Analysis of Brownfield Cleanup Alternatives

White Park Southside Trail Cleanup
1001 Mississippi Street
Monongalia County
Morgantown, West Virginia

Brownfield Cleanup Grant
#95330201

Prepared for and by:
City of Morgantown
389 Spruce Street
Morgantown, WV 26505

March 1, 2024

Version 2

TABLE OF CONTENTS

TABLE OF TABLES

TABLE OF FIGURES

1. INTRODUCTION

The City of Morgantown (hereafter 'the City' or 'Morgantown'), presents here an Analysis of Brownfield Cleanup Alternatives (ABCA) for the White Park Southside Trail Cleanup Project (Site) in support of Environmental Protection Agency (EPA) Brownfield Cleanup Grant #95330201. The ABCA:

- Describes the historical and planned future use of the Site;
- Reviews previous environmental investigations and their findings;
- Identifies and evaluates feasible cleanup alternatives; and
- Recommends a cleanup alternative that directly integrates with site redevelopment objectives.

1.1 Project Goal

Recent Site Assessment identified heavy metals and PAHs in Site soils above state risk-based standards. The proposed cleanup will include construction of a new trail subsystem and closure of existing, unauthorized trails. We propose an integrated process that combines remedy and reuse with goals to:

- Achieve a Certificate of Completion via the West Virginia Voluntary Remediation Program;
- Minimize negative ecological impacts of any cleanup to the Site's mature forest canopy;
- Make trails more accessible, sustainable, and useable for both transportation and recreation; and
- Leverage diverse funding sources and innovative methods to more fully complete remediation projects during cleanup phases.

1.2 Site Location and Description

The City's 170-acre White Park (Figure 1) sits in between several residential neighborhoods, two commercial corridors, and a large county school campus in the southern portion of Morgantown, Monongalia County, West Virginia. The Southside Trail Site (Figure 2) encompasses nearly 22.5-acres of mostly underutilized and poorly accessible park lands, including portions of and extending across four City-owned parcels listed below in Table 1.

Table 1: White Park Southside Cleanup Parcels

Parcel ID	Total Acres	Owner
31-09-048A-0006-0000	40.74	City of Morgantown
31-09-048A-0007-0000	7.118	City of Morgantown
31-09-0048-0041-0000	33.51	City of Morgantown
31-09-048A-0001-0000	3.051	City of Morgantown

The Site forms part of White Park's southern boundary. One of the City's secondary drinking water reservoirs (Cobun Creek Reservoir #1) forms most of the Site's northern border and is within park boundaries. The remainder of White Park and a small portion of the Site, both north of the reservoir, are lightly developed by a recreational trail network that winds through mature forested lands. Other park developments, outside the boundary of the Southside Trail Site, include several ballfields, an ice rink, picnic pavilions, public restrooms, and other typical park amenities.

A commercial plaza sits between the Site's southern boundary and Greenbag Road. Light commercial development also sits to the west, bordering Don Knotts Blvd. (Route 119). The municipal water treatment plant sits across Route 119, just downstream of the Site. South Middle School and Monongalia County Technical Education Center campuses are also located to the northeast, immediately adjacent to White Park.

No permanent, habitable structures exist on the Site. Several thousand feet of existing, unauthorized, social and/or wildlife trails pass on, around, and through poorly drained earthen berm features left behind by previous Site use. Outside a recently cleared and poorly compacted utility corridor that transects the site east to west, the Site contains a mature forest canopy and typical eastern, hardwood forest silt loam between the berm clays and hardpan. A gravel dam access road and construction laydown area sit on the western side of the Site. In general, the Site's terrain is mixed with side slopes ranging between 5%-60%.

1.3 Geology and Hydrogeology

The Site sits at an elevation of approximately 950 to 1,000 feet above mean sea level. The topography of the project area has a hilly and variable gradient, generally sloping north towards the Cobun Creek Reservoir. Regionally, the slope trends west towards the Monongahela River.

The Appalachian Plateaus physiographic province underlies all of Monongalia County, including the White Park Southside. Bedrock in the region is characteristically flat to gently folded shale, siltstone, and sandstone. Uppermost consolidated geology is composed of the Conemaugh Group of the Pennsylvania Series, which consists of non-marine cyclic sequences of red and grey shale, siltstone, and sandstone. Thin seams of limestone and coal are also present.

U.S. Department of Agriculture's (USDA's) Soil Conservation Service (SCS) mapping[1] indicates primary soils at the site consist of Clarksburg silt loams, with minor contributions of Culleoka-Westmorland silt loams, Lobdell silt loams, and Urban Land. Clarksburg silt loams are moderately well drained and are derived from fine- loamy colluvium from shale, sandstone, and limestone parent material. Urban land is largely introduced material.

Surface runoff at the Site flows toward Cobun Creek and the Cobun Creek Reservoir to the north. Cobun Creek discharges into the Monongahela River approximately 0.25-miles to the west. Under natural, unconfined aquifer conditions, shallow groundwater is anticipated to flow towards the reservoir and the Monongahela River.

The online National Wetlands Inventory[2] mapping indicates no wetlands located within the White Park Southside project area. The Cobun Creek Reservoir is designated as a 12.17-acre freshwater pond. Cobun Creek incoming from the east is classified as a riverine habitat.

1.4 Site History

The City acquired the Site in 1973 as part of a succession of transfers of real estate that eventually formed White Park. Immediately prior to the City's ownership, the Site, the rest of White Park lands, and several other surrounding properties sat largely vacant for decades after the decommissioning of Standard Oil's (succeeded by Eureka Pipeline, Pennzoil-Quaker State, and Royal Dutch Shell) 700-acre South Morgantown Tank Farm.

The Tank Farm began crude oil storage operations around 1890 and operated throughout the first half of the 20th century. Although largely abandoned by the late 1940s, a handful of aboveground storage tanks (ASTs) remained, at least two of which were on the Site, and which may have been used for other purposes into the early 1970s. Aerial imagery and other records suggest the Tank Harm had at least 70 ASTs at its operational height, with a total capacity around 2 million barrels. Primary and secondary containment berms formed by large earthen dikes largely remain, suggesting at least 6 ASTs previously existed on the Site.

[1] https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx
[2] https://fwsprimary.wim.usgs.gov/wetlands/apps/wetlands-mapper/

In 1958, the Morgantown Water Commission constructed a dam to form a drinking water reservoir immediately adjacent to the Site. A 1960 aerial shows only three tanks on the farm (two existing on the Site), with unknown uses and stewardship. In 2016, concerns with the reservoir's capacity to service the area's water needs prompted the Water Commission's successor, the Morgantown Utility Board (MUB) to begin constructing a new and much larger reservoir several miles upstream. In 2019, MUB placed a raw water line through the Site to connect the new reservoir, still currently under construction, to the municipal drinking water treatment plant just downstream of the Site near the confluence of Cobun Creek and the Monongahela River.

1.5 Site Uses

Today, White Park serves as major recreational hub for the City. It is the center for numerous activities including adult and youth ballfields, the Morgantown Ice Arena, picnic shelters, playground areas, and outdoor classroom areas for the adjacent middle school. A substantial natural-surfaced trail system developed informally over the past century, winding through, around, and on top the abandoned primary and secondary AST containment dikes. Before the City and its Board of Parks and Recreation Commissioners (BOPARC, the land manager) formalized White Park, this greenspace was essentially unmanaged. Curious hikers, motorcyclists, and early mountain bikers blazed a labyrinthian system from the natural wildlife and dog trails. Although popular, these trails now elicit as many complaints as they do praise due to their extreme density, poor drainage, high maintenance costs, and general lack of ability to supply desired and accessible experiences for the various user, volunteer, and manager groups. The system now serves cross-country teams, the adjacent middle school bicycle club, hikers, birders, and several other trail users.

Until recently, the Site has been a less visited portion of the park primarily due to limited options for access. Still, a loose network of poorly built, unsanctioned, casual trails demonstrate consistent, if occasional, visitation.

In recent years, community demand for recreation and alternate transportation routes spurred major planning efforts focusing on development and expansion of the City's existing trail network. Due its central location and proximity to neighborhoods, schools, and commercial districts, White Park is a central hub for a larger regional trail network that is being designed and built in phases and supported by the 2020 Morgantown Regional Bike and Pedestrian Transportation Plan.

In early 2020, the City and West Virginia University (WVU) jointly contracted IMBA Trail Solutions to develop an Area-wide Master Trails Plan. The plan, initial phases of which were completed during the spring of 2022 after an intensive phase of research, planning, and interactions with area stakeholder groups; provides a comprehensive blueprint for implementation of a trail network consisting of greenway corridors, alternate transportation routes, and "pocket parks" on both City and university owned lands inside city limits and extending into Monongalia County. Development of the White Park Southside Trail will be the first phase of the City's trail redevelopment effort and will showcase an innovative and technically sound approach as a model for future successes.

2. PREVIOUS ENVIRONMENTAL INVESTIGATIONS

As a result of historical use as a crude oil aboveground storage tank (AST) farm, site assessment for White Park has occurred in sporadic phases beginning in the 1980s, including some investigation into tank sites on the Site. Assessments specific to the White Park Southside Cleanup project area began in 2019, although targeted assessment and cleanup activities have been performed at the Site beginning in 1988.

The following subsections present a summary of historical assessment findings and targeted cleanup actions provided in a May 2022 Phase II ESA for the White Park Southside Cleanup project area (Environmental Standards, 2022). The Phase II ESA was performed utilizing funding provided by an EPA Brownfield Community-Wide Assessment grant Cooperative Agreement (BF-963692-01-0) awarded to the West Virginia Land Stewardship Corporation (WVLSC). Refer to Figure 3 for a map depicting numbered AST locations.

2.1 1980s through early 2000s

In August 1988, White Park, inclusive of the White Park Southside Cleanup project area, was listed as a potentially hazardous waste site in the Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) as WVD988766168 resulting from an inspection and preliminary sampling investigation conducted by the West Virginia Department of Natural Resources, Waste Management Section (WVDNR WMS).

The inspection was initiated by a report from a private citizen concerning tar-like deposits observed in an area remaining from the former crude oil tank farm. During the inspection, a tar-like substance with a petroleum odor was observed in a former dike area near the South Middle School, and additional tar-like deposits were observed along a small tributary stream that flowed into the Cobun Creek Reservoir.

A Preliminary Assessment (PA) was performed in March 1989 by WVDNR WMS, and a CERCLA site investigation (SI) was recommended.

In April 1989, WVDNR WMS personnel inspected White Park. In 1998, the Eureka Pipeline Company completed reclamation work consisting of mixing lime with surface soils in three dike areas near the ball fields with exposed hydrocarbon residues. These were identified as tank locations 44, 68, and 74. One of these reclaimed dike areas sits at the northeastern corner of the Site.

In 2004, the WVDEP Office of Environmental Remediation (OER) determined further assessment was warranted to determine potential risk associated at White Park and if the site should undergo further investigation under CERCLA.

2.2 2009 Site Inspection Reassessment and Soil Cleanup

A Site Inspection was performed at White Park under a pre-remedial cooperative agreement between the WVDEP and the EPA Region III in 2009. Field sampling activities included 13 surface soil, seven subsurface soil, two reservoir surface water, and two reservoir sediment samples. The samples were analyzed for Volatile Organic Compounds (VOCs); Semivolatile organic compound (SVOCs) of which Polycyclic Aromatic Hydrocarbons (PAHs) are a subset; Resource Conservation and Recovery Act (RCRA) 8 Metals; and polychlorinated biphenyls (PCBs).

The investigation reported the following:

- Elevated concentrations of barium in the reservoir surface water
- Elevated levels of SVOCs in the reservoir sediments

- Arsenic, naphthalene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd) pyrene, methylene chloride, benzene, 1,2-dichloroethane, ethylbenzene, and 1,1,2,2 tetrachloroethane in soils at concentrations greater than their respective residential soil risk-based concentrations (RBCs).

The highest concentration of these contaminants occurred near free-product observed within the diked area of former tank number 40, which is within the Site boundary and approximately 100-feet upgradient of the Cobun Creek Reservoir. The following conclusions were provided in the SI Report (Triad, 2010):

- Contamination to site soils from historical land use (tank farm) exists.
- Recreational visitors are being exposed to surface soil concentrations above residential soil RBCs.
- The risk of a release to Cobun Creek Reservoir via overland flow exists.

The following actions were recommended for consideration:

- Removal of the area of observed free product in the diked area of tank number 40.
- If not already in place, groundwater and future land use be restricted through a land use covenant or deed restriction.

Upon notification of the SI findings by WVDEP, in November 2010, Pennzoil-Quaker State removed approximately 1,300 cubic yards of soil from the diked area of former tank number 40 and transported the impacted soils off site after characterization as non-hazardous waste. Approximately 1,900 cubic yards of off-site backfill was imported from a virgin hillside/hill cut at the southern terminus of Distributor Drive (MUB office located on intersection of Greenbag Road and Distributor Drive) approximately 1-mile south the Site. Prior to import, the backfill was characterized by VOC analysis of two samples to demonstrate attainment of WVDEP residential soil RBCs.

2.3 2019 MUB Phase II ESA and Soil Removal

During June 2019, a limited Phase II ESA (Triad, 2019a) was completed on behalf of MUB to assess subsurface soil contamination along the corridor of a proposed raw waterline. The waterline corridor transects the White Park Southside Trail Cleanup project area from northeast to southwest.

A total of 43 subsurface soil samples were collected and analyzed for metals, VOCs, and SVOCs. Phase II ESA findings indicated low level PAHs and metals present in the subsurface soil of the proposed waterline right-of-way.

As a result of the Phase II ESA findings, MUB coordinated with the WVDEP and an environmental professional from Triad Engineering, Inc. (Triad) was retained to perform monitoring during excavation of the waterline right-of-way. A strong petroleum odor and soil staining were observed during excavation near the former tank number 40 location, presumably in or near the same location remediated by Pennzoil/Quaker State in 2010. Soils presumed contaminated based on photoionization detector field screening were over excavated and temporarily stored onsite. Triad noted that suspected petroleum contamination became less evident as excavation progressed northeast. A total of 10 samples were collected from the estimated 2,785-tons of stockpiled material and analyzed for potential leachability for disposal purposes. Excavated soils were disposed offsite at a local disposal facility in accordance with the approved Soil Management Plan (Triad, 2019b). Due to the analysis performed (TCLP extract), direct comparison to WV VRP De Minimis standards for residential soils was not applicable.

2.4 2020 Site Inspection Reassessment

In 2020, a site inspection reassessment (SIR) (Triad, 2020) was performed under a pre-remedial cooperative agreement between the WVDEP and EPA Region III. The SIR was performed to qualitatively assess potential risk and determine whether the entire White Park CERCLIS Site may be eligible for further investigation under CERCLA. Reassessment activities included collection of 11 surface soil, five subsurface soil, five surface water, eight sediment samples, and four soil vapor samples for analysis of VOCs, SVOCs, metals, and PCBs.

Elevated concentrations of metals were detected in surface water and sediment. Metals and PAH were detected in soils at concentrations greater than their respective residential soil RBCs. The highest contaminant concentrations were observed in samples collected in the diked areas of former tank numbers 30, 50, 60, 61, 62, and 74. (Figure 3)

Based on the reassessment activities, the recommendation was provided to enter the White Park site into the West Virginia Voluntary Remediation Program (VRP) to evaluate human health and ecological receptors and remedial options for the Site.

2.5 2022 Phase II ESA for White Park Southside Trail Property

Based on the history of White Park and findings of previous assessments, a limited Phase II ESA (Environmental Standards, 2022) was performed prior to construction of the proposed White Park Southside (WPS) trail. The assessment focused on the planned trail course, and not the entire property. Soil samples were collected to identify and characterize contaminants present within the White Park Southside Cleanup project area that would be a potential risk to recreational trail users of the Site.

A total of 65 surface soil samples were collected from the 0-2 feet below ground surface (bgs) at regular intervals along the proposed trail corridor. Four subsurface soil samples were collected from the 2-8 feet bgs, in areas of potential on-site borrow material to support construction of natural surfaced trail features. Soil samples were analyzed for RCRA 8 metals, PAHs, and VOCs.

Soil analytical results were compared to calculated recreational regional screening levels (RRSLs) derived using the EPA regional screening level generator tool and exposure scenarios approved by WVDEP as inputs. Recreational exposure is typically less than residential so results that exceed the calculated recreational screening levels would typically also exceed WV De Minimis values for residential soil.

Laboratory analytical results indicated that the only metal exceeding its calculated RRSL was arsenic in 13 of the 65 surface soil samples. There were multiple PAHs that exceeded their calculated RRSLs in surface soil across the Site. Arsenic was also the only metal detected at a concentration that exceeded the RRSL in subsurface soil. Subsurface soils demonstrated attainment of the RRSLs for PAHs.

The Phase II ESA recommendations included:

- Development of a soil management plan.
- Rerouting of the trail was not recommended without additional sampling.
- Entry of the site into the WV VRP.

Based on the current proposed trail path across the White Park Southside Trail Cleanup project area, the Phase II ESA also recommended a soil cover should be established in the areas of sample locations near T-37, T-38, and T-43. The cover was recommended to be a one-foot layer of clean soil, although alternate materials and cover thickness may be approved by WVDEP, to provide exposure pathway elimination for contaminants in soil.

2.6 Voluntary Remediation Program (VRP)

On October 5, 2022, the entire White Park site was accepted into the WV VRP with the City of Morgantown as the Applicant. For the White Park Southside Trail Cleanup project, site assessment in the context of the VRP is complete. A WVDEP-approved human health and ecological risk assessment addressed the potential for adverse effects related to exposure to constituents associated with soil and groundwater from the Site. The receptors considered for remedial action include residents, indoor workers, recreators, outdoor workers, construction/utility workers, trespassers, visitors, and ecological receptors.

The City coordinated development of a site assessment work plan for the White Park Southside cleanup project and completion of supplemental site assessment activities. The supplemental site assessment included the collection of four surface soil samples; three in a proposed "Skills Area", and one at a proposed cross-over trail, near the confluence of former AST locations T-37, T-38, and T-43 (Figure 3). Five subsurface soil samples collected at known AST locations across the Site were analyzed via synthetic precipitation leaching procedure (SPLP) as an alternative to groundwater monitoring samples. Analytical testing included RCRA metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, silver, and zinc), and PAHs.

A human health and ecological risk assessment (HHERA) was completed and approved by the WVDEP that addressed the potential for adverse effects related to exposure to constituents associated with soil and groundwater from the Site. The receptors considered for remedial action include residents, indoor workers, recreators, outdoor workers, construction/utility workers, trespassers, visitors, and ecological receptors.

Constituents associated with groundwater (SPLP leachate), potential vapor intrusion, surface soil, and subsurface soil exposures were evaluated and included in the assessment. The HHERA concluded:

- There are no contaminants of concern (COCs) or complete pathways for any potential future use to the groundwater or to occupied structures (vapor intrusion) or workers (ambient vapors).
- Arsenic, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenz[a,h]anthracene, benzo(k)anthracene, and indeno[1,2,3-cd]pyrene are COCs in surface soil for a residential or recreational use scenario in limited areas.
- Arsenic is a COC in surface soil for a future industrial use scenario at one location, northwest of the secondary containment berm of former AST, T-37.
- Benzo(a)pyrene is a COC in surface soil for a future industrial use scenario at one location, the northern edge secondary containment berm of former AST, T-43.
- Arsenic is a COC for subsurface soil, but only for a construction worker/utility worker use scenario. To be conservative, all former AST locations are considered potentially complete pathways to a future construction/utility worker.
- There are no potentially complete ecological exposure pathways identified.

Based on the results of HHERA, remedial action is warranted for the White Park - Southside Trail Site. The following is recommended:

- Restriction of the Site to non-residential use via a land use covenant (LUC).
- Restricting access to impacted soils, removal of impacted soils, or a surface covering of the impacted soils in the identified hot spots is warranted to prevent direct contact and sever the remaining soil exposure pathways. If a soil cover is selected as the remedy, the cover would be maintained and disturbance of the cover would warrant health and safety protocols, and repairs. If soil removal is selected as a remedy, the removal should be performed under the guidance of a Soil Management Plan (SMP).
- For the construction/utility worker, the results suggest that requiring worker training and wearing protective clothing is warranted for activities undertaken in defined areas of concern (to prevent potential subsurface soil contact in former AST locations). Furthermore, excavation, surface exposure, and/or removal of subsurface soils from these areas of concern within the Site should be performed under the guidance of a SMP.
- A Remedial Action Work Plan should be developed to address the above potentially complete

exposure pathways and submitted to the WVDEP for review and approval.

For the White Park Southside cleanup project, a VRP Remedial Action Work Plan is currently being developed in tandem with the planned trail development.

.

3. APPLICABLE REGULATIONS AND CLEANUP STANDARDS

The WVDEP provides the state's environmental oversight and has provided a specific letter of support for this project. WVDEP operates and regulates according to environmental laws adopted by the United States Congress and the West Virginia Legislature.

Authorized by the West Virginia Voluntary Remediation and Redevelopment Act (WV VRRA), the WVDEP OER administers the WV Voluntary Remediation Program (VRP) and provides regulatory oversight for all brownfield cleanup projects. The program provides a Certificate of Completion to applicants who successfully demonstrate their site has met the state's most current risk-based human health and ecological standards, reviewed annually and published as the WVDEP VRP De Minimis Standards and Relevant Benchmarks within Interpretive Rule 60CSR9. Decisions on how to remedy a site through the VRP are based on risks the site may pose to human health and the environment. Remedies such as removal, treatment, and control of the contamination are used, alone or in concert, to address these risks. The VRP is protective of communities and the environment, while promoting economic development in West Virginia.

The cleanup effort will comply with applicable Federal, State and Local environmental regulations, which include but are not limited to the Federal Davis-Bacon Act, NPDES permitting, and Occupational Safety and Health Administration (OSHA) guidelines. At a minimum, a NPDES permit for stormwater management is anticipated. As appropriate, the United States Army Corps of Engineers (USACE) will be consulted to determine if wetland areas may be affected or if permits are required for work potentially impacting surface water bodies. All applicable regulations will be determined as part of the engineering phase of the project and adhered to accordingly. As with any West Virginia construction project disturbing an area greater than one-acre, the project will be subject to inspections by the WVDEP for stormwater management and erosion and sediment control best management practices.

Contractors must be licensed in the State of West Virginia and must also abide by all federal, state, and local laws. As applicable, contractors will be required to obtain a building permit from the City of Morgantown Code Enforcement Office.

3.1 Climate Change Considerations

The EPA has directed Cleanup Grant recipients to evaluate the resilience of the remedial options considering reasonably foreseeable changing climate conditions (e.g., sea level rise, increased frequency and intensity of flooding and/or extreme weather events).

Current climate models for the Mid-Atlantic region and specifically northcentral West Virginia predict continued warming coupled with an increase frequency and intensity of extreme precipitation events. An increase in precipitation abundance is predicted overall, but shifting patterns will stress water availability for human and ecological consumers. These conditions likewise stress local government's ability to provide a sufficient quantity and quality of drinking water. The White Park Southside Cleanup project centers around utilizing constructed recreational trail beds to provide an effected barrier from identified contaminants while maximizing preservation of the existing vegetation surrounding the Cobun Creek Reservoir. Where applicable, portions of the trail bed cover will be weather hardened by armoring with materials salvaged from on-site and reclaimed from City construction projects. The City has reserved a stockpile of bricks, once produced in abundance locally, recovered from repaving projects specifically for this purpose. This approach, under the oversight of the VRP, ensures protectiveness while mitigating the stresses – increased rates of erosion and supply variations- that climate change places on drinking water reservoirs.

3.2 Aligning Remedy with Reuse

The City and BOPARC strive to enhance White Park for the use and enjoyment of its residents and as a showcase to visitors of the region as a natural, recreational, and economic asset.

Following the principles of EPA's Superfund Redevelopment Initiative (SRI) to align cleanups with planned future uses, the White Park Southside cleanup project is designed to support recreational uses, preserve ecological habitat, and protect human health and the environment. The cleanup design centers around the development of a recreational trail system that meets the demonstrated needs of the community and user groups, while ensuring protection of human and ecological receptors through the state's VRP. The White Park Southside trail will maximize user access throughout the available acreage and specific points of interest desired by users, such as scenic viewpoints, fishing access, and wildlife viewing opportunities.

4. ANALYSIS OF BROWNFIELD CLEANUP ALTERNATIVES

Currently the Site represents a significantly less visited portion of the City's highly popular White Park. Over time and exacerbated by the Covid-19 pandemic, a network of unsanctioned casual and social trails developed under the pressure of increased park visitation. For several years, the City has planned redevelopment to bring the Site up to date with expanded recreational access as a responsibly managed recreational trail system. The land manager and park users expect the Site to be opened to more active use as soon as possible.

4.1 Chemicals of Potential Concern

Construction-related and subsequent environmental site assessments have identified the presence of contaminants in Site soils above health-based recreational screening levels. The COCs for the Site soils are metals, specifically arsenic, and several PAHs (benzo[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, dibenz[a,h]anthracene, benzo[k]anthracene, indeno[1,2,3-cd]pyrene). Mitigation of risk from potential exposure to heavy metals and PAHs in soil at the Site is necessary to support current and planned future uses for the Site.

4.2 Cleanup Alternatives Considered

The City and BOPARC plan to redevelop the White Park Southside as a responsibly managed recreational trail system spanning an approximately 22.5-acre area of White Park along the south side of the Cobun Creek Reservoir. The following remedial alternatives have been considered for this planned future use with respect to effectiveness, long-term reliability, implementability, and the general cost implications. A comparison of these attributes relative to each considered option is provided as Table 2 and a comparison of costs is provided as comparison Table 3.

4.2.1 *Alternative 1: No Action*

We find the No Action alternative unacceptable because it fails to address unacceptable recreator exposure to site contaminants. Deficiencies in the park's trail system have proven irresistible to the local community, who repeatedly conduct light grading of existing trail and construction of new earthen features without land manager authorization. The growing interest in outdoor recreation and the rapidly maturing skill of local riders due to organized youth education and trail sports places further demands on a systematic restructuring of White Park's offerings.

4.2.2 *Alternative 2: Removal of All Contaminants*

Removing all contamination from the White Park Southside Site would continue to set an unfortunate precedent for future cleanup that favors an extreme impact to ecology, society, and budget. All but one of the previous tank farm cleanup efforts have taken this approach, and all have come with unsustainably high costs of cleanup that result in scarred lands requiring subsequently extensive (and expensive) restoration.

Late succession forests, extreme topography, and otherwise difficult site access would drastically expand negative impacts of cleanup of the small and dispersed former AST areas. Removal of contaminants would require construction of several access roads to facilitate excavation of soil across the entire Site for off-site disposal and the trucking in of clean fill. Even the installation of traditional stormwater controls (such as silt fences and retention ponds) for this type of cleanup would have higher impacts than the totality of our preferred alternative.

4.2.3 *Alternative 3: Pathway Elimination Through Cap/Cover Without Regard to Planned Trail Development*

Alternative 3 considers a traditional presumptive remedy emerging from the human and ecological heath risk assessment. In order to successfully implement Alternative 3, additional site assessment activities would be required throughout the Site. The study data currently available is focused on planned trail development areas. The time and costs to complete additional site assessment would be great.

Once the additional assessment is completed, exposure pathways to site contaminants would be initially eliminated through targeted soil cover or capping of known areas of concern with imported and/or relocated local clean fill materials. Consolidation of impacted soil on-Site prior to cover may be required. This cleanup approach can lead to effective risk reduction, but its long-term reliability depends heavily on institutional control (Land Use Covenant) and prescribed periodic inspection and maintenance for the engineering control (cap/cover). We see several shortcomings of this approach without any direct integration of those covers or caps into the desired redevelopment activities.

First, due to site characteristics and access constraints discussed above in **Alternative 2: Removal of All Contaminants**, a more traditional and targeted cap/cover approach would bring similar negative impacts. It would continue to set precedent for cleanup performed in isolation and resulting in a site that requires further extensive and expensive restoration. Although the requirement for and high costs of off-site disposal might be mitigated by consolidating contaminated soils on-site to a centralized location or locations where capping could be performed, doing so separately from trail construction would still require heavier excavation techniques and equipment. This heavier footprint would undoubtedly be associated with higher ecological impacts to the forest canopy and nearby secondary-source public drinking water reservoir. The approach is also moderately difficult to implement utilizing established construction practices and technical guidance provided by the VRP (See VRP Guidance Manual Appendix F – Cover and Cap Guidance).

Second, whether a single large or several smaller capped sites are chosen, without direct integration, this approach might inadvertently limit planned future use. As previously discussed, both the land manager and park users expect the Site to be opened to more active use as soon as possible. Trail construction is unlike roadway construction in that, due to its primary use of on-site materials, the construction process inherently responds to site characteristics. The constructed tread winds through a general flagged centerline corridor, sometimes deviating up to 20 feet from that flagged corridor. Even with careful sampling and planning of the traditional cap/cover, if these areas are off-limits to trail builders, any resulting trail system development would be severely hampered.

In general, this alternative method of soil cover or capping does not align with the planned future use for trail development and the objective of providing user-friendly access to park amenities. Therefore, this alternative carries a high cost due to the requirement of additional assessment and where it fails to make the most efficient use of limited space and resources to support the planned uses.

4.2.4 *Alternative 4: Pathway Elimination with Cap/Cover Integrated into Trail Design under VRP Oversight*

Alternative 4 is to perform remedial action, under the oversight of WVDEP through the VRP, with a remedy to provide exposure pathway elimination to site contaminants through soil cover or capping. However, in contrast to Alternative 3, Alternative 4 will specifically combine the design objectives for the planned future use (recreational trail development, enhance amenity access) into the remedial design.

Since it will utilize the same remedial approach and engineering controls as that proven in Alternative 3, Alternative 4 would also achieve the cleanup effectiveness and long-term reliability criteria. However, by performing cap or cover installation as an integral part during trail construction, Alternative 4 would be substantially easier to implement and lower cost due to several important advantages.

Alternative 4 would require very little to no large tree removal as indicated by Alternatives 2 and 3. As part of

the design, Alternative 4 will properly abandon and restore over 1750 linear feet of unauthorized "trails of convenience" that have been developed passively by wildlife and users as means to access scenic areas, fishing spots, etc. This includes intentionally excavated unauthorized trails observed during design reconnaissance, presumably created to satisfy the need of advanced skill trail user groups (mountain bikers). Mitigating such uncontrolled excavation, and the resulting direct contact to contaminants in subsurface soil, is a requirement of the remedial design best accomplished by meeting the need through proper trail design and management.

Alternative 4 would also take advantage of utilizing the linear trail corridor for access during cap construction. Materials for both trail and protective capping would be moved along the trail corridor utilizing smaller, light duty equipment typically utilized by professional trail contractors, and create substantially less ecological disturbance and surface impact. Site restoration would occur practically simultaneously with remedy construction. Alternative 4 also provides a substantial cost benefit of maximizing use of available space. Under Alternative 4, trail construction will be performed according to best design principles by an experienced contracted professional trail designer recognized by recognized professional organizations such as the Professional Trail Builders Association (PTBA) or International Mountain Biking Association (IMBA). Together, the contracted environmental professional licensed by the WV VRP - a Licensed Remediation Specialist (LRS), and the contracted professional trail designer will finalize a design that will be approved by the WV VRP to ensure both user adoption and protectiveness.

To leverage common design elements for the remedial and trail design, signage and other educational tools will be used. Design professionals from the Brad and Alys Smith Outdoor and Economic Development Collaborative and the Northern Brownfield Assistance Center at West Virginia University will assist with design of accessible signage to educate and inform the public. Traditional wayfinding and placemaking signage at trail heads, junctions, and along the trail course will also help explain the remedy to the public, communicate its effectiveness at protecting human health, and celebrate the vibrant site history. This will provide an important means of communication to the community, burdened by environmental uncertainty associated with the well-known and publicized park history as a former crude oil tank field. Signage resources will also provide opportunity to communicate the importance of protecting and managing safe sources of drinking water in the adjacent Cobun Creek Reservoir. The signage program will help the public to become familiar with the remedial approach most likely to be used for other nearby areas planned for trail construction in the near future.

Amenities, if and where needed, will be incorporated to encourage users to remain on the trail system. Lastly, the land manager or its successors and assigns will be required to inspect and maintain the engineering controls into perpetuity via a WVDEP approved land use covenant that will be recorded with the land title records.

4.3 Recommended Cleanup Alternative

As demonstrated by this ABCA, the preferred and recommended remedial alternative is Alternative 4: Pathway Elimination through Cap/Cover Integrated into Trail Design under VRP Oversight. This option is evaluated as the most favorable since it does not limit, but, rather, forwards planned future uses of the White Park Southside Trail Site and is protective of both human health and the environment.

5. REFERENCES

Environmental Standards, Inc., Human Health and Ecological Risk Assessment Report, White Park, Parcel A - Southside Trail, VRP #22015, August 29, 2023.

Environmental Standards, Inc., Supplemental Site Assessment Report, White Park, Parcel A - Southside Trail, VRP #22015, VRP Project #22015, White Park Southside Trail, April 3, 2023.

Environmental Standards, Inc., Site Assessment Work Plan, White Park, Parcel A - Southside Trail, VRP #22015, VRP Project #22015, White Park Southside Trail, December 2022.

City of Morgantown, White Park Voluntary Remediation Agreement (VRA) executed on October 24, 2022.

City of Morgantown, White Park VRP Application #22015, approved by the WVDEP, Office of Environmental Remediation on August 3, 2022.

Environmental Standards, Inc., Phase II Environmental Site Assessment Report. White Parke Southside Trail Property. Brownfield Assessment Grant Number BF-963692-01-0. May 31, 2022.

Triad Engineering, Inc., Phase II Environmental Site Assessment, White Park, September 16, 2019a.

Triad Engineering, Inc., Phase II Environmental Site Assessment, White Park, September 16, 2019b.

Triad Engineering, Inc., Site Inspection Reassessment, White Park CERCLIS Site, December 2020.

Malcom-Pirnie, Inc., White Park Soil Excavation Activities letter report, January 31, 2011.

Triad Engineering, Inc., Site Inspection Reassessment, White Park CERCLIS Site, December 2009.

Triad Engineering, Inc., Executive Summary Report, White Park, CERCLIS WVD988766168, October 2004.

WVDEP. 2021. De Minimis Standards and Relevant Benchmarks within Interpretive Rule 60CSR9. Effective December 12, 2021.

West Virginia Voluntary Remediation Program Guidance Manual. Updated June 2020.

West Virginia Department of Natural Resources, Preliminary Assessment, White Park, March 30, 1989.

West Virginia Department of Natural Resources, Site Visit Summary Report, White Park, May 4, 1989.

Figure 1: Site Location Map

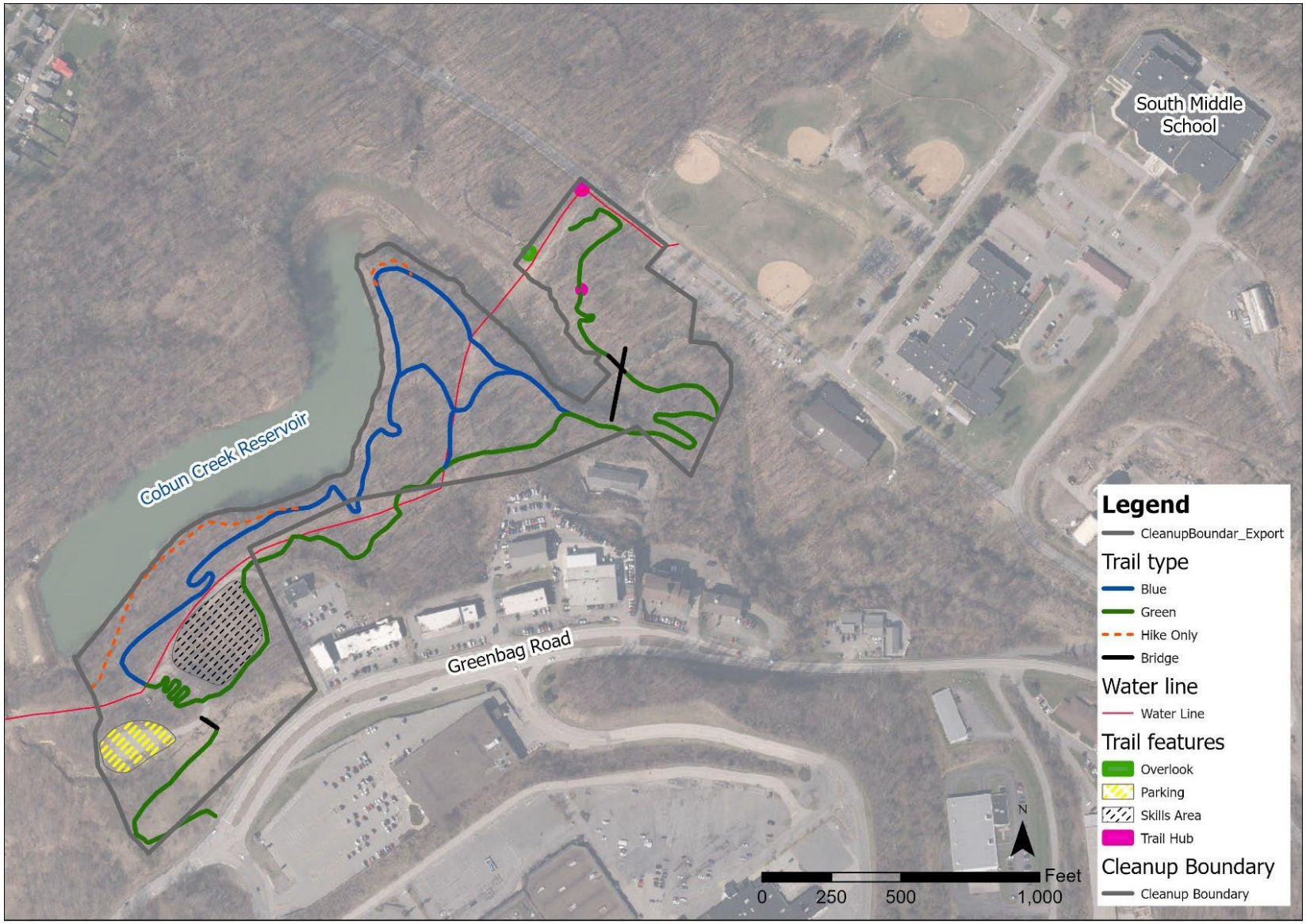

Figure 2: Site Map

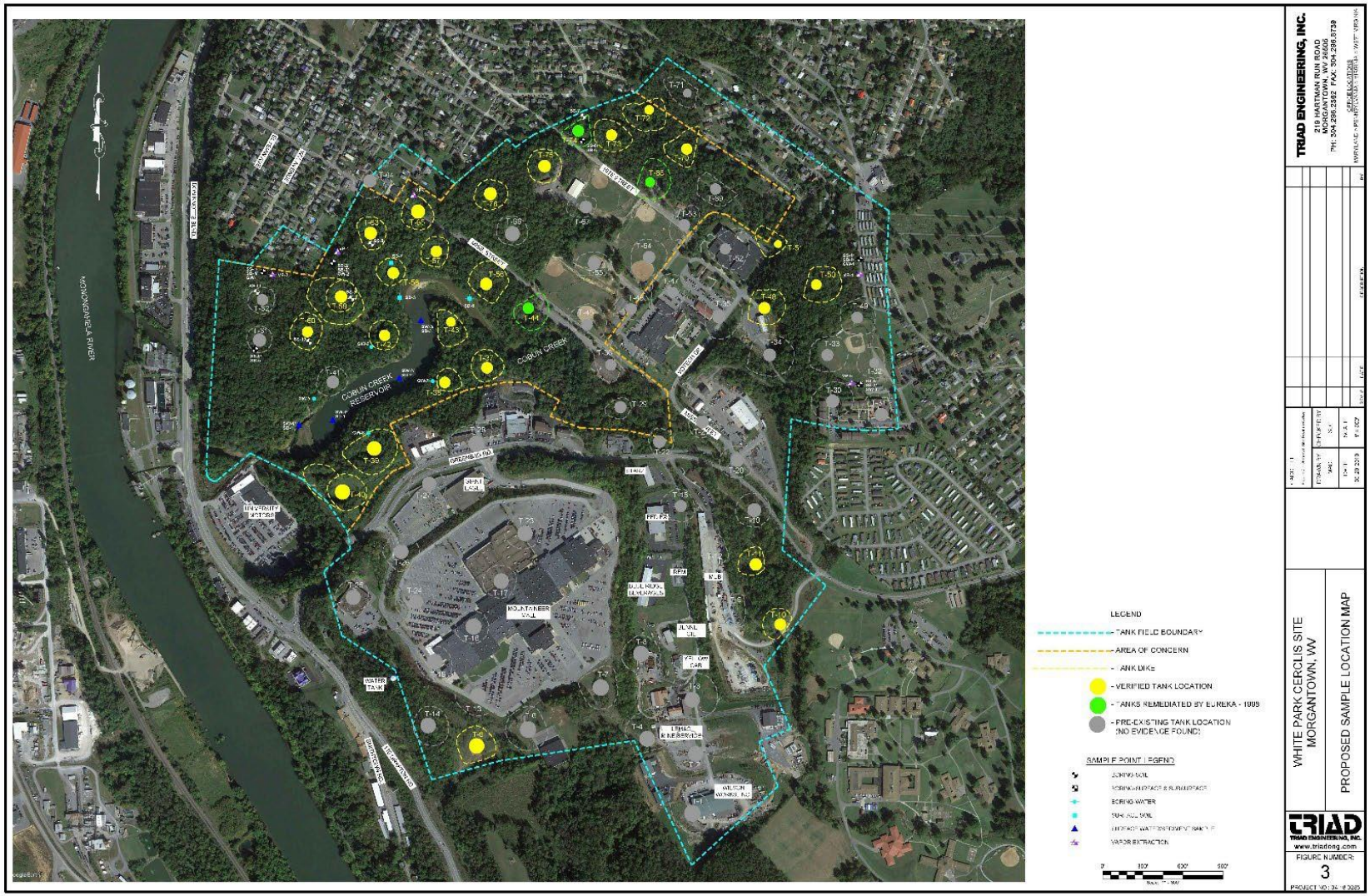

Figure 3: Historical AST Locations and Numbers

Table 2: Brownfield Cleanup Alternative Balancing Factor Evaluation

Remedial Alternative		Effectiveness	Long-term Reliability	Implementability	Cost implications
1	No action.	Does not address potential risks.	Does not address potential risks.	Easy to implement.	No cost to implement. Likely cost implications for leaving property unusable and future liabilities for exposure to contaminants.
2	Remove all contaminants.	Reduces or eliminates risks.	Reliably reduces risks from contaminants.	Moderately difficult to implement. Would require significant disturbance to forested landscape and a public recreational asset.	Very high cost to excavate, transport, and dispose of contaminated soils and import replacement fill. Costs associated with destruction of mature natural forest assets.
3	Pathway elimination via cover or capping without regard to Planned Trail Development.	Effectively manages risk under regulatory oversight.	Long-term reliability with moderate ongoing operation and maintenance costs. Restricts access and usability of park features.	Moderately difficult to implement. Approach would severely limit planned redevelopment and use. Would require disturbance to forested landscape and a public recreational asset.	High cost to implement and would not align with planned redevelopment or capture leverage funding commitments.
4	Pathway elimination via capping integrated into trail design and Risk Assessment through the WV VRP.	Effectively manages risk under regulatory oversight.	Long term reliability with moderate on-going operation and maintenance costs. Adds high value for long-term public recreation access, alternate transportation hub, school access.	Moderately difficult to implement. Approach would fully implement planned redevelopment and use. Will minimize disturbance to forested landscape and a public recreational asset.	Moderate cost to implement. Aligns with existing redevelopment plans and would leverage investment commitments from multiple stakeholders.

Table 3: Estimated Comparative Cost for Selected Cleanup Alternative

	Unit	Quantity	Unit Price	Cost	Description
Remedy Construction					
New Trail: Diversion & Cover	LF	9871	$ 25.93	$ 255,936.25	Construction of new, sustainable trail that diverts visitors from old tank sites and serves as a cover for unavoidable AOCs. Proper trail design protects people by providing desired and accessible user experiences with appropriate density, therefore reducing proliferation of unauthorized trail development in potentially contaminated areas. This reduction in unauthorized trails helps protect ecological resources, and sustainable trail design also reduces concentration of runoff and sedimentation of nearby wetlands and waterways. Includes grading of onsite materials and acquisition, testing, and installation of imported materials.
Trail Closure & Ecological Restoration	LF	1750	$ 10.00	$ 17,500.00	Formally close existing, unauthorized trails. Includes replanting and signage / temporary fencing to protect restoration in fragile early stages.
Trigger layer (demarcation)	LF	987	$ 2.00	$ 1,974.00	Furnishing and installation of standard nylon construction fencing-style demarcation under areas of trail that need cover (those that cross known or encountered AOCs)
Contingency 10%	Project	1		$ 27,541.03	
			Sub Total	**$ 302,951.28**	
Historical, Remedy Education/Demarcation/Health and Safety					
Trail System Kiosks	Each	2	$ 5,000.00	$ 10,000.00	Overcome negative perception, educate remedy, demonstrate protect, green cleanup /climate change practices
Trail Intersection Signage	Each	10	$ 750.00	$ 7,500.00	Traditional trail wayfinding to further encourage users to stay on trail
Trail corridor blazes	Each	123	$ 15.00	$ 1,845.00	Traditional trail wayfinding to further encourage users to stay on trail
Large Historical/Ecological Interpretation Feature	Each	1	$ 20,000.00	$ 20,000.00	Educate public about history and remedy process
Enhanced Cover/ Elevated Features Skills Area	Each	1	$ 50,000.00	$ 50,000.00	Enhanced cover or elevated features over no-dig zone identified in Soil Managment Plan.
			Sub Total	$ 89,345.00	
Voluntary Remediation Program Costs					
Risk Assessment Report (RAR)	HR	80	100	$ 8,000.00	

Table 3: Estimated Comparative Cost for Selected Cleanup Alternative, Continued

	Unit	Quantity	Unit Price		Cost	Description
Remedial Action Work Plan (RAWP)	HR	90	100	$	9,000.00	ESI Aug 22 Estimate
Land Use Covenant (LUC)	HR	15	100	$	1,500.00	ESI Aug 22 Estimate
Oversight of Engineering Controls	HR	50	100	$	5,000.00	ESI Aug 22 Estimate
Remedial Action Completion Report (RACR)	HR	50	100	$	5,000.00	ESI Aug 22 Estimate
Final Report	HR	50	100	$	5,000.00	ESI Aug 22 Estimate
WVDEP Oversight Fees	Each	1	$7,100.00	$	7,100.00	Best Professional Judgement, similar project experience
NPDES Storm Water / BMP Design	HR	25	100	$	2,500.00	Best Professional Judgement, similar project experience
LUC Inspections	HR	12	100	$	1,200.00	Best Professional Judgement, similar project experience
			Sub Total	**$**	**44,300.00**	
Contractual Engineer/Consultant						
Surveying	Each	1	9500	$	9,500.00	Best Professional Judgement, similar project experience
As-Built Documents	HR	45	100	$	4,500.00	Best Professional Judgement, similar project experience
Procurement- Remediation and Trail Contractors	HR	60	100	$	6,000.00	Best Professional Judgement, similar project experience
			Sub Total	**$**	**20,000.00**	
			Project Total	**$**	**456,596.28**	