2240819

25 August 2026

Engineering Evaluation/Cost Analysis

Colorado Smelter Superfund Site
Operable Unit 2 Benedict Park

310 E Mesa Avenue
Pueblo, Colorado

Prepared for:

United States Environmental Protection Agency
Region 8
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List of Acronyms

µg/dL	micrograms per deciliter
ALM	Adult Lead Methodology
ARAR	Applicable or Relevant and Appropriate Requirements
ASARCO	American Smelting and Refining Company
bgs	below ground surface
BLL	blood lead level
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COC	contaminant(s) of concern
COPC	contaminant(s) of potential concern
CUL	cleanup level
DU	decision unit
EE/CA	Engineering Evaluation/Cost Analysis
HHRA	Human Health Risk Assessment
IEUBK	Integrated Exposure Uptake Biokinetic
mg/kg	milligrams per kilogram
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPL	National Priority List
NTCRA	Non-Time-Critical Removal Action
OLEM	Office of Land and Emergency Management
O&M	operation and maintenance
OUs	Operable Units
OU1	Operable Unit 1
OU2	Operable Unit 2
Park	Benedict Park
PM10	inhalable particles with diameters that are generally 10 micrometers and smaller
ppm	parts per million
PRG	Preliminary Remediation Goal
PWT	Pacific Western Technologies
RAO	removal action objective
RBA	relative bioavailability
RBSL	risk-based screening level
RCRA	Resource Conservation and Recovery Act

RSL	Regional Screening Level
Site	Colorado Smelter Superfund Site Operable Unit 2 Benedict Park
TBC	to be considered
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
XRF	X-ray fluorescence

Executive Summary

The United States Environmental Protection Agency (USEPA), hereinafter referred to as EPA, with support from the United States Army Corp of Engineers (USACE), has completed an Engineering Evaluation/Cost Analysis (EE/CA) for Benedict Park (Park), located within Operable Unit 2 (OU2) of the Colorado Smelter Superfund Site (Site) in Pueblo, Pueblo County, Colorado (**Figure 1**). This EE/CA was completed following the statutory framework of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). Section 300.415(b)(4)(i) of the NCP requires an EE/CA for all non-time-critical removal actions. An EE/CA is intended to: (1) satisfy environmental review requirements for removal actions; (2) satisfy administrative record requirements for improved documentation of removal action selection; and (3) provide a framework for evaluating and selecting alternative technologies. The results of the EE/CA, along with EPA's response decision, will be summarized in a subsequent Action Memorandum.

The EPA prepared and approved the *EE/CA Approval Memo,* which prompted the completion of this EE/CA (USEPA, 2025). The *EE/CA Approval Memo* was prepared by the EPA Region 8 Remedial Project Manager and reviewed and approved by the EPA Region 8 Superfund and Emergency Management Division Director. The *EE/CA Approval Memo* documented that the Park meets the NCP criteria for initiating a Non-Time-Critical Removal Action (NTCRA) and approved funding for the completion of an EE/CA as part of the NTCRA.

The purpose of this EE/CA is to develop removal action objectives (RAOs) and evaluate appropriate removal action alternatives to address lead soil contamination at Benedict Park. Lead soil contamination is present at the Park due to its proximity to deposited waste slag and the old flue run for the main stack associated with the American Smelting and Refining Company (ASARCO). The old flue run was underground and extended along what is currently the entire eastern edge of Benedict Park. EPA’s previous CERCLA investigations at the Park have confirmed elevated levels of lead in the soil.

The EPA has established RAOs for the Park to minimize current and future human health risks associated with exposure to lead contaminated soils, consistent with EPA’s 2025 Lead Directive. A park improvement project will be completed by the Bojon Town Foundation and the City of Pueblo that will involve disturbance of lead contaminated soil. This could allow contaminated subsurface soils to move to the surface and become airborne and migrate downwind, creating an exposure pathway to residents of the Eilers and Bessemer neighborhoods, construction and park workers, and child recreational users. Updated site-specific risk-based screening levels (RBSL) were calculated for the Park that are protective of workers and child recreational users. The proposed cleanup levels for this EE/CA and are considered interim values and may differ from the OU2 risk-based Preliminary Remediation Goals (PRGs) that will be calculated by EPA’s remedial program after the baseline Human Health Risk Assessment (HHRA) is completed for the ongoing OU2 Remedial Investigation. The criteria EPA used to calculate the RBSLs for the Park included updated toxicity values and exposure factor assumptions that changed since the last RBSLs were calculated (see **Appendix A**). The background concentration of lead in soil was identified in a previous report (Pacific West Technologies [PWT], 2023).

The removal action cleanup level (CUL) for lead is 250 mg/kg, rounded for implementation purposes from the calculated value of 258 mg/kg for child recreators for surface soils accessible to child recreators.

This EE/CA report evaluates three removal action alternatives:

- Alternative 1: No action
- Alternative 2: Excavation to 12 inches and offsite disposal
- Alternative 3: Excavation to 24 inches and offsite disposal

Each alternative was evaluated based on effectiveness, implementability, and cost. Alternative 2, excavation to 12 inches and offsite disposal, is the recommended removal action alternative. This alternative is considered to balance effective removal of impacted soil with reasonable implementability and cost, meeting Colorado and Federal Applicable or Relevant and Appropriate Requirements (ARARs) and achieving the RAOs.

1 Introduction

The EPA, with support from USACE, has completed an EE/CA for the NTCRA at Benedict Park, located within OU2 of the Colorado Smelter Superfund Site in Pueblo, Pueblo County, Colorado (**Figure 1**). This EE/CA was completed following the statutory framework of CERCLA and the NCP. The EPA drafted and approved the *EE/CA Approval Memo* prompting the completion of this EE/CA (USEPA, 2025). The *EE/CA Approval Memo* was completed by the EPA Region 8 Remedial Project Manager and reviewed and approved by the EPA Region 8 Superfund and Emergency Management Division Director. The *EE/CA Approval Memo* documented that the Park meets the NCP criteria for initiating a removal action and recommended completion of an EE/CA as part of a NTCRA.

EPA selected an NTCRA for the Park due to elevated lead concentrations in soils. On 16 October 2025, EPA published the memorandum *Residential Lead Directive for CERCLA Sites and Resource Conservation and Recovery Act (RCRA) Hazardous Waste Cleanup Program Facilities*[1] (2025 Lead Directive). The EPA evaluated soils at the Park based on the updated Regional Screening Level (RSL) for lead outlined in the 2025 Lead Directive, and new exposure factor assumptions for the Park. Using specific factors listed in the NCP, EPA determined an NTCRA was appropriate to prevent public exposures associated with unacceptable levels of risk and decrease the threat to public health, welfare, or the environment. Development of the EE/CA is a statutorily required step of the NTCRA process.

The purpose of this EE/CA is to develop RAOs and evaluate appropriate removal action alternatives. Removal action alternatives will be evaluated based on effectiveness, implementability, cost, and ability to meet ARARs. Based on the results of current and previous investigations, soil cleanup at the Park will be primarily focused on removal of lead-containing soil to minimize human exposure.

[1] Residential Lead Directive for CERCLA Sites and RCRA Hazardous Waste Cleanup Program Facilities. October 16, 2025. https://semspub.epa.gov/work/HQ/100003761.pdf

2 Park Characterization

The Park is located within OU2 of the Colorado Smelter Superfund Site. The Park is owned by the City of Pueblo and is closely surrounded by the Eilers and Bessemer neighborhoods. The Park covers approximately 2.28 acres and is open year-round for family and recreational activities.

2.1 Description and Background

The Eilers Smelter was constructed by the Colorado Smelter Company between Santa Fe Avenue and the Denver & Rio Grande railroad tracks in the Eilers neighborhood of south Pueblo to process silver-lead ore (**Figure 1**). The smelter operated from 1883 to 1908 and reportedly operated eight blast furnaces, two calcining furnaces, one fusing furnace, and 20 kilns. In 1899, the Colorado Smelting Company was merged into ASARCO.

Smelting operations resulted in waste slag being deposited into a ravine between Santa Fe Avenue and the Denver & Rio Grande Western railroad tracks. Some of the slag was used as ballast for the railroad track west of the Park. In 1923, bricks from the blast furnace smokestack were used to construct Saint Mary School, located immediately east of the Park and portions of the slag area. The old flue run for the main stack also ran along the entire Eastern edge of the park. This flue run was underground and at this time the current status of the abandoned run is unknown.

An orange discharge at the Santa Fe Bridge Culvert to the Arkansas River was observed during an inspection, prompting site investigations that identified metals contamination from smelting operations. Based on the investigation results, the EPA listed the Colorado Smelter Superfund Site on the National Priority List (NPL) in 2014.

The Colorado Smelter Superfund Site is comprised of two operable units (OUs): Operable Unit 1 (OU1), Community Properties, and OU2, the Former Smelter Area. Benedict Park (**Figure 2**), the focus of this EE/CA, is located within OU2 and is closely surrounded by the Eilers and Bessemer neighborhoods—these neighborhoods are part of OU1. OU1, the focus of an early interim action Record of Decision, consists of the preliminary study area based on a one-half mile radius surrounding the former smelter stack location. Within OU1, there are approximately 2,060 homes and another 400 parcels that include vacant properties, commercial businesses, schools, parks and city-owned alleys within OU1.

Benedict Park is a large open grass area with irrigation, limited trees for shade, and consists of a small parking lot that is shared with St. Mary School, two playground areas: one in the northern portion of the park and the other at the park entrance where a previous removal action was completed. Other park features include a basketball court that borders the eastern side of the park, sidewalks that lead to one playground area and to a covered structure with a picnic table. A ravine with railroads tracks runs north and west of the park where slag was deposited when the smelter was in operation. No trespassing signs and signs identifying hazardous levels of arsenic and lead are posted along the north and west edges of the park before the ravine restricting access to the slag piles.

The Bojon Town Foundation and the City of Pueblo are planning a park improvement project that is anticipated to include removal of the northern playground, expansion of the other playground area with installation of new equipment, lighting and a sidewalk that extends around the park.

2.2 Previous Removal Actions at Benedict Park

In 2016, the EPA conducted a removal action at the Park to repair chain link fencing and post caution and “no trespassing” signs along the boundary to Benedict Park to restrict access.

In 2017, the EPA developed a Risk Evaluation Technical Memorandum for Benedict Park (see **Appendix A**). The Risk Evaluation recommended action to remove soil with higher concentrations of lead in subsurface soil below the playground on the east side of the park, identified as Decision Unit (DU) G on **Figure 3**. The EPA subsequently conducted a Time-Critical Removal Action to remove a total of 215 tons of contaminated soils (97 tons of contaminated pea gravel and 118 tons of heavy metals-impacted waste).

2.3 Source, Nature, and Extent of Contamination

As outlined in the Benedict Park Risk Evaluation Technical Memorandum (see **Appendix A**), the Park is located on the former location of the Eilers Smelter. The main source of contamination is the old flue run for the main stack of the smelter that ran along the entire Eastern edge of the park. The flue run was underground, and the current status of the abandoned run is unknown. The old flue run, main stack emissions, waste slag deposits and smelter operations resulted in soil contamination with heavy metals.

In 2017, the EPA conducted a Remedial Investigation of OU1 that included soil sampling in the high use/play areas of Benedict Park. Incremental soil samples were collected from seven separate DUs within Benedict Park at depths ranging from 0 to 18 inches and analyzed for lead. Sample results showed elevated lead levels throughout the park in both playground and non-playground areas, with concentrations generally increasing with depth, except at DU B where concentrations decreased at depth.

The highest concentrations in the park corresponded to the historic flue run. DU G for the east playground exhibited elevated concentrations in the subsurface soils below the pea gravel prompting a removal action of 12 inches of soil completed in 2017. Layers of orange soil were observed on the sidewalls and floor during the excavation, confirming the playground was built either on top of or adjacent to the flue run of the smelter. In addition, a test pit was performed in the middle of the removal area, that confirmed contamination still existed at a depth of 4 feet, based on observations of orange soil. Since a removal action has already been completed at DU G, it is not included in this EE/CA and will not be part of the subsequent NTCRA.

2.4 Analytical Data

Soil samples were collected from five separate DUs in non-playground areas identified as DUs A, B, C, D and E (**Figure 3**). Separate samples were collected from 0 to 1 inch below ground surface (bgs), 1 to 6 inches bgs, 6 to 12 inches bgs, and 12 to 18 inches bgs. Each sample was a 30-increment composite sample collected from a random grid within the DU (PWT, 2017). Samples

were analyzed for lead using a field portable X-ray fluorescence (XRF) instrument with select samples from sample intervals sent to a laboratory for analysis to determine the correlation between the XRF and laboratory data.

Soil samples collected from the DUs within two separate playground areas at the park identified as DUs F and G, included an approximately 18-inch pea gravel layer and underlying subsurface soils. The underlying subsurface soil samples were collected from the same sample depths and sampling methodology listed above for the non-playground areas.

In June 2017, additional bioavailability analyses for lead were performed on the DU samples collected from the surface soil layer of DUs B, C and E and a sample of the fine dust from the pea gravel layer and the subsurface soil layer from DU G (PWT, 2017).

Lead maximum concentrations in soil at the non-playground areas are shown in **Table 2-1** and in soil and surface cover/pea gravel at the playground areas shown in **Table 2-2** below. Elevated concentrations in the subsurface soil in DU G prompted a removal action that was completed in 2017. Therefore, DU G is not part of this EE/CA, and the analytical results were not included. Analytical results for DU G can be found in the Benedict Park Risk Evaluation Technical Memorandum (see Appendix A).

Table 2-1 Non-Playground Maximum Concentrations (DUs A-E)

Compound	Soil Layer	Depth Below Ground Surface (inches)	Maximum Concentration parts per million (ppm)
Lead	Surface Soil	0-1	348
	Subsurface Soil	1-6	378
		6-12	648
		12-18	880

Table 2-2 Playground Maximum Concentrations (DU F)

Compound	Soil Layer	Depth Below Ground Surface (inches)	Maximum Concentration (ppm)
			Northwest Playground (DU F)
Lead	Surface cover/Pea Gravel	0-18	80.3
	Subsurface Soil	0-1	320
		1-6	539
		6-12	578
		12-18	942

2.5 Streamlined Risk Evaluation

On 16 October 2025, EPA published the memorandum *Residential Lead Directive for CERCLA Sites and RCRA Hazardous Waste Cleanup Program Facilities* (*2025 Lead Directive*). As outlined in the *2025 Lead Directive*, EPA's national lead policy specifies the use of a regional screening level (RSL) of 200 ppm for lead in residential soil and a target children's blood lead level (BLL) of 5 micrograms per deciliter (ug/dL) to develop PRGs and CULs. EPA calculated a new recreational CUL for lead using the Integrate Exposure Uptake Biokinetic (IEUBK) model version 2, incorporating site-specific values, as appropriate (See **Appendix A**, *Technical Memorandum on Updating Risk-Based Screening Level Estimates for Lead in soils at Benedict Park, Colorado Smelter OU2; Revision 2*). The results indicate that the revised site-specific CUL for soil is 250, rounded for implementation purposes from the calculated value of 258 mg/kg. While 250 mg/kg is the CUL for this removal action, a Baseline Risk Assessment has not yet been completed as a part of the OU2 Remedial Investigation and may result in a different CUL for OU2 remedial action in the former smelter area. As a result, this value, specific to Benedict Park, will be referred to as the recreational RBSL, and will be used to identify areas for removal. Soil lead concentrations that are present above the calculated RBSL indicate a potential threat to the health of child recreators from soil lead attributed to the site.

The updated recreational RBSL analysis evaluated potential exposures for three receptor groups:

- Child recreational users of the park
- Park workers conducting routine maintenance activities
- Construction workers performing park improvement activities

RBSLs were calculated for lead, using EPA modeling tools and current toxicity values. Lead risk assessment does not use traditional toxicity values (e.g., reference dose for non-cancer risks, oral slope factor for cancer risks); rather, protectiveness for lead is defined by the risk of exceeding the target blood lead level (BLL) for a given exposure scenario.

Lead RBSLs were derived using IEUBK model for children and the Adult Lead Methodology (ALM) for adult workers.

The updated modeling also incorporated site-specific relative bioavailability (RBA) values derived from in vitro bioaccessibility testing of Benedict Park soils. The updated screening evaluation confirms that lead remains a primary risk driver in Benedict Park soils.

Modeling results indicate that the most sensitive exposure scenario is for child recreational users exposed to surface soil and playground materials. Screening levels for lead vary depending on receptor type and exposure duration. Worker-based screening levels are substantially higher due to lower exposure frequency and duration.

Concentrations of lead are at or exceed the recreational CUL of 250 mg/kg in the top 12 inches of all DUs and generally increase with depth across the park and are highest near the historic flue run along the eastern edge of the park. Subsurface soils in several decision units contain concentrations that substantially exceed the updated screening level.

Under current conditions, exposure to these deeper soils is limited. However, the Bojon Town Foundation and the City of Pueblo are planning park improvement activities that will involve excavation and soil disturbance. These activities could expose contaminated subsurface soil and create potential exposure pathways for park users and workers through direct contact, incidental ingestion of soil, and inhalation of contaminated dust.

The lead RBSL of 258 mg/kg developed for recreational users of Benedict Park is a screening-level concentration intended to inform site management decisions during the investigation and removal action process. The removal action cleanup level for lead is 250 mg/kg, rounded for implementation purposes. This value is not a final cleanup level and may differ from the PRG or cleanup level ultimately selected for OU2 following completion of the baseline human health risk assessment and evaluation of the NCP remedy selection criteria.

The updated risk evaluation supports the conclusion that removal of lead-impacted subsurface soil is appropriate to minimize potential future exposures associated with planned park improvements and long-term recreational use of Benedict Park.

2.6 Applicable or Relevant and Appropriate Requirements (ARARs)

The NCP requires removal actions to meet ARARs to the extent practicable considering the exigencies of the situation. State and federal ARARs are developed to define remedy protectiveness and ensure the response is performed in accordance with regulations. Selected alternatives should fulfill the requirements of the ARARs.

The EPA identified ARARs that pertain to this removal action as defined in the *Guidance on Consideration of ARARs During Removal Actions* (USEPA, 1991):

> *"*Applicable *requirements are cleanup standards, standards of control, and other substantive requirements, criteria or limitations promulgated under Federal environmental or State environmental or facility siting laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location or other circumstances found at a CERCLA site.*
>
> *Relevant and appropriate requirements are cleanup standards, standards of* control*, and other substantive requirements, criteria, or limitations promulgated under Federal environmental or State environmental or facility siting laws that, while not "applicable" to a hazardous substance, pollutant, contaminant, remedial action, location or other circumstances at a CERCLA site, address problems or situations sufficiently similar to those encountered at the CERCLA site and are well-suited to the particular site.*
>
> *Other information To Be Considered (TBC) generally falls within three categories: health effects information with a high degree of credibility; technical information on how to perform or evaluate site investigations or* response *actions; and policy."*

The federal and State ARARs for the NTCRA at the Park include location, action, and chemical-specific requirements and are presented in **Appendix B**.

3 Identification of Removal Action Objectives

EPA's *Guidance on Conducting Non-Time-Critical Removal Actions Under CERCLA* (USEPA, 1993) states that specific RAOs should be developed for the NTCRA at the Park. The RAOs should be medium-specific goals for protecting human health and the environment that identify the contaminants of concern (COCs) and exposure routes and receptors.

3.1 Statutory Limits of Removal Actions

Congress has established statutory limits for removal actions. The statutory limits for NTCRAs are set at $2 million in cost and 12 months in duration. A waiver is required if a removal action will exceed the statutory limits. Here, the cost estimate for the recommended removal action alternative does not exceed the $2 million- and 12-month statutory limits; therefore, a waiver is not required. The cost estimate is discussed in detail in subsequent sections of this EE/CA.

3.2 Determination of Removal Scope

The soil at Benedict Park, which is open year-round for family and recreational activities, exhibited elevated levels of lead in soil. Lead is a hazardous substance as defined by Section 101(14) of CERCLA and identified in 40 CFR Section 302.4.

Sampling results from EPA's 2017 risk evaluation indicated that lead in soils is a primary contaminant of potential concern (COPC) and elevated lead concentrations in subsurface soil generally increase with depth.

In 2025, the EPA was notified by the City of Pueblo that Bendict Park will undergo a significant improvement project. The improvement project will disturb contaminated soils at depth and remove playground equipment and sidewalks that act as informal barriers. The park improvement project would disturb and relocate high levels of subsurface soils containing lead to the surface. Due to park improvements, it is likely that areas of the park that are currently low use will now be high-use areas (USEPA, 2025). The soil disturbance could expose contaminated subsurface soil and create new potential exposure pathways for park users and workers through direct contact, incidental ingestion of soil, and inhalation of contaminated dust and the dust becoming airborne and migrating downwind during and after the project as a potential exposure pathway for neighborhood residents through inhalation. This EE/CA will evaluate alternatives for excavation of soil to a depth of 12 inches and up to 24 inches.

For the Park, components of the RAO are defined as follows:

- Medium: Park soils
- Contaminant Risk Driver: Lead
- Exposure Routes: Dermal contact or accidental ingestion of soil and inhalation of dust
- Exposure Receptors: Park users, workers and residents of the Eilers and Bessemer neighborhoods

The Park RAO is defined as:

- Prevent recreational and worker direct contact exposure (incidental, ingestion, inhalation, and dermal contact) to soil with lead concentrations that exceed CULs.

The cleanup levels, identified below, are derived from site-specific risk-based calculations.

3.2.1 Cleanup Levels

Cleanup levels for the Benedict Park NTCRA were selected using the results of the *EPA Region 8 Benedict Technical Memorandum on Updating Risk-Based Screening Level Estimates for Lead in Soils* (see **Appendix A**). The memorandum evaluated potential human health risks associated with exposure to lead in soil at Benedict Park and calculated RBSLs using current EPA toxicity values and exposure assumptions applicable to recreational use of the park and workers.

The evaluation considered exposure scenarios relevant to park use, park maintenance and planned park improvement activities, including:

- Child recreational users
- Park maintenance workers
- Construction workers performing park improvements

Lead screening levels were calculated using EPA's IEUBK model for children and the ALM for adult workers.

Because Benedict Park is a public recreational area used by children, the child recreational exposure scenario represents the most sensitive receptor and was used to evaluate soil concentrations that may require response actions.

Cleanup levels for the Benedict Park removal action were evaluated and selected using the results of the risk evaluation, consistent with EPA lead guidance, and with the site-specific background analysis documented in the Benedict Park risk memorandum, which is included in the Administrative Record for this EE/CA.

The cleanup levels applied for the NTCRA are:

Table 3-1 Lead Cleanup level for the NTCRA at the Park

Contaminant of Concern	Cleanup Level (mg/kg)	Basis
Lead	**250 mg/kg**	RBSL for Child Recreator and rounded for implementation purposes
Lead	**290 mg/kg**	RBSL for Construction Worker and rounded for implementation purposes

The cleanup level for lead is based directly on the RBSLs calculated for the Park in that evaluation. The RBSLs provide context for evaluating potential exposure and informing removal decisions but are not final cleanup levels for the Colorado Smelter Superfund Site.

The cleanup level, exposure of impacted soils to respective receptors, and ability for institutional controls and clean cover to prevent exposure will be used to determine whether soil removal is required within each decision unit evaluated for Benedict Park. Soil exceeding the cleanup levels will be removed to the specified excavation depth and replaced with clean fill material.

The cleanup level is specific to the Benedict Park NTCRA and are intended to reduce potential exposure to contaminated soil during recreational use of the park and during planned park improvement activities that may disturb subsurface soils. Final remedial action cleanup levels for OU2 of the Colorado Smelter Superfund Site will be calculated during the remedial investigation and feasibility study process and documented in a future OU2 Record of Decision.

3.2.2 Removal Scope

The removal scope is based on a comparison of the 2017 lead results and the updated cleanup levels. If lead concentrations in a DU exceed the cleanup level, that DU falls within the removal scope. This EE/CA will evaluate alternatives for excavation of soil at 12 inches and up to a depth of 24 inches, as described in **Section 4**. DU G, which was addressed through the 2017 TCRA, is not included in the removal scope.

The analytical results from the 2017 removal action showed exceedances (**Section 2.4**) of the new cleanup levels presented in **Table 3-1** throughout the park. Based on the migration of source contaminants from historical site activities, soil at all depths and locations above the cleanup levels and have current or future exposure of respective receptors, are subject to this removal action and/or institutional controls. DUs with soil lead results that exceed the cleanup levels at the evaluated excavation depths will require excavation. Excavation will not be required if lead concentrations in soil are below the cleanup levels.

A demarcation layer (e.g., construction/snow fencing or geotextile fabric) will be installed at the bottom of DUs where remaining contaminated soils with lead concentrations of 290 mg/kg pose an unacceptable risk for construction workers. The demarcation layer will then be covered with clean soil. If the remaining soil after excavation is below cleanup levels indicating there is no remaining unacceptable risk, a demarcation layer will not be installed. This layer will act as a physical barrier between the clean fill and contaminated soil remaining in the ground and clearly identify the depth of contaminated material exists below the layer. The demarcation layer will help minimize human exposure and accidental disturbance of the remaining contaminants after the removal action is complete and for institutional controls purposes.

3.3 Determination of Removal Schedule

A specific schedule for the removal action will be established once the EE/CA is approved and an Action Memorandum is issued, subject to federal funding and contracting timing constraints. Duration of the removal action is respective of the alternative selected, between 30 (Alternative 2) and 60 days (Alternative 3). The removal schedule will be coordinated with the City of Pueblo.

3.4 Planned Remedial Activities

There is currently an ongoing Remedial Investigation being conducted for OU2 that will support the OU2 Record of Decision and OU2 Remedial Design/Remedial Action.

4 Identification and Analysis of Removal Action Alternatives

As outlined in EPA's *Guidance on Conducting Non-Time-Critical Removal Actions Under CERCLA* (USEPA, 1993), the purpose of an EE/CA is to satisfy environmental review requirements for the removal action, improve documentation of removal selection, and provide a framework for evaluating and selecting alternative technologies. The removal alternatives evaluated in this EE/CA were developed based on the information from EPA's previous CERCLA investigations at the Park.

4.1 Evaluation Criteria

The evaluation criteria outlined in EPA's *Guidance on Conducting Non-Time-Critical Removal Actions Under CERCLA* (USEPA, 1993) are effectiveness, implementability, and cost.

Effectiveness evaluates the protectiveness and ability to achieve the removal objectives for each alternative. This includes evaluating whether the alternative is protective of public health and the community, workers during implementation, and the environment. In addition, the selected alternative should comply with the ARARs and meet the RAOs within the scope of the removal action.

Implementability evaluates the technical and administrative feasibility of each alternative. Technical feasibility includes construction and operational considerations, performance and useful life, adaptability to environmental conditions, remedial performance, and implementability within one year. Administration feasibility includes permit requirements, easement or right-of-way requirements, impact on adjoining properties, and ability to impose institutional controls. In addition, general availability of equipment, personnel, services, outside laboratories, and disposal facilities is also evaluated as part of the implementability of each alternative.

Cost evaluates the life-cycle costs of the project, including capital costs and annual operation and maintenance (O&M) costs. Capital costs may include costs for construction, equipment and materials, land and site acquisition, buildings and services, relocation, transportation and disposal, and analytical services. Annual costs may include costs for operations, maintenance, on-going monitoring, and general administrative support. Cost calculations have assumed the ongoing annual costs are consistent between each solution and therefore have not been included.

4.2 Common Activities

Common activities will be completed for each alternative presented (excluding the no action alternative). These common activities include:

- Remove accessible impacted surface and shallow subsurface soil. Accessible soils are those that are not located beneath roadways, paved areas, or other structures. Impacted soil around tree roots will be removed with shovels to the best extent possible without damaging the roots.
- Perform Ground Penetrating Radar (GPR) Survey to locate underground infrastructure.

- Replace excavated soil and playground pea gravel with clean fill from an off-site source.
- Install a physical barrier (demarcation layer) at the vertical extent of excavation such as a snow fence or geotextile between the clean fill and contaminated soil above cleanup levels remaining in the ground as a sign that contaminated material exists below the layer.
- Re-vegetate with grass (sod) after backfilling is complete.
- Waste characterization sampling and analysis.
- Dispose of excavated soil at an appropriate off-site disposal facility.
- Record a Notice of Environmental Use Restrictions on the Park property as an institutional control to protect the clean fill and cover and prevent exposure to Site contaminants in soil beneath the physical barrier.

The amount of impacted soil removed and requiring disposal as well as the amount of soil imported will vary between each alternative based on depth of excavation. The variability in cost between alternatives is primarily from the variation in the amount of soil for disposal and import as well as the increase in time to complete deeper excavations and the application of the visual barrier if the remaining soil beneath the excavation exceeds the construction worker cleanup level. The only consistent cost between the alternatives is for the GPR survey. For cost estimating purposes, cover will be clean fill from an off-site source and re-vegetated with sod (**Appendix C**).

The disposal of soil and playground pea gravel will be completed at a permitted landfill that can accept non-hazardous lead-containing soil waste. For cost estimating, it is assumed that soil will be transported to the Waste Management Midway Landfill (8925 Rancho Colorado Boulevard, Fountain, CO 80817) for disposal.

4.3 Alternative 1: No Action

The No Action alternative leaves the Park in its current condition. There would be no soil removed and no cover installed. This alternative is required to be evaluated per NCP requirement and serves as a baseline for comparing the environmental effect of other proposed alternatives.

4.3.1 Effectiveness

With this alternative, the Site contaminant concentrations in soil would not change. This alternative does not reduce the potential park users, workers and residents of the Eilers and Bessemer neighborhoods exposure to Site contaminants and does not reduce the toxicity, mobility, or volume of the Site contaminants. This alternative does not meet the RAOs.

4.3.2 Implementability

This alternative is technically and administratively feasible; however, State and community acceptance of this alternative is not likely.

4.3.3 Cost

The cost associated with this alternative is $0 (**Appendix C**).

4.4 Alternative 2: Excavation to 12 inches

Alternative 2 includes those common activities described in **Section 4.2** with excavation of available soils within Benedict Park to a depth of 12 inches. Excavation of contaminated soils and replacement of clean fill with a demarcation layer to provide an adequate barrier from contaminated soil for the protection of human health is consistent with the *Superfund Lead-Contaminated Residential Sites Handbook* (USEPA, 2003) and EPA's updated lead directive (USEPA, 2025). This alternative includes excavation of DUs A, B, C, D and E. Institutional controls will still be required for contaminated soil below 12 inches. DU G was addressed in the 2017 TCRA.

4.4.1 Effectiveness

Excavation of impacted soil will reduce the volume of impacted soil and the addition of 12 inches of clean fill over the contaminated soil will prevent direct exposure to contamination for child recreational users and park workers performing routine maintenance activities, such as mowing and prevent wind dispersion to nearby residents. In the long term, institutional controls in the form of a Notice of Environmental Use Restrictions will require contaminated soil management for activities disturbing the clean fill and cover, such as additional park improvements, irrigation, or modifying landscaping. In addition, institutional controls will be required for contaminated soil below 12 inches at DUs that will not be excavated and unexcavated soil remaining under permanent structures. The physical barrier will provide additional long-term effectiveness as a reminder to limit excavation depths. Long-term effectiveness would be maintained through institutional controls and management of soils generated from future intrusive activities at depths containing residual contaminated soil.

4.4.2 Implementability

Soil excavation, backfilling, and disposal are readily implementable and does not require specialized equipment with minimal design or engineering. The estimated volume of contaminated soil for this alternative is 2,804.2 cubic yards, and the estimated time to complete this alternative is 30 days. The Park would be closed during the removal action and best management practices for dust mitigation would be employed to prevent contaminant dispersion from wind. Because of the depth of excavation, including areas that cannot be excavated beneath hard cover, all impacted soils may not be removed, and institutional controls would be required. Institutional controls are administrative controls that are implementable with agreement from all stakeholders. The confirmation soil samples collected at the depth of excavation would provide stakeholders with details of where impacted soils remain in place for documentation as part of the environmental covenant.

During construction, multiple engineered controls must be in place to meet the ARARs. These may include noxious weed control; limiting noise levels; appropriate characterization, handling, and disposal of generated waste soil; developing a fugitive dust control plan; limiting emissions of

lead and inhalable particles with diameters that are generally 10 micrometers and smaller (PM10); and complying with substantive requirements from Colorado's stormwater discharge program. Soil imported to the Site will need to be characterized and meet the cleanup levels prior to placement on Site.

4.4.3 Cost

The estimated cost to implement this alternative is $1,091,151. (**Appendix C**).

4.5 Alternative 3: Excavation to 24 inches

Alternative 3 includes those common activities described in **Section 4.2** with excavation of soils within the Site to a depth of 24 inches. Alternative 3 exceeds the minimum removal depth of 12 inches to provide an adequate barrier from contaminated soil for the protection of human health that is recommended by the *Superfund Lead-Contaminated Residential Sites Handbook* (USEPA, 2003). This alternative includes excavation of DUs A and B to a depth of 12 inches and excavation of DU C, D and E to a depth of 24 inches. DU G was addressed in the 2017 TCRA.

4.5.1 Effectiveness

Excavation of impacted soil will reduce the volume of impacted soil and the addition of 24 inches of clean fill over the contaminated soil will prevent direct exposure to contamination for child recreational users and park workers performing routine maintenance activities, such as mowing and required repair/replacement of the irrigation system lines and components and prevent wind dispersion to nearby residents. In the long term, institutional controls in the form of a Notice of Environmental Use Restrictions will require contaminated soil management for activities disturbing the clean fill and cover, such as additional park improvements and modifying landscaping. In addition, institutional controls will be required for contaminated soil below 24 inches and unexcavated soil remaining under permanent structures. The physical barrier will provide long-term effectiveness as a reminder to limit excavation depths; however, the barrier may degrade over time.

4.5.2 Implementability

Soil excavation, backfilling, and disposal are readily implementable and does not require specialized equipment with minimal design or engineering. The estimated volume of contaminated soil for this alternative is 7,163 cubic yards, and the estimated time to complete this alternative is 60 days. The main irrigation system lines are located at an approximate depth of 24 inches. The excavation depth will impact the lines that increases the potential for damage to the lines. The Park would be closed during the removal action and best management practices for dust mitigation would be employed to prevent contaminant dispersion from wind. The longer duration for completing this alternative increases the risk of neighborhood residents being exposed to contaminant dispersion from the wind. Because of the depth of excavation, including areas that cannot be excavated beneath hard cover, all impacted soil may not be removed, and institutional controls would be required. Institutional controls are administrative controls that are implementable with agreement from all stakeholders. The confirmation soil samples collected at the depth of excavation would provide stakeholders with details of where impacted soils remain

in place for documentation as part of the environmental covenant.

During construction, multiple engineered controls must be in place to meet the ARARs. These may include noxious weed control; limiting noise levels; appropriate characterization, handling, and disposal of generated waste soil; developing a fugitive dust control plan; limiting emissions of lead and PM10; and comply with substantive requirements from Colorado's stormwater discharge program. Soil imported to the Site will need to be characterized and meet the cleanup levels prior to placement on Site.

4.5.3 Cost

The estimated cost to implement this alternative is $1,820,307.28 (**Appendix C**).

5 Comparative Analysis of Removal Action Alternatives

Each of the alternatives was evaluated based on effectiveness, implementability, and cost (**Table 5-1**). Alternative 1 is the lowest cost but does not reduce the potential human exposure to Site contaminants, does not meet the RAOs, and would likely not be accepted by the EPA and community. Generally, each of the soil removal alternatives (Alternative 2 and Alternative 3) is protective of the park user and neighborhood residents' potential exposure to Site contaminants. Alternative 3 would be protective for the park worker for some maintenance activities and Alternative 2 would be protective for the park worker for routine maintenance activities and is protective for maintenance or replacement of the irrigation system at depth with contaminated soils management. Long term exposure to Site contaminants would be managed through engineering controls and an environmental covenant. Of the soil removal alternatives, Alternative 2 is more implementable due to removal of less soil. Alternative 3 is less likely to achieve the target removal completion timeframe to meet to the desired date for completion of the park renovation project, due to the increased volume of excavated soil compared to alternative 2, although the removal timeframe meets the statutory limitation of one year. Alternatives 2 and 3 are consistent with *Superfund Lead-Contaminated Residential Sites Handbook* (USEPA, 2003). Alternative 3 cost is significantly higher than Alternative 2. Both Alternative 2 are 3 would be accepted by the State of Colorado and would likely be accepted by the community.

Table 5-1. Summary Comparison of Removal Action Alternatives

Alternative	Effectiveness	Implementability	Cost
Alternative 1: No Action	Low	High	Lowest
Alternative 2: Excavation to 12 inches and offsite disposal	Moderate	Moderate	Low
Alternative 3: Excavation to 24 inches and offsite disposal	High	Low	High

Alternative 2 best balances effectiveness, implementability, and cost while meeting the removal action objectives.

6 Recommended Removal Action Alternatives

The alternatives evaluated for the Site include:

- Alternative 1: No action
- Alternative 2: Excavation to 12 inches and offsite disposal
- Alternative 3: Excavation to 24 inches and offsite disposal

Alternative 2, excavation to 12 inches and off-Site disposal is the recommended removal action. This alternative meets Colorado and federal ARARs and will achieve the RAOs. These alternative balances effective removal action with reasonable implementability and cost.

Although Alternative 3 would involve deeper excavation, the additional removal depth would significantly increase excavation volume, cost, and construction complexity while providing limited additional reduction in exposure potential because both excavation alternatives include placement of a demarcation layer, clean cover, and institutional controls to prevent direct contact with remaining subsurface soils.

Scope variations that may be considered with the implementation of Alternative 2 are listed below.

The cost of these variations have not been included and may present a change in cost to the selected alternative.

- In areas under permanent structures, soil is less likely to be encountered by most park workers and child recreational users and presents a lower risk so soil removal may not be needed.
- A physical barrier (demarcation layer) will be installed in excavated DUs and Institutional Controls will be required for all DUs where contaminated soil above cleanup levels remaining in the ground is an unacceptable risk, including soil under permanent structures.
- Removal, replacement, and/or repair of underground irrigation system components if impacted and damaged.
- Replacement of concrete or asphalt removed or damaged during excavation.
- Excavation may not be completed within 1 foot of a structure or sidewalk to maintain structural safety of the structure.
- Excavation may not be completed within 1-2 feet of underground utilities to maintain safety for excavation workers and limit potential damage to existing utility lines.

In areas where a structure is planned to be removed or relocated, such as moving a playground set, the playground set removal may be completed prior to soil removal with relocation of playground equipment after soil removal. This would allow the soil removal activities to be more effective and completed over the entire park and more implementable because of the lack of access restrictions around the playground equipment.

7 References

Pacific Western Technologies (PWT), LTD. “Technical Memorandum, Benedict Park Risk Evaluation”, Colorado Smelter Superfund Site, Pueblo County, Colorado, November 2017.

United States Environmental Protection Agency (USEPA), 1991. “Guidance on Consideration of ARARs During Removal Actions”, EPA/540/P-91/011, September 1991.

USEPA, 1993. “Guidance on Conducting Non-Time-Critical Removal Actions Under CERCLA”, EPA540-R-93-057, August 1993.

USEPA, 2017. “Early Interim Action Residential Property Cleanups, Operable Unit 1 – Community Properties Record of Decision”, September 2017.

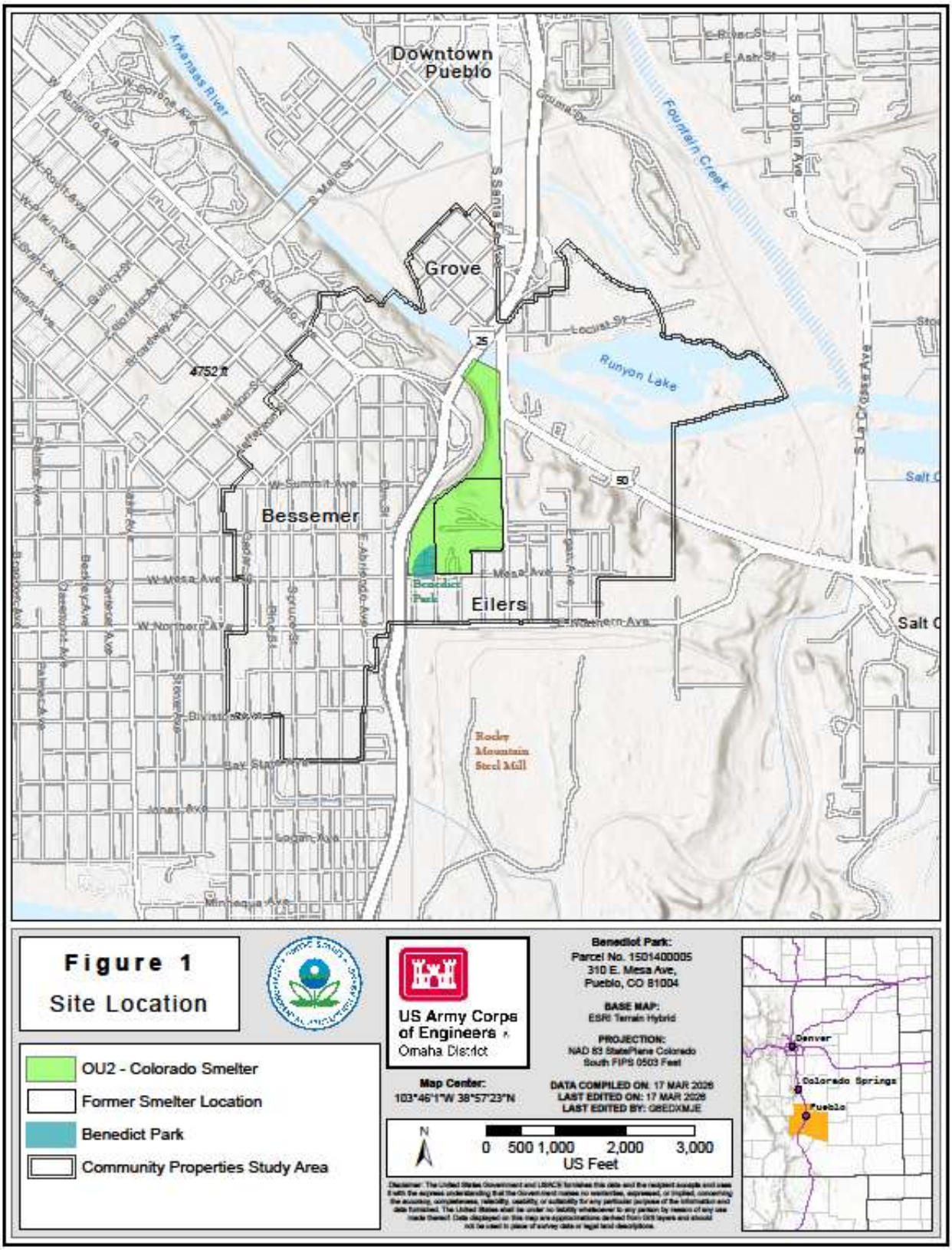
USEPA, 2018. “POLREP 1 (Initial and Final), Benedict Park (Colorado Smelter Superfund Site – Former Smelter Area (OU2), Pueblo City, Pueblo County, Colorado, January 2018.

USEPA, 2003. “Superfund Lead-Contaminated Residential Sites Handbook”, OSWER 9285.7-50, August 2003.

USEPA, 2024. “Updated Residential Soil Lead Guidance for CERCLA Site and RCRA Corrective Action Facilities”, January, 2024.

USEPA, 2025. “Engineering Evaluation/Cost Analysis Approval Memo, Colorado Smelter Superfund Site, Benedict Park”, September 2025.

USEPA, 2026. “Technical Memorandum on Updating Risk-Based Screening Level Estimates for Lead in soils at Benedict Park, Colorado Smelter OU2, Revision 2”, April 2026.


Downtown Pueblo
Grove
Bessemer
Eilers
Runyon Lake
Fountain Creek
Arkansas River
4752 ft
Rocky Mountain Steel Mill
Figure 1
Site Location
OU2 - Colorado Smelter
Former Smelter Location
Benedict Park
Community Properties Study Area
US Army Corps of Engineers
Omaha District
Benedict Park:
Parcel No. 1501400005
310 E. Mesa Ave,
Pueblo, CO 81004
BASE MAP:
ESRI Terrain Hybrid
PROJECTION:
NAD 83 State Plane Colorado South FIPS 0503 Feet
Map Center:
103°46'1"W 38°57'23"N
DATA COMPILED ON: 17 MAR 2026
LAST EDITED ON: 17 MAR 2026
LAST EDITED BY: GBEDXMJE
N
0 500 1,000 2,000 3,000
US Feet
Denver
Colorado Springs
Pueblo


Benedict Park
E Mesa Ave
Figure 2
Park Map
Benedict Park
US Army Corps of Engineers
Omaha District
Benedict Park:
Parcel No. 1501400005
310 E. Mesa Ave,
Pueblo, CO 81004
BASE MAP:
ESRI Terrain Hybrid
PROJECTION:
NAD 83 StatePlane Colorado South FIPS 0503 Feet
Map Center:
103°46'1"W 38°57'23"N
DATA COMPILED ON: 17 MAR 2026
LAST EDITED ON: 17 MAR 2026
LAST EDITED BY: GREENMJE
N
0 50 100 200
US Feet
Denver
Colorado Springs
Pueblo

Area Sample	Sample Depth (inches	30-pt XRF Lead Result (ppm)	ICP/ MS Lead Result (ppm)
F	Pea Gravel	80.3	-
F	0 - 1	320.0	-
F	1 - 6	539.0	-
F	6 - 12	578.0	-
F	12 - 18	942.0	619.0

Area Sample	Sample Depth (inches	30-pt XRF Lead Result (ppm)	ICP/ MS Lead Result (ppm)
D	0 - 1	216.0	-
D	1 - 6	249.0	228.0
D	6 - 12	214.0	-
D	12 - 18	381.0	-

Area Sample	Sample Depth (inches	30-pt XRF Lead Result (ppm)	ICP/ MS Lead Result (ppm)
E	0 - 1	333.0	-
E	1 - 6	378.0	-
E	6 - 12	648.0	614.0
E	12 - 18	880.0	-

Area Sample	Sample Depth (inches	30-pt XRF Lead Result (ppm)	ICP/ MS Lead Result (ppm)
C	0 - 1	348.0	-
C	1 - 6	280.0	-
C	6 - 12	441.0	436.0
C	12 - 18	465.0	-

Area Sample	Sample Depth (inches	30-pt XRF Lead Result (ppm)	ICP/ MS Lead Result (ppm)
A	0 - 1	161.0	-
A	1 - 6	250.0	-
A	6 - 12	293.0	-
A	12 - 18	217.0	203.0

Area Sample	Sample Depth (inches	30-pt XRF Lead Result (ppm)	ICP/ MS Lead Result (ppm)
B	0 - 1	348.0	310.0
B	1 - 6	225.0	-
B	6 - 12	171.0	-
B	12 - 18	121.0	-

Appendix A:

Technical Memorandum on Updating Risk-Based Screening Level Estimates for Lead in Soils at Benedict Park, Colorado Smelter OU2; Revision 2

REGION 8

DENVER, CO 80202

April 23, 2026

MEMORANDUM

SUBJECT: Technical Memorandum on Updating Risk-Based Screening Level Estimates for Lead in soils at Benedict Park, Colorado Smelter OU2; Revision 2

FROM: Jason Fritz, Ph.D., Toxicologist, EPA Region 8, Laboratory Services and Applied Sciences Division

TO: Paul Stoick, Remedial Project Manager, EPA Region 8, Superfund and Emergency Management Division

Erica Serna, Remedial Project Manager, EPA Region 8, Superfund and Emergency Management Division

Sydney Chan, Remedial Project Manager, EPA Region 8, Superfund and Emergency Management Division

1.0 Executive Summary

This technical memorandum documents the updated calculation of site-specific risk-based screening levels (RBSLs) protective of recreators and workers encountering contaminated soils in Benedict Park (Park), part of operable unit 2 (OU2) in the Colorado Smelter Site (Site), located in Pueblo, Colorado. These RBSLs are calculated independently for lead which is considered to be a risk driver in soils at OU2, using updated toxicity values and exposure factor assumptions which have changed since earlier estimates (PWT, 2017); contaminants of concern (COCs) have not been identified for OU2, since a baseline Human Health Risk Assessment (HHRA) has not yet been completed to date.

These RBSLs are derived to provide information for Site risk managers to support decision-making during the Remedial Investigation, and to prevent public exposures associated with unacceptable levels of risk. Due in part to differences in approaches and assumptions employed, these RBSLs are interim values, and thus may differ from the risk-based preliminary remediation goals (PRGs) eventually derived for OU2 following the completion of the baseline Human Health Risk Assessment (HHRA). Likewise, cleanup levels eventually selected for Site OU2 soils may differ from both these RBSLs as well as any risk-based PRGs. Revision 2 updates the Technical Memorandum (first finalized on 09 September, 2025) consistent with criteria described in the most recent Office of Land and Emergency Management (OLEM) Residential Lead Directive, which

includes “parks and other recreational areas” in the definition of residential properties (USEPA, 2025a).

2.0 Site History

The Colorado Smelter was constructed around 1883, and deposited waste slag into a ravine between Santa Fe Avenue and the Denver & Rio Grande Western railroad tracks. The smelter reportedly operated eight blast furnaces, two calcining furnaces, one fusing furnace, and 20 kilns. The Colorado Smelting Company was merged into the American Smelting and Refining Company (ASARCO) in 1899, and closed in 1908 (PWT, 2017; PWT, 2023).

Some of the slag was used as ballast for the railroad track to the West of Benedict Park, and in 1923, bricks from the blast furnace smokestack were used to construct St. Mary School, located adjacent to the East of Benedict Park. Critically for human health risk considerations, the old flue run for the main stack ran along what is currently the entire Eastern edge of the park. This flue run was underground; the highest concentrations of contaminants seen in the park are primarily located in the same area as this historic flue run, with concentrations of lead and particularly arsenic increasing at deeper soil horizons (PWT, 2017).

3.0 Identification of Contaminants, Residential Risk-Based Screening Levels and Remediation Goals, and Exposure Scenarios

Lead was identified as one of the primary risk drivers from the draft OU1 HHRA (SRC, 2019), and high levels were reported in Benedict Park during an early investigation leading to a focused removal action of soils excavated from a playground area on the East side of Benedict Park (Exposure unit “G”; PWT, 2017; USEPA, 2018). Therefore, updated RBSLs are estimated for lead using blood lead level (BLL) targets of 5.0 µg/dL consistent with current EPA OLEM lead policy (USEPA, 2024a; 2025a). Information regarding site-specific background soil concentrations for lead was collected from previous reports (PWT, 2023), and tabulated along with the residential screening level (RSLs), removal management levels (RML), and RBSL for comparison purposes (Table 1).

Table 1. Background Values, Residential Regional Screening Levels, Removal Management Levels, and Site-Specific Risk-Based Screening Levels

COPCs	Site Background Values (mg/kg; PWT, 2023)	Residential RSL (mg/kg)[a]	Residential RML (mg/kg)[a]	Residential RBSL (mg/kg)[b]
Lead	62	200	600	241

[a] Based upon Target Blood Lead Level (BLL) of 5.0 µg/dL in accordance with Agency directives (USEPA, 2025a).

[b] RBSL corresponding to a BLL of 5.0 µg/dL (USEPA, 2025a), and the site-specific residential lead relative bioavailability (RBA) of 63% (USEPA, 2024b).

Exposure scenarios evaluated were similar to those described earlier (PWT, 2017), and included Child Recreational users of the Park, as well as Park Workers conducting routine care and maintenance activities. New to this update, Construction Workers performing time-limited renovation activities were also evaluated, as planning for these activities is currently underway. Child Recreators were evaluated for exposure to surface soil defined as soil less than 1” below ground surface (bgs), as well as the pea gravel located in specific play areas (up to 18” bgs). As young children are the receptor of greatest sensitivity and concern for recreational exposures, Adult Recreators were specifically not evaluated. Park Workers and Construction Workers were evaluated for exposures to surface soil at 1 – 18” bgs, which is indicated as the 18-36” interval when underlaying 18” of pea gravel (in Exposure Units F and G, see PWT (2017), and Table 2).

4.0 Exposure Parameters and Toxicity Values

Exposure factors used were primarily defaults, with all site-specific values described in the footnotes of Table 2. For lead, RBSLs were calculated for Child Recreators using integrated exposure uptake and biokinetic (IEUBK) model v2.0 Build 1.72, and RBSLs for adult workers using the Adult Lead Methodology (ALM).

5.0 Calculation of Risk-Based Soil Screening Levels for Benedict Park Exposure Units

Soil RBSLs were estimated for the exposure scenarios as described in Sections 3.0 and 4.0, for the Benedict Park exposure units and soil depth horizons defined previously (PWT, 2017), using site-specific inputs where available, and otherwise default assumptions (See Tables 2). RBSLs are provided for the target BLL of 5.0 µg/dL for both children and adults, consistent with current EPA OLEM policy directives (USEPA, 2025a).

Table 2. Risk-Based Screening Levels for Benedict Park Exposure Units

Exposure Scenario	Exposure Units	Depth Interval (inches)	Lead for BLL 5.0 µg/dL (mg/kg)
Child Recreator	F, G	0 – 18 (pea gravel)	438[a]
Child Recreator	A-E	0 – 1	258[a]
Park Worker	F, G	0 – 18 (pea gravel)	4,894[b]
Park Worker	F, G	18 – 36	2,556[b]
Park Worker	A-E	1 – 18	3,027[b]
Construction Worker (½ season)	A-E	1 – 18	296[b]
Construction Worker (¼ season)	A-E	1 – 18	585[b]
Construction Worker (¼ season)	F, G	18 – 36	494[b]

[a] Estimates for Target Blood Lead Levels (BLL) of 5.0 µg/dL (USEPA, 2025a); site-specific of M_{SD} of 0.36 was used in the integrated exposure uptake and biokinetic (IEUBK) model v2.0 Build 1.72; site-specific lead background value used for residential soil exposure assumptions in time-weighted average (TWA) calculations.
[b] Estimates for BLLs of 5.0 µg/dL (USEPA, 2025a) provided to be consistent with target BLLs for the Child Recreator, obtained from the adult lead
methodology (ALM) updated with 2009 – 2014 NHANES information.

6.0 Uncertainties and Additional Considerations

6.1 Uncertainties

Estimation of RBSLs for Recreational exposures was complicated by the consideration that recreators at Benedict Park are also likely to be exposed at residences potentially impacted by site-related contamination, which would bias the RBSLs to being more protective if recreational users were not also residents living with the CO Smelter OU1 study area. Therefore, the site-specific lead background value (62 mg/kg, Table 1) was used for residential lead soil exposure assumptions in time-weighted average (TWA) calculations used to evaluate lead risks for Child Recreators, which were informed by site-specific information on use frequency (PWT, 2017), and based upon recommended assumptions for averaging timeframes (USEPA, 2024c). Note only Benedict Park-specific RBAs were used as inputs when estimating the TWA soil concentrations, which means that the TWA estimate for EUs F,G is slightly less conservative using an RBA of 47%, and the TWA estimate for EUs A-E is slightly more conservative using an RBA of 76%, compared with the OU1 residential soils RBA of 63% which could have been applied to the fraction of residential soil exposures that Child Recreators were anticipated to experience (USEPA, 2024b). The impact of this simplifying assumption of applying only the Park RBA to the TWA calculation is likely to be minor in both directions (across all Benedict Park EUs), due to the relatively small absolute differences between the Park and Residential lead RBAs (i.e. 13 – 16%), and that the Child Recreators' exposure to residential soils represented only 2/7 of their weekly soil exposures.

Child Recreators' exposure to lead in Residential soils may be greater than the sitewide lead background value which was used as the assumption for Residential soil exposures. For example, higher exposures could result from residential soil lead cleanup target values being higher than background, in which case this would bias soil lead RBSLs for Child Recreators to be less protective, the magnitude of which would be directly related to the difference between the actual residential soil lead concentrations for those residences and the site background value of 62 mg/kg. The other uncertainties described in the TWA approach apply generally to lead exposures to Adult Workers (USEPA, 2024c), but the magnitude and direction of potential bias is unclear. Park and Construction Workers may also be exposed to site contaminants in residential soils if they live within the CO Smelter OU1 study area, but this is much less likely than for Child Recreators.

Another source of uncertainty comes from estimating RBSLs for lead independently from other OU2 contaminants to which these receptors may be exposed. Lead hazards are typically evaluated independently from hazards or risks associated with other contaminants, even when the associated adverse health effects may be similar. Generally, the lack of consideration for exposure to multiple site-related contaminants, or inclusion of other routes of exposure, would bias these RBSLs to be less protective, but the potential magnitude of this cannot be determined at this time. Other uncertainties exist regarding the potential usage patterns and exposure factors of the Receptors evaluated; as the assumptions used were intended to represent the 95th percentile values for exposures consistent with the evaluation of Reasonable Maximum Exposures (RMEs; USEPA, 2010), the bias would be likely towards the RBSLs being overprotective, but the potential magnitude is unclear.

6.2 Different Roles for Risk-Based Concentrations

RBSLs differ from preliminary remediation goals (PRGs) in that RBSLs were calculated only for lead, but not other COCs which may be identified, and therefore do not account for the potential risks resulting from exposure to multiple contaminants, or from exposure to medias aside from contaminated soils at Benedict Park (USEPA, 2010).

These RBSLs are derived to provide information for Site risk managers to support decision-making during the Remedial Investigation, e.g. to prevent public exposures associated with unacceptable levels of risk. Due in part to differences in approaches and assumptions employed, these RBSLs are interim values, and thus may differ from the risk-based PRGs eventually derived for OU2.

Final cleanup levels consider not only risk-based PRGs to assess protectiveness, but also the remaining eight criteria contained in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP; 40 CFR 300.430(e)(9)). Notably, background concentrations of individual contaminants, as well as applicable or relevant and appropriate requirements (ARARs), also inform achievable cleanup levels (USEPA, 1997). Therefore, any cleanup levels eventually selected for Site soils may differ from both these RBSLs as well as any risk-based PRGs developed later.

7.0 References

National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 CFR §300.

Pacific Western Technologies (PWT), 2017. *Colorado Smelter OU1 Technical Memorandum, Benedict Park Risk Evaluation*. Prepared for US EPA Region 08 by Pacific Western Technologies, Ltd. Revision 0.

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U.S. Environmental Protection Agency (USEPA), 2003. *Recommendations of the Technical Review Workgroup for Lead for an Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil*. EPA-540-R-03-001.

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U.S. Environmental Protection Agency (USEPA), 2024a. *Updated Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities Memorandum*, 17 January 2024.

U.S. Environmental Protection Agency (USEPA), 2024b. *Calculation of Updated Residential Soil Lead Risk-Based Preliminary Remediation Goals for Colorado Smelter Operable Unit 1*. USEPA Region 08 Memorandum dated 22 October 2024.

U.S. Environmental Protection Agency (USEPA), 2024c. *Assessing Intermittent or Variable Exposures at Lead Sites. Office of Superfund Remediation and Technology Innovation*, Washington D.C. August.

U.S. Environmental Protection Agency (USEPA), 2025a. *Residential Lead Directive for CERCLA Sites and RCRA Hazardous Waste Cleanup Program Facilities Memorandum*, 16 October 2025.

Appendix B

Applicable or Relevant and Appropriate Requirements

Preliminary Notes:

State and federal requirements must be substantive in nature to qualify as ARARs. On-site portions of response actions need only comply with "substantive" aspects of ARARs rather than any corresponding "administrative" requirements. Substantive requirements typically are those requirements that pertain directly to actions or conditions in the environment. Administrative requirements typically are those mechanisms that facilitate the implementation of the substantive requirements of a statute or regulation and include the approval of, or consultation with, administrative bodies, issuance of permits, documentation, reporting, recordkeeping and enforcement.[2]

The summary statements in the "Requirement" column for each identified ARAR should not be relied upon exclusively in ascertaining the full requirement. Please refer to full version of the applicable state or federal law, as codified.

Federal Chemical-Specific ARARs

Chemical-specific ARARs are usually health- or risk-based numerical values or methodologies used to determine acceptable concentrations of chemicals that may be found in or discharged to the environment.

None

Federal Location-Specific ARARs

Location-specific requirements are restrictions placed on the concentration of hazardous substances or the conduct of activities solely because they occur in special locations.

None

Federal Action-Specific ARARs

Action-specific requirements are technology- or activity-based requirements or limitations or actions taken with respect to hazardous substances.

Action	Requirement	Prerequisite	Citation
Regulation | Hazardous Waste (Resource Conservation and Recovery Act)			
Storage of solid waste	Must comply with certain storage requirements for solid waste. ***40 CFR 243.200-1*** *(a) All solid wastes (or materials which have been separated for the purpose of recycling) shall be stored in such a manner that they do not constitute a fire, health, or safety hazard or provide food or harborage for vectors, and shall be contained or bundled so as not to result in spillage. All solid waste containing food wastes shall be securely stored in covered or closed containers which are nonabsorbent, leakproof, durable, easily cleanable (if reusable), and designed for safe handling. Containers shall be of an adequate size and in sufficient numbers to contain all food wastes, rubbish, and ashes that a*	**Applicable*** *The substantive requirements of this provision would only apply to RA activities that involve generation of solid waste.	40 CFR 243.200-1(a) and (e)

[2] *See* Memorandum from Larry Douchand to Superfund National Program Managers re: "Documenting Applicable, or Relevant and Appropriate Requirements in Comprehensive Environmental Response, Compensation, and Liability Act Response Action Decisions" at p. 10-11 (Mar. 1, 2023), available at https://semspub.epa.gov/work/HQ/100003166.pdf

Action	Requirement	Prerequisite	Citation
Regulation | Hazardous Waste (Resource Conservation and Recovery Act)			
	residence or other establishment generates in the period of time between collections. Containers shall be maintained in a clean condition so that they do not constitute a nuisance, and to retard the harborage, feeding, and breeding of vectors. When serviced, storage containers should be emptied completely of all solid waste. *(e) Waste containers used for the storage of solid waste (or materials which have been separated for recycling) must meet the standards established by the American National Standards Institute (ANSI) for waste containers as follows: Waste Containers—Safety Requirements, 1994, American National Standards Institute, ANSI Z245.30-1994; and Waste Containers—Compatibility Dimensions, 1996, American National Standards Institute, ANSI Z245.60-1996.*		
Characterization of solid waste	Must determine if solid waste is listed as a hazardous waste in Subpart D of 40 C.F.R. Part 261. ***40 CFR § 262.11 Hazardous waste determination and recordkeeping.*** *A person who generates a solid waste, as defined in 40 CFR 261.2, must make an accurate determination as to whether that waste is a hazardous waste in order to ensure wastes are properly managed according to applicable RCRA regulations. A hazardous waste determination is made using the following steps:* ***(a)*** *The hazardous waste determination for each solid waste must be made at the point of waste generation, before any dilution, mixing, or other alteration of the waste occurs, and at any time in the course of its management that it has, or may have, changed its properties as a result of exposure to the environment or other factors that may change the properties of the waste such that the RCRA classification of the waste may change.*	**Applicable*** *The substantive requirements of this provision would only apply to RA activities that involve generation of solid waste.	40 C.F.R.§262.11(a)
Characterization of solid waste	Must determine if solid waste is excluded from regulation under 40 C.F.R.§261.4. ***40 CFR § 262.11 Hazardous waste determination and recordkeeping.*** *A person who generates a solid waste, as defined in 40 CFR 261.2, must make an accurate determination as to whether that waste is a hazardous waste in order to ensure wastes are properly managed according to applicable RCRA regulations. A hazardous waste determination is made using the following steps:* ***(b)*** *A person must determine whether the solid waste is excluded from regulation under 40 CFR 261.4.*	**Applicable*** *The substantive requirements of this provision would only apply to RA activities that involve generation of solid waste.	40 C.F.R.§262.11(b)
Characterization of solid waste	Must determine whether the solid waste is identified in subpart C of 40 C.F.R. part 261 by either: (1) Testing the waste according to the methods set forth in subpart C of 40 C.F.R.	**Applicable*** *The substantive requirements of this provision would only	40 C.F.R.§262.11(d)

Action	Requirement	Prerequisite	Citation
Regulation | Hazardous Waste (Resource Conservation and Recovery Act)			
	part 261, or according to an equivalent method approved by the Administrator under 40 C.F.R.§260.21; or (2) Applying knowledge of the hazard characteristic of the waste in light of the materials or the processes used. ***40 CFR § 262.11 Hazardous waste determination and recordkeeping.*** *A person who generates a solid waste, as defined in 40 CFR 261.2, must make an accurate determination as to whether that waste is a hazardous waste in order to ensure wastes are properly managed according to applicable RCRA regulations. A hazardous waste determination is made using the following steps:* ***(d)** The person then must also determine whether the waste exhibits one or more hazardous characteristics as identified in subpart C of 40 CFR part 261 by following the procedures in paragraph (d)(1) or (2) of this section, or a combination of both.* ***(1)** The person must apply knowledge of the hazard characteristic of the waste in light of the materials or the processes used to generate the waste. Acceptable knowledge may include process knowledge (e.g., information about chemical feedstocks and other inputs to the production process); knowledge of products, by-products, and intermediates produced by the manufacturing process; chemical or physical characterization of wastes; information on the chemical and physical properties of the chemicals used or produced by the process or otherwise contained in the waste; testing that illustrates the properties of the waste; or other reliable and relevant information about the properties of the waste or its constituents. A test other than a test method set forth in subpart C of 40 CFR part 261, or an equivalent test method approved by the Administrator under 40 CFR 260.21, may be used as part of a person's knowledge to determine whether a solid waste exhibits a characteristic of hazardous waste. However, such tests do not, by themselves, provide definitive results. Persons testing their waste must obtain a representative sample of the waste for the testing, as defined at 40 CFR 260.10.* ***(2)** When available knowledge is inadequate to make an accurate determination, the person must test the waste according to the applicable methods set forth in subpart C of 40 CFR part 261 or according to an equivalent method approved by the Administrator under 40 CFR 260.21 and in accordance with the following:*	apply to RA activities that involve generation of solid waste.	

Action	Requirement	Prerequisite	Citation
Regulation | Hazardous Waste (Resource Conservation and Recovery Act)			
	(i) *Persons testing their waste must obtain a representative sample of the waste for the testing, as defined at 40 CFR 260.10.* ***(ii)*** *Where a test method is specified in subpart C of 40 CFR part 261, the results of the regulatory test, when properly performed, are definitive for determining the regulatory status of the waste.*		
Characterization of solid waste	Must refer to Parts 261, 262, 264, 265, 266, 268, and 273 of Chapter 40 for possible exclusions or restrictions pertaining to management of the specific waste. ***40 CFR § 262.11 Hazardous waste determination and recordkeeping.*** *A person who generates a solid waste, as defined in 40 CFR 261.2, must make an accurate determination as to whether that waste is a hazardous waste in order to ensure wastes are properly managed according to applicable RCRA regulations. A hazardous waste determination is made using the following steps:* ***(e)*** *If the waste is determined to be hazardous, the generator must refer to parts 261, 264, 265, 266, 267, 268, and 273 of this chapter for other possible exclusions or restrictions pertaining to management of the specific waste.*	**Applicable*** *The substantive requirements of this provision would only apply to RA activities that involve generation of hazardous waste.	40 C.F.R.§262.11(e)
Generation of hazardous waste	Must determine generator status under 40 C.F.R.§262.13 ***40 CFR § 262.13 Generator category determination.*** *A generator must determine its generator category. A generator's category is based on the amount of hazardous waste generated each month and may change from month to month. This section sets forth procedures to determine whether a generator is a very small quantity generator, a small quantity generator, or a large quantity generator for a particular month, as defined in § 260.10 of this chapter.* *(a) Generators of either acute hazardous waste or non-acute hazardous waste.* *(b) Generators of both acute and non-acute hazardous wastes.* *(c) When making the monthly quantity-based determinations required by this part, the generator must include all hazardous waste that it generates, except hazardous waste that:* *(d) In determining the quantity of hazardous waste generated in a calendar month, a generator need not include:* *(e) Based on the generator category as determined under this section, the generator must meet the applicable independent requirements listed in § 262.10. A generator's category also determines which of the provisions of §§ 262.14, 262.15, 262.16*	**Applicable*** *The substantive requirements of this provision would only apply to RA activities that involve generation of hazardous waste.	40 C.F.R.§262.13

Action	Requirement	Prerequisite	Citation
Regulation | Hazardous Waste (Resource Conservation and Recovery Act)			
	or 262.17 must be met to obtain an exemption from the storage facility permit, interim status, and operating requirements when accumulating hazardous waste. *(f) Mixing hazardous wastes with solid wastes* NOTE: Please refer to full version of the applicable federal law, as codified.		
Generation of hazardous waste	Must comply with hazardous waste generator requirement, which vary depending on generator status, including: waste determination, waste accumulation, recordkeeping, and tracking under 40 C.F.R. § 262 Subparts A-D, M ***40 CFR Part 262 - PART 262—STANDARDS APPLICABLE TO GENERATORS OF HAZARDOUS WASTE*** *Subpart A—General (§§ 262.1 - 262.18)* *Subpart B—Manifest Requirements Applicable to Small and Large Quantity Generators (§§ 262.20 - 262.27)* *Subpart C—Pre-Transport Requirements Applicable to Small and Large Quantity Generators (§§ 262.30 - 262.35)* *Subpart D—Recordkeeping and Reporting Applicable to Small and Large Quantity Generators (§§ 262.40 - 262.44)* *Subpart M—Preparedness, Prevention, and Emergency Procedures for Large Quantity Generators (§§ 262.250 - 262.265)* NOTE: Please refer to full version of the applicable federal law, as codified.	**Applicable*** *Applicable based on generator status. The substantive requirements of this provision would only apply to RA activities that involve generation of hazardous waste.	40 C.F.R. § 262 Subparts A-D, M
Transportation of Hazardous Waste	In the event of a discharge of hazardous waste during transportation, the transporter must take appropriate immediate action to protect human health and the environment (e.g., notify local authorities, dike the discharge area). ***40 CFR § 263.30 Immediate action.*** ***(a)*** *In the event of a discharge of hazardous waste during transportation, the transporter must take appropriate immediate action to protect human health and the environment (e.g., notify local authorities, dike the discharge area).*	**Applicable*** * The substantive requirements of this provision would only apply to RA activities that involve transportation hazardous waste.	40 C.F.R. §263.30(a)
Transportation of Hazardous Waste	A transporter must clean up any hazardous waste discharge that occurs during transportation or take such action as may be required or approved by Federal, State, or local officials so that the hazardous waste discharge no longer presents a hazard to human health or the environment. ***40 CFR § 263.30 Immediate action.*** ***(b)*** *If a discharge of hazardous waste occurs during transportation and an official (State or local government or a Federal Agency) acting within the scope of his official responsibilities determines that immediate removal of the waste is necessary to protect human health or the environment, that official may authorize the removal of the waste*	**Applicable*** * The substantive requirements of this provision would only apply to RA activities that involve transportation of hazardous waste.	40 C.F.R. §263.30(b)

Action	Requirement	Prerequisite	Citation
Regulation | Hazardous Waste (Resource Conservation and Recovery Act)			
	by transporters who do not have EPA identification numbers and without the preparation of a manifest.		
Transportation of Hazardous Waste	A transporter must clean up any hazardous waste discharge that occurs during transportation or take such action as may be required or approved by Federal, State, or local officials so that the hazardous waste discharge no longer presents a hazard to human health or the environment. ***40 CFR § 263.31 Discharge clean up.*** *A transporter must clean up any hazardous waste discharge that occurs during transportation or take such action as may be required or approved by Federal, State, or local officials so that the hazardous waste discharge no longer presents a hazard to human health or the environment.*	**Applicable*** * The substantive requirements of this provision would only apply to RA activities that involve transportation of hazardous waste.	40 C.F.R. §263.31
Disposal of hazardous waste	Certain hazardous wastes are restricted from land disposal. Must determine if land disposal restrictions apply under 40 C.F.R.§268.1 ***§ 268.1 Purpose, scope, and applicability.*** ***(a)*** *This part identifies hazardous wastes that are restricted from land disposal and defines those limited circumstances under which an otherwise prohibited waste may continue to be land disposed.* ***(b)*** *Except as specifically provided otherwise in this part or part 261 of this chapter, the requirements of this part apply to persons who generate or transport hazardous waste and owners and operators of hazardous waste treatment, storage, and disposal facilities.*	**Applicable*** * The substantive requirements of this provision would only apply to RA activities that involve disposal of hazardous waste.	40 C.F.R.§268.1(a) and (b)
Disposal of hazardous waste	Certain hazardous wastes are exempt from the land disposal restrictions (40 C.F.R.§268). ***§ 268.1 Purpose, scope, and applicability.*** ***(e)*** *The following hazardous wastes are not subject to any provision of part 268:* ***(1)*** *Waste generated by very small quantity generators, as defined in § 260.10 of this chapter;* ***(2)*** *Waste pesticides that a farmer disposes of pursuant to § 262.70;* ***(3)*** *Wastes identified or listed as hazardous after November 8, 1984 for which EPA has not promulgated land disposal prohibitions or treatment standards;* ***(4) De minimis*** *losses of characteristic wastes to wastewaters are not considered to be prohibited wastes and are defined as losses from normal material handling operations (e.g. spills from the unloading or transfer of materials from bins or other containers, leaks from pipes, valves or other devices used to transfer materials); minor leaks*	**Applicable*** * The substantive requirements of this provision would only apply to RA activities that involve disposal of hazardous waste.	40 C.F.R.§268.1(e)

Action	Requirement	Prerequisite	Citation
Regulation | Hazardous Waste (Resource Conservation and Recovery Act)			
	of process equipment, storage tanks or containers; leaks from well-maintained pump packings and seals; sample purgings; and relief device discharges; discharges from safety showers and rinsing and cleaning of personal safety equipment; rinsate from empty containers or from containers that are rendered empty by that rinsing; and laboratory wastes not exceeding one per cent of the total flow of wastewater into the facility's headworks on an annual basis, or with a combined annualized average concentration not exceeding one part per million in the headworks of the facility's wastewater treatment or pretreatment facility.		

State Chemical-Specific ARARs

Chemical-specific ARARs are usually health- or risk-based numerical values or methodologies used to determine acceptable concentrations of chemicals that may be found in or discharged to the environment.

None

State Location-Specific ARARs

Location-specific requirements are restrictions placed on the concentration of hazardous substances or the conduct of activities solely because they occur in special locations.

Action	Requirement	Prerequisite	Citation
Regulation | Colorado Environmental Covenant Statute			
Activities resulting in contamination left in place	Requires environmental covenants (ECs) or notice of environmental use restrictions (NEURs) whenever residual contamination is left in place at properties and at levels above unlimited use and unrestricted exposure or where the remedy includes an engineered feature or structure that requires monitoring, maintenance, or operation or that will not function as intended if disturbed.	**Applicable*** *The substantive requirements of this provision would only apply to RA activities that will result in contamination left in place at levels above unlimited use and unrestricted exposure.	CRS §§ 25-15-317 et seq
Regulation | Colorado Historical, Prehistorical, and Archaeological Resources Act			
Encountering historical, prehistorical, or archaeological resources	Establishes procedures for investigation, excavation, gathering, or removal of any historical, prehistorical, or archaeological resources on state lands.	**Applicable*** *The substantive requirements of this provision would only apply to RA activities that involve historical, prehistorical, or archaeological resources.	CRS §§ 24-80-401 to 411, 24-80-1301 to 1305

State Action-Specific ARARs

Action-specific requirements are technology- or activity-based requirements or limitations or actions taken with respect to hazardous substances.

Action	Requirement	Prerequisite	Citation
Regulation | Colorado Discharge Permit System			
Activities resulting in stormwater discharges during construction	Establishes stormwater control requirements for construction activities.	**Applicable*** *The substantive requirements of this provision would only apply to RA activities that involve stormwater discharges during construction.	5 CCR 1002-61
Activities resulting in stormwater discharges during construction	Establishes stormwater control requirements for construction activities.	**Applicable*** *The substantive requirements of this provision would only apply to RA activities that involve stormwater discharges during construction.	5 CCR 1002.2
Regulation | Colorado Air Pollution Prevention and Control Act			
Activities resulting in PM10 and lead emissions	Establishes emissions standards for PM10 and lead.	**Applicable*** *The substantive requirements of this provision would only apply to RA activities that involve PM10 or lead air emissions	5 CCR § 1001-1, 2, 3, 4, 5, 8, 10
Activities resulting in fugitive emissions	Establishes regulations concerning fugitive emissions from construction activities, storage and stockpiling activities, and haul trucks.	**Applicable*** *The substantive requirements of this provision would only apply to RA activities that involve fugitive air emissions	Colorado Fugitive Dust Control Plan/Opacity, Regulation No. 1., 5 CCR 1001-3
Activities resulting in regulated odors	Establishes regulations concerning regulated odors	**Applicable*** *The substantive requirements of this provision would only apply to RA activities that involve regulated odors	Odors, Regulation No. 2, 5 CCR 1001-4
Regulation | Colorado Hazardous Waste Regulations			
Transportation of Hazardous Materials	Establishes regulations concerning transportation of hazardous materials	**Applicable*** *The substantive requirements of this provision would only apply to RA activities that involve transportation of hazardous materials	6 CCR 1007-3, Part 264: Section 264.301, (g), (h), (i) and (j);
Transportation of Hazardous	Establishes regulations concerning transportation of hazardous materials	**Applicable***	6 CCR 1007-3, Part 264: Section

Materials		*The substantive requirements of this provision would only apply to RA activities that involve transportation of hazardous materials	264.310 (a)(1) through (a)(4);
Transportation of Hazardous Materials	Establishes regulations concerning transportation of hazardous materials	**Applicable*** *The substantive requirements of this provision would only apply to RA activities that involve transportation of hazardous materials	6 CCR 1007-3, Part 264: Section 264.310, (b)(1) and (b)(5)
Regulation | Colorado Noxious Weed Act			
Revegetation	Establishes regulations addressing management of noxious weeds.	**Applicable*** *The substantive requirements of this provision would only apply to RA activities that involve revegetation.	CRS § 35-5.5-101-119; 8 CCR 1203-19
Regulation | Colorado Noise Abatement Statute			
Construction Noise Levels	Establishes maximum permissible noise levels for particular time periods and land use zones.	**Applicable*** *The substantive requirements of this provision would only apply to RA activities that involve regulated noise levels.	CRS §§ 25-12-101-109

To Be Considered:

USEPA, Regional Screening Levels (updated regularly), found at https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables.

USEPA, Management of Investigation-Derived Waste, 22 April 2023, found at: https://www.epa.gov/quality/management-investigation-derived-waste.

Appendix C: Cost Tables

Costs Estimates

Location	Area	Unit	Area	Unit
Site	2.22	acres	96,703.2	square feet

Alternative 1		**Excavation Depth (inches):**		**0**
Item	Amount	Unit	Per Unit Cost	Total
Soil Excavation	0	cubic yards	$0.00	$0.00
Soil Disposal	0	ton	$0.00	$0.00
GPR Survey	0	square feet	$0.00	$0.00
Demarcation Layer	0	square feet	$0.00	$0.00
Soil Import and Placement	0	cubic yards	$0.00	$0.00
Sod & Installation	0	square feet	$0.00	$0.00
Total				$0.00

Alternative 2		**Excavation Depth (inches):**		**12**
Item	Amount	Unit	Per Unit Cost	Total
Soil Excavation	3,582	cubic yards	$20.00	$71,640.00
Soil Disposal	5,373	ton	$70.00	$376,110.00
GPR Survey	1	lump sum	$15,000.00	$15,000.00
Demarcation Layer	96,703.2	square feet	$1.50	$145,054.80
Soil Import and Placement	3,582	cubic yards	$60.00	$214,920.00
Sod & Installation	96,703.2	square feet	$1.75	$169,230.60
Contingency (10%)				$99,195.54
Total				$1,091,150.94

Alternative 3		**Excavation Depth (inches):**		**24**
Item	Amount	Unit	Per Unit Cost	Total
Soil Excavation	7,163	cubic yards	$20.00	$143,260.00
Soil Disposal	10,750	ton	$70.00	$752,500.00
GPR Survey	1	lump sum	$15,000.00	$15,000.00
Demarcation Layer	96,703.2	square feet	$1.50	$145,054.80
Soil Import and Placement	7,163	cubic yards	$60.00	$429,780.00
Sod & Installation	96,703.2	square feet	$1.75	$169,230.00
Contingency (10%)				$116,582.48
Total				$1,820,307.28

Note: The costs are burdened and reflect planning and construction oversight