Bama Bowl Shopping Center
Tuscaloosa, Alabama
ADEM VCP Site #: 461-073-23012

Fact Sheet

A Voluntary Cleanup Program (VCP) Voluntary Cleanup Plan has been found to be technically adequate by the Alabama Department of Environmental Management (ADEM) for the Bama Bowl Shopping Center. The applicant is Hackberry Properties, LLC. This fact sheet has been prepared to briefly advise the public of the principal legal and policy issues of the VCP.

I. VCP PROCESS

The VCP provides a mechanism for the implementation of a cleanup program that encourages applicants to voluntarily assess, remediate, and reuse rural and urban areas of actual or perceived contamination. The program does not relieve any "responsible person" for the liability for administrative, civil, or criminal fines or penalties which are otherwise authorized by law and imposed as a result of the illegal or unpermitted disposal of solid waste, hazardous waste, hazardous constituents, hazardous substances, petroleum products, and/or pollutants to the land, air, or waters of the State on an identified property. The program is designed to expedite the voluntary cleanup process and has been designed for entry at any stage of the cleanup process as long as all applicable criteria have been met up to the point of entry.

II. PROCEDURES FOR REACHING A FINAL DECISION

The ADEM is proposing to issue Hackberry Properties LLC., a final decision for the site remediation.

ADEM Admin Code R. 335-15-6-.02 requires that the public be given a 30-day comment period from the date of the notice. The comment period will begin on September 4th, 2024, which is the date of publication of the public notice in major local newspaper(s) of general circulation and will end on October 4th, 2024.

All persons wishing to comment on any of the conditions of the VCP Remediation should submit their comments in writing to the Alabama Department of Environmental Management, Permits and Services Division, 1400 Coliseum Blvd. (Zip 36110). P.O. Box 301463 (Zip 36130-1463) Montgomery, Alabama, ATTENTION: Mr. Russell Kelly. Written comments on the VCP activities should be submitted to the Alabama Department of Environmental Management and be received by 5:00 p.m. on October 4th, 2024.

ADEM will consider all written comments received during the comment period while making a final decision on this issue. When the Department makes its final decision, notice will be given to the applicant and each person who has submitted written comments or requested notice of the final decision.

III. FACILITY DESIGN

Hackberry Properties, LLC. has completed Site Investigation activities under the VCP program at Bama Bowl Shopping Center site located at 15th Street and Hackberry Lane, Tuscaloosa, Tuscaloosa County, Alabama 35401. The site consists of 3.37 acres. The coordinates are as follows: 33.1995833333, and -87.5416916667.

The contaminants found on the site are the following examples: PCE's in groundwater and soil gas, Arsenic. The site is currently a lot with vacant commercial buildings. The most recent usage being said commercial use such as bowling alley, retail, restaurants, and cry cleaning services. This form of use would have been from around 1983 to 2017-2020. Prior use was a dairy store, parking lot, and stables from the years 1923-1956, with the current lot design being sometime around 1956.

IV. TECHNICAL CONTACT

Jacob McCollum, Project Manager
Redevelopment Section
Industrial Hazardous Waste Branch
Land Division
Alabama Department of Environmental Management
1400 Coliseum Boulevard (Zip 36110)
P.O. Box 301463 (Zip 36130-1463)
Montgomery, Alabama
(334) 279-3047

bullock environmental, llc 2811 crescent avenue, suite 101, birmingham, alabama 35209 t 205.876.1715 f 205.443.9413

July 12, 2024

Mr. Jacob McCollum
Redevelopment Unit
Land Division
Alabama Department of Environmental Management
P.O. Box 301463
Montgomery, Alabama 36130-1463

Subject: **Voluntary Cleanup Plan**
Former Bama Bowl Strip Shopping Center
15th Street and Hackberry Lane
Tuscaloosa, Tuscaloosa County, Alabama
ADEM VCP Site No.: 461-073-23012
Bullock Environmental, LLC Project #: 23-HACK01

Dear Mr. McCollum:

On behalf of the Voluntary Cleanup Program Applicant, Hackberry Properties, LLC, Bullock Environmental, LLC (Bullock) submits the attached Voluntary Cleanup Plan proposed for the property above.

If you have any questions or comments regarding the content or recommendations set forth in this report, please call us at (205) 876-1715.

Sincerely,

BULLOCK ENVIRONMENTAL, LLC

Douglas A. Bullock
Principal

cc: Mr. Will Akin (Hackberry Properties, LLC)

Enclosure

bullock environmental, llc 2811 crescent avenue, suite 101, birmingham, alabama 35209 t 205.876.1715 f 205.443.9413

Voluntary Cleanup Plan
Former Bama Bowl Strip Shopping Center
15th Street and Hackberry Lane
Tuscaloosa, Tuscaloosa County, Alabama
ADEM VCP Site No.: 461-073-23012
Bullock Environmental, LLC Project #: 23-HACK01

Prepared for:

Hackberry Properties, LLC
361 Summit Boulevard
Suite 110
Birmingham, Alabama 35243

July 2, 2024

BULLOCK ENVIRONMENTAL, LLC

Samuel Smith, AL-P.G. # 1287
Project Geologist
July 12, 2024

Douglas A. Bullock
Principal
July 12, 2024

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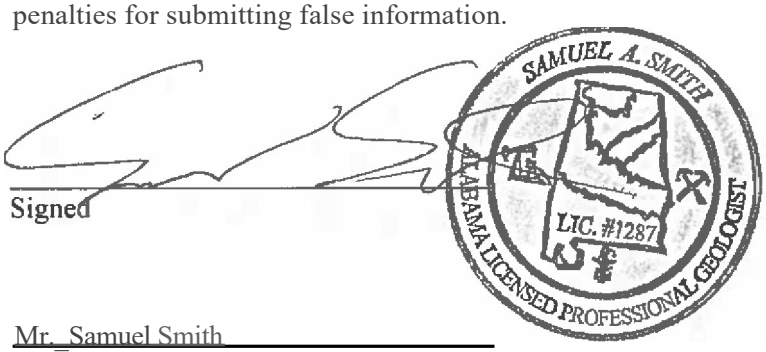
CERTIFICATION PAGE

I certify under penalty of law that this document and all plans, specifications, and technical data submitted were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiring of the person or persons who directly gathered the enclosed information, the information submitted, to the best of my knowledge and belief, is true, accurate, and complete. I am aware that there are significant penalties for submitting false information.



Signed

Mr. Samuel Smith
Printed

AL-P.G. # 1287
Registration Number

7/2/2024
Date

1.0 INTRODUCTION

1.1 SITE DESCRIPTION

The former Bama Bowl Strip Shopping Center (hereafter the "Site") is located at the northeastern corner of the intersection of 15th Street and Hackberry Lane in Tuscaloosa, Alabama, and depicted on the United States Geological Survey (USGS) 7.5-Minute Topographic Quadrangle *Tuscaloosa, Alabama*, dated 2020 (**Figure 1**). As indicated on **Figure 1**, the Site is approximately located at north latitude 33°11'58.5" and west longitude 87°32'30.09" and comprises approximately 4.41 acres.

The Site is currently vacant. A multi-tenant shopping center (approximately 51,000-square feet in area and reportedly constructed in the 1950s) was demolished in approximately June 2024, leaving the Site with the paved parking lot and components of the former building slab. A Site plan illustrating structures and approximate boundaries is included as **Figure 2**. As depicted on **Figure 2**. Lot 1 (the western side) comprises approximately 1.75 acres and is proposed for use as a gasoline service station. Lot 2 (eastern section) is approximately 1.4 acres in area and is intended for redevelopment as a food service retailer.

1.2 SITE HISTORY AND PURPOSE

Historical sources indicate the Site was first developed prior to 1923, with a dwelling, two stables, and three outbuildings. The 1923 Sanborn® map did not depict the southern portion of the Site. Between 1923 and 1938, a gasoline station was constructed in the southwestern quarter (historically identified as 1425 Hackberry Lane) and an additional dwelling was constructed in the southeastern corner of the Site. The northern, central, and western portions of the Site were developed with additional stables and a store associated with a dairy between 1938 and 1950. All previously identified structures were demolished between 1956 and 1958 when the current building was constructed along the northern boundary and subsequently operated by Sears-Roebuck & Company (with automotive service operations) until 1983. The remainder of the parcel was utilized as parking. In 1983, the structure was renovated into multiple suites to complete the current multi-tenant layout. Tenants included various retail establishments, a bowling alley, dry cleaners, and restaurants from 1983 until most of the suites were vacated between 2017 and 2020.

Bullock Environmental, LLC (Bullock) prepared this document on behalf of Hackberry Properties, LLC (hereafter "the Applicant") to achieve the following objectives:

1. Demonstrate adequate assessment of chemicals of concern (COCs) groundwater and soil vapor at the Site to develop an appropriate remedial plan;
2. Document the evaluation of potential vapor intrusion risks through sub-slab and soil vapor sampling events completed between January 2023 and August 2023;
3. Present a viable Voluntary Cleanup Plan to address COCs detected in onsite groundwater and sub-slab/ soil vapor (limited to tetrachloroethylene [PCE]) through the Alabama Land Recycling and Economic Redevelopment Act (ALRERA);
4. Develop a remedial framework to eliminate potential vapor intrusion risks following the redevelopment of the Site;
5. Obtain ADEM approval of this Voluntary Cleanup Plan by September 9, 2024;
6. Establish appropriate institutional and/or engineering controls (through an environmental covenant, following the implementation of this Voluntary Cleanup Plan) to mitigate potential exposure to the COCs potentially remaining in onsite groundwater and soil vapor; and
7. Develop a Soil Management Plan for use during future Site improvements.

In order to achieve these objectives, Bullock will oversee the installation of an impermeable vapor barrier beneath the proposed building slab on Lot 1. The following sections contain the required elements of a Voluntary Cleanup Plan (as outlined in ADEM Administrative Code 335-15-4-.04) and detail the process for implementation following ADEM approval. As such, this Voluntary Cleanup Plan will "*describe in sufficient detail those actions necessary to return the property to residential quality use, or at a minimum include restrictions such as land use controls, if appropriate to, satisfy the cleanup requirements for the qualifying property* (ADEM Administrative Code 335-4-.04(1))."

As outlined in Sections 5.0 and 6.0 of this document, the proposed remedy for this Site includes the following:

1. Install a vapor barrier beneath the proposed gasoline station building footprint on Lot 1;
2. Development of a soil management plan to be utilized during redevelopment;
3. Execute and record an Environmental Covenant onto the deed of the Site; and
4. Submit a Voluntary Cleanup Implementation report for your review and approval.

2.0 SUMMARY OF PREVIOUS ASSESSMENTS

Assessment tasks completed to date have included Phase I Environmental Site Assessments (ESAs) dated June 1994, October 2012, August 2020, and November 2022, and various subsurface investigations completed in May 2013, March 2021, and February 2023.

As detailed below, the assessments completed between 1994 and 2013 identified evidence of *recognized environmental conditions* in connection with the historical gasoline station and Sears operations on the Site. Those assessment results did not identify the onsite dry cleaner or offsite laundry facility (located immediately north) as potential sources of contamination. Likewise, those investigations yielded no evidence of petroleum contamination from these historical operations.

The assessments completed between August 2020 and February 2023 identified the former onsite dry cleaner (Penny Profit Cleaners) and offsite laundry (former dry cleaning) facility (located in a tenant space within the shopping center located along the northern Site boundary) as potential contaminant sources for Lot 1. Penny Profit Cleaners reportedly operated onsite from at least the mid 1990s until approximately 2015 and conducted onsite dry cleaning operations (registered as a small-quantity generator of hazardous waste for PCE). The results obtained from the February 2023 investigation, however, indicated the offsite laundry (former dry cleaning) facility as a potential source of contamination (based on soil vapor and groundwater results obtained).

The 1994 Phase I ESA provided information regarding the former Sears location, including the removal of a waste oil underground storage tank (UST) when Sears vacated in 1983, but no closure documentation was available. The report also identified an adjoining laundry facility as a former dry cleaner (drop-off only location). The ESA identified the former USTs associated with Sears and the former gasoline station as *recognized environmental conditions*; however, the report concluded that based on the lack of visual evidence of remaining tanks, no further action was recommended (unless future information revealed the tanks were present).

The October 2012 Phase I ESA identified the former gasoline station and automotive repair operations as *recognized environmental conditions*. While identified as a generator of PCE in connection with its operation, the Phase I ESA concluded the Penny Profit Cleaners facility did "not pose an environmental concern to the Site." As a result, a Limited Phase II ESA was conducted in May 2013, which included the installation of four soil borings and collection of eight soil samples for analysis of benzene, toluene,

ethylbenzene, and total xylenes (BTEX), methyl tertiary butyl ether (MTBE), ethylene dibromide (EDB), and naphthalene. The Limited Phase II ESA focused its investigation on the former gasoline station and Sears operations; analytical results indicated no COCs in soil at concentrations exceeding laboratory method detection limits. Additionally, ground penetrating radar (GPR) analysis of the area identified no anomalies consistent with an UST.

The August 2020 Phase I ESA identified the former Penny Profit dry cleaning operation and automotive repair operations as *recognized environmental conditions*. With regard to the gasoline filling station, the report stated: "Based on the location of the soil borings, lack of evidence of a UST and the length of time since operations (at least 61 years), PM agrees that the former gasoline filling station is not considered a [*recognized environmental condition*] REC." In response to these findings, a Phase II ESA was conducted in February 2021, which included the installation of ten soil borings and the collection of ten soil samples and four groundwater samples for laboratory analysis of volatile organic compounds (VOCs), polynuclear aromatic hydrocarbons (PAHs), and/or metals (cadmium, total chromium, and lead). None of the soil samples contained COC concentrations above regulatory screening levels. Three of the groundwater samples (TMW-2, TMW-3, and TMW-5) contained PCE concentrations ranging from 0.0328 milligrams per liter (mg/L, TMW-3) to 0.07 mg/L (TMW-5); no other COCs were detected above laboratory reporting limits. The report concluded: "The results of this investigation indicate no further action is warranted at this time. Based on the current commercial zoning of the property, planned continued use of the property for commercial purposes, and the concentrations of detected contaminants, no complete exposure pathways have been identified; however, should the future property use and zoning change, these recommendations should be re-evaluated."

The November 2022 Phase I ESA identified the groundwater contamination (detected in 2021) as a *recognized environmental condition* and indicated "further evaluation of the contaminants associated with this REC may be determined through additional site investigation and/or risk assessment." In light of these findings, PM recommended further assessment to evaluate the lateral extent of the groundwater plume and investigate potential vapor intrusion risks associated with the former Penny Profit Cleaners tenant space.

In January 2023, field personnel initiated the supplemental site assessment activities, which included the installation of seven soil borings, six monitoring wells, and six soil gas samples across the Site. Field personnel collected soil and groundwater samples for analysis of VOCs and/or Resource Conservation & Recovery Act (RCRA) metals. None of the soil samples contained COC concentrations above regulatory screening levels. One of the groundwater samples (MW-16) contained PCE at a concentration of 0.104 mg/L while three additional monitoring wells (MW-12, MW-15, and MW-17) contained detectable concentrations of PCE below its regulatory screening level (ranging from 0.00291 mg/L [MW-15] to 0.00423 mg/L [MW-17]). The remaining monitoring wells installed during this investigation (MW-11 and MW-13) contained no COCs above laboratory method detection limits. Of the six soil gas samples collected (SG-11 through SG-16), two locations contained PCE concentrations of 24,000 micrograms per cubic meter (µg/m^3) in sample SG-14 to 2,500 µg/m^3 in sample SG-16. None of the remaining soil gas samples contained PCE (or other COCs) at concentrations representing a potential vapor intrusion risk. Considering the locations of the soil-gas borings containing elevated PCE concentrations (representing a potential vapor intrusion risk), the former Penny Profit Cleaners and the offsite, former dry cleaner were identified as potential sources of contamination. Soil boring/monitoring well/soil gas sampling locations are illustrated on **Figure 2**.

In February 2023, Bullock completed the following activities to achieve comprehensive (Site-wide) evaluation of COCs in onsite soil, groundwater, and sub-slab/soil vapor:

- Installation of five soil borings on the eastern, adjacent lot (**Figure 2**), and their conversion into groundwater monitoring wells, to evaluate the lateral extent of COCs in soil and groundwater;
- Analysis of soil and groundwater samples from each soil boring/monitoring well for VOCs, PAHs, and/or select RCRA metals according to Environmental Protection Agency (EPA) Methods 8260B, 8270C, and/or 6010B (7470C for mercury);
- Completion of a top-of-casing (TOC) elevation survey to obtain relative water table elevation data from each monitoring well location;
- Measurement of Site-wide groundwater flow;
- Collection of four sub-slab vapor samples on Lot 1 for analysis of VOCs according to EPA Method TO-15;
- Collection of two pairs of samples (one beneath the slab and a second in ambient, interior air) for analysis of radon to derive a Site-specific attenuation factor (AF) and better quantify potential vapor intrusion risks associated with COCs beneath the building slab;
- Comparison of sub-slab and soil gas sample concentrations to established Vapor Intrusion Screening Levels (VISLs) published by EPA using Site-specific AFs to assess the risk (if any) posed by former dry cleaning operations;
- Compilation and analysis of previous Site investigations to achieve a better understanding of the overall groundwater plume; and
- Presentation of the investigation findings into a Voluntary Property Assessment Report.

The results obtained from the Voluntary Property Assessment Report concluded the source of contamination onsite to be the former dry cleaning plant located in the northern portion of the Site. Additionally, an offsite dry cleaner is present adjacent to the northwestern property boundary, which could be functioning as a secondary contaminant source; previous investigations revealed PCE present in groundwater and soil gas samples in this vicinity. Based on previous investigations, the PCE plume appears to be limited to the northwestern and western portions of the Site. Information related to the location and time or quantity of a known release was not available.

In light of the findings from this Voluntary Property Assessment Report, Bullock concluded a Cleanup Plan may be warranted, depending on the results of the warm-season vapor sampling event and the final plans (and building locations) associated with the forthcoming redevelopment activities.

Finally, in July 2023, Bullock returned to the Site to complete a warm-season soil vapor sampling event. This investigation included the re-collection of soil vapor samples from the locations assessed in February 2023. As detailed in this supplemental assessment, "PCE was detected in each sub-slab vapor sample at concentrations ranging from 49,000 µg/m^3 in sample SS-3 to 220,000 µg/m^3 in sample SS-1. Sample SS-2 contained PCE at a concentration of 120,000 µg/m^3 while SS-4 contained PCE at a concentration of 180,000 µg/m^3. PCE sub-slab vapor concentrations measured during February 22, 2023, sampling event ranged from 31,000 µg/m^3 in sample SS-3 to 110,000 µg/m^3 in sample SS-1. Sample SS-2 contained PCE at a concentration of 72,000 µg/m^3 while SS-4 contained PCE at a concentration of 96,000 µg/m^3.

Comparison of the PCE concentrations measured in sub-slab vapor measured during the July 31, 2023, sampling event to those measured during the February 22, 2023, event reveals increased levels by a factor of 1.5 to 2X."

With regard to the findings from this supplemental assessment, Bullock concluded the following:"

…the risk posed by the maximum concentration of all COCs in soil vapor, combined with the Site-specific attenuation factor (AF), does not exceed ADEM's cumulative risk threshold of 1 X 10^{-5} or the cumulative non-cancer (HQ) of 1.0. While these risk thresholds have not been exceeded, the elevated PCE concentrations in sub-slab vapor appear to cover a significant area on the western half of Lot 1.

Moreover, the average PCE concentrations measured in sub-slab vapor during the July 2023 sampling event were more than twice the calculated average from the February 2023 event.

Considering the information summarized in this document, the source of contamination onsite is attributed to a former dry cleaning facility, Penny Profit Cleaners, which reportedly operated onsite from at least the mid 1990s until approximately 2015 . Additionally, an offsite dry cleaner is present adjacent to the northwestern Site boundary, which could be functioning as a secondary contaminant source; previous investigations revealed PCE present in groundwater and soil gas samples in this vicinity. Based on previous investigations, the PCE plume appears to be limited to the northwestern and western portions of the Site."

Following its review of the report documenting the results from the July 2023 soil vapor re-sampling event, ADEM delivered correspondence dated January 23, 2024, stating: *"If the building will remain or will be torn down based on current data, a vapor mitigation system will be needed for long term redevelopment."*

3.0 SCOPE OF WORK AND REPORT ORGANIZATION

In accordance with ADEM Administrative Code 335-4-.04(2), this Voluntary Cleanup Plan includes the following:

1. A description of the remediation at each area of known contamination;
2. A description of the conduct of the cleanup at the facility;

a. A detailed description of the methods to be used during cleanup, including but not limited to, removing, transporting, treating, storing, or disposing of all remediation waste, identification of the type(s) of off-site solid and/or hazardous waste management unit(s) to be used, if applicable.

b. A detailed description of the steps needed to remove or decontaminate all hazardous residues and contaminated containment system components, equipment, structures, and soils during cleanup including, but not limited to:

(i) Procedures for cleaning equipment and removal of contaminated soils;
(ii) Methods for sampling and testing surrounding soils; and
(iii) Criteria for determining the extent of remediation necessary to satisfy the cleanup requirements.

c. A detailed description of other activities necessary during or after the cleanup period to ensure compliance with the cleanup performance requirements. This description may include operation and maintenance, such as, but not limited to groundwater monitoring, leachate collection, and run-on and run-off control;

d. A schedule for cleanup of known areas of contamination. At a minimum, the schedule must include the total time necessary to remediate each known area of contamination and the time required for cleanup activities;

e. Provide proof of financial assurance in accordance with 335-15-5 (covered by EPA Cleanup Grant awarded to the City of Albertville, May 2020); and

f. An estimate of the expected year of cleanup for facilities that use trust funds to demonstrate financial assurance under 335-15-5-.02(b).

3. An estimate of the maximum inventory of remediation wastes/contaminated media on-site during cleanup operations; and
4. A voluntary cleanup plan submitted by a non-responsible party must provide for remediation of all contamination described in the property assessment report on-site only.

3.2 REPORT ORGANIZATION

Section 4.0 summarizes Site characterization information, which includes the general geology, hydrogeology, and lithology of the Site area and provides Site-specific information regarding COCs in onsite soil, groundwater, and soil vapor. Section 5.0 constitutes the Voluntary Cleanup Plan for ADEM's review and approval. Section 6.0 presents conclusions and recommendations for further action and provides an estimated schedule for implementation while the final section (Section 7.0) provides a summary of the reference materials cited throughout this report.

4.0 SITE CHARACTERIZATION AND FIELD INVESTIGATION RESULTS

4.1 SURROUNDING POPULATION

Surrounding properties include 15th Street and various commercial enterprises to the south, commercial and residential development to the north, Hackberry Lane followed by light industrial use (bread plant) to the west, and residential to the east. An area land use map is included as **Figure 3**.

4.2 GEOLOGY AND HYDROGEOLOGY

According to the Geological Survey of Alabama (GSA) *Map of Tuscaloosa County, Alabama, Showing Distribution of Geologic Formations and Ground Water Supplies*, dated 1961, the Site is underlain by Alluvial and Terrace deposits. This formation comprises lenticular beds of clay, coarse sand, and gravel ranging in thickness from a few feet in small stream valleys to about 80 feet in the Black Warrior River valley. Terraces range in height from 40 to 200 feet above stream levels. Some areas mapped as alluvium include low terraces. Where sufficient saturated thicknesses of sand and gravel occur, they form excellent aquifers and will yield water readily to wells and springs. Yields of more than 1,000 gallons per minute are available in places in the Black Warrior River valley at relatively shallow depths. High terrace deposits are generally dry. Water is generally of good quality but in places is high in iron.

The Site, which has been altered by development, is generally level. Various factors can affect groundwater flow direction. For unconfined aquifers, the direction of shallow groundwater movement generally mirrors surface topography and generally flows from hilltops and uplands (recharge areas) to stream valleys (discharge areas). Considering the interpretation of the *Tuscaloosa, Alabama* topographic quadrangle, shallow groundwater beneath the Site is inferred to generally flow south-southeast toward Cribbs Mill Creek. However, water table elevation data (included as **Table 1** and graphically represented on **Figure 4**) indicates that groundwater flows south-southwest.

4.3 SITE SOILS

According to the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Web Soil Survey, a majority of the Site is underlain by the Bama-Urban land complex, 2 to 6 percent slopes. Bama soils have a parent material of loamy fluviomarine deposits derived from sedimentary rock, with a typical profile of fine sandy loam from 0 to 5 inches and sandy clay loam from 5 to 72 inches. The depths to restrictive feature and to water table are more than 80 inches. Urban land areas are covered by commercial, industrial, or high-density residential facilities. These areas have been altered to achieve large areas that are nearly level, to avoid flooding or wetness problems, or to increase load supporting capacity. The original soil was altered by cutting and filling, shaping and grading, excavating, blasting, compacting, or covering with concrete or asphalt. The easternmost portion of the Site is underlain by the Shatta-Urban land complex, 0 to 2 percent slopes. Shatta soils have a parent material of loamy fluviomarine deposits derived from sedimentary rock, with a typical profile of silt loam

from 0 to 28 inches and clay loam from 28 to 60 inches. The depth to restrictive feature is 20 to 36 inches to fragipan, and the depth to water table is about 18 to 24 inches.

4.4 RELEASE CHARACTERIZATION AND DISTRIBUTION OF COCs

Considering the results of assessment activities completed to date, the source of contamination is attributed to a former dry cleaning plant located in the northern portion of the Site. Additionally, an offsite dry cleaner is present adjacent to the northern property boundary. Previous investigations revealed PCE present in groundwater and soil gas samples in this vicinity. Based on previous investigations, the PCE plume appears to be limited to the northwestern and western portions of the Site. Information related to the location and time or quantity of a known release was not available. A summary of the source characterization for soil, groundwater, and soil gas/sub-slab vapor is presented below.

4.4.1 Chemicals of Concern

The primary COC considered in this evaluation is PCE in groundwater and soil gas. While other COCs were detected above laboratory reporting limits (in groundwater and sub-slab/soil vapor samples), none were present at concentrations exceeding regulatory screening levels or appear to present a viable exposure risk to current or future occupants of the Site.

4.4.2 Distribution of COCs

The COCs detected during previous investigations are limited to the northern and northeastern portions of the Site in the vicinity of a former onsite and a currently operating offsite laundry (former dry cleaning) facilities.

4.4.2.1 Soil

Surficial Soil: During a previous investigation, arsenic was detected above its EPA RSL of 3.0 milligrams per kilogram (mg/kg) in one location at a concentration of 7.6 mg/kg on Lot 1 (SB-17, located on the southern Site boundary along 15th Street). No other COCs were present above applicable EPA RSLs.

Subsurface Soil: No COCs were detected above applicable EPA RSLs from subsurface soil samples collected during this or previous investigations.

Table 2 summarizes the analytical results for the soil samples collected during this and previous assessments while **Figure 4** illustrates the COCs detected in onsite soil.

4.4.2.2 Groundwater

PCE was present in groundwater at concentrations exceeding its EPA Maximum Contaminant Level (MCL) of 0.005 mg/L in four locations on Lot 1 during previous Site investigations. No other COCs were present in groundwater on the Site at concentrations exceeding applicable MCLs or tap water RSLs.

Table 3 summarizes the analytical results for the groundwater samples collected during this and previous assessments while **Figure 5** illustrates the COCs detected in onsite groundwater.

4.4.2.3 Soil Gas/Sub-Slab Vapor

PCE was present in soil gas and sub-slab vapor samples at elevated concentrations in six locations on Lot 1 during the 2023 Site investigations. **Table 4** summarizes the analytical results for the soil gas and sub-

slab vapor samples collected during this and previous assessments while **Figure 6A and Figure 6B** illustrate the COCs detected in sub-slab and soil vapor during the January 2023, February 2023, and July 2023 sampling events. Finally, **Table 5** presents the predicted indoor air concentrations based on the maximum soil vapor concentration and Site-specific Attenuation Factor (AF) derived from the comparison of radon levels in ambient air versus soil/sub-slab vapor. As summarized in **Table 5** and documented in the VISL Calculator output (contained in the Voluntary Property Assessment Report), use of the maximum PCE concentration in sub-slab vapor, combined with the Site-specific AF of 0.000184, resulted in a cumulative risk well below the established single-chemical threshold deemed acceptable by EPA (i.e., Estimated Increased Lifetime Cancer Risk [EILCR] of 1 X 10^{-6}). Similarly, the most conservative threshold for Non-Cancer Risk (Hazard Quotient, HQ) established by EPA for a single chemical is 0.1. Review of the risk derived from the VISL Calculator for the maximum PCE concentration within the proposed building footprint indicates the EILCR value to be 8.58 X 10^{-7} and the HQ value to be 0.231. While the EILCR indicates an acceptable cancer risk, the HQ remains above the threshold for Non-Cancer Risk of 0.1 established by EPA. The target sub-slab/soil vapor concentration for PCE is 92,200 µg/m^3, based on the Site-specific AF derived during the 2023 vapor sampling events. Review of the results obtained during the July 2023 sampling event reveals the soil vapor/sub-slab vapor concentrations in samples SS-1 and SS-2 exceeded this threshold. Likewise, the predicted indoor air concentrations, using both the maximum and average PCE concentrations from the July 2023 sampling event exceeded the EPA RSL for PCE in ambient air for a commercial/industrial setting. With these findings, remedial measures are warranted to address this potential exposure risks on the Site.

5.0 DESCRIPTION OF REMEDIATION: INSTALLATION OF VAPOR BARRIER

In an effort to mitigate or altogether eliminate potential vapor intrusion risk to future building occupants on Lot 1, Bullock, on behalf of the Applicant, proposes the installation of a vapor barrier beneath the concrete slab and foundation of the gasoline station building as a viable remedy. As illustrated on **Figure 7**, PCE has been measured in soil vapor and groundwater beneath and surrounding the footprint of the proposed gasoline station building with concentrations in both media representing a potential vapor intrusion risk. Additionally, review of **Table 3**, **Table 4**, and **Figure 8** reveals that COC concentrations in soil, groundwater, and soil vapor on Lot 2 were not sufficient to pose a viable vapor intrusion risk to future occupants of a structure on this parcel. As such, no remedial measures are warranted in this area.

To that end, Bullock will oversee the installation of a vapor barrier system beneath the building footprint on Lot 1 to eliminate the potential for exposure via vapor intrusion from subsurface sources related to the former dry cleaner. The vapor barrier will be a spray-applied, rubberized asphalt (formed from a waterborne emulsion and catalyst that are sprayed simultaneously from a dual-nozzle wand) combined with a geomembrane to create an effective protective barrier against vapor intrusion into a structure.

The resulting barrier will comprise a seven-layer geomembrane which seals surfaces and penetrations and creates a seamless, monolithic membrane that fully adheres without mechanical fastening and protects against vapor migration.

The spray-applied barrier will also result in diffusion coefficients 20 times lower than 80 mil High Density Polyethylene (HDPE), restricting of volatile constituents into the overlying structure. Specifications for the proposed vapor barrier system are included in **Appendix A**.

As illustrated on **Figure 9**, the applied vapor barrier will be installed beneath the concrete slab and over the footings supporting the structure while surrounding all utility conduits (sewer, water, gas, electrical) protruding through the slab into the building interior.

Regarding the schedule for implementation, this remedy cannot be applied until construction of the structure begins. As such, Bullock anticipates its application between October and November 2024. An estimated timeframe for implementation of the remedial actions detailed in this report is included in **Appendix B**.

6.0 CONCLUSIONS & RECOMMENDATIONS

6.1 CONCLUSIONS

As detailed in previous sections of this document, PCE (associated with historical dry cleaning operations on the Site) is present in groundwater and soil vapor on Lot 1 at concentrations representing a potential vapor intrusion risk. PCE was not present in soil, groundwater, or soil vapor on Lot 2 at concentrations representing a viable human health exposure risk. As such, the remedial measures presented in this Voluntary Cleanup Plan are limited to structures on Lot 1.

6.2 RECOMMENDATIONS

Considering the results summarized in previous sections of this document, Bullock recommends the following corrective action activities at the Site:

1. Installation of a vapor barrier (as detailed in Section 5.0) beneath the proposed structure on Lot 1;
2. Following installation of the vapor, completion of two indoor air sampling events within the structure to verify the effectiveness of the remedy (See Section 6.4);
3. Submittal of a Cleanup Plan Implementation Report documenting the completion of the tasks detailed in this Voluntary Cleanup Plan;
4. Following ADEM's review and approval of the Cleanup Plan Implementation Report, delivery of a draft environmental covenant for review and approval by ADEM, which sets forth the institutional and engineering controls to be applied to the Site.

Figure 10 illustrates the proposed areas for the application of institutional and engineering controls at the Site following the implementation of this plan. As illustrated on **Figure 10**, Lot 1 would be subject to engineering controls (vapor barrier beneath enclosed structure) and institutional controls (future Site use limited to commercial or industrial purposes [residential use, per ADEM Administrative Code 335-15-1-.02(ccc) is prohibited] and use of onsite groundwater for potable or irrigation purposes is prohibited). Lot 2 restrictions will be limited to the institutional controls set forth above. These use restrictions will be recorded onto an environmental covenant executed by the Site owner and ADEM and recorded onto the deed of the Site.

6.3 SOIL MANAGEMENT PLAN

As summarized above, while PCE was not detected above applicable EPA RSLs during previous Site investigations, it is possible that future excavation, earthwork, grading, and/or utility work may encounter PCE-containing soil. In the unlikely event such materials are encountered, a soil management plan (**Appendix C**) will be in place (following ADEM review and approval) to address such circumstances.

6.4 POST-REMEDIAL ACTIVITIES

Upon completion of the remedial activities detailed in Section 5.0, Bullock proposes to complete two post-remedial indoor air monitoring events within the structure. The first post-remedial indoor air

sampling event is proposed one month following the construction of the enclosed building. The second post-remedial indoor air sampling event is proposed two months after the first event;

With ADEM's approval of the Applicant's Voluntary Cleanup Implementation report and recordation of an environmental covenant, Bullock will request that ADEM deliver a *Conditional Letter of Concurrence* documenting that the Applicant has successfully completed the requirements of the Alabama VCP pursuant to ADEM Administrative Code 335-15.

8.0 REFERENCE MATERIALS

Bullock referenced the following sources during the preparation of this report.

1. USGS 7.5-minute Topographic Quadrangle *Tuscaloosa, Alabama*, dated 2020.
2. *Phase I Environmental Site Assessments (ESAs) dated June 1994, October 2012, August 2020, and November 2022.*
3. *Phase II ESA and Limited Site Investigations completed in May 2013, March 2021, and February 2023*.
4. Voluntary Property Assessment Report, dated March 17, 2023.
5. Supplemental Soil Vapor Evaluation, August 28, 2023.
6. Soil Survey Staff, NRCS, USDA. Web Soil Survey. Available online at http:// websoilsurvey.nrcs.usda.gov.
7. AEIRG (revised February 2017).
8. EPA Regional Screening Levels (May 2024 revision).
9. OSWER Technical Guide for Assessing and Mitigating the Vapor Intrusion Pathway from Subsurface Vapor Sources to Indoor Air (U.S. EPA Office of Solid Waste and Emergency Response, June 2015).

TABLES

Table 1
Water Table Elevation Data
Former Bama Bowl Strip Shopping Center
15th Street & Hackberry Lane
Tuscaloosa, Tuscaloosa County, Alabama
Bullock Environmental, LLC Project #: 23-HACK01

MW ID	Date	TOC	DTW	WTE
Lot 1 TMW-1	2/25/2021	NOT SURVEYED-NO WATER TABLE ELEVATION		
Lot 1 TMW-2	2/25/2021	NOT SURVEYED-NO WATER TABLE ELEVATION		
Lot 1 TMW-3	2/25/2021	NOT SURVEYED-NO WATER TABLE ELEVATION		
Lot 1 TMW-5	2/25/2021	NOT SURVEYED-NO WATER TABLE ELEVATION		
Lot 1 MW-11	1/11/2023	218.83	20.50	198.33
	2/24/2023	218.83	18.95	199.88
	3/14/2023	**218.83**	**18.72**	**200.11**
Lot 1 MW-12	1/11/2023	219.55	20.71	198.84
	2/24/2023	219.55	19.72	199.83
	3/14/2023	**219.55**	**19.48**	**200.07**
Lot 1 MW-13	1/11/2023	218.27	19.60	198.67
	2/24/2023	218.27	18.32	199.95
	3/14/2023	**218.27**	**18.13**	**200.14**
Lot 1 MW-15	1/11/2023	219.78	21.50	198.28
	2/24/2023	219.78	20.22	199.56
	3/14/2023	**219.78**	**19.97**	**199.81**
Lot 1 MW-16	1/11/2023	223.38	25.40	197.98
	2/24/2023	223.38	Not Meaured - Obstructed	
	3/14/2023	**223.38**	**24.02**	**199.36**
Lot 1 MW-17	1/11/2023	219.88	22.12	197.76
	2/24/2023	219.88	20.81	199.07
	3/14/2023	**219.88**	**20.55**	**199.33**
Lot 2 MW-1	2/24/2023	219.13	19.40	199.73
	3/14/2023	**219.13**	**19.19**	**199.94**
Lot 2 MW-2	2/24/2023	217.08	17.61	199.47
	3/14/2023	**217.08**	**17.03**	**200.05**
Lot 2 MW-3	2/24/2023	219.13	19.55	199.58
	3/14/2023	**219.13**	**19.38**	**199.75**
Lot 2 MW-4	2/24/2023	217.08	17.44	199.64
	3/14/2023	**217.08**	**17.18**	**199.90**
Lot 2 MW-5	2/24/2023	217.49	17.80	199.69
	3/14/2023	**217.49**	**17.58**	**199.91**

Notes:
MW ID = Monitoring Well Identification
TOC = Top of Casing (feet above mean sea level [ft amsl])
DTW = Depth to Water (feet below top of casing [ft btoc])
WTE = Water Table Elevation (ft amsl)

Table 2
Chemicals of Concern in Soil
Former Bama Bowl Strip Shopping Center
15th Street & Hackberry Lane
Tuscaloosa, Tuscaloosa County, Alabama
Bullock Environmental, LLC Project #: 23-HACK01

Client Sample ID			SB/TMW-1	SB/TMW-2	SB/TMW-3	SB-4	SB/TMW-5	SB-6	SB-7	SB-8	SB-9	SB-10
Sample Depth (below land surface)			2-4FT	2-4FT	2-4FT	2-4FT	22-24FT	9-10FT	9-10FT	9-10FT	9-10FT	9-10FT
Date Collected			2/25/2021	2/25/2021	2/25/2021	2/26/2021	2/25/2021	2/25/2021	2/25/2021	2/25/2021	2/25/2021	2/25/2021
Method	Analyte	**EPA RSL**	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
8260B	ETHYLBENZENE	25	**0.177**	<0.00250	<0.00250	<0.00250	<0.00250	<0.00250	<0.00250	<0.00250	<0.00250	<0.00250
8260B	ISOPROPYLBENZENE	990	**0.00344**	<0.00250	<0.00250	<0.00250	<0.00250	<0.00250	<0.00250	<0.00250	<0.00250	<0.00250
8260B	TETRACHLOROETHYLENE	39	**0.00272**	**0.0266**	<0.00250	<0.00250	<0.00250	**0.00281**	**0.00929**	<0.00250	**0.0104**	<0.00250
8260B	TOTAL XYLENES	250	**1.04**	<0.00650	<0.00650	<0.00650	<0.00650	<0.00650	<0.00650	<0.00650	<0.00650	<0.00650
8260B	ALL OTHER VOCS	CS	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
8270C	PAHS	CS	BDL	BDL	NA	NA	NA	NA	NA	NA	NA	NA
6010B	HEXAVALENT CHROMIUM	6.3	<2.0	<2.0	NA	NA	NA	NA	NA	NA	NA	NA
6010B	LEAD	800	**2.91**	**2.74**	NA	NA	NA	NA	NA	NA	NA	NA
6010B	OTHER METALS	CS	BDL	BDL	NA	NA	NA	NA	NA	NA	NA	NA

Client Sample ID			SB/MW/SG-11	SB/MW/SG-11	SB/MW/SG-12	SB/MW/SG-12	SB/MW/SG-13	SB/MW/SG-13	SB/SG-14	SB/MW/SG-15	SB/MW/SG-15	SB/MW/SG-16	SB/MW/SG-16	SB/MW-17	SB/MW-17
Sample Depth (below land surface)			0-1FT	9-10FT	0-1FT	17.5-20FT	0-1FT	19-20FT	0-1FT	0-1FT	19-20FT	0-1FT	19-20FT	0-1FT	14-15FT
Date Collected			1/11/2023	1/11/2023	1/10/2023	1/10/2023	1/11/2023	1/11/2023	1/10/2023	1/11/2023	1/11/2023	1/11/2023	1/11/2023	1/11/2023	1/11/2023
Method	Analyte	**EPA RSL**	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
8260B	TOLUENE	4,700	NA	BDL	NA	**0.00642**	NA	BDL	NA	NA	BDL	NA	**0.00846**	NA	BDL
8260B	ALL OTHER VOCS	CS	NA	BDL	NA	BDL	NA	BDL	NA	NA	BDL	NA	BDL	NA	BDL
8270C	PAHS	CS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
6010B	ARSENIC	3.0	BDL	NA	BDL	NA	**2.28**	NA	BDL	BDL	NA	BDL	NA	**7.6**	NA
6010B	BARIUM	22,000	**41.4**	NA	**25.3**	NA	**98.5**	NA	**4.61**	**13.4**	NA	**84.2**	NA	**162**	NA
6010B	TOTAL CHROMIUM	180,000	**4.36**	NA	**8.9**	NA	**14.9**	NA	**5.05**	**6.15**	NA	**10.2**	NA	**7.54**	NA
6010B	HEXAVALENT CHROMIUM	6.3	NA	NA	NA	NA	<2.0	NA	NA	NA	NA	NA	NA	NA	NA
6010B	LEAD	800	**5.76**	NA	**16.1**	NA	**9.72**	NA	**3.07**	**3.94**	NA	**25.4**	NA	**91.1**	NA
6010B	MERCURY	4.6	BDL	NA	**0.0733**	NA	BDL	NA	BDL	BDL	NA	BDL	NA	**0.122**	NA
6010B	OTHER METALS	CS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Client Sample ID			LOT 2 MW-1	LOT 2 MW-1	LOT 2 MW-2	LOT 2 MW-2	LOT 2 MW-3	LOT 2 MW-3	LOT 2 MW-4	LOT 2 MW-4	LOT 2 MW-5	LOT 2 MW-5
Sample Depth (below land surface)			1-5FT	10-15FT	1-5FT	10-15FT	1-5FT	5-10FT	1-5FT	10-15FT	1-5FT	10-15FT
Date Collected			2/22/2023	2/22/2023	2/22/2023	2/22/2023	2/22/2023	2/22/2023	2/22/2023	2/22/2023	2/22/2023	2/22/2023
Method	Analyte	**EPA RSL**	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
8260B	VOCs	CS	NA	BDL	NA	BDL	NA	BDL	NA	BDL	NA	BDL
8270C	PAHS	CS	NA	BDL	NA	BDL	NA	BDL	NA	BDL	NA	BDL
6010B	TOTAL CHROMIUM	180,000	**11**	NA	<1.0	NA	**26**	NA	<1.0	NA	<1.0	NA
6010B	HEXAVALENT CHROMIUM	6.3	NA	NA	NA	NA	<1.0	NA	NA	NA	NA	NA
6010B	LEAD	800	**27**	NA	**12**	NA	**12**	NA	<1.0	NA	**13**	NA
6010B	OTHER METALS	CS	BDL	NA	BDL	NA	BDL	NA	BDL	NA	BDL	NA

Notes:
All concentrations presented in milligrams per kilogram (mg/kg), parts per million equivalent.
VOCs = Volatile Organic Compounds, other than those listed separately
PAHs = Polynuclear Aromatic Hydrocarbons
EPA RSL = Regional Screening Level for Industrial Soil (THQ 0.1) established by Environmental Protection Agency (EPA) Region 9 (November 2022)
CS = RSLs are Constituent-Specific
Bolded Cell = Detected concentration but below EPA RSL
Highlighted/bolded cells = Concentration exceeds corresponding EPA RSL
BDL = Below Detection Limits
NA = Not Analyzed

Table 3
Chemicals of Concern in Groundwater
Former Bama Bowl Strip Shopping Center
15th Street & Hackberry Lane
Tuscaloosa, Tuscaloosa County, Alabama
Bullock Environmental, LLC Project #: 23-HACK01

Client Sample ID			TMW-1	TMW-2	TMW-3	TMW-5	MW-11	MW-12	MW-13	MW-15	MW-16	MW-17
Date Collected			2/25/2021	2/25/2021	2/25/2021	2/25/2021	1/11/2023	1/11/2023	1/11/2023	1/11/2023	1/11/2023	1/11/2023
Method	Analyte	**MCL/RSL**	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
8260B	TETRACHLOROETHYLENE	0.005	<0.001	**0.0466**	**0.0328**	**0.07**	<0.001	**0.00386**	<0.001	**0.00291**	**0.104**	**0.00423**
8260B	ALL OTHER VOCS	CS	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
8270C	PAHS	CS	BDL	BDL	NA	NA	NA	NA	NA	NA	NA	NA

Client Sample ID			Lot-2 MW-1	Lot-2 MW-2	Lot-2 MW-3	Lot-2 MW-4	Lot-2 MW-5
Date Collected			2/23/2023	2/23/2023	2/23/2023	2/23/2023	2/23/2023
Method	Analyte	**MCL/RSL**	Result	Result	Result	Result	Result
8260B	TETRACHLOROETHYLENE	0.005	<0.005	<0.005	<0.005	<0.005	<0.005
8260B	ALL OTHER VOCS	CS	BDL	BDL	BDL	BDL	BDL
8260B	PAHs	CS	BDL	BDL	BDL	BDL	BDL

Notes:
All concentrations presented in milligrams per liter (mg/L), parts per million equivalent.
VOCs = Volatile Organic Compounds, other than those listed separately
PAHs = Polynuclear Aromatic Hydrocarbons
MCL = Maximum Contaminant Level (THQ 0.1) established by Environmental Protection Agency (EPA) Region 9 (November 2022)
RSL = Regional Screening Level for Tapwater (THQ 0.1) established by EPA Region 9 (November 2021)
CS = MCLs/RSLs are Constituent-Specific
Bolded Cell = Detected concentration but below EPA MCL/RSL
Highlighted/bolded cells = Concentration exceeds corresponding EPA MCL/RSL
BDL = Below Detection Limits
NA = Not Analyzed

Table 4
Chemicals of Concern in Soil Gas and Sub-slab Vapor &
Radon Concentrations in Sub-slab Vapor and Ambient Air
Former Bama Bowl Strip Shopping Center
15th Street & Hackberry Lane
Tuscaloosa, Tuscaloosa County, Alabama
Bullock Environmental, LLC Project #: 23-HACK01

Client Sample ID	SG-11	SG-12	SG-13	SG-14	SG-15	SG-16
Date Collected	1/10/2023	1/9/2023	1/9/2023	1/16/2023	1/9/2023	1/9/2023
Depth	4 FT	4 FT	4 FT	4 FT	4 FT	4 FT
Analyte	Result	Result	Result	Result	Result	Result
ACETONE	**220**	**350**	**270**	**110**	**180**	**170**
N-BUTANE	BDL	BDL	BDL	BDL	BDL	**120**
1,3-BUTADIENE	BDL	BDL	BDL	BDL	BDL	**19**
2-BUTANONE (MEK)	BDL	**18**	BDL	BDL	BDL	BDL
CARBON DISULFIDE	BDL	BDL	**19**	BDL	BDL	BDL
ETHANOL	**18**	**41**	**19**	**23**	**17**	**11**
ETHYLBENZENE	**36**	BDL	**33**	BDL	**32**	**28**
4-ETHYLTOLUENE	**69**	**37**	**48**	**30**	**57**	**48**
N-HEPTANE	BDL	BDL	**23**	BDL	BDL	**32**
N-HEXANE	BDL	BDL	BDL	BDL	BDL	**46**
ISOPROPYL ALCOHOL	**12**	**25**	BDL	**18**	**17**	BDL
PROPYLENE	**53**	**30**	BDL	BDL	**71**	**160**
2,2,4-TRIMETHYLPENTANE	BDL	**55**	**45**	BDL	BDL	BDL
TOLUENE	**79**	**70**	**83**	**40**	**78**	**61**
TETRACHLOROETHENE	BDL	BDL	BDL	**24,000**	**59**	**2,500**
1,2,4-TRIMETHYLBENZENE	**66**	**44**	**50**	**31**	**60**	**49**
M&P-XYLENE	**130**	**73**	**110**	**59**	**110**	**100**
O-XYLENE	**53**	**30**	**44**	**26**	**46**	**39**
ALL OTHER VOCS	BDL	BDL	BDL	BDL	BDL	BDL

Client Sample ID	SS-1	SS-2	SS-3	SS-4	SS-2-AI	SS-4 AI	SS-1	SS-2	SS-3	SS-4
Date Collected	2/22/2023	2/22/2023	2/22/2023	2/22/2023	2/22/2023	2/22/2023	7/31/2023	7/31/2023	7/31/2023	7/31/2023
Depth	SUB-SLAB	SUB-SLAB	SUB-SLAB	SUB-SLAB	Ambient	Ambient	SUB-SLAB	SUB-SLAB	SUB-SLAB	SUB-SLAB
Analyte	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
1,1,1-TRICHLOROETHANE	<5.5	<5.5	**16**	<5.5	NA	NA	ND	ND	ND	ND
2-BUTANONE (MEK)	**11**	**11**	**23**	**8.3**	NA	NA	ND	ND	ND	ND
2-HEXANONE	<4.1	**5.9**	<4.1	<4.1	NA	NA	ND	ND	ND	ND
ACETONE	**100**	**100**	**240**	**120**	NA	NA	ND	ND	ND	ND
BENZENE	<3.2	**5.6**	**4.6**	<3.2	NA	NA	ND	ND	ND	ND
CARBON DISULFIDE	**3.4**	**65**	**5.1**	**11**	NA	NA	ND	ND	ND	ND
CYCLOHEXANE	<3.4	**6.5**	<3.4	**3.4**	NA	NA	ND	ND	ND	ND
M&P-XYLENE	<8.7	<8.7	**9.6**	<8.7	NA	NA	ND	ND	ND	ND
N-HEPTANE	<4.1	**19**	**4.7**	**6.1**	NA	NA	ND	ND	ND	ND
N-HEXANE	<3.5	**25**	**3.7**	**8.5**	NA	NA	ND	ND	ND	ND
PROPENE	<1.7	**20**	<1.7	<1.7	NA	NA	ND	ND	ND	ND
STYRENE	<4.3	<4.3	**5.5**	<4.3	NA	NA	ND	ND	ND	ND
TETRACHLOROETHENE	**110,000**	**72,000**	**31,000**	**96,000**	NA	NA	**220,000**	**120,000**	**49,000**	**180,000**
TOLUENE	**7.2**	**5.5**	**9.0**	<3.8	NA	NA	ND	ND	ND	ND
TRICHLOROTHENE	**35**	<5.4	**7.0**	**24**	NA	NA	ND	ND	ND	ND
XYLENES, TOTAL	<13	<13	**13**	<13	NA	NA	ND	ND	ND	ND
ALL OTHER VOCS	BDL	BDL	**BDL**	BDL	NA	NA	ND	ND	ND	ND
Radon (pCi/L)	NA	**1,299**	NA	**1,034**	**0.20**	**0.23**	NA	**1,299**	NA	**1,034**
Avg ambient Radon (pCi/L)					**0.22**					
Avg sub-slab Radon (pCi/L)			**1,167**						**1,167**	
Site-Specific AF			**0.000184**						**0.000184**	

Notes:
All concentrations presented in micrograms per cubic meter (ug/m3), parts per billion equivalent.
VOCs = Volatile Organic Compounds, other than those listed separately
Bolded Cell = Detected concentration
BDL = Below Detection Limits
pCi/L = picoCuries per Liter
NA = Not Analyzed
AF = Attenuation Factor (average ambient radon concentration/average sub-slab radon concentration)

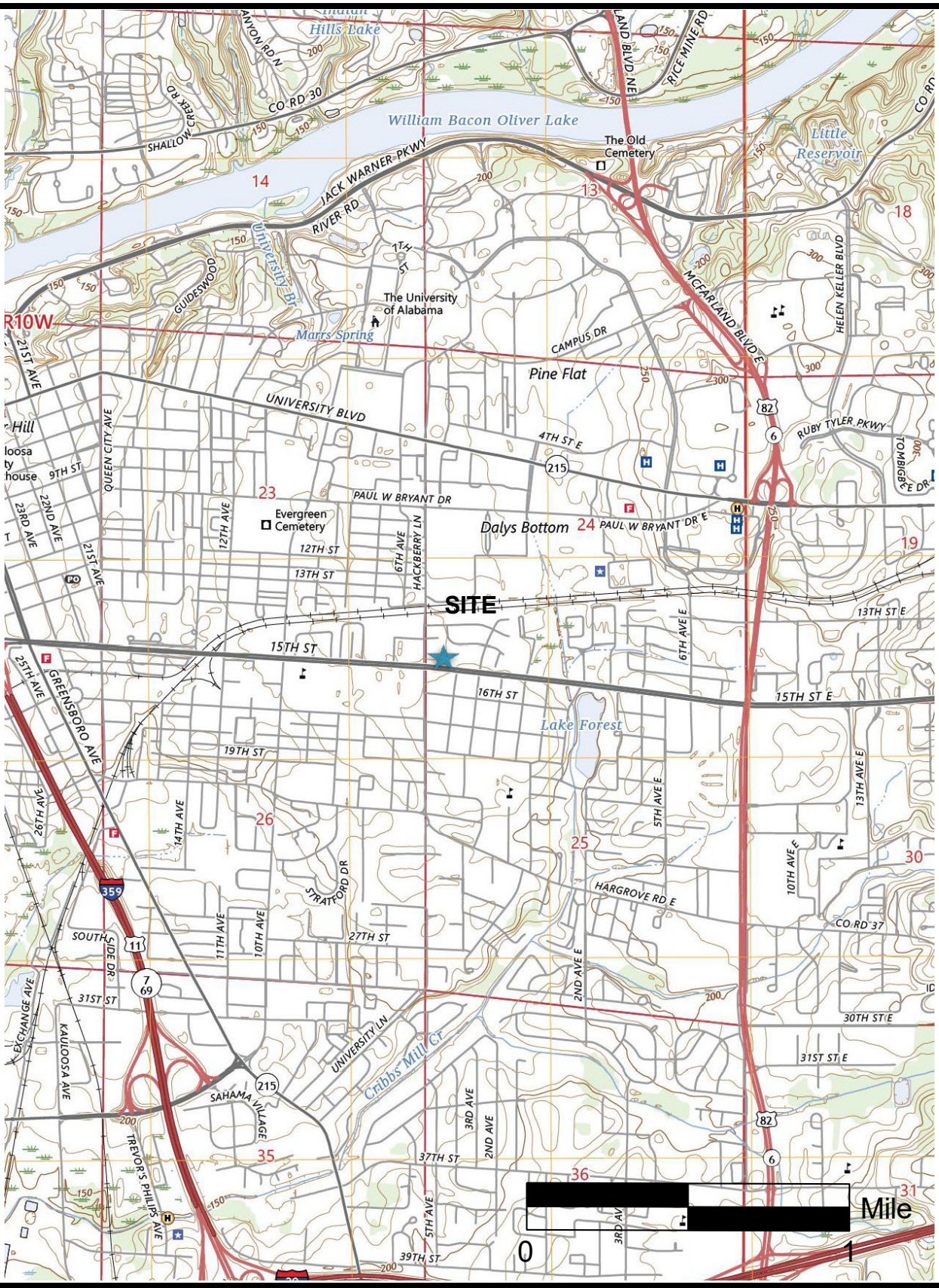
Table 5
Predicted Indoor Air Concentrations with Site-Specific Attenuation Factor
Former Bama Bowl Strip Shopping Center
15th Street & Hackberry Lane
Tuscaloosa, Tuscaloosa County, Alabama
Bullock Environmental, LLC Project #: 23-HACK01

FEBRUARY 2023 SOIL GAS DATA							
Analyte	Maximum Concentration (ug/m3)	AF	Predicted Indoor/Ambient Air Concentration (ug/m3)	**RSL Ambient Air (ug/m3)**	**Carcinogenic VISL (ug/m3)**	**Non-Carcinogenic VISL (ug/m3)**	**Target Sub-Slab and Near Source Concentration (ug/m3)**
1,1,1-TRICHLOROETHANE	**16**	1.84E-04	**0.003**	**2,200**	**NA**	**2,190**	**1.15E+07**
2-BUTANONE (MEK)	**23**	1.84E-04	**0.004**	**0.41**	**NA**	**2,190**	**1.15E+07**
2-HEXANONE	**6**	1.84E-04	**0.001**	**13**	**NA**	**NA**	**NA**
ACETONE	**240**	1.84E-04	**0.044**	**NE**	**NA**	**NA**	**NA**
BENZENE	**6**	1.84E-04	**0.001**	**1.6**	**1.57**	**13.1**	**8.28E+03**
CARBON DISULFIDE	**65.0**	1.84E-04	**0.012**	**310**	**NA**	**307**	**9.22E+05**
CYCLOHEXANE	**7**	1.84E-04	**0.001**	**2,600**	**NA**	**NA**	**NA**
M&P-XYLENE	**9.6**	1.84E-04	**0.002**	**44**	**NA**	**NA**	**2.31E+05**
N-HEPTANE	**19**	1.84E-04	**0.003**	**180**	**NA**	**175**	**9.22E+05**
N-HEXANE	**25**	1.84E-04	**0.005**	**310**	**NA**	**307**	**1.61E+06**
PROPENE	**20**	1.84E-04	**0.004**	**1,300**	**NA**	**1,310**	**6.92E+06**
STYRENE	**6**	1.84E-04	**0.001**	**440**	**NA**	**438**	**NA**
TETRACHLOROETHENE	**110,000**	1.84E-04	**20.240**	**18**	**47.2**	**17.5**	**9.22E+04**
TOLUENE	**9**	1.84E-04	**0.002**	**2,200**	**NA**	**2,190**	**1.15E+07**
TRICHLOROTHENE	**35**	1.84E-04	**0.006**	**1**	**2.99**	**0.876**	**4.61E+03**
XYLENES, TOTAL	**13**	1.84E-04	**0.002**	**44**	**NA**	**43.8**	**2.31E+05**
ALL OTHER VOCS	BDL	1.84E-04	NA	NA	NA	NA	NA
JULY 31, 2023 SOIL GAS DATA							
Analyte	Maximum Concentration (ug/m3)	AF	Predicted Indoor/Ambient Air Concentration (ug/m3)	**RSL Ambient Air (ug/m3)**	**Carcinogenic VISL (ug/m3)**	**Non-Carcinogenic VISL (ug/m3)**	**Target Sub-Slab and Near Source Concentration (ug/m3)**
1,1,1-TRICHLOROETHANE	**16**	1.84E-04	**0.003**	**2,200**	**NA**	**2,190**	**1.15E+07**
2-BUTANONE (MEK)	**23**	1.84E-04	**0.004**	**0.41**	**NA**	**2,190**	**1.15E+07**
2-HEXANONE	**6**	1.84E-04	**0.001**	**13**	**NA**	**NA**	**NA**
ACETONE	**240**	1.84E-04	**0.044**	**NE**	**NA**	**NA**	**NA**
BENZENE	**6**	1.84E-04	**0.001**	**1.6**	**1.57**	**13.1**	**8.28E+03**
CARBON DISULFIDE	**65.0**	1.84E-04	**0.012**	**310**	**NA**	**307**	**9.22E+05**
CYCLOHEXANE	**7**	1.84E-04	**0.001**	**2,600**	**NA**	**NA**	**NA**
M&P-XYLENE	**9.6**	1.84E-04	**0.002**	**44**	**NA**	**NA**	**2.31E+05**
N-HEPTANE	**19**	1.84E-04	**0.003**	**180**	**NA**	**175**	**9.22E+05**
N-HEXANE	**25**	1.84E-04	**0.005**	**310**	**NA**	**307**	**1.61E+06**
PROPENE	**20**	1.84E-04	**0.004**	**1,300**	**NA**	**1,310**	**6.92E+06**
STYRENE	**6**	1.84E-04	**0.001**	**440**	**NA**	**438**	**NA**
TETRACHLOROETHENE	**220,000**	1.84E-04	**40.480**	**18**	**47.2**	**17.5**	**9.22E+04**
TOLUENE	**9**	1.84E-04	**0.002**	**2,200**	**NA**	**2,190**	**1.15E+07**
TRICHLOROTHENE	**35**	1.84E-04	**0.006**	**1**	**2.99**	**0.876**	**4.61E+03**
XYLENES, TOTAL	**13**	1.84E-04	**0.002**	**44**	**NA**	**43.8**	**2.31E+05**
ALL OTHER VOCS	BDL	1.84E-04	NA	NA	NA	NA	NA

Analyte	Average Concentration (ug/m3)	AF	Predicted Indoor/Ambient Air Concentration (ug/m3)	**RSL Ambient Air (ug/m3)**	**Carcinogenic VISL (ug/m3)**	**Non-Carcinogenic VISL (ug/m3)**	**Target Sub-Slab and Near Source Concentration (ug/m3)**
TETRACHLOROETHENE	**71,000**	1.84E-04	**13.064**	**18**	**47.2**	**17.5**	**9.22E+04**
TETRACHLOROETHENE	**142,250**	1.84E-04	**26.174**	**18**	**47.2**	**17.5**	**9.22E+04**
Site-Specific AF	**0.000184 (calculated in Table 1)**						

Notes:
All concentrations presented in micrograms per cubic meter (ug/m3), parts per billion equivalent.
VOCs = Volatile Organic Compounds, other than those listed separately
Bolded Cell = Detected concentration
BDL = Below Detection Limits
NA = Not Applicable
NE = Not Established
AF = Attenuation Factor (average ambient radon concentration/average sub-slab radon concentration)
Highlighted Bold = Concentration exceeds applicable screening value using site-specific AF

FIGURES



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PROJECT

VOLUNTARY CLEANUP PLAN
FORMER BAMA BOWL STRIP SHOPPING CENTER
15TH STREET AND HACKBERRY LANE
TUSCALOOSA, TUSCALOOSA COUNTY, ALABAMA
ADEM VCP SITE NO.: 461-073-23012
BULLOCK ENVIRONMENTAL, LLC PROJECT #: 23-HACK01

FIGURE 1

SITE LOCATION MAP

USGS 7.5-MINUTE
TOPOGRAPHIC QUADRANGLE
TUSCALOOSA, ALABAMA,
DATED 2020

SCALE: AS SHOWN

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FIGURE 2

SITE PLAN WITH LOT 1
AND LOT 2 LAYOUT

SCALE: APPROX. 1" = 100 FT

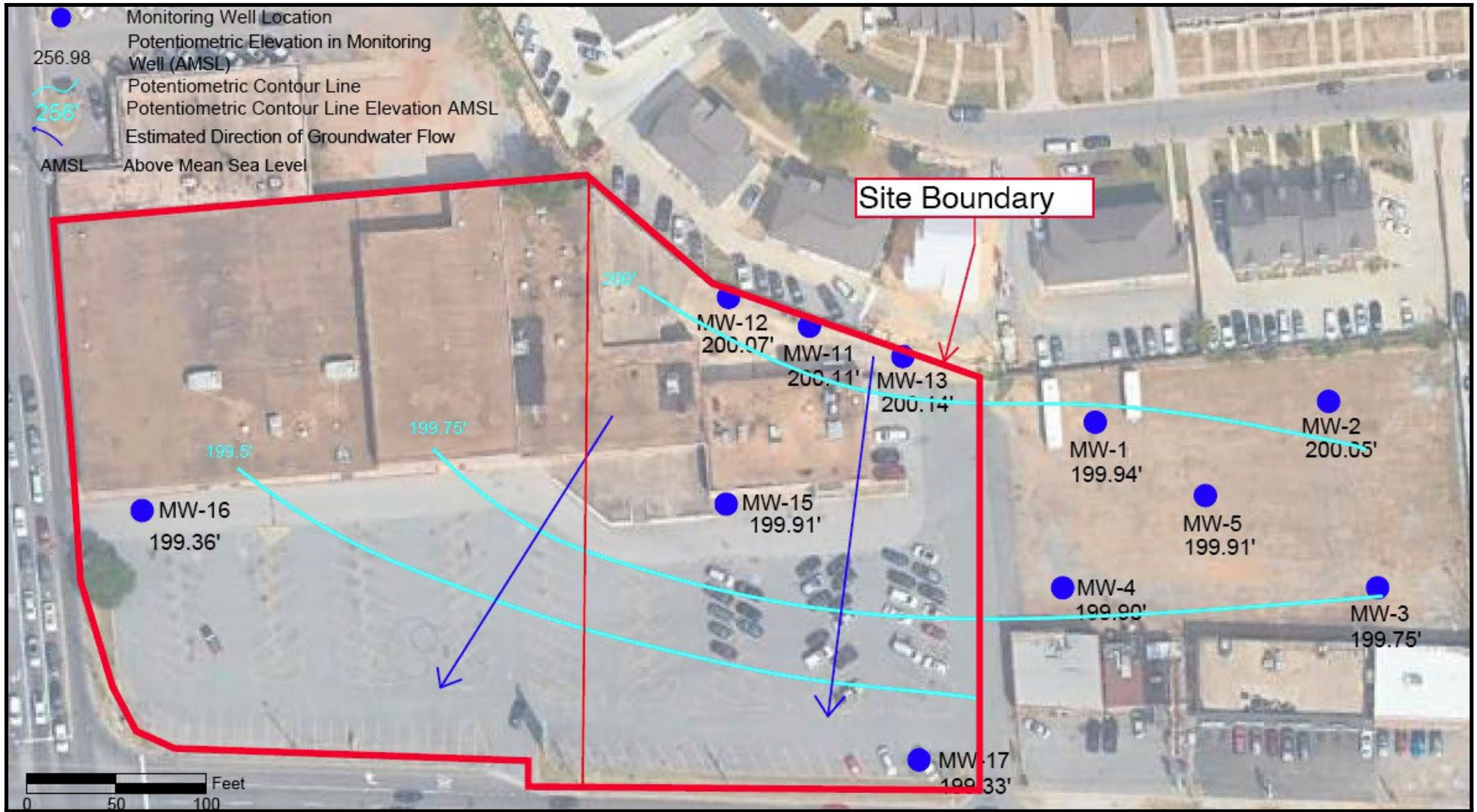

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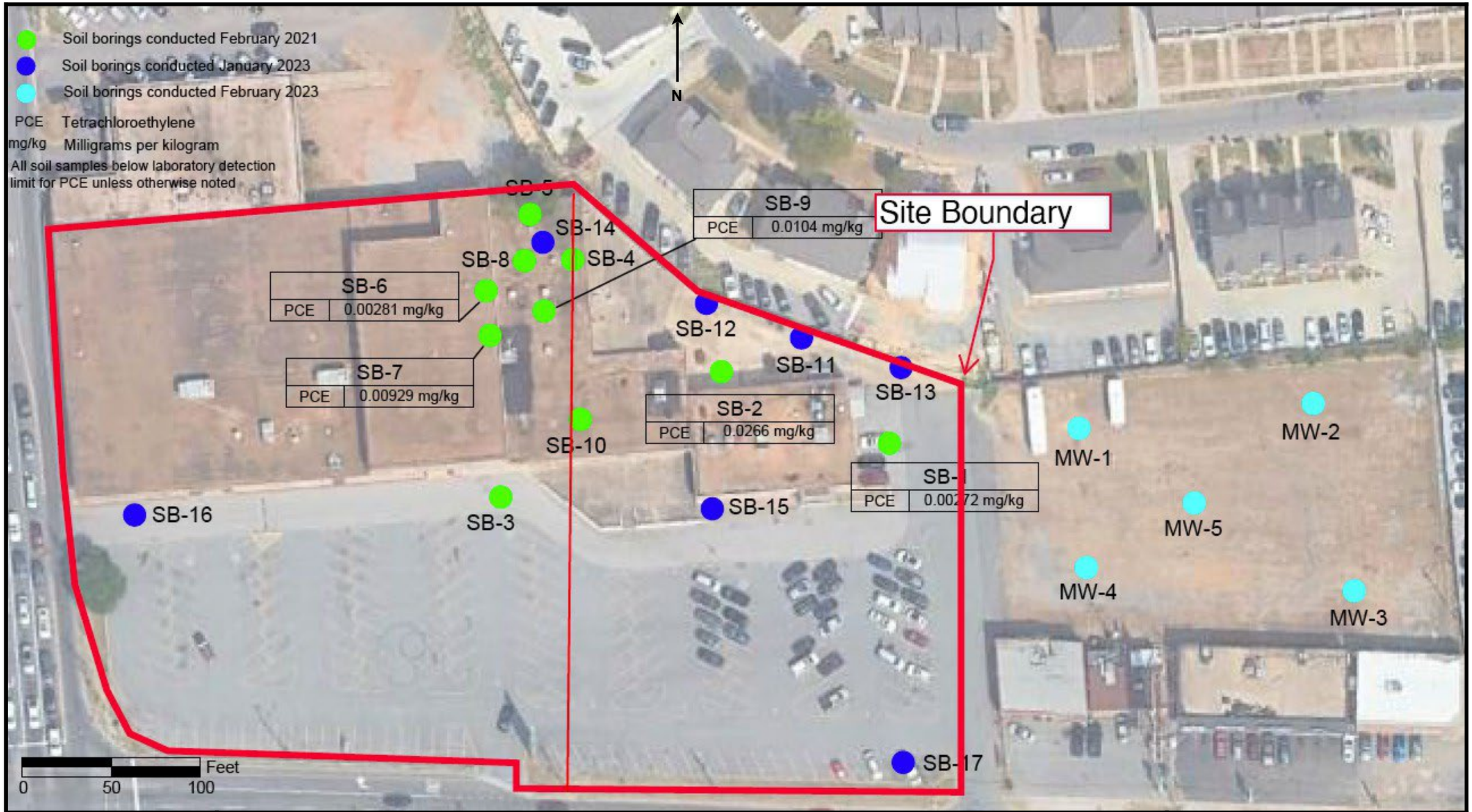
FIGURE 3

POTENTIOMETRIC SURFACE MAP
(MARCH 14, 2023)



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ADEM VCP SITE NO.: 461-073-23012

FIGURE 4

CHEMICALS OF CONCERN IN SOIL

Groundwater samples collected February 2021
Groundwater samples collected January 2023
Groundwater samples collected February 2023
mg/L Milligrams per Liter
PCE Tetrachloroethylene
ND Not detected

N

Site Boundary

TMW-5	
PCE	0.07 mg/L

MW-12	
PCE	0.00386 mg/L

MW-11
ND

MW-13
ND

TMW-2	
PCE	0.0466 mg/L

TMW-1
ND

MW-1
ND

MW-2
ND

MW-16	
PCE	0.104 mg/L

TMW-3	
PCE	0.0328 mg/L

MW-15	
PCE	0.00291 mg/L

MW-5
ND

MW-4
ND

MW-3
ND

MW-17	
PCE	0.00423 mg/L

Feet
0 50 100

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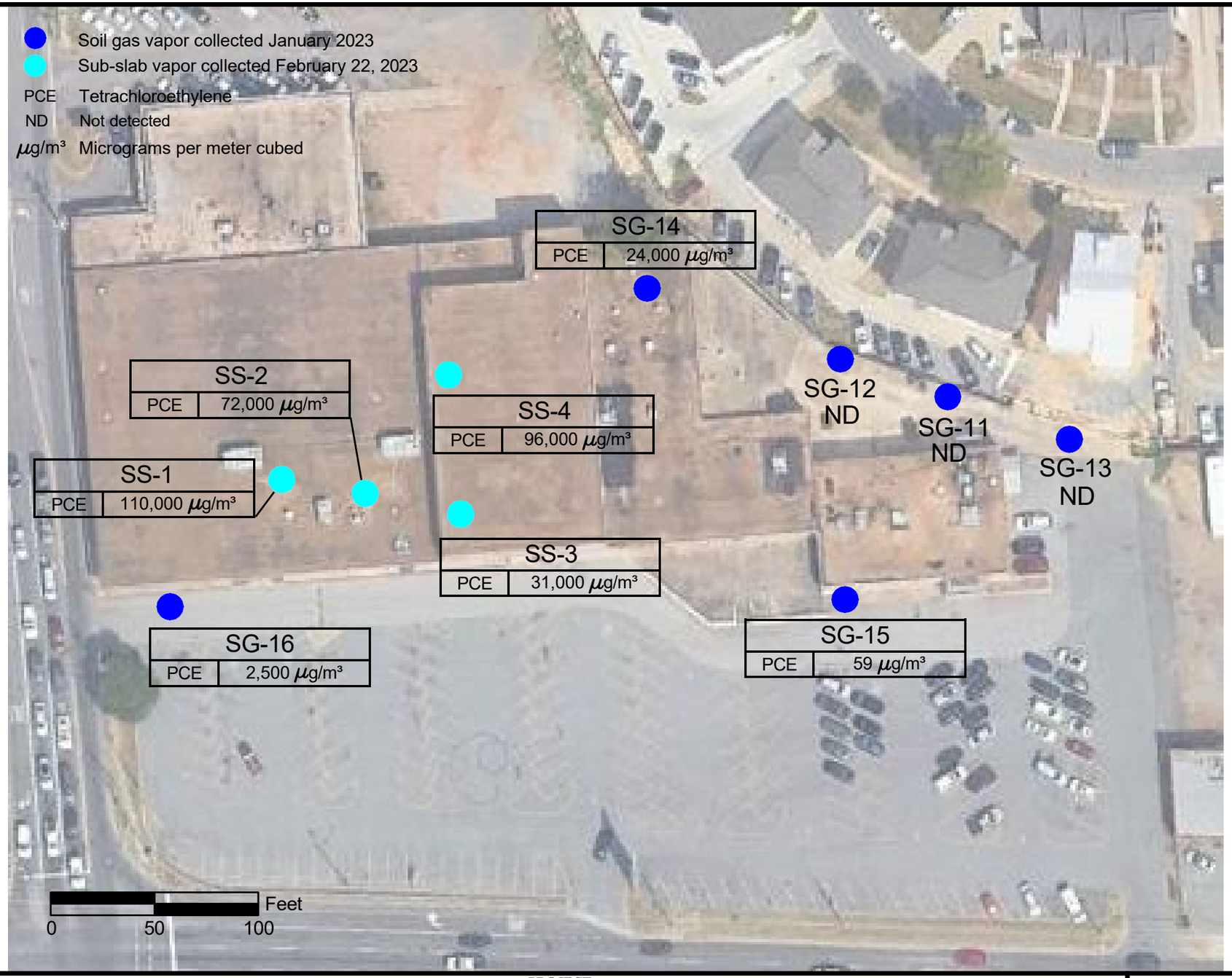
ADEM VCP SITE NO.: 461-073-23012

FIGURE 5

CHEMICALS OF CONCERN IN GROUNDWATER



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VOLUNTARY CLEANUP PLAN
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15TH STREET AND HACKBERRY LANE
TUSCALOOSA, TUSCALOOSA COUNTY, ALABAMA
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FIGURE 6A

CHEMICALS OF CONCERN IN SOIL GAS/SUB-SLAB VAPOR (JANUARY/ FEBRUARY 2023)

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PROJECT

VOLUNTARY CLEANUP PLAN
FORMER BAMA BOWL STRIP SHOPPING CENTER
15TH STREET AND HACKBERRY LANE
TUSCALOOSA, TUSCALOOSA COUNTY, ALABAMA
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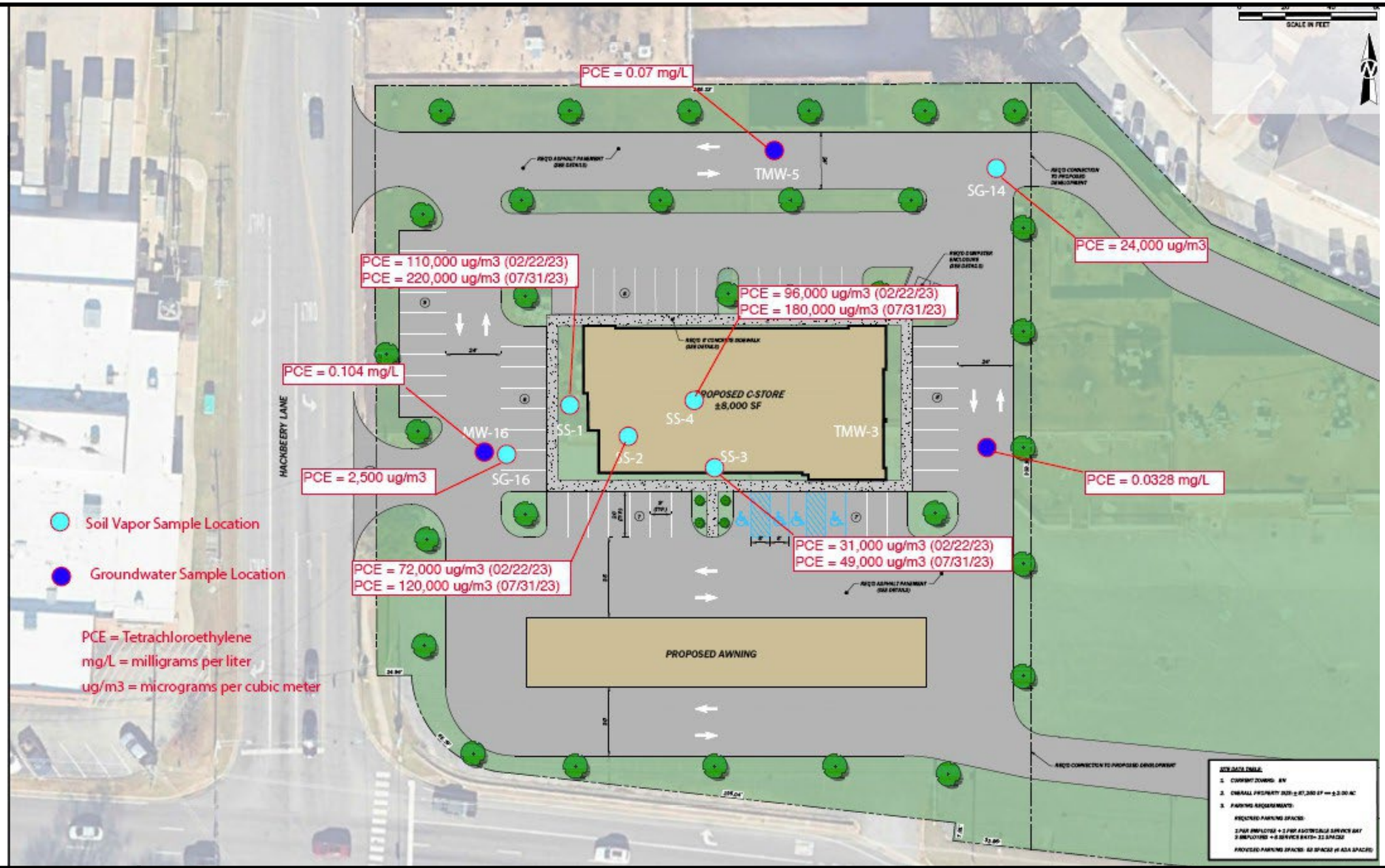
FIGURE 6B

CHEMICALS OF CONCERN IN SOIL VAPOR (JULY 31, 2023)
SCALE: 1"=APPROX. 40'



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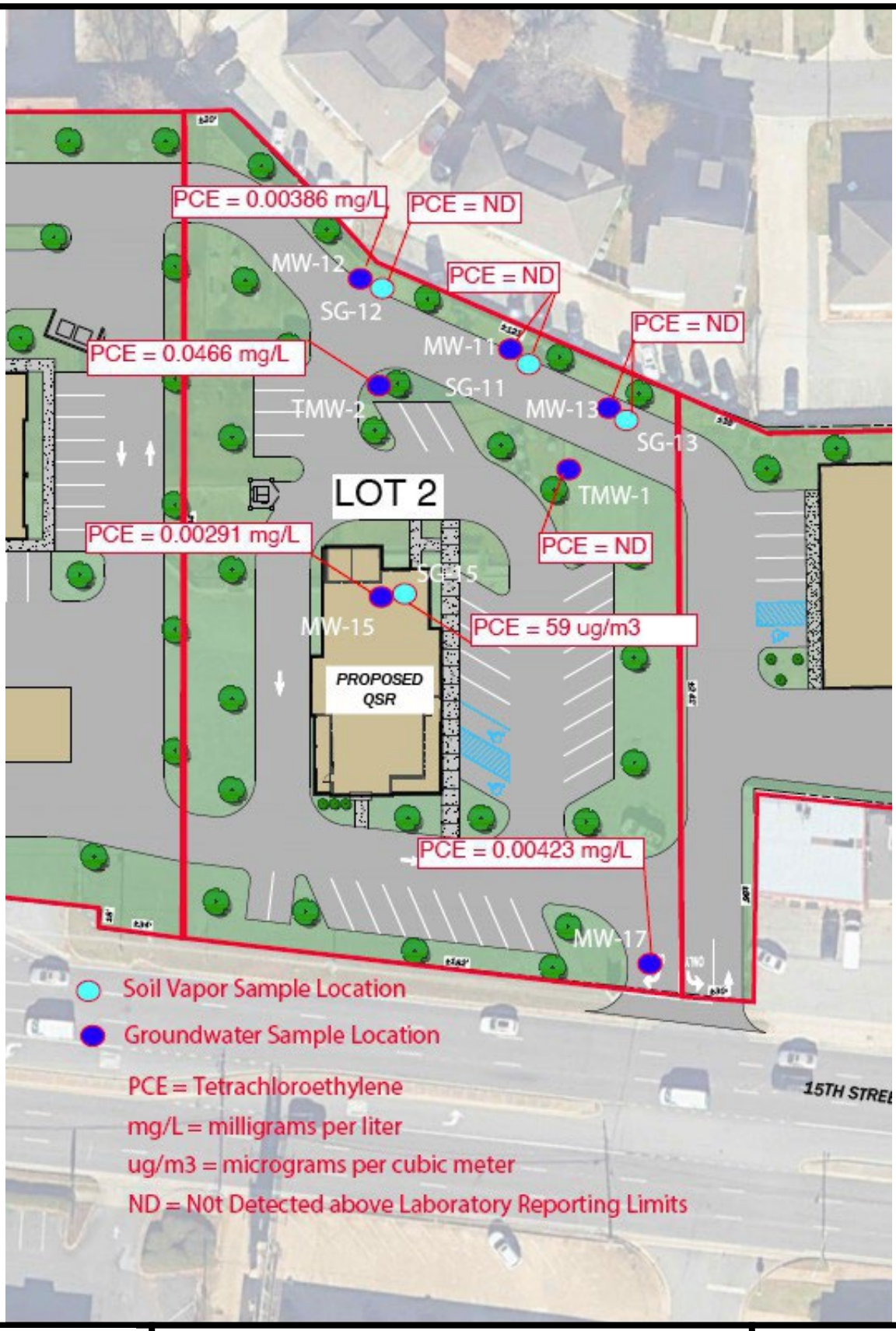
TUSCALOOSA, TUSCALOOSA COUNTY, ALABAMA
ADEM VCP SITE NO.: 461-073-23012

FIGURE 7

LOT 1: CHEMICALS OF CONCERN IN GROUNDWATER & SOIL VAPOR BENEATH PROPOSED LOT 1 STRUCTURE



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PROJECT

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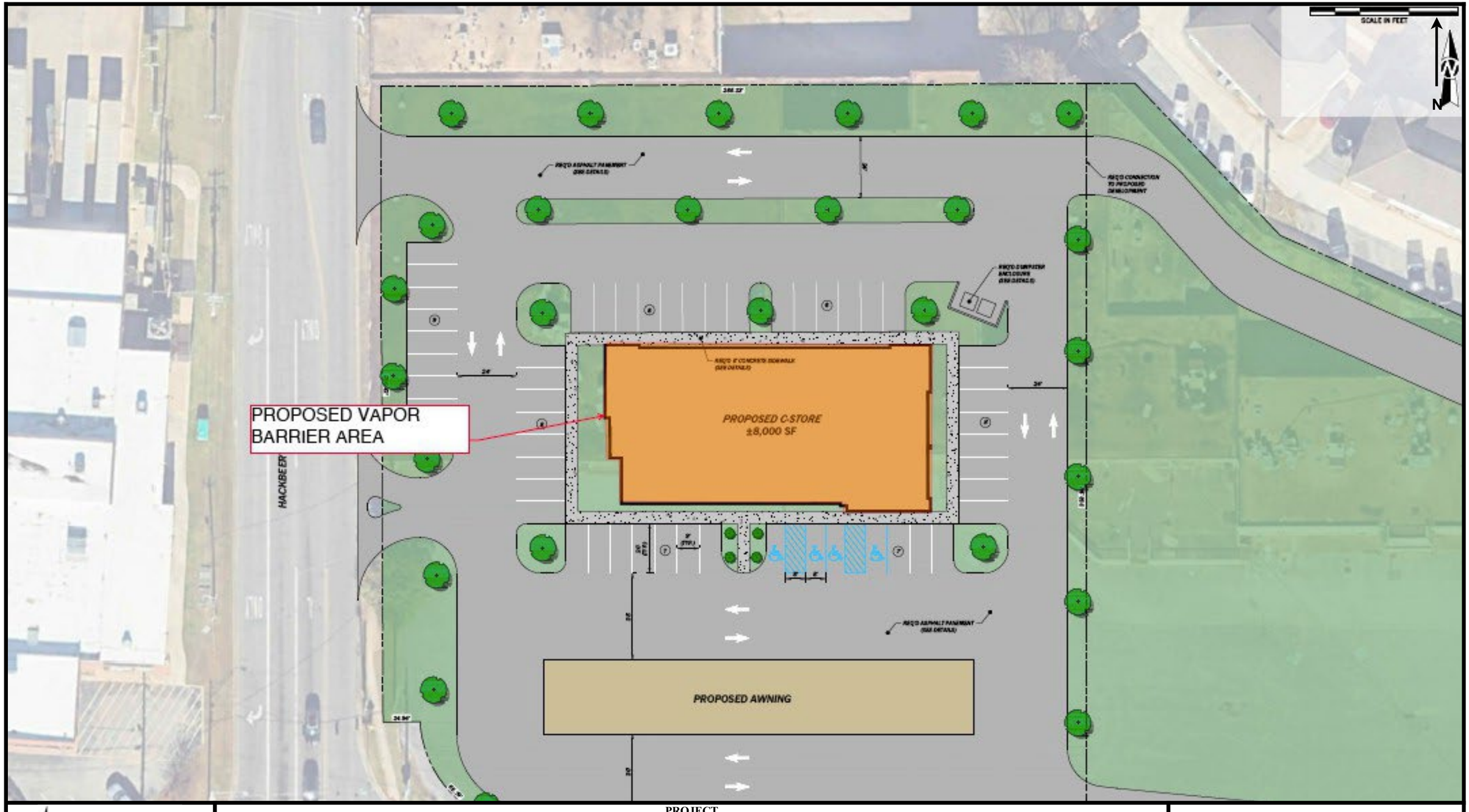
BULLOCK ENVIRONMENTAL, LLC PROJECT #: 23-HACK01

FIGURE 8

LOT 2
CHEMICALS OF CONCERN IN GROUNDWATER & SOIL VAPOR

SCALE: AS SHOWN



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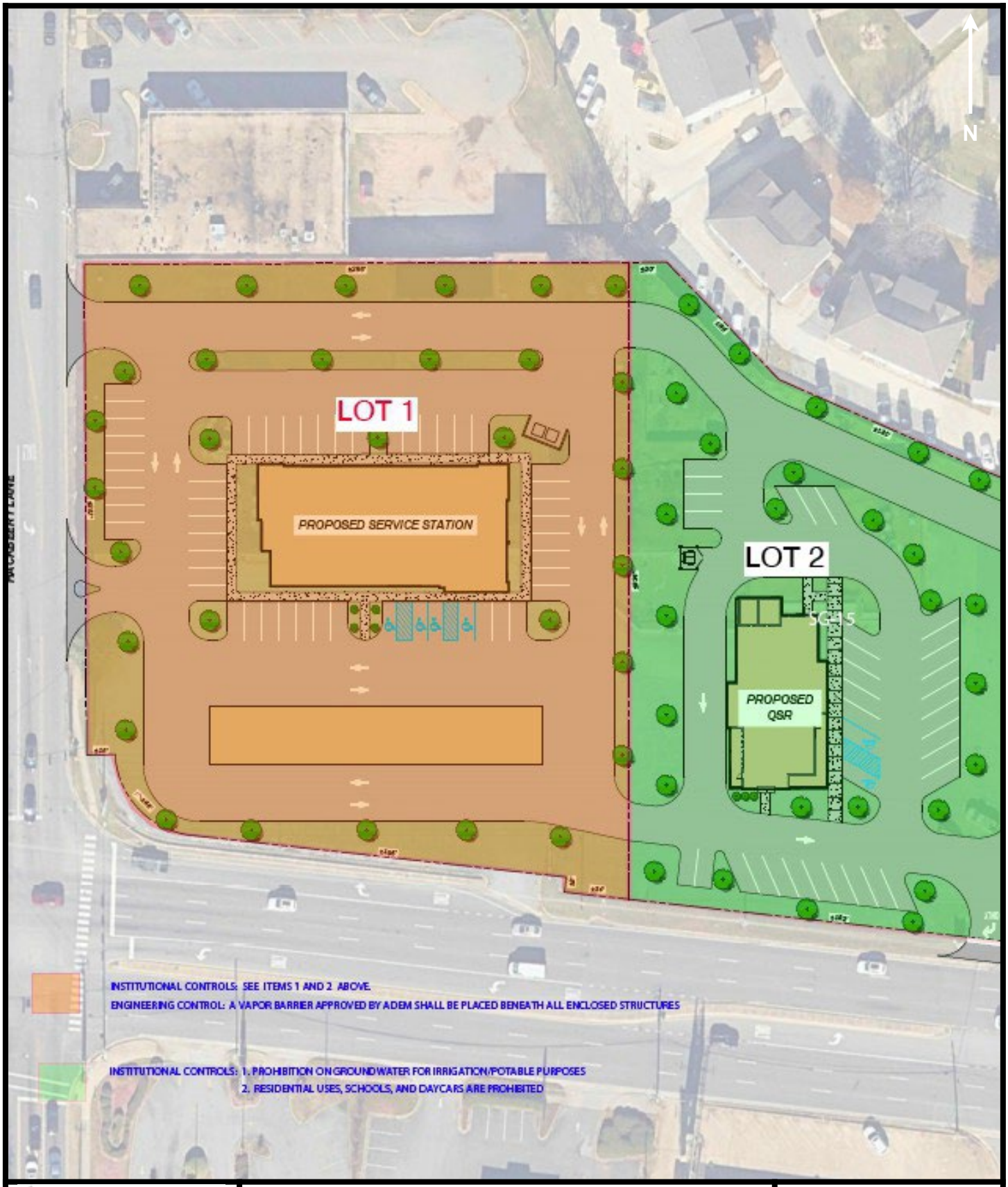
ADEM VCP SITE NO.: 461-073-23012

FIGURE 9

PROPOSED VAPOR BARRIER APPLICATION AREA



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FORMER BAMA BOWL STRIP SHOPPING CENTER
15TH STREET AND HACKBERRY LANE
TUSCALOOSA, TUSCALOOSA COUNTY, ALABAMA
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BULLOCK ENVIRONMENTAL, LLC PROJECT #: 23-HACK01

FIGURE 10

PROPOSED AREAS FOR INSTITUTIONAL AND ENGINEERING CONTROLS

SCALE: 1"=APPROX. 30'

APPENDIX A

Specifications and Technical Data Sheets for Proposed Vapor Barrier System

TECHNICAL DATA

LIQUID BOOT® 500

SPRAY-APPLIED GAS VAPOR BARRIER

DESCRIPTION

LIQUID BOOP 500 is a seemliess, spr plied, water-based rnermtane containing no voes, which pro.ndes8 berrier against \-ap0r intrusion into structures. LIQUID BOO 500 sprey-eppicetion direcdy to penetrations, footings, gradebeams, pilecapsend OCher ir• regular surfaces, pro.tides for a fully-adhered gasvapor barriersys,<:ern.

APPLICATIONS

LIQUID BOOT- 500 is used as an undersleb gasvapor barrier, 1o1sed to OW'limize vaporm gration into buildings. LIQUID 500 is ideal for methanemigrationcontrol.

BENEFITS

- Can be ...Stalled more ecoo011.ically than UQUID BOO'P, resultingin greater S8'Vings
- UQUID eoor- 500 is comprised of the serne elements es LIQUIDsoar-
- Unique formulation provides superior pr tectionfr«nmethane gasintrusion

INSTALLATION

Protect ell adjacent areas not to *receive* gas vapor berrier. Ambient temperature shal be within rneriufecturer's specifi tions. Al plumbing, electrical, mechanical end structural items to be under or pess- i thro the \'8por berrier shall be secured in thea' proper positions and Sf> propriately proteeted prior to membrane application. Gas \'&por barrier shal be in- stalled before placement of reinforcirlg steel.

Expansion jointsmustbefilledwitha oonven- tional wa':ef'p!OOf expansion joint material. Surface preparation shal be per manufac> turer's speci.fi cation. A minim\IO'I thick.ness of 60 dry unless specified otherwise.

PACKAGING

LIQUID BOOJ♦ 500 is *avaUable in the (of. lowingpackagingoptions:*

- 55 Gallon 0nm
- 275 Gallon Tate

EQUIPMENT

- COMPRESSOR: Mil'Wn\.ll'I output of 155- 185cubic *feet* perrNnute (CfM)
- PUMPS: For "A" drun,, an aW-powered pis- ton pump of 4:1 ratio (suggested rnodel: Graoo, 4:1 Bulldog). For •er drurn, an air- powereddiaphragm pump(0-100 psa)

UQIIID B0019 500 spray-eppication effecti\-elysealsperietrations, footings,grade beams and other rregular surfaces that are consideredcritical vapor intrusion pathways.

- HOSES: ForA• drun,, *W v.ire* hose with a sotvent resi.starrt core (for diesel cleani flush), hoserated for 500 psi mil'lirN.m. For •er drun,, a 3/8◦ fluid hose rated at only 300 psi maybe used.
- SPRAY WANO:Only the spray wand s-old17/ CETCO is approved for the application of LIQUIDBOOT".
- SPRAY TIPS:Replacement tipscanbe pur- chasedseparately from CETCO.

TESTING DATA

CHEMICAL & PHYSICAL PROPERTIES

PROPERTY	TEST METHOD	RESULT
EI tion	ASTMD412	>500%
Bonded SeemStrength Tests	ASTMD6392	Passed
Methane Permeability	ASTMD1434	Passed
Micr-ootganismResistance (Soil Burial)	ASTM 04068-88	Passed
OilResistance Test	ASTM 0543-87	Passed
Heat Aging	ASTM 04068-88	Passed
Oeed load Searn Strer'lgth	City ofL-osArlgeles	Passed
Environmental Stress-Cracking	ASTM 01693-78	Passed
*Wate1*Vapor Permeability	ASTME96	0.22 perms
Adhesion to Concrete	ASTMC-836	Passed
Ha<dness	ASTMC-836	Passed
Hydrostaiic Heed Resistance (Tested at 20 ps,I	ASTM0-751	Passed

cetco@mineralstech.com | cetco.com | 800.527.9948

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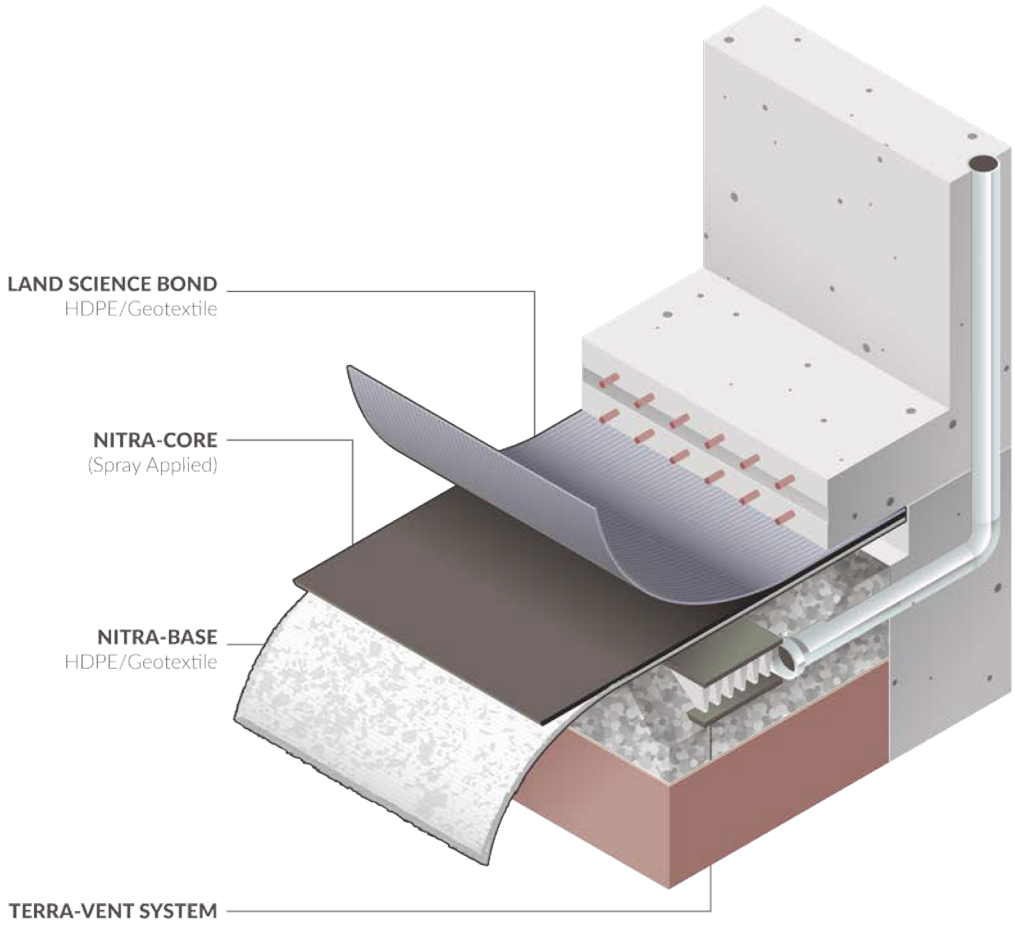
Nitra-Seal™ Technical Data Sheet

Nítra-Seal™
Nitrile-Advanced Vapor Barrier

Nitra-Seal is an update/improvement on current vapor barrier systems, providing a more chemically resistant spray-applied core material. Nitra-Seal is a triple-layer system. The Nitra-Base layer (bottom) and the Land Science Bond layer (top) are composed of a HDPE material bonded to a geo-textile on the out-facing side. HDPE is known for chemical resistance, high tensile strength, excellent stress-crack resistance and highly reliable subsurface containment. The geo-textile, which is physically bonded to the chemical resistant layer, accomplishes two goals; it allows the Land Science Bond layer to adhere to the slab, and provides friction course between the Nitra-Base layer and the soil.

The Nitra-Core layer is composed of a unique, nitrile-modified asphaltic membrane which also provides additional protection against vapor transmission[1]. Nitrile has been proven to offer exceptional chemical resistance in a wide range of applications. This layer creates a highly-effective seal around slab penetrations and eliminates the need for mechanical fastening at termination points.



[1] US and International patents pending

Land Science
a division of REGENESIS

Corporate Headquarters
1011 Calle Sombra, San Clemente CA 92673 USA
Tel: +1.949.481.8118

www.landsciencetech.com

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APPENDIX B

Anticipated Milestone Schedule for Implementation of Cleanup

HACKBERY PROPERTY, LLC

PROPOSED MILESTONE SCHEDULE: CLEANUP PLAN APPROVAL & IMPLEMENTATION

TASK	DATE/MONTH	MAR. 2023	APR. 2023	JULY 2023	JANUARY 2024	JULY 2024	AUG. 2024	SEPT. 2024	OCT. 2024	NOV. 2024	DEC. 2024	JAN. 2025	FEB. 2025	MAR. 2025	APR. 2025	MAY 2025	JUNE 2025	JULY 2025
Submit Application and Voluntary Cleanup Plan to ADEM (enroll into State VCP)	MARCH 2023																	
ADEM review of Application and Voluntary Property Assessment Report	APRIL 2023																	
Submit QAPP for review/approval by ADEM	JULY/AUG 2023																	
ADEM review and approval of Voluntary Property Assessment Report	JAN. 2024																	
Submit Voluntary Cleanup Plan	JULY 12, 2024																	
ADEM Review and approval of Voluntary Cleanup Plan	JULY/AUG 2024																	
Public Notice Period for approved Voluntary Cleanup Plan	SEPTEMBER 2024																	
ADEM formally approves Voluntary Cleanup Plan	OCT. 2024																	
Cleanup Plan Implementation	DECEMBER 2024																	
Submit Cleanup Implementation Report to ADEM for review/approval	JAN. 2025																	
ADEM review of Cleanup Plan Implementation Report	JAN.-FEB. 2025																	
ADEM Approval of Cleanup Implementation Report	MAR. 2025																	
Prepare Draft Environmental Covenant	Feb. 2025																	
ADEM approval of Environmental Covenant provisions	MAR. 2025																	
Execute Environmental Covenant on deed and document to ADEM	APRIL 2025																	
Deliver Certification of Compliance to ADEM	APRIL 2025																	
ADEM issues Letter of Concurrence	MAY 2025																	

Task Allocation:		
		Hackberry Property Tasks (Grantee)
		Bullock Env. Tasks (QEP)
		ADEM Tasks (State Agency Review)

APPENDIX C

Soil Management Plan

bullock environmental, llc 4924 5th avenue south, birmingham, alabama 35222 t 205.876.1715 f 205.443.9413

July 8, 2024

Subject: **Description of Work and Soil Management Plan**
Former Bama Bowl Strip Shopping Center
15th Street and Hackberry Lane
Tuscaloosa, Tuscaloosa County, Alabama
ADEM VCP Site No.: 461-073-23012

Bullock Environmental, LLC (Bullock) submits the following Soil Management Plan for the above-referenced Site to address management of material, if any is generated, during potential grading or excavation activities.

As summarized in the Voluntary Property Assessment Report and Voluntary Cleanup Plan, while PCE was not detected above applicable EPA RSLs during previous Site investigations, it is possible that future excavation, earthwork, grading, and/or utility work may encounter PCE-containing soil. In the unlikely event such materials are encountered, the following soil management plan is proposed to address such circumstances.

HANDLING

Bullock recommends that onsite personnel don Level D personal protective equipment (PPE), to minimize contact with potentially affected media (to include particulate dusk masks or similar protective measures). Beyond the standard PPE required for construction sites (hard hats, safety glasses, steel-toed boots, etc.), workers who handle the soil should do so with protective gloves, including but not limited to standard work gloves or impermeable material such as latex or nitrile. To minimize potential dispersion of particulates, field personnel should have on hand a water truck to maintain adequate moisture on the ground surface to mitigate fugitive dust.

MANAGEMENT

Lot 1 Soil Surrounding Proposed Structure

Before commencing with grading or excavation activities beneath or surrounding the proposed Lot 1 structure, field personnel will investigate the area for suspect staining, odors, or discoloration. Should such material be encountered, field personnel shall notify the Site owner immediately to allow for qualified personnel to confirm the lateral extent of COC-affected media in this area and complete laboratory analysis to evaluate its character as a hazardous or non-hazardous waste. This will ensure the material is handled and disposed in accordance with applicable state and federal regulations. Upon confirming the extent of COC-affected area beneath, qualified personnel will oversee its excavation and removal (see subsequent sections regarding handling of this material). Under no circumstances will suspect material be transported offsite without first characterizing it through laboratory analysis.

Site-Wide Soil

For all other soil managed on the Site (demonstrated to contain no COCs above residential RSLs), field personnel will manage all disturbed areas onsite in accordance with the requirements set forth in the construction stormwater permit and related BMPs to be obtained from ADEM in advance of any land distur-

bance to exceed one acre. Further, field personnel shall incorporate appropriate controls (i.e., silt fencing, hay bales, or other mitigation measures) to reduce or eliminate sediment runoff into Waters of the State.

WASTE MANAGEMENT & CHARACTERIZATION

Waste material generated during excavation activities will be characterized and staged in accordance with ADEM Administrative Code 335-14-2 for waste determination requirements. More specifically, the waste will be characterized in 20-cubic yard increments (representative, composite samples) with ten 20-yd^3 composite samples consolidated to represent a 200-yd^3 volume (should such a volume be generated). These waste characterization samples will be submitted for laboratory analysis of applicable COCs (i.e. metals and/or pesticides) according to appropriate EPA Methods. If COCs are present (in total concentration) at levels exceeding 20 times the Toxicity Characteristic Leaching Procedure (TCLP) threshold, the laboratory will conduct a TCLP analysis for that (or those) specific constituent(s) to confirm its character as non-hazardous or hazardous waste.

Representative sampling and analysis of the waste will be conducted to determine whether it exhibits one of the characteristics found at ADEM Admin. Code r. 335-14-2-.03. A "representative sample" is a sample of a universe that can be expected to exhibit the average properties of the universe. A representative sample is required to properly characterize a waste stream using sampling and analysis.

Following generation, field personnel will stage the waste material on polyethylene (or storage container) in a designated area on the Site and cover the material with polyethylene to mitigate potential runoff. The stockpiles will be staged in 200-yd^3 volumes (i.e ten separate stockpiles of waste containing 20 yd^3 each) or within 20-yd^3 containers.

Upon characterization of the generated waste, Bullock (on behalf of Hackberry Properties, LLC), will complete and submit ADEM Form 300 for review and approval by the Solid Waste Branch and dispose of such waste in accordance with the requirements set forth in an approved solid waste profile.

Finally, ADEM personnel will be contacted before the commencement of earth work on the property.
If you have any questions about this Soil Management Plan, please call us at (205) 876-1715.

Sincerely,

BULLOCK ENVIRONMENTAL, LLC

Douglas A. Bullock
Principal