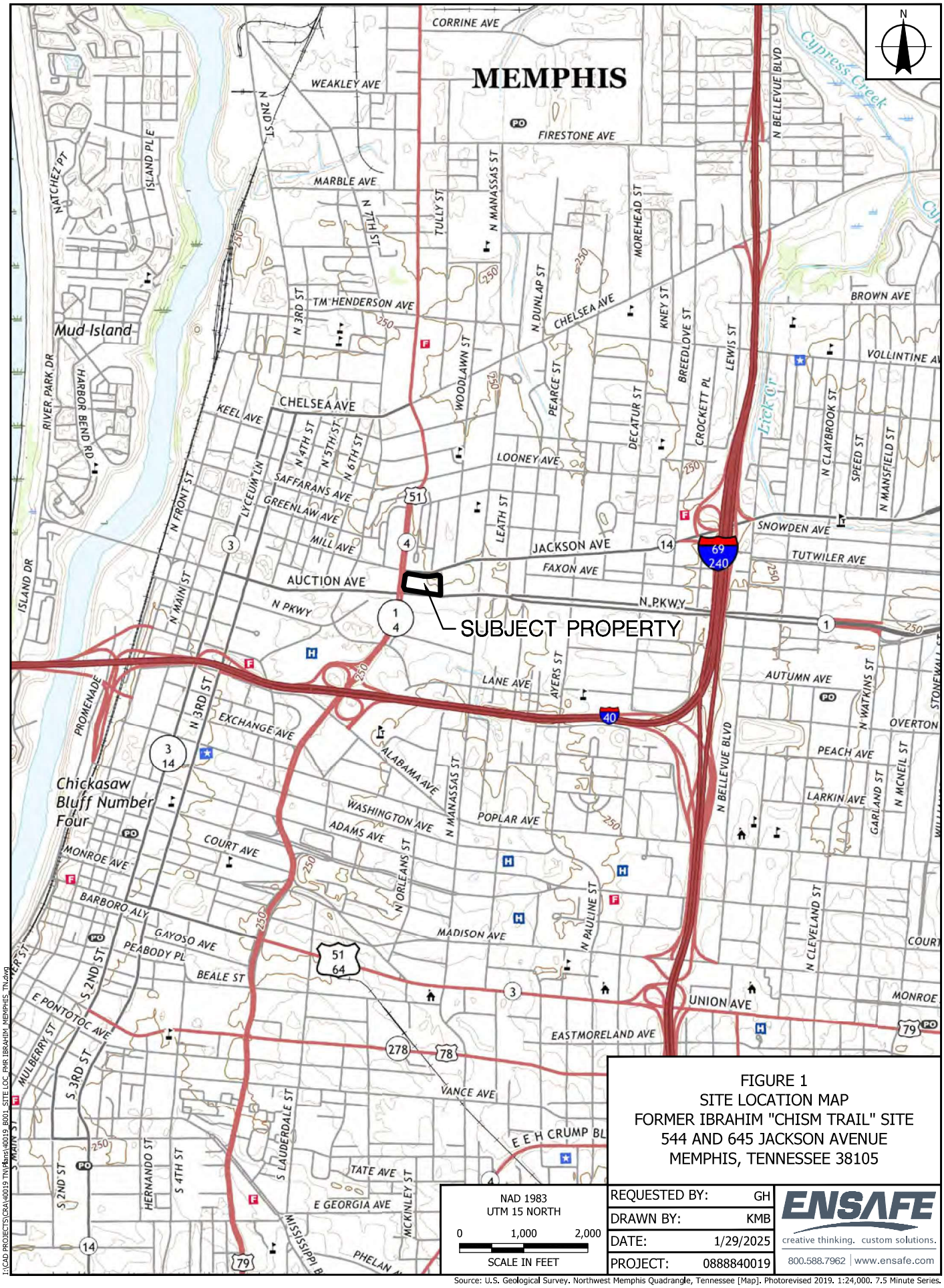

FIGURE 1
SITE LOCATION MAP
FORMER IBRAHIM "CHISM TRAIL" SITE
544 AND 645 JACKSON AVENUE
MEMPHIS, TENNESSEE 38105

REQUESTED BY:	GH
DRAWN BY:	KMB
DATE:	1/29/2025
PROJECT:	0888840019

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Source: U.S. Geological Survey. Northwest Memphis Quadrangle, Tennessee [Map]. Photorevised 2019. 1:24,000. 7.5 Minute Series.

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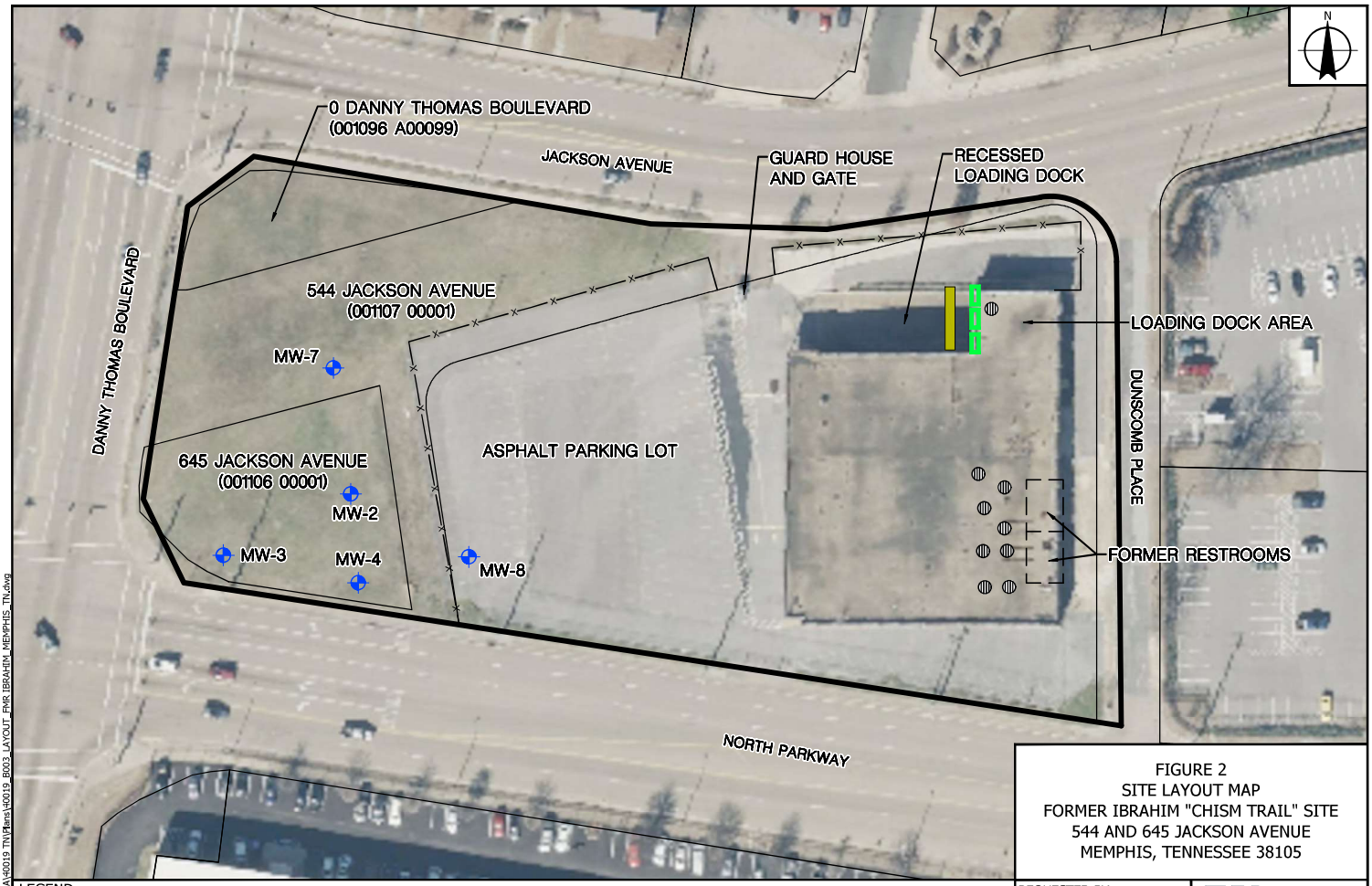

FIGURE 2
SITE LAYOUT MAP
FORMER IBRAHIM "CHISM TRAIL" SITE
544 AND 645 JACKSON AVENUE
MEMPHIS, TENNESSEE 38105

LEGEND

- FLOOR DRAIN
- MONITORING WELL
- APPROXIMATE SUBJECT PROPERTY BOUNDARY
- APPROXIMATE PARCEL BOUNDARY
- FENCING
- TRENCH DRAIN
- OVERHEAD BAY DOOR

NAD 1983 STATE PLANE
TENNESSEE FEET

0 40 80
SCALE IN FEET

REQUESTED BY:	GH
DRAWN BY:	KMB
DATE:	2/14/2025
PROJECT:	0888840019

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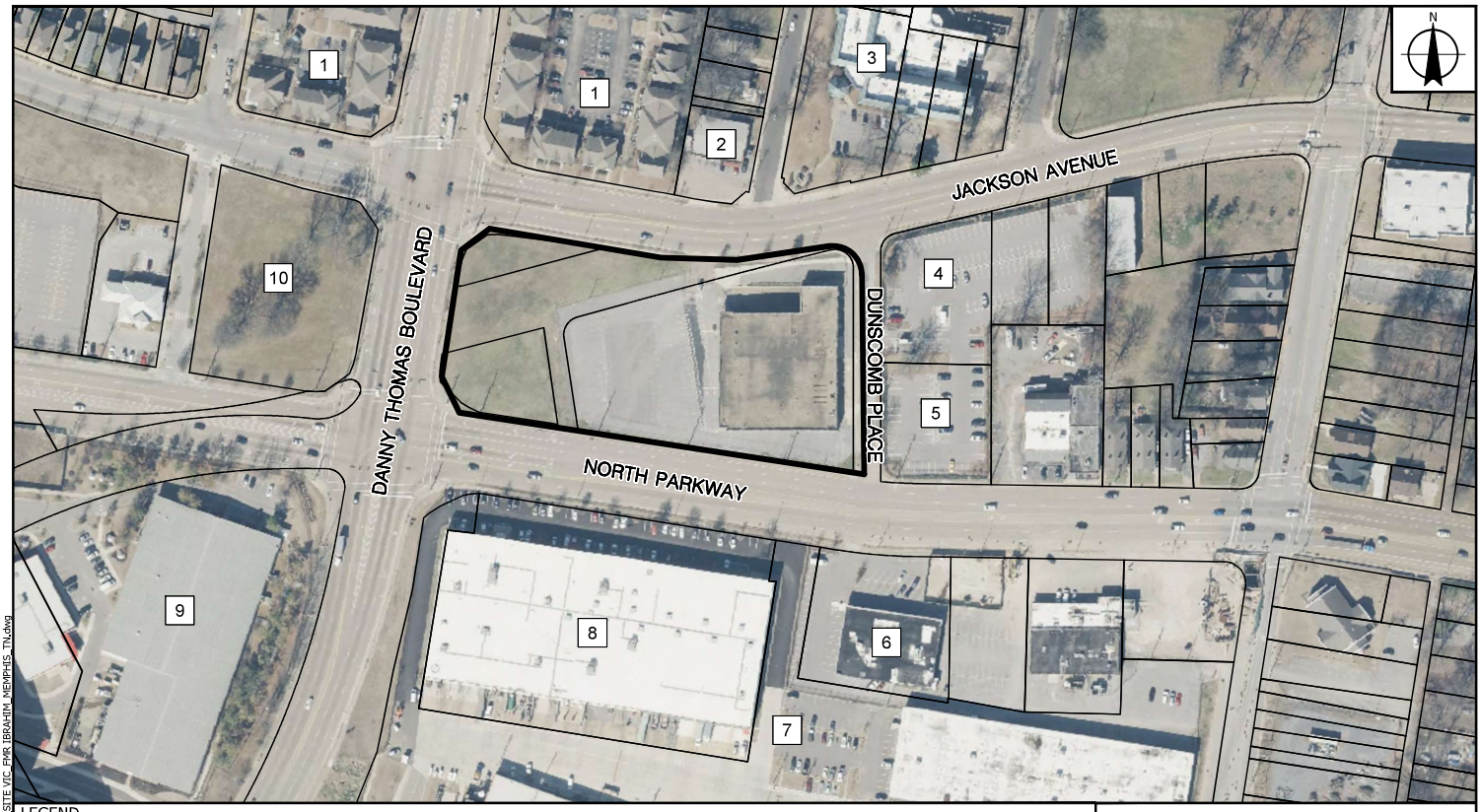
Source: ©2024 Microsoft Corporation © 2024 Maxar ©CNES (2024) Distribution Airbus DS Bing

I:\CAD PROJECTS\CRA\40019 TN\Plans\40019_B003_LAYOUT_FMR IBRAHIM_MEMPHIS_TN.dwg



LEGEND

- APPROXIMATE SUBJECT PROPERTY BOUNDARY
- APPROXIMATE PARCEL BOUNDARY
- 1 RESIDENTIAL OWNED BY MEMPHIS HOUSING AUTHORITY
- 2 VILLAGE MART (684 JACKSON AVENUE)
- 3 SALVATION ARMY (OFFICES AND RESIDENCE CENTER) (696 JACKSON AVENUE)
- 4 ASPHALT PARKING LOT OWNED BY ALSAC (715 JACKSON AVENUE)
- 5 ASPHALT PARKING LOT OWNED BY BERMAR ASSOCIATES IV LLC (710 NORTH PARKWAY)
- 6 ISLAND COMMUNITY CHURCH (721 NORTH PARKWAY)
- 7 WAREHOUSE BUILDINGS OWNED BY ALSAC (483 NORTH MANASSAS STREET)
- 8 WAREHOUSE BUILDING OWNED BY ALSAC (661 NORTH PARKWAY)
- 9 ST. JUDE CAMPUS OFFICE BUILDING (590 DANNY THOMAS PLACE)
- 10 VACANT GRASSY LOT OWNED BY MEMPHIS HOUSING AUTHORITY - AUCTION STREET

ALSAC AMERICAN LEBANESE SYRIAN ASSOCIATED CHARITIES INC.

NAD 1983 STATE PLANE TENNESSEE FEET

0 100 200

SCALE IN FEET

FIGURE 3
SITE VICINITY MAP
FORMER IBRAHIM "CHISM TRAIL" SITE
544 AND 645 JACKSON AVENUE
MEMPHIS, TENNESSEE 38105

REQUESTED BY:	GH
DRAWN BY:	KMB
DATE:	1/29/2025
PROJECT:	0888840019

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Source: Google Earth Pro Imagery Date: July 24, 2022

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Appendix B
Photo Log

PHOTO NO. 1 **DESCRIPTION:**	View of the asphalt parking lot and the vacant grocery store building on the east portion of the subject property. The parking lot is currently leased to American Lebanese Syrian Associated Charities Inc.

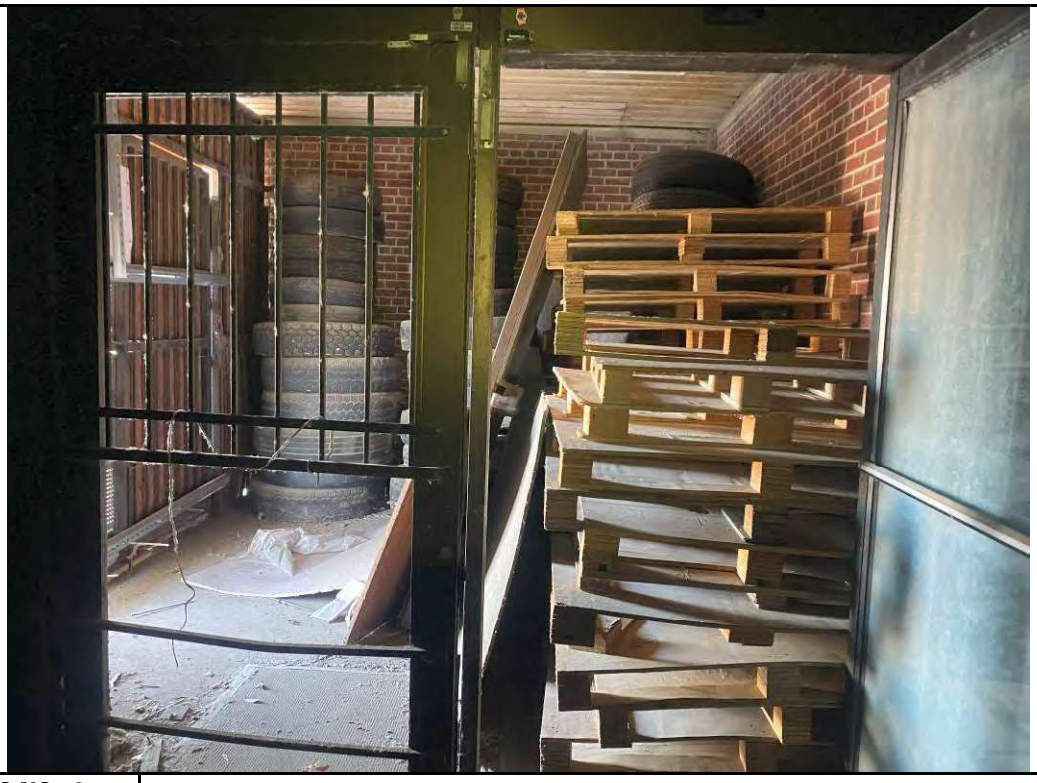


PHOTO NO. 2 **DESCRIPTION:**	View of the subject property building entryway with tires and wood pallets.

PHOTO NO. 3 **DESCRIPTION:**	General view of the subject property building interior. The building was vacant and empty at the time of EnSafe's site assessment.

PHOTO NO. 4 **DESCRIPTION:**	View of some of the floor drains (arrows) observed within the subject property building near the former restroom area. Also, note the rust and white colored staining on the concrete floor.

PHOTO NO. 5 **DESCRIPTION:**	View of the interior loading dock area within the subject property building.

PHOTO NO. 6 **DESCRIPTION:**	View of the recessed loading dock on the north side of the subject property building.

PHOTO NO. 7 **DESCRIPTION:**	View of the grassy area on the west side of the subject property.

PHOTO NO. 8 **DESCRIPTION:**	View of one of the monitoring wells observed on the subject property.

PHOTO NO. 9 **DESCRIPTION:**	View towards the north-adjoining Memphis Housing Authority properties.

PHOTO NO. 10 **DESCRIPTION:**	View towards the north-adjoining Village Mart.

PHOTO NO. 11 **DESCRIPTION:**	North view towards the north-adjoining Salvation Army property.

PHOTO NO. 12 **DESCRIPTION:**	View towards the east-adjoining parking lots.

PHOTO NO. 13 DESCRIPTION:	View towards the south-adjoining warehouse buildings.

PHOTO NO. 14 DESCRIPTION:	View to the west across the subject property. Another grass lot adjoins to the west across Danny Thomas Boulevard.

Appendix C
Historical Documents

ERIS

HISTORICAL AERIALS

Project Property: Former Ibrahim "Chism Trail" Site
544 and 645 Jackson Avenue
Memphis TN 38105

Project No: Z00000005

Requested By: EnSafe Inc.

Order No: 25012000253

Date Completed: January 21,2025

Environmental Risk Information Services
A division of Glacier Media Inc.
1.866.517.5204 | info@erisinfo.com | erisinfo.com

Date	Source	Scale	Comments
2023	United States Department of Agriculture	1" = 500'	
2022	Maxar Technologies	1" = 500'	
2021	United States Department of Agriculture	1" = 500'	
2018	United States Department of Agriculture	1" = 500'	
2016	United States Department of Agriculture	1" = 500'	
2014	United States Department of Agriculture	1" = 500'	
2012	United States Department of Agriculture	1" = 500'	
2010	United States Department of Agriculture	1" = 500'	
2008	United States Department of Agriculture	1" = 500'	
2007	United States Department of Agriculture	1" = 500'	
2006	United States Department of Agriculture	1" = 500'	
2004	United States Department of Agriculture	1" = 500'	
1997	United States Geological Survey	1" = 500'	
1990	United States Geological Survey	1" = 500'	
1984	United States Geological Survey	1" = 500'	
1973	United States Geological Survey	1" = 500'	
1963	United States Geological Survey	1" = 500'	
1953	Agricultural Stabilization & Conserv. Service	1" = 500'	
1937	Agricultural Stabilization & Conserv. Service	1" = 500'	

Year: 2023
Source: USDA
Scale: 1" = 500'
Comment:

Address: 544 and 645 Jackson Avenue, Memphis, TN
Approx Center: -90.03632286,35.15606718

Order No: 25012000253

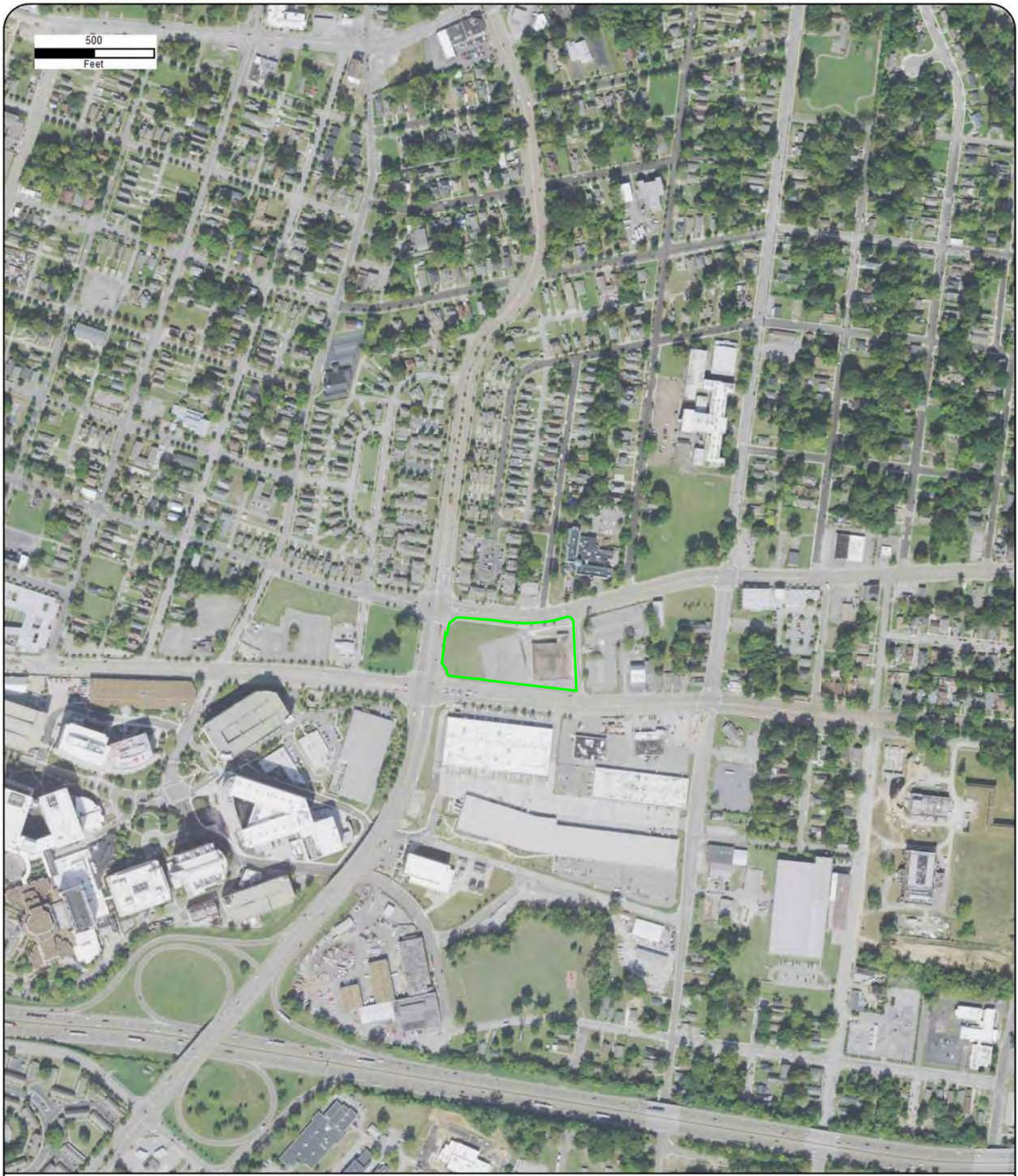
ERIS

Year: 2022
Source: MAXAR
Scale: 1" = 500'
Comment:

Address: 544 and 645 Jackson Avenue, Memphis, TN
Approx Center: -90.03632286,35.15606718

Order No: 25012000253

ERIS



Year: 2021
Source: USDA
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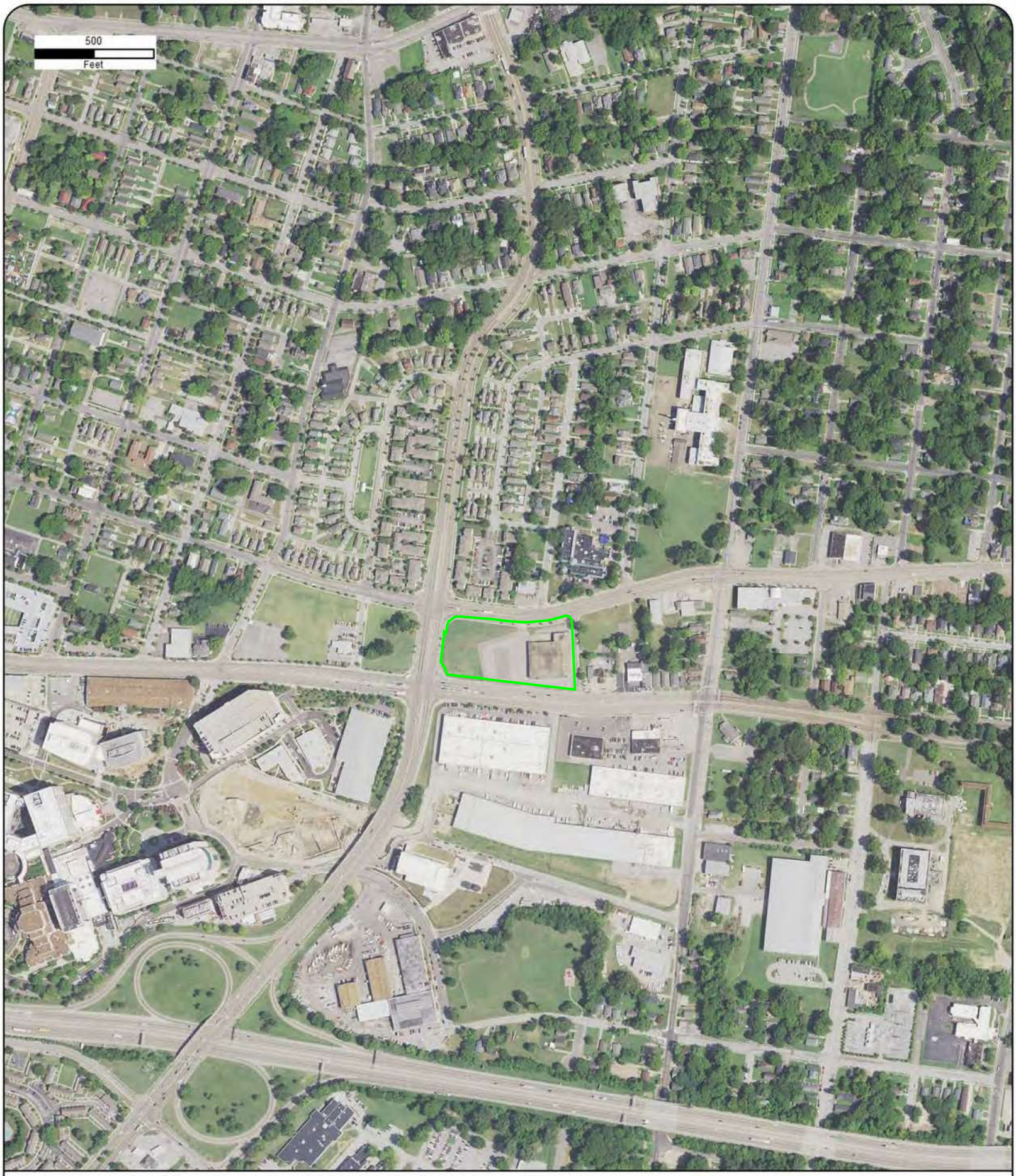

Year: 2018
Source: USDA
Scale: 1" = 500'
Comment:

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Order No: 25012000253

ERIS

Year: 2016
Source: USDA
Scale: 1" = 500'
Comment:

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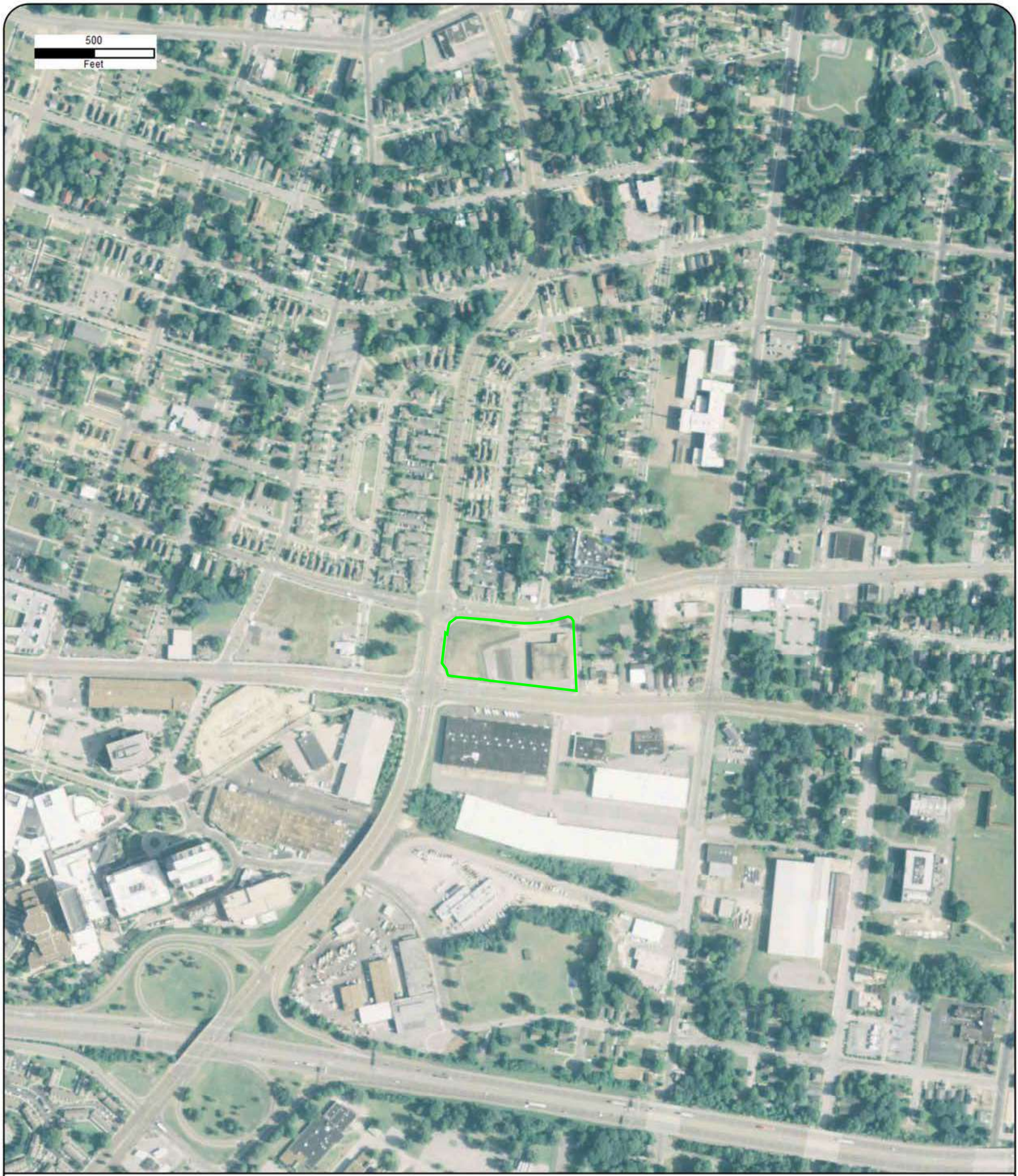
Order No: 25012000253

ERIS



Year: 2014
Source: USDA
Scale: 1" = 500'
Comment:

Address: 544 and 645 Jackson Avenue, Memphis, TN
Approx Center: -90.03632286,35.15606718

Order No: 25012000253

ERIS

Year: 2012
Source: USDA
Scale: 1" = 500'
Comment:

Address: 544 and 645 Jackson Avenue, Memphis, TN
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Order No: 25012000253

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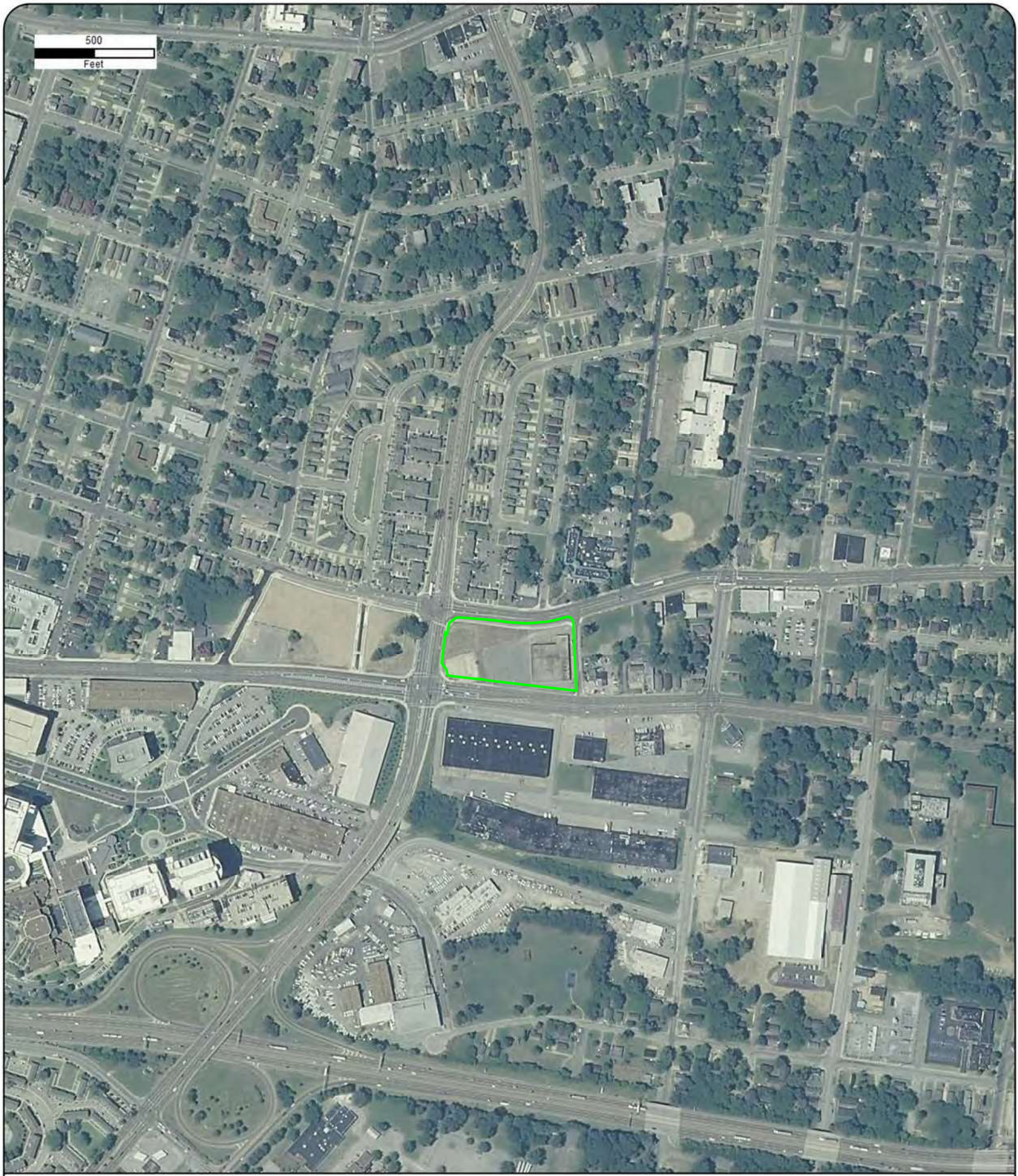

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Order No: 25012000253

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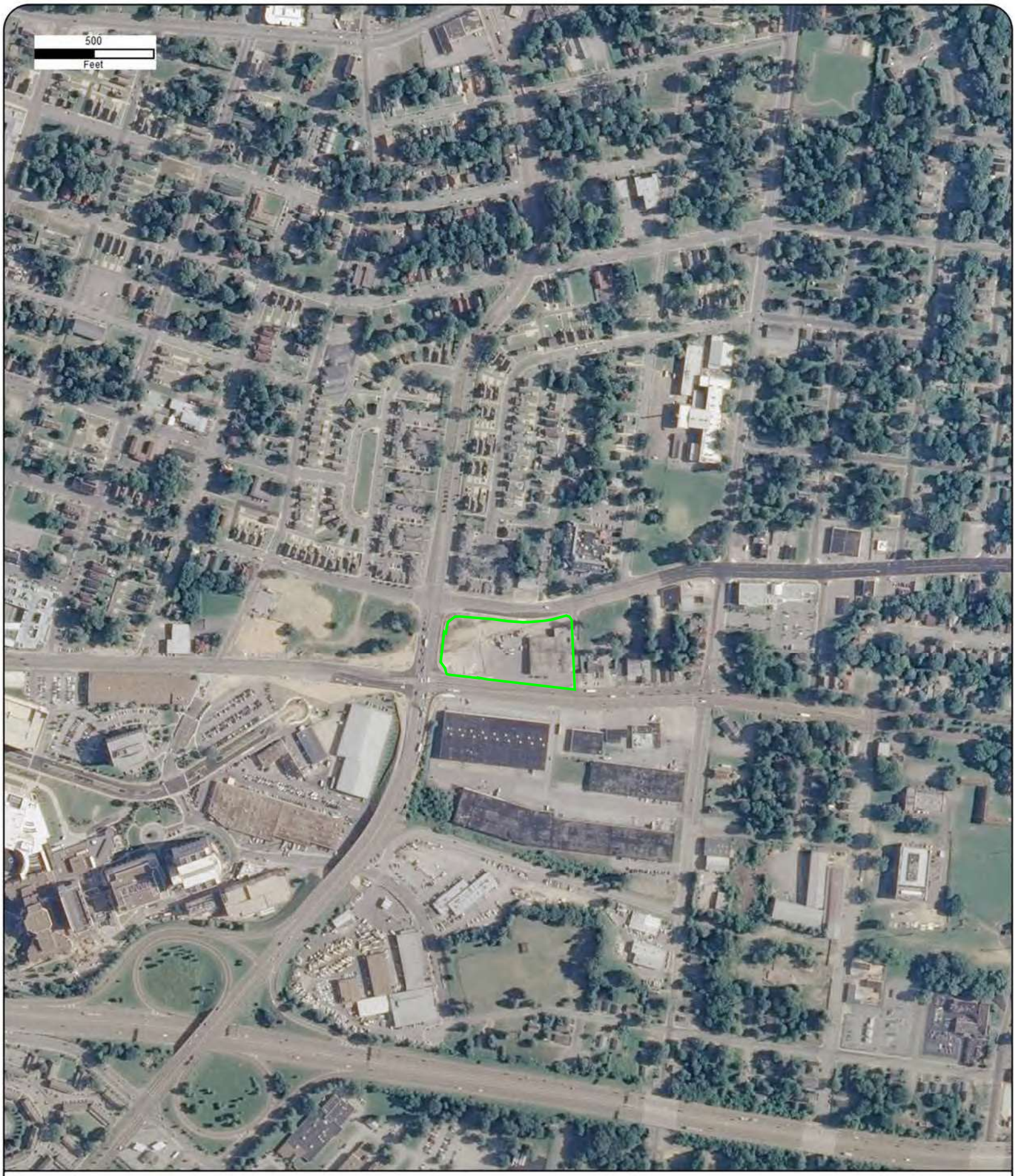

Year: 2008
Source: USDA
Scale: 1" = 500'
Comment:

Address: 544 and 645 Jackson Avenue, Memphis, TN
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Order No: 25012000253

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Year: 2007
Source: USDA
Scale: 1" = 500'
Comment:

Address: 544 and 645 Jackson Avenue, Memphis, TN
Approx Center: -90.03632286,35.15606718

Order No: 25012000253

ERIS

Year: 2006
Source: USDA
Scale: 1" = 500'
Comment:

Address: 544 and 645 Jackson Avenue, Memphis, TN
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Order No: 25012000253

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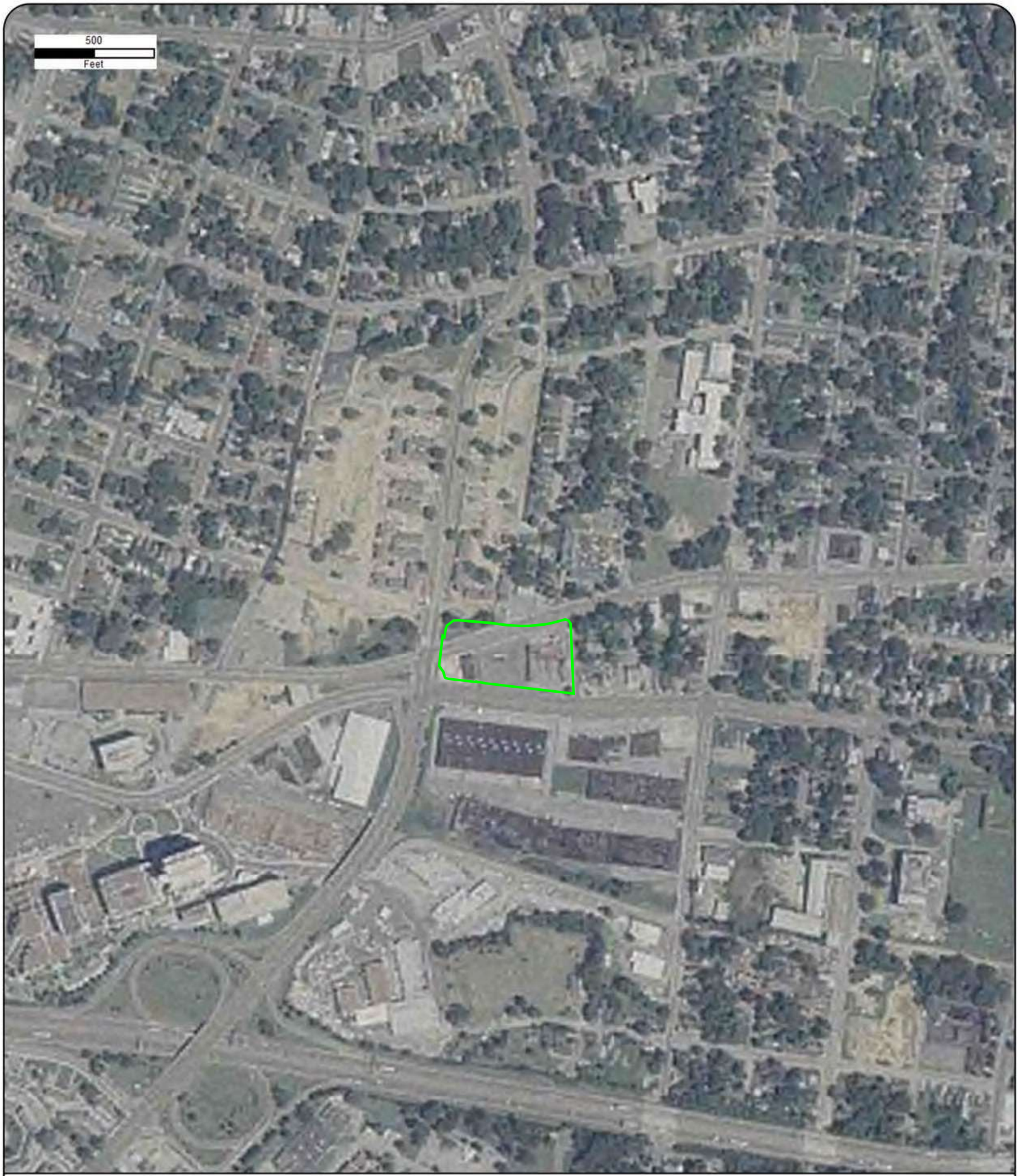


Year: 2004
Source: USDA
Scale: 1" = 500'
Comment:

Address: 544 and 645 Jackson Avenue, Memphis, TN
Approx Center: -90.03632286,35.15606718

Order No: 25012000253

ERIS

Year: 1997
Source: USGS
Scale: 1" = 500'
Comment:

Address: 544 and 645 Jackson Avenue, Memphis, TN
Approx Center: -90.03632286,35.15606718

Order No: 25012000253

ERIS

Year: 1990
Source: USGS
Scale: 1" = 500'
Comment:

Address: 544 and 645 Jackson Avenue, Memphis, TN
Approx Center: -90.03632286,35.15606718

Order No: 25012000253

ERIS

Year: 1984
Source: USGS
Scale: 1" = 500'
Comment:

Address: 544 and 645 Jackson Avenue, Memphis, TN
Approx Center: -90.03632286,35.15606718

Order No: 25012000253

ERIS

Year: 1973
Source: USGS
Scale: 1" = 500'
Comment:

Address: 544 and 645 Jackson Avenue, Memphis, TN
Approx Center: -90.03632286,35.15606718

Order No: 25012000253

ERIS

Year: 1963
Source: USGS
Scale: 1" = 500'
Comment:

Address: 544 and 645 Jackson Avenue, Memphis, TN
Approx Center: -90.03632286,35.15606718

Order No: 25012000253

ERIS

Year: 1953
Source: ASCS
Scale: 1" = 500'
Comment:

Address: 544 and 645 Jackson Avenue, Memphis, TN
Approx Center: -90.03632286,35.15606718

Order No: 25012000253

ERIS

Year: 1937
Source: ASCS
Scale: 1" = 500'
Comment:

Address: 544 and 645 Jackson Avenue, Memphis, TN
Approx Center: -90.03632286,35.15606718

Order No: 25012000253

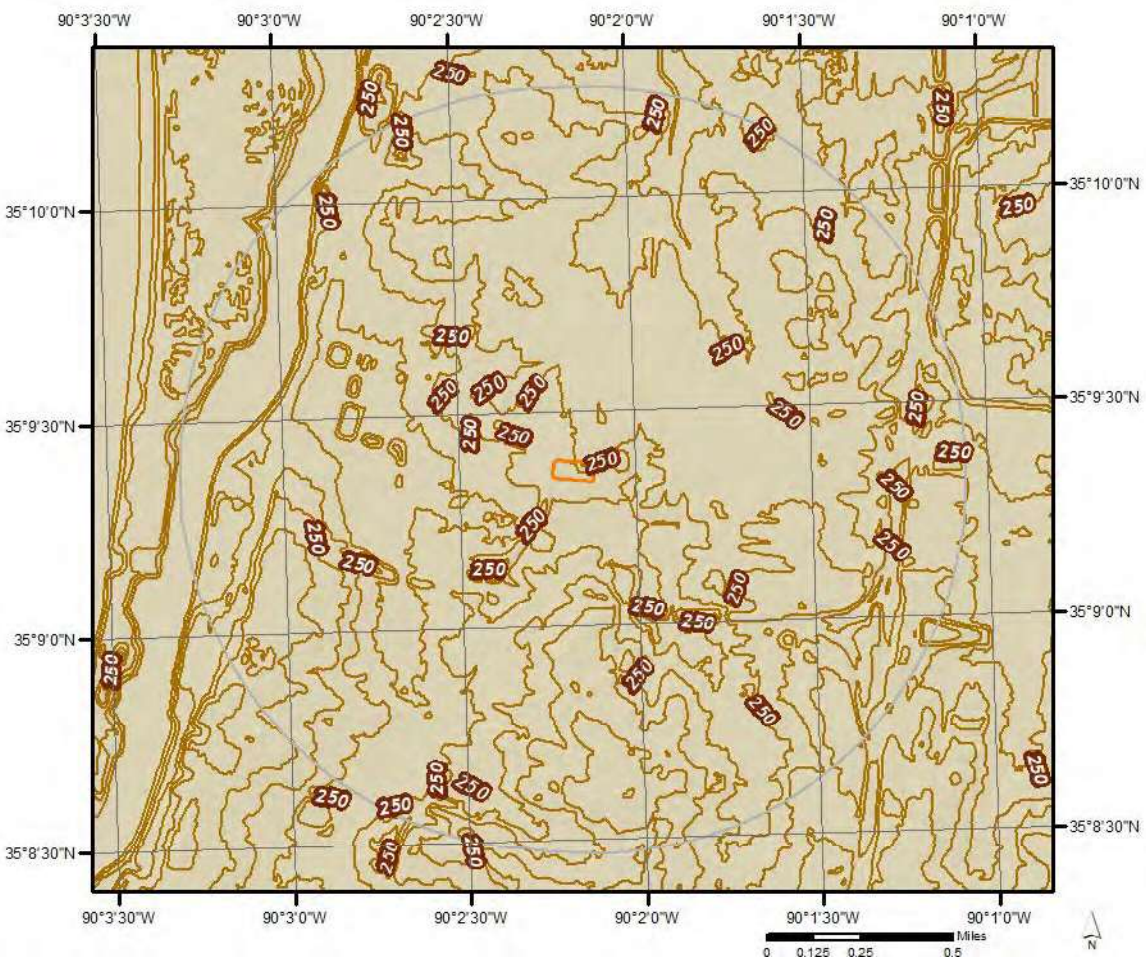
ERIS

Topographic Information

The previous topographic map(s) are created by seamlessly merging and cutting current USGS topographic data. Below are shaded relief map(s), derived from USGS elevation data to show surrounding topography in further detail.

Topographic information at project property:

Elevation:	249.19 ft
Slope Direction:	SW



Hydrologic Information

Wetland

0 0.075 0.15 0.3 Miles

N

This map shows wetland existence using data from US Fish & Wildlife.
Data coverage is shown to the right. Gray indicates no data available in the area.

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

ERIS

Hydrologic Information

Flood Hazard Zones

This map shows FEMA flood hazard zones based on FEMA's National Flood Hazard Layer. FIRM Panels are overlayed. An absent FIRM panel represents no data available.

Miles
0 0.075 0.15

N

- 1% Annual Chance Flood Hazard
- Regulatory Floodway
- Special Floodway
- Area of Undetermined Flood Hazard
- 0.2% Annual Chance Flood Hazard
- Future Conditions 1% Annual Chance Flood Hazard
- Area with Reduced Risk Due to Levee
- Area with Risk Due to Levee
- Open Water

Quadrangle(s): Northwest Memphis,TN

ERIS

Hydrologic Information

The Wetland Type map shows wetland existence overlaid on an aerial imagery. The Flood Hazard Zones map shows FEMA flood hazard zones overlaid on an aerial imagery. Relevant FIRM panels and detailed zone information is provided below.
For detailed Zone descriptions please click the link: https://floodadvocate.com/fema-zone-definitions

Available FIRM Panels in area:	47157C0270F(effective:2007-09-28) 05035C0375E(effective:2011-05-03)

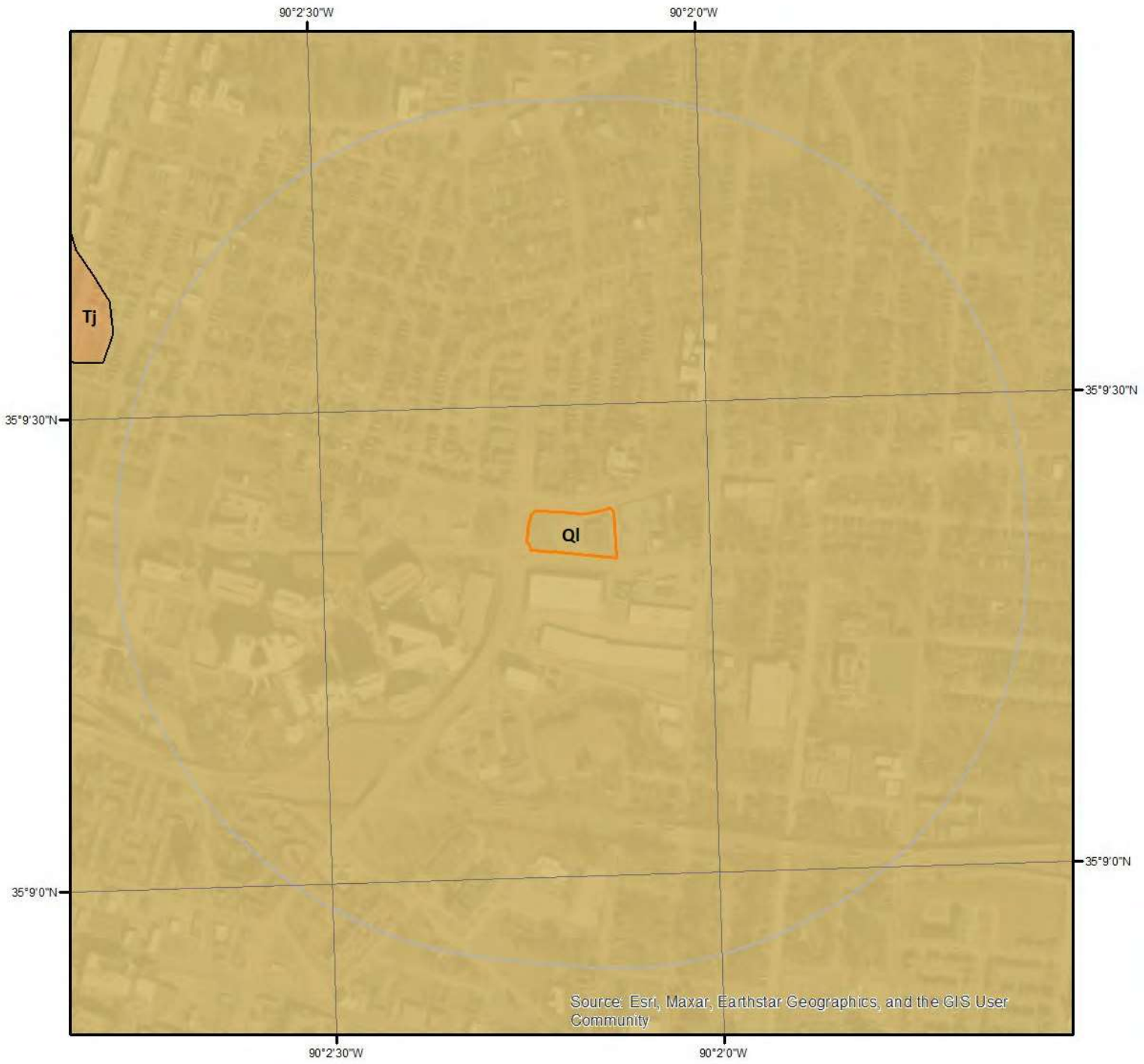
Flood Zone X-12

Zone:	X
Zone subtype:	AREA OF MINIMAL FLOOD HAZARD

Flood Zone X-14

Zone:	X
Zone subtype:	AREA WITH REDUCED FLOOD RISK DUE TO LEVEE

Geologic Information



Geologic Units

This maps shows geologic units in the area. Please refer to the report for detailed descriptions.

N

0 0.15 0.3 Miles

ERIS

Geologic Information

The previous page shows USGS geology information. Detailed information about each unit is provided below.

Geologic Unit Ql

Unit Name:	Loess
Unit Age:	Quaternary
Primary Rock Type:	Silt
Secondary Rock Type:	
Unit Description:	Clayey and sandy silt, gray to brown, massive. Maximum thickness about 100 feet along bluffs of Mississippi River; thins eastward. (Minimum mapped thickness 4 feet.)

Soil Information

SSURGO Soils

N

0 0.15 0.3 Miles

This maps shows SSURGO soil units around the target property. Please refer to the report for detailed soil descriptions.

ERIS

Soil Information

The previous page shows a soil map using SSURGO data from USDA Natural Resources Conservation Service. Detailed information about each unit is provided below.

Map Unit Fs (4.2%)

Map Unit Name:	Filled land, silty (Udorthent, silty)
Bedrock Depth - Min:	null
Watertable Depth - Annual Min:	null
Drainage Class - Dominant:	Well drained
Hydrologic Group - Dominant:	null
Major components are printed below	
Udorthents, silty(100%)	
horizon H1(0cm to 152cm)	Silt loam

Component Description:

Minor map unit components are excluded from this report.

Map Unit: Fs - Filled land, silty (udorthent, silty)

Component: Udorthents, silty (100%)
Generated brief soil descriptions are created for major soil components. The Udorthents, silty is a miscellaneous area.

Map Unit Gr (36.61%)

Map Unit Name:	Graded land, silty materials (Udorthent, silty)
Bedrock Depth - Min:	null
Watertable Depth - Annual Min:	null
Drainage Class - Dominant:	Well drained
Hydrologic Group - Dominant:	null
Major components are printed below	
Udorthents, silty(100%)	
horizon H1(0cm to 152cm)	Silt loam

Component Description:

Minor map unit components are excluded from this report.

Map Unit: Gr - Graded land, silty materials(udorthent, silty)

Component: Udorthents, silty (100%)
Generated brief soil descriptions are created for major soil components. The Udorthents, silty is a miscellaneous area.

Map Unit MeB (59.19%)

Map Unit Name:	Memphis silt loam, 2 to 5 percent slopes, northern phase
Bedrock Depth - Min:	null
Watertable Depth - Annual Min:	null
Drainage Class - Dominant:	Well drained
Hydrologic Group - Dominant:	B - Soils in this group have moderately low runoff potential when thoroughly wet. Water transmission through the soil is unimpeded.
Major components are printed below	

Soil Information

Memphis(100%)

horizon Ap(0cm to 18cm)	Silt loam
horizon Bt1(18cm to 46cm)	Silty clay loam
horizon Bt2(46cm to 188cm)	Silt loam
horizon C(188cm to 274cm)	Silt loam

Component Description:

Minor map unit components are excluded from this report.

Map Unit: MeB - Memphis silt loam, 2 to 5 percent slopes, northern phase

Component: Memphis (100%)
The Memphis component makes up 100 percent of the map unit. Slopes are 2 to 5 percent. This component is on loess hills on plains. The parent material consists of fine-silty noncalcareous loess. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is very high. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. This component is in the F134XY002AL Northern Deep Loess Summit - Provisional ecological site. Nonirrigated land capability classification is 2e. This soil does not meet hydric criteria.

Map Unit W (0.01%)

Map Unit Name: Water

No more attributes available for this map unit

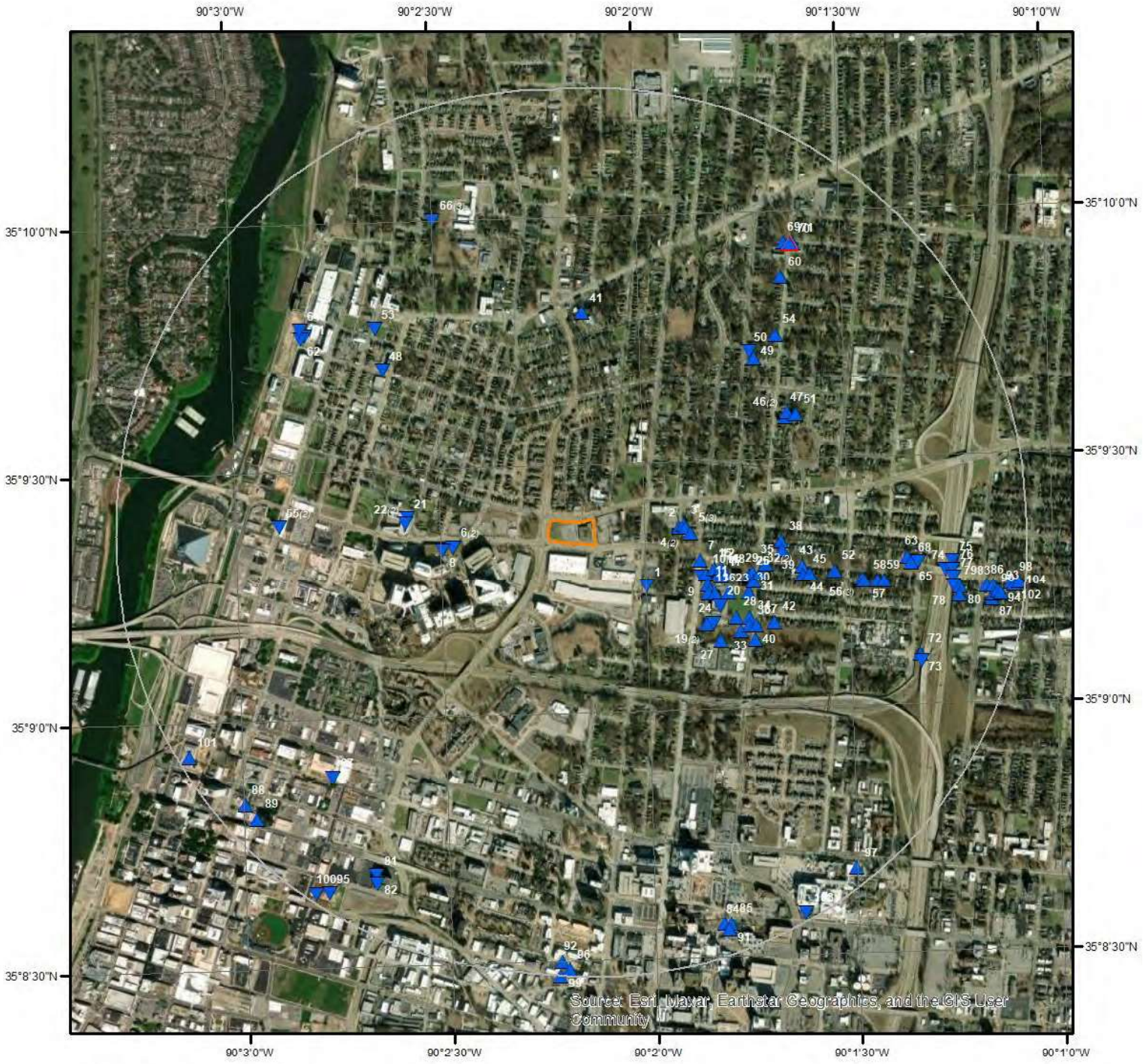
Component Description:

Minor map unit components are excluded from this report.

Map Unit: W - Water

Component: Water (100%)
Generated brief soil descriptions are created for major soil components. The Water is a miscellaneous area.

Wells and Additional Sources



Wells & Additional Sources

N

0 0.15 0.3 0.6 Miles

- Sites with Higher Elevation
- Sites with Same Elevation
- Sites with Lower Elevation
- Sites with Unknown Elevation
- OGW Sites with Higher Elevation
- OGW Sites with Same Elevation
- OGW Sites with Lower Elevation
- OGW Sites with Unknown Elevation

ERIS

Wells and Additional Sources Summary

Federal Sources

Public Water Systems Violations and Enforcement Data

Map Key	PWS ID	Distance (ft)	Direction
55	TX0100081	3286.54	W

Safe Drinking Water Information System (SDWIS)

Map Key	PWS ID	Distance (ft)	Direction
55	TX0100081	3286.54	W

USGS National Water Information System

Map Key	Site No	Distance (ft)	Direction
3	USGS-350922090015401	1099.64	E
5	USGS-350921090015302	1178.23	E
5	USGS-350921090015301	1178.23	E
5	USGS-350921090015300	1178.23	E
6	USGS-350920090022800	1161.99	W
6	USGS-350920090022801	1161.99	W
10	USGS-350916090015100	1397.13	ESE
10	USGS-350916090015101	1397.13	ESE
14	USGS-350916090014901	1557.26	ESE
18	USGS-350916090014801	1637.78	ESE
19	USGS-350910090015102	1672.68	SE
19	USGS-350910090015101	1672.68	SE
20	USGS-350912090014901	1705.03	ESE
22	USGS-350923090023500	1749.75	W
22	USGS-350923090023501	1749.75	W
24	USGS-350910090015001	1739.96	ESE
26	USGS-350916090014501	1920.71	ESE
27	USGS-350908090014901	1927.86	SE
29	USGS-350916090014401	1962.02	ESE
31	USGS-350915090014401	1984.79	ESE
32	USGS-350916090014301	2043.46	ESE
32	USGS-350916090014302	2043.46	ESE
33	USGS-350909090014601	2072.88	ESE
35	USGS-350917090014201	2108.67	E
40	USGS-350908090014401	2267.41	ESE
41	USGS-350948090020801	2527.82	N
42	USGS-350910090014101	2390.76	ESE
47	USGS-350936090013901	2712.26	ENE
49	USGS-350942090014301	2796.10	NE
51	USGS-350935090013701	2801.43	ENE
52	USGS-350916090013201	2945.55	E
56	USGS-350915090012800	3288.88	E
56	USGS-350915090012804	3288.88	E
56	USGS-350915090012801	3288.88	E
61	USGS-350946090024901	3760.53	NW
63	USGS-350917090012000	3825.09	E
69	USGS-350955090031201	4120.81	NE
71	USGS-350955090013701	4179.43	NE
87	USGS-350912090010901	4895.57	E
89	USGS-350848090025801	4935.12	SW
91	USGS-350833090014901	4976.67	SSE

93	USGS-350913090100801	4962.32	E
97	USGS-350840090013001	5079.50	SE
98	USGS-350914090010601	5114.12	E
99	USGS-350829090021401	5279.70	S
104	USGS-350914090010503	5196.65	E

State Sources

County Water Wells

Map Key	Well No	Distance (ft)	Direction
1	15701028	813.82	SE
2	15709658	1042.46	E
4	15709612	1125.22	E
4	15709720	1125.22	E
7	20171720	1304.01	ESE
8	15709496	1303.60	W
9	15709712	1353.53	ESE
11	15709650	1465.86	ESE
12	15709610	1486.62	ESE
13	15709649	1505.23	ESE
15	15709611	1567.86	ESE
16	15709675	1580.89	ESE
17	15709653	1591.93	ESE
21	15709681	1730.85	W
23	15709648	1734.75	ESE
25	20082152	1914.15	ESE
28	15709711	1938.65	ESE
30	15709671	1969.04	ESE
34	15709607	2085.75	ESE
36	15709608	2132.90	ESE
37	15709651	2206.01	ESE
38	15709613	2281.63	E
39	15709614	2284.82	E
43	15709663	2551.75	E
44	15709615	2566.61	E
45	15709616	2648.34	E
46	20041112	2662.33	ENE
46	15709667	2662.33	ENE
48	15709680	2763.91	NW
50	15709668	2803.96	NE
53	15709500	3189.03	NW
54	15709661	3182.95	NE
57	15709726	3320.79	E
58	15709617	3484.78	E
59	15709618	3567.00	E
60	15709662	3759.23	NE
62	15709499	3784.19	NW
64	15709498	3847.05	NW
65	15709620	3873.77	E
66	15701351	3953.88	NNW
66	15701491	3953.88	NNW
66	20020844	3953.88	NNW
67	15709515	3927.93	SW
68	15709619	3956.63	E
72	15709518	4197.17	ESE
73	15709519	4232.91	ESE
74	15709652	4296.74	E
75	15709606	4370.79	E
76	15709605	4379.49	E
77	15701038	4390.46	E
78	15709666	4403.77	E

79	15709621	4485.78	E
80	15709622	4501.09	E
81	15709575	4611.71	SSW
82	15709574	4700.49	SSW
83	15709624	4815.32	E
84	15709564	4894.51	SSE
85	15709563	4919.80	SSE
86	15709623	4897.47	E
88	15709674	4930.24	SW
90	20161087	4911.49	E
92	15709549	5108.08	S
94	15709722	4993.73	E
95	15709554	5087.27	SW
96	15709548	5200.75	S
100	15709553	5181.09	SW
101	15709511	5137.12	WSW
102	15709727	5144.95	E
103	15709576	5187.29	SSE

Oil and Gas Wells

Map Key	API No	Distance (ft)	Direction
70	157-00006	4149.31	NE

UPTOWN MIXED-USE CENTER MEETING – December 10, 2007

Environmental Issues

Parcel:	**544 Jackson**	**001-107-0001**	**Chism Trail**
Issue / Status:	Phase 1 completed by Fisher & Arnold on 11/30/2007		
Findings:	Three recognized environmental conditions (RECs) were noted on adjacent parcels (see attached Executive Summary for details).		
Recommendation:	Fisher & Arnold recommend performing further environmental investigation (Phase 2). Scott Thomas (Bass Berry Sims) suggested that upon initial review it did not seem necessary to perform a Phase 2, but is reviewing the entire report before giving his final recommendation.		
Decision:			

Parcel:	**645 Jackson**	**001-106-0001**	**Ibraheim property**
Issue / Status:	Phase 1 completed by Fisher & Arnold on 05/31/2006		
Findings:	Two recognized environmental conditions (RECs) were noted on the subject property (see attached Executive Summary for details).		
Recommendation:	Fisher & Arnold recommend performing further environmental investigation (Phase 2). Scott Thomas (Bass Berry Sims) and Randy Womack (Glankler Brown) agreed that a Phase 2 environmental report was necessary on this site.		
Decision:	Perform Phase 2. Proposals were solicited from Fisher & Arnold, Brown & Caldwell and EnSafe. EnSafe were contracted to perform the Phase 2 report (contract amount $7,500) and results will be available by mid- to late-January 2008.		

Parcel:	**0 Danny Thomas 001-096-A00099 Jackson Island**
Issue / Status:	Phase 1 completed by Fisher & Arnold on 12/06/2007
Findings:	One recognized environmental conditions (RECs) was noted on an adjacent parcel (see attached Executive Summary for details).
Recommendation:	Fisher & Arnold did not recommend performing further environmental investigation (Phase 2) due to the isolated nature of the subject property (a 0.2 acre of land in between Mill and Jackson Avenues that is part of the State's realignment (and subsequently has essentially been dug up by TDOT).
Decision:	No further action required.

Parcel:	**Auction & Seventh 001-096-00024 / 25 / 98 MHA / ALSAC parcels**
Issue / Status:	Phase 1 completed by Fisher & Arnold on 12/06/2007
Findings:	Four recognized environmental conditions (RECs) were noted on adjacent parcels (see attached Executive Summary for details).
Recommendation:	Fisher & Arnold recommend performing further environmental investigation (Phase 2).
Decision:	

FISHER &
ARNOLD, INC.

November 30, 2007

The Memphis Housing Authority
c/o Mr. Marty Boscaccy
700 Adams Avenue
Memphis, TN 38105

RE: **PHASE I ESA REPORT SUBMITTAL**
544 Jackson Ave.
Memphis, TN

Dear Mr. Boscaccy:

Fisher & Arnold Environmental is pleased to submit three copies of the above referenced report for your use.

You will note that the conclusion of the report is that additional subsurface information regarding the identified recognized environmental conditions is necessary in order to formulate a more detailed opinion regarding the potential presence of environmental contamination.

Thank you for the opportunity to assist you on this project, and if you have any further questions please feel free to contact me at 748-1811.

Sincerely,

FISHER & ARNOLD ENVIRONMENTAL

Sarah Rehkopf

Sarah Rehkopf
Project Scientist

Enclosures – Phase I Report (3)

cc: Ms. Alexandra Mobley, Lauderdale-Greenlaw, LLC. (Belz-Turley)

• Architects
• Engineers
• Environmental Consultants
• Interior Designers
• Landscape Architects
• Planners
• Surveyors

9180 Crestwyn Hills Dr.
Memphis, TN 38125
(901) 748-1811
(888) 583-9724
fax (901) 748-3115
www.fisherarnold.com

EXECUTIVE SUMMARY

Fisher & Arnold Environmental, a Division of Fisher & Arnold, Inc. (F&A), was retained by the Memphis Housing Authority, to perform a Phase I Environmental Site Assessment (ESA) on a property located at 544 Jackson Avenue. The approximately 2-acre property is located in northern downtown Memphis, Shelby County, Tennessee.

The purpose of the Phase I ESA was to identify areas of environmental concern and to determine the condition of the property from an environmental standpoint in general accordance with American Society for Testing and Materials (ASTM) standards, Practice E 1527-05. The scope of work and conditions of the agreement have been described within Section 1.2 of the report.

F&A obtained and reviewed a variety of site-specific information and performed a visual inspection of the site. This current report includes a description of the site and addresses pertinent data and observations relating to the environmental condition of the site.

Based on site reconnaissance, interviews and review of available records, F&A identified three recognized environmental conditions (REC) associated with the subject property.

The first REC pertains to the adjacent former Leaking Underground Storage Tanks (LUST) located at 645 Jackson Ave. (653 Jackson). The former Williams Express operated three, 12,000 gallon gasoline USTs on the property, in which a leak was detected February of 1990. After a series of soil and groundwater sampling events, the USTs were removed from the ground in January 2002 in response to the contamination. Although documentation suggests that the state required no further action from the adjacent facility, this REC does present a risk of environmental impairment to the subject property. This adjacent property is also known to be a former dry cleaner, although it was believed to be a pick-up only operation. However, due to that lack of information regarding site operation, this REC presents a threat of environmental impairment to the subject property.

The second REC pertains to the adjacent Historical Underground Storage Tank (HIST UST) east of the subject property at the Old Garage located at 710 N. Parkway. This facility is listed as containing three waste oil USTs. This facility had 3 USTs that were removed from the ground in 1990. Although, TDEC officials issued a closure letter for this facility in 1995, due to the approximately 30 year operation as a gasoline station and auto repair garage, this site presents a risk of impairment to the subject property.

The third REC pertains to the LUST at 726 N. Parkway located 0.4 miles east of the subject property. This facility was reported as containing a 250 gallon waste oil UST. TDEC officials list the UST on this property as 'permanently out of use'. Due to the small size of the tank and distance from the subject property, this facility does not appear to present a significant threat to the subject property.

Additional environmental information is recommended to be collected for this site in order to determine if adjacent RECs have negatively impaired the subject property.

EXECUTIVE SUMMARY

Fisher & Arnold Environmental (F&A), a Division of Fisher & Arnold, Inc. was retained by Mr. Marty Boscaccy of the Memphis Land Bank to perform a Phase I Environmental Site Assessment (ESA) on an approximate 0.40 acre tract located at 645 Jackson Avenue in Memphis, Shelby County, Tennessee (Figure 1).

The purpose of the Phase I ESA was to identify areas of environmental concern and to determine the condition of the property from an environmental standpoint in general accordance with American Society for Testing and Materials (ASTM) standards, Practice E 1527-00. The scope of work and conditions of the agreement have been included within Appendix A of the report.

F&A obtained and reviewed a variety of site-specific information and performed a visual inspection of the site perimeter. Access to the site was not available and this report is limited to records review and perimeter observation. This report includes a description of the site and addresses pertinent data and observations relating to the environmental condition of the site.

This historic information reveals the presence of two (2) Recognized Environmental Conditions (REC), associated with the subject property. A review of historical information that includes City Directories, Sanborn fire insurance maps, and aerial photos for the subject property reveals that gasoline stations and possible dry cleaning operations were on the subject property for the years of 1950-1952, and 1955, respectively. Gasoline stations were found to be on the subject property under the address of 653 Jackson Ave property in 1935, as well as from the years 1968-1992. See section 4.2 of the report for a discussion on the former gasoline stations.

The Williams Express, former 7-Eleven was located on the subject property at 653 Jackson Ave. The Williams Express had three, 12,000-gallon gasoline UST's on the property, in which a leak was detected in February of 1990. Initial soil samples revealed BTEX levels within applicable cleanup standards. On-site ground water samples revealed TPH levels within applicable clean up levels, but an off-site well (MW-6) revealed elevated levels of TPH. The UST's were removed from the ground in January of 2002 in response to the contamination, and a site-specific standard for ground water of 3.4 ppm TPH was approved by TDEC officials on June 14, 1996. Subsequently, a closure and well abandonment letter for the site was issued on August 15, 1997. Due to confirmed closure by State officials and due to the fact that TPH is no longer a risk-based parameter in the UST program, the former UST project appears to present minimal risk.

The listing of a former dry clean operation in the City Polk directory is the second REC. However, the listing is not corroborated by Sanborn Maps. Further, the Polk directory also lists another business on the subject property, suggesting that the dry clean operation was a pick-up only. As such, it appears that the dry clean operation presents a minimal risk to the subject property.

No further information is recommended to be collected for the subject property.

EXECUTIVE SUMMARY

Fisher & Arnold Environmental, a Division of Fisher & Arnold, Inc. (F&A), was retained by The Memphis Housing Authority, to perform a Phase I Environmental Site Assessment (ESA) on a property located southeast of Mill Avenue and Danny Thomas Blvd. The approximately 0.2-acre property is located in northern downtown Memphis, Shelby County, Tennessee.

The purpose of the Phase I ESA was to identify areas of environmental concern and to determine the condition of the property from an environmental standpoint in general accordance with American Society for Testing and Materials (ASTM) standards, Practice E 1527-05. The scope of work and conditions of the agreement has been described within Section 1.2 of the report.

F&A obtained and reviewed a variety of site-specific information and performed a visual inspection of the site. This current report includes a description of the site and addresses pertinent data and observations relating to the environmental condition of the site.

Based on site reconnaissance, interviews and review of available records, F&A identified one recognized environmental condition (REC) associated with the subject property.

The REC pertains to the adjacent former Leaking Underground Storage Tanks (LUST) located at 645 Jackson Ave. (653 Jackson). The former Williams Express operated three, 12,000 gallon gasoline USTs on the property, in which a leak was detected February of 1990. After a series of soil and groundwater sampling events, the USTs were removed from the ground January 2002 in response to the contamination. Although documentation suggests that the state required no further action from the adjacent facility, this REC does present a risk of environmental impairment to the subject property. This adjacent property is also known to be a former dry cleaner, although it was believed to be a pick-up only operation. However, due to that lack of information regarding site operation, this REC presents a threat of environmental impairment to the subject property.

However, this property has been isolated with no non-residential operations throughout the history that could be documented for this study. The isolation has occurred due to the roadway design of Jackson Ave. and Danny Thomas Blvd. throughout the years. Although it is not known if impairment has occurred at this property, this study determined that no RECs are associated with activity on the subject property. Due to the fact that other nearby potential sources are in fact being evaluated further, no further data is recommended to be collected.

EXECUTIVE SUMMARY

Fisher & Arnold Environmental, a Division of Fisher & Arnold, Inc. (F&A), was retained by The Memphis Housing Authority, to perform a Phase I Environmental Site Assessment (ESA) on an approximately 5.0 acre property at the located northeast corner of the intersection of Seventh Street and Auction Avenue. The property is located in northern downtown Memphis, Shelby County, Tennessee.

The purpose of the Phase I ESA was to identify areas of environmental concern and to determine the condition of the property from an environmental standpoint in general accordance with American Society for Testing and Materials (ASTM) standards, Practice E 1527-05. The scope of work and conditions of the agreement has been described within Section 1.2 of the report.

F&A obtained and reviewed a variety of site-specific information and performed a visual inspection of the site. This current report includes a description of the site and addresses pertinent data and observations relating to the environmental condition of the site.

Based on site reconnaissance, interviews and review of available records, F&A identified four recognized environmental conditions (RECs) associated with the subject property.

The first REC pertains to the adjacent former drycleaning operation located at 581 Auction Ave. A letter dated August 2004, reveals that ALSAC was involved with the cleanup of contaminated soil at the former Spic N' Span drycleaner. The soil was removed accompanied by manifests with the USEPA ID TND034795989. Due to the lack of information obtained from this property owner, this condition could not be evaluated further and presents a risk of impairment to the subject property.

The second REC pertains to the adjacent former fuel station located at 572 N. Parkway. The Sanborn Maps show a fuel station from at least 1965 to 1969. The City Directory Abstract shows this property as the Market Grocery Store in 1997. No other information is available for this property. This facility presents a risk of impairment to the subject property.

The third REC pertains to the adjacent former fuel station located 632 North Parkway (632 Jackson Ave.). This facility is located on the Sanborn Map from at least 1950 to 1952, and it appears in the 1938 aerial photograph. The property is currently located west of the intersection of Danny Thomas Blvd. and Auction Ave. under the road. No other information is available for this property. This facility presents a risk of impairment to the subject property.

The fourth REC pertains to the adjacent former Leaking Underground Storage Tanks (LUST) located at 645 Jackson Ave. (653 Jackson). The former Williams Express operated three, 12,000 gallon gasoline USTs on the property, in which a leak was detected February of 1990. After a series of soil and groundwater sampling events, the USTs were removed from the ground January 2002 in response to the contamination.

Although documentation suggests that the state required no further action from the adjacent facility, this REC does present a risk of environmental impairment to the subject property. This adjacent property is also known to be a former dry cleaner, although it was believed to be a pick-up only operation. However, due to that lack of information regarding site operation, this REC presents a threat of environmental impairment to the subject property.

Additional environmental information is recommended to be collected for this site in order to determine if adjacent RECs have negatively impaired the subject property.

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April 19, 2012

Mr. Danny Fox
Tennessee Department of Environment and Conservation (TDEC) State Remediation Section
5th Floor L & C Tower
401 Church Street
Nashville, Tennessee 37243-1535

RE: Phase II ESA Report
645 Jackson Avenue Property — Memphis, Tennessee

Dear Mr. Fox:

In accordance with the Phase II ESA work plan dated July 26, 2011, EnSafe Inc. is pleased to summarize the shallow groundwater investigation at the property at 645 Jackson Avenue in Memphis, Tennessee. In addition, this report summarizes the removal of the manhole and over excavation of contaminated soil.

As you are aware, underground structures were uncovered during the UST removal and building demolition performed by Ops Contracting Services, LLC (OCS) at the above referenced property. OCS uncovered the following structures:

- Vertical underground storage tank (UST) possibly containing tetrachloroethene (PCE)
- Buried product lines
- UST containing Stoddard Solvent
- Buried 55-gallon drum containing kerosene and heavy motor oil
- Two 4 foot by 4 foot by 3 foot concrete boxes, one of which contained contaminated soil

Except for one of the concrete boxes, contaminated soil was encountered at all the structures.

Soils removed from the excavations were segregated by source and were placed on plastic and covered with plastic.

Estimated contaminated soil volumes were:

- Vertical UST — 37 cubic yards
- Product lines — 456 cubic yards
- Stoddard Solvent UST — 100 cubic yards
- Buried 55 gallon drum — 20 cubic yards
- Concrete box — 1 cubic yard

In addition, approximately 342 cubic yards of soil were segregated from the demolition debris. Construction and demolition debris were removed from the site for disposal; the volume was estimated at 256 cubic yards.

Because of their location adjacent to North Parkway, the excavations were promptly backfilled with sand to prevent cave-ins, which could potentially impact the road, and to prevent any inadvertent injuries to pedestrians who may pass by the area. In addition, due to the types of materials encountered, the laboratory analysis was changed to include volatile organic compounds, semivolatile organic compounds, and Resource Conservation Recovery Act (RCRA) 8 metals on select samples. Fingerprint analysis was performed on the contents of the UST and buried drum to determine the contents. Because of the detected concentration of PCE in soil at the vertical tank, EnSafe also performed toxicity characteristic leaching procedure (TCLP) analysis to determine if the soil would be considered a characteristic waste and to determine disposal alternatives. The soil from the vertical UST excavation was classified as a hazardous waste and was disposed at the Waste Management facility in Emelle, Alabama. All other non-hazardous soil was disposed at the Waste Management facility in Tunica, Mississippi.

Investigation Scope

From August 18 to August 22, 2011, EnSafe advanced four borings using Direct Push Technology (DPT) drilling methods. Boring locations are shown on Figure 1. An EnSafe geologist performed oversight of the drilling and sampling activities. Soil borings were advanced at the following locations:

- 1 soil boring at the location of the former vertical tank
- 1 soil boring near the buried drum
- 1 soil boring at the southwest corner of the Ibrahim property to assess lateral extent
- 1 soil boring along the eastern property boundary to determine background conditions

From each soil boring, soil samples were collected continually from the ground surface to the water table. Lithology was visually logged in the field. Lithology encountered at the site was a reddish brown, silty clay which grades into a grayish brown, silty clayey silt at 13 to 17 feet below ground surface. Boring logs are provided in Attachment A. All soil samples were screened for elevated organic vapors using a photoionization detector (PID). PID readings are summarized on the boring logs. Because of the extensive soil sampling completed as part of the removal action and the fact that a land use control will be placed on the property, soil samples were not collected for laboratory analysis.

After the soil interval was logged, all of the borings were advanced into the saturated zone and a temporary monitoring well was installed. Groundwater samples were collected from each location using a peristaltic pump and dedicated polyethylene tubing. Well development and sampling forms are provided in Attachment B. As shown on the forms, TW-3 and TW04 both purged dry initially during development at .25 gallons. The wells were repeatedly allowed to

recharge and then were purged dry again. Groundwater samples were packaged, labeled, and thermally preserved for transport under chain-of-custody procedures to the laboratory.

All groundwater samples were submitted to TestAmerica in Nashville, Tennessee, for the following analyses:

- Volatile Organic Compounds (VOC) by Environmental Protection Agency (EPA) Method 8260B
- Polynuclear Aromatic Hydrocarbons (PAHs) by EPA Method 8270C
- RCRA 8 Metals by EPA Method 6010B/7470A/7471A
- Polychlorinated biphenyls (PCBs) by EPA Method 8081

Groundwater Contour Map

Top of casing elevations, depth to groundwater, and groundwater elevations are summarized in Table 1. Figure 1 is a groundwater contour map. Groundwater flow is to the west-southwest.

Groundwater Analytical Results

Groundwater analytical results are compared with EPA Regional Screening Levels (RSLs) for tap water and maximum contaminant levels (MCLs). Analytical results are summarized in Table 2 and the laboratory analytical report is provided in Attachment C.

VOCs — Tetrachloroethene (PCE), trichloroethene (TCE), and cis-1,2-dichloroethene all exceeded their respective MCLs and RSLs in TW-04. Notably, PCE was detected at 110,000 micrograms per liter (µg/L), and TCE was detected at 166 µg/L. At TW-02, benzene (93 µg/L) and 1,1,2-trichloroethane (26.6 µg/L) exceeded their MCLs (5 µg/L) and RSLs (0.41 µg/L and 0.24 µg/L). VOCs were not detected in TW-01 and only methyl-tert-butyl ether was detected in TW-03. The MTBE detection of 33.7 µg/L was above its RSL of 12 µg/L.

PAHs — 2-methylnapthalene, naphthalene, and 1-methylnapthalene were detected in TW-01 only. Napthalene (74.3 µg/L) and 1-methylnapthalene (16.4 µg/L) exceeded their RSLs of 0.14 µg/L and 2.3 µg/L, respectively.

Metals — Arsenic, barium, total chromium, and lead were the only metals detected. Arsenic was detected in TW-04 (10 µg/L) at a concentration equal to its MCL and above its RSL (0.045 µg/L).

Barium, total chromium and lead did not exceed their MCLs or RSLs.

PCBs — PCBs were not detected in any of the groundwater samples.

Manhole Removal Action

As we have discussed, a manhole remained onsite. EnSafe believed it to be a part of the sanitary or storm sewer system. However, the City of Memphis, Department of Public Works

performed a site visit on October 26, 2011, and determined that the structure was not part of the sanitary or storm water sewer system and was a grease trap. They agreed that the structure could be removed. Their concurrence is provided in Attachment D.

The manhole contained liquid (87 gallons) and sludge (10 cubic feet). The liquid and sludge were analyzed for metals and VOCs. In addition, the two IDW drums were analyzed for metals and VOCs. The manhole sludge was also analyzed for TCLP metals. The analytical results are summarized in Tables 3, 4, and 5, and the laboratory report is provided in Attachment E.

OCS conducted the removal action of the manhole from January 4, 2012 to January 6, 2012. EnSafe screened soil at the extent of the excavation with a PID. The excavation continued until the PID readings were less than 10 ppm. Confirmation samples were collected at the excavation extent and submitted for laboratory analysis of VOCs. Immediate backfilling of the excavation was performed. The analytical results are summarized in Table 6 and the laboratory report is provided in Attachment F. The confirmation sample locations are shown on Figure 2.

Because of the history of the site and the previous removal actions, the manhole, contents, and surrounding soil were handled as hazardous waste. The material was shipped to the Waste Management facility in Emelle, Alabama. Manifests are provided in Attachment G. The two partially filled IDW drums were disposed with the above materials.

Recommendations

As described above, PCE was detected in groundwater at 110,000 µg/L at TW-4 near the manhole structure. Groundwater flow is to the west-southwest. An offsite temporary monitoring well is recommended to determine if the contamination extends offsite. The proposed well location is shown on Figure 3. MLB-Uptown will pursue an access agreement with the property owner. Upon receipt of the access agreement, MLB-Uptown will promptly schedule the groundwater sample collection.

If you have any questions regarding this work plan, please call me at (901) 372-7962.

Sincerely,
EnSafe Inc.

Allison L Harris

By: Allison Harris
Project Manager

cc: John Dudas — 1 electronic copy
Alex Mobley — 1 electronic copy
Marty Regan — 1 electronic copy
Randy Womack — 1 electronic copy
Marion Jones — 1 electronic copy
Luretha Phillips — 1 electronic copy
Greg Perry — 1 electronic copy

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Figure 1
Groundwater Contour Map
Sampling Locations
Ibrahim Site
645 Jackson Avenue
Memphis, Tennessee

2/6/2012 X:\Ibreheim\Memphis\Projects\GW_contours.mxd

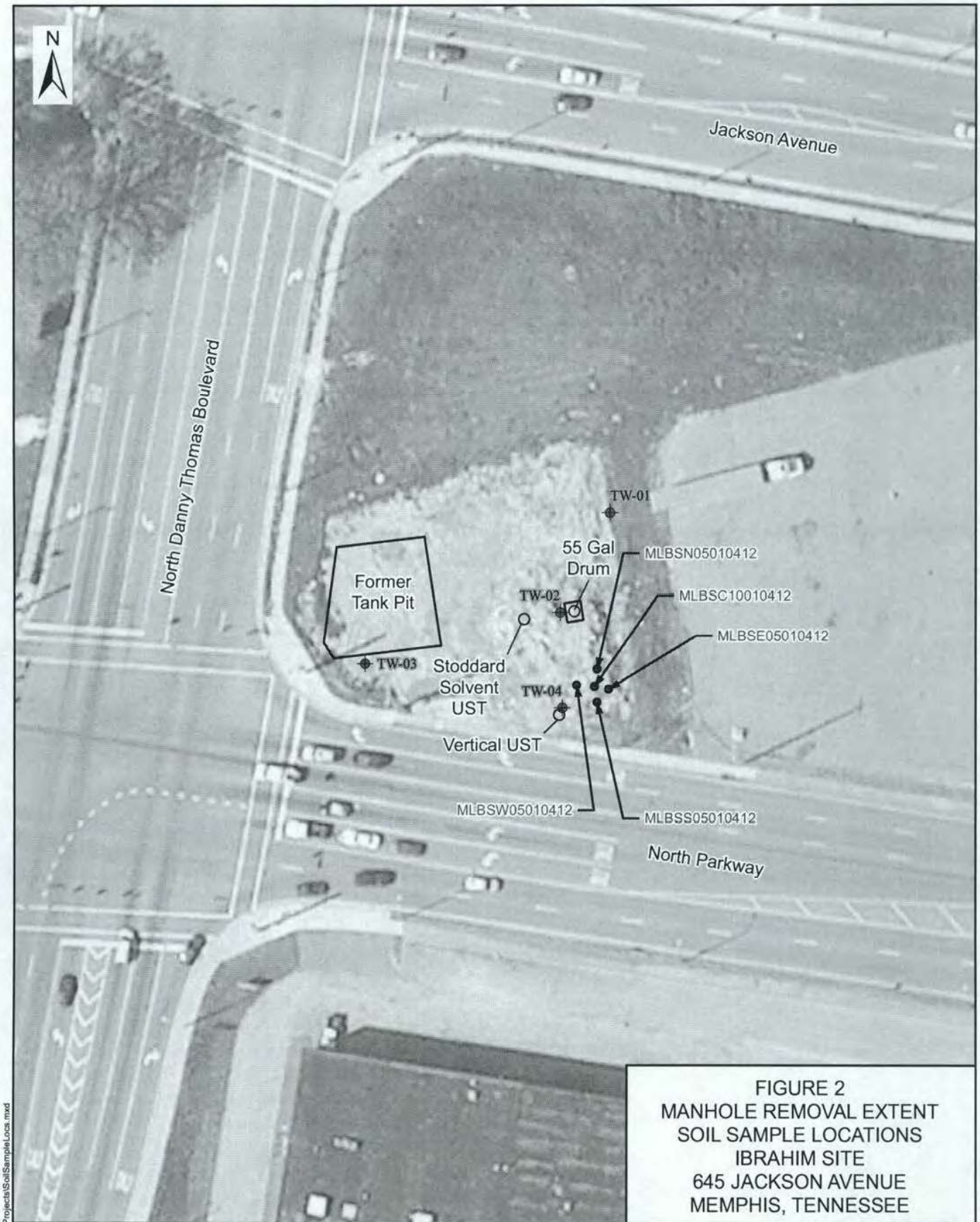

FIGURE 2
MANHOLE REMOVAL EXTENT
SOIL SAMPLE LOCATIONS
IBRAHIM SITE
645 JACKSON AVENUE
MEMPHIS, TENNESSEE

Legend

- Soil Sample Location
- Monitoring Well Location

0 25 50 75 100 Feet

Basemap Source: Bing Aerial Map - (c) 2010 Microsoft Corporation and its data suppliers

REQUESTED BY: R. Bailey	
DRAWN BY: N. Rinehart, S. Swan	
DATE: 2/6/2012	
PROJECT NO: 0888811483	

ENSAFE
1-800-588-7962
WWW.ENSAFE.COM

X:\Ibrehem\Memphis\Projects\SoilSampleLocs.mxd

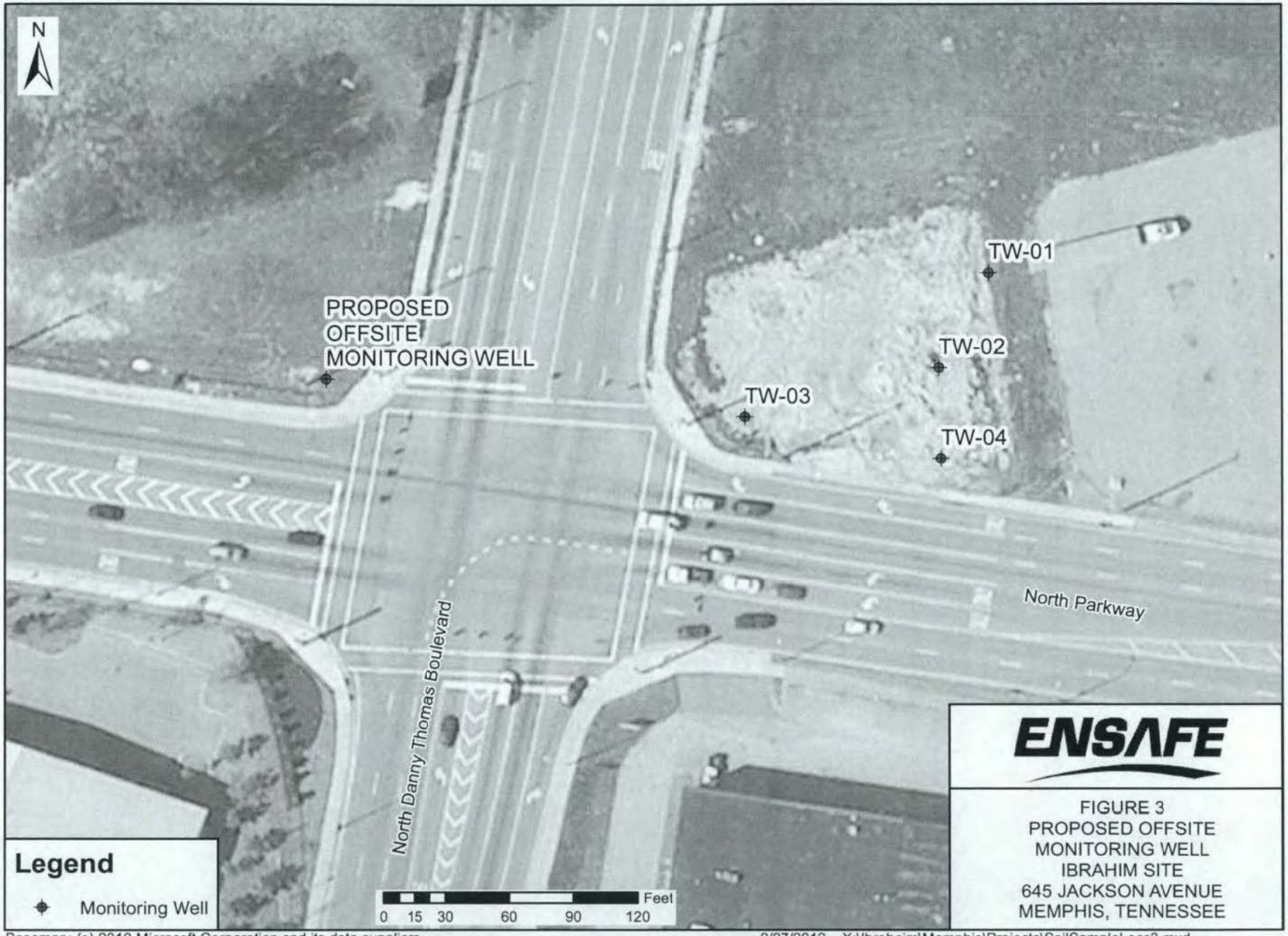

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FIGURE 3
PROPOSED OFFSITE
MONITORING WELL
IBRAHIM SITE
645 JACKSON AVENUE
MEMPHIS, TENNESSEE

Basemap: (c) 2010 Microsoft Corporation and its data suppliers

2/27/2012 X:\Ibreheim\Memphis\Projects\SoilSampleLocs3.mxd

Table 1
Groundwater Elevations
Ibrahim Property, 645 Jackson Avenue, Memphis Tennessee

	Top of Casing Elevation (ft msl)	Depth to Groundwater (ft btoc)	Groundwater Elevation (ft msl)
MW / TW-01 SB-01	247.55	9.82	237.73
MW / TW-02 SB-02	246.39	8.59	237.80
MW / TW-03 SB-03	244.89	7.20	237.69
MW / TW-04 SB-04	244.01	6.58	237.43

Note:
Depth to water measurements were collected on August 30, 2011

Table 2
Detected Concentrations in Groundwater
Ibrahim Property, 645 Jackson Avenue, Memphis, Tennessee

	TW-01 Upgradient	TW-02 Buried Drum	TW-03 Downgradient	TW-04 Vertical UST	MCL	RSL Tap Water
VOCs						
Benzene	ND	93 a b	ND	ND	5	0.41
sec-butylbenzene	ND	5.07	ND	ND	ND	NS
n-butylbenzene	ND	20.1	ND	ND	ND	1,800
Chlorobenzene	ND	ND	ND	51	100	91
cis-1,2-Dichloroethene	ND	ND	ND	194 a b	70	73
Ethylbenzene	ND	107 b	ND	ND	700	1.5
Hexachlorobutadiene	ND	0.31	ND	ND	NS	0.86
Isopropylbenzene	ND	37.6	ND	ND	NS	NS
p-isopropyltoluene	ND	8.24	ND	ND	NS	NS
Napthalene	ND	119 b	ND	ND	NS	0.14
n-propylbenzene	ND	53.6	ND	ND	NS	NS
Trichloroethene	ND	ND	ND	166 a b	5	2
Tetrachloroethene	ND	0.27 b	ND	110,000 a b	5	0.11
1,3,5-Trimethylbenzene	ND	123	ND	ND	NS	370
Toluene	ND	582	ND	ND	1,000	2,300
MTBE	ND	ND	33.7 b	ND	NS	12
1,1,2-Trichloroethane	ND	26.6 a b	ND	ND	5	0.24
1,2,4-Trimethylbenzene	ND	409 b	ND	ND	NS	15
Xylene, total	ND	1,240 b	ND	ND	10,000	200
Polychlorinated Biphenyls						
Not Detected						
Polycyclic Aromatic Hydrocarbons						
2-Methylnapthalene	48.4	ND	ND	ND	NS	150
Napthalene	74.3 b	ND	ND	ND	NS	0.14
1-Methylnapthalene	16.4 b	ND	ND	ND	NS	2.3

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Table 2
Detected Concentrations in Groundwater
Ibrahim Property, 645 Jackson Avenue, Memphis, Tennessee

	TW-01 Upgradient	TW-02 Buried Drum	TW-03 Downgradient	TW-04 Vertical UST	MCL	RSL Tap Water
Metals						
Arsenic	ND	ND	8.5 b	10 a b	10	0.045
Barium	80.3	365	186	235	2,000	7,300
Total Chromium	1.7	4.3	9.2	3.6	100	NS
Lead	ND	ND	2.9	ND	15	NS

Notes:
All results are in micrograms per liter (µg/L) or parts per billion (ppb)
ND — Not detected
MCL exceedances are shown in red
RSL exceedances are highlighted
NS — No standard established
a — exceeds USEPA Maximum Contaminant Level
b — exceeds the USEPA Regional Screening Level — top waste retrieved on September 1, 2011 from http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/Generic_Tables/pdf/master_sl_table_run_JUN2011.pdf

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Table 3
Manhole/Grease Trap and Drum Solids Analytical Results
Former Ibrahim Property, 645 Jackson Avenue, Memphis, Tennessee

	Manhole/Grease Trap Sludge IBHSGT102611	Soil Drum IBHSD102611
Metals (mg/kg)		
Silver	3.40	ND
Arsenic	1.46	1.60
Barium	29.1	40.7
Cadmium	1.26	ND
Chromium	11.9	7.86
Lead	49.4	4.12
Mercury	0.159	ND
Volatile Organic Compounds (µg/kg)		
Tetrachloroethene	398	245
Trichloroethene	7,840	ND
cis-1,2-dichlorothene	332,000	ND
trans-1,2-dichloroethene	12,300	ND
1,1-dichloroethene	289.0	ND
Vinyl chloride	8,390	ND
N-Butylbenzene	ND	19.1
Sec-Butylbenzene	ND	3.41
Chlorobenzene	270.0	ND
4-Isopropyltoluene	ND	6.02
1,2,4-Trimethylbenzene	285	16.9

Notes:
mg/kg — milligrams per kilogram or parts per million
µg/kg — micrograms per kilogram or parts per billion
ND — not detected

Table 4
Manhole/Grease Trap and Drum Liquids Analytical Results
Former Ibrahim Property, 645 Jackson Avenue, Memphis, Tennessee

	Manhole/Grease Trap Liquid IBHWGT102611 (µg/L)	Water Drum IBHWD102611 (µg/L)
Tetrachloroethene	4.07	8,650
Trichloroethene	10.9	1.65
cis-1,2-dichlorothene	419	ND
trans-1,2-dichloroethene	13.9	ND
Vinyl chloride	37.5	ND
Chlorobenzene	ND	2.91
4-Isopropyltoluene	7.10	ND

Notes:
µg/L — micrograms per liter or parts per billion
ND — not detected

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Table 5
Manhole/Grease Trap Solid TCLP Analytical Results
Former Ibrahim Property, 645 Jackson Avenue, Memphis, Tennessee

	IBHSGT102611	Regulatory Level
Barium	0.256	100
Cadmium	0.006	1.0
Lead	0.169	5.0
Trichloroethene	0.315	0.5
Vinyl Chloride	0.0759	0.2

Note:
All results are in milligrams per liter (mg/L)

Table 6
Detected Concentrations in Soil Confirmation Samples
Ibrahim Property, 645 Jackson Avenue, Memphis, Tennessee

	Tetrachloroethene	Trichloroethene	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	1,2-Dichloroethane
MLBSE05010412	**0.0171**	ND	ND	ND	ND
MLBSN05010412	ND	ND	ND	ND	ND
MLBSW05010412	**0.0203**	ND	ND	ND	ND
MLBSC10010412	**0.0656**	ND	ND	ND	**0.000699**
MLBSS05010412	**0.400**	0.00143 J	0.00106 J	0.000662 J	ND
RSL Residential	0.55	0.91	160	150	0.43
RSL Industrial	2.6	6.4	2000	690	2.2
RSL Protection of Groundwater	0.000033	0.00016	0.0082	0.025	0.000042

Notes:
All results are in milligrams per kilogram or parts per million (ppm)
RSL — Regional Screening Level
NDM — Not Detected
J — Estimated value

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Attachment A
Boring Logs

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5724 Summer Trees Drive
Memphis, Tennessee 38134

Environmental Boring Log: TW-01

Project: Ibrahim - Phase II

Site: Jackson Ave., Memphis, TN

Client: MLB-Uptown	Completion Date: 08/18/2011	Northing:	324365.3491
Location: Jackson Ave., Memphis, TN	Drilling Method: Direct Push Technology	Easting:	762067.2645
Project: Ibrahim - Phase II	Drilling Contractor: Tri-State Testing Services, Inc.	TOC Elev.:	247.5534
Purpose: Groundwater Investigation	Geologist: Robert Bailey	Total Depth FT:	21

DEPTH BGS	ELEVATION	SYMBOLS	USCS	PID	Lithologic Description Visual-Manual Description (ASTM-D2488)	Boring Construction
0			Fill	0.0	Fill material (i.e., Gravel and minor Topsoil); dark gray to light grayish brown	
			ML	0.0	Reddish brown to light brownish tan Clayey SILT; moist; loose; soft	
			CL		Grades with reddish orange iron staining; becoming dry and friable	
				0.0	Dark reddish brown Silty CLAY; dry to slightly moist; increasing reddish orange iron staining	
-5				0.0	Grades with increasing reddish orange iron staining and dark reddish black concretions	1" OD and 0.75" ID PVC Piping
	240			0.0	Grades with increasing reddish orange iron staining and dark reddish black concretions; increasing moisture down column	
-10				0.0	Grades light reddish brown	
	235			0.0		
			ML	0.0	Light reddish tan to brown Clayey Sandy SILT; moist; heavy reddish orange iron staining and dark reddish black concretions	
-15					Grades to light to medium reddish orange	1" OD and 0.75" ID 0.1" Slotted PVC Screen
			SC	0.0	Light tannish gray Silty CLAY with very fine grained SAND; increasing moisture down column	
	230				Grades moist to saturated	
				0.0		
-20				0.0	Grades from moist to slightly moist; minor reddish orange iron staining	

NOTES: TW-01 advanced to 21 feet below ground surface on August 18, 2011.
TW-01 screened from 13' to 18 ' bgs.

TW-01

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5724 Summer Trees Drive
Memphis, Tennessee 38134

Environmental Boring Log: TW-02

Project: Phase II

Site: Jackson Ave., Memphis, TN

Client: MLB-Uptown	Completion Date: 08/18/2011	Northing:	324328.3614
Location: Jackson Ave., Memphis, TN	Drilling Method: Direct Push Technology	Easting:	762056.5984
Project: Phase II	Drilling Contractor: Tri-State Testing Services, Inc.	TOC Elev.:	246.3877
Purpose: Groundwater Investigation	Geologist: Robert Bailey	Total Depth FT:	18

DEPTH BGS	ELEVATION	SYMBOLS	USCS	PID	Lithologic Description Visual-Manual Description (ASTM-D2488)	Boring Construction
0			Fill	0.0	Fill material (i.e., Gravel and minor Topsoil); dark gray to light grayish brown	
			ML	0.0	Light grayish tan to brown Sand (Fill) and Clayey SILT; dry and friable; reddish orange iron staining;	
				0.0		
-5	240			0.0		1" OD and 0.75" ID PVC Piping
				264	Grades with strong petroleum-like odor. Black oil-like staining observed in sample sleeve.	
				167		
				78	Grades with trace Sand; becoming light reddish tan to brown; moist	
-10				58		
	235			42		
				16		
				8.0		
			CL	1.6	Light reddish tan to brown Silty CLAY; minor fine grained Sand	
				1.2		
				1.0		
				0.6	Grades with increasing Sand; strong petroleum-like odor	
				0.1		
-15				48.2	Grades to saturated	1" OD and 0.75" ID 0.1" Slotted PVC Screen
	230			-19.1		
			SM	4.1	Light tannish gray Sandy SILT, fine to very fine grained Sand; wet to moist; strong petroleum-like odor	
					Becoming moist to slightly moist down column	

NOTES: TW-02 advanced to 18 feet below ground surface on August 18, 2011.
TW-02 screened from 13' to 18 ' bgs.

TW-02

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5724 Summer Trees Drive
Memphis, Tennessee 38134

Environmental Boring Log: TW-03

Project: Phase II

Site: Jackson Ave., Memphis, TN

Client: MLB-Uptown	Completion Date: 08/18/2011	Northing:	324301.0228
Location: Jackson Ave., Memphis, TN	Drilling Method: Direct Push Technology	Easting:	761956.8473
Project: Phase II	Drilling Contractor: Tri-State Testing Services, Inc.	TOC Elev.:	244.8936
Purpose: Groundwater Investigation	Geologist: Robert Bailey	Total Depth FT:	18

DEPTH BGS	ELEVATION	SYMBOLS	USCS	PID	Lithologic Description Visual-Manual Description (ASTM-D2488)	Boring Construction
0			Fill	0.4	Fill material (i.e., Gravel and minor Topsoil); dark gray to light grayish brown	
			ML	0.8	Light grayish tan to brown Clayey SILT; dry and friable; reddish orange iron staining;	
				1.8	Grades to dark tannish grayish brown; reddish black iron concretions	
			CL	1.0		
				1.0	Tannish reddish brown Silty CLAY; dry and firm; heavy iron staining and concretions	
-5				4.8	Grades to brownish greenish gray; slightly moist to moist; firm; petroleum-like odor observed	
				19.2		1" OD and 0.75" ID PVC Piping
				36		
				165		
				21.7	Grades with increasing moisture; increasing fine grained Sand; increasing reddish orange iron staining	
	235			7.0	Grades to brownish greenish tan; petroleum-like odor observed but decreasing down column	
-10				4.5		
				4.5		
				3.2		
				2.7		
			ML	0.3	Orangish red and light tannish brown Sandy Clayey SILT, fine grained Sand; moist	
	230			0.6	Grades to orangish tan and brown; increasing moisture; heavy reddish orange iron staining	
-15				0.4		1" OD and 0.75" ID 0.1" Slotted PVC Screen
				0.1		
					Grades with decreasing moisture	

NOTES: TW-03 advanced to 18 feet below ground surface on August 18, 2011.
TW-03 screened from 13' to 18 ' bgs.

TW-03

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5724 Summer Trees Drive
Memphis, Tennessee 38134

Environmental Boring Log: TW-04

Project: Phase II

Site: Jackson Ave., Memphis, TN

Client: MLB-Uptown	Completion Date: 08/18/2011	Northing:	324269.4738
Location: Jackson Ave., Memphis, TN	Drilling Method: Direct Push Technology	Easting:	762061.6833
Project: Phase II	Drilling Contractor: Tri-State Testing Services, Inc.	TOC Elev.:	244.0124
Purpose: Groundwater Investigation	Geologist: Robert Bailey	Total Depth FT:	18

DEPTH BGS	ELEVATION	SYMBOLS	USCS	PID	Lithologic Description Visual-Manual Description (ASTM-D2488)	Boring Construction
0			Fill		Fill material (i.e., Gravel and minor Topsoil); dark gray to light grayish brown	
			ML	23.1	Reddish brown to reddish tan Clayey SILT; minor Sand; some organics; moist; heavy reddish orange iron staining and reddish black iron crustacions; firm	
				57.7		
				34.2		
				8.0		
-5			CL	66.7	Reddish brown Silty CLAY; dry to slightly moist; heavy reddish orange iron staining and reddish black iron crustacions	
				36.1		1" OD and 0.75" ID PVC Piping
				410	Grades with minor Sand; increasing moisture; becoming soft	
	235			829	Grades with less Sand	
				457		
-10				478		
				105		
				100	Grades with increasing moisture	
				202		
	230		ML		Light grayish brown Sandy Clayey SILT, fine grained Sand; moist to wet; some reddish orange iron staining	
				163		
				88		
-15				83	Grades with increasing Sand; wet	1" OD and 0.75" ID 0.1" Slotted PVC Screen
				100		
				88		
				68		
				16		

NOTES: TW-04 advanced to 18 feet below ground surface on August 18, 2011.
TW-04 screened from 13' to 18 ' bgs.

TW-04

Attachment B

Monitoring Well Development and Groundwater Sampling Forms

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WELL DEVELOPMENT & GROUNDWATER SAMPLING FORM

DATE: 05-19-11, 08-22-11	JOB NUMBER: 088810470	PHASE: PH05	TASK: Default
PROJECT: Ibrahim, Phase II	EVENT: August 2011, PHASE II		
WELL ID: TW-01/SB01	LOCATION:		
WEATHER CONDITIONS: Sunny, Warm	AMBIENT TEMP: 90's		
REVIEWED BY:	PERSONNEL: R. Bailey, C. Pope		

WELL DIA: 1in	**WELL DEVELOPMENT**
TOTAL DEPTH from TOC (ft.):	START: 0930 / FINISH:
DEPTH TO WATER from TOC (ft.): 9.36	VOLUME PURGED (gal):
LENGTH OF WATER COL. (ft.):	**GROUNDWATER SAMPLING**
1 VOLUME OF WATER (gal):	START: / FINISH:
3 VOLUMES OF WATER (gal):	VOLUME PURGED (gal):
	ANALYSIS:

MNA FIELD RESULTS

FERROUS IRON	mg/L	CHLORIDE	mg/L		mg/L
SULFIDE	mg/L	ALKALINITY	mg/L		mg/L
SULFATE	mg/L	CO_2	mg/L		mg/L

IN-SITU TESTING

Circle one: (DEVELOPMENT) + (SAMPLING) ☐ Bailer ☒ Pump Description: Peristaltic

Time (hh:mm):	0918	1130	1247	1500								
pH (units):												
Conductivity (mS/cm):												
Turbidity (NTU):	12.7	7.7	8.4	11.2								
DO (mg/L):												
Temperature (C°):												
ORP (mV):												
Volume Purged (gal):												
Depth to Water (ft):												

Meter Type: Well Goes Dry While Purging ☒

SAMPLE DATA ☐ Bailer ☒ Pump Description: Peristaltic

Sample ID	Date (m/d/y)	Time (hh:mm)	Bottles (total to lab)	Filtered (0.45 µm)	Remarks
IBHGTW010811	08-22-11	1555	6	None	

Purging/Sampling Device Decon Process:

COMMENTS:

Purge water placed in drum#_____

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WELL DEVELOPMENT & GROUNDWATER SAMPLING FORM

DATE: 08-19-11, 08-22-11	JOB NUMBER: 05888104720	PHASE: PH05	TASK: Default
PROJECT: Ibraheim, Phase II	EVENT: August 2011, Phase II		
WELL ID: TW-02/SB02	LOCATION: Jackson Ave, Memphis, TN		
WEATHER CONDITIONS: Sunny, Warm (90's)	AMBIENT TEMP: 90s		
REVIEWED BY:	PERSONNEL: R. Bailey, C Pope		

WELL DIA: 1in	WELL DEVELOPMENT	
TOTAL DEPTH from TOC (ft.):	START: 0952	FINISH:
DEPTH TO WATER from TOC (ft.):	VOLUME PURGED (gal):	
LENGTH OF WATER COL. (ft.):	GROUNDWATER SAMPLING	
1 VOLUME OF WATER (gal):	START:	FINISH:
3 VOLUMES OF WATER (gal):	VOLUME PURGED (gal):	
	ANALYSIS:	

MNA FIELD RESULTS

FERROUS IRON	mg/L	CHLORIDE	mg/L		mg/L
SULFIDE	mg/L	ALKALINITY	mg/L		mg/L
SULFATE	mg/L	CO_2	mg/L		mg/L

IN-SITU TESTING

Circle one: DEVELOPMENT & SAMPLING ☐ Bailer ☑ Pump Description: Peristaltic

Time (hh:mm):	0855	0923	0951	1011	1017	1101	1217	1227	1405	1420	1449	1503	1513
pH (units):													
Conductivity (mS/cm):													
Turbidity (NTU):	683	491	415	392	274	223	199	147	113	98	115	91	87
DO (mg/L):													
Temperature (C°):													
ORP (mV):													
Volume Purged (gal):													
Depth to Water (ft):													
Meter Type:								Well Goes Dry While Purging ☒					

SAMPLE DATA ☐ Bailer ☒ Pump Description: Peristaltic

Sample ID	Date (m/d/y)	Time (hh:mm)	Bottles (total to lab)	Filtered (0.45 µm)	Remarks
IBH6TW02081l	08-22-11	1527	6	None	

Purging/Sampling Device Decon Process:

COMMENTS:

Purge water placed in drum#_____

ENSAFE

WELL DEVELOPMENT & GROUNDWATER SAMPLING FORM

DATE: 8-19-11, 8-22-11	JOB NUMBER: 08888104.20	PHASE: P1105	TASK: Default
PROJECT: Ihrcheim Phase II	EVENT: August 2011, Phase II		
WELL ID: TW-03	LOCATION: Memphis, TN. Jackson Ave		
WEATHER CONDITIONS: Sunny, Warm	AMBIENT TEMP: Sunny 90s		
REVIEWED BY:	PERSONNEL: B. Brister, R. Bailey, C. Pope		

WELL DIA: 1"	**WELL DEVELOPMENT**
TOTAL DEPTH from TOC (ft.):	START: 0959 / FINISH:
DEPTH TO WATER from TOC (ft.):	VOLUME PURGED (gal):
LENGTH OF WATER COL. (ft.):	**GROUNDWATER SAMPLING**
1 VOLUME OF WATER (gal):	START: ~~0959~~ / FINISH:
3 VOLUMES OF WATER (gal):	VOLUME PURGED (gal):
	ANALYSIS:

MNA FIELD RESULTS

FERROUS IRON	mg/L	CHLORIDE	mg/L		mg/L
SULFIDE	mg/L	ALKALINITY	mg/L		mg/L
SULFATE	mg/L	CO_2	mg/L		mg/L

IN-SITU TESTING

Circle one: (DEVELOPMENT) / (SAMPLING) ☐ Bailer ☑ Pump Description: Peristaltic

Time (hh:mm):	0903	0927	1017	1125	1207	1231	1241	1304	1324	1329	1334	
pH (units):												
Conductivity (mS/cm):												
Turbidity (NTU):	473	412	389	241	194	111	103	93	88	81	67	
DO (mg/L):												
Temperature (C°):												
ORP (mV):												
Volume Purged (gal):												
Depth to Water (ft):												
Meter Type:	~~NT~~							Well Goes Dry While Purging ☐				

SAMPLE DATA ☐ Bailer ☐ Pump Description:

Sample ID	Date (m/d/y)	Time (hh:mm)	Bottles (total to lab)	Filtered (0.45 µm)	Remarks
IBHGTW0308H	08-22-11	1350	6	None	

Purging/Sampling Device Decon Process:

COMMENTS: 1005: Ran dry ... 0.25 gal purged. 1032: Resume purging. 1035: Well dry after 0.05 purged. 1120: Resume purging. 1122: dry after 0.15 gal purged. 1152: Resume purging. 1154: Well dry after 0.15 gal purged. 1400: Resume purging. 1404: Well dry after 0.20 gal purged. 1434: Purge. 1437: Dry/0.20 gal purged. 1524: Purge. 1529: Dry/0.15 gal purged. 1536: Purge. 1559: Dry/0.15 gal purged. 1619: Purge. 1621 Dry/0.10 gal purged.

Purge water placed in drum#_____

ENSAFE

WELL DEVELOPMENT & GROUNDWATER SAMPLING FORM

DATE: 8-19-11, 08-22-11	JOB NUMBER: 088881 0470	PHASE: PH05	TASK: Detail
PROJECT: Ibenhein, Phase II	EVENT: August 2011, Phase II		
WELL ID: TW-04	LOCATION: Memphis, TN, Jackson Ave		
WEATHER CONDITIONS: Sunny Warm	AMBIENT TEMP: 90's		
REVIEWED BY:	PERSONNEL: B. Bister		

WELL DIA: 1"	WELL DEVELOPMENT	
TOTAL DEPTH from TOC (ft.):	START: 1046	FINISH:
DEPTH TO WATER from TOC (ft.):	VOLUME PURGED (gal):	
LENGTH OF WATER COL. (ft.):	GROUNDWATER SAMPLING	
1 VOLUME OF WATER (gal):	START: ~~1046~~	FINISH:
3 VOLUMES OF WATER (gal):	VOLUME PURGED (gal):	
	ANALYSIS:	

MNA FIELD RESULTS

FERROUS IRON	mg/L	CHLORIDE	mg/L		mg/L
SULFIDE	mg/L	ALKALINITY	mg/L		mg/L
SULFATE	mg/L	CO_2	mg/L		mg/L

IN-SITU TESTING

Circle one: ~~DEVELOPMENT~~ SAMPLING ☐ Bailer ☑ Pump Description: Peristaltic

Time (hh:mm):	0837	0903	1023	1112	1237	1253	1313	1333	1358	1410		
pH (units):												
Conductivity (mS/cm):												
Turbidity (NTU):	707	849	533	239	181	99	87	63	65	77		
DO (mg/L):												
Temperature (C°):												
ORP (mV):												
Volume Purged (gal):												
Depth to Water (ft):												
Meter Type:								Well Goes Dry While Purging ☐				

SAMPLE DATA ☐ Bailer ☐ Pump Description:

Sample ID	Date (m/d/y)	Time (hh:mm)	Bottles (total to lab)	Filtered (0.45 µm)	Remarks
IBHGTW04 0811	08-22-11	1435	6	None	

Purging/Sampling Device Decon Process:

COMMENTS: 1051: Well dry after 0.25 gal purged. 1158: Resume purging. 1159: Dry after 0.05 gal purged. 1352: Water level @ 13.87'. ~~1358~~ Resume purging. 1359: Dry after 0.10 gal purged. 1441: Purge. 1442: Dry/0.05 gal purged. 1539: Purge. 1541: Dry/0.25 gal purged. 1601: Purge. 1604: Dry/0.30 gal purged. 1615: Purge. 1617: Dry/0.15 gal purged.

Purge water placed in drum#_____

SRS791204 Former Ibrahim Property

Monitoring Well Installation and Groundwater Sampling Report

7_2013

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a global professional services company
creative thinking. **custom solutions.**®

5724 Summer Trees Drive | Memphis, Tennessee 38134| Telephone 901-372-7962 | Facsimile 901-372-2454 | www.ensafe.com

July 30, 2013

Mr. Danny Fox
Tennessee Department of Environment and Conservation
Division of Remediation
5th Floor L & C Tower
401 Church Street
Nashville, Tennessee 37243-1535

Re: Monitoring Well Installation and Groundwater Sampling Report
Former Ibrahim Property, 645 Jackson Avenue
Memphis, Tennessee

Dear Mr. Fox:

As you are aware, tetrachloroethene (PCE) was previously detected in groundwater at the Former Ibrahim property at 645 Jackson Avenue in Memphis, Tennessee.

Between April 22 and 25, 2013, EnSafe Inc. installed and sampled three permanent onsite monitoring wells and sampled one permanent offsite well on the property west of the 645 Jackson Avenue property (subject property). The investigation findings are provided below.

Permanent Monitoring Well Installation:

On April 22, 2013, EnSafe installed three permanent monitoring wells (MW02, MW03, and MW04). The soil boring for the monitoring well installation was advanced using hollow stem auger drilling techniques, and soil samples were collected continually from the ground surface to the termination depth of the boring for lithology. Lithology was visually logged in the field and recorded on the soil boring log in Ataachment A. All soil sample intervals were screened for ionizable organic vapors using a photoionization detector (PID). The well locations are shown in Figure 1.

The soil boring at MW02 was completed to 20 feet below ground surface (bgs). The lithology consisted of clayey silt and fill from the surface to 3 feet bgs. From 3 to 8 feet bgs, the lithology was moist, medium red to brown clayey silt with iron staining and gray mottling. From 8 to 13 feet bgs, the lithology remained moist and firm, but the color transitioned from red-brown to medium olive gray with black mottling. Below 13 feet bgs, the lithology was very moist to wet and changed to a medium yellow-brown clayey silt with iron staining until it transitioned again to medium olive gray at 16 feet bgs and then to medium/dark gray at 19 and 20 feet bgs.

The soil boring at MW03 was completed to 23 feet bgs because wet sand and fill was present to 8 feet bgs. Below 8 feet bgs, the lithology consisted of moist, firm, medium yellow-brown clayey silt with iron staining. The lithology transitioned to medium gray at 15 feet bgs and then to dark brown-gray at 18 feet bgs. From 19 to 23 feet bgs, the lithology became very moist and firm, medium olive-gray silty clay.

Because of overhead utilities, the MW04 location was moved 25 feet north. It was located in a tank pit, which went to 12 feet bgs, so soil boring was completed to 26 feet bgs in order to sample the formation. From the surface to 12 feet bgs, the lithology consisted of wet, medium brown, fine-grained sand (fill material). Below 12 feet bgs, the lithology consisted of very moist to wet, yellow-brown clayey silt with iron staining and an odor. The color changed to medium olive-gray at 14 feet bgs and then to medium gray with iron staining at 23 feet bgs.

Upon reaching the boring termination depth, monitoring wells were installed at each identified location. The monitoring wells were constructed using a 10-foot-long, 2-inch-diameter polyvinyl chloride (PVC) 0.010-inch slotted screen, a 2-inch diameter, schedule 40 PVC well riser with flush jointed threaded connections, and well caps. The depth of the well's screen interval was determined in the field based on the lithology sampling results. The filter pack encasing the screen consists of U.S. standard sieve size 10/20, clean, washed silica sand extending at least 2 feet above the screen. A 2-foot minimum bentonite plug was installed after placement of the filter pack. The plug consists of 3/8-inch-diameter bentonite pellets. The bentonite pellets were allowed to hydrate in accordance with manufacturer's specifications before installing cement-bentonite grout to fill the remaining annular space. The cement-bentonite grout was placed from the top of the bentonite seal to the ground surface. The monitoring well was finished at the surface with a flush-mounted wellhead consisting of an 8-inch inner diameter, watertight, welded manhole with 3/8-inch steel watertight, bolt-down load bearing cover. The manhole was secured with a 2-foot x 2-foot x 6-foot concrete pad. Well construction logs are presented with the boring logs in Attachment A.

Monitoring Well Development

Each well was developed after installation to remove clay fines, silt, and very fine-grained sand from the filter pack surrounding the well screen. Development also helped to restore the normal hydrologic conditions of the geologic formation near the borehole.

The monitoring well was developed by agitating the water in the well casing and next to the screen by moving a 12-volt submersible pump attached to tubing rapidly up and down from the bottom of the well to the top of the well screen. The agitation served to dislodge silt and clay particles from the well screen and the surrounding sand pack. The agitation and pumping continued until the groundwater was free of sediment and clear. Approximately 61.5 gallons of water were removed from the monitoring wells during development and containerized in 55-gallon steel drums onsite.

Depth to Groundwater/Groundwater Elevation Determination

Allen & Hoshall, a Tennessee registered land surveyor, located the permanent monitoring wells horizontally and vertically. Well location information, top of casing elevation, depth to water measurements, and groundwater elevations are summarized in Table 1. Groundwater flow appears to be mounded in the sand backfill material. Overall, the flow appears to be to the southwest as shown in Figure 1.

Groundwater Sampling and Analysis Results

Groundwater samples were collected from MW02, MW03, MW04, and MW05 (offsite monitoring well) using a peristaltic pump and dedicated Teflon tubing. After collection, the samples were placed on ice and hand delivered under chain-of-custody to ETC of Memphis, Tennessee. Water quality parameters were monitored during monitoring well purging to assure representative groundwater samples were obtained. Table 2 summarizes the final field stabilization readings. Groundwater sampling forms are provided in Attachment B. All samples were analyzed for volatile organic compounds (VOCs) using U.S. Environmental Protection Agency (USEPA) Method 8260B. Detected concentrations are summarized in Table 3, and the analytical report is provided in Attachment C.

VOCs were detected in groundwater samples including petroleum and chlorinated solvent related compounds. Groundwater results were compared to the USEPA regional screening levels (RSLs) for tap water and maximum contaminant levels (MCLs). Sixteen VOCs exceeded their tap-water RSLs and eight VOCs exceeded their MCLs in MW02, MW03, and MW04. Chlorinated solvent-related VOCs represent the most significant groundwater contamination where PCE was detected in onsite permanent well MW04 at 106,000 micrograms per liter (µg/L) or parts per billion (ppb). PCE was also detected in

onsite monitoring wells MW02 (18.3 µg/L) and MW03 (8.1 µg/L). Trichloroethene (TCE) and cis-1,2-dichloroethene (Cis-1,2-DCE) were detected above their MCLs of 5 µg/L and 70 µg/L in MW04 at 989 µg/L and 798 µg/L. Cis-1,2-DCE was also detected below its MCL (70 µg/L) at MW03 at 1.81 µg/L. TCE and cis-1,2-DCE were not detected in MW02.

Petroleum related VOCs were detected in MW02 and MW04. Benzene was detected above its MCL of 5 µg/L at MW02 (1,240 µg/L) and MW04 (95.7 µg/L). Ethylbenzene was detected at MW02 (44.6 µg/L) and MW04 (1.78 µg/L) above the RSL (1.3 µg/L) but below the MCL (700 µg/L). Xylene (Total) was detected at onsite wells MW02 (389 µg/L) and MW04 (32.1 µg/L) but only exceeded its RSL of 190 µg/L at MW02.

Four VOCs exceeded their RSLs and one VOC exceed its MCL in offsite monitoring well MW05. PCE was detected at 32.7 µg/L exceeding both its RSL of 9.7 µg/L and MCL of 5 µg/L. TCE and cis-1,2-DCE were not detected in MW05.

Conclusions

Chlorinated solvent-related VOCs appear to be generally localized in the area of MW04. PCE and its daughter products, TCE and cis-1,2-DCE, are observed at concentrations above MCLs in MW04. Benzene was also detected above its MCL in MW04. MW02 was characterized by petroleum contamination with the highest site detections of benzene, ethylbenzene, toluene, and xylene. PCE was detected in MW02 but at lower concentrations than those observed at MW04. Offsite well MW05 continues to have a detection of PCE greater than the MCL and RSL. As stated in the Offsite Monitoring Well Report dated March 21, 2013, MLB believes the groundwater contamination at MW05 may be related to a former filling station that was near the well.

Sincerely,

EnSafe Inc.

Allison L Harris

By: Allison Harris
Project Manager

Attachment A — Soil Boring and Monitoring Well Logs
Attachment B — Groundwater Sampling Forms
Attachment C — Laboratory Analytical Report

Figures

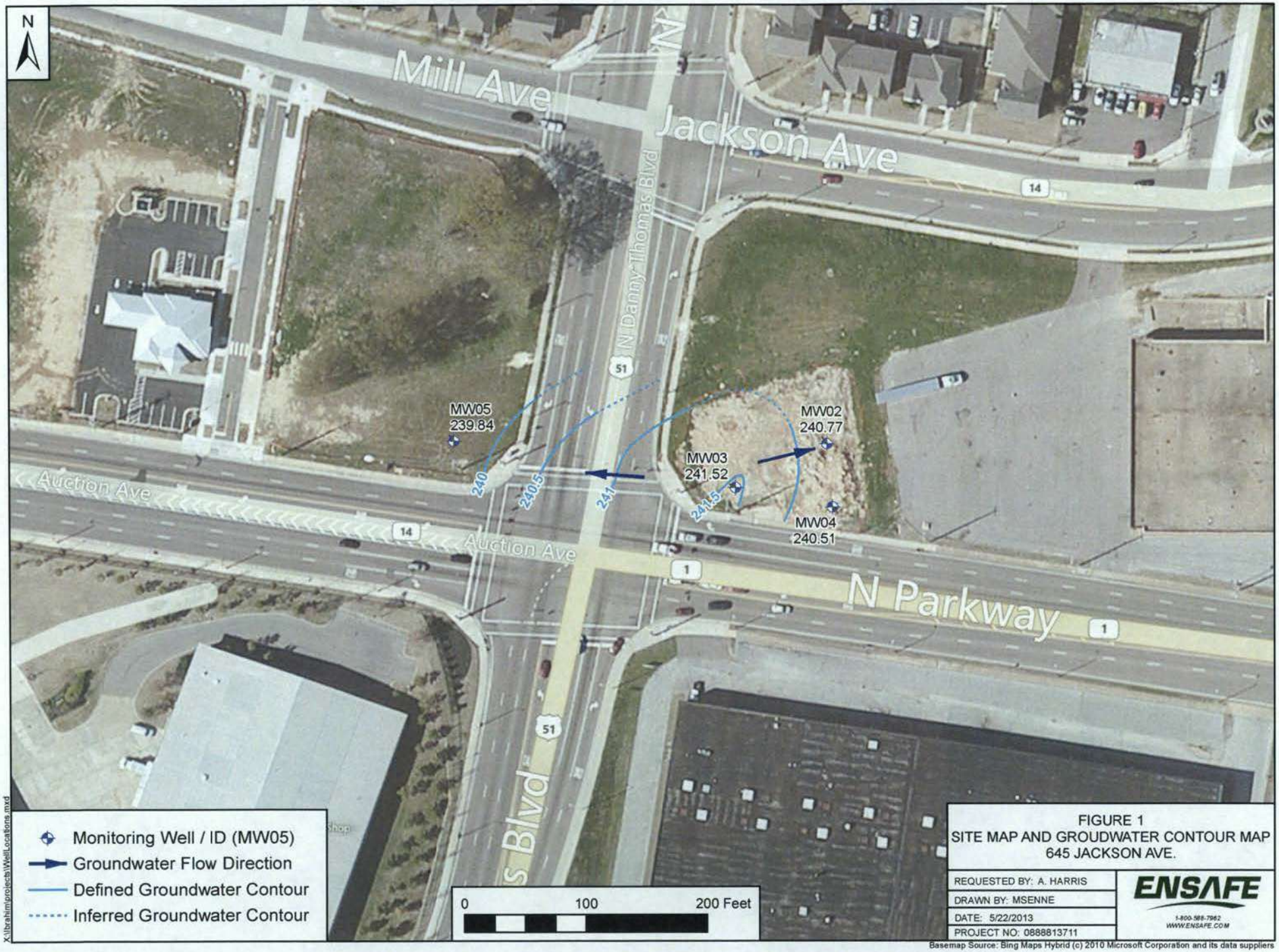


FIGURE 1
SITE MAP AND GROUDWATER CONTOUR MAP
645 JACKSON AVE.

REQUESTED BY: A. HARRIS	
DRAWN BY: MSENNE	
DATE: 5/22/2013	
PROJECT NO: 0888813711	

ENSAFE
1-800-588-7962
WWW.ENSAFE.COM

Basemap Source: Bing Maps Hybrid (c) 2010 Microsoft Corporation and its data suppliers

Tables

Table 1
Monitoring Well Location and Groundwater Elevations
Former Ibrahim Property, 645 Jackson Avenue
Memphis, TN

Location	Easting	Northing	Original TOC Elevation (ft msl)	Depth to Water (ft btoc)	Groundwater Elevation (ft msl)
MW02	324328.01	762057.36	245.62	4.85	240.77
MW03	324291.88	761982.23	243.6	2.08	241.52
MW04	324275.58	762061.76	243.19	2.68	240.51
MW05	324330.17	761750.87	245.63	5.79	239.84

Notes:
Depth to water measurements were collected on April 25, 2013
ft msl—feet mean sea level
ft btoc— feet below top of casing
TOC— top of casing

Table 2
Stabilization Readings
Former Ibrahim Property, 645 Jackson Avenue
Memphis, TN

	MW02	MW03	MW04	MW05
pH (S.U.)	6.62	6.96	6.66	6.82
Specific Conductance (mS/cm)	1.497	0.423	1.741	1.08
Turbidity (NTU)	64.5	14	28.4	36.7
DO (mg/L)	3.59	4.55	5.63	0.65
Temperature (C°)	18.36	17.7	18.67	18.8
ORP (mV)	-38.6	-13.8	-18.7	-91.9

Notes:
SU — Standard Unit
mS/cm — millisiemens/centimeter
NTU — Nephelometric Turbidity Unit
mg/L — milligram per Liter
°C — degree Celsius
mV — millivolt

Table 3
Detected Concentrations of VOCs in Groundwater
Former Ibrahim Property, 645 Jackson Avenue, Memphis, TN

Parameters	MW02	MW03	MW04	MW05	MCL	RSL tap water
Tetrachloroethene	18.3	8.1	106000	32.7	5	9.70
Trichloroethene	ND	ND	989	ND	5	0.44
cis-1,2-Dichloroethene	ND	1.81	798	ND	70	28.00
trans-1,2-Dichloroethene	ND	ND	15.9 J	ND	100	86.00
1,2-Dichloroethene (Total)	ND	1.81	814	ND	NS	130.00
Benzene	1240	ND	95.7	3.00 B	5	0.39
Ethylbenzene	44.6	ND	6.04 J	1.78 B	700	1.30
Toluene	369	ND	42.6 J	1.36 J	1000	860.00
o-Xylene	88.5	ND	ND	ND	NS	190.00
m,p-Xylene	300	ND	32.1 J	2.03	NS	190.00
Xylene (total)	389	ND	32.1	2	10000	190.00
Acrolein	166	ND	ND	306	NS	0.04
sec-Butyl benzene	1.07	ND	ND	8	NS	NS
tert-Butyl benzene	.63 J	ND	ND	4.14	NS	NS
Carbon Disulfide	.15 JB	ND	ND	0.94 JB	NS	720.00
Chlorobenzene	ND	ND	66.4	ND	100	72.00
1,2-Dichloroethane	42.3	ND	ND	ND	5	0.15
1,1-Dichloroethene	ND	ND	34.9	ND	7	260.00
1,2-Dichloropropane	3.68	ND	ND	ND	0.38	5.00
2-Hexanone	4.66 J	ND	ND	ND	NS	34.00
Isopropyl benzene	10.4	ND	ND	22.1	NS	NS
4-Isopropyl toluene	1.5	ND	ND	4.93	NS	NS
4-Methyl-2-Pentanone	58.6	ND	ND	ND	NS	
Methylene Chloride	ND	ND	24.0 J	ND	5	9.90
Napthalene	30	1.19 JB	43.4 J	1.77 JB	NS	0.14
n-Propyl benzene	7.16	ND	ND	18.6	NS	530.00
1,2,4-Trimethylbenzene	124	ND	10.8 J	11.9	NS	15.00
1,3,5-Trimethylbenzene	47.4	ND	4.45 J	0.35 J	NS	87.00

Notes:
All results are in micrograms per liter (µg/L) or parts per billion (ppb).
ND-Not Detected
NS-No standard established
RSL exceedances are highlighted in yellow.
MCL exceedances are shown in red.
J-estimated
B-detected in blank

Attachment A
Soil Boring and Monitoring Well Logs

ENSAFE

5724 Summer Trees Drive
Memphis TN 38134

Soil Boring and Monitoring Well Log

Location: MW02

Client:	MLB - Uptown LLC	Start Date:	April 22, 2013
Address:	645 Jackson Avenue	End Date:	April 22, 2013
City/St:	Memphis, TN	Drilling Method:	Hollow-Stem Auger
Project:	0888813711	Drilling Contractor:	Tri-State Testing Services
Well Owner:	MLB - Uptown LLC	Geologist:	Allison Harris
		Northing:	324327.93
		Easting:	762057.4
		TOC Elevation:	245.62
		Surface Elevation FT:	246.1
		Total Depth FT:	20.0

DEPTH FT BGS	ELEVATION	SYMBOLS	USCS CODE	ORGANIC VAPOR	Lithologic Description (Visual-Manual Description (ASTM D 2488-06))	Well Construction	Well Description
0	245		ML		Fill and clayey-silt	Flush-Grade	
			ML		Clayey silt, medium red to browm, Fe staining, moist, firm, gray mottling	Cement Grout	
-5	240			0.1		Sch 40 PVC Riser	
			ML		Clayey silt, olive gray, black mottling, very moist, firm	Bentonite Seal	
-10	235						
			ML	1.1	Clayey silt, medium yellow brown, Fe staining, very moist to wet, firm	20/40 Sand Filter Pack	
-15	230		ML	0.4	Clayey silt, medium olive gray, very moist to wet, firm	0.01-inch Slot Sch 40 PVC Screen	
-20			ML		Clayey silt, medium to dark gray, very moist to wet, firm		

NOTES:

NA - Not Analyzed
PVC - Polyvinyl Chloride

ENSAFE

5724 Summer Trees Drive
Memphis TN 38134

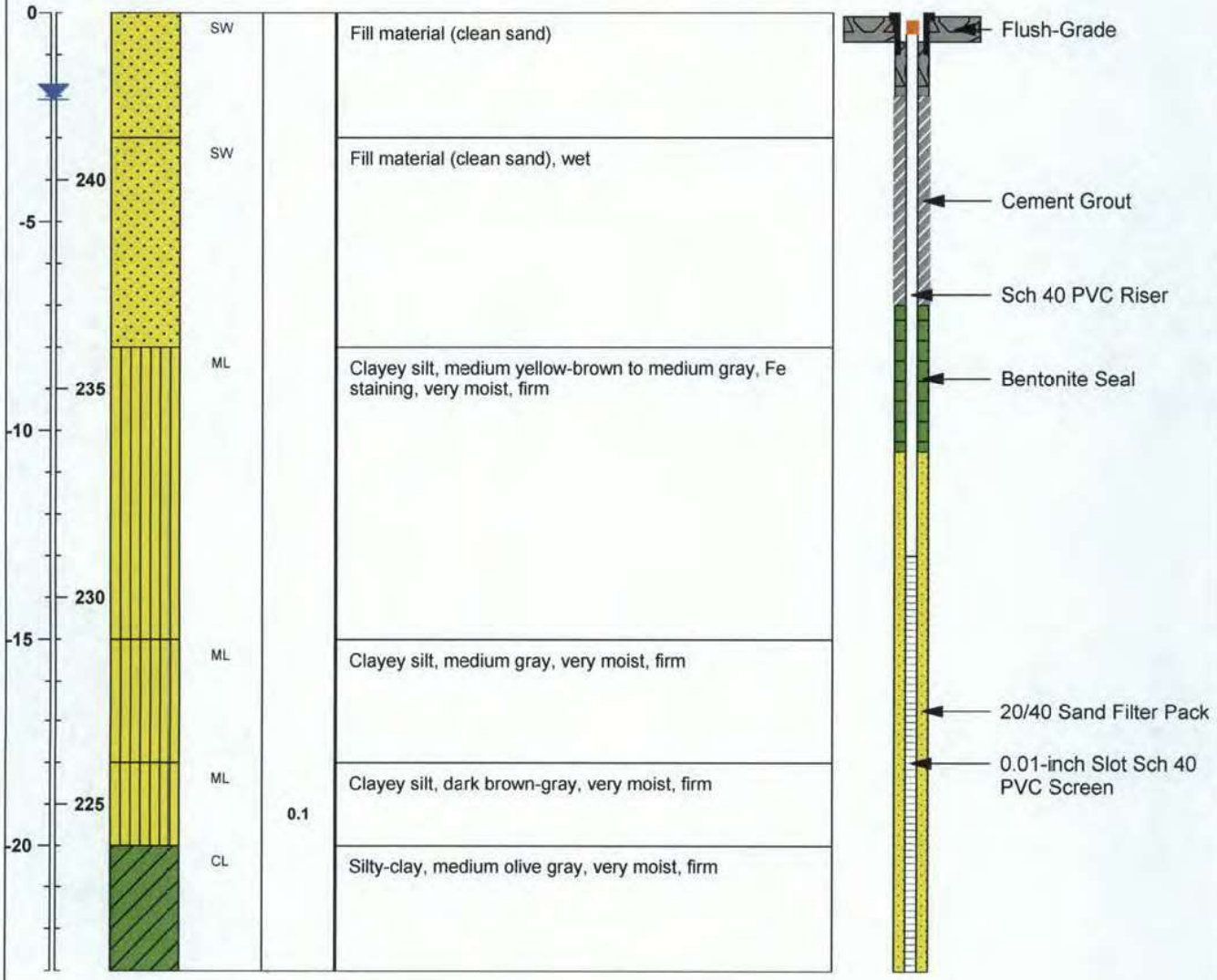
Soil Boring and Monitoring Well Log

Location: MW03

Client: MLB - Uptown LLC
Address: 645 Jackson Avenue
City/St: Memphis, TN
Project: 0888813711
Well Owner: MLB - Uptown LLC

Start Date: April 22, 2013
End Date: April 22, 2013
Drilling Method: Hollow-Stem Auger
Drilling Contractor: Tri-State Testing Services
Geologist: Allison Harris

Northing: 324291.72
Easting: 761982.2
TOC Elevation: 243.6
Surface Elevation FT: 244.0
Total Depth FT: 23.0



NOTES:

NA - Not Analyzed
PVC - Polyvinyl Chloride

ENSAFE

5724 Summer Trees Drive
Memphis TN 38134

Soil Boring and Monitoring Well Log

Location: MW04

Client:	MLB - Uptown LLC	Start Date:	April 22, 2011
Address:	645 Jackson Avenue	End Date:	April 22, 2011
City/St:	Memphis, TN	Drilling Method:	Hollow-Stem Auger
Project:	0888813711	Drilling Contractor:	Tri-State Testing Services
Well Owner:	MLB - Uptown LLC	Geologist:	Allison Harris
		Northing:	324275.59
		Easting:	762061.8
		TOC Elevation:	243.19
		Surface Elevation FT:	243.6
		Total Depth FT:	26.0

DEPTH FT BGS	ELEVATION	SYMBOLS	USCS CODE	ORGANIC VAPOR	Lithologic Description (Visual-Manual Description (ASTM D 2488-06))	Well Construction	Well Description
0			SW		Fill material (clean sand)		Flush-Grade
							Concrete
	240		SW		fin to medium-grained sand (fill material), medium brown, wet, firm		
-5							
	235						Cement Grout
							Sch 40 PVC Riser
-10							
			ML	>1000	Clayey silt, medium yellow brown, Fe staining, very moist to wet, odor		Bentonite Seal
	230			352			
-15			ML		Clayey silt, medium olive gray, very moist to wet, odor		
				171			
	225						
				82			
-20							20/40 Sand Filter Pack
				1.1			0.01-inch Slot Sch 40 PVC Screen
	220		ML	0.6	Clayey silt, medium gray, Fe staining, very moist to wet, odor		
-25				0.4			

NOTES:

NA - Not Analyzed
PVC - Polyvinyl Chloride

Template:\\ESbackup\Data\EQuIS Projects\Memphis Land Bank\645 Jackson Ave\EnSafe MWLogStandard

Attachment B

Monitoring Well Development and Groundwater Sampling Forms

ENSAFE

WELL DEVELOPMENT & GROUNDWATER SAMPLING FORM

DATE: 4/24/13	JOB NUMBER: 08888137.11	PHASE: PH01	TASK: —
PROJECT: MLB Ibrahim	EVENT:		
WELL ID: MW02	LOCATION: 645 Jackson Ave, Memphis, TN		
WEATHER CONDITIONS: Overcast	AMBIENT TEMP: 46°		
REVIEWED BY:	PERSONNEL: C.Wiley		

WELL DIA:	**WELL DEVELOPMENT**
TOTAL DEPTH from TOC (ft.):	START: 1130/1423 FINISH:
DEPTH TO WATER from TOC (ft.): 4.71/7.23	VOLUME PURGED (gal): 12
LENGTH OF WATER COL. (ft.):	**GROUNDWATER SAMPLING**
1 VOLUME OF WATER (gal):	START: FINISH:
3 VOLUMES OF WATER (gal):	VOLUME PURGED (gal):
	ANALYSIS:

MNA FIELD RESULTS

FERROUS IRON	mg/L	CHLORIDE	mg/L		mg/L
SULFIDE	mg/L	ALKALINITY	mg/L		mg/L
SULFATE	mg/L	CO_2	mg/L		mg/L

IN-SITU TESTING

Circle one: DEVELOPMENT ~~SAMPLING~~ ☐ Bailer ☐ Pump Description:

Time (hh:mm):	1150	1428											
pH (units):	6.84	6.82											
Conductivity (mS/cm):	1.514	1.163											
Turbidity (NTU):	*2	500											
DO (mg/L):	9.37	2.41											
Temperature (C°):	18.62	17.57											
ORP (mV):	-340	-57.2											
Volume Purged (gal):	7.5	11.0											
Depth to Water (ft):													
	1												
Meter Type:									Well Goes Dry While Purging ☐				

SAMPLE DATA ☐ Bailer ☐ Pump Description:

Sample ID	Date (m/d/y)	Time (hh:mm)	Bottles (total to lab)	Filtered (0.45 µm)	Remarks

Purging/Sampling Device Decon Process:

COMMENTS: *2 - Error 2
- well going dry @ 1155; will move on to MW4; Dry again @ 1430

Purge water placed in drum#_____

ENSAFE

WELL DEVELOPMENT & GROUNDWATER SAMPLING FORM

DATE: 4/24/13	JOB NUMBER: 088888137.11	PHASE: PH01	TASK: —
PROJECT: MLB-Ibrahim	EVENT:		
WELL ID: MW03	LOCATION: 645 Jackson Ave, Memphis, TN		
WEATHER CONDITIONS: Overcast/Windy	AMBIENT TEMP: 43°		
REVIEWED BY:	PERSONNEL: T. Wiley		

WELL DIA:	**WELL DEVELOPMENT**
TOTAL DEPTH from TOC (ft.):	START: 1010/1340 FINISH:
DEPTH TO WATER from TOC (ft.): 2.05/2.51	VOLUME PURGED (gal): 35.5 total
LENGTH OF WATER COL. (ft.):	**GROUNDWATER SAMPLING**
1 VOLUME OF WATER (gal):	START: FINISH:
3 VOLUMES OF WATER (gal):	VOLUME PURGED (gal):
	ANALYSIS:

MNA FIELD RESULTS

FERROUS IRON	mg/L	CHLORIDE	mg/L		mg/L
SULFIDE	mg/L	ALKALINITY	mg/L		mg/L
SULFATE	mg/L	CO_2	mg/L		mg/L

IN-SITU TESTING

Circle one: (DEVELOPMENT) SAMPLING ☐ Bailer ☒ Pump Description: Whale Pump

Time (hh:mm):	1050	1055	1100	1343	1348	1353						
pH (units):	6.93	6.78	6.74	7.12	6.86	7.04						
Conductivity (mS/cm):	0.582	0.561	0.555	0.447	0.482	0.584						
Turbidity (NTU):	366	158	145	*	*	397						
DO (mg/L):	9.74	10.09	9.77	13.02	13.84	15.51						
Temperature (C°):	18.54	18.26	18.11	17.01	18.66	18.73						
ORP (mV):	-34.0	-37.8	-35.6	-7.5	-8.7	-27.4						
Volume Purged (gal):	16.0	18.0	20.5	24.5	29.5	34.5						
Depth to Water (ft):	-	-	-									
Meter Type:								Well Goes Dry While Purging ☒				

SAMPLE DATA ☐ Bailer ☐ Pump Description:

Sample ID	Date (m/d/y)	Time (hh:mm)	Bottles (total to lab)	Filtered (0.45 µm)	Remarks
Purging/Sampling Device Decon Process:					

COMMENTS: - Well going dry @1102, will move on to MW02, about 21-22 gal pumped
- Dry again @1355

* = Error

Purge water placed in drum#_____

ENSAFE

WELL DEVELOPMENT & GROUNDWATER SAMPLING FORM

DATE: 4/24/13	JOB NUMBER: 0888813711	PHASE: PH01	TASK: —
PROJECT: MLB Ibrahim	EVENT:		
WELL ID: MW04	LOCATION: 645 Jackson Ave, Memphis, TN		
WEATHER CONDITIONS: Overcast	AMBIENT TEMP: 51°		
REVIEWED BY:	PERSONNEL: C. Wiley		

WELL DIA:	**WELL DEVELOPMENT**	
TOTAL DEPTH from TOC (ft.):	START: 1250 / 1440	FINISH:
DEPTH TO WATER from TOC (ft.): 7.53	VOLUME PURGED (gal): 140	
LENGTH OF WATER COL. (ft.):	~~**GROUNDWATER SAMPLING**~~	
1 VOLUME OF WATER (gal):	~~START:~~	~~FINISH:~~
3 VOLUMES OF WATER (gal):	~~VOLUME PURGED (gal):~~	
	~~ANALYSIS:~~	

MNA FIELD RESULTS

FERROUS IRON	mg/L	CHLORIDE	mg/L		mg/L
SULFIDE	mg/L	ALKALINITY	mg/L		mg/L
SULFATE	mg/L	CO_2	mg/L		mg/L

IN-SITU TESTING

Circle one: (DEVELOPMENT) SAMPLING ☐ Bailer ☑ Pump Description: Whale

Time (hh:mm):	1300	1445										
pH (units):	7.09	6.92										
Conductivity (mS/cm):	1.560	1.651										
Turbidity (NTU):	X²	X²										
DO (mg/L):	9.02	12.50										
Temperature (C°):	19.86	20.30										
ORP (mV):	42.2	29.0										
Volume Purged (gal):	6.0	12.0										
Depth to Water (ft):												
Meter Type:												

Well Goes Dry While Purging ☐

SAMPLE DATA

☐ Bailer ☐ Pump Description:

Sample ID	Date (m/d/y)	Time (hh:mm)	Bottles (total to lab)	Filtered (0.45 µm)	Remarks

Purging/Sampling Device Decon Process:

COMMENTS: (cw) ~~[illegible]~~ X² - Error 2

- Well going dry @ 1303; Will go back to MW03; going dry again @ 1450

Purge water placed in drum#________

ENSAFE

WELL DEVELOPMENT & GROUNDWATER SAMPLING FORM

DATE: 4/25/13	JOB NUMBER: 05858137.11	PHASE: 1401	TASK: —
PROJECT:	EVENT:		
WELL ID: MW02	LOCATION: 645 Jackson Ave, Memphis, TN		
WEATHER CONDITIONS:	AMBIENT TEMP: 65°		
REVIEWED BY:	PERSONNEL: C Wiley		

WELL DIA:	**WELL DEVELOPMENT**
TOTAL DEPTH from TOC (ft.):	START: FINISH:
DEPTH TO WATER from TOC (ft.): 4.85	VOLUME PURGED (gal):
LENGTH OF WATER COL. (ft.):	**GROUNDWATER SAMPLING**
1 VOLUME OF WATER (gal):	START: 1319 FINISH: 1355
3 VOLUMES OF WATER (gal):	VOLUME PURGED (gal): 1.50
	ANALYSIS: VOCs

MNA FIELD RESULTS

FERROUS IRON	mg/L	CHLORIDE	mg/L		mg/L
SULFIDE	mg/L	ALKALINITY	mg/L		mg/L
SULFATE	mg/L	CO_2	mg/L		mg/L

IN-SITU TESTING

Circle one: DEVELOPMENT SAMPLING ☐ Bailer ☑ Pump Description: Peristaltic

Time (hh:mm):	1329	1334	1339	1344	1349								
pH (units):	6.51	6.57	6.59	6.61	6.62								
Conductivity (mS/cm):	1.490	1.491	1.493	1.496	1.497								
Turbidity (NTU):	84.9	83.9	76.1	67.2	64.5								
DO (mg/L):	4.40	3.34	3.61	3.64	3.59								
Temperature (C°):	18.59	18.44	18.37	18.42	18.36								
ORP (mV):	-46.8	-47.0	-39.8	-38.5	-38.6								
Volume Purged (gal):	0.50	0.70	1.0	1.20	1.40								
Depth to Water (ft):	5.93	6.26	6.67	6.93	7.14								
Meter Type:								Well Goes Dry While Purging ☐					

SAMPLE DATA ☐ Bailer ☐ Pump Description:

Sample ID	Date (m/d/y)	Time (hh:mm)	Bottles (total to lab)	Filtered (0.45 µm)	Remarks
MLBIGMW02413	4/25/13	1355	3 VOA		

Purging/Sampling Device Decon Process:

COMMENTS:

Purge water placed in drum#_____

ENSAFE

WELL DEVELOPMENT & GROUNDWATER SAMPLING FORM

01 of 2

DATE: 4/25/13	JOB NUMBER: 08888137.11	PHASE: PH01	TASK: ****
PROJECT: MLB Rubicon	EVENT:		
WELL ID: MW03	LOCATION: Memphis TN. 645 Jackson Ave		
WEATHER CONDITIONS: Sunny	AMBIENT TEMP: 46°		
REVIEWED BY:	PERSONNEL: C. Wiley		

WELL DIA:	**WELL DEVELOPMENT**
TOTAL DEPTH from TOC (ft.):	START: / FINISH:
DEPTH TO WATER from TOC (ft.): 2.08	VOLUME PURGED (gal):
LENGTH OF WATER COL. (ft.):	**GROUNDWATER SAMPLING**
1 VOLUME OF WATER (gal):	START: 0943 FINISH: 1240
3 VOLUMES OF WATER (gal):	VOLUME PURGED (gal): 10.80
	ANALYSIS: VOCs

MNA FIELD RESULTS

FERROUS IRON	mg/L	CHLORIDE	mg/L		mg/L
SULFIDE	mg/L	ALKALINITY	mg/L		mg/L
SULFATE	mg/L	CO_2	mg/L		mg/L

IN-SITU TESTING

Circle one: DEVELOPMENT / SAMPLING ☐ Bailer ☐ Pump Description: Peristaltic

Time (hh:mm):	0954	1017	1022	1027	1032	1037	1042	1047	1052	1057	1102	1107
pH (units):	6.73	6.75	6.68	6.71	6.74	6.78	6.78	6.80	6.83	6.85	6.86	6.85
Conductivity (mS/cm)	0.441	0.443	0.448	0.447	0.446	0.444	0.442	0.442	0.437	0.435	0.434	0.432
Turbidity (NTU):	*	450	65	40	28	16	11	100	7.9	6.0	4.8	4.8
DO (mg/L):	15.28	12.82	11.32	10.21	9.28	8.37	7.92	7.46	6.53	6.19	5.98	11.66
Temperature (C°):	17.23	16.92	17.2	17.21	17.18	17.15	17.23	17.27	17.25	17.36	17.3	17.26
ORP (mV):	-10.3	-10.4	-7.8	-5.9	-5.5	-6.8	-7.8	-7.7	-7.8	-8.7	-8.7	-10.5
Volume Purged (gal):	2.00	2.50	2.60	2.75	2.90	3.20	3.65	3.95	4.25	4.65	5.05	5.50
Depth to Water (ft):	3.61	3.44	3.44	3.44	3.44	3.44	3.44	3.44	3.44	3.44	3.44	3.44
Meter Type:								Well Goes Dry While Purging ☐				

SAMPLE DATA ☐ Bailer ☐ Pump Description:

Sample ID	Date (m/d/y)	Time (hh:mm)	Bottles (total to lab)	Filtered (0.45 µm)	Remarks
DG2					

Purging/Sampling Device Decon Process:

COMMENTS: * Recalibrated DO (*) - Power surge when truck was turned on

Purge water placed in drum#_____

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MURIGMW030413

ENSAFE

WELL DEVELOPMENT & GROUNDWATER SAMPLING FORM

B2 of 2
MW03

DATE: 4/25/13	JOB NUMBER:	PHASE:	TASK:
PROJECT: MLB Ibrahim	EVENT:		
WELL ID: MW03	LOCATION:		
WEATHER CONDITIONS:	AMBIENT TEMP:		
REVIEWED BY:	PERSONNEL:		

WELL DIA:	**WELL DEVELOPMENT**
TOTAL DEPTH from TOC (ft.):	START: / FINISH:
DEPTH TO WATER from TOC (ft.):	VOLUME PURGED (gal):
LENGTH OF WATER COL. (ft.):	**GROUNDWATER SAMPLING**
1 VOLUME OF WATER (gal):	START: / FINISH:
3 VOLUMES OF WATER (gal):	VOLUME PURGED (gal):
	ANALYSIS:

MNA FIELD RESULTS

FERROUS IRON	mg/L	CHLORIDE	mg/L		mg/L
SULFIDE	mg/L	ALKALINITY	mg/L		mg/L
SULFATE	mg/L	CO_2	mg/L		mg/L

IN-SITU TESTING

Circle one: DEVELOPMENT SAMPLING ☐ Bailer ☐ Pump Description:

Time (hh:mm):	1112	1117	1122	1127	1132	1137	1209	1214	1219	1224	1229	1234
pH (units):	6.88	6.89	6.89	6.93	6.90	6.90	6.94	6.98	6.98	6.94	6.93	6.96
Conductivity (mS/cm):	0.433	0.433	0.433	0.432	0.432	0.431	0.469	0.441	0.435	0.426	0.424	0.423
Turbidity (NTU):	0.82	4.81	4.85	3.67	3.49	2.69	2.23	2.24	2.20	1.76	1.53	1.40
DO (mg/L):	11.82	11.83	9.96	8.20	7.01	5.78	6.79	6.64	6.33	5.35	4.67	4.55
Temperature (C°):	17.28	17.31	17.37	17.38	17.41	17.58	17.57	17.52	17.65	17.49	17.51	17.76
ORP (mV):	-10.7	+2.0	12.3	-14.0	-14.8	-15.7	-15.3	-14.5	-14.6	-14.4	-14.5	-13.8
Volume Purged (gal):	6.50	7.00	7.50	7.75	8.00	8.25	9.50	9.75	10.00	10.25	10.50	10.75
Depth to Water (ft):	3.44	3.50	3.44	3.44	3.44	3.44	2.71	2.71	2.71	2.71	2.71	2.71
Meter Type:								Well Goes Dry While Purging ☐				

SAMPLE DATA ☐ Bailer ☐ Pump Description:

Sample ID	Date (m/d/y)	Time (hh:mm)	Bottles (total to lab)	Filtered (0.45 µm)	Remarks
MLBIGMW03042513	4/25/13	1240	3 VOAs		

Purging/Sampling Device Decon Process:

COMMENTS: * Changed DO probe

Purge water placed in drum#_____

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ENSAFE

WELL DEVELOPMENT & GROUNDWATER SAMPLING FORM

DATE: 4/25/13	JOB NUMBER: 08888137.11	PHASE: PH01	TASK: —
PROJECT: MLB Ebrahim	EVENT:		
WELL ID: MW04	LOCATION: 645 Jackson Ave, Memphis, TN		
WEATHER CONDITIONS: Sunny	AMBIENT TEMP: 70°		
REVIEWED BY:	PERSONNEL: C. Wiley		

WELL DIA:	**WELL DEVELOPMENT**
TOTAL DEPTH from TOC (ft.):	START: ~~FINISH:~~
DEPTH TO WATER from TOC (ft.): 2.68	VOLUME PURGED (gal):
LENGTH OF WATER COL. (ft.):	**GROUNDWATER SAMPLING**
1 VOLUME OF WATER (gal):	START: 1420 FINISH: 1508
3 VOLUMES OF WATER (gal):	VOLUME PURGED (gal): 2.05
	ANALYSIS: VOCs

MNA FIELD RESULTS

FERROUS IRON	mg/L	CHLORIDE	mg/L		mg/L
SULFIDE	mg/L	ALKALINITY	mg/L		mg/L
SULFATE	mg/L	CO_2	mg/L		mg/L

IN-SITU TESTING

Circle one: DEVELOPMENT SAMPLING ☐ Bailer ☐ Pump Description: Peristaltic

Time (hh:mm):	1429	1434	1439	1444	1449	1454	1459	1504				
pH (units):	6.64	6.64	6.63	6.65	6.66	6.67	6.66	6.66				
Conductivity (mS/cm):	1.688	1.689	1.692	1.745	1.743	1.741	1.741	1.741				
Turbidity (NTU): 7/8	[illegible]	59.8	52.6	44.7	43.1	38.4	33.8	28.4				
DO (mg/L):	5.60	5.49	6.02	6.00	6.17	6.10	5.88	5.63				
Temperature (C°):	19.42	19.52	17.67	18.16	18.32	18.47	18.45	18.62				
ORP (mV):	-24.4	-22.0	-18.5	-17.4	-17.1	-17.3	-18.7	-18.7				
Volume Purged (gal):	0.5	0.70	1.08	1.38	1.68	1.88	1.80	2.0				
Depth to Water (ft):	4.23	*5.30	6.22	6.64	6.98	7.38	7.87	8.42				
Meter Type:								Well Goes Dry While Purging ☐				

SAMPLE DATA ☐ Bailer ☐ Pump Description:

Sample ID	Date (m/d/y)	Time (hh:mm)	Bottles (total to lab)	Filtered (0.45 µm)	Remarks
MLBEGMW04413	4/25/13	1508	3 VOAs		
Purging/Sampling Device Decon Process:					

COMMENTS:

Purge water placed in drum#_____

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ENSAFE

WELL DEVELOPMENT & GROUNDWATER SAMPLING FORM

DATE: 4/25/13	JOB NUMBER: 08888 13711	PHASE: PH01	TASK: —
PROJECT: MLB Ibrahim	EVENT:		
WELL ID: MW05	LOCATION: 645 Jackson Ave, Memphis TN		
WEATHER CONDITIONS: Sunny	AMBIENT TEMP: 75°		
REVIEWED BY:	PERSONNEL: CWiley		

WELL DIA:	**WELL DEVELOPMENT**
TOTAL DEPTH from TOC (ft.):	START: FINISH:
DEPTH TO WATER from TOC (ft.): 5.79	VOLUME PURGED (gal):
LENGTH OF WATER COL. (ft.):	**GROUNDWATER SAMPLING**
1 VOLUME OF WATER (gal):	START: 1553 FINISH: 1634
3 VOLUMES OF WATER (gal):	VOLUME PURGED (gal): 1.30
	ANALYSIS: VOCs

MNA FIELD RESULTS

FERROUS IRON	mg/L	CHLORIDE	mg/L		mg/L
SULFIDE	mg/L	ALKALINITY	mg/L		mg/L
SULFATE	mg/L	CO_2	mg/L		mg/L

IN-SITU TESTING

Circle one: DEVELOPMENT SAMPLING ☐ Bailer ☐ Pump Description: Peristaltic

Time (hh:mm):	1610	1615	1620	1624	1629								
pH (units):	6.79	6.78	6.79	6.82	6.82								
Conductivity (mS/cm):	1.086	1.086	1.086	1.083	1.080								
Turbidity (NTU):	13.9	9.73	6.61	4.91	3.67								
DO (mg/L):	0.80	0.63	0.77	0.88	0.65								
Temperature (C°):	16.28	18.82	18.86	16.84	19.80								
ORP (mV):	-93.1	-95.5	-99.5	-92.6	-91.9								
Volume Purged (gal):	0.50	0.70	0.95	1.20	1.70								
Depth to Water (ft):	6.82	7.02	7.27	7.45	7.58								
Meter Type:									Well Goes Dry While Purging ☐				

SAMPLE DATA ☐ Bailer ☐ Pump Description: Reverse Siphon

Sample ID	Date (m/d/y)	Time (hh:mm)	Bottles (total to lab)	Filtered (0.45 µm)	Remarks
MLBIGMW05 0413	4/25/13	1634	3 VOA		

Purging/Sampling Device Decon Process:

COMMENTS:

Purge water placed in drum#_____

April 23, 2021

Memphis Housing Authority
c/o Ms. Luretha Phillips
700 Adams Avenue
Memphis, Tennessee 38105

via email:lphillips@memphisha.org

Re: Phase II Environmental Site Assessment
0 Auction Avenue— Memphis, Tennessee

Dear Ms. Phillips:

This letter report summarizes the field activities and analytical results from the Phase II Environmental Site Assessment (ESA) performed at 0 Auction Avenue (Site) in Memphis, Tennessee.

BACKGROUND

The 1.37-acres Site (Shelby County Parcel ID: 001096 00029) is vacant grass-covered land with no structures. Based on a review of historical resources and a Phase I ESA performed by ACI Environmental Associates (ACI) dated September 28, 2020, the east portion of the Site operated as a service station from as early as 1937. The service station, known as North Parkway Fill, operated until approximately 1952. The north portion of the Site was residential with multiple single-family dwellings, duplexes, and apartments as early as 1897 through 2002. The Jackson Avenue, Danny Thomas Street, and North Parkway intersection was in the southern portion of the Site until the interchange was reconfigured in 2008.

The Phase I ESA also identified potential impacts from the east adjoining property at 645 Jackson Avenue. Volatile organic compounds (VOC), polycyclic aromatic hydrocarbons (PAH), and arsenic concentrations have historically exceeded their respective cleanup levels in several onsite (645 Jackson Avenue) groundwater wells.

This assessment evaluates soil, groundwater, and soil gas at the Site for potential chemicals of concern associated with historical operations at the Site and the east adjoining property.

DATA COLLECTION PROCEDURES

Soil, groundwater, and soil gas sampling were conducted on the Site following the procedures outlined in the approved Phase II ESA Proposal, dated December 22, 2020. Field work was conducted by EnSafe personnel on March 10, 16, and 19, 2021.

Before initiating field sampling, Tennessee One Call was contacted to identify the locations of buried utilities. Additionally, Alsip Locating Service, a private subsurface utility location service, was subcontracted to locate and mark underground utilities and pipelines on the subject property using ground-penetrating radar equipment. No underground storage tanks or product lines were identified during the survey; however, a former easement with public utility lines was identified crossing the southeast corner of the Site. The easement is shown on Figure 1 in Attachment A. Additionally, a storm water sewer line was identified along the north portion of the Site.

Soil Borings

Ten soil borings were completed using direct-push technology techniques by McCray Drilling of Memphis, Tennessee. Locations are shown on Figure 1 in Attachment A. The soil borings (TW01-TW03 and SB01-SB07) were advanced to the following depths below ground surface (bgs):

- TW01 to 20-feet below ground surface (bgs)
- TW02 and TW03 to 24-feet bgs
- SB01 through SB07 to 20-feet bgs

At each location, the soil was logged for lithology using the Unified Soil Classification System, screened with a photoionization detector (PID), and further examined by EnSafe field personnel for visual and olfactory evidence of contamination. PID readings over 50 parts per million (by volume) were observed atTW02, TW03 SB03, and SB07. Boring lithology generally consisted of a dark brown and yellowish-brown silty clay from 0 to 8-feet bgs and dark greenish clay and olive-brown silty clay from 8 to 28-feet bgs. No staining was identified in any of the soil samples collected as part of the Site investigation; however, faint petroleum odors were noted at 7 to 20-feet bgs in TW02, 4 to 20-feet bgs in SB03, 13 to 20-feet bgs in SB04, and 4 to 20-feet bgs in SB07. Lithologic descriptions and field screening results for the soil borings are recorded on borings logs included in Attachment B.

One sample was collected from each soil boring at the highest PID reading interval. Table 1 in Attachment C lists the soil boring locations and the depth interval of samples collected for laboratory analysis. All soil samples were submitted for the following analysis:

- VOCs by U.S. Environmental Protection Agency (EPA) Method 8260B
- PAHs by U.S. EPA Method 8270
- Resource Conservation and Recovery Act (RCRA) 8 metals by U.S. EPA Method 6010
- Extractable Petroleum Hydrocarbons (EPH) by Tennessee EPH Method

Groundwater Sampling

Temporary groundwater monitoring wells were installed in three of the ten soil borings after completion of the soil sampling. The temporary wells consisted of a 5-foot long, ¾-inch diameter poly-vinyl chloride screen attached to a riser pipe and set to the terminal depth of the boring. The wells were developed and purged following installation to ensure communication with the saturated zone and minimize turbidity. A peristaltic pump equipped with new, dedicated polyethylene tubing was used to develop and sample the wells. Following the purging, grab groundwater samples were collected from the temporary monitoring wells.

Additionally, two onsite permanent groundwater monitoring wells were purged and sampled with the same procedure mentioned above. Geochemistry data, including temperature, pH, specific conductance, oxidation-reduction potential, and turbidity, were recorded during purging of the permanent monitoring wells. Groundwater monitoring well purge forms for MW-5 and MW-6 are in Attachment B.

All groundwater samples were collected in laboratory-provided, pre-cleaned containers. Samples were immediately placed on ice following sample collection and delivered under chain-of-custody to Waypoint Analytical for analysis. The groundwater samples were submitted for analysis of VOCs, PAHs, RCRA 8 Metals, and EPH. Following sample collection, each temporary groundwater well was removed, and the borehole was abandoned with hydrated bentonite clay to the ground surface.

Soil Gas

All soil-gas sampling activities were conducted in general accordance with the Tennessee Department of Environment and Conservation (TDEC) Division of Underground Storage Tanks (DUST) Technical Guidelines Document 018 and TDEC vapor intrusion guidance methodologies (New Jersey Department of Environmental Protection Vapor Intrusion Technical Guidance [Version 4.1], January 2018).

Four sampling locations (SG01-SG04) were advanced to 3-4-feet bgs using a hammer drill. A 6-inch stainless steel vapor screen was attached to a section of 0.25-inch Teflon tubing (sample train) and inserted into the boring. At each sample location, sand-pack and bentonite clay were used to seal the borehole opening around the Teflon tubing to prevent infiltration from outside air. All sampling apparatuses equilibrated for at least two hours before sample collection. All fittings were inspected for proper fit and seal. The system was purged before sampling using a laboratory-provided, clean-certified, 6-liter purge vacuum canister. At each location, isopropyl alcohol was used as a tracer gas to indicate any potential leaks within the sample train. Soil gas samples were collected in a laboratory-provided, individually clean-certified, 6-liter Summa canister with a

soil gas manifold supplied by the laboratory. Each sample was collected over an approximately 30-minute period.[1] Purge rates for each sample did not exceed 200 milliliters per minute as recommended by the referenced guidance documents.

All samples, including pre- and post-canister vacuum pressures, canister serial numbers, sample identifications, sampling dates, and required analyses were recorded on a chain-of-custody form. The samples were shipped via overnight courier to Pace Analytical of Minneapolis, Minnesota. Canisters were analyzed using U.S. EPA Method TO-15. Field sampling forms are included in Attachment B.

ANALYTICAL RESULTS

Soil analytical results were compared to the November 2020 U.S. EPA regional screening levels (RSLs) for residential and industrial land use, TDEC Hazardous Trace Elements in Tennessee Soils Background Levels (TDEC 2001), and TDEC DUST initial screening levels (ISLs) for petroleum constituents. The detected concentrations for soil are presented in Table 2 in Attachment C.

Groundwater analytical results were compared to the November 2020 U.S. EPA tap water RSL (hazard quotient 0.1) and the U.S. EPA Maximum Contaminant Level (MCL). The detected concentrations for groundwater are presented in Table 3 in Attachment C.

The soil gas analytical results were evaluated using the U.S. EPA vapor intrusion screening level (VISLs) for residential and commercial target sub-slab and near-source soil gas concentrations target lifetime carcinogenic risk of 10E-6 and a target noncarcinogenic hazard quotient of 0.2. Detected concentrations are provided in Table 4 in Attachment C.

Laboratory reports for soil, groundwater, and soil gas are provided in Attachment D.

ANALYTICAL RESULTS

SOIL ANALYTICAL RESULTS

RCRA 8 Metals

Concentrations of arsenic and chromium exceeded both their residential and industrial RSLs in all soil samples collected, however, only the arsenic concentration (11.3 milligrams per kilogram [mg/kg]) at TW02 at 12-14 feet exceeded the TDEC background concentration of 10 parts per million (ppm). The chromium concentration (21.3 mg/kg) in SB04 (at 16-18 feet) was the only location to exceed

[1] In accordance with the New Jersey Department of Environmental Protection Vapor Intrusion Technical Guidance (Version 4.1), January 2018.

the TDEC background concentration of 20 mg/kg. All other detected metal concentrations were below residential RSLs, industrial RSLs, and TDEC background concentrations.

Volatile Organic Compounds

All VOC detections were reported below their respective residential and industrial RSLs.

Polynuclear Aromatic Hydrocarbons

All PAH detections were reported below their respective residential and industrial RSLs.

Extractable Petroleum Hydrocarbons

Diesel range organics and EPH concentrations were detected at SB03 (8.38 mg/kg) at 16-18 feet, TW02 (39.9 mg/kg) at 12-14 feet, and TW03 (5.54 mg/kg) at 12-14 feet. All detected concentrations were reported below the TN UST ISL of 500 mg/kg.

GROUNDWATER ANALYTICAL RESULTS

RCRA 8 Metals

Arsenic, barium, chromium, lead, and selenium were detected in collected groundwater samples. Arsenic concentrations exceed the tap water RSL (0.052 micrograms per liter [µg/L]) in TW01 and TW03. The lead concentration at TW01 is equal to its tap water RSL of 15 µg/L. Arsenic and lead concentrations do not exceed their respective MCLs. Chromium concentrations also exceed the tap water RSL in TW01, TW02, and TW03; however, the tap water RSL is based only on hexavalent chromium, and not total chromium. The U.S EPA maximum contaminant level (MCL) for total chromium which includes hexavalent chromium is 100 µg/L.[2] Reported concentrations of chromium in TW01, TW02, and TW03 do not exceed its MCL. All other metal detections are below their respective tap Water RSLs and MCLs. Metals exceedances are noted in temporary monitoring wells and are not observed in permanent monitoring wells indicating the exceedances may be related to sample turbidity.

Volatile Organic Compounds

Benzene and ethylbenzene exceed their respective tap water RSLs in TW03. The benzene concentration (6 µg/L) in TW03 also exceeds its MCL of 5 µg/L. The ethylbenzene concentration (3 µg/L) in TW03 does not exceed its MCL of 700 µg/L. All other VOC detections are below their respective tap water RSLs and MCLs.

Polynuclear Aromatic Hydrocarbons

Naphthalene and 1-methylnaphthalene concentrations exceed their tap water RSLs in TW02.

[2] In accordance with *Chromium in Drinking Water,* U.S. EPA January 27, 2020. https://www.epa.gov/sdwa/chromium-drinking-water.

Naphthalene concentrations also exceed the tap water RSL in TW03. All other PAH detections are below their respective tap water RSLs. MCLs are not established for PAHs.

Extractable Petroleum Hydrocarbons

Diesel range organics, oil range organics, and TN EPH were detected at MW-6 and TW02. Diesel range organics and TN EPH were also detected at TW01 and TW03. Screening levels and MCLs for diesel range organics, oil range organic, and TN EPH in groundwater are not established.

SOIL GAS ANALYTICAL RESULTS

Naphthalene concentrations at SG01 (6.4 micrograms per cubic meter [µg/m^3]), SG02 (3.1µg/m^3), and SG04 (3.1 µg/m^3) exceed the residential VISL of 2.75 µg/m^3. Naphthalene concentrations do not exceed the commercial VISL of 12 µg/m^3. All other detections were below their VISLs.

Isopropanol was detected at trace concentrations (ranging from 4.2 µg/m^3 at SG01 to 147 µg/m^3 at both SG02 and SG04 in all soil gas samples. Based on the isopropanol detections, analytical data may be biased low due to potential leakage from the ambient air.

SOIL GAS AND GROUNDWATER RISK EVALUATION

Tennessee Department of Environment and Conservation (TDEC) requires an evaluation of soil gas data to assess vapor intrusion risk based on cumulative cancer risks and non-cancer hazards; risk and hazard estimates are then used to gauge appropriate mitigation responses if needed.[3] Based on the exceedances in groundwater, EnSafe also evacuated groundwater data to assess vapor intrusion risk. Risk and hazard for both soil gas and groundwater are summarized using a more conservative residential exposure scenario for each location and are presented in Table 5. The VISL Risk Calculator outputs are included in Attachment E.

Soil Gas

For the residential exposure scenarios, carcinogenic risk ranged from 1.81E-06 to 2.66E-06; hazard (non-carcinogenic risk) in active soil gas ranged from 0.075 to 0.086. Carcinogenic risk ranged from 4.14E-07 to 6.10E-07 and hazard ranged from 0.018 to 0.02 in the commercial exposure scenarios. TDEC generally requires response actions (which could include monitoring, institutional controls, etc.) when risk is above 10E-06 and/or hazard is above 0.2. Active mitigation is generally required when risk is above 10E-06 and/or hazard is above 1.0.

Three soil gas locations (SG01, SG02, and SG04) exceed a risk of 10E-06; however, calculated hazards are below 1.0. Elevated risk is contributed primarily by naphthalene, which is a common

[3] *Vapor Intrusion Mitigation Risk Criteria for New Construction at DoR Sites* (TDEC 2017).

constituent of petroleum products. Since VOC concentrations in SG04 were reported below respective VISL, the risk was not calculated.

As discussed in the U.S. EPA's *Technical Guide for Addressing Petroleum Vapor Intrusion at Leaking Underground Storage Tanks* (U.S. EPA 2015) (PVI Guidance), aerobic biodegradation of petroleum constituents can be anticipated within the vadose zone over the long term. This Phase II did not identify light non-aqueous phase liquids, and residual vadose zone soils were determined to be either clean or exhibited concentrations low enough not to impede vapor degradation. Moreover, concentrations in soil gas are likely to decrease significantly during and after property development activities (i.e., regrading, etc.); aeration intrinsic to field activities will likely further stimulate degradation of residual contamination.

Groundwater

For the residential exposure scenarios, carcinogenic risk ranged from 1.25E-07 to 4.83E-06; hazard (non-carcinogenic risk) ranged from 0.0033 to 0.079. Carcinogenic risk ranged from 1.1E-06 to 2.85E-08 and hazard ranged from 0.018 to 0.00078 in the commercial exposure scenarios.

One groundwater sample, TW03, exceeds a risk of 10E-06; however, its calculated hazard number is below 1.0. Elevated risk is contributed primarily by benzene and ethylbenzene, common constituents of petroleum products. Risk was not calculated for TW01, MW-5, and MW-6 as their detected VOC concentrations were below RSLs.

CONCLUSIONS

Arsenic and chromium concentrations in soil are above residential and industrial RSLs, however, concentrations of arsenic at TW02 and chromium at SB04 are reported above the TN background values. Both concentrations may be within the upper portion of a population of background values and are most likely naturally occurring as they do not appear to be significantly higher than the TN background soil levels. VOCs, PAHs, and EPH detections in soil are below the U.S. EPA residential and industrial RSLs and the TDEC DUST ISLs.

Arsenic detections in groundwater at TW01 and TW 03 are above its U.S. EPA tap water RSL but below its MCL. Chromium detections in groundwater at TW01, TW02, and TW03 are also above its RSL but its MCL. The lead detection at TW01 is equal to its RSL and MCL of 15 µg/L. Benzene, ethylbenzene, and naphthalene concentrations in TW03 are above the U.S. EPA tap water RSLs, and the concentration of benzene in TW03 also exceeds its MCL. 1-Methylnaphthalene and naphthalene concentrations in TW02 are also above the U.S. EPA tap water RSLs. TW03 slightly exceeds a carcinogenic risk of 10E-06 for residential and commercial; however, its calculated hazard is below 1.0.

Naphthalene concentrations at SG01, SG02, and SG03 are above its residential VISL but are below its commercial VISL. Three soil gas locations (SG01, SG02, and SG03) exceed a carcinogenic risk of 10E-06 for residential; however, all calculated hazards are below 1.0. For a commercial scenario, soil detections are below 10E-06 and the calculated hazard is below 1.

LIMITATIONS

The information presented in this report was obtained through performance of an approved proposal dated December 22, 2020. Report users should recognize that any sampling or testing activities are inherently limited, in that conditions at other locations and depths within the Site may vary from those at the locations where samples or measurements were obtained. The ability of EnSafe to interpret results and draw conclusions about Site conditions is similarly limited and subject to the availability and quality of information that led EnSafe to select sampling or measurement locations, and to practical limits in the extent of sampling that was conducted. EnSafe has conducted the professional assessment services with a level of care and skill consistent with generally accepted environmental consulting industry standards.

Report results apply solely to conditions existing at the time that EnSafe obtained samples or conducted tests. Only the party for whom this report was originally prepared has the right to make use of and rely upon this report. Reuse of this report or any portion thereof for other than its intended purpose shall be at the user's sole risk. EnSafe makes no representation as to the accuracy or completeness of information prepared by other parties.

We appreciate the opportunity to provide you with our professional consulting services.

Sincerely,

EnSafe Inc.

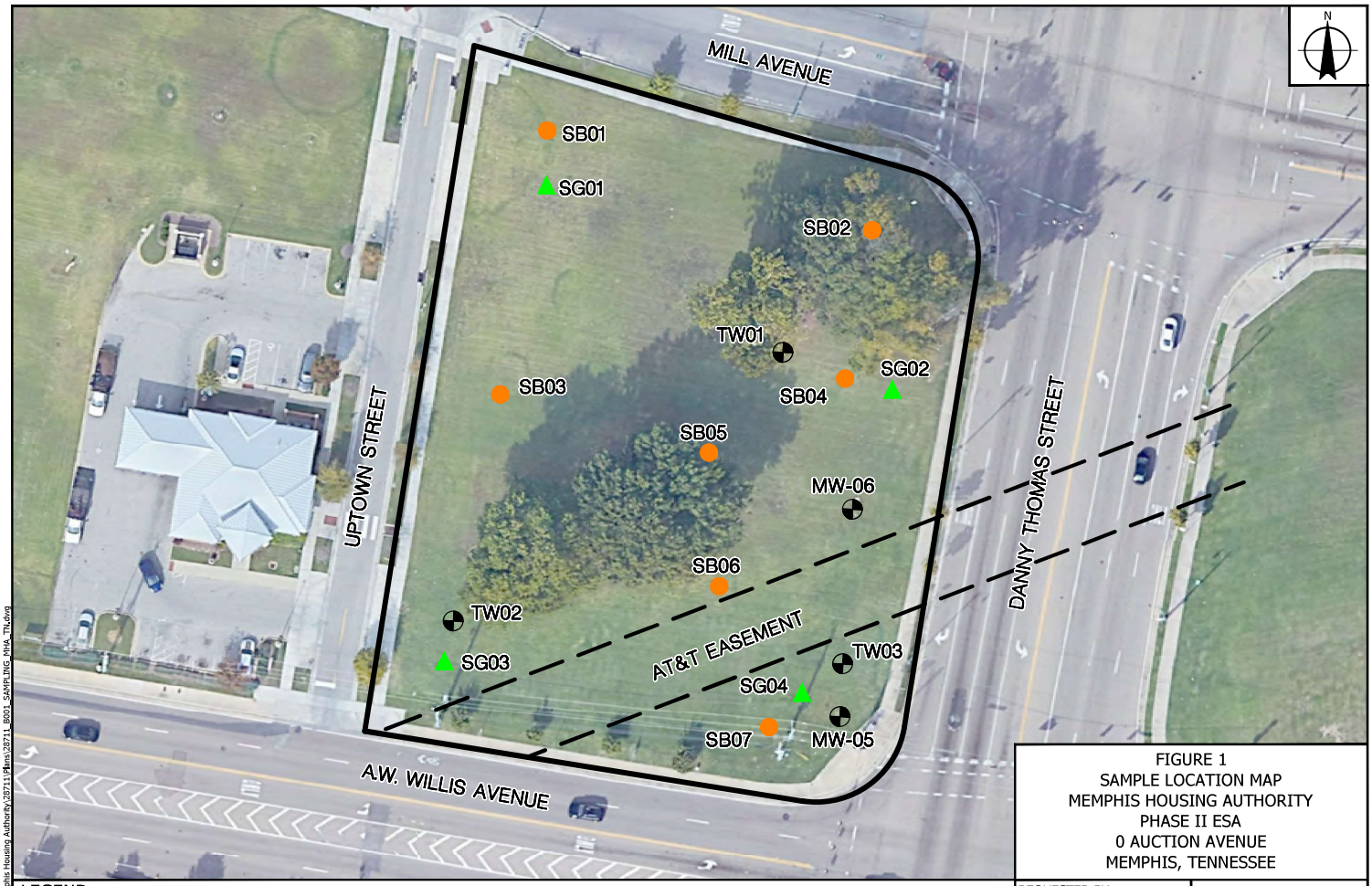
By: Emily Vasko
Environmental Scientist/Geologist

Allison Harris, P.G.
Project Manager

Attachments:

Attachment A — Figures
Attachment B — Soil Boring Logs and Field Documents
Attachment C — Tables
Attachment D — Laboratory Report
Attachment E — VISL Risk Calculator Outputs

Attachment A
Figures



LEGEND

- APPROXIMATE SUBJECT PROPERTY BOUNDARY
- SOIL BORING LOCATION
- TEMORARY/PERMANENT MONITORING WELL LOCATION
- SOIL GAS LOCATION

NAD 1983 STATE PLANE TENNESSEE FEET

0 30 60

SCALE IN FEET

FIGURE 1
SAMPLE LOCATION MAP
MEMPHIS HOUSING AUTHORITY
PHASE II ESA
0 AUCTION AVENUE
MEMPHIS, TENNESSEE

REQUESTED BY:	EV
DRAWN BY:	KMB
DATE:	4/14/2021
PROJECT:	0888828711

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Source: Google Earth Pro Imagery Date: October 21, 2018

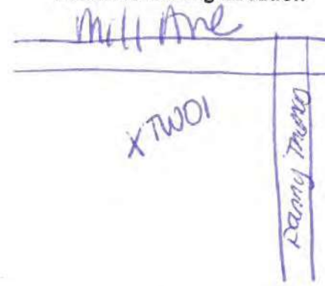
I:\CAD PROJECTS\Memphis Housing Authority\28711\Plans\28711_B001_SAMPLING_MHA_TN.dwg

Attachment B
Soil Boring Logs and Field Documents

ENSAFE

Client:	MHA Phase
Project #:	0888828721
Purpose:	Phase II
Project:	
Location:	0 Auction Ave

Sketch of Boring Location



Location ID: TW01

Start Date/Time: 03/16/2021 1030 Page 1 of 1

End Date/Time: 03/16/2021 1115 Total Depth: 20 ft.

Sample Method: DPT / Hand Auger

Drill Equip: DPT - geoprobe

Drilling Co.: McCray

Geologist: E. Vasco.

Sample Number	Sample Interval	Inches Recovered / Inches Driven	Miscellaneous (Time/Blow Ct)	OVA Reading (ppm)	USCS	DEPTH (FT)	Lithologic Description — Visual-Manual Description (ASTM D 2488-06)
		48/48		0.0		0	0-2: Brown (7.5YR 4/4) silty clay w/ tree roots dry, no S/O.
						1	
				0.0		2	2-4: Dark Brown (7.5 4/6) silty clay, dry, no odor staining
						3	
		48/48		1.0		4	4-8: Yellowish Brown (10YR 5/6) silty clay moist to slightly wet, no odor/staining mottled w/ iron + magnese nodules.
						5	
				0.2		6	
						7	
		36/48		1.6		8	8-11: SAA
						9	
				1.3		10	
						11	11-12: light olive brown silty clay (2.5Y 5/3) silty clay, moist to dry, no staining/odor.
		48/48		2.4		12	12-15: olive gray (5Y 5/2) silty clay, moist to dry no staining/odor.
						13	
				2.2		14	*Sample 12-14 1125*
						15	15-16: Dark olive gray (5Y 3/2) silty clay moist to dry, no staining/odor.
		48/48		1.4		16	16-20: Dark yellowish Brown (10YR 4/4) dry slightly moist drier w/ depth no staining/odor.
						17	
				0.1		18	
						19	Temp well set at 20ft - ~~10ft screen~~ 5ft screen

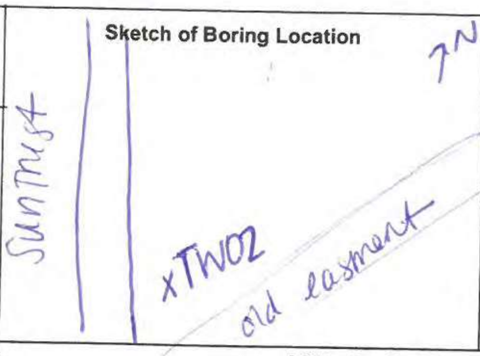
Notes:
PVC temp well
5ft screen

Well Constuction		Top	Base	Sample ID	Time	Interval	Analyses
Material:	Casing:			1) MHASTW01140321	1125	12-14	PAH VOC metals EPLA
Diameter:	Screen:			2)			
Wellhead:	Grount:			3)			
Bollards:	Bent/Seal:			4)			
Pad:	Sand Pack:			5)			

ENSAFE

Client: MHA
Project #: Phase II
Purpose: Phase II invest.
Project: 08888-2871
Location: Auction Ave

Sketch of Boring Location



Location ID: TW02

Start Date/Time: 3/16/2021 930 — Page 1 of 2
End Date/Time: 3/16/2021 930 — Total Depth: 24
Sample Method: DPT handauger
Drill Equip: geoprobe
Drilling Co.: McCray Drilling
Geologist: Emily Vasko

Sample Number	Sample Interval	Inches Recovered / Inches Driven	Miscellaneous (Time/Blow Ct)	OVA Reading (ppm)	USCS	DEPTH (FT)	Lithologic Description Visual-Manual Description (ASTM D 2488-06)
		24/24		0.1		0	0-2: Dark Brown (7.5YR 3/2), silty clay, dry
				0.6		1	non plastic clays, no staining or odor (NOS/O)
				1.5		2	Brick fragments + some roots observed; 2-3: SAA
				1.4		3	3-4: SAA; however, slightly moist.
		18/36				4	4-7: Yellowish Brown (10YR 5/6), silty clay, stiff, dry, mottled w/ black/orange, Fe + Mn nodules.
						5	no S/O.
						6	
		12/12		123.3		7	7-8: Very dark greenish gray (GLEY 3/1) silty clay, dry, strong petroleum odor, no staining
				94.2		8	8-12: very dark greenish gray (GLEY 3/1) silty clay, moist to wet, strong petroleum odor.
						9	
				40.1		10	
						11	
		48/48		215.3		12	12-16: greenish gray (GLEY 6/1), silty clay, moist to wet, strong petroleum odor no staining
						13	* sample 12-14
				58.1		14	
						15	
		48/48		21.4		16	16-19: light olive brown (2.5Y 5/3) silty clay moist, slight petroleum odor / no staining.
						17	
						18	
				3.0		19	19-20: Dark olive brown (2.5Y 3/3) silty clay moist, slight petroleum / must odor.

Notes:
Temp Well
PVC screen ~~10 ft~~ 5 ft.

Well Constuction		Top	Base
Material:	Casing:		
Diameter:	Screen:		
Wellhead:	Grount:		
Ballards:	Bent/Seal:		
Pad:	Sand Pack:		

	Sample ID 14	Time	Interval	Analyses
1)	MHASTW020321	0940	12-14	Metals PAH VOC EPH
2)				
3)				
4)				
5)				

ENSAFE

Client: MHA
Project #: Phase II
Purpose: 08888287H
Project:
Location: Operations Area

Sketch of Boring Location

Location ID: TW02

Start Date/Time: 3/16/2021 0930 Page 2 of 2
End Date/Time: 3/16/2021 0930 Total Depth: 24 ft

Sample Method: DPT/hand auger
Drill Equip: geoprobe
Drilling Co.: McCrary
Geologist: E. Vaught

Sample Number	Sample Interval	Recovery Inches Recovered	Recovery Inches Driven	Miscellaneous (Time/Blow Ct)	OVA Reading (ppm)	USCS	DEPTH (FT)	Lithologic Description (Visual-Manual Description, ASTM D 2488-06)
		48	48		2.2		20	light yellowish Brown (2.5Y 6/4) Silty clay Stiff NO S/O, moist to dry.
							21	
					3.5		22	
							23	
					1.3		24	24-28: SNA.
							25	
							26	Tempwell set at 24 w/ ~~10 ft~~ 5-ft. screen.
							27	
							28	
							9	
							0	
							1	
							2	
							3	
							4	
							5	
							6	
							7	
							8	
							9	

Notes:

Well Constuction		Top	Base	Sample ID	Time	Interval	Analyses
Material:	Casing:			1)			
Diameter:	Screen:			2)			
Wellhead:	Grount:			3)			
Ballards:	Bent/Seal:			4)			
Pad:	Sand Pack:			5)			

ENSAFE

Client: MHA
Project #: Phase II
Purpose: 0888828711
Project:
Location: 0 Auction Ave

Sketch of Boring Location

Location ID: TW03

Start Date/Time: 3/16/21 1000 Page 1 of 2

End Date/Time: 3/16/2021 Total Depth: 24

Sample Method: DPT / Hand Auger

Drill Equip: Geoprobe

Drilling Co.: McCray Drilling

Geologist: E. Vasko

Sample Number	Sample Interval	Recovery Inches Recovered	Recovery Inches Driven	Miscellaneous (Time/Blow Ct)	OVA Reading (ppm)	USCS	DEPTH (FT)	Lithologic Description Visual-Manual Description (ASTM D 2488-06)
		48	48				0	0-1: Brown silty clay with gravels (7.5YR 4/4) dry, No S/O.
							1	1-2: Brown silty clay w/ iron nodules (7.5 YR 4/4), dry to moist, NO S/O.
							2	2-4: SAA
							3	
		48	48		4.2		4	4-4.5: Strong brown silty clay (7.5YR 5/6) dry, NO/S.
							5	5-8: very dark greyish olive (10YR 5GY 3/2) silty clay, moist, soft, strong petroleum odor.
					4.2		6	
							7	
		36	48		11.1		8	8-12: Dark greenish gray (GLEY 1 4/1) silty clay moist, soft, strong petroleum odor.
							9	
					43.8		10	
							11	
		36	48		54.9		12	12-16: Dark greenish gray (GLEY 4/1) silty clay moist, soft, strong petroleum odor.
							13	* sample 12-14 1020
					28.1		14	
							15	
		48	48		16.5		16	16-18: greenish Black (GLEY 2.5/1) silty clay stiff moist to dry faint petroleum odor
							17	
					18.2		18	18-20: Greenish gray (GLEY 1 6/1) silty clay, moist to dry faint petroleum odor
							19	
					5.2		20	20-24: SAA. no petroleum odor.

Notes: temp well 5ft screen.

Well Constuction			Top	Base	Sample ID	Time	Interval	Analyses
Material: PVC		Casing:	—		1) MHA-S-TW03-031621	1020	12-14	PAH, VOC, metals, EPH
Diameter: 1/2in		Screen:	—		2)			
Wellhead:		Grount:	—		3)			
Ballards:		Bent/Seal:	—		4)			
Pad:		Sand Pack:	—		5)			

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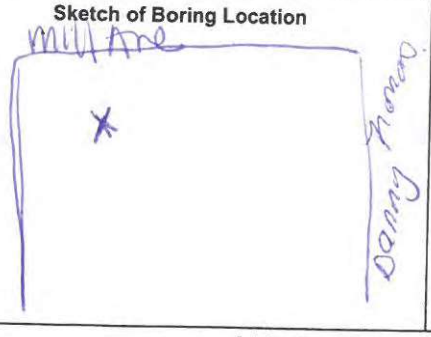
Client: MHA
Project #: 08888871
Purpose: Phase II
Project:
Location: Auchter Ave

Sketch of Boring Location



Location ID: SB01
Start Date/Time: 03/16/21 1315 Page 1 of 1
End Date/Time: 03/16/21 1345 Total Depth: 20ft
Sample Method: DPT / Hand Auger
Drill Equip: Geoprobe
Drilling Co.: McCrary
Geologist: E. Vasko

Sample Number	Sample Interval	Recovery Inches Recovered	Recovery Inches Driven	Miscellaneous (Time/Blow Ct)	OVA Reading (ppm)	USCS	DEPTH (FT)
	12	12		0.0			0
	12	12					1
	12	12		0.0			2
	12	12					3
	48	12		0.0			4
	48	48					5
				0.0			6
							7
	48	48		0.1			8
							9
							10
							11
	48	48		0.5			12
							13
				0.3			14
							15
	48	48		0.3			16
							17
				0.4			18
							19

Lithologic Description
Visual-Manual Description
(ASTM D 2488-06)

0-2 Brown (7.5YR 5/2) silty clay w/some bricks moist to dry no staining odor

2-4: SAA; NO BRICK pieces observed.

4-8: Light Brown (7.5 YR 6/3) silty clay moist to slightly wet, plastic clay no stain/odor

8-12: SAA

sample @ 1445

12-14: Grayish olive brown (2.5 YR 3/3) silty clay with Fe + Mn Nodules no staining/odor, moist to slightly wet.

14-16 - grayish olive Brown – olive Brown (2.5Y 4/3) silty clay, more clay than silt. no stain/odor. moist, stiff.

16-20: olive Brown (2.5Y 4/3) silty clay. more clay than silt, stiff, moist to dry, no stain odor.

MHASSB01140321

Notes:	Well Constuction		Top	Base	Sample ID	Time	Interval	Analyses
	Material:	Casing:			1)	1445	12-14	VOC BTEX EPH TRPH
	Diameter:	Screen:			2)			
	Wellhead:	Grount:			3)			
	Ballards:	Bent/Seal:			4)			
	Pad:	Sand Pack:			5)			

6/23/17

ENSAFE

Client: MHA

Project #: 0888828711

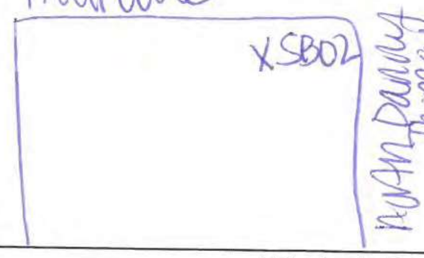
Purpose: Phase II

Project:

Location: Auction Ave

Sketch of Boring Location

mill ave



Location ID: SB02

Start Date/Time: 3/16/2021 1345

Page 1 of 1

End Date/Time: 3/16/2021 1400

Total Depth: 20 ft

Sample Method: DPT / Hinger

Drill Equip: geoprobe

Drilling Co.: McCray Drilling

Geologist: E. Vasko

Sample Number	Sample Interval	Inches Recovered / Inches Driven	Miscellaneous (Time/Blow Ct)	OVA Reading (ppm)	USCS	DEPTH (FT)	Lithologic Description — Visual-Manual Description (ASTM D 2488-06)
		48/48		0.0		0–2	0-2: Brown (7.5YR 5/2) silty clay w/ root fragments + Bricks Dry No staining / odor
				0.0		2–4	2-4: SAA
		38/48		0.0		4–8	4-8: Light brown / strong Brown (7.5 YR 6/3) Silty clay - moist No stain / odor.
		48/48		0.3		8–10	8-10: SAA * Sample 1405 *
		48/48		0.0		10–12	10-12: Yellowish Brown (10YR 5/4) Silty clay mottled w/ Fe + Mg fragments moist No stain/odor
				0.0		12–16	12-16: SAA
				0.0			
		48/48		0.0		16–17	16-17: SAA
						17–20	17-20: Strong Brown (10YR 3/3) Silty clay, stiff, semi dry to moist no stain / odor.

MHASSB02100321

Notes:

Well Construction		Top	Base
Material:	Casing:		
Diameter:	Screen:		
Wellhead:	Grout:		
Bollards:	Bent/Seal:		
Pad:	Sand Pack:		

Sample ID	Time	Interval	Analyses
1)	1405	8-10	PAH VOC [illegible] metals
2)			
3)			
4)			
5)			

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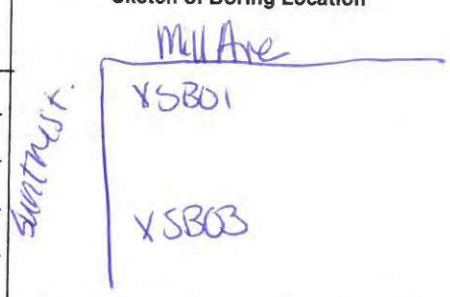
Client: MHA
Project #: 088878711
Purpose: Phase II
Project:
Location: Old Auction Area

Sketch of Boring Location



Location ID: SB03

Start Date/Time: 03/18/2021 1600 Page 1 of 1
End Date/Time: 03/18/21 1730 Total Depth: 20ft
Sample Method: DPT / H.A.
Drill Equip: Geoprobe
Drilling Co.: McCray
Geologist: E Vasta

Sample Number	Sample Interval	Recovery Inches Recovered	Recovery Inches Driven	Miscellaneous (Time/Blow Ct)	OVA Reading (ppm)	USCS	DEPTH (FT)
SB03					0.0		0
					0.0		1
					0.0		2
							3
SB03							4
					0.0		5
					0.0		6
SB03							7
					3.9		8
SB03					2.5		9
					3.8		0
SB03					24.7		1
					3970		2
					12.3		3

Lithologic Description
Visual-Manual Description
(ASTM D 2488-06)

0-2: Brown (7.5YR 5/12) silty clay, dry w/ gravels; No Stain/odor

2-4: SAA

4-8: Light Olive Brown (2.5Y 5/3) silty clay w/ some Fe + MN nodules; faint petroleum odor, moist to slightly wet

8-12 SAA; more moist @ 8-10 less moist @ 10-12

12-14 Olive gray (5Y 4/2) silty clay moist strong petroleum odor mottled w/ some yellowish brown clay.

14-16 Olive gray (5Y 4/2) silty clay moist to dry petroleum odor.

16-19 - SAA sample @ 18 1725
16-18 392.8

19-20 very dark gray silty clay w/ some clay; slight petroleum odor.

MHASSB03180321 1725

Notes:	Well Construction		Top	Base	Sample ID	Time	Interval	Analyses
	Material:	Casing:			1)			VOC, SVOC, metals, EDB
	Diameter:	Screen:			2)			
	Wellhead:	Grount:			3)			
	Bollards:	Bent/Seal:			4)			
	Pad:	Sand Pack:			5)			

ENSAFE

Client:	MHA
Project #:	Phase II
Purpose:	
Project:	
Location:	Auction Avenue

Sketch of Boring Location

Location ID:	SB04
Start Date/Time:	3/16/2021 1115
Page	1 of 1
End Date/Time:	1145
Total Depth:	20
Sample Method:	DPT / hand auger
Drill Equip:	Geoprobe
Drilling Co.:	McCray
Geologist:	E. Vasko

Lithologic Description
Visual-Manual Description
(ASTM D 2488-06)

Sample Number	Sample Interval	Inches Recovered / Inches Driven	Miscellaneous (Time/Blow Ct)	OVA Reading (ppm)	USCS	DEPTH (FT)	Lithologic Description
		12/12		0.0		0	0-1: Dark Brown (7.5YR 3/2) Silty clay w/ root fragments, dry, No staining odor.
		36/36		0.0		1–2	1-4: Dark brown (7.5YR 3/2) to Strong Brown (7.5 3/6) Silty clay, dry, NO S/O.
		36/48		0.9		4	4-8: dark yellowish brown (10YR 4/4) Silty clay w/ iron modules moist to slightly wet, No staining odor.
				0.6		6	
		48/48		1.0		8	8-12: SAA
				1.2		10	
		48/48		2.6		12	12-13: SAA
				1.8		13	13-16: ~~gray~~ Dark olive gray (5Y 3/2) Silty clay, moist, strong petroleum odor. No staining.
		48/48		3.2		16	16-18: Dark gray (10YR 4/1) Silty clay moist to dry, faint petroleum odor. No staining. Sample @ 12:15
				1.6		18	18-20: very dark grayish brown (10YR 3/2) Silty clay, more clay than silt, hard dry NO O/S.

Notes:

Well Construction		Top	Base	Sample ID	Time	Interval	Analyses
Material:	Casing:			1) MHASSB0418021	1215	16-18	TPH VOC Tot Metals
Diameter:	Screen:			2)			
Wellhead:	Grout:			3)			
Ballards:	Bent/Seal:			4)			
Pad:	Sand Pack:			5)			

ENSAFE

Client: MHA
Project #:
Purpose:
Project: Phase II
Location: Auction Area

Sketch of Boring Location

Location ID: SB05
Start Date/Time: 3/15/2021 1350
Page 1 of 1
End Date/Time: 3/16/2021 1440
Total Depth: 20ft
Sample Method: DPT / Hand Auger
Drill Equip: Geoprobe
Drilling Co.: McCray
Geologist: E. Vasko

Sample Number	Sample Interval	Inches Recovered / Inches Driven	Miscellaneous (Time/Blow Ct)	OVA Reading (ppm)	USCS	DEPTH (FT)	Lithologic Description Visual-Manual Description (ASTM D 2488-06)
		48/48		0.0		0	0-2 Brown (7.5 YR 5/2) silty clay w/ some roots, dry, no staining/odor
						1	
				0.0		2	2-4: SAA
						3	
		48/48		0.0		4	4-7: Yellowish brown (10YR 5/4) silty clay w/ some Fe+Mn nodules, moist to slightly wet, no staining/odor.
						5	
				0.3		6	
						7	7-8: Brown (10YR 4/3) silty clay w/ some Fe+Mn nodules moist no staining/odor
		48/48		0.2		8	8-12: Olive gray (5Y 5/2) silty clay moist, no staining, musty odor.
						9	
				0.4		10	
						11	
		48/48		0.8		12	12-16: SAA, more clay w/ depth stiff
						13	
				0.8		14	
						15	
		48/48		0.4		16	16-20: Dark olive gray silty clay more clay w/ depth, moist, stiff no staining/odor.
						17	
				0.1		18	
						19	
						20	

MHASSB05160321

Notes:

Well Constuction		Top	Base	Sample ID	Time	Interval	Analyses
Material:	Casing:			1)	1515	14-16	VOC PAH metals TPH
Diameter:	Screen:			2)			
Wellhead:	Grount:			3)			
Ballards:	Bent/Seal:			4)			
Pad:	Sand Pack:			5)			

ENSAFE

Client: MHA

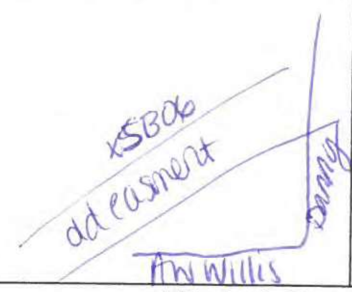
Project #:

Purpose:

Project: Phase II

Location: Daughton Avenue

Sketch of Boring Location



Location ID: SB06

Start Date/Time: 3/16/2021 1530 Page 1 of 1

End Date/Time: 3/16/2021 1550 Total Depth: 20ft

Sample Method: DPT / Hand Auger

Drill Equip: geoprobe

Drilling Co.: McCray

Geologist: G. Vajda

Sample Number	Sample Interval	Inches Recovered / Inches Driven	Miscellaneous (Time/Blow Ct)	OVA Reading (ppm)	USCS	DEPTH (FT)	Lithologic Description — Visual-Manual Description (ASTM D 2488-06)
		48/48		0.0		0	0-2: Brown (7.5YR 5/2) Silty clay w/ some gravel + roots. no staining/odor dry
				0.0		2	2-4: SAA; no roots or gravel observed.
		48/48		0.0		4	4-8: yellowish Brown to Brown (10YR 5/4) Silty clay, moist, no staining/odor
				0.0		6	
		48/48		0.6		8	8-11: SAA
						10	sample ~~11-12~~ 12-13 @ 1555
				0.9		11	11-12 Olive Brown (~~10YR~~ 2.5YR 4/3) Silty clay moist to slightly wet, stiff near 12.5ft No stain/odor
		48/48		0.6		12	
						13	12-13: Dark olive gray (2.5Y 3/3) Silty clay. moist, musty odor.
				0.6		14	13-16: Olive Brown (2.5Y 4/3) Silty clay moist to slightly wet, no stain, musty odor
		48/48		0.5		16	16-20: SAA.
				0.1		18	
						20	

MHASSB0613032~~1~~ 1600

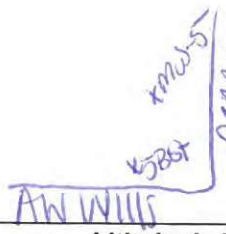
Notes:

Well Constuction		Top	Base	Sample ID	Time	Interval	Analyses
Material:	Casing:			1)	1600	11-13	PAH VOC
Diameter:	Screen:			2)			DRH metals
Wellhead:	Grount:			3)			
Ballards:	Bent/Seal:			4)			
Pad:	Sand Pack:			5)			

ENSAFE

Client: MHA
Project #:
Purpose: Phase II
Project:
Location: Dauchan Avenue

Sketch of Boring Location



Location ID: SB07
Start Date/Time: 03/16/21 1605 Page 1 of 1
End Date/Time: 03/16/21 1710 Total Depth: 20
Sample Method: DPT / hand auger
Drill Equip: Geoprobe
Drilling Co.: McCray
Geologist: E. Vasko

Sample Number	Sample Interval	Recovery Inches Recovered	Recovery Inches Driven	Miscellaneous (Time/Blow Ct)	OVA Reading (ppm)	USCS	DEPTH (FT)	Lithologic Description (Visual-Manual Description, ASTM D 2488-06)
48	48				0.0		0	0-2': Brown (7.5YR 5/12) silty clay w/ some gravel / Brick dry no staining
					6.0		2	2-4: SAA.
48	48				1.7		4	4-5: Dark yellowish Brown (10YR 4/4) silty clay w/ Fe nodules. dry
					1.3		6	5-8: Olive gray (5Y 5/2) silty clay moist to slightly wet, slightly stiff slight petroleum odor
48	48				1.5		8	8-12': SAA faint petroleum odor.
					2.5		10	
48	48				1.8		12	12-16': Olive silty clay (5Y 5/3) slightly moist to moist clay w/ depth faint petroleum odor
					54.6		14	Sample 14-16 1700
48	48				4.0		16	16-19': SAA
					3.1		18	
							19	19-20': Very dark gray (5Y 3/1) silty clay / clay petroleum odor).
							20	

MHASSB07160321

Notes:	Well Construction		Top	Base	Sample ID	Time	Interval	Analyses
	Material:	Casing:			1)	1700		PAH VOC Metals EPH
	Diameter:	Screen:			2)			
	Wellhead:	Grount:			3)			
	Ballards:	Bent/Seal:			4)			
	Pad:	Sand Pack:			5)			

ENSAFE

WELL DEVELOPMENT & GROUNDWATER SAMPLING FORM

DATE: 3/10/2021	JOB NUMBER: 08888.18111
PROJECT: MHA PHASE II	EVENT: PHASE II 2021
WELL ID: MW-5	LOCATION: 0 Auction Avenue
WEATHER CONDITIONS: cloudy	AMBIENT TEMP: 60°F
REVIEWED BY:	PERSONNEL: AW / CK

WELL DIA: 2"	**WELL DEVELOPMENT**
TOTAL DEPTH from TOC (ft.): 24	START: — FINISH: —
DEPTH TO WATER from TOC (ft.): 4.53	VOLUME PURGED (gal):
LENGTH OF WATER COL. (ft.): 19.47	**GROUNDWATER SAMPLING**
1 VOLUME OF WATER (gal):	START: 0915 FINISH: 1030
3 VOLUMES OF WATER (gal):	VOLUME PURGED (gal): 0.50
	ANALYSIS: PAH, TNEPH, VOCs
	RCRA 8

IN-SITU TESTING

Circle one: DEVELOPMENT SAMPLING ☐ Bailer ☒ Pump Description: peri

Time (hh:mm):	0930	0935	0940	0945	0950							
pH (units):	6.73	6.76	6.85	6.86	6.90							
Conductivity (mS/cm): uS/cm	456.0	458.7	462.2	463.1	462.1							
Turbidity (NTU):	12.9	13.3	11.2	8.5	6.94							
DO* (mg/L):	2.39	1.71	1.49	1.43	1.46							
Temperature (C°):	16.7	16.6	16.6	16.5	16.7							
ORP (mV):	124.3	122.2	120.3	115.0	114.3							
Volume Purged (gal):	0.10	0.20	0.30	0.40	0.50							
Depth to Water (ft):	5.30	5.33	5.40	5.50	5.48							

Well Goes Dry While Purging ☐

*DO Range = 0 to 14.6 mg/L, max of 8.6 mg/L at 25°C

Sample Data

☐ Dup Collected ☐ MS/MSD Collected ☐ Bailer ☒ Pump Description: peri

Sample ID	Date (m/d/y)	Time (hh:mm)	#Bottles (total to lab)	Filtered (0.45 µm)	Remarks
MHAGMW5032	03/10/2021	1000	9	NO	

COMMENTS:

Purge water placed in drum#_____

ENSAFE

WELL DEVELOPMENT & GROUNDWATER SAMPLING FORM

DATE: 3/10/2021	JOB NUMBER: 05888.2821
PROJECT: MHA Phase II	EVENT: Phase II 2021
WELL ID: MW6	LOCATION: Oakcrest Ave
WEATHER CONDITIONS: Cloudy	AMBIENT TEMP: 60°F
REVIEWED BY:	PERSONNEL: EV/CK

WELL DIA: 2"	**WELL DEVELOPMENT**
TOTAL DEPTH from TOC (ft.): 18	START: FINISH:
DEPTH TO WATER from TOC (ft.): 5.20	VOLUME PURGED (gal):
LENGTH OF WATER COL. (ft.): 12.80	**GROUNDWATER SAMPLING**
1 VOLUME OF WATER (gal):	START: 1050 FINISH: 1145
3 VOLUMES OF WATER (gal):	VOLUME PURGED (gal): 0.50
	ANALYSIS: PAH, VOC, TAL PP RCRA 8

IN-SITU TESTING

Circle one: DEVELOPMENT (SAMPLING) ☐ Bailer ☒ Pump Description: peri

Time (hh:mm):	1100	1105	1110	1115	1120							
pH (units):	6.82	6.80	6.81	6.78	6.79							
Conductivity (mS/cm): uS/cm	815	817	817	818	818							
Turbidity (NTU):	55.8	21.2	29.5	30.2	31.5							
DO* (mg/L):	0.51	0.30	3.0	2.0	0.79							
Temperature (C°):	17.5	17.8	17.8	17.0	17.7							
ORP (mV):	107.1	103.4	97.4	94.9	88.0							
Volume Purged (gal):	0.10	0.20	0.30	0.40	0.50							
Depth to Water (ft):	5.4	5.80	5.81	5.83	5.87							

Well Goes Dry While Purging ☐

*DO Range = 0 to 14.6 mg/L, max of 8.6 mg/L at 25°C

Sample Data

☐ Dup Collected ☐ MS/MSD Collected ☐ Bailer ☒ Pump Description: Peri

Sample ID	Date (m/d/y)	Time (hh:mm)	#Bottles (total to lab)	Filtered (0.45 µm)	Remarks
MHAGMW60321	03/10/21	1140	9		

COMMENTS:

Purge water placed in drum#_____

Instructions:
Complete for vapor intrusion assessments; one form per day.

Site Location: 0 Auction Ave

Project Name: MHA Phase VI

Project Number: 088828711

Personnel: E. Vasko / C. Kipper

Sampling Date: 03/11/2021

Sub-Slab Samples
Include near-slab or soil-gas samples in this section
□ No sub-slab samples were collected

Sample ID	MHAASG030321	MHAASG040321	MHAASG020321	MHAASG010321
Sub-Slab, Near-Slab, or Soil-Gas?	Soil gas	Soil gas	Soil gas	Soil gas
Sample Type (Summa, Tedlar, Syringe, HAPSITE, FROG, etc.)	SUMMA	SUMMA	SUMMA	SUMMA
Was leak testing performed? (Y/N)	Y	Y	Y	Y
What type? (check dam, Helium shroud, IPA)	IPA	IPA	IPA	IPA
Were leaks indicated?				
If helium, provide shroud/purge He concentrations (%)				
Provide final He concentration (%)				
If using IPA or He, have analyses been requested from lab?	Yes	Yes	Yes	Yes
Was shut-in test performed? (Y/N)	120sec	120sec	120sec	120sec
Duration of test (sec)	20	25	21	22
Canister vacuum pre-test (in Hg)	20	25	21	22
Canister vacuum post-test (in Hg)				
Purge method (sacrifical summa, personnel pump, syringe, other)	Syringe	Syringe	Syringe	Syringe
Purge rate (mL/min)	200	200	200	200
Volume purged (L)	0.4	0.4	0.4	0.4
Was purge gas screening performed? (Y/N)	N	N	N	N
Total VOCs (ppm)	–	–	–	–
O2 (%)	–	–	–	–
CO2 (%)	–	–	–	–
CH4 (%)	–	–	–	–
Canister Size	6L	6L	6L	6L
Sampling duration (24 hr, 12 hr, 8 hr, grab)	grab	grab	grab	grab
Canister #	2753	3356	2835	3891
Flow Controller #	FC1506	FC2216	FC2868	FC2376
Sample Start Time	1324	1420	1430	1524
Canister Starting Vacuum (in Hg)	30	30	30	29
Sample End Time	1408	1509	1515	1602
Canister Ending Vacuum (in Hg)	3	3	3	3
Analyses	TO-15	TO-15	TO-15	TO-15
Additional Documentation				
Floor Conditions (concrete, wood, tile, carpet, other)	grass	grass	grass	grass
Visible cracks, sumps, utility penetrations? (Y/N)				
VOC sources in area? (Y/N)	traffic	traffic	traffic	traffic
Other comments? (Y/N)	SG03	SG04	SG02	SG01

Attachment C
Tables

Table 1 Sampling Locations and Rationale 0 Auction Avenue —Memphis, Tennessee		
Soil Boring ID	**Location on Subject Property Depth(s) of Sample Collection and Vapor Concentrations**	**Rationale**
TW01	Central portion of the Site. Sample collected at 12-14 feet below ground surface (bgs). Photoionization detector (PID) reading: 2.4 parts per million (ppm).	Potential impacts from historical service station operations.
TW02	Northwest corner of the Site. Sample collected at 12-14 feet bgs. PID reading: 215.3 ppm.	
TW03	Southeast corner of the Site. Sample collected at 12-14 feet bgs. PID reading: 59.4 ppm.	Potential impacts from historical service station operations and known impacts from the east adjoining property.
SB01	Northwest corner of the Site. Sample collected at 12-14 feet bgs. PID reading: 0.5 ppm.	Potential impacts from historical service station operations.
SB02	Northeast corner of the Site. Sample collected at 8-10 feet bgs. PID reading: 0.3 ppm.	Potential impacts from historical service station operations and known contamination at the east adjoining property.
SB03	Along the west portion of the Site. Sample collected at 16-18 feet bgs. PID reading: 392.8 ppm	Potential impacts from historical service station operations.
SB04	Along the east portion of the Site. Sample collected at 16-18 feet bgs. PID reading: 3.2 ppm.	Potential impacts from historical service station operations and known contamination at the east adjoining property.
SB05	Central portion of the Site. Sample collected at 14-16 feet bgs. PID reading: 0.8 ppm.	Potential impacts from historical service station operations.
SB06	South-central portion of the Site. Sample collected from 12-13 feet bgs. PID reading: 0.9 ppm.	
SB07	Southeast corner of the Site. Sample collected from 14-16 feet bgs. PID reading: 54.6	Potential impacts from historical service station operations and known contamination at the east adjoining property.

Table 2
Detected Concentrations in Soil
0 Auction Avenue — Memphis, Tennessee

Analyte	RSL Soil Res HQ=0.1 (a)	RSL Soil Ind HQ=0.1 (b)	TDEC Background (c)	TDEC DUST ISL (d)	SB01 12-14 feet	SB02 8-10 feet	SB03 16-18 feet	SB04 16-18 feet	SB05 14-16 feet	SB06 11-13 feet	SB07 14-16 feet	TW01 12-14 feet	TW02 12-14 feet	TW03 12-14 feet
Metals														
Arsenic	0.68	3	10	NA	5.13 ab	9.34 ab	3.66 ab	3.35 ab	3.2 ab	4.15 ab	4.62 ab	5.0 ab	11.1 abc	4.12 ab
Barium	1500	22000	144	NA	46.1	76.4	33.4	86.2	41.9	52.9	36.5	60.4	60.1	64.1
Cadmium	7.1	98	1.0	NA	0.197	0.335	0.156	0.172	0.138	0.303	0.128	0.225	0.246	0.159
Chromium	0.3	6.3	20	NA	11.9 ab	12.2 ab	11.1 ab	21.3 abc	11.1 ab	11.7 ab	12.6 ab	10.2 ab	12.3 ab	13.3 ab
Lead	400	800	45.0	NA	5.03	7.99	5.61	7.84	5.42	8.55	6.39	5.11	7.97	6.78
Selenium	39	580	1.2	NA	-	-	-	-	-	-	-	0.655	-	-
Silver	39	580	1.2	NA	0.609	0.646	0.55	-	0.577	0.655	0.481	-	-	-
Mercury	1.1	4.6	0.18	NA	0.0142 J	0.0202	-	0.0208	0.0193	0.0194	0.0319	0.0164 J	0.0266	0.019
Volatile Organic Compounds														
Acetone	6100	67000	NA	NA	0.024 J	0.015 J	0.405	0.045 J	0.026 J	0.013 J	0.03 J	0.019 J	-	-
Isopropylbenzene	190	990	NA	NA	-	-	0.006 J	-	-	-	0.001 J	-	-	-
n-Butylbenzene	390	5800	NA	NA	-	-	0.016	-	-	-	0.002 J	-	-	-
n-Propylbenzene	380	2400	NA	NA	-	-	-	-	-	-	0.002 J	-	-	-
p-Isopropyltoluene	190	990	NA	NA	-	-	-	-	-	-	0.001 J	-	-	-
sec-Butylbenzene	780	12000	NA	NA	-	-	0.039	-	-	-	0.002 J	-	-	-
tert-Butylbenzene	780	12000	NA	NA	-	-	0.011	-	-	-	-	-	-	-
Polynuclear Aromatic Hydrocarbons														
2-Methylnaphthalene	24	300	NA	NA	-	-	0.00222	-	-	-	-	-	-	-
Acenaphthene	360	4500	NA	NA	-	-	-	-	-	-	0.000704 J	-	0.0052	0.00155
Acenaphthylene	360	4500	NA	NA	-	-	-	-	-	-	-	-	0.00382 J	-
Anthracene	1800	23000	NA	NA	-	-	-	-	-	-	-	-	0.00484	-
Benzo(a)pyrene	0.1	2.1	NA	NA	-	0.000361 JB	-	-	0.000245 JB	0.000342 JB	0.000319 JB	-	0.00134 JB	0.000296 JB
Benzo(b)fluoranthene	1.1	21.0	NA	NA	-	0.000699 JB	0.000551 JB	-	-	0.000641 JB	-	-	-	0.000353 JB
Benzo(g,h,i)perylene	180	2300	NA	NA	-	-	0.00059 JB	-	-	-	-	-	-	-
Chrysene	110	2100	NA	NA	-	0.00077 JB	0.000387 JB	-	-	0.000381 JB	-	-	-	-
Fluoranthene	240	3000	NA	NA	-	-	-	-	-	0.00188	0.00101	-	-	0.000908
Fluorene	240	3000	NA	NA	-	-	-	-	-	-	0.000676 J	-	0.0307	0.000728 J
Naphthalene	2	8.6	NA	NA	-	-	0.00142	-	-	-	0.000613 J	-	0.011	0.00256
Phenanthrene	180	2300	NA	NA	-	-	-	-	-	-	-	-	0.0232	-
Pyrene	180	2300	NA	NA	-	-	-	-	-	0.00123 B	0.000813 JB	-	-	0.000723 JB
Extractable Petroleum Hydrocarbons														
Diesel Range Organics (C10-C28)	NE	NE	NA	500	-	-	8.38	-	-	-	-	-	39.9	5.54
TN EPH (C10-C40)	NE	NE	NA	500	-	-	8.38	-	-	-	-	-	39.9	5.54

Notes:

All results are in milligrams per kilogram (mg/kg) or parts per million (ppm)

U.S. EPA	= United States Environmental Protection Agency
RSL SOIL Res HQ=0.1	= U.S. EPA Regional Screening Levels for Residential Soil, Hazard Quotient =0.1, November 2020
RSL SOIL Ind HQ=0.1	= U.S. EPA Regional Screening Levels for Industrial Soil, Hazard Quotient =0.1, November 2020
TDEC	= Tennessee Department of Environment and Conservation
TDEC UST ISL	= Tennessee Department of Environment and Conservation Division of Underground Storage Tank Initial Screening Level
TDEC Background	= Tennessee Department of Environment and Conservation Background Screening Levels (TDEC 2001)
TNEPH	= Tennessee Extractable Petroleum Hydrocarbons
J	= Estimated. Result is below the limit of quantitation
B	= Analyte was detected in the associated method blank
NA	= Not Applicable
-	= Not Detected
a	= Exceeds RSL Soil Res HQ=1 0.1 screening level
b	= Exceeds RSL Soil Ind HQ=1 0.1 screening level
c	= Exceeds TDEC Background
d	= Exceeds TDEC DUST ISL

Chromium RSL is for hexavalent chromium. There is no RSL for total chromium.

Table 3
Detected Concentrations in Groundwater
0 Auction Avenue — Memphis, Tennessee

Analyte	RSL TAP WATER (a) HQ=0.1	MCL	MW5	MW6	TW01	TW02	TW03
Metals							
Arsenic	0.052	10	-	-	9 J a	-	9 J a
Barium	380	2000	142	107	325	161	189
Chromium	0.035	100	-	-	24 a	15 a	6 a
Lead	15	15	-	-	15 a	6	3 J
Selenium	10	50	-	4 J	4 J	-	-
Volatile Organic Compounds							
Benzene	0.46	5	-	-	-	-	6 ab
Ethylbenzene	1.5	700	-	-	-	-	3 a
Isopropylbenzene	45	NE	-	-	-	-	9
m,p-Xylene	19	10000	-	-	-	-	2
n-Propylbenzene	66	NE	-	-	-	-	8
sec-Butylbenzene	200	NE	-	-	-	0.9 J	2
tert-Butylbenzene	69	NE	-	-	-	-	2
Xylene (Total)	19	10000	-	-	-	-	2
Polynuclear Aromatic Hydrocarbons							
1-Methylnaphthalene	1.1	NE	-	-	-	1.78 a	0.956
2-Methylnaphthalene	3.6	NE	-	-	-	0.92	0.413
Acenaphthene	53	NE	-	-	-	0.041	0.036
Acenaphthylene	53	NE	-	-	-	0.033	-
Anthracene	180	NE	-	0.038	-	-	0.079
Fluorene	29	NE	-	-	-	0.14	-
Naphthalene	0.12	NE	-	-	-	0.572 a	0.859 a
Phenanthrene	12.0	NE	-	-	-	0.055	-
Extractable Petroleum Hydrocarbons							
Diesel Range Organics (C10-C28)	NE	NE	-	87.4 J	85.1 J	243	628
Oil Range Organics C28-C40	NE	NE	-	134	-	107	-
TN EPH (C10-C40)	NE	NE	-	221 J	85.1 J	350	628

Notes:

All results are in micrograms per liter (µg/L) or parts per billion (ppb).

U.S. EPA	= United States Environmental Protection Agency
RSL TAPWATER HQ=0.1	= U.S. EPA Regional Screening Levels Tap water, Hazard Quotient =0.1, November 2020
MCL	= U.S. EPA Maximum Contaminant Level
TN EPH	= Tennessee Extractable Petroleum Hydrocarbons
-	= Not detected
J	= Estimated. Result is below the limit of quantitation
a	= Exceeds RSL Tap water HQ=1 0.1 screening level
b	= Exceeds MCL
NE	= Not established

Chromium RSL is based on hexavalent chromium. MCL is based on total chromium.

Table 4
Detected Concentrations in Soil Gas
0 Auction Avenue — Memphis, Tennessee

Analyte	Residential VISL (a) TCR=1E-06 THQ=0.2	Commercial VISL (b) TCR=1E-06 THQ=0.2	SG01	SG02	SG03	SG04
1,1,2-Trichloro-1,2,2-trifluoroethane	34800.00	146000.00	0.36 J	0.41 J	-	0.83
1,2,4-Trimethylbenzene	417.00	1750.00	19.6	7.2	1.4	7.2
1,3,5-Trimethylbenzene	417.00	1750.00	3.7	2.2	0.66 J	2.0
1,3-Dichlorobenzene	No VISL	No VISL	-	-	-	1.2 J
2-Butanone (MEK)	34800.00	146000.00	16.7	4.8	2.9 J	30.8
2-Hexanone	209.00	876.00	1.9 J	1.3 J	-	2.3 J
4-Methyl-2-Pentanone (MIBK)	20900.00	87600.00	4.1	1.5 J	0.7 J	3.0 J
Acetone	215000.00	902000.00	32.9	23.5	12.3	97.4
Benzene	12.00	52.40	0.7	2.2	1.1	3.9
Carbon disulfide	4870.00	20400.00	0.69 J	0.48	1.4	1.0
Chloroform	4.07	17.80	0.86	1.4	-	0.83
Cyclohexane	41700.00	175000.00	-	-	0.7 J	9.0
Dichlorodifluoromethane	695.00	2920.00	2.3	2.5	1.7	2.4
Ethanol	No VISL	No VISL	12.0	935.0	542.0	746.0
Ethylbenzene	37.40	164.00	2.6	5.8	4.0	6.1
Isopropanol	1390.00	5840.00	4.2	147.0	92.9	147.0
m,p-Xylene	695.00	2920.00	12.6	22.3	16.0	20.2
Naphthalene	2.75	12.00	**6.4 (a)**	**3.1 J (a)**	-	**3.1 J (a)**
n-Heptane	2780.00	11700.00	0.56 J	1.1 J	-	4.5
n-Hexane	4870.00	20400.00	0.6 J	0.77 J	-	4.7
o-Xylene	695.00	2920.00	4.9	6.6	4.6	6.0
p-Ethyltoluene	NA	NA	5.1	3.1 J	1.4 J	3.0 J
Propylene	20900.00	87600.00	2.7	15.3	11.3	-
Styrene	6950.00	29200.00	2.2	2.0	0.54 J	1.5
Tetrahydrofuran	13900.00	58400.00	3.2	0.95	-	3.8
Toluene	34800.00	146000.00	3.9	13.0	3.9	12.1
Trichlorofluoromethane	No VISL	No VISL	1.1 J	1.2 J	0.79 J	1.2 J

Notes:

All results are in reported in micrograms per cubic meter (µg/m3)

VISL	= Vapor Intrusion Screening Level for Sub-Slab and Near-source Soil Gas, December 2020
Res	= Residential Target Sub-Slab and Near-source Soil Gas Concentration
Com	= Commercial Target Sub-Slab and Near-source Soil Gas Concentration
TCR=1E-06, THQ=0.2	= Target cancer risk = 1E-06 or target hazard quotient = 0.2
J	= Estimated value
-	= Not detected
a	= Exceeds the residential VISL
b	#NAME?

Table 5
Soil Gas and Groundwater Cumulative Vapor Intrusion Risk
0 Auction Avenue—Memphis, Tennessee

	Residential Exposure Scenario		Commercial Exposure Scenario	
Sample ID	**Risk**	**Hazard**	**Risk**	**Hazard**
Soil Gas				
SG01	2.66E-06	0.086	6.10E-07	0.02
SG02	1.81E-06	0.075	4.14E-07	0.018
SG04	1.82E-06	0.077	4.16E-07	0.018
Groundwater				
TW02	1.25E-07	0.0033	2.85E-08	0.00078
TW03	4.83E-06	0.079	1.11E-06	0.018