Analysis of Brownfield Cleanup Alternatives
Skyline Steel Site

304 South 1st Street
Cañon City, Colorado 81212

Cooperative Agreement Number:
BF-4B95821202

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Prepared for:

Colorado Department of Public Health and Environment
4300 Cherry Creek Drive South
Denver, CO 80246

Prepared by:

Stantec Consulting Services Inc.
410 17th Street, Suite 1400
Denver, CO 80202

Project No: 203722836

Sign-off Sheet

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Prepared by_____
Annie Eiseman, CHMM
Environmental Scientist

Reviewed by_____
Dave Laney
Principal

Reviewed by_____

Enter Name

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Acronyms and Abbreviations

AACE	American Association of Cost Estimating
ABCA	analysis of brownfield cleanup alternatives
AOC	area of concern
AST	aboveground storage tank
bgs	below ground surface
CDLE	Colorado Department of Labor and Employment
CDPHE	Colorado Department of Public Health and Environment
CFR	Code of Federal Regulations
COC	Contaminants of Concern
CY	Cubic Yards
EA	Excavation Area
EPA or USEPA	US Environmental Protection Agency
ESA	environmental site assessment
ERIS	Environmental Risk Information Services
HAZWOPER	Hazardous Waste Operations and Emergency Response
mg/kg	milligrams per kilogram
OPC	Opinion of probable costs
OPS	Oil and Public Safety
PAHs	polycyclic aromatic hydrocarbons
RAO	Remedial Action Objective
RBSL	Risk-Based Screening Level
RCRA	Resource Conservation and Recovery Act
REC	Recognized Environmental Condition
RSL	Regional Screening Level
SF	Square Foot
Stantec	Stantec Consulting Services Inc.
TEPH	total extractable petroleum hydrocarbons
TRPH	total recoverable petroleum hydrocarbons
UST	Underground Storage Tank
WMA	WMA Environmental Services, LLC

1.0 INTRODUCTION

Stantec Consulting Services Inc. (Stantec) has prepared this Analysis of Brownfield Cleanup Alternatives (ABCA) report for the Skyline Steel property located at 304 South 1st Street, Cañon City, Colorado 81212 (referred to as the "site") on behalf of the Colorado Department of Public Health and Environment (CDPHE; the "Client"). The purpose of the ABCA is to present alternatives and costs for the management of impacted soils associated with forthcoming renovation and construction activities at the site.

1.1 SITE LOCATION AND DESCRIPTION

The site consists of 2.15 acres of vacant land on Fremont County assessor parcel number 11031400 located at 304 South 1st Street, Cañon City, Colorado 81212. The site is zoned Class I Industrial and is bounded to the north by a rail spur and Union Pacific railroad tracks followed by Veterans Park, to the east by a commercial property owned by JPA Properties LLC (200 Water Street), to the south by the Arkansas River, and to the west by South 1st Street followed by property owned by the Black Hills Corporation, which is the former location of a power plant but is now vacant except for an electrical substation. A petroleum storage and fueling facility owned by Acorn Petroleum (formerly Kimmick; 302 South 1st Street) currently occupies and operates on the adjoining site to the northwest of the site. A site Location Map is provided on **Figure 1**.

1.2 BACKGROUND AND PROJECT DESCRIPTION

The site was formerly operated by Skyline Steel and used for selling drainage products and scrap metal recycling from the 1970s until 2014. The site was developed with a 4,000-square-foot (SF) warehouse built in 1935, an 800 SF shed built in 1981, a 408 SF shed built in 1981, and a 286 SF office built in 1983. In 2023, all buildings were razed by Cañon City and the site is currently vacant. A Property Vicinity and Former Layout is provided on **Figure 2.** Redevelopment plans for the site include construction of a hotel with a parking lot as a part of the Cañon City Arkansas River Corridor Master Plan. Other possible reuse plans for the site include shops, restaurants, and/or residential (Cañon City, 2017).

2.0 PREVIOUS ENVIRONMENTAL ASSESSMENTS

The site has had several assessments, including a 1999 Phase I Environmental Site Assessment (ESA) and a 2000 Phase II ESA prepared by WMA Environmental Services, LLC (WMA) on behalf of Paula Johnson (WMA, 1999; 2000), and a 2019 Phase I ESA and a 2020 Phase II ESA prepared by Stantec on behalf of Fremont County, Colorado (Stantec, 2019; 2020), and a 2024 Phase II ESA prepared by Stantec on behalf of CDPHE was conduction following removal of the buildings on the site. The most recent ESAs are discussed in the following sections. Sample locations and exceedances are shown on Figure 3.

2.1 PHASE I ESA

The 2019 Phase I ESA identified the following recognized environmental conditions (RECs) associated with the site:

- According to discussions with a Skyline Steel employee during the site reconnaissance, onsite scrap storage and recycling on the site occurred over a period of 50 to 55 years. Based on findings from a Phase II ESA conducted by WMA, apparent lead contamination was documented in both soil and groundwater at the site in February of 2000. Stantec concludes that materials with the potential to contain lead may have been stored or are currently stored on site. The presence of these materials represents a REC for the site.

- Acorn Petroleum, previously identified as Kimmick Oil Company, is located on the northwest-adjoining property. The Acorn Petroleum site is identified in the Environmental Risk Information Services (ERIS) database report as a Petroleum Distributor and is listed in the COSTIS database as containing one aboveground storage tank (AST) pad with six ASTs containing diesel fuel and unleaded gasoline. A dispenser island and metal drum storage building were also observed at the site. Releases of petroleum from this facility, located at a higher elevation than the site, may have migrated onto the site. The potential for these releases to have impacted the site is considered potentially significant because Acorn has been located adjacent to the site for approximately 42 years. Observations during the site reconnaissance confirmed the poor condition of the Acorn drum storage building that backs up to, and reportedly impinges upon, the Skyline Steel property. The presence of this site adjacent to the site represents a REC for the site.

- Three former underground storage tanks (USTs) are associated with the west adjoining Acorn Petroleum property. Two of the USTs contained gasoline and were of 1,000-gallon capacities, and one contained diesel and was of 2,000-gallon capacity. The tanks were last used on October 1, 1988, were removed from the site (date unknown), and are considered permanently closed. Given the lack of documentation re: closure assessment sampling, Stantec believes the previous existence of these USTs represents a REC for the site.

- The adjoining railway to the north of the site is listed as the location for a spill reported on October 7, 1999. Two pipe connectors to fuel tanks ruptured, causing a release of 3,000-gallons of diesel

fuel. According to the database listing, EPA on-scene coordinator Al Lange was dispatched to the site. No records were found in relation to the current status of environmental responses to the spill. It should be noted that the results from the Phase II ESA conducted by WMA in February of 2000 indicated that soils and groundwater on the site were not considered significantly impacted by petroleum products; however, given the lack of information regarding the current status of the release, Stantec considers this spill to represent a REC for the site.

2.2 2020 PHASE II ESA

The results of the 2020 Phase II ESA indicated the following:

- Soil in the vicinity of test pits south of the Acorn Petroleum ASTs (DP01b and DP01c) had elevated concentrations of total extractable petroleum hydrocarbons (TEPH), total recoverable petroleum hydrocarbons (TRPH), and polycyclic aromatic hydrocarbons (PAHs) at least as deep as 7 feet below ground surface (bgs). The elevated petroleum concentrations are likely associated with a black, tarry substance that appeared to be solidified diesel and gray to black stained soil both of which were assumed to be related with a former release from tanks at nearby Acorn Petroleum.
- Soil in the vicinity of borings east of Acorn Petroleum (DP02b and DP02c) had elevated concentrations of barium, TEPH, and TRPH at least as deep as 4 feet bgs which is associated with gray to black stained soil and was likely part of a former release from Acorn Petroleum.
- Test pits in the vicinity of borings south and east of Acorn Petroleum (DP01 and DP02) showed evidence of former burning and/or burial of trash and debris.
- The upper foot of soil in the vicinity of the boring (DP03) at the northern boundary of the site south of the railroad had elevated concentrations of lead, cadmium, and benzo(a)pyrene. The extent of this contamination was not delineated in an east-northeast direction.

2.3 2024 PHASE II ESA

An additional Phase II ESA was conducted in 2024 following removal of the buildings on the site. The results of the 2024 Phase II ESA indicated the following:

- Resource Conservation and Recovery Act (RCRA) metals were detected in all samples collected within the former building footprints up to 5 feet bgs, with concentrations of arsenic, cadmium, and lead exceeding screening levels. None of the elevated metals concentrations exceed hazardous waste criteria.
- TEPH and TVPH were detected at concentrations that exceed screening levels at up to 5 feet bgs near the center of the main building footprint.
- Benzo(a)pyrene was detected at concentrations that exceed screening levels at up to 5 feet bgs in the center of the main building footprint and in the upper foot of soil in the western portion of the main building footprint.

3.0 CLEANUP STANDARDS

3.1 POTENTIAL RECEPTORS AND EXPOSURE PATHWAYS

Based on the findings of the Phase II ESAs for the site, there are contaminants of concern (COCs) in several locations across the site. Locations of the soil samples and exceedances are provided on **Figure 3.**

Considering that remedial excavation and potential redevelopment activities are expected at the site, construction workers, site workers, and trespassers have been identified as the most applicable potential human receptors. Exposure to COCs in soils by construction/remediation workers could occur during remediation, demolition, and construction activities through inhalation, ingestion, and/or dermal contact. Redevelopment and reuse plans for the site are still in the planning phase. This ABCA assumes that the site will be redeveloped for commercial and/or residential use. Further evaluation of exposure pathways may be required to align with a future development of potential site reuse plans.

Potential exposure during the remedial work would be managed with a Health and Safety Plan and a Community Air Monitoring Plan designed to protect site workers and the public from fugitive emissions of contaminants of concern during the remedial activities. An exclusion zone in the form of a perimeter fence would be in place during remedial work to prevent the public from accessing the site. Potential future exposures to residual contamination, if any, would be mitigated using institutional and engineering controls and a site management plan. No potential impacts are anticipated to ecological receptors as part of this remedial effort; although, if the site were to be designated as habitat or ecological, then receptors are anticipated to be impacted by remedial activities and the applicable cleanup standards and remedial action objectives presented below should be revised accordingly.

3.2 APPLICABLE LAWS, REGULATIONS, AND CLEANUP STANDARDS

Contaminants of concern at the site are defined as the substances for which the concentrations in soil exceed the associated applicable screening levels; which include USEPA Residential Regional Screening Levels (RSLs) for residential soil and/or Colorado Department of Labor and Employment (CDLE) Division of Oil and Public Safety (OPS) Tier 1 Risk-Based Screening Levels (RBSLs). In addition, arsenic soil concentrations are compared against the Region 8 EPA average background concentration of all land uses (11 milligrams per kilogram [mg/kg]) (CDPHE, 2014). Though the screening criteria of 11 mg/kg does not constitute an enforceable standard, CDPHE suggests it be used to evaluate potentially impacted soils (CDPHE, 2014).

Impacted soil having contaminants above USEPA Residential RSLs and OPS RBSLs that may be left in-place would be managed with a soil management plan for potential future disturbances and with environmental engineering and institutional controls (e.g., placement of a clean soil cover). If it is not feasible to achieve acceptable standards, site-specific cleanup levels would be established for the site

that, in conjunction with institutional and engineering controls, would attain conditions protective of public health and the environment for the intended and reasonably anticipated use of the site.

Relevant regulations and cleanup standards for the site are listed below:

- CLDE OPS RBSLs
- USEPA Residential RSLs
- Hazardous Waste Regulations, 40 Code of Federal Regulations (CFR) 261.31

4.0 CLEANUP ALTERNATIVES

The nature and extent of contamination are presented in the previous ESAs and have been previously described in Section 2. The following sections provide a description of cleanup alternatives analyzed as part of this ABCA report to address the contamination at the site.

4.1 REMEDIAL ACTION OBJECTIVE (RAO)

The remedial action objective (RAO) for the site is:

- Prevent direct contact between human receptors and soil containing COCs at concentrations above residential risk-based concentrations during remediation and construction activities.

4.1.1 Description of Areas of Concern (AOCs) and Excavation Areas

Based on the findings of the Phase II ESAs for the site; impacted soils were grouped into six areas of concern (AOC):

- AOC-1: Soil impacted by the isolated historical lead sample at 400 mg/kg for lead (1999 sampling).
- AOC-2: Soil in the vicinity of test pits south of the Acorn Petroleum ASTs with elevated concentrations of TEPH, TRPH, and PAHs at least as deep as 7 feet bgs with evidence of former burning and/or burial of trash and debris.
- AOC-3: Soil in the vicinity of borings east of Acorn Petroleum with elevated concentrations of barium, TEPH, and TRPH at least as deep as 4 feet bgs with evidence of former burning and/or burial of trash and debris.
- AOC-4: Soil soil in the vicinity of the boring (DP03) at the northern boundary of the site south of the railroad with elevated concentrations of lead, cadmium, and benzo(a)pyrene down to 1-foot bgs.
- AOC-5: The soil in the footprint of the former Office Building with elevated concentrations of cadmium and lead down to 1-foot bgs.
- AOC-6: The soil in the footprint of the former structures in the center of the eastern portion of the site (Main Building, Warehouse, and storage shed) with elevated arsenic, lead, cadmium, benzo(a)pyrene concentrations at least as deep as 5 feet bgs.

4.2 CLEANUP ALTERNATIVES CONSIDERED

Under USEPA guidance, remedial alternatives are evaluated using the following criteria:

- Effectiveness;
- Long-term Reliability;
- Implementability;
- Implementation Risk;
- Sustainability;
- Reasonableness of Cost; and
- Susceptibility to Climate Change.

4.2.1 Description of Alternatives

The evaluated alternatives involve a combination of partial and complete excavation for identified AOCs based on the contaminants of concern. To address the management of impacted soil at the site, three remedial alternatives were considered to achieve the remedial goals:

- Alternative #1: No Action
- Alternative #2: Partial Excavation and Off-Site Disposal of Impacted Soils
- Alternative #3: Comprehensive Excavation and Off-Site Disposal of Impacted Soils

To achieve Alternative #2 and Alternative #3; the following excavation areas (EAs) have been identified:

- EA1: Excavation of soil from a 330 SF area around AOC-1.
- EA2: Excavation of soil from a 3,400 SF area around AOC-2.
- EA3: Excavation of soil from a 4,800 SF area encompassing ACO-3 and AOC-5.
- EA4: Excavation of soil from a 1,785 SF area around AOC-4.
- EA5: Excavation of an 8,600 SF area around AOC-6.

Excavation areas were focused on the areas where Stantec conducted sampling in the Phase II ESAs, then extended out to areas adjacent to identified impacts by approximately 10 to 40 feet or out to the property boundary. Excavations were extended out further (40 feet) in cases where aerial imagery / site knowledge suggests potential impacts and sampling data was not available to confirm/deny potential impacts. Where data, site knowledge, or aerial imagery suggested no impacts, excavations only extended 10 feet out from a given sample location with results above screening levels.

4.2.2 Alternative #1 – No Action

Alternative 1 is the baseline against which all other alternatives are compared. Under this alternative, contaminated soils would be left in place in their current configuration.

4.2.3 Alternative #2 – Partial Excavation and Off-Site Disposal of Impacted Soils

This potential remedial alternative would include the excavation and disposal of soils from the five EAs described in Section 4.2.1 down to 2 feet bgs. Soils with impacts deeper than 2 feet bgs would be left in place. Approximately 1,410 cubic yards (CY) of soil is estimated for excavation from all five EAs. After excavation of the EAs, confirmation samples will be collected from the sidewalls of the EA to confirm lateral extent of soil impacts have been removed. If confirmation samples indicate remaining contamination, additional soil would be excavated and disposed of and this alternative would be adjusted accordingly.

Based on the findings from the Phase II ESA, it is assumed that the soils will be characterized as non-hazardous waste. Assuming the waste characterization samples are favorable for disposal at a designated receiving facility, the materials would then be excavated and directly loaded into trucks for transport to the disposal facility. Direct loading at the Site would remove the requirement for on-site stockpiling of soils.

Non-hazardous waste soils, approved by the disposal facility, would be disposed of at a Subtitle D landfill. The excavated areas would be backfilled with clean fill from a known off-site source for which the material has been confirmed through laboratory analysis to be non-impacted and to meet the criteria for unrestricted use. It is anticipated that the required backfill soil volume from an off-site source would be approximately 1,751 CY.

This alternative assumes that the site will be covered by structure(s) and pavement/asphalt in order to achieve the RAO for the site. Potential future exposures to remaining contamination would be mitigated using institutional and engineering controls and a site management plan.

4.2.4 Alternative #3 – Comprehensive Excavation and Off-Site Disposal of Impacted Soils

This potential remedial alternative would include the excavation and disposal of soils from the five EAs described in Section 4.2.1 down to 1 foot deeper than the deepest known impacted soil. Approximately 3,976 CY of soil is estimated for excavation from all five EAs. After excavation of the EAs, confirmation samples would be collected from the sidewalls and floor of the EA to confirm vertical and lateral extent of soil impacts have been removed. If confirmation samples indicate remaining contamination, additional soil would be excavated and disposed of, and this alternative would need be adjusted accordingly.

Based on the findings from the Phase II ESA, it is assumed that the soils will be characterized as non-hazardous waste. Assuming the waste characterization samples are favorable for disposal at a designated receiving facility, the materials would then be excavated and directly loaded into trucks for transport to the disposal facility. Direct loading at the site would remove the requirement for on-site stockpiling of soils.

Non-hazardous waste soils, approved by the disposal facility, would be disposed of at a Subtitle D landfill. The excavated areas would be backfilled with clean fill from a known off-site source for which the material has been confirmed through laboratory analysis to be non-impacted and to meet the criteria for

unrestricted use. It is anticipated that the required backfill soil volume from an off-site source would be approximately 4,970 CY.

4.3 EVALUATION OF CLEANUP ALTERNATIVES

Potential cleanup alternatives are evaluated herein based on the following criteria: effectiveness, implementation feasibility, remedial costs, and general reasonableness. **Appendix A** provides a breakdown of applicable costs and assumptions.

4.3.1 Alternative #1 – No Action

Effectiveness – Alternative 1 has low effectiveness since there is no action implemented and thus no protection to potential receptors is provided. It is also not protective of current or future receptors at the site.

Implementation Feasibility - This alternative is easy to implement because no action is required. There is also low implementation risk associated with this alternative because no activities would be conducted.

Remedial Costs – There is no cost to implement this alternative.

General Reasonableness: Alternative 1 has low long-term reliability because it does not remove contamination or eliminate exposure pathways.

Sustainability: Alternative 1 is moderately sustainable. No greenhouse gas emissions would be produced by this alternative however the site would remain impacted by metals, PAHs, TEPH, and TRPH. No site-specific risk factors were identified under this alternative with respect to climate change considerations.

4.3.2 Alternative #2 – Partial Excavation and Off-Site Disposal of Impacted Soils

Effectiveness –Patrial soil excavation and disposal is an effective method since it reduces concentrations of contaminants of concern at the surface of the site. This alternative is an effective way to reduce potential future exposure to contaminated soils at the site through removal of impacted soil at the surface (0-2 feet bgs). This alternative is only fully effective if the site is fully covered by structures and/or asphalt/pavement to effectively eliminate all future contact with contaminated on-site soils through a cap. This alternative would not achieve the cleanup goal of unrestricted land use for the future development of the site as impacted soils left in place deeper than 2 feet bgs would require institutional and engineering controls.

Implementation Feasibility – This alternative would logistically include more earthwork, trucking, transportation and disposal than Alternative #1, but less than Alternative #3. Materials, equipment, and labor resources used for implementation of the alternative would be relatively easy to obtain. Cañon City, Colorado is moderately remote and therefore, labor and equipment may need to be sourced from elsewhere.

Remedial Costs – The total estimated costs for this alternative would be approximately $294,000. The cost includes premium wages for Hazardous Waste Operations and Emergency Response (HAZWOPER) trained contractor(s) and consultant oversight.

General Reasonableness – This alternative provides good long-term management of the site impacts assuming the reuse plan for the site remains the same and the entirety of the property is covered in structure(s) and pavement/asphalt. Reuse plans for the site would be limited to options that cover the site in impacted areas with pavement/asphalt that would act as a cap over the impacted soils that remain in place deeper than 2 feet bgs.

Sustainability: Alternative 2 would entail the more truck traffic than Alternative 1, but less traffic than Alternative 3 and would generate a neither conservative nor liberal amount of greenhouse gases. The site would remain impacted by COCs at deeper greater than 2 feet bgs. No site-specific risk factors were identified under this alternative with respect to climate change considerations.

4.3.3 Alternative #3 – Comprehensive Excavation and Off-Site Disposal of Impacted Soils

Effectiveness – Comprehensive soil excavation and off-site disposal is an effective method since it removes contaminated soil and utilizes an approved off-site disposal facility for final disposition. This alternative is an effective way to eliminate potential future exposure to contaminated soils at the site through comprehensive source removal. This alternative effectively eliminates all future contact, human or environmental, with contaminated soils on-site. This alternative would achieve the cleanup goal of residential land use for the future development of the site.

Implementation Feasibility – This alternative would logistically include more trucking, transportation, and disposal than the other considered alternatives. Materials, equipment, and labor resources used for implementation of the alternative would be relatively easy to obtain. Cañon City, Colorado is moderately remote and therefore, labor and equipment may need to be sourced from elsewhere. This would be the most labor-intensive alternative for remediation of the site.

Remedial Costs – The total estimated costs for this alternative would be approximately $538,000. The cost includes premium wages for HAZWOPER trained contractor(s) and consultant oversight.

General Reasonableness – This alternative provides good long-term management of the site impacts. This option does not limit the potential reuse of the site as the contaminated soils would not be retained on-site but requires significant volumes of soil to be transported and disposed of off-site.

Sustainability: Alternative 3 would entail the most truck traffic and therefore, when compared to remaining alternatives, would generate the most greenhouse gases. However, the site would not remain impacted by any COCs. No site-specific risk factors were identified under this alternative with respect to climate change considerations.

5.0 RECOMMENDED CLEANUP ALTERNATIVE

The recommended cleanup alternative is Alternative 3 - Comprehensive Excavation and Off-Site Disposal of Impacted Soils. This alternative would effectively provide the site owner with a reliable alternative that could be completed in a reasonable timeframe. This alternative would also provide full flexibility relative to redevelopment options and leave the site with no remaining soil impacts. It would also achieve the cleanup goal of un-restricted land use for the future development of the site.

6.0 OPINION OF PROBABLE COST LIMITATIONS

The opinion of probable costs (OPC) presented herein represents a Class 5 estimate as defined by the American Association of Cost Estimating (AACE) International. The AACE defines a Class 5 estimate as follows:

Class 5 estimates are generally prepared based on very limited information, and subsequently have wide accuracy ranges. They are often prepared for strategic planning purposes, market studies, assessment of viability, project location studies, and long-range capital planning. Virtually all Class 5 estimates use stochastic estimating methods such as cost curves, capacity factors, and other parametric techniques. Expected accuracy ranges are from –20% to –50% on the low side and +30% to 100% on the high side, depending on technological complexity of the project, appropriate reference information, and the inclusion of an appropriate contingency determination. Ranges could exceed those shown in unusual circumstances.

Stantec has used its professional judgement given the available information and our experience with similar remedial techniques on other sites. Accordingly, the Client agrees that Stantec cannot and does not make any warranty, promise, guarantee, or representation, either expressed or implied, that proposals, bids, project construction costs, or cost of operation or maintenance would not vary substantially from this good-faith cost estimate.

Data gaps remain in terms of fully delineating the horizontal extent of subsurface impacts. Accordingly, the extent and magnitude of subsurface impacts requiring remediation upon which the OPC has been developed is unknown. Therefore, the final extent of excavation, and resultant costs, would be dependent upon the collection and laboratory analyses of confirmatory soil samples at the time of excavation.

7.0 REFERENCES

City of Cañon City, Colorado, 2017. City of Cañon City Arkansas River Corridor Master Plan. December 4.

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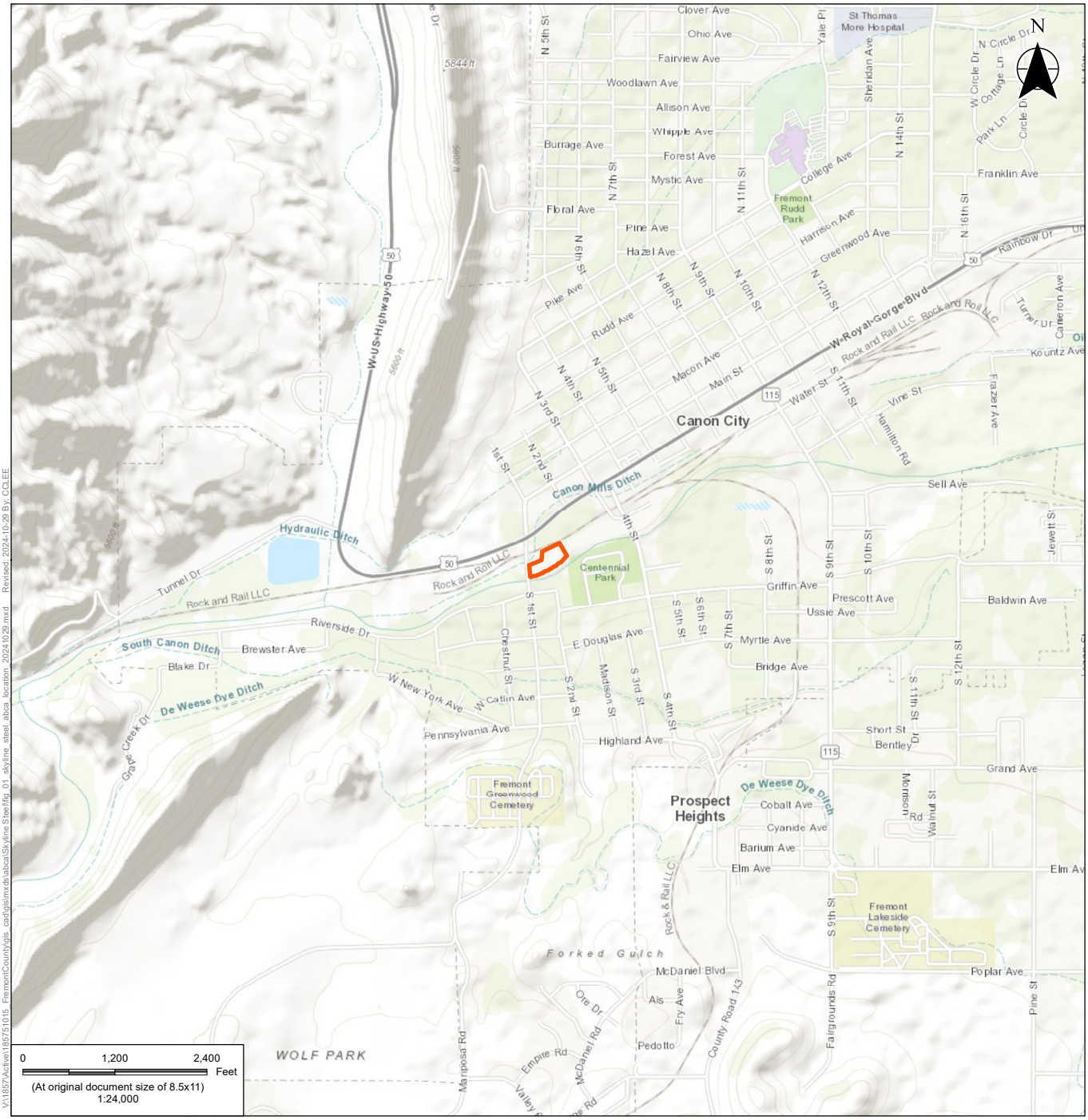
FIGURES



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Approximate Site Boundary

Stantec

Project Location
Skyline Steel
304 South 1st Street
Cañon City, Colorado

Client/Project 185751015
Fremont County, Colorado
EPA Brownfield Assessment Grant
Analysis of Brownfields Cleanup Alternatives

Notes
1. Coordinate System: NAD 1983 UTM Zone 13N
2. Background: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

Title
Site Location Map

Figure No.
1

Stantec

Approximate Site Boundary

0 50 100 Feet

1:750 (At original document size of 11x17)

Notes

1. Coordinate System: WGS 1984 Web Mercator Auxiliary Sphere
2. Orthoimagery © Google Earth (11/05/2019)(Canon City, CO) Retrieved September 5, 2019.

Project Location 185751015 REVA

Skyline Steel
304 South 1st Street, Cañon City, Colorado

Prepared by CCL on 10/29/2024

Client/Project

Fremont County, Colorado
EPA Brownfield Assessment Grant
Analysis of Brownfields Cleanup Alternatives

Figure No.

2

Title

Site Features

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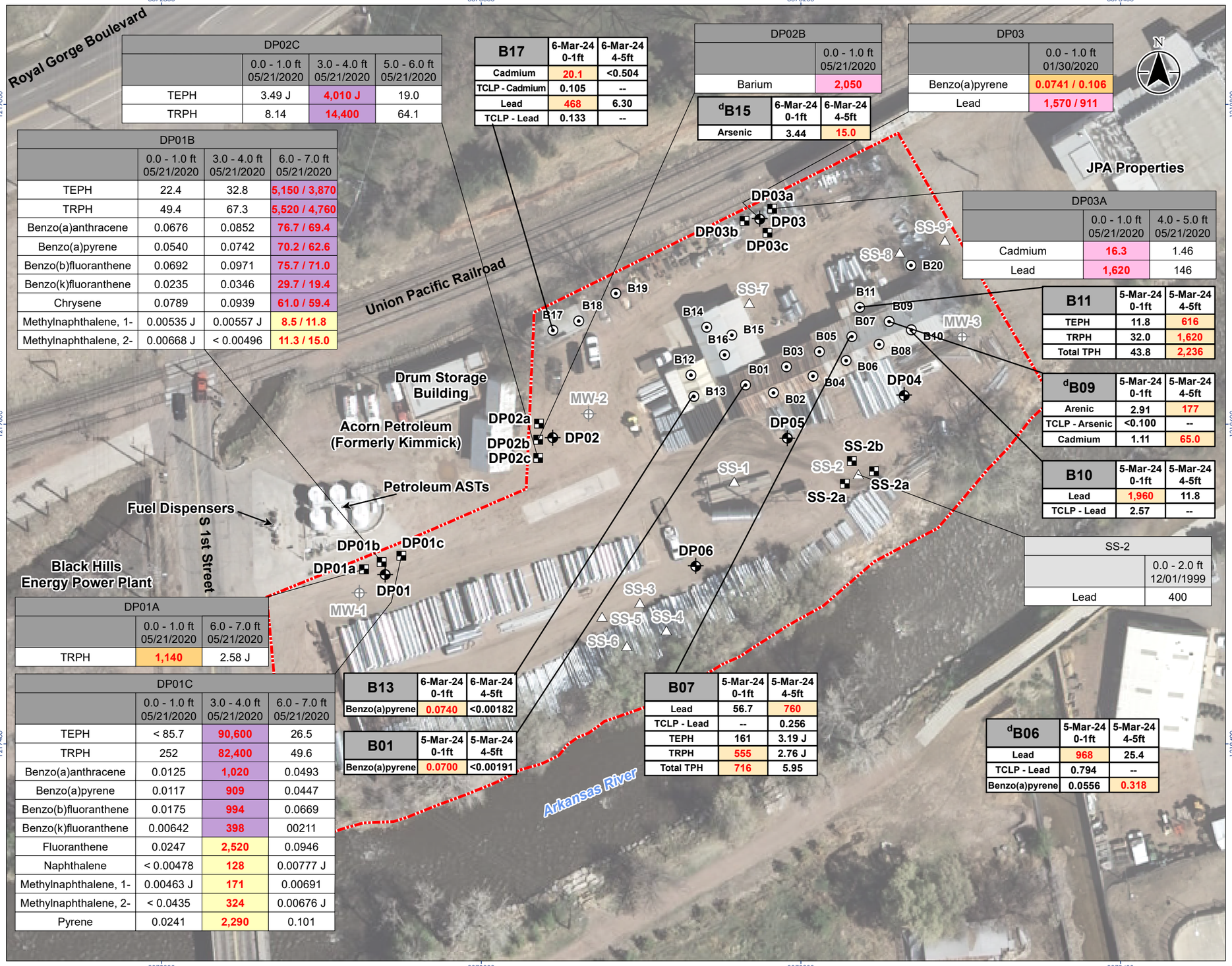

DP02C	0.0 - 1.0 ft 05/21/2020	3.0 - 4.0 ft 05/21/2020	5.0 - 6.0 ft 05/21/2020
TEPH	3.49 J	4,010 J	19.0
TRPH	8.14	14,400	64.1

DP01B	0.0 - 1.0 ft 05/21/2020	3.0 - 4.0 ft 05/21/2020	6.0 - 7.0 ft 05/21/2020
TEPH	22.4	32.8	5,150 / 3,870
TRPH	49.4	67.3	5,520 / 4,760
Benzo(a)anthracene	0.0676	0.0852	76.7 / 69.4
Benzo(a)pyrene	0.0540	0.0742	70.2 / 62.6
Benzo(b)fluoranthene	0.0692	0.0971	75.7 / 71.0
Benzo(k)fluoranthene	0.0235	0.0346	29.7 / 19.4
Chrysene	0.0789	0.0939	61.0 / 59.4
Methylnaphthalene, 1-	0.00535 J	0.00557 J	8.5 / 11.8
Methylnaphthalene, 2-	0.00668 J	< 0.00496	11.3 / 15.0

B17	6-Mar-24 0-1ft	6-Mar-24 4-5ft
Cadmium	20.1	<0.504
TCLP - Cadmium	0.105	--
Lead	468	6.30
TCLP - Lead	0.133	--

DP02B	0.0 - 1.0 ft 05/21/2020
Barium	2,050

[d]B15	6-Mar-24 0-1ft	6-Mar-24 4-5ft
Arsenic	3.44	15.0

DP03	0.0 - 1.0 ft 01/30/2020
Benzo(a)pyrene	0.0741 / 0.106
Lead	1,570 / 911

DP03A	0.0 - 1.0 ft 05/21/2020	4.0 - 5.0 ft 05/21/2020
Cadmium	16.3	1.46
Lead	1,620	146

B11	5-Mar-24 0-1ft	5-Mar-24 4-5ft
TEPH	11.8	616
TRPH	32.0	1,620
Total TPH	43.8	2,236

[d]B09	5-Mar-24 0-1ft	5-Mar-24 4-5ft
Arenic	2.91	177
TCLP - Arsenic	<0.100	--
Cadmium	1.11	65.0

B10	5-Mar-24 0-1ft	5-Mar-24 4-5ft
Lead	1,960	11.8
TCLP - Lead	2.57	--

SS-2	0.0 - 2.0 ft 12/01/1999
Lead	400

DP01A	0.0 - 1.0 ft 05/21/2020	6.0 - 7.0 ft 05/21/2020
TRPH	1,140	2.58 J

DP01C	0.0 - 1.0 ft 05/21/2020	3.0 - 4.0 ft 05/21/2020	6.0 - 7.0 ft 05/21/2020
TEPH	< 85.7	90,600	26.5
TRPH	252	82,400	49.6
Benzo(a)anthracene	0.0125	1,020	0.0493
Benzo(a)pyrene	0.0117	909	0.0447
Benzo(b)fluoranthene	0.0175	994	0.0669
Benzo(k)fluoranthene	0.00642	398	00211
Fluoranthene	0.0247	2,520	0.0946
Naphthalene	< 0.00478	128	0.00777 J
Methylnaphthalene, 1-	0.00463 J	171	0.00691
Methylnaphthalene, 2-	< 0.0435	324	0.00676 J
Pyrene	0.0241	2,290	0.101

B13	6-Mar-24 0-1ft	6-Mar-24 4-5ft
Benzo(a)pyrene	0.0740	<0.00182

B01	5-Mar-24 0-1ft	5-Mar-24 4-5ft
Benzo(a)pyrene	0.0700	<0.00191

B07	5-Mar-24 0-1ft	5-Mar-24 4-5ft
Lead	56.7	760
TCLP - Lead	--	0.256
TEPH	161	3.19 J
TRPH	555	2.76 J
Total TPH	716	5.95

[d]B06	5-Mar-24 0-1ft	5-Mar-24 4-5ft
Lead	968	25.4
TCLP - Lead	0.794	--
Benzo(a)pyrene	0.0556	0.318

Stantec

- Soil Sampling Location (Stantec, 2023)
- Soil Sampling Test Pit Location (Stantec, May 2020)
- Soil/Groundwater Sampling Location (Stantec, January 2020)
- Monitoring Well Location (WMA, 1999)
- Soil Sampling Location (WMA, 1999)
- Approximate Site Boundary
- Concentration Exceeds CDPHE - GPV
- Concentration Exceeds RBSLs - Surface
- Concentration Exceeds RBSLs - Sub-Surface
- Concentration Exceeds EPA RSL - Residential
- Concentration Exceeds USEPA Resident or Industrial RSLs or Colorado RBSLs

* not analyzed for metals.

Sample ID / Sample Depth (feet)/ Sample Date

DP03	0.0 - 1.0 ft 01/30/2020
Benzo(a)pyrene	0.0741 / 0.106
Lead	1,570 / 911

Parameter / Concentration Exceeds Guidelines / Value/Field Duplicate (mg/kg)

Parameter	Units	CDPHE GPV	CDPHE Background	OPS RBSLs Surface	OPS RBSLs Sub-Surface	EPA RSLs Residential
Barium	mg/kg	n/v	n/v	n/v	n/v	1,500
Cadmium	mg/kg	n/v	n/v	n/v	n/v	7.1
Lead	mg/kg	n/v	n/v	n/v	n/v	400
TEPH	mg/kg	n/v	n/v	500	500	n/v
TRPH	mg/kg	n/v	n/v	500	500	n/v
Benzo(a)anthracene	mg/kg	1,000	n/v	0.62	1.6	1.1
Benzo(a)pyrene	mg/kg	1,000	n/v	0.062	4.8	0.11
Benzo(b)fluoranthene	mg/kg	1,000	n/v	0.62	4.5	1.1
Benzo(k)fluoranthene	mg/kg	1,000	n/v	6.2	4.4	11
Chrysene	mg/kg	1,000	n/v	62	1.5	110
Fluoranthene	mg/kg	1,000	n/v	2,300	n/v	240
Methylnaphthalene, 1-	mg/kg	0.81	n/v	n/v	n/v	18
Methylnaphthalene, 2-	mg/kg	7.4	n/v	n/v	n/v	24
Naphthalene	mg/kg	23	n/v	850	n/v	3.8
Pyrene	mg/kg	1,000	n/v	1,800	n/v	180

0 50 100 Feet

1:750 (At original document size of 11x17)

Notes

1. Coordinate System: NAD 1983 HARN StatePlane Colorado Central FIPS 0502 Feet
2. Orthoimagery © Google Earth (11/05/2019)(Canon City, CO) Retrieved September 5, 2019.
3. Arsenic was not analyzed by WMA; see Section 2 of the report for list of analyses.
4. WMA sampling locations are approximate, and based on the

Project Location 185751015 REVA

Skyline Steel
304 South 1st Street, Cañon City, Colorado

Prepared by SVD on 10/29/2024

Client/Project
Fremont County, Colorado
EPA Brownfield Assessment Grant
Phase II Environmental Site Assessment

Figure No.
3

Title
Summary of Soil Analytical Results Exceeding Screening Levels

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ALTERNATIVE COST ESTIMATES SUPPORTING INFORMATION

List of Abbreviations

--	not applicable
AACE	Association for the Advancement of Cost Engineering
BCY	bank (in-place) cubic yard
CF	cubic foot
CY	cubic yard
DY	day
Ea.	each
EPA	Environmental Protection Agency
FT	foot
GAL	gallons
H&S	health and safety
LCY	loose (expanded) cubic yard
LF	linear foot
LS	lump sum
MI	mile
O&P	overhead and profit
%	percent
SF	square foot
SY	square yard
SL	screening levels (see main text for the applicable levels being used for this evaluation)

General Alternative Screening Cost Notes and Assumptions

- Cost estimates were developed using 2024 as the base year.

- The primary cost source used was RS Means Online Data: Year 2024, Location: Pueblo (810), Labor Type: Open Shop. Pueblo was selected as the location since it was the nearest neighbor city to Canon City, Colorado that was listed in RSMeans. The values used from RS Means were inclusive of O&P.

- Remedial design is considered conceptual in nature. As such, costs represent a Class 5 estimateas defined by AACE, which has an expected accuracy range of -50% to +100%.

- An emphasis was placed on cost drivers to enable cost comparison among the alternatives. Although there are likely other costs associated with the implementation of a given remedy, there is a limited level of remedy component scoping at this stage of the project.

- Scope and bid contingencies are included in this estimate, but execution contingency is not.

- EPA Cost Guidance (EPA 540-R-00-002) was used for estimating the professional and technical services for each alternative and for identification of the health and safety productivity factor used for the asbestos work. EPA, 2000. A Guide to Developing and Documenting Cost Estimates During the Feasibility Study. July 2000.

QUANTITY TABLE

General	QTY	Units	Notes - Comments
Property Size Zoning is Class I Industrial	2.15	ACR	
Soil Excavation			
The footprint of impacted soils to be excavated was estimated using Google Earth Pro, soil data from the Stantec Phase II ESAs (Stantec, 2020; 2024), aerial imagery, and known historical site use. Excavation areas were focused on the areas where Stantec conducted sampling in the Phase II ESAs, then extended out to areas adjacent to identified impacts by approximately 10 to 40 feet or out to the property boundary. Excavations were extended out further (40 feet) in cases where aerial imagery / site knowledge suggests potential impacts and sampling data was not available to confirm/deny potential impacts. Where data, site knowledge, or aerial imagery suggested no impacts, excavations only extended 10 feet out from a given sample location with results above screening levels.			
Alternative 2			
AOC-1: SS-2 Excavation Footprint	330	SF	Isolated historical (1999 sampling) lead sample at 400 mg/kg for lead. Assume removal of soils approximately 10 feet out from sample location.
AOC-2: DP-01 Excavation Footprint	3400	SF	Elevated detections near property boundary of petroleum hydrocarbons and PAHs in shallow and/or deeper soils (7 ft or greater)
AOC-3: DP-02 and AOC-5: B18 Excavation Footprint	4800	SF	Petroleum hydrocarbon and barium concentrations above SLs near property boundary and adjacent to an area potentially used as a burn pit. Aerial imagery of suspect burn pit used to estimate excavation area.
AOC-4: DP-03 Excavation Footprint	1785	SF	Cadmium, lead, and benzo(a)pyrene concentrations above SLs in surface soils near property boundary adjacent to Union Pacific Railroad.
Soils beneath previous structures (Main Building, Warehouse, and storage shed)	8600	SF	Arsenic, lead, cadmium, benzo(a)pyrene concentrations above SLs in surface soils and/or deeper soils (5 ft or greater).
Total Excavation Footprint	18,915	SF	
Depth of excavation	2	FT	Alternative 2 assumes removal of surface soil impacts, with remaining impacts left in place
Volume of Alternative 2 Soils for Removal	37,830	CF	
	1,401	BCY	1 CY= 27 CF
	25	%	https://www.engineeringtoolbox.com/soil-rock-bulking-factor-d_1557.html
	1,751	LCY	
Alternative 3			
Excavation Footprint	18,915	SF	Equivalent to footprint assumed for Alternative 2 above
SS-2 Excavation Depth	3	FT	Depth assumes 1 foot deeper than sample with detections above SLs
DP-01 Excavation Depth	8	FT	Depth assumes 1 foot deeper than sample with detections above SLs
DP-02 and B-18 Excavation Depth	5	FT	Depth assumes 1 foot deeper than sample with detections above SLs. Impacts at B18 were not observed below 4 feet, but for simplicity the entire area is assumed to be excavated to a depth of 5 feet.
DP-03 Excavation Depth	2	FT	Depth assumes 1 foot deeper than sample with detections above SLs
Soils beneath previous structures Excavation Depth	6	FT	The majority of elevated detections beneath the former buildings were observed up to 5 feet bgs. PAH detections above SLs at B01 and B13 were not observed past 4 feet bgs; however, for simplicity, the entire area is assumed to be excavated to a depth of 6 feet (1 foot deeper than sample with detections above SLs).
Volume of Alternative 3 Soils for Removal	107,360	CF	

	3,976	CY	1 CY= 27 CFT
Expansion Factor	25	%	https://www.engineeringtoolbox.com/soil-rock-bulking-factor-d_1557.html
	4,970	LCY	

Description	Quantity	Unit	Unit Cost	Cost	Notes/Assumptions
Alternative 1 - No Action					The no action alternative assumes no costs.
Alternative 1 Total				**$0**	
Alternative 2					
Workplan and Reporting	1	LS	$50,000	$50,000	Previous project experience
Soil Excavation	1,401	BCY	$8.75	$12,262	RS Means 312316130050 with 15% adder for loading onto truck. Assumes no additional soil will need to be excavated based on confirmation sampling.
Dozer Backfill	1,751	LCY	$1.62	$2,837	RS Means 312323131300
Compaction	1,401	BCY	$3.31	$4,638	RS Means 312323131600
Soil pickup and hauling to landfill	1,751	LCY	$14.78	$25,886	RS Means 312323201678. Assumes hauling and disposal at Twin Enviro Services in Penrose, Colorado (~8 miles, 16 miles round trip)
Dust Suppression/Protection for Excavation Work	10%	--	--	$4,562	10% of the excavation costs above
Soil disposal fee (tipping fee)	1,751	LCY	$25.00	$43,785	Assumes excavated soils can be disposed of as non-hazardous waste
Confirmation Sampling	1	LS	$12,000	$12,000	Assumes additional sampling to confirm lateral extent of soil impacts. Includes labor and equipment costs to collect the samples as well as analytical costs.
Haz Waste Characterization (TCLP)	1	LS	$3,000	$3,000	Previous project experience
			Subtotal	$158,969	
Additional Costs					
Mobilization & Demobilization	4%			$6,359	
Contingency (20% Scope and 15% Bid)	35%			$55,639	
				$220,967	
Professional and Technical Services					Percentages are based on values presented in Exhibit 5-8 from EPA 540-R-00-001
Project Management	8%			$17,677	
Remedial Design	15%			$33,145	
Construction Management	10%			$22,097	
Alternative 2 Total				**$294,000**	Totals are rounded to the nearest thousand

Description	Quantity	Unit	Unit Cost	Cost	Notes/Assumptions
Alternative 3					
Workplan and Reporting	1	LS	$65,000.00	$65,000	Previous project experience
Soil Excavation	3,976	BCY	$8.75	$34,799	RS Means 312316130050 with 15% adder for loading onto truck. Assumes no additional soil will need to be excavated based on confirmation sampling.
Dozer Backfill	0	LCY	$1.62	$0	RS Means 312323131300
Compaction	3,976	BCY	$3.31	$13,162	RS Means 312323131600
Soil pickup and hauling to landfill	4,970	LCY	$14.78	$73,462	RS Means 312323201678. Assumes hauling and disposal at Twin Enviro Services in Penrose, Colorado (~8 miles, 16 miles round trip)
Dust Suppression/Protection for Excavation Work	10%	--	--	$12,142	10% of the excavation costs above
Soil disposal fee (tipping fee)	4,970	LCY	$25.00	$124,259	Assumes excavated soils can be disposed of as non-hazardous waste
Confirmation Sampling	1	LS	$15,000	$15,000	Assumes additional sampling to confirm vertical extent and lateral extent of soil impacts. Includes labor and equipment costs to collect the samples as well as analytical costs.
Haz Waste Characterization (TCLP)	1	LS	$5,000	$5,000	Previous project experience
			Subtotal	$342,824	
Additional Costs					
Mobilization & Demobilization	4%			$6,359	
Contingency (20% Scope and 15% Bid)	35%			$55,639	
				$404,822	
Professional and Technical Services					Percentages are based on values presented in Exhibit 5-8 from EPA 540-R-00-001
Project Management	8%			$32,386	
Remedial Design	15%			$60,723	
Construction Management	10%			$40,482	
Alternative 3 Total				**$538,000**	Totals are rounded to the nearest thousand