

LIMITED PHASE II ENVIRONMENTAL SITE ASSESSMENT

**Urban County Government Center
810 Barret Avenue
Louisville, Kentucky 40204**

ATC PROJECT No. LOUEN17006

Prepared For

**Louisville Metro Government
Develop Louisville
LOUISVILLE FORWARD
444 S. Fifth Street
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February 14, 2017



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1.0 PURPOSE & SCOPE

The purpose of this report is to describe potential environmental concerns associated with past operations at the Site and surrounding area and investigations designed to further evaluate the presence of potential contaminants (constituents of concern, or “COCs”) in these locations. The report includes:

- an overview of the Site setting;
- current and past uses of the Site and surrounding area;
- identification of potential environmental concerns discerned from readily available documentation;
- scope of Phase II subsurface investigations in relation to concerns;
- observations derived from subsurface investigation;
- laboratory analytical results for soil and groundwater samples recovered from subsurface investigations;
- interpretation and investigation findings; and
- conclusions



2.0 INTRODUCTION

ATC Group Services LLC (ATC) was contracted by the Louisville / Jefferson County Metro Government (LMG) to conduct a series of Environmental Site Assessments at the former Urban County Government Center (Site) and adjacent parcels/structures owned and occupied by LMG or related tenants. The investigations were commissioned in contemplation of redevelopment of the Site properties, and included the following:

- Phase I Environmental Site Investigation (Phase I ESA)
- Limited Asbestos and Lead Based Paint Surveys
- Limited Mold Surveys
- Phase II Environmental Site Investigation (Phase II ESA) – that is the subject of this report.

The Site includes five parcels of land that occupy approximately 11.5 acres and contain four commercial structures. The main address at the Site is 810 Barret Avenue however, a total of five parcels/addresses are currently listed the Site as listed below:

810 BARRET AVE
Parcel ID: 021J01300000
Approximate Area: 5.28 AC

768 BARRET AVE
Parcel ID: 021J00900000
Approximate Area: 2.55 AC

850 BARRET AVE
Parcel ID: 021J01130000
Assessed Value: \$5,300.00
Approximate Area: 1.51 AC

814 VINE ST
Parcel ID: 021J00760000
Approximate Area: 2.07 AC

1235 E BRECKINRIDGE ST
Parcel ID: 021J01140000
Approximate Area: 0.44 AC

Structures within the Site include a seven-story former hospital located near the center of the area, a four-story Louisville Metro Housing Authority building, a three-story office building and the two-story boiler house associated with the former hospital. The buildings appear to be constructed of concrete, masonry block, brick and steel. The parcel at 814 Vine Street is an overflow parking lot for the other identified facilities.

3.0 SITE SETTING AND BACKGROUND

The following sections describe the location, physical setting, historical, and current land use at the Site.

3.1 Location

As shown in Figure 1 – Vicinity Map, the Site is located in north central Jefferson County approximately 1.5 miles east of the center of downtown Louisville (4th Street and Broadway). The Site is depicted near the northeast corner of the United States Geological Survey (USGS) 7.5 Minute Topographic Map for Louisville-East, Kentucky (1994) at approximate geographic coordinates of N 38°14' 27" latitude, W 85°43' 58" longitude, corresponding to Universal Transverse Mercator (UTM) coordinates of 610,900 meters E, 4,233,283 meters N, zone 16 S [source: Google Earth, horizontal datum World Geodetic System 1984 (WGS84)]. Based on Geographic Information System (GIS) data obtained from the Louisville/Jefferson County Information Consortium (LOJIC), Site occurs at an approximate ground surface elevation varies between 475-and-480 feet above-mean-sea level (AMSL) based on the North American Vertical Datum of 1988 (NAVD 88).

3.2 Topographic and Geologic Setting

The surface at the Site is relatively flat with no discernable trends in gradient beyond those conforming to Site drainage design and structures. Surface water from the Site enters catch basins and/or other drainage control structures flowing to the Louisville / Jefferson County Metropolitan Sewer District's (MSD) subsurface combined sewer collection system.

Most of the Site is paved, overlying the uppermost geologic material identified at the Site on the Geologic Map of the Louisville East Quadrangle, Jefferson County, Kentucky (Kapferle, 1974) as loess and eolian sand, described as:

“Silt and minor sand: Silt, light olive gray, calcareous where fresh; weathers yellowish to grayish brown and light brown to medium yellowish orange, noncalcareous; small irregular calcareous concretions locally abundant near base; adjacent to margin of outwash plain locally include interbeds of fluvial and eolian sand.”

Soil borings advanced at the Site indicate that where undisturbed, the soil beneath the Site is mostly comprised of brown silty-clay, grading to slight variations in color with depth including dark-brown, red brown, and gray. Borings advanced in Site parking lots/ trafficways displayed asphalt and gravel approximately 6 inches thick. Brick, concrete, and possibly coal/slag were encountered in one boring in the northwest area of the overflow parking lot, immediately below the asphalt/gravel, down to approximately 8 feet below ground surface (bgs). Lesser amounts of similar materials were observed below the asphalt/gravel down to approximately 1.2 feet bgs in a boring advanced in the parking lot just west of the former hospital building.

The uppermost bedrock underlying the Site is identified as Lower and Middle Devonian aged Sellersburg and Jeffersonville Limestones. These are described as:

“Limestone, olive, brownish, and medium to light gray; weathers pale yellowish brown to very light gray and light yellowish gray; fossil fragments abound in matrix of sparry calcite or calcareous mudstone; pyritic; dolomitic in part; prominent stylolites in quarry exposures; scattered banded chert in thin irregular stringers.”

Although boreholes were not advanced beyond the elevation where bedrock was encountered, observations of the bedrock surface materials indicated the presence of limestone and/or chert. Structural contours drawn on the surface of the Waldron Shale that underlies the Site at depths on the order of 100 feet indicate bedrock dips to the east.

East of the Site geology changes rather quickly to glacial outwash associated with the major alluvial aquifer along the Ohio River. The aquifer lies in a valley eroded by glacial meltwater that was later partly filled with outwash sand and gravel deposits.

3.3 Current Use of the Property

The property consists of approximately 11.5 acres of commercial land and is occupied by four commercial structures:

810 Barret Ave. consists of approximately 5.28 acres with a mostly-vacant seven-story, 255,900-square foot structure (a former hospital) located centrally on the property. This structure was the Site of the administrative offices of the Urban County Government Center until late 2016.

825 Barret Ave contains a two story, nominally 23,325-square foot (combined) Boiler House and additional maintenance and utility buildings are located in the southwest portion of the same parcel that contains the former hospital building.

850 Barret Ave. consists of approximately 1.51 acres with a vacant three-story, 32,400-square foot structure. This structure formerly served as office space for the Louisville Metro Air Pollution Control District and Louisville Metro Department of Public Health and Wellness (Metro Health Department). This structure is located on the southeast portion of the parcel.

768 Barret Ave. consists of approximately 2.55 acres with four-story, 58,492-square foot structure. The structure is currently occupied by the offices of the Louisville Metro Housing Authority and formerly, Louisville Metro Police Department (LMPD) Suburban Headquarters. Portions of the structure currently house electronic systems related to a reported backup MetroSafe911 call center;

The parcel at 1235 East Breckinridge Street is an approximately 0.44 acre asphalt-paved parking lot, and served the structures at 810 and 850 Barret Avenue; and,



The parcel at 814 Vine Street is an asphalt-paved parking lot consisting of approximately 2.07 acres, and provided remote parking for the UCGC and support facilities.

ATC's Phase I ESA for this Site includes additional details regarding current Site structures/improvements.

3.4 Current Uses of Adjoining Properties

Current uses of adjoining parcels were observed to be as follows:

Direction from Property	Address	Occupant(s) Name	Current Use	Potential Environmental Conditions
South	1228 E. Breckinridge Street	Christ Evangelical United Church/ Highlands Community Ministries	Church; Commercial	None observed
	Various	Various residential; offices	Residential; Commercial (offices)	None observed
North	751 Vine Street	Brooke & Billy's Restaurant	Commercial	None observed
	752 Barret Avenue	Peak 10 Data Center	Commercial	None observed
East	1313 St. Anthony Place	Kindred Hospital – Louisville	Commercial	None observed
	801 Barret Avenue	Vacant	Commercial	None observed
	825 Barret Avenue	Vacant	Commercial	None observed
	845 Barret Avenue	Council on Prevention & Education - Substances	Commercial	None observed
	901 Barret Avenue	Wiltshire Pantry & Catering	Commercial	None observed
West	Various	Various residential	Residential	None observed

Review of available information did not indicate known or suspected releases of petroleum or hazardous substances at adjoining properties.

3.5 Review of Historical Information

ATC's Phase I ESA report contains a detailed accounting of the sources and findings from review of historical sources regarding the Site and surrounding area, and may be referred to for more in depth descriptions. The discussion below provides a summary of this review.

3.5.1 City Directory Review

ATC's review of the historical city directories report indicated that the Site existed primarily as a hospital, nurse residences and government offices from the 1930s. Prior to the 1930, city directories indicate that the Site was used primarily for residential purposes, with a few retail businesses.

Adjacent parcels to the east of the Site on Barrett Avenue were listed as medical or commercial offices from 1910 through 2013. The adjacent properties to the south of the Site on East Breckinridge Street and parcels west of the Site on Vine Street were identified as residential use until redevelopment of the Vine Street parcel as a parking lot.

The parcel at 1235 E. Breckinridge is listed a service station in 1930 and remains a service station until 1966. No listings are available for the address after 1971 until 2007, when "No Listing" is given. Due to the potential for historical releases of petroleum on the Site, the historical gas station represents a recognized environmental condition associated with the Site.

Adjoining and adjacent land use indicates primarily mixed residential and commercial uses. Historical commercial land use of adjacent properties directories indicate that the following addresses have been associated with possible environmentally-significant historical uses, as described below:

- 1304 E. Breckinridge Street and 901 Barret Avenue are the reported addresses of a possible historical dry-cleaning facility. Currently this tract, addressed as 901 Barret Avenue, is occupied by Wiltshire Pantry, a restaurant and caterer. No environmental concerns are known to exist relative to this address.
- 909 Barret Avenue is the address of possible historical dry-cleaning facility. This tract, formerly occupied by apparent cleaners, is currently used as office space.

3.5.2 Building Department Records

The Site at 810 Barret Avenue, which may have included the Boiler House, eight permits for asbestos abatement were issued from 2009 to 2012 to various contractors. For the Housing Authority/LMPD at 768 Barret Avenue, one permit for asbestos abatement was issued in July 2011. No permits are shown to have been issued to the former APCD building at 850 Barret Avenue.

The only surrounding parcels with permits other than routine maintenance was 1313 St. Anthony's Place, where three permits for asbestos abatement were issued from 2010 to 2011 to various contractors.

3.5.3 Zoning/Land Use Records

ATC reviewed available zoning/land use information provided by the General Information and Land Development Reports generated by the LOJIC Online Map for information regarding past uses of the Site and surrounding area. The Site is currently zoned as OR2: Office/ Residential. No historical zoning records were available for review. The review of available zoning/land use records did not identify past uses indicating recognized environmental conditions in, on, or at the Site or surrounding area.

3.5.4 Prior Reports

No prior environmental reports were provided by the User to ATC for this assessment. However, ATC obtained records from the KDEP related to the closure of two historical USTs at the Site and related documents. As part of the assessment of this Site, ATC reviewed the following reports:

Closure Assessment Report and KDEP Equivalent No Further Action Letter

- ATC reviewed, UST Closure Assessment Report for the Urban Government Center; 810 Barret Avenue, Louisville, Kentucky; Facility ID number 0902-056; by EnviroData; dated September 19, 1995. The report indicated that during removal activities on August 24, 1994, there was no release associated with a former 5,000-gallon diesel and 1,000-gallon diesel USTs and associated piping. A soil remedial action was apparently performed in the two tank excavation areas during UST closure. Confirmation soil samples indicated that petroleum hydrocarbon concentrations were below state screening levels at the time of closure remediation. No groundwater was apparently encountered; therefore, no groundwater samples appears to have been collected or analyzed.
- Following its review of the Closure Assessment Report, KDEP's UST Branch issued a letter stating that the requirements for UST closure had been achieved. This equivalent No Further Action letter was issued December 29, 1995 and applies only to the USTs removed from the Site in August 1994.

Due to apparent petroleum releases that affected area soils associated with the two USTs closed in 1994, and determination of the KDEP that applicable regulatory requirements were satisfied, the former USTs closed in 1994 represent an historical recognized environmental condition associated with the Site.

3.6 Phase I ESA Findings

The following findings from the Phase I ESA at this Site are relevant to the design and implementation of the Phase II described in this report.

- Two former diesel fuel USTs, one 5,000-gallon and one 1,000-gallon capacity, were removed from separate areas on the south side of the former hospital building in August 1994. Soil remediation was completed at the time of UST closure. KDEP's determination that applicable regulatory requirements were satisfied, the former USTs closed in 1994 represent an *historical recognized environmental condition* associated with the Site.
- Two 20,000-gallon fuel oil tanks located on the north side of the Boiler House are classified as exempt USTs. A letter from Jefferson County to the Kentucky UST Branch dated June 5, 1995 stated that the two 20,000-gallon fuel oil tanks on the Site were "scheduled for closure in 1995." A May 2, 1995 letter from the Jefferson County Fiscal Court to KDEP states that these tanks "remain in the ground and are budgeted to be closed in-place during 1995." No information related to the closure of these exempt oil USTs and their location was provided or could be obtained by ATC during the course of this assessment. Based on the absence of documentation related to operation, assessment and/or closure of the exempt USTs (one 5,000-gallon fuel oil reportedly removed in 1992, and the two 20,000-gallon fuel oil tank reportedly closed in-placed on the Site), these historical exempt USTs represent a represent *recognized environmental condition* associated the Site.
- Historical city directories and fire insurance maps indicate that a parcel at the southeast corner of the Site, previously addressed at 1235 E. Breckinridge Street, is the location of an historical gas station. Although the Site has been redeveloped, the possibility that the USTs related to this facility exist on the Site cannot be rule out. The presence of a historical gas station at the southeast corner of the Site represents a *recognized environmental condition* associated with the Site.
- Petroleum products, including oil, gasoline and used oil, were observed within the Lawn Maintenance Room building east of the Boiler House. Consequently, the accumulation and storage of oil-filled equipment in the Lawn Maintenance Room represents a *de minimis condition* associated with the Site.
- A non-functional hydraulic elevator was observed on the south end of the pedestrian tunnel near the UCGC building at 810 Barret Avenue. The hydraulic elevator possesses an associated reservoir of hydraulic fluid which appeared to be leaking. ATC observed accumulated hydraulic fluid in an apparent drip pan at the base of the mechanical room for the hydraulic elevator in the pedestrian tunnel. The accumulated hydraulic fluid associated with non-functional elevator in the pedestrian tunnel area represents a *de minimis condition* associated with the Site.

4.0 SCOPE OF LIMITED PHASE II ESA

The goals for the Limited Phase II ESA were primarily to identify and generally evaluate potential environmental concerns that may impact future plans for reuse and/or redevelopment of all or portions of the Site. Currently the nature of future plans for use/redevelopment of the Site are unknown. However, such plans have a substantial bearing on the significance of any environmental findings. If limited or no subsurface disturbance is undertaken, then Site environmental risks could likely be controlled solely by institutional and/or engineering controls. If redevelopment includes considerable and/or deep subsurface disturbance, then remedies and costs for environmental conditions might increase rapidly.

The scope of the Limited Phase II ESA was developed to identify most significant potential and probable environmental concerns from past operations at the property and surrounding parcels. Investigative elements of the Limited Phase II ESA were based on review of historical data from EDR and similar readily available data sources. Note that the Limited Phase II ESA is by nature not exhaustive and cannot be anticipated to completely characterize all actual and/or potential environmental conditions at the Site; however, it is designed to provide a reasonable basis for assessing the feasibility and relative magnitude of concerns impacting future Site use / redevelopment options.

In consideration of the findings from the Phase I ESA listed in Section 3.6 of this report, and the observations from review of historical documents and data the following areas were targeted for the Limited Phase II ESA Site investigations:

- Area of former USTs associated with soil remediation during closure activities in 1994;
- Area of existing 20,000-gallon capacity exempt fuel oil tanks north of the Boiler House;
- Vicinity of former Nurse's Home near southeast corner of the building at 810 Barret Avenue (former fuel oil tank reported to have been removed in 1992);
- Area former occupied by the historical gasoline station reported to have had up to five USTs at the southeast corner of the property from the mid- to late-1920s through the late-1960s.;

Southwest corner of Site in vicinity of the former address of a possible historical automotive repair shop at 1201 E. Breckinridge Street;

- Southeast corner of property where historical city directories indicate possible dry cleaning operations on adjacent tracts;
- Southern border of Site along E. Breckinridge Street and Vine Street west parking lot area where historical residential structures existed for the presence of possible heavy metals and fuel oil and other possible historical anthropogenic sources (e.g., coal storage/burning, auto maintenance);and,

- Locations at the Site near sewer manholes or other locations to determine if possible contaminants originating from historical hospital operations may be present in subsurface soil and/or groundwater as a result of a possible compromised condition of the combined sewers on the property.

In order to evaluate for the presence of COCs from the identified potential sources of environmental concern within and surrounding the Site, ATC completed the following Site investigations.

4.1 Subsurface Investigation

Advancement of a total of 18 soil test borings across the Site as shown on Figure 2 - Limited Phase II Soil Boring Locations. Eleven of these borings were advanced to the bedrock surface, encountered at depths ranging from 14 feet to 39.5 feet bgs. The remaining seven borings were advanced to predetermined shallower depths, ranging from 8 feet to 20 feet bgs.

Each boring was advanced using direct-push techniques employing a macro-core sampler to extract soil samples continuously in 4 foot vertical intervals throughout the boring. Soil recovered from borings was examined and logged in the field to record depth, lithological classification, headspace vapor screening results [screened for the presence of total photoionizable volatile organic compounds in soil vapors using a photoionization detector (PID)], and other relevant observations including indicators of potential contamination (staining, odor, etc.).

Soil boring logs prepared from field examinations described above are provided in Appendix A.

4.1.1 Soil Sampling

A single soil sample was selected from each soil boring for laboratory analysis. Soil samples were selected from the interval displaying the greatest evidence of potential impacts (i.e., staining, odors, appearance, PID measurements, etc.).

Table 1 - Summary of Analytes and USEPA SW-846 Test Methods for Soil Samples, provides details for the analyses performed on the soil samples extracted from each of the soil borings advanced at the Site. In general, samples were analyzed for polycyclic aromatic hydrocarbon (PAH) constituents and metals ranging from Arsenic and Lead to the full list of the federal Resource Conservation and Recovery Act's (RCRA) eight toxic heavy metals (Arsenic, Barium, Cadmium, Chromium, Lead, Mercury, Selenium, and Silver). Select samples were also analyzed for volatile organic compounds (VOCs) and/or polychlorinated biphenyl (PCB) compounds.

PAH constituents are typically associated with diesel fuel, kerosene, No. 2 fuel oil, and Stoddard solvents/mineral spirits. VOCs are present in a variety of chemical products, including gasoline and chlorinated solvents associated with various degreasing/parts cleaning operations and dry cleaning. PCBs are components of dielectric fluids in

electrical equipment, hydraulic oils, and other industrial oil products. The heavy metals analyzed in these samples may be associated with a variety of anthropogenic sources, including residential, commercial, and industrial activities.

Once all sampling was completed, all soil borings were sealed with bentonite and the surface was patched to match the existing ground, asphalt, or concrete surface.

4.1.2 Groundwater Sampling

As shown on Figure 3, Temporary Groundwater Monitoring Well Locations, Temporary Groundwater Monitoring Wells were installed in five of the eighteen boreholes following their completion, as follows:

- SB-6 - MW-3
- SB-11 - MW-5
- SB-15 - MW-8
- SB-16 - MW-9
- SB-18 - MW-10

In addition, attempts were made to install Temporary Groundwater Monitoring Wells at four additional soil boring locations (SB-6, SB-10, SB-12, and SB-14); however, the volume of groundwater available at these locations proved insufficient for sampling.

Temporary Groundwater Monitoring Wells were installed by placing 1-inch diameter PVC well screen and casing into the borehole. The well depths and screened intervals are summarized below:

Boring I.D.	Temp MW I.D.	Boring Termination Depth (ft-bgs)	Screen Interval (ft-bgs)		Screen Length (feet)
			From	To	
SB-6	MW-3	39.5	29.5	39.5	10
SB-11	MW-5	23.5	18.5	23.5	5
SB-15	MW-8	24	19.0	24.0	5
SB-16	MW-9	22	17.0	22.0	5
SB-18	MW-10	8	3.0	8.0	5

Samples were extracted using a polypropylene disposable bailer. Following collection, all casing placed into the boreholes was removed and the boreholes were closed as noted above.

All soil and groundwater samples were properly containerized, stored on ice and delivered under Chain-of-Custody via overnight courier to ESC Lab Sciences in Mt. Juliet, Tennessee for specified analysis.

Table 2, Summary of Analytes and USEPA SW-846 Test Methods for Groundwater Samples, provides details for the laboratory analysis completed for each of the groundwater samples collected at the Site.

5.0 LIMITED PHASE II ESA FINDINGS

The following sections present the results from collection and analysis of soil and groundwater samples from 18 borings advanced at the Site. For ease of discussion, tables have been developed to identify detected constituents and comparisons to screening values. A complete copy of the **Laboratory Analytical Report** prepared by ESC Lab Sciences (February 1, 2017) is provided as Appendix B.

5.1 Soils

Table 3, Summary of Detected Analytes in Subsurface Soils, presents a summary of detected analytes in the 18 subsurface soil samples collected at the Site. A total of 26 analytes were detected at concentrations equal to or exceeding their corresponding detection limits.

Heavy Metals

Six of the detected constituents were heavy metals:

Arsenic	Chromium
Barium	Lead
Cadmium	Mercury

VOCs

Two of the detected constituents were VOCs:

Acetone
2-Butanone (also known as Methyl Ethyl Ketone, or MEK)

PAHs

The balance of the detected analytes were 18 PAH constituents:

Anthracene	Dibenz(a,h)anthracene
Acenaphthene	Fluoranthene
Acenaphthylene	Fluorene
Benzo(a)anthracene	Indeno(1,2,3-cd)pyrene
Benzo(a)pyrene	Naphthalene*
Benzo(b)fluoranthene	Phenanthrene
Benzo(g,h,i)perylene	Pyrene
Benzo(k)fluoranthene	1-Methylnaphthalene
Chrysene	2-Methylnaphthalene

**Note that Naphthalene is also included and was detected as a VOC constituent using USEPA SW-846 Method 8260B.*

PCBs

Select soil samples were also analyzed for PCBs. There were no detections of PCB congeners at concentrations equal to or above the detection limits for these compounds in these samples.

5.1.1 Soil Constituents of Concern

Constituents of concern (COCs) are identified as those that exceed established screening thresholds, and may pose a risk to human health and/or the environment under certain Site conditions and/or uses. Table 2 also provides screening of the detected constituent results for comparison to the most recent (May 2016) United States Environmental Protection Agency's (USEPA) Regional Screening Levels (RSLs).

Heavy Metals

As shown, Arsenic is the only heavy metal constituent that was detected at concentrations exceeding corresponding RSLs. In the case of Arsenic, all detections exceeded the RSLs for both Residential (0.68 mg/Kg) and Industrial soils (3 mg/Kg), with sample results ranging from 4.87 mg/Kg to 29.5 mg/Kg. Figure 4, Soil Borings with Arsenic Detected above Residential and/or Industrial RSLs, depicts the location and distribution of Arsenic detected above RSLs at the Site.

In 2004, the Kentucky Department for Environmental Protection (KDEP) issued guidance entitled ***Kentucky Guidance for Ambient Background Assessment (January 8, 2004)***. **Table 2 - Generic Statewide Ambient Background for Kentucky** indicates that 9.4 mg/Kg represents the 95% Upper Confidence Level (UCL_{95%}) for 539 samples ranging in concentration from 0.059 mg/Kg to 55.5 mg/Kg that were collected and analyzed across Kentucky.

However, as corroborated in telephone and email correspondence with Ms. Jerri Martin, Risk Assessment Section Supervisor with the Kentucky Division of Waste Management – Superfund Branch, a more appropriate screening level for Arsenic at the Site is the UCL_{95%} Bluegrass Region Ambient Background. KDEP calculated this value from the same dataset as the Generic Statewide Ambient Background, but used only data from counties within the Bluegrass Physiographic Region, which includes Louisville. The Bluegrass Region Ambient Background UCL_{95%} for Arsenic is 13.12 mg/kg, with the upper bound of this background data set being 22.7 mg/kg.

Using the Bluegrass Regional Ambient Background UCL_{95%} for Arsenic, the number of samples exceeding this value is reduced to 11 of the 18 samples collected from the Site. Two of the samples exceed the background upper bound value.

Given the range of statewide results for Arsenic, and the higher trend within the Bluegrass Region, it is possible that background concentrations for the Site are even higher than the UCL_{95%} Bluegrass Region Ambient Background. However, determination of the Site background value was not within the scope of this investigation.

VOCs

Neither of the two detected VOC constituents were present at concentrations equal to or exceeding corresponding RSLs for Residential or Industrial soils.

PAHs

The following four PAH constituents were detected at concentrations exceeding corresponding RSLs for Residential soils:

- Benzo(a)anthracene
- Benzo(b)fluoranthene
- Dibenz(a,h)anthracene
- Indeno(1,2,3-cd)pyrene

In addition, Benzo(a)pyrene was detected at concentrations exceeding the corresponding RSL for Residential soils in three samples, and at concentrations exceeding the corresponding RSL for Industrial soils in one sample.

Figure 5, Soil Borings w/PAH Constituents Detected Above Residential and/or Industrial RSLs, depicts the location and distribution of PAH constituents detected above RSLs at the Site.

Soil COC Summary

Based on the findings of the Phase II Environmental Assessment and the above discussion, the COCs for Site soils are identified as:

- Arsenic
- Benzo(a)anthracene
- Benzo(a)pyrene
- Benzo(b)fluoranthene
- Dibenz(a,h)anthracene
- Indeno(1,2,3-cd)pyrene

5.2 Groundwater

Table 4, Summary of Detected Analytes in Groundwater, presents a summary of detected analytes in the five groundwater samples collected at the Site. A total of 20 analytes were detected at concentrations equal to or exceeding their corresponding detection limits.

Heavy Metals

Due to the method of sample collection from temporary wells using bailers, metals were not analyzed for groundwater samples. The nature of this method does not allow for full development of the well and sediments are frequently entrained in samples. The presence of sediments may bias samples for metals, which are naturally occurring in the soils, and yields falsely elevated results.

VOCs

Detected VOC constituents were the same for groundwater as for soils:

Acetone
2-Butanone (also known as Methyl Ethyl Ketone, or MEK).

PAHs

The balance of the detected analytes were 18 PAH constituents (once again, the same as for soil samples):

Anthracene	Dibenz(a,h)anthracene
Acenaphthene	Fluoranthene
Acenaphthylene	Fluorene
Benzo(a)anthracene	Indeno(1,2,3-cd)pyrene
Benzo(a)pyrene	Naphthalene*
Benzo(b)fluoranthene	Phenanthrene
Benzo(g,h,i)perylene	Pyrene
Benzo(k)fluoranthene	1-Methylnaphthalene
Chrysene	2-Methylnaphthalene

**Note that Naphthalene is also included and was detected as a VOC constituent using USEPA SW-846 Method 8260B.*

5.2.1 Groundwater Constituents of Concern

As noted for soils, groundwater (COCs) are identified as those that exceed established screening thresholds, and may pose a risk to human health and/or the environment under certain Site conditions and/or uses. Table 3 also provides screening of the detected constituent results in groundwater for comparison to the most recent (May 2016) USEPA RSLs for Tap Water and the federal Safe Drinking Water Act (SDWA) Maximum Contaminant Levels (MCLs) for potable water.

VOCs

Neither of the two detected VOC constituents were present at concentrations equal to or exceeding corresponding RSLs for Tap Water. There are no MCLs listed for these constituents.

PAHs

The following seven PAH constituents were detected at concentrations exceeding corresponding RSLs for Tap Water, or had detection limits which were above the Tap Water RSL value.

Benzo(a)anthracene
Benzo(a)pyrene
Benzo(b)fluoranthene
Dibenz(a,h)anthracene
Indeno(1,2,3-cd)pyrene
1-Methylnaphthalene
Naphthalene

The following observations are made regarding these PAH constituents in Site groundwater samples:

Benzo(a)anthracene

Two samples (MW3 and MW5) exceeded Tap Water RSL of 0.000012 mg/L. Nondetect result values in MW8, MW9, and MW10 exceed RSL for Tap Water of 0.000012 mg/L. No MCL is listed for this constituent.

Benzo(a)pyrene

Exceeds MCL of 0.2 mg/L in MW3. Result exceeds Tap Water RSL of 0.0000034 mg/L in MW5. Nondetect result values in MW8, MW9, and MW10 exceed RSL for Tap Water of 0.0000034 mg/L.

Benzo(b)fluoranthene

Exceeds Tap Water RSL of 0.034 mg/L in MW3, MW5, and MW10. Nondetect result values in MW8 and MW9 exceed RSL for Tap Water of 0.0000034 mg/L. No MCL is listed for this constituent.

Dibenz(a,h)anthracene

Exceeds RSL for Tap Water of 0.0000034 mg/L in MW3, MW5, MW8, MW9, and MW10. No MCL is listed for this constituent.

Indeno(1,2,3-cd)pyrene

Exceeds Tap Water RSL of 0.0000034 mg/L in MW3 and MW5. Nondetect result values in MW8, MW9, MW10 exceed RSL for Tap Water of 0.0000034 mg/L. No MCL is listed for this constituent.

1-Methylnaphthalene

Exceeds Tap Water RSL of 0.0011 mg/L in MW5. No MCL is listed for this constituent.

*Naphthalene**

Exceeds Tap Water RSL of 0.00017 mg/Kg in MW3, MW5, and MW 10. Nondetect result values in MW8 and MW9 exceed RSL for Tap Water of 0.0000034 mg/L. No MCL is listed for this constituent.

** As previously noted, Naphthalene is included in the analytical suites for both VOC and PAH constituents. In evaluating Naphthalene results, the higher reported value between USEPA SW-846 Method 8260B and 8270C was utilized for screening.*

Groundwater COC Summary

Based on the findings of the Phase II Environmental Assessment and the above discussion, the groundwater COCs for the Site are identified as:

- Benzo(a)anthracene
- Benzo(a)pyrene
- Benzo(b)fluoranthene
- Dibenz(a,h)anthracene
- Indeno(1,2,3-cd)pyrene
- 1-Methylnaphthalene
- Naphthalene

6.0 CONCLUSIONS

The results of the Limited Phase II ESA Site investigation indicate the presence of COCs in the subsurface at concentrations exceeding current risk screening levels. In general, the COCs include one heavy metal, Arsenic, and several PAH compounds.

Given the distribution of Arsenic both horizontally and vertically across the Site, a particular source for the observed concentrations is not evident. The only identified potential anthropogenic source at the Site and surrounding are may be related to burning of fossil fuels. In considering the depths from which samples displaying Arsenic concentrations above screening levels, the average top depth of these samples was 12.2 feet bgs, and depths ranged from 1 foot to 38.5 feet bgs. Only four (SB2A, SB4, SB8, and SB9) of the 18 samples were collected from the upper 4 feet bgs. Although the data set is limited, the following concentration trends for Arsenic with depth is noteworthy:

Average Arsenic Concentrations 0 to 4 feet bgs = 11.5 mg/Kg

Average Arsenic Concentrations 4 to 8 feet bgs = 17.1 mg/Kg

Average Arsenic Concentrations 8 to 16 feet bgs = 15.4 mg/Kg

Average Arsenic Concentrations greater than 16 feet bgs = 25.5 mg/Kg

As noted previously, the range of statewide results for Arsenic, and the higher trend within the Bluegrass Region, suggest it is possible that background concentrations for the Site are even higher than the UCL_{95%} Bluegrass Region Ambient Background. However, determination of the Site background value was not within the scope of this investigation.

As a result of the wide distribution of above-screening-level Arsenic concentrations across the Site, future redevelopment may necessitate consideration for isolation and/or targeted removal of soils containing arsenic at concentrations above ambient background levels.

PAH compounds are related to diesel fuel range compounds, and as shown in Figure 5, their detection in concentrations above screening levels are limited to four boring locations on the southeast and southwest corners of the Site, and in the 814 Vine Street overflow parking lot area. The samples collected from the overflow parking log area are at shallow top depths ranging from 1 foot bgs to 2 feet bgs. Samples collected from the southeast and southwest corners of the Site are from greater depths ranging from top depths of 6 feet to 12 feet bgs.

Only the sample from SB-9 located near the northeast corner of the 814 Vine Street overflow parking lot area yielded detection of a compound exceeding the RSL for Industrial soil [Benzo(a)pyrene at 0.788 mg/Kg versus the Industrial Soil RSL of 0.29 mg/Kg]. All other PAH detections were below RSLs for Industrial soils. Therefore, non-residential developments in areas other than the vicinity of SB-9 would likely not be concerned with PAH COCs.

With respect to detections of COCs within groundwater samples extracted from temporary monitoring wells, the following observations are offered. There is no water-table aquifer evident at the Site. Groundwater occurs in isolated perched zones – some within the unconsolidated soils above bedrock or associated with fill placed within this interval – or appears as limited water perched along the bedrock surface. There is no developable groundwater resource within the depth range evaluated as part of this investigation at the Site. Therefore, impacts to groundwater are more or less inconsequential, and for the most part are likely attributable to corresponding soil sample results at locations and intervals where groundwater was sampled. In summary, prohibition on use of groundwater as an institutional control, if necessary, will eliminate any associated concerns identified based on contaminant detections derived from this investigation.

The range of contaminant concentrations observed at the site indicate that any soils removed and disposed at off site locations will not be considered RCRA hazardous wastes. Although any soils managed in this fashion will require characterization, profiling, and permitting for disposal at a Subtitle D landfill, the results do not indicate the presence of characteristically hazardous wastes based on the 20x rule. Any soil and/or groundwater encountered and/or removed from the site must be properly characterized to determine potential hazards and to manage such materials in a manner compliant with local, state, and federal regulations.

As noted, the Limited Phase II ESA is not exhaustive and cannot identify or quantify all environmental concerns at the Site. However, data collected at the Site was targeted to address areas of most-probable concern and has yielded only limited indications of contaminant residues in Site subsurface soils and groundwater. Overall, the Limited Phase II ESA indicates that there is not a significant source, or sources, of contamination to be addressed at the Site. It appears that the Site has been impacted in limited areas by small releases, mainly along its margins.

Depending upon the nature of proposed future developments, limited areas may require measures to further evaluate and isolate / remediate a small list of COCs. The lack of VOC constituents is favorable in that no vapor intrusion hazards were identified by this investigation.

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10.0 REFERENCES

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