Analysis of Brownfield Cleanup Alternatives

Former Virginia Scrap Iron & Metal Company, Inc. Property

City of Roanoke, Virginia
Brownfield Redevelopment Program
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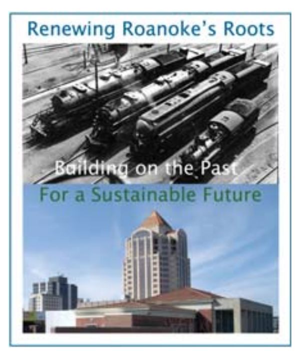

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Former Virginia Scrap Iron & Metal Company, Inc. Property
1620 South Jefferson Street, S.E.
Roanoke, Virginia 24014

TABLE OF CONTENTS

Figures

Appendices

1. Introduction

This Preliminary Analysis of Brownfield Cleanup Alternatives (ABCA) was prepared to summarize known environmental conditions, anticipated regulatory framework for cleanup and the proposed remediation approach at the former Virginia Scrap Iron and Metal Company, Inc. (Virginia Scrap) property located along South Jefferson Street in the City of Roanoke, Virginia. This document serves as a starting point to determine the specific actions necessary to formally define the regulatory program jurisdiction for the property and to complete site assessment, risk assessment and remedial action work plans required to document formal cleanup levels and actions. This Preliminary ABCA includes the following:

- Introduction – provides general overview of the proposed project.
- Property Information – presents more detailed information on the property and its operating history.
- Sources and Extent of Contamination – documents the sources of environmental impact and extent thereof.
- Exposure Pathways – identifies potential receptors and means of exposure
- Applicable Laws and Cleanup Levels – identifies the likely regulatory programs, area of coverage and likely cleanup levels that are expected.
- Analysis of Cleanup Alternatives Considered – reviews cleanup alternatives that have been considered as part of this preliminary analysis.
- Proposed Cleanup Plan – provides additional information on the likely cleanup approach to be considered at the property.

The Virginia Scrap property is located in the 110-acre South Jefferson Redevelopment Area (SJRA) where brownfield redevelopment has been underway for several years. Redevelopment efforts were initially focused on the 25-acre Riverside Center for Research and Technology (RCRT). The City of Roanoke and the Roanoke Redevelopment and Housing Authority (RRHA) are moving their attention further along the corridor to the adjacent Virginia Scrap Iron and Metal Company, Inc. (Virginia Scrap) property. This property is strategically located along Jefferson Street and connects RCRT to a main thoroughfare, downtown and to the remainder of the SJRA.

This property was originally developed in 1906 as the Adams, Payne and Gleaves Lumber Co. This lumber yard consisted of a variety of buildings ranging from the dressed lumber building, stables, planning mill, warehouse, and coal storage. The 1921-22 Roanoke City Directory cover page advertisement advertised the lumber yard as having “Everything for a Building but Hardware.” The 1928 Sanborn Fire Insurance Maps backed up this claim showing the lumber yard as selling lumber, coal, building materials, cement, lime, and baled forage.

The lumber company downsized in 1936, and by 1937 several different companies occupied the property including the Strietmann Biscuit Company, Farmco Package Corporation (Basketmakers), DuPont – Grasselli Chemicals, Blue Ridge Stone Corporation (used the yard, no buildings), and Johnson Motor Lines. The year 1941 was the last year that Adams, Payne, and Gleaves Lumber Co, Inc. was listed in the Roanoke City Directories at 1600-1604 South Jefferson Street.

In 1942, the Virginia Scrap Iron and Metal Co. purchased the yard and began what would become a 66 year occupancy. The property is now vacant as the redevelopment process is initiated. The redeveloped property will likely contain a mix of uses including institutional, commercial and potentially residential development based on the redevelopment plan for the SJRA and the City's Strategic Housing Plan.

The City and RRHA have used EPA brownfield assessment grant funds to perform Phase I and Phase II Environmental Site Assessment (ESAs) prior to acquisition of the property. These assessments identified significant environmental impacts associated with metals (e.g., lead); petroleum constituents and some PCBs related to the former scrap yard operations.

Executing a full cleanup to meet Virginia Department of Environmental Quality (DEQ) Voluntary Remediation Program (VRP) program default standards for residential development could cost as much as $4,000,000. However, by tailoring remediation to the proposed development of the property the level of cleanup can be significantly reduced. The use of targeted cleanup and engineering controls can significantly reduce cleanup costs while allowing a development scenario that remains protective of human health and the environment. New construction will likely include several feet of fill and unoccupied first floor space to address flood plain issues. Under this scenario, only highly impacted soil will be removed with the remainder of the material being capped by the fill material and new construction. The cost of cleanup is reduced to approximately $1,300,000 in this scenario with an additional cost of $900,000 to provide additional fill for flood proofing. The reduced cost of cleanup in conjunction with flood proofing is much less than the cost of full cleanup and is equally protective of human health and the environment.

2. Property Information

The subject property is comprised of approximately 7 acres, as shown on Figure 2, which formerly housed the Virginia Scrap Iron and Metal Company., Inc. (Virginia Scrap) scrap metal recycling operation and business office. All the parcels of the subject property were historically zoned HM (heavy manufacturing) with the zoning designation changed to Institutional Planned Unit Development (INPUD) as part of the City's 2005 comprehensive rezoning. This zoning change was designed to facilitate reuse of the property as part of the redevelopment of the SJRA.

The Roanoke River is the primary groundwater receptor for the property as it is located just to the east of the Virginia Scrap property as shown on Figure 2. At the southern end of the property the river is located approximately 100 feet from the eastern property line. This distance increases to approximately 450 feet at the northern end of the property. The river flows from the south and bends toward the northeast as its channel moves by the subject property. The ground surface of the Virginia Scrap properties is approximately 15 to 20 feet above the water level in the Roanoke River indicating the presence of a shallow water table aquifer. Groundwater flow direction is assumed to be generally to the east across the property towards the river. The flow direction may bend towards the north as it nears the river and begins to flow parallel to the stream channel. The property is located entirely within the 100-year flood plain of the river with a small sliver along the eastern edge of the property located within the floodway.

Based on a review of readily available historical information and interviews conducted with long-term employees, the property has been used for scrap metal recycling beginning, at least, in 1942. As previously noted, the property primarily housed a lumber/building materials supplier with portions of the property leased to other industrial operations. According to Mr. Curtis Eppley and Ms. Mary Ann Ward, employees of Virginia Scrap, Virginia Scrap was originally established in 1936 and moved its operations to the subject facility in the early 1940s.

A few of the larger Virginia Scrap customers and sources of scrap metal included the Virginian Railway Company (merged with the Norfolk & Western in 1959), Appalachian Power, General Electric, Westvaco and many other regional industries. Particular items of interest that were routinely processed on-site include electric transformers and capacitors, locomotive engines, automobile engines and batteries, power system back-up batteries and steel drums and tanks. The facility received and processed scrap metal primarily in the central portion of the property. The areas of scrap storage can be seen on the 2002 aerial image on Figure 2.

A hydraulic scrap shear, and later a hydraulic material baler were formerly located on a concrete foundation/basin to the southeast of Building No. 6 as shown on Figure 2. The baler was removed in the summer of 2007. During site reconnaissance, the basin that was located beneath the former baler was observed to contain a mixture of water and hydraulic oil, and the soils surrounding the basin exhibited hydraulic oil staining.

Spent automotive and industrial batteries historically were stored on an exterior concrete pad located on the eastern side of Building No. 6. Spent automotive and industrial batteries have also been discovered at various additional locations throughout the property during scrap material removal operations from October 2004 to the present. Batteries were also stored in Building No. 3 which is constructed with an earthen floor. As shown on Figure 2, approximately 2 acres of outdoor area to the east of Building 3 and south of Building 6 was used as a staging area for scrap material.

In a letter dated January 10, 2005, Mr. Robert J. Weld, Office Director of the Virginia Department of Environmental Quality's (DEQ's) Office of Remediation Programs indicated that the Virginia Scrap's South Jefferson Street facility was eligible for participation in the Virginia Voluntary Remediation Program (VRP) and issued the VRP site number of VPR00410 to the facility.

River Metals Recycling (River Metals) was contracted by Virginia Scrap to process and remove the inventory of scrap material in 2005. River Metals performed the processing and removal activities during two separate periods of time, the first being November 2005 to May 2006 and the second being May 21, 2007 to August 15, 2007. Virginia Scrap stopped receiving scrap material from customers on May 11, 2007. The bulk of the scrap metal has been removed from the property but small metal fragments and other debris remains on the ground surface across much of the property.

In support of the acceptance of the subject property into the VRP, Faulkner & Flynn (F2) was contracted to perform site assessment activities. F2 defined a scope for the investigative efforts, in accordance with VRP established guidelines, to evaluate environmental impacts to the subject property. The assessment was initiated to determine the nature and extent of impacts to soil and groundwater underlying the property, with the notion, based on the review of remediation projects on similar sites in Virginia, that the most likely constituents of concern (COCs) would consist of volatile organic compounds (VOCs), heavy metals, and petroleum related constituents.

F2 initiated a significant soil investigation on the property. However, at the time the property acquisition process was initiated by RRHA, F2 had not performed the groundwater investigation nor developed a report of the soil investigation. As part of RRHA's all appropriate inquiry, groundwater samples were collected from temporary monitoring wells to provide a preliminary evaluation of groundwater conditions under the property.

Between August 14, 2006, and August 30, 2007, F2 representatives performed the collection of soil samples, to assist in the above referenced evaluation, through the advancement of 55 soil borings. Additionally, 69 surface soil samples were collected. The soil borings were advanced throughout the majority of the property to varying depths below ground surface (bgs). Native soil consisted primarily of orange colored, dark brown silty clay and was encountered at approximately 18 to 24 inches bgs across the property. The interval lying above the native soil consisted largely of blackish gray to blackish dark brown silty clay mixed with non-native material (i.e. small pieces of scrap, gravel, pulverized concrete, coal, etc.).

Additional groundwater investigations were performed by Draper Aden Associates (DAA) in December 2007 and March 2008 under contract to the City and RRHA as part of due diligence efforts prior to acquisition of the property. The December investigation included installation of 14 temporary monitoring wells to assess groundwater conditions underlying the property. Follow up activities in March 2008 included advancement of 8 soil borings in the vicinity of the former hydraulic shear/baler to investigate the depth of hydraulic oil related impacts.

3. Sources and Extent of Contamination

The various assessment activities performed on the site have identified several sources of contamination related to the processing and storage of scrap metal. These issues are as follows:

- Elevated levels of metals in surface soil along with scattered, low levels of petroleum constituents and PCBs where scrap metal was handled.
- Visible presence of oil stained soils with high levels of PCBs (greater than 50 ppm) in the immediate vicinity of the former hydraulic scrap shear/baler.

The results of soil and groundwater sampling efforts are further discussed in the following sections.

3.1 Soil Samples

The sampling efforts by F2 resulted in the submittal and laboratory analysis of 169 soil samples. The soil collected from each location was submitted for a variety of laboratory analytical parameters, including volatile organic compounds (VOCs), semi-volatile organics (SVOCs), polychlorinated biphenyls (PCBs), and total RCRA metals. A figure showing the location of these samples and summary tables of analytical results are included in Appendix A.

The laboratory analytical data indicated significant detections, including high levels of metals (particularly lead), and relatively low levels of PCBs (less than 50 ppm), and petroleum related constituents.

3.1.1 Metals

The concentrations of metals vary widely based on the location and depth of samples. The highest lead concentrations (exceeding 100,000 mg/kg) were identified in surface samples collected to the east of Building No. 6 and within Building No. 3, both areas where lead-acid batteries were stored. Soil samples collected from a depth of three feet bgs in these areas show that the level of lead was substantially reduced to levels typically less than 1,000 mg/kg. These results indicate that lead levels are high where soil was in direct contact with batteries but limited leaching into the underlying soil has occurred. The areas of the property with significant lead impacts are shown on Figure 3.

Similar results were identified in the larger area of outdoor scrap storage. Surface samples in these areas showed the highest lead concentrations have values typically ranging from a few thousand to as much as 82,900 mg/kg. Other samples were collected from a 0'-2' or 1'-3' sample interval. The deeper the interval the less contamination was detected typically a few hundred to a few thousand mg/kg. A smaller number of samples were collected from deeper intervals (4 feet or more) and generally showed little or no impact from metals. Sample results that indicated the vertical limits of lead impact are as follows:

- SB-7: 82,900 mg/kg (surface) 4,320 mg/kg (0-2' bgs)
- SB-10: 10,400 mg/kg (surface) 13.3 mg/kg (2'-4' bgs)
- SB-49: 8,030 mg/kg (surface) 15.8 mg/kg (2'-4' bgs)
- SB-50: 61,600 mg/kg (surface) 21.4 mg/kg (2'-4' bgs)
- Bldg3-SS10: 123,000 mg/kg (surface) 31.2 mg/kg (3' bgs)

3.1.2 PCBs

Of the initial 169 samples collected by F2, 95 were analyzed for the presence of PCBs. Based on the data, PCBs found in soil on the property and can generally be attributed to two sources as follows:

- Releases associated with processing scrap in the former shear/bailer.
- Incidental drips, etc. from material staged in the former scrap piles on the property.

Figure 4 shows the sampling locations and the distribution of PCBs across the property.

High levels of PCBs (greater than 50 ppm) are present in the vicinity of the former hydraulic scrap shear/baler as indicated on Figure 4. F2 collected 39 samples from the shear/bailer area which exhibits visible oil staining (the bailer unit was noted by to have leaked hydraulic fluid during its operation). PCBs were detected in 37 of the 39 samples. The PCBs in this area can be attributed to either dielectric fluid contained in capacitors and transformers that may have been processed in the shear/baler prior to implementation of the TSCA regulations and/or PCBs that may have been present in the hydraulic oil used to operate the equipment.

There is a distinct hot spot in this area with PCBs in surface soils in four samples exceeding 50 ppm (ranging from 82.3 ppm to 351ppm) immediately adjacent to the concrete foundation/basin that housed the hydraulic equipment. In this hot spot PCBs are detected in soil to depths of approximately 10 feet. PCBs are typically immobile but are soluble in oil and have likely migrated with the hydraulic fluid that was released in the area. Samples collected from within the hot spot show that the highly impacted soil is limited to the ground surface with PCB levels dropping to below 50 ppm within a few feet of the ground surface. Results from selected sample locations within the hotspot are as follows.

- SS-3: 49.1 ppm (surface) Not Detected (1.5' bgs)
- SS-11: 93.11 ppm (surface) Not Detected (1.5' bgs)
- SS-18: 111.1 ppm (surface) 25.1 ppm (2' bgs)
- SB-45: 351 ppm (0-2' bgs) 2.53 ppm (9-11' bgs)

Surface soil concentrations of PCBs in samples collected from the perimeter of the hot spot quickly drop. Of the 21 samples collected from the perimeter, all the samples, with the exception of two, contained less than 10 ppm of PCBs.

Draper Aden Associates advanced eight geoprobe borings around the perimeter of the hotspot area in March 2008 to further evaluate the depth of PCB impact. These samples confirmed low concentrations of PCBs near the ground surface and low levels at depth with PCBs greater than 1 ppm in only two samples (3.720 ppm and 2.290 ppm).

- GP-1: 0.630 ppm (1-3' bgs) Not Detected (8-10' bgs)
- GP-2: 1.690 ppm (1-3' bgs) 3.720 ppm (8-10' bgs)
- GP-3: 1.690 ppm (1-3' bgs) 0.118 ppm (8-10' bgs)
- GP-4: 2.030 ppm (1-3' bgs) Not Detected (8-10' bgs)
- GP-5: 0.127 ppm (1-3' bgs) 2.290 (8-10' bgs)
- GP-6: 0.082 ppm (1-3' bgs) Not Detected (8-10' bgs)
- GP-7: 8.200 ppm (1-3' bgs) 0.105 ppm (8-10' bgs)
- GP-8: 0.0409 ppm (1-3' bgs) 0.231 (8-10' bgs)

Low levels of PCBs were also detected in surface soil in areas where scrap was staged outdoors. A total of 47 samples were analyzed for PCBs from the general scrap storage areas. PCBs were detected in 13 of these samples at concentrations well below 50 ppm and were typically less than 5 ppm. The presence of PCBs in these areas is likely the result of residual oil present on scrap material stored at the facility. As with the metals in these outdoor storage areas, the data indicates that PCBs are limited to the surface soil layer in these areas.

3.1.3 Petroleum and Other Organic Constituents

Low levels of organic constituents, primarily Polynuclear Aromatic Hydrocarbons (PAHs), typically associated with mid-range petroleum products, were identified in scattered samples across the property. The presence of these constituents is likely related to residual oil on scrap material staged in the outdoor storage areas and/or leaks and drips from facility equipment. The highest concentrations were detected in shallow (1-3' bgs) soil samples collected by F2 from borings SB-21 and SB-22. These borings are located in proximity to the former shear/baler and likely reflect the release of hydraulic fluid or other oil in the area. PAH detections from the remainder of the scrap staging area appears to be randomly distributed and at relatively low concentrations when compared to VRP screening levels and likely future land use/development scenarios.

3.2 Groundwater Results

Groundwater samples were collected from the 14 temporary monitoring wells installed by DAA and analyzed for Target Analyte List (TAL) metals along with volatile VOCs, SVOCs, and PCBs. The temporary monitoring well locations are shown on Figures 3 and 4.

The laboratory analytical results for groundwater samples were initially compared to the Virginia VRP Tier II screening levels for unrestricted use. Various TAL inorganic compounds were detected at concentrations exceeding their respective VRP Tier II screening levels in all 14 groundwater samples. In addition, PAH compounds benzo[b]fluoranthene, dibenz[a,h]anthracene, and indeno[1,2,3-cd]pyrene were detected at concentrations exceeding their VRP Tier II screening levels, and benzo[a]anthracene and benzo[b]fluoranthene were detected at concentrations exceeding their VRP Tier II screening levels. Dibenz[a,h]anthracene was also detected in upgradient groundwater at a concentration exceeding its VRP Tier II screening level. TCL VOCs were detected in groundwater several samples at concentrations below their respective VRP Tier II screening levels. No PCBs were detected in any sample.

As groundwater use at the property will likely be restricted, the groundwater data were also compared to the VRP Tier III screening level. Tier III screening levels exist for vapor intrusion from groundwater to a commercial structure and for exposure of a construction worker. The only Tier III screening that is exceeded is that for direct exposure of a construction worker to groundwater based on the concentration of mercury.

4. Exposure Pathways

The attached Figure 5 shows a Conceptual Site Model (CSM) indicating potential exposure routes related to environmental impacts at the property. The two primary sources of contaminants, as previously discussed and as indicated on the CSM are related to the storage of scrap metal and other materials and the former hydraulic shear/baler.

The potential constituents of concern in each area are the same although the magnitude of the impacts varies as follows:

- Scrap and material storage – primary concern is high levels of metals in surface soil with scattered petroleum constituents and PCBs present at low concentrations and also limited to surface soil. The primary release mechanism for these constituents is long-term exposure to precipitation and incidental drips and leaks of oil.
- Hydraulic shear/baler – primary concerns are high levels of lead in surface soil along with significant petroleum and PCB impacts in the immediate vicinity of the former equipment location. The primary release mechanism here are leaks and drips of oil from the shear/baler and/or material being processed and exposure of scrap in the area to precipitation.

While high levels of metals in surface soil are a concern in both areas, petroleum constituents and associated PCBs are only a significant issue at the former hydraulic shear/baler. An overview of the prospective exposure routes is as follows:

- The primary exposure route that poses the greatest potential risk is related to direct exposure of surface soil impacted by the scrap yard operations. Direct exposure poses the biggest threat to future on-site workers or residents after redevelopment and to construction workers during redevelopment activities.
- As metals, PAHs and PCBs are not readily volatile; inhalation of vapors is not believed to be a significant threat.
- Windborne dust particles that contain constituents of concern represent a risk to future on-site workers or residents. However, as there is not evidence of significant dust issues at the property, exposure to surrounding residences or businesses appears unlikely.
- Impacts to groundwater are minimal and would not impact future occupants of the property or adjacent properties. It is unlikely that groundwater migration to the Roanoke River could impact aquatic life and seepage rates and river flow levels can be evaluated to determine if water quality standards would be affected.
- The potential for stormwater runoff carrying impacted sediment from the property is a potential concern that will need to be addressed as part of

the redevelopment process. There is no indication at this time that there has been significant off-site impacts related to stormwater runoff.

The following pathways are considered to be insignificant for the purposes of this preliminary analysis:

- Human ingestion of groundwater is not considered a significant risk as it is presumed that institutional controls restricting use of groundwater will be necessary as the site is redeveloped.
- Human ingestion/contact with surface water is not considered significant risk as groundwater and stormwater impact appears to be negligible.

5. Applicable Laws and Cleanup Levels

As previously noted the Virginia Scrap property was enrolled in the VRP in early 2005 with subsequent assessment activities performed on the property. This work indicated the presence of metals with some petroleum constituents and low level PCBs across much of the area where scrap metal was staged. A PCB hot spot in the vicinity of the former hydraulic scrap shredder and bailer unit was also identified.

In accordance with 9VAC20-160-30.C, properties are eligible for participation in the VRP if "(i) remediation has not been clearly mandated by the United States Environmental Protection Agency, the department or a court pursuant to the Comprehensive Environmental Response, Compensation and Liability Act (42 USC § 9601 et seq.), the Resource Conservation and Recovery Act (42 USC § 6901 et seq.), the Virginia Waste Management Act (§ 10.1-1400 et seq. of the Code of Virginia), the Virginia State Water Control Law (§ 62.1-44.2 et seq. of the Code of Virginia), or other applicable statutory or common law; or (ii) jurisdiction of the statutes listed in clause (i) has been waived."

Based on review of the available data and operating history the property is not subject to remediation under CERCLA, RCRA the Virginia Waste Management Act or the Virginia State Water Control Law. However, based on the presence of PCBs, review to determine if remediation at the property is clearly mandated by the Toxic Substance Control Act (TSCA) is necessary.

5.1 TSCA Review

Federal regulations regarding the cleanup of PCBs under TSCA are covered in 40 CFR Part 761- Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, And Use Prohibitions. Part 761.61(a) of this regulation establishes the "Self-implementing on-site cleanup and disposal of

PCB remediation waste" clean up program that will likely be used to address PCB impacts subject to TSCA at the former Virginia Scrap property.

EPA has developed a specific reference document providing assistance to EPA brownfields grant recipients, *Polychlorinated Biphenyl (PCB) Site Revitalization Guidance Under the Toxic Substances Control Act (TSCA)*, for implementing PCB cleanups.

Under the TSCA regulations in 40 CFR Part 761- Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions, soil contaminated from the release of PCBs, PCB remediation waste must be cleaned up under certain circumstances. PCB remediation waste is defined in Part 761.3 - Definitions as follows:

> *PCB remediation waste* means waste containing PCBs as a result of a spill, release, or other unauthorized disposal, at the following concentrations:
>
> - Materials disposed of prior to April 18, 1978, that are currently at concentrations ≥50 ppm PCBs, regardless of the concentration of the original spill;
> - Materials which are currently at any volume or concentration where the original source was ≥500 ppm PCBs beginning on April 18, 1978, or ≥50 ppm PCBs beginning on July 2, 1979;
> - Materials which are currently at any concentration if the PCBs are spilled or released from a source not authorized for use under 40 CFR 761.
>
> PCB remediation waste means soil, rags, and other debris generated as a result of any PCB spill cleanup, including, but not limited to:

1. Environmental media containing PCBs, such as soil and gravel; dredged materials, such as sediments, settled sediment fines, and aqueous decantate from sediment.
2. Sewage sludge containing < 50 ppm PCBs and not in use according to §761.20(a)(4); PCB sewage sludge; commercial or industrial sludge contaminated as the result of a spill of PCBs including sludges located in or removed from any pollution control device; aqueous decantate from an industrial sludge.
3. Buildings and other man-made structures (such as concrete floors, wood floors, or walls contaminated from a leaking PCB or PCB-Contaminated Transformer), porous surfaces, and non-porous surfaces.

Part 761.3 further defines disposal as:

> *Disposal* means intentionally or accidentally to discard, throw away, or otherwise complete or terminate the useful life of PCBs and PCB Items. Disposal includes spills, leaks, and other uncontrolled discharges of PCBs as well as actions related to containing, transporting, destroying, degrading, decontaminating, or confining PCBs and PCB Items.

Based on these definitions it is clear that soil and related environmental media at the property may be considered PCB remediation waste based on the fact that the material was "disposed" through incidental leaks, drips, etc. from either electrical equipment containing PCBs that were salvaged at the facility and/or from hydraulic fluid that may have been present in the scrap shear.

However, the extent to which cleanup of PCB remediation is required by TSCA is established in 40 CFR Part 761.50(b)(3) as noted in *Polychlorinated Biphenyl (PCB) Site Revitalization Guidance Under the Toxic Substances Control Act (TSCA).* 40 CFR Part 761.50(b)(3) states the following with regard cleanup of remediation waste.

> *PCB remediation waste.* PCB remediation waste, including PCB sewage sludge, is regulated for cleanup and disposal in accordance with §761.61.
>
> (i) Any person responsible for PCB waste at as-found concentrations ≥50 ppm that was either placed in a land disposal facility, spilled, or otherwise released into the environment prior to April 18, 1978, regardless of the concentration of the spill or release; or placed in a land disposal facility, spilled, or otherwise released into the environment on or after April 18, 1978, but prior to July 2, 1979, where the concentration of the spill or release was ≥50 ppm but < 500 ppm, must dispose of the waste as follows:
>
> (A) Sites containing these wastes are presumed not to present an unreasonable risk of injury to health or the environment from exposure to PCBs at the site. However, the EPA Regional Administrator may inform the owner or operator of the site that there is reason to believe that spills, leaks, or other uncontrolled releases or discharges, such as leaching, from the site constitute ongoing disposal that may present an unreasonable risk of injury to health or the environment from exposure to PCBs at the site, and may require the owner or operator to generate data necessary to characterize the risk. If after reviewing any such data, the EPA Regional Administrator makes a finding, that an unreasonable risk exists, then he or she may direct the owner or operator of the site to dispose of the PCB remediation waste in accordance with §761.61 such that an unreasonable risk of injury no longer exists.
>
> (B) Unless directed by the EPA Regional Administrator to dispose of PCB waste in accordance with paragraph (b)(3)(i)(A) of this section, any person responsible for PCB waste at as-found concentrations ≥50 ppm that was either placed in a land disposal facility, spilled, or otherwise released into the environment prior to April 18, 1978, regardless of the concentration of the spill or release; or placed in a land disposal facility, spilled, or otherwise released into the environment on or after April 18, 1978, but prior to July 2, 1979, where the concentration of the spill or release was ≥50 ppm but < 500 ppm, who unilaterally decides to dispose of that waste (for example, to obtain insurance or to sell the property), is not required to clean up in accordance with §761.61. Disposal of the PCB remediation waste must comply with §761.61. However, cleanup of those wastes that is not in complete compliance with §761.61 will not afford the responsible party with relief from the applicable PCB regulations for that waste.
>
> (ii) Any person responsible for PCB waste at as-found concentrations ≥50 ppm that was either placed in a land disposal facility, spilled, or otherwise released into the environment on or after April 18, 1978, but prior to July 2, 1979, where the concentration of the spill or release was ≥500 ppm; or placed in a land disposal facility, spilled, or otherwise released into the environment on or after July 2, 1979, where the concentration of the spill or release was ≥50 ppm, must dispose of it in accordance with either of the following:
>
> (A) In accordance with the PCB Spill Cleanup Policy (Policy) at subpart G of this part, for those PCB remediation wastes that meet the criteria of the Policy. Consult the Policy for a description of the spills it covers and its notification and timing requirements.

(B) In accordance with §761.61. Complete compliance with §761.61 does not create a presumption against enforcement action for penalties for any unauthorized PCB disposal.

(iii) The owner or operator of a site containing PCB remediation waste has the burden of proving the date that the waste was placed in a land disposal facility, spilled, or otherwise released into the environment, and the concentration of the original spill.

Based on information collected from interviews during the Phase I ESA performed prior to property acquisition it is known that all facility records were destroyed during a significant flood in 1985. Since the flood a ledger was maintained by staff of all significant material coming to the facility to show it was PCB free from post flood (1986) forward and discussion with facility staff indicated that no one was aware of the use of PCBs on-site.

With the destruction of facility records during the 1985 flood it is impossible to determine the specific dates for when PCBs may have been handled on the property. Based on the most conservative criteria in item (ii) above, it is assumed that the concentration of the spill or release at the facility was greater than 50 ppm and that areas with as-found concentrations equal to or exceeding 50 ppm will be remediated under TSCA. Based on the relatively small area at the Virginia Scrap property that meets this threshold a self implementing cleanup in accordance with 40 CFR Part 761.61 – PCB Remediation Waste is most appropriate.

Figure 4 shows that area of PCB remediation waste with in-place concentrations exceeding 50 ppm that are subject to TSCA and will cleaned up in accordance with the provisions of 40 CFR Part 761.61.

5.2 VRP Review

As noted in the introduction to this section, a property is eligible for the VRP if cleanup is not clearly mandated by other federal or state law. As CERCLA, RCRA, TSCA or other state/federal programs do not clearly mandate cleanup for the bulk of the property, RRHA intends to advance cleanup activities for the property with the exception of the PCB hotspot under the state VRP. This program provides clear guidance for addressing the metals, petroleum, and low level PCB impacts across the balance of the property.

5.3 Definition of "Site" and Program Coverage

Defining the "site" with regard to both the VRP and the portion of the property that is subject to TSCA is necessary. Both the state and federal program recognize that the "site" for regulatory purposes can be a small portion of the actual property(ies) where the impacts are present as follows.

- The VRP defines a "Site" as any property or portion thereof, as agreed to and defined by the participant and the department, which contains or may contain contaminants being addressed under this program (9VAC20-160-10. Definitions).
- TSCA defines a “cleanup site” as the areal extent of contamination and all suitable areas in very close proximity to the contamination necessary for implementation of a cleanup of PCB remediation waste, regardless of whether the site was intended for management of waste (40 CFR Part 761.3 Definitions).

Based on these definitions, the portion of the property subject to a self-implementing rule PCB cleanup is viewed as the area of the former hydraulic shredder/bailer with PCB concentrations in soil exceeding 50 ppm and the immediately surrounding area. This “cleanup site” is shown as the PCB hot spot on Figure 4. The remainder of the property will be addressed as a “site” through the VRP.

5.4 Cleanup Levels

Cleanup levels at the property will be defined by the regulatory program directing cleanup of each site.

Cleanup levels for the “cleanup site” subject to the PCB self-implementing cleanup will be determined based on the occupancy of the area once redeveloped (i.e., high or low occupancy) as follows:

- *High occupancy area* means any area where PCB remediation waste has been disposed of on-site and where occupancy for any individual not wearing dermal and respiratory protection for a calendar year is: 840 hours or more (an average of 16.8 hours or more per week) for non-porous surfaces and 335 hours or more (an average of 6.7 hours or more per week) for bulk PCB remediation waste. Examples could include a residence, school, day care center, sleeping quarters, a single or multiple occupancy 40 hours per week work station, a school class room, a cafeteria in an industrial facility, a control room, and a work station at an assembly line.
- *Low occupancy area* means any area where PCB remediation waste has been disposed of on-site and where occupancy for any individual not wearing dermal and respiratory protection for a calendar year is: less than 840 hours (an average of 16.8 hours per week) for non-porous surfaces and less than 335 hours (an average of 6.7 hours per week) for bulk PCB remediation waste. Examples could include an electrical substation or a location in an industrial facility where a worker spends small amounts of time per week (such as an unoccupied area outside a building, an electrical equipment vault, or in the non-office space in a warehouse where occupancy is transitory).

Based on the occupancy level the following cleanup levels apply as defined in 40 CFR Part 761.61(a)(4):

- *High occupancy areas* - ≤1 ppm without further conditions (High occupancy areas where bulk PCB remediation waste remains at concentrations >1 ppm and ≤10 ppm shall be covered with a cap).

- L*ow occupancy areas.* - ≤25 ppm unless otherwise specified (Bulk PCB remediation wastes may remain at a cleanup site at concentrations >25 ppm and ≤50 ppm if the site is secured by a fence, etc. or may remain at a cleanup site at concentrations >25 ppm and ≤100 ppm if the site is covered with a cap).

The specific cleanup level will be defined based on the proposed development. If it is possible to define the future development in the "cleanup site" to include a cap and/or low occupancy space a cleanup goal between 10 ppm and 100 ppm may be possible. If that level of certainty in the redevelopment can not be defined and/or future flexibility is to be retained the "cleanup site" will be remediated to a level of ≤ 1ppm.

Cleanup levels for the remainder of the property (VRP site) will be determined based on a site-specific risk assessment. The risk assessment will be based on environmental data collected from the property, evaluation of exposure routes and analysis in accordance with VRP risk assessment guidance.

Preliminary review of site data indicates that the lead concentrations will drive the cleanup. Default VRP cleanup standards for lead are 270 mg/kg and 800 mg/kg for residential and commercial/industrial land use scenarios, respectively. However, initial discussions with DEQ VRP staff have indicated that clean up levels for lead could be between 5,000 and 7,000 mg/kg based on the assumption that significant fill will be placed on the site and that the first floors of buildings will be unoccupied due to flooding issues. Of course, these numbers will need to be substantiated by the actual risk analysis.

6. Analysis of Cleanup Alternatives Considered

Based on analysis of the Conceptual Site Model, cleanup will be required at the site to address contaminated surface soil and likely additional material in the vicinity of the former scrap shear/baler. This will be confirmed and defined as the site assessment and risk assessment is completed and a formal remedial action workplan is developed to address the VRP site and a self-implementing cleanup plan is developed for the TSCA cleanup site.

A key consideration in the review of cleanup alternatives lies with the requirements for reuse of the site. The redevelopment plan for the SJRA identifies the property for reuse as mixed commercial and institutional uses. In addition, the City's Strategic Housing Plan calls for additional housing in the SJRA which could be incorporated as part of the redevelopment. If housing is incorporated as part of the project it would likely be as apartment or condominium units on upper stories of mixed-use buildings rather than residential units at grade.

As much of the SJRA, including the former Virginia Scrap property is within the 100–year flood plain, special design considerations are required as noted in the area's design guidelines. These design considerations include constructing buildings with an "other-than-habitable" use such as parking at the ground level. Another option would be to raise the site so that the first floor is above the flood level. Based on the current development patterns in the RCRT, it is reasonable to expect that the site will be redeveloped by raising the site approximately 5 feet with earth fill and then constructing buildings with first floor parking. Such a development provides for a substantial engineering control in the five feet of fill, concrete slab for parking and air space between the ground surface and first occupied floor.

The following sections review three scenarios based on no-action, limited soil removal considering the likely engineering controls associated with development and removal of contaminated soil to meet default DEQ VRP standards. For simplicity of discussion at this time, the clean up alternatives are focused on lead in soil for the VRP site (presumption that other constituents of concern will also be addressed by this action) and include a self-implementing cleanup in the TSCA cleanup site.

6.1 No Action

A no-action alternative would leave the site in its present condition, with high levels of contaminants at the ground surface, making it unsafe for and therefore unavailable for development. Even with the assumption that the site could only be developed with the placement of significant fill and/or unoccupied first floors it is unlikely that DEQ would approve such a scenario based on its policy for application of engineering controls. The only advantage of this option would be the avoidance of expenses incurred by taking action. The continued presence of lead and PCBs would pose potential long-term health risks to anyone working on the property. The health risks would prevent use of the land therefore the no-action alternative would be ineffective at accomplishing the goals of the SJRA.

It should be noted that the no-action alternative would still have to include expenses for site security, maintenance, and site monitoring. Depending on the nature of required monitoring and security, the annual cost for long-term, no action could range from $20,000 to $100,000 per year. Indirect costs include the diversion of funds from other projects or operations in the area and the loss of potential income from a development. The effectiveness, implementation, and costs associated with the no-action alternative are summarized as follows:

- Effectiveness – Ineffective in protecting human health and the environment; Negligible effect towards accomplishing land use goals and will likely hinder development in the long-term.
- Implementation – Simple, straightforward, and easy to implement.
- Cost – Minimal in the short term, but could be a very expensive alternative considering the continued maintenance expenses and the revenue lost from not using the property.

6.2 Removal of All Impacted Soils

This approach involves the removal of lead contaminated soil to Virginia DEQ default levels that will allow for safe reuse of the property. This would be driven by lead present at the property and would require cleanup to a level of 270 ppm for residential or 800 ppm for commercial/industrial use. Specific actions include:

- Mobilization of equipment.
- Stabilization of lead contaminated soil (render non-hazardous).
- Excavate and dispose of contaminated soil (within Building 3, former bailer area, and approximately 3 feet of soil across the former outdoor scrap handling/storage areas) totaling as much as 16,000 tons.
- Restore site.

This option will be the most expensive but would allow for flexibility for development as no engineering, institutional, or other land use controls would be necessary. The City's consultant estimates this option to remediate the site to a level of 800 ppm to cost between approximately $2,200,000 and $3,000,000. The lower value reflects the use of on-site treatment to render the soil non-hazardous for disposal purposes. This cost does not include fill or other steps to flood proof the site as the property is located within the 100-year flood plain of the Roanoke River. The cost to provide 5 feet of fill across the property is an additional $900,000.

The effectiveness, implementation, and costs associated with this alternative are summarized below:

- Effectiveness – Very effective at mitigating the risks to human health and the environment and accomplishing land use goals.
- Implementation – Requires a step-wise implementation of lead and PCB abatement. More difficult to implement than taking no action.

- Cost – Most expensive alternative with an estimated cost of up to $3,000,000 (not including flood proofing).

6.3 Limited Soil Removal with Engineering/Institutional Controls

This approach will be the most cost effective and assumes that cleanup will occur concurrently (or at least in coordination) with the future development. Development on the property will likely incorporate the following processes for basic development and to address flood plain issues:

- Placement of several feet of fill.
- Construction of parking or other unoccupied first floor uses.
- Structural fill and concrete slabs on grade.

These activities, alone or combined, will create an "Engineering Control" (or cap) that will limit the exposure of future users of the property to underlying soil. With the cap in place, DEQ typically allows 10 times the normal cleanup level. By using a cap as part of the clean up, lead impacted soil would only need to be remediated to a level 2,700 ppm to allow residential uses and to a level of 8,000 ppm for commercial/industrial uses only. DEQ has indicated that upper floor residential development may be possible with a cleanup level between 5,000 and 7,000 ppm based on the premise of a substantial engineering control provided by design requirements for flood proofing.

This approach would remove the top, most heavily impacted soil layer, leaving much of the underlying soil in place. This top layer includes loose soil and debris that would likely be removed as part of the development process to create a suitable sub-grade to build from. The quantity of material to be removed based on the cleanup endpoint is estimated between 9,000 and 10,000 tons.

The City's consultant estimated the cost of this approach at approximately $1,500,000. The cost to provide 5-feet of fill across the property to assist with flood proofing is estimated at $900,000 for a total cost that is still less than a more extensive soil removal action.

The effectiveness, implementation, and costs associated with this alternative are summarized below:

- Effectiveness – Effective at mitigating the risks to human health and the environment and accomplishing land use goals in SJRA.
- Implementation – Requires removal of surface material only containing lead and PCBs from the VRP site and implementing self-implementing cleanup at the TSCA cleanup site and placing a "cap" on the site. Based on the proposed redevelopment plan it may be possible to use more flexible cleanup standards at the TSCA cleanup site due to installation of

a cap and/or provision of a low occupancy space above the area. This option is more difficult to implement than taking no action but significantly less expensive than removal of all impacted soils.
- Cost – Moderately expensive alternative with an estimated cost of up to $1,500,000.

6.4 Preferred Alternative

The preferred scenario for cleanup and redevelopment of the site is limited soil removal with the use of engineering and institutional controls. This option is protective of human health and the environment and utilizes site work and design considerations that will be required as part of the redevelopment as engineering controls. In this manner the volume of soil that would be removed is significantly reduced which lowers the project cost and also reduces the amount of material that would be shipped from the site for disposal elsewhere.

This approach is satisfactory to address the VRP and TSCA self-implementing cleanup requirements.

7. Redevelopment Concept

This section provides a conceptual overview of how the site could be reused based on the preferred remediation alternative and the contents of the SJRA Redevelopment Plan. As previously noted, the Redevelopment Plan calls for the property to be reused as an Institutional/Mixed Use development with some open space. The City's Strategic Housing Plan also suggests that additional housing opportunities be incorporated in the area.

The former Virginia Scrap Property is currently zoned Institutional Planned Unit Development (INPUD). The INPUD district contains the following requirements regarding land use and development:

- General uses: Multifamily residential, office, medical clinic, educational facilities, eating/drinking establishments, outdoor recreation
- Residential density: 1,800 sf/unit (maximum 174 residential units)
- Building height (max): N/A
- FAR: 10.0
- Impervious surface ratio: 80%
- Open space: 300 sf/residential unit

A set of design guidelines has been prepared for the SJRA that further defines development patterns beyond those in the zoning ordinance. These guidelines divided the SJRA into three design districts. The former Virginia Scrap property is located in both the Jefferson Corridor and Crossings design districts with differing development requirements as follows:

Jefferson Corridor:

- Building height (max): 120 ft
- FAR: 3.0
- Maximum build out: 540,201sf

Crossings District:

- Building height (max): 40 ft
- FAR: 1.2
- Maximum build out: 160,234

Total build out: 700,435 sf

Floodplain Use (excerpt from SJRA Design Guidelines):

Because of the floodplain condition of much of the redevelopment area, the first floor of some buildings will need to have an other-than-habitable use. Some redevelopment projects may capitalize on this condition to park cars on a pad below the first occupied floor, or to raise the building pad in accordance with the City of Roanoke floodplain regulations. Creative application of techniques to mitigate and manage potential flooding will be key to successful development in the redevelopment area.

Figures 6 and 7 show a concept plan for how the site could be developed based on the prospective land uses from the Redevelopment Plan and Strategic Housing Plan, the allowable density and related development requirements of the zoning ordinance and SJRA design guidelines. This development could include:

- First floor parking in structures.
- Lower level floors available for various commercial and institutional uses.
- Upper level floors available for additional office space or for residential use.
- Open space for customers, workers, and/or residents as well as potential tie-ins to the Roanoke River Greenway or related spurs.

FIGURES

FIGURE 1
SITE LOCATION
Former Virginia Scrap Properties

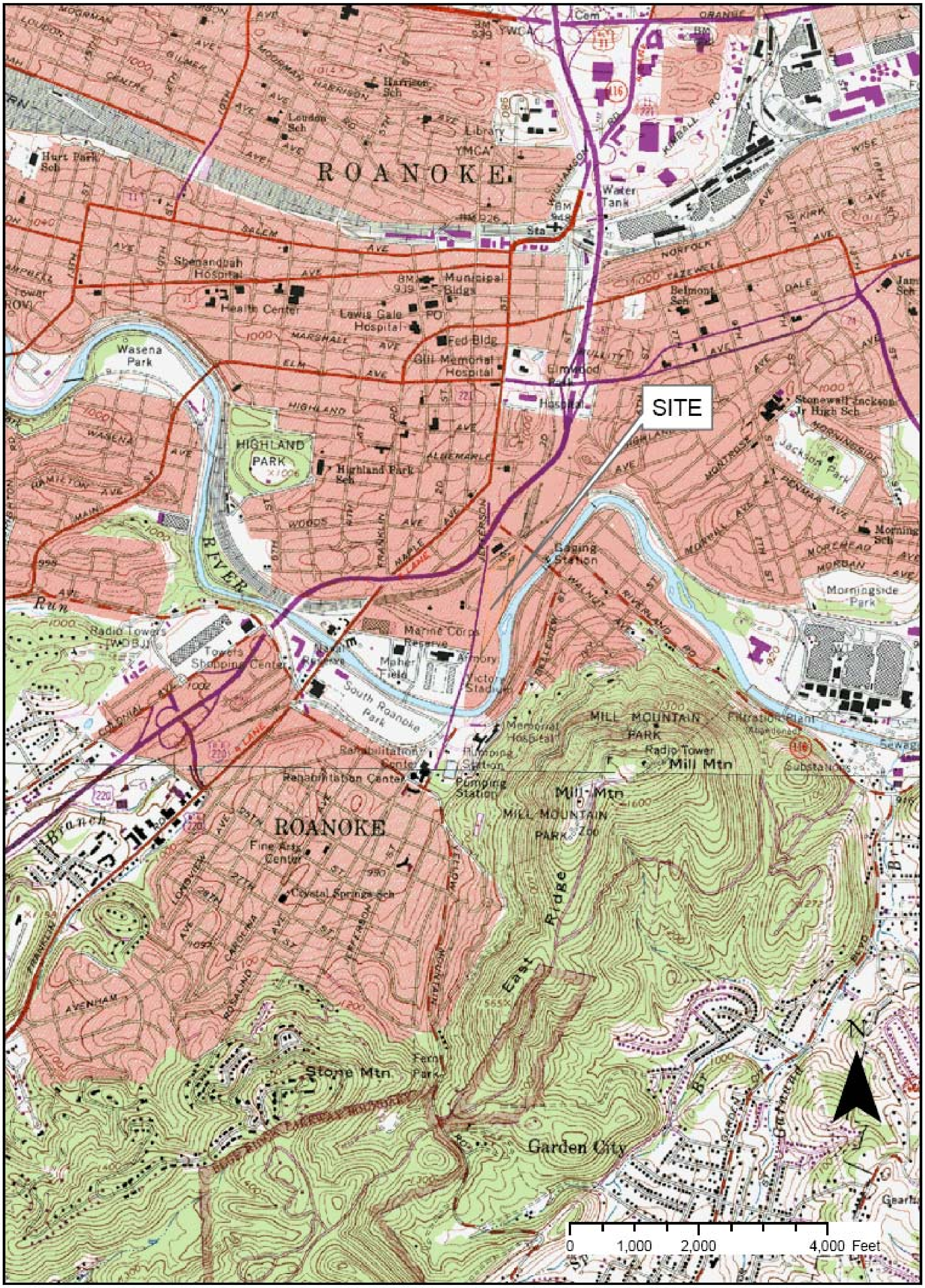


FIGURE 2
SITE CONDITIONS
Former Virginia Scrap Iron & Metal Company Properties

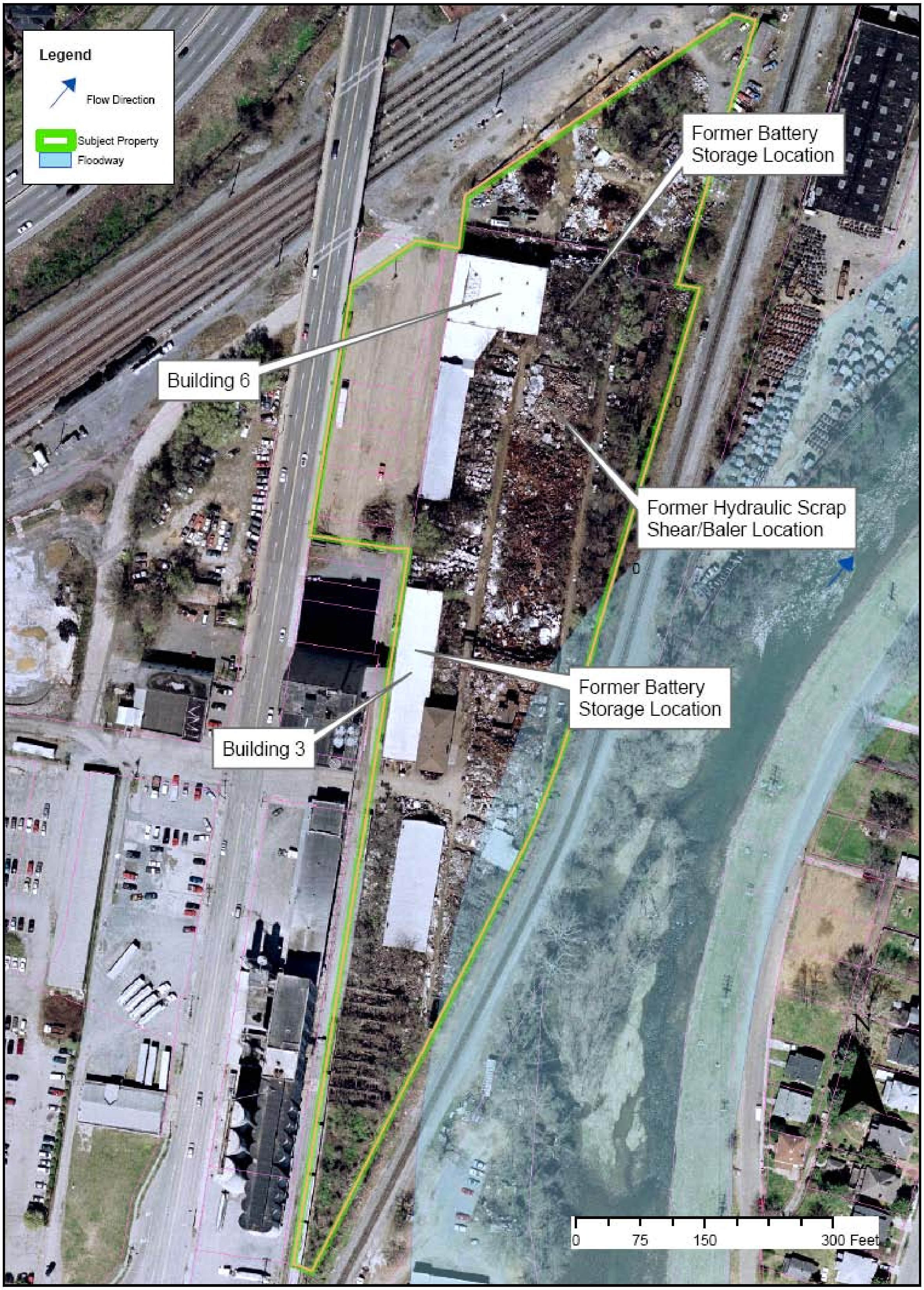


FIGURE 3
EXTENT OF LEAD IMPACTS
Former Virginia Scrap Iron & Metal Company Properties

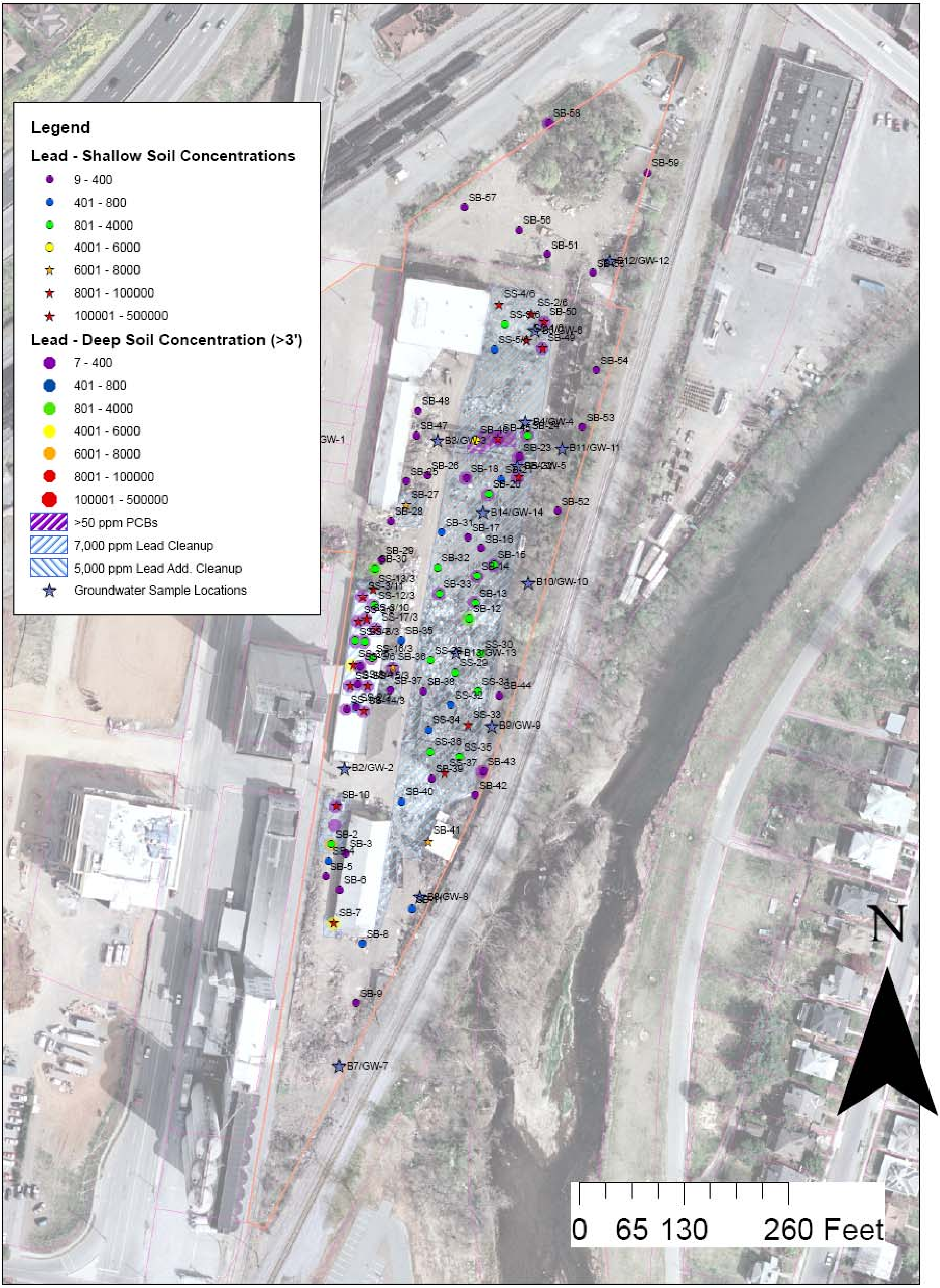


FIGURE 4
EXTENT OF PCB IMPACTS AND
PROSPECTIVE TSCA CLEANUP SITE
Former Virginia Scrap Iron & Metal Company Properties

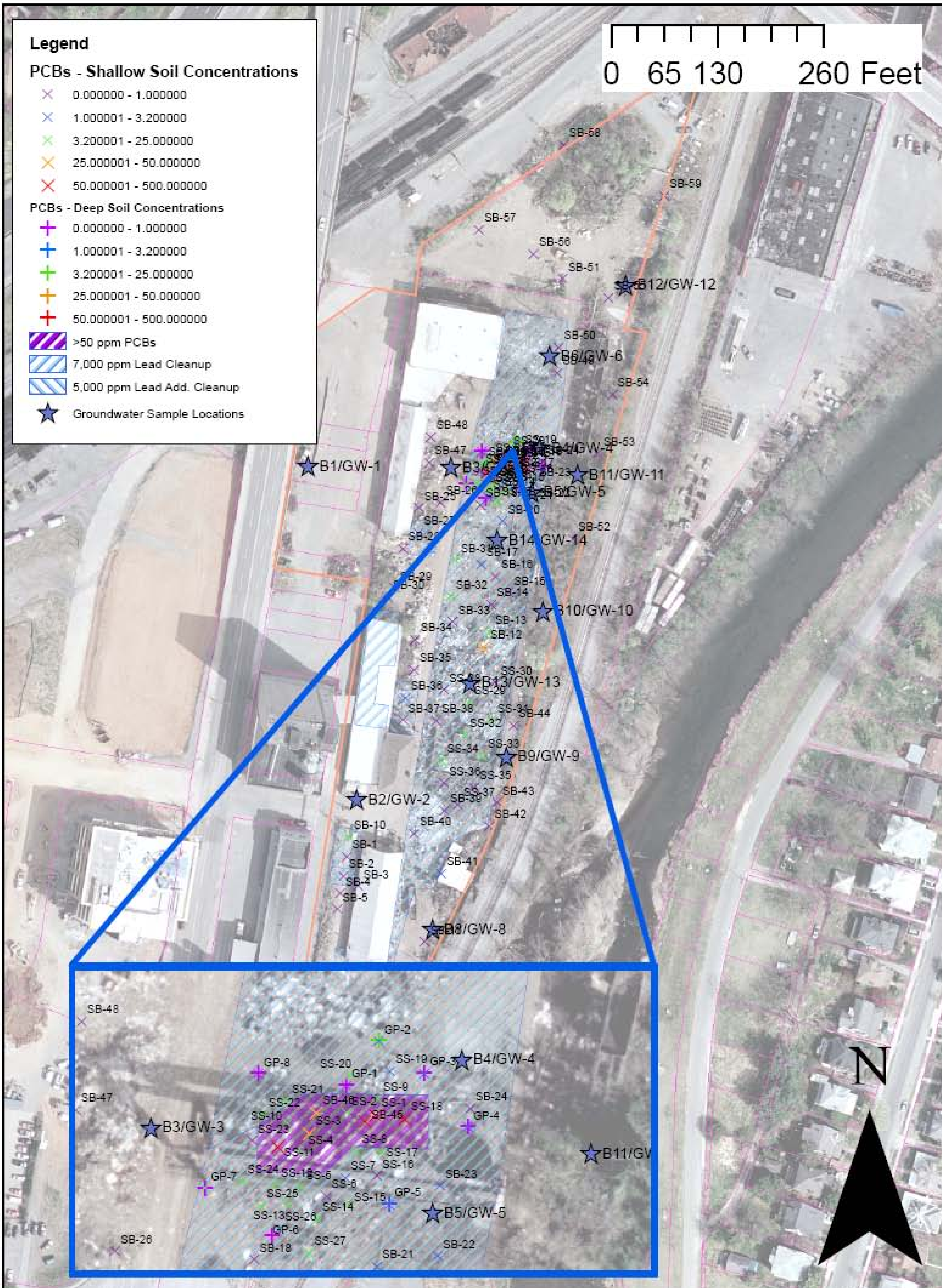


FIGURE 5
CONCEPTUAL SITE MODEL
Former Virginia Scrap Iron & Metal Company, Inc. Properties

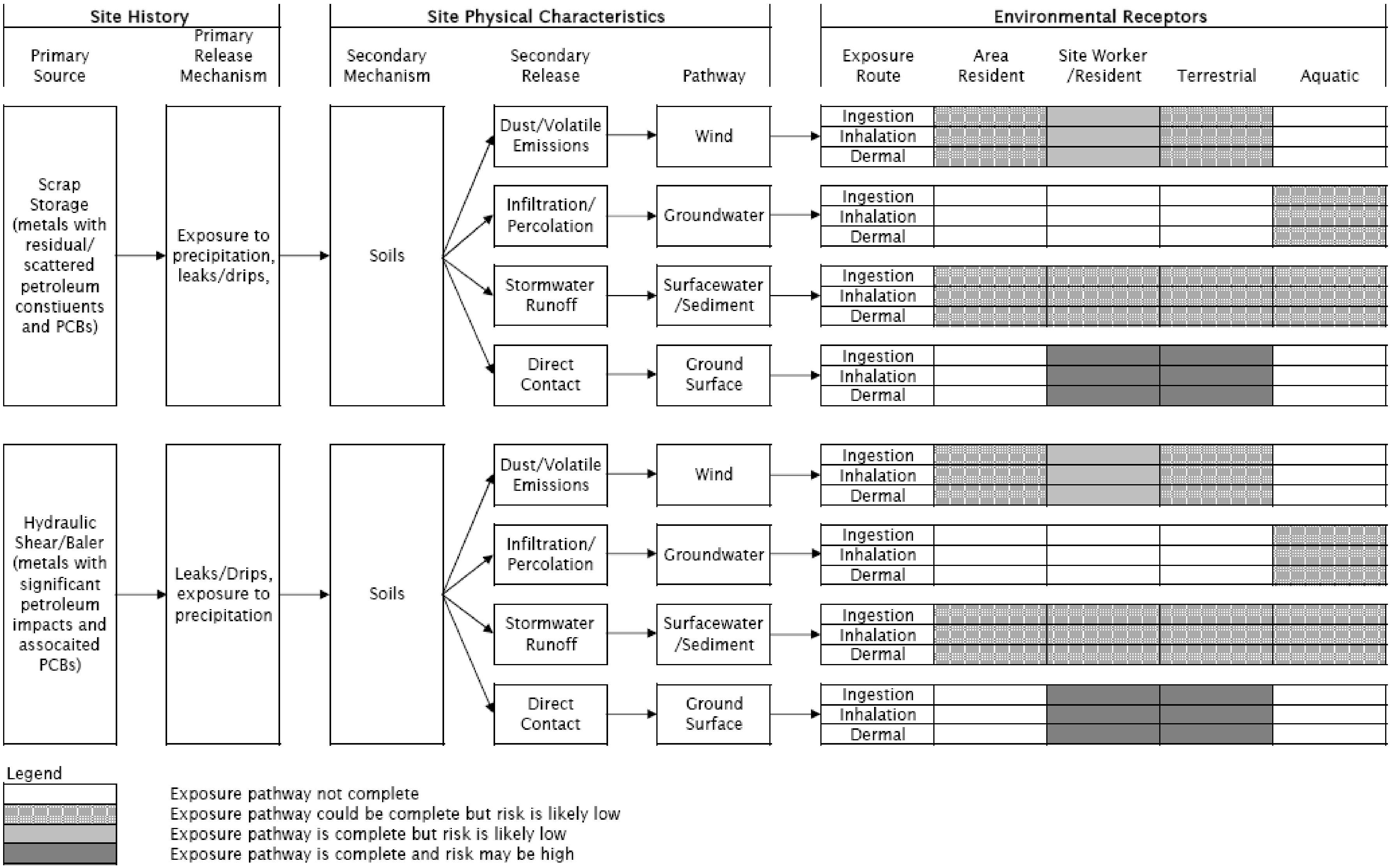
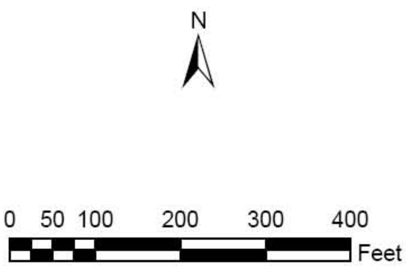
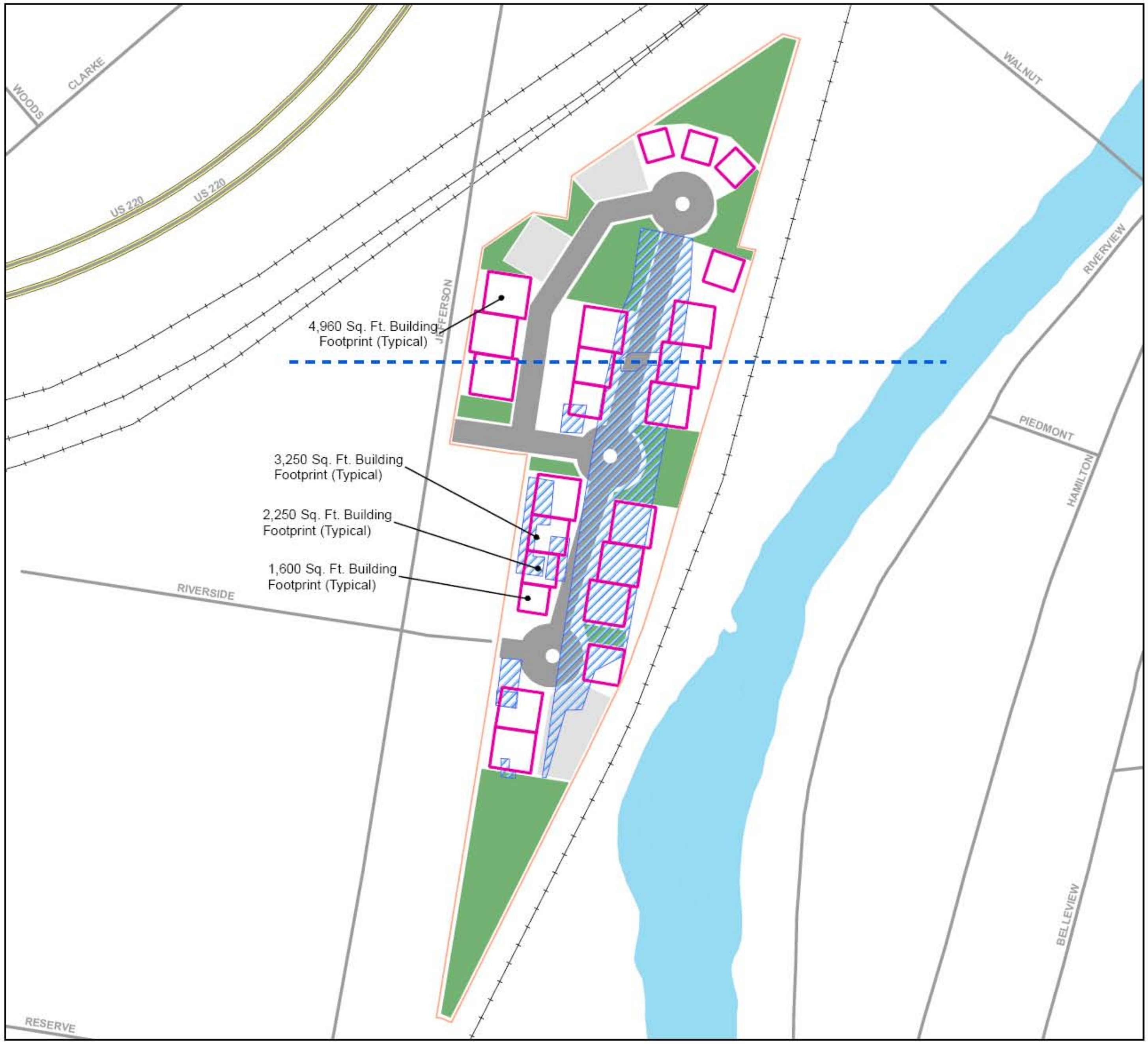


FIGURE 6
CONCEPT PLAN - MAXIMUM BUILD OUT
Former Virginia Scrap Properties





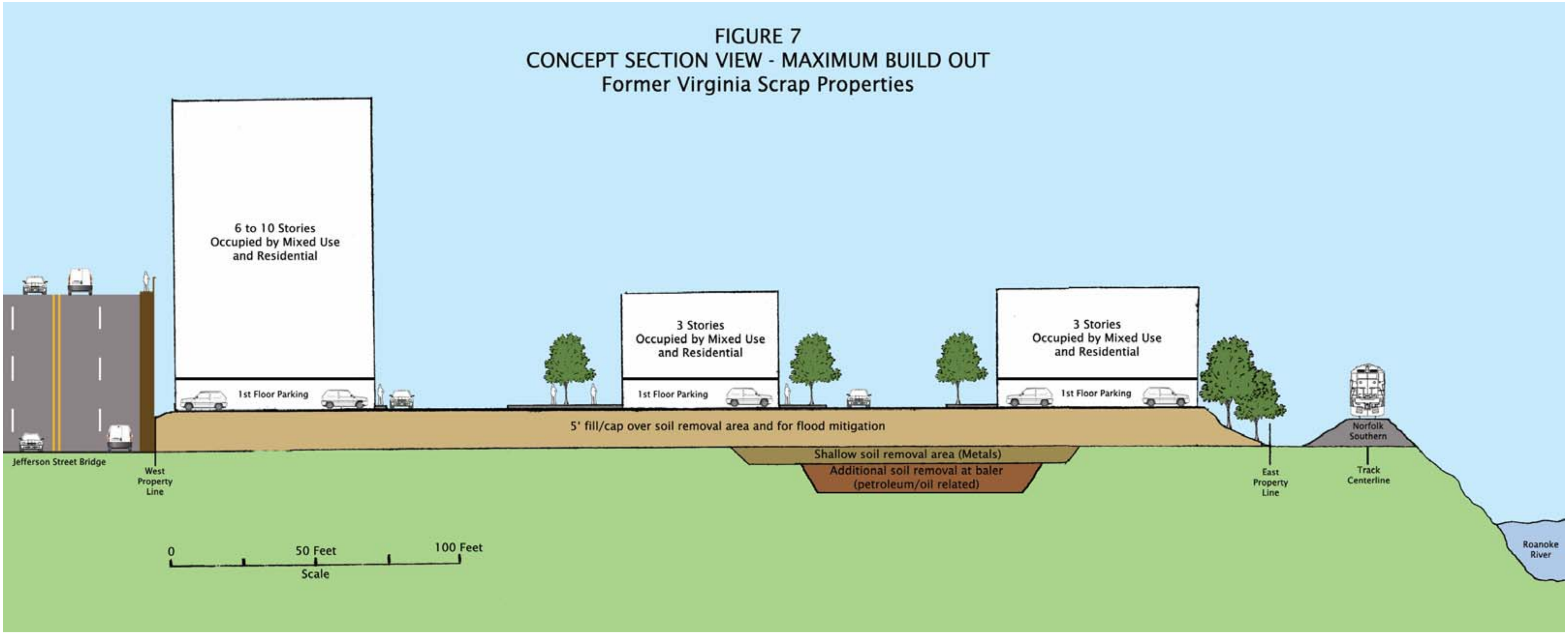


FIGURE 7
CONCEPT SECTION VIEW - MAXIMUM BUILD OUT
Former Virginia Scrap Properties