REMEDIATION WORK PLAN

MIFCO Environmental Recycling, Inc. – Old Book Bindery
516 South Wayne Street
Portland, Jay County, Indiana
BFD# 4170703
CA# BF-00E48101-B

Final Draft
June 4, 2019

Prepared for:

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Portland, Indiana 47371

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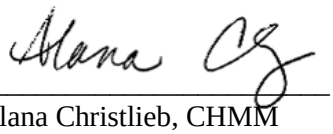
ENVIRONMENTAL PROFESSIONAL STATEMENT

I certify, under penalty of law, that this document and all appendices and attachments as applicable 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 inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete.

I declare that, to the best of my professional knowledge and belief, I meet the definition of Environmental Professional as defined in §312.10 of 40 CFR 312. I have the specific qualifications based on education, training, and experience.



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EXECUTIVE SUMMARY

This document serves as a remediation work plan (RWP) to address lead impact in surface soil at 516 South Wayne Street, Portland, Jay County, Indiana (hereinafter referred to as the site). This RWP was prepared on behalf of the City of Portland and the Indiana Brownfields Program / Indiana Finance Authority. The City of Portland will utilize brownfield funding from the U.S. EPA Region 5 to/from the Indiana Finance Authority to conduct remediation of lead impact soil at the subject property/site. Cleanup will revitalize approximately four acres of blighted property in downtown Portland, Indiana.

Background Information
The generally consists of 1.48 acres of undeveloped land. The majority of the site is covered with grass and bare soil. The site has a long industrial history and was formerly occupied by Haynes Wheel Company, Portland Auto Body Works, a tool and die shop, a petroleum company, a book bindery, and an auto repair shop.

Screening investigations were conducted in October and November 2017. Results indicate fill material consisting of a mixture of silt, clay, sand, gravel, cinders, and brick debris were encountered from the surface to depths ranging between 4 and 6 feet. Testing found various concentrations of heavy metals and polycyclic aromatic hydrocarbons (PAHs) in surface soils. While metals and hydrocarbons were present in the surface fill soils, lead was the only constituent to exhibit concentrations exceeding the Indiana Department of e Environmental Management (IDEM) Remediation Closure Guide (RCG) residential direct contact screening levels. Statistical evaluation infers lead in the surface soils poses an exposure risk; due solely on the calculated EPC exceeding direct contact screening levels.

Constituents/Contaminants/Chemicals of Concern (COCs)
Lead is the primary COC detected at concentrations exceeding the residential direct contact screening level.

Focus COC Area
Investigation results indicated elevated lead concentrations occur in surface fill material near soil borings SB-2 / SB-10 (southwest corner of property), and SB-12 (southeast property corner). COC concentrations at these locations exceed *residential direct contact levels* and are the focus of this RWP.

Potential Exposure Assessment
Lead concentrations in surface soil are an exposure concern for visitors, trespassers, and transient site workers and maintenance personnel. Ingestion of wind-blown dust particles and surface runoff to storm sewers are also identified as potential concerns.

Future Land Use
The site is vacant and is available for potential redevelopment. The City of Portland intends to redevelop the subject property/site for commercial use.

Proposed Remedial Approach
Soil removal will be conducted at areas where lead concentrations in fill soil samples exceed the residential direct contact screening levels. Up to 3,200 tons of soil are targeted for removal. Soil removal would be the most effective corrective action to achieve closure without restrictions.

Schedule
Regulatory approval of this RWP is requested to initiate remediation of this site. Soil removal will begin following RWP approval and is estimated to require at least one month.

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1.0 INTRODUCTION

This document serves as a RWP to address COCs at 516 South Wayne Street, Portland, Jay County, Indiana (hereinafter collectively referred to as the site). This RWP was prepared on behalf of the City of Portland and the Indiana Brownfields Program/Indiana Finance Authority.

The City of Portland (City) will utilize brownfield funding (i.e., subgrant) from the U.S. EPA Region 5 to/from the Indiana Finance Authority (IFA) to conduct remediation of hazardous substances (contaminated soil) at the site. Cleanup will help revitalize approximately four acres of blighted property in downtown Portland, Indiana. The City intends to redevelop the subject property/site for commercial use.

As will be discussed, investigation results indicate an exposure risk due to lead concentrations in surface fill material at the site. This RWP specifies a risk-based environmental remedy consisting of selective soil removal. The plan begins by providing a summary of site conditions and previous environmental investigation conducted in 2017. This discussion is followed by details concerning contaminant characteristics, distribution, and potential exposure scenarios. The plan concludes by presenting details concerning the remediation approaches chosen for the site. All figures referenced in the text are located together at the conclusion of the report. Project supporting information is provided in the Appendices.

1.1 Project Identification

The site consists of one vacant land tract identified as 516 South Wayne Street, Portland, Jay County, Indiana (Figure 2). The land parcel is currently owned by City of Portland. Contact information for involved parties are as follows:

Owner	**Indiana Brownfields / Indiana Finance Authority**	**Consultant**
City of Portland	Indiana Brownfields / Indiana Finance Authority	SES Environmental
321 North Meridian Street	100 North Senate Avenue, Suite 1275	3807 Transportation Drive
Portland, IN 47371	Indianapolis, IN 46204	Fort Wayne, Indiana 46818
Randy Geesaman, Mayor	Mitchell Smith, Project Manager	Glen A. Howard, Project Manager
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1.2 Overview of COC Distribution and Cleanup Approach

SES Environmental (SES) conducted a Phase I Environmental Site Assessment (ESA) of the site in September 2017. The assessment revealed one *recognized environmental condition* (REC) in connection with the site: Historical review indicates the site was formerly occupied by Haynes Wheel Company, Portland Auto Body Works, a tool and die shop, a petroleum company, a book bindery, a tire recycler, and an auto repair shop. Details concerning operations at these facilities and the potential use of hazardous substances and/or petroleum products were not found during this Phase I ESA. Additional investigation was recommended to assess the identified REC.

Environmental screening investigation was conducted in October and November 2017. A geophysical survey was conducted and seventeen soil borings were advanced. Samples were analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), Resource Conservation and Recovery Act (RCRA) 8 metals, and polychlorinated biphenyls (PCBs). Investigation results indicate surface fill material consisting of a mixture of silt, clay, sand, gravel, cinders, and brick debris was encountered. Testing has found various concentrations of heavy metals and polycyclic aromatic hydrocarbons in surface fill soils. While metals and hydrocarbons are present in the surface fill soils, lead is the only parameter that exhibits concentrations exceeding the *residential direct contact screening levels.* Statistical evaluation infers lead in the surface fill soils poses an exposure risk; due solely on the calculated EPC exceeding *direct contact screening levels*. Investigation found no evidence of impact extending into the native soils beneath the surface fill.

SES recommended developing a remedial strategy to address the lead in surface fill soils using exposure risk. Typically, surface impact is addressed by (1) removing the impacted media, (2) by placing a barrier (pavement/clean soil) over the impact, or (3) a combination of removal and isolation. Given the known conditions and proposed redevelopment, extraction would be the most effective corrective action alternative to achieve closure without restrictions. Remedial efforts will focus on fill soils at and near sampling locations SB-2, SB-10, and SB-12 where lead concentrations in fill soil samples collected from these locations exceed the *residential direct contact screening level.*

2.0 GENERAL BACKGROUND INFORMATION

This section provides general information concerning local and site-specific conditions. This information was obtained from published sources and site reconnaissance.

2.1 Site Location and Setting

The site is located at 516 South Wayne Street, Portland, Jay County, Indiana. Geographically, the site is located at approximately 40.4269600° north latitude and 84.9745880° west longitude. The parcel is identified by the Jay County Assessor's office as No. 38-07-21-303-023.002-034.

The elevation of this site is approximately 913 feet above mean sea level as shown on the Portland, Indiana USGS 7.5-Minute Quadrangle Map. A Topographic Map and Site Area Map are presented as Figure 1.

2.2 Surrounding Population and Land Use

The area surrounding the site includes residences, undeveloped land, and commercial facilities. The north adjacent property consists of a residence and undeveloped land. South Wayne Street borders the site to the east, with Hudson Family Park, a residence, and a commercial facility occupied by Community & Family Services beyond. Railroad tracks border the site to the south, with a commercial facility occupied by United Telephone beyond. The west adjacent property consists of a residence and undeveloped land. An aerial photograph depicting the site and surrounding area is provided as Figure 2.

2.3 Site and Site History

The site generally consists of 1.48 acres of undeveloped land (Figure 3). The majority of the site is covered with grass and bare soil. An area of asphalt pavement is located on the northwest portion of the site. Access to the site is from South Wayne Street to the east. A gravel access drive is located along the north site boundary. A concrete sidewalk is located along the east site boundary.

The site area is served by public utilities including water, sewer, natural gas, and electric. Water and sanitary sewer service are provided to the site area by the City of Portland. Surface drainage is east toward South Wayne Street and to a stormwater catch basin located on the southeast portion of the site. Natural gas is supplied to the area by Ohio Valley Gas Company and Vectren. Electricity is supplied by American Electric Power (AEP).

Information obtained from the Jay County Historical Society indicated the site was bare ground until 1887 when a small building was constructed by Haynes Wheel Company. A larger building was constructed by Haynes Wheel Company in 1896. In 1910, the building was occupied by Portland Auto Body Works. The property was then acquired by the Joseph Lay Broom Company on August 26, 1925 and a broom factory operated at the building until approximately the 1950s. Following this, the Modern Book Bindery Company occupied the building in the 1960s.

Review of a historical aerial photograph from the year 1950 shows the site developed with an industrial facility over the south and east portions. Review of historical city directories indicates occupants of the building included Jay Tool & Gauge Engineering (1953); Service Tool & Die (1957 to 1962); L&M Beverage Corp.

(1953 to 1965); Modern Binding Corp. (1957 to 1971); Joseph Lay Co. (1953 to 1982); Jay County Farm Bureau Co-Op Bulk Plant (1976 to 1982); Jay Petroleum Inc./Pak-A-Sak (1987 to 1993); Mifco Environmental Recycling (1998); and Community & Family Services food bank and thrift store (1980s and 1990s). A representative with Jay Petroleum Inc. stated they utilized the site building for their corporate offices during the 1980s and 1990s. They also used the building as a warehouse for tires, batteries and automotive accessories. They stated they sold the building to Mifco Environmental Recycling in the late 1990s, which stored and shredded used tires in the building. An auto repair facility also reportedly occupied the building in the 2000s.

The site structures were reportedly demolished in 2014 and 2015.

The City of Portland accepted ownership of the site in January 2018.

2.4 Surface Waters

Surface drainage at the site is to the east toward drains along South Wayne Street. The nearest surface-water feature to the site is the Salamonie River located approximately ¼ mile north of the site. Other surface water features in the site vicinity include an unnamed pond located approximately ¼ mile to the east.

Review of a FEMA Flood Insurance Rate Map (FIRM) indicates the site is not located in a designated flood zone.

Surface water on the site or in its immediate vicinity is not a source of local drinking water. The site area receives water from the City of Portland.

2.5 Regional and Local Topography

The Portland area topography is generally characterized as gently rolling. The city is located between the Salamonie Moraine to the north and the Mississinewa Moraine to the south. The city lies within the Tipton Till Plain (Wayne, 1958). The Salamonie River flows west through the area with elevations ranging between 923 to 907 feet.

Local topography surrounding the site is generally flat, with elevations ranging between 905 and 915 feet. Lower elevations are located east toward along the Salamonie River. The elevation of this site is approximately 913 feet above mean sea level as shown on the Portland, Indiana USGS 7.5-Minute Quadrangle Maps (Figure 1).

2.6 Subsurface Structures

A geophysical survey was conducted by Ground Penetrating Radar Systems, Inc. (GPRS) on October 5, 2017 to identify private utilities and to scan for buried tanks or indications of buried tank systems. The geophysical survey included ground penetrating radar (GPR) using a Geophysical Survey Systems, Inc. (GSSI) unit, equipped with a deep antenna (400 MHz) and Radio Frequency (RF) detection. In addition, SES notified Indiana811 to have public utilities identified.

- The GPR operator indicated the unit could not obtain any useable data due to saturated soil conditions. More specifically, the penetration depth of GPR is determined by antenna frequency and the electrical conductivity of the earthen materials being profiled. Soils having high electrical conductivity, such as wet clay soils, rapidly attenuate radar energy, restrict penetration depths, and severely limit the effectiveness of GPR.

- The RF found no indication of buried utilities at the sampling locations. The RF unit detects electromagnetic fields and is used to actively trace metallic pipes and tracer wires, or passively detect electric, communications and other lines.

2.7 Regional Geology and Hydrogeology

The site is located in a physiographic province known as the Tipton Till Plain. The Tipton Till Plain is characteristically flat and poorly drained, except in moraine deposit areas, which typically display varying degrees of relief. Soils in the till plain areas tend to be somewhat homogeneous. Unconsolidated materials in the site area were deposited during Wisconsinan-aged glacial advances. The unconsolidated material consists of clayey till of the Lagro Formation. The unconsolidated sediments overly bedrock, which, according to the Bedrock Geologic Map of Indiana, consists of the Wabash Formation of Silurian Age. The Wabash Formation consists of limestone, dolomite, and argillaceous dolomite. The depth to bedrock near the site is estimated to be approximately 50 feet below ground surface (bgs).

A United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Custom Soil Resource Report for Jay County, Indiana, shows soil beneath the subject site is part of the Blount-Glynwood and Pewamo silty clay soil complexes. The specific soil types identified on the site are described in a custom soil report provided in Appendix A.

Groundwater in the site vicinity is obtained primarily from surficial sand and gravel aquifers and carbonate bedrock aquifers. Surficial sand and gravel aquifers have been deposited by present day streams (alluvial), by glacial meltwater (outwash), and by sand dunes where sediment was deposited by wind. The bulk of the surficial sand and gravel aquifers are composed of outwash deposits. Most major streams in the area have outwash deposits adjacent to their channels. Surficial sand and gravel aquifers commonly contain large volumes of recoverable groundwater. The largest alluvial deposits are found within the outwash deposits along the Eel River and along the Wabash River. The width of alluvial deposits is from 0.5 to 1 mile along the Wabash River (Fenelon, et al, 1994). No significant data is available regarding the range of water yield from these aquifers.

The carbonate bedrock aquifer underlies nearly the entire Upper Wabash River Basin. Groundwater flow in the carbonate bedrock aquifer is through vertical fractures, horizontal bedding planes, and solution openings. Karstification of the carbonate bedrock aquifer by surface water has further enhanced the secondary permeability of the aquifer throughout the basin. Yields from wells completed in this aquifer range from 15 gallons per minute to 1,250 gallons per minute, with median yields in the range of 200 to 360 gallons per minute. The full carbonate aquifer sequence ranges up to approximately 700 feet (Fenelon, et al, 1994).

2.8 Location and Usage of Water Wells

A water well log search was conducted utilizing an electronic database maintained by the Indiana Department of Natural Resources, Water Resources Division. The search identified 33 low-capacity wells within one mile of the site, and 11 high-capacity water wells within 2 miles of the site, including eight significant withdrawal wells. Water well records and a figure depicting locatable wells are provided in Appendix B.

In general, records indicate alternating layers of clay and mud/gravel extend from the surface to bedrock at depths ranging between 33 and 85 feet. Wells were typically installed within bedrock at depths between 42 and 226 feet. Water levels range between 14 and 72 feet.

The majority of low-capacity wells (24) located within one mile of the site appear to have been completed for domestic use. These wells were completed in bedrock to depths between 42 and 226 feet. Three wells were listed as “Public Supply”, two wells were listed as “Industry”, and two wells were listed as “Irrigation”. The remaining low discharge wells did not indicate a usage.

Four of the 11 high discharge wells were listed as industrial use. These wells were completed in bedrock to depths between 220 and 260 feet. The remaining high discharge wells were listed as “Public Supply”, “Irrigation”, and “Residential”.

Eight significant withdrawal water wells are located within 2 miles of the site. According to the Indiana Department of Natural Resources – Significant Water Withdrawal Facility Database (Appendix B) four wells

located within 1 mile of the site are registered to City of Portland (Registration Number 00190) and utilized for public supply. Portland Forge (Registration Number 00295) and Coca-Cola Refreshments USA, Inc (Registration Number 00289) each have two wells within the 2-mile radius. These wells are listed as industrial use. Wells were completed in bedrock at depths ranging between 165 and 227 feet. The capacities of the wells are listed as 40 to 590 gallons per minute.

The nearest water supply well to the site is located approximately 0.3 mile north (#130694). The well was installed to a depth of 196 feet in October 1961 for public supply. The well log indicates clay is present to 20 feet. Mud and gravel are present from 27 to 31 feet where limestone bedrock is encountered. The well was developed by pumping 500 gallons per minute for 8 hours. The status water level was reportedly 22 feet.

According to the IDEM Wellhead Proximity Determinator Viewer, the site is included in a Wellhead Protection Area (Appendix B). The wellhead is registered Portland Municipal Water Plant (IN5238007). According to the IDEM Drinking Water Facility Database, there are three active wells that service a population of 6,209.

2.9 Future Land Use

As previously noted, the site is currently vacant. The City of Portland intends to redevelop the property for commercial use.

2.10 Susceptible Area Evaluation

Geologically susceptible areas (e.g., surface-water bodies, karstic bedrock areas, etc.) have not been identified at or immediately surrounding the site. The nearest surface-water feature to the site is the Salamonie River located approximately ¼ mile north of the site.

Other potentially susceptible areas located adjacent to the site include residences to the north, east, and west. The Hudson Family Park and a day care/preschool/family service center is located east of the site, across South Wayne Street. Parks and churches are located in the outlying area but are not considered potential receptors due to their location and distance from the site. The following table describes potentially susceptible facilities nearest to the site.

Table 1. Surrounding Land Use
516 South Wayne Street
Portland, Jay County, Indiana

Facility Type	Address	Distance from Site (miles)
Residential		
Residence	508 South Wayne Street, Portland, IN 47371	Adjacent - north
Residence	515 South Wayne Street, Portland, IN 47371	Adjacent - east
Residence	514 South Helen Street, Portland, IN 47371	Adjacent - west
Senior Citizen Services / Living Centers		
Union Street Home	227 East Union Street, Portland, IN 47371	0.1 – northwest
Recreational – Athletic		
Portland Water Park	304 South Hayes Street, Portland, IN 47371	0.5 – northeast
Jay Community Center	115 East Water Street, Portland, IN 47371	0.5 – northwest
Portland Junior League Baseball	304 South Hayes Street, Portland, IN 47371	0.5 – northeast
Churches		
Trinity United Methodist Church	323 South Meridian Street, Portland, IN 47371	0.4 – north
Cornerstone Baptist	211 East Main Street, Portland, IN 47371	0.5 – north
Portland Friends Church – Nazarene	229 East Main Street, Portland, IN 47371	0.4 – north
Family Worship Center	200 East Elder Street, Portland, IN 47371	0.4 – south
Day Cares / Preschools		
Head Start	521 South Wayne Street, Portland, IN 47371	Adjacent - east
Parks		
Hudson Family Park	509 South Wayne Street, Portland, IN 47371	0.0 – east
Portland Dog Park	126 E 100 S, Portland, IN 47371	0.4 – east
Hoosier Park	151 E 100 S, Portland, IN 47371	0.4 – east
Freedom Park	231 South Meridian Street, Portland, IN 47371	0.5 – northwest
Portland Water Park	304 South Haynes Street, Portland, IN 47371	0.5 – northeast
Portland Junior League Baseball	304 South Haynes Street, Portland, IN 47371	0.5 – northeast

Up to date as of May 7, 2019 from MapQuest and Jay County GIS

2.11 Constituents/Contaminants/Chemicals of Concern (COCs)

Lead is the primary COC detected at concentrations exceeding *residential direct contact screening levels*.

2.12 Potential Exposure Evaluation

Constituents of concern have been documented in surface soil at levels that pose an exposure risk for visitors, trespassers, and/or transient site workers and maintenance personnel. Ingestion or inhalation of wind-blown dust particles and surface runoff to storm sewers are also identified as potential concerns.

3.0 PREVIOUS INVESTIGATIONS

The following provides a summary of investigation information that has been reproduced from previous reports. Soil boring logs are provided in Appendix C. Data compilation tables are provided in Appendix D.

3.1 Phase I Environmental Site Assessment – September 2017

SES Environmental (SES) conducted a Phase I Environmental Site Assessment (ESA) in September 2017. The ESA included a visual inspection of the site and limited observations of surrounding properties, a review of historic land use, a review of regulatory listings, and interviews with persons potentially knowledgeable concerning site conditions. The assessment revealed the following *recognized environmental condition* (REC) in connection with the site:

REC#1 Historical review indicates the site was formerly occupied by Haynes Wheel Company, Portland Auto Body Works, a tool and die shop, a petroleum company, a book bindery, a tire recycler, and an auto repair shop. Details concerning operations at these facilities and the potential use of hazardous substances and/or petroleum products were not found during this Phase I ESA.

Additional investigation was recommended to assess the identified REC.

3.2 Screening Investigation – October 2017

A Phase II environmental screening investigation was conducted in October 2017 to further assess soil and groundwater conditions and to screen for contaminants of concern. The screening investigation consisted of geophysical survey and advancing six soil borings (identified as SB-1 through SB-6) within and around the footprint of the interconnected buildings that formerly occupied the site. Borings were completed as temporary groundwater sampling points to assess groundwater quality and conditions. Soil and groundwater samples were collected at each boring location and analyzed for VOCs, SVOCs) and metals. Groundwater did not accumulate at SB-5. Near surface soil samples were also analyzed for PCBs. Collectively, borings were used to evaluate overall site conditions. Screening results are summarized below. Laboratory results are depicted on Figures 4 and 5.

- Useable data could not be obtained during geophysical survey due to saturated soil conditions.
- Fill material consisting of silt, clay, sand, gravel, cinders, and brick debris was encountered at sampling locations. This surface fill material extended to depths of 2 to 4 feet, followed by silt to depths of approximately 16 to 19 feet, followed by sand to depths of 20 to 22 feet, followed by clay.
- Water bearing sand was observed at a depth of approximately 18 feet. The inferred groundwater flow direction was to the south-southwest. Further monitoring would be required to more accurately establish seasonal flow patterns.
- Field evidence of contamination, such as elevated photoionization detector responses and odor, was not observed.
- VOCs and PCBs were not detected in soil or fill samples. SVOCs were not detected in soil samples, except for trace concentrations of benzo(a)pyrene at SB-5 and SB-6. Benzo(a)pyrene concentrations did not exceed any *residential* or *commercial/industrial remediation screening level.*
- Metals including barium, chromium, copper, and zinc were detected in soil samples. These metals are known to occur naturally in soils and detected concentrations did not exceed *residential* or *commercial/industrial remediation screening levels.*
- Arsenic was detected in smear zone soil at SB-1 and in near surface sample SB-3. The arsenic concentration in sample SB-1 collected from a depth of 18 feet exceeded the *residential migration to groundwater screening level* and the *residential direct contact screening level.* The arsenic concentration in sample SB-3 collected from the near surface exceeded the *residential migration to groundwater screening level.* However, arsenic is known to occur naturally in soils at levels exceeding *residential remediation screening levels.*
- Lead was detected in all soil samples. Lead concentrations did not exceed *remediation screening levels,* except at SB-2. The lead concentration in fill sample SB-2 was 1050 mg/kg and exceeded *remediation screening levels* that range from the most conservative 270 mg/kg to 1000 mg/kg.
- VOCs and SVOCs were not detected in groundwater samples. Metals including arsenic, cadmium, chromium, copper, mercury, lead, selenium, silver, and zinc were not detected in groundwater samples.
- The metal, barium, was detected in groundwater sample SB-4. The barium concentration was well below the *tap water screening level.*

The Phase II screening results indicated the lead concentration in fill soil was evidence of contamination. SES recommended establishing *remediation objectives,* and conducting additional investigation to characterize the fill soil, extent of lead, and potential exposure pathways. SES concluded that other detected metals in soil including arsenic, were consistent with naturally occurring concentrations, and therefore did not pose a concern. Benzo(a)pyrene detection was not considered evidence of a release at that time, due to the ubiquitous nature of the incomplete combustion byproduct.

3.3 Screening Investigation – November 2017

Additional screening was conducted in November 2017 as a follow up to a previous screening investigation that found contaminated surface fill soils at the site.

The additional screening investigation consisted of advancing eleven soil borings. Ten samples of fill material and seven samples of native clay soil beneath the fill material were collected and analyzed for lead, arsenic, and polycyclic aromatic hydrocarbons (PAHs). Fill soils with coal, slag, glass and/or cinders were observed at SB-8, SB-10, SB-13, SB-15, and SB-17; therefore, testing at these borings included RCRA 8 metals. The fill soil samples collected at SB-8, SB-13 and SB-17 were also analyzed for polychlorinated biphenyls (PCBs) and the SB-14 samples were also analyzed for volatile organic compounds (VOCs). Testing results are depicted on Figure 6.

- VOCs were not detected in the one fill soil sample.
- PCBs were not detected in the three fill soil samples.
- Lead was the only metal in surface fill samples that exhibited a concentration exceeding the *residential direct contact screening level.* Lead concentrations in two surface fill samples exceeded the *residential direct contact screening level* and one surface fill sample result exceeded the *commercial/industrial direct contact screening level.*
- PAH constituents were detected in four of the ten surface fill samples. Detected PAH constituent concentrations did not exceed *residential direct contact screening levels.*
- VOCs were not detected in the one native soil sample (SB-14).
- Metals were detected in the native soil samples; however, detected concentrations did not exceed *residential direct contact screening levels.*
- PAH constituents were not detected in the native soil samples.

In summary, additional screening investigation has confirmed various concentrations of metals and polycyclic aromatic hydrocarbons are present in surface fill soils at the site; however, lead is the only parameter that exhibits concentrations exceeding the *residential direct contact screening level*. This additional screening found no evidence of impact extending into the native soils beneath the surface fill.

SES recommended developing a remedial strategy to address the lead in surface fill soils using exposure risk. Typically, surface impact is addressed by (1) removing the impacted media, (2) by placing a barrier (pavement/clean soil) over the impact, or (3) a combination of removal and isolation. At a minimum, remedial efforts should focus on fill soils at and near sampling locations SB-2, SB-10, and SB-12 due to elevated lead concentrations at these locations exceed the *residential direct contact screening level* (Figures 3 and 6).

3.4 Analysis of Brownfield Cleanup Alternatives

The *Analysis of Brownfield Cleanup Alternatives* (ABCA) outlined environmental cleanup alternatives that were evaluated to mitigate blight and facilitate potential redevelopment. The analysis included an evaluation of alternatives with respect to effectiveness and cost.

Lead is the only parameter that exhibits concentrations exceeding the *residential direct contact screening level*. Specifically, lead concentrations in surface fill soil samples SB2 (2-4), SB10 (2-4), and SB12 (2-4) exceed screening levels.

Remediation alternatives for metals in soil include (1) immobilization, (2) separation, (3) isolation, or (4) extraction. The *ABCA* determined that while there may be alternatives for addressing contamination at this particular site; given the known conditions and proposed redevelopment, extraction would be the most effective corrective action alternative to achieve closure without restrictions.

Table 2. Summary of Analysis of Brownfield Cleanup Alternatives 516 South Wayne Street Portland, Jay County, Indiana		
Corrective Alternative	**Effective**	**Estimated Cost**
Extraction *Removal/Disposal*	Yes	$194,000
Isolation *Pavement Barrier*	Yes – *Includes Restrictions on Property Deed*	$10,000 - $15,000
Immobilization	Impractical	No Estimates
Separation	Impractical	No Estimates

4.0 REMEDIATION APPROACH AND RATIONALE

As a part of selecting an appropriate environmental remedy, the nature, concentration and distribution of constituents of concern were evaluated, as well as potential exposure risk to human health and the environment. Based on this evaluation, soil extraction at the site is proposed, and soil extraction is proposed at the two COC areas (SB-2 and SB-12) where previous investigation results indicate lead concentrations exceed *residential direct contact screening levels*.

4.1 Source and Nature of COCs

COCs documented in surface soil are the focus of this RWP. There has been no known illegal dumping at the site and the exact source of the COCs has not been determined. The site has a long industrial history. The site was formerly occupied by Haynes Wheel Company, Portland Auto Body Works, a tool and die shop, a petroleum company, a book bindery, a tire recycler, and an auto repair shop.

Lead is the primary COC detected at concentrations exceeding *residential direct contact screening levels*.

The following presents published toxicity characteristics for lead.

Lead (CAS#: 7439-92-1) Lead occurs naturally as a sulfide in galena. It is a soft, bluish-white, silvery gray, malleable metal. Lead is a natural element that is persistent in water and soil. Most of the lead in environmental media is of anthropogenic sources. Soil content varies with the location, ranging up to 30 ug/g in rural areas, 3000 ug/g in urban areas, and 20,000 ug/g near point sources. Human exposure occurs primarily through diet, air, drinking water, and ingestion of dirt and paint chips (U.S. EPA; ATSDR). Lead absorbed into the body is distributed to three major compartments: blood, soft tissue, and bone. Exposure to lead is evidenced by elevated blood lead levels. Evidence shows that lead is a multitargeted toxicant, causing effects in the gastrointestinal tract, hematopoietic system, cardiovascular system, central and peripheral nervous systems, kidneys, immune system, and reproductive system. Other organs or systems affected by exposure to lead are the kidneys, immune system, reproductive system, gastrointestinal tract, and liver. These effects usually occur at high blood levels, or the blood levels at which they occur have not been sufficiently documented. The U.S. EPA has not developed an RfD for lead because it appears that lead is a nonthreshold toxicant, and it is not appropriate to develop RfDs for these types of toxicants. Instead the U.S. EPA has developed the Integrated Exposure Uptake Biokenetic Model to estimate the percentage of the population of children up to 6 years of age with blood lead levels above a critical value, 10 ug/dL. The model determines the contribution of lead intake from multimedia sources (diet, soil and dirt, air, and drinking water) on the concentration of lead in the blood. Site-specific concentrations of lead in various media are used when available; otherwise default values are assumed. The U.S. EPA has established a screening level of 400 ppm (ug/g) for lead in soil. Inorganic lead and lead compounds have been evaluated for

carcinogenicity by the U.S. EPA; however, the data from human studies are inadequate for evaluating the potential carcinogenicity of lead.

4.2 Distribution

Investigation results indicate surface fill material consisting of silt, clay, sand, gravel, cinders, and brick debris was encountered to depths ranging between 2 and 4 feet. Testing has found various concentrations of heavy metals and polycyclic aromatic hydrocarbons in surface fill soils. While metals and hydrocarbons are present in the surface fill soils, lead is the only parameter that exhibits concentrations exceeding the *residential direct contact screening levels.* Statistical evaluation infers lead in the surface fill soil poses an exposure risk; due solely on the calculated EPC exceeding *direct contact screening levels*. SES notes the site is currently vacant.

Lead concentrations in fill soils are depicted on Figure 7. Data compilation tables are provided in Appendix D. Investigation found no evidence of impact extending into the native soils beneath the surface fill.

- Lead in the surface fill soils poses an exposure risk; due to the calculated EPC exceeding *direct contact screening levels*.
- Lead concentrations in fill soil samples SB-2 (2-4), SB-10 (2-4), and SB-12 (2-4) exceed the *residential direct contact screening level.*
- Lead concentrations in fill soil samples SB-2 (2-4) and SB-12 (2-4) exceed the *commercial/industrial direct contact screening level.*

4.3 Baseline Ecological Assessment

A baseline ecological assessment was conducted to determine if any critical habitats exist on or near the site. The assessment included a review of the U.S. Geological Survey 7.5-minute topographic map to identify features such as parks, preserves, and other special-use areas within a one-mile radius of the site; a visit to the property to identify wildlife, vegetation, and critical habitats in the near vicinity; and online database review of governmental and regulatory agencies having jurisdiction over protected species to identify state-listed and proposed endangered and threatened animal and plant species and wetlands within the area.

Topographic Map. The nearest natural surface water feature is the Salamonie River, which is located approximately ¼ mile north of the site. IDEM policy stipulates all surface waters are potentially susceptible. No other significant potential ecological features were noted within the immediate site vicinity.

Site Visit. The site was visually inspected and ecological habitats were not discernible. The inspection revealed grass, scrub vegetation and gravel over the majority of the site surface. Streets and alleys border the site to the east and north. Residential properties border the site to the north, east, and west. Surface drainage is primarily east to storm water catch basins.

Governmental Database. Online information was obtained from the following agencies: U.S. Forest Service, National Park Service, U.S. Department of Fish and Wildlife Service, and the Indiana Department of Natural Resources (DNR). No registered forests or parks were identified at or adjacent to the site or within one mile of the site.

The U.S. Department of Fish and Wildlife Service National Wetlands Inventory (Appendix E) identified riverine, freshwater forested/shrub wetlands, freshwater emergent wetlands, and freshwater ponds within ½ mile radius of the site. No wetlands were identified within or adjacent to the site property.

A DNR listing of endangered, threatened and rare species for Jay County is provided in Appendix E. Several types of mollusk, insect, reptile, bird, mammal, and vascular plant are listed, as well as high-quality natural communities. U.S. Department of Fish and Wildlife: Environmental Conservation Online System (Appendix E) identified the bald eagle, Indiana bat, and northern long-eared bat as threatened or endangered species.

In summary, potentially susceptible ecological areas were not identified at or adjacent to the site. There is a potential risk of impact to river waters under a scenario wherein surface fill material is washed into the combined sewer and is discharged prior to treatment. This scenario is assigned a negligible exposure risk.

4.4 Identification and Evaluation of Potential Human Receptors

Human receptors that might be potentially exposed to COCs were identified by inspecting the site property and adjacent properties, and reviewing published site maps, and reports detailing site conditions. The following potential receptors were identified and exposure risk evaluated.

- Potentially susceptible areas located adjacent to the site include residences to the north, east, and west, as well as a family service center. A potential exposure route through ingesting wind-blown contaminated dust currently exists.
- Several additional potentially susceptible areas (park and churches) occur in the outlying area. These areas are not considered at risk due to their location and distance from the site.
- Lead occurs in surface soils and a potential route of exposure through ingesting/inhaling wind-blown contaminated dust currently exists.
- Transient site workers are identified as receptors, as well as maintenance personnel and caretakers. A potential route of exposure through direct contact or ingestion of impacted surface material currently exists.
- VOCs were not detected, so vapor intrusion into adjacent building structures is not a complete exposure pathway.
- The site is located within a wellhead protection area. Lead impact is limited to the near surface and there is no indication groundwater has been impacted. The scenario of impacting a water supply is assigned a negligible risk.
- There are no known underground utilities (gas/water/sewer/etc.) that extend through the site and therefore, preferential migration to a receptor is not expected.
- Construction workers involved with any site redevelopment are identified as receptors. Routes of exposure would include incidental direct contact and ingestion/inhalation of impacted soil. This exposure scenario is assigned a moderate risk.
- If unrestricted access to the site is allowed, there could be an exposure risk to adults/children via direct contact, and ingestion. This exposure scenario is assigned a moderate risk.
- Under an unrestricted access scenario, offsite transport of constituents of concern through physical tracking of soil by people, vehicles, or equipment would also be possible. This exposure scenario is assigned a negligible risk.

In summary, lead is present in surface soil at levels that pose an exposure risk for visitors, trespassers, and transient site workers and maintenance personnel. Exposure pathways include ingestion/inhalation of wind-blown dust particles, direct contact/dermal and ingestion, and offsite transport of COCs through physical tracking of soil by people, vehicles, or equipment.

4.5 Soil Removal

Soil removal is proposed to mitigate the following potential exposure risks resulting from lead occurrence in surface clay in the vicinity of soil borings SB-2 / SB-10 and SB-12:

1) Dermal contact with COCs in surface soils;
2) Ingestion of COC in surface soils;
3) Wind transport of particulates;
4) Stormwater transport of particulates; and
5) Physical tracking of COC in soil.

Soil removal will be conducted at areas where lead concentrations in fill soil samples (SB-2 (2-4), SB-10 (2-4), and SB-12 (2-4)) exceed the *residential direct contact screening level (RDCSL).* Up to 3,200 tons of soils are targeted for removal. The following task implementation sequence will be followed to complete the soil removal effort:

1. Prior to beginning site work, representative soil samples will be collected from the excavation areas for waste characterization. The samples will be analyzed in accordance with criteria provided by the solid waste disposal facility chosen to receive the waste. Based on testing completed to date, only TCLP lead testing is anticipated.
2. Set up site work to minimize potential for wind-blown contaminants (ex. moisten soil prior to removal, silt fence to east, all trucks to be covered, etc.)
3. SES will continually monitor soil and lead during excavation to identify and segregate clean soil that may be encountered at each target removal area. Fill soils are targeted for removal and native clays will be segregated. An XRF instrument will be utilized to assess lead concentrations during excavation. Clean fill soils will be segregated.
4. SES will observe excavation and collect samples as needed to ensure the project is completed in accordance with RWP specifications.
5. Removed soil will be transported to a licensed solid waste-disposal facility. Waste manifests will be maintained for all off-site shipments.
6. At least one sample per 50 cubic yards of segregated material will be collected and submitted for lead analysis in accordance with SW 846 Method 6010. In the event a sample exhibits a lead concentration that exceeds the *RDCSLs*, the soil will be transported to a disposal facility.
7. Excavation will extend down through the fill material to native clay, which is expected to occur at depths of approximately 4 to 6 feet.
8. SES will collect soil samples from exposed excavation sidewalls and bottom. One soil sample will be collected for each sidewall or every 20 feet. These soil samples will be collected from the vertical midpoint of the sidewall. One sample will be collected to represent each 500 square feet of exposed excavation bottom.
9. Samples will be placed in laboratory provided sample containers. Containers will be properly labeled, entered into chain-of-custody documentation, and placed into an ice-filled cooler for shipment to the laboratory.
10. All retained soil samples will be promptly delivered to a sub-contract laboratory for lead analysis in accordance with SW846 Method 6010. Laboratory analysis will be conducted within 48-hours of collection to facilitate uninterrupted site work.
11. QA/QC samples consisting of field duplicates and MS/MSD samples will be retained per 20 samples. A level IV analytical data package will be requested from the laboratory.
12. All test results will be statistically evaluated using Pro-UCL software to calculate an EPC. In the event, the calculated EPC exceeds the *RDCSL*, additional soil may be removed from select areas, which exhibit the highest COC concentrations (unless structural constraints are encountered). The additional soil will be transported off-site for disposal as previously specified.
13. After receiving acceptable laboratory testing results (EPC less than *RDCSL*), the excavations will be backfilled with granular soil/aggregate and topped with crushed stone. The aggregate will not be compacted and screening for contaminants in the aggregate will not be conducted.
14. Level D personnel protective equipment will be required for all on-site work tasks. All construction personnel will be advised of site and lead conditions through contractual documents.
15. A *Remediation Completion Report* will be prepared to document soil removal sequence, soil sampling methods, and laboratory testing results. Site maps will be developed that clearly and accurately depict the excavation locations, and final sampling results. The report appendix will include waste characterization data, disposal documentation, photographs, and other information derived from RWP implementation.

4.6 Schedule

The remedy implementation sequence will commence after approval of this RWP, and is summarized as follows:

Task	Duration of Task (months)
Soil Excavation	1
Reporting	2
Agency Review and Site Closure	1
Total Duration	4 months

5.0 HEALTH AND SAFETY PLAN

A *Health and Safety Plan* is included as Appendix F. The plan specifies a site safety coordinator, job task delegation, emergency procedures, and directions to the nearest emergency care facility.

All field personnel conducting on-site activities will have completed OSHA 1910.120 40-hour Health and Safety Training, as well as annual eight-hour refresher training updates. All site personnel will be enrolled in a medical monitoring program.

The site safety coordinator will review the health and safety plan with all site personnel prior to beginning work. Daily toolbox meetings will be conducted at the beginning of each day thereafter to assess unforeseen hazards and/or make modifications due to changes in site conditions. All site personnel will acknowledge participation in the safety meeting by signing and dating the health and safety plan.

6.0 QUALITY ASSURANCE

The overall QA objective is to develop and implement procedures for field sampling, chain of custody, laboratory analysis, and reporting that will provide results that are scientifically valid, and the levels of which are sufficient to meet Level IV DQOs. Field and quality assurance procedures are detailed in a report titled *"Quality Assurance Project Plan (QAPP) – Revision 0"* dated May 2019.

REFERENCES

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United States Geological Survey, 2016. Portland - 7.5 Minute Topographical Quadrangle, Indiana.

REMEDIATION WORK PLAN

FIGURES

MIFCO Environmental Recycling, Inc. – Old Book Bindery
516-518 South Wayne Street
Portland, Jay County, Indiana
BFD# 4170703
CA# BF-00E48101-B

REMEDIATION WORK PLAN

APPENDIX A. USDA SOIL REPORT

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REMEDIATION WORK PLAN

APPENDIX B. WATER WELL LOGS

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REMEDIATION WORK PLAN

APPENDIX C. SOIL BORING LOGS

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REMEDIATION WORK PLAN

APPENDIX D. DATA COMPILATION TABLES

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REMEDIATION WORK PLAN

APPENDIX E. EXPOSURE ASSESSMENT DATA

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REMEDIATION WORK PLAN

APPENDIX F. HEALTH AND SAFETY PLAN

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