AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. CONTRACT ID CODE	PAGE OF PAGES
	1 2

2. AMENDMENT/MODIFICATION NO.	3. EFFECTIVE DATE	4. REQUISITION/PURCHASE REQ. NO.	5. PROJECT NO. *(If applicable)*
0003	01/29/2024		ROMO 316223

6. ISSUED BY	CODE	7. ADMINISTERED BY *(If other than Item 6)*	CODE
NPS, DSC Contracting Services Div 12795 W. Alameda Pkwy P.O. Box 25287 Denver CO 80225-0287	PDS		

8. NAME AND ADDRESS OF CONTRACTOR *(No., street, county, State and ZIP Code)*		9A. AMENDMENT OF SOLICITATION NO.
	(x)	140P2024R0022
	x	9B. DATED *(SEE ITEM 11)* 01/02/2024
		10A. MODIFICATION OF CONTRACT/ORDER NO.
		10B. DATED *(SEE ITEM 13)*
CODE / FACILITY CODE		

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

☒ The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offers ☐ is extended, ☒ is not extended.

Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended , by one of the following methods: (a) By completing Items 8 and 15, and returning 1 copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted ; or (c) By separate letter or electronic communication which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGEMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted , such change may be made by letter or electronic communication, provided each letter or electronic communication makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

12. ACCOUNTING AND APPROPRIATION DATA *(If required)*

13. THIS ITEM ONLY APPLIES TO MODIFICATION OF CONTRACTS/ORDERS. IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.

CHECK ONE	
	A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: *(Specify authority)* THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.
	B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES *(such as changes in paying office, appropriation data, etc.)* SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(b).
	C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:
	D. OTHER *(Specify type of modification and authority)*

E. IMPORTANT: Contractor ☐ ☐ i s required to sign this document and return 1 copies to the issuing office.

14. DESCRIPTION OF AMENDMENT/MODIFICATION *(Organized by UCF section headings, including solicitation/contract subject matter where feasible.)*

ROMO 316223

The purpose of this amendment is to:

a) Provide questions and answers received to date.

b) Provide Sampling and Analysis Plan dated 5/4/23.

c) Extend the Proposal Due Date to February 13, 2024, 2:00 PM MS. Question deadline remains the same.

Continued ...

Except as provided herein, all terms and conditions of the document referenced in Item 9 A or 10A, as heretofore changed, remains unchanged and in full force and effect.

15A. NAME AND TITLE OF SIGNER *(Type or print)*		16A. NAME AND TITLE OF CONTRACTING OFFICER *(Type or print)*	
		Jason Longshore	
15B. CONTRACTOR/OFFEROR *(Signature of person authorized to sign)*	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA *(Signature of Contracting Officer)*	16C. DATE SIGNED

NAME OF OFFEROR OR CONTRACTOR

ITEM NO. (A)	SUPPLIES/SERVICES (B)	QUANTITY (C)	UNIT (D)	UNIT PRICE (E)	AMOUNT (F)

Amendment 3 – Questions and Answers

1. The solicitation indicates to provide past project experience information for Subcontractors. Can the subcontractor experience forms be submitted after Prime contractor is awarded? The subcontractors that are to be used typically change quickly in a competitive hard bid format up until the bid time. Compiling with certainty the correct subcontractors to be used on the project is not typically feasible on a hard bid timeline. Prime contractor experience will still be submitted with proposal.

Contracting Officer Response: No, Subcontractors are a key part of a Prime's proposal and need to be submitted prior to award.

2. Please provide the soils report

Contracting Officer Response: Soils Report has been issued via Amendment 2

3. Section L paragraph 52.222-23 indicates minority and female participation percentage requirements as "for each trade goals". There are minority and female owned trades that can contribute to a percentage of the prime contractors overall contract value but as it is written "per trade" this section seems to be indicting at all trades must comply with the percentages. Essentially requiring all subcontractors must be minority or female owned businesses to be used on this project. Please confirm the intent in this section is to ensure that minority and female owned business participation in this project is to meet the goals for overall prime contract participation and not a per trade requirement.

CO Response: Those are goals that we strive for and are intended for each trade. We also have overall goals for the prime contract participation. These are goals and the intent is not to have all subcontractors be minority owned businesses.

4. Will a stormwater permit be required for this project?

CO Response: Yes, as this project is over an acre of disturbance, a CDPHE and NPDES stormwater permit is required. See spec sections 01 31 00-1.7 & 01 57 23

5. What is the tax rate or is this project tax exempt?

CO Response: This project is not tax exempt. All regulatory federal, state and local taxes shall be applied as necessary.

6. Please confirm if NPS will be providing Material Testing Services / 3rd Party Testing?

CO Response: Per spec section 01 40 00-1.6.A "The contractor is responsible for all testing and inspections" This would include hiring 3rd party testing and inspection agencies as required in the contract documents.

7. Please confirm if Prime contractor to include costs for AHJ Tap Fees

CO Response: Please elaborate on what AHJ tap fees are, if its the typical utility tap fees then we do not need any for water or sewer. The contractor will be working with the local utility company for the electric.

8. Will a fee be charged for use of power/water consumption during construction?

CO Response: Per spec section 01 50 0-1.2 - there is electric with no metering or service charge. Water if available without charge up to 400 gal/day.

9. Is a temporary project sign with the project information, renderings, logos, etc. required?

CO Response: Temporary project signs with project information, renderings, logos are not required. Typical construction and traffic signs may be required.

10. Is access restricted to the existing maintenance building at any times for installation of the new telecom conduit?

CO Response: Contractor shall provide notice before accessing the maintenance building but typically there will not be any restrictions.

a. If furniture is needed to complete the work inside the maintenance building, NPS will be responsible. Contractor to provide at least 2 weeks notice prior to work starting in that area.

11. What is to be included for the Keyed Note 2: Ridge Vent?
Is this a low-profile vented ridge?
Or are ridge ventilators required?
(I would assume with the ducted ventilation system for the building that a low profile vent is sufficient).

CO Response: The intent of note 2 on sheet A1.8 is to call out a low-profile vent as seen in detail 3/A5.1

12. Walls: Specs call for a concealed-fastener metal panel, but drawings show fiber cement siding.

Are we to supply metal panels? If so, we need to know what profile for the basis-of-design.

CO Response: The metal siding referenced in specification 13 34 19 is incorrect. The siding on the hay barn should be the cement board called out in the elevations on sheet A2.3

13. If fiber cement siding, what framing is required?

Will walls be stud-framed by others with a spandrel beam included by Behlen to laterally support the walls? Or will standard zee girts be required?

If standard girts, what spacing is required? Will vertical channels be needed in the girt line for attachment of the horizontal siding?

(Pre-engineered buildings are not typically designed to carry that kind of load on the wall girts. Would structural steel studs be acceptable within the main frames?).

CO Response: The drawings indicate using sheathing over the Zee girts (note 9 on sheet A2.3). Vertical infill members will be required to maintain a max 16” span on the sheathing and for lap siding attachment. The PEMB MFR shall design vertical supports that integrate with their system and meet all require loading.

14. There is requirement for an “Archaeological Monitor” for this project. Does the NPS have companies that they would recommend performing this role? Or companies that they have used in the past?

CO Response: Yes, no recommendations will be made.

15. Under the “Building Subcontractor Qualifications” section of the solicitation there is a requirement for all subcontractors to provide past performance. This is not a typical requirement for the subcontractors. For this are the subcontractors expected to submit PPQ’s or CPARS, or is this for the Prime contractor?

CO Response: The Prime needs to be able to demonstrate that proposed subcontractors have worked on similar projects of size and complexity.

16. Is there an alternate water source available for the project other than the 400GAL/day one that was called out in the prebid meeting?

CO Response: The town of Grand Lake has water available for purchase.

17. In the spec 01 11 00 – 1.10A says that the Geotech report is “an appendix to this report”. After reviewing this am not seeing anything that is an Appendix. Please advise.

CO Response: Geo tech report has been provided in a previous amendment.

Source: NPS, 2020

Sampling and Analysis Plan

Rocky Mountain National Park

EDL #: NA

East Troublesome Wildfire Structural Fire Debris Sites
Site Investigation and Post-Removal Confirmation Sampling

Contract Number: 140D0419A0020
Task Order: 140P1221F0008

Prepared by:

BB&E, Inc.
235 E. Main Street, Unit 107
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May 4, 2023

Signatories

Signatory	Signature	Date Signed
[NAME], Federal Government Lead		
[NAME], Cleanup Lead		
[NAME], Legal Lead		
[NAME], Regional Coordinator		
[NAME], Environmental Compliance and Cleanup Division		

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List of Abbreviations and Acronyms

α	Alpha (Type I error probability; false rejection)
ACM	Asbestos Containing Material (ACM)
β	Beta (Type II error probability, false acceptance)
bgs	Below ground surface
CABI	Certified Asbestos Building Inspector
CCR	Code of Colorado Regulations
CDPHE	Colorado Department of Public Health and Environment
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COC	Contaminant of Concern
COPEC	Contaminant of Potential Ecological Concern
CRD	Colorado River District
CSM	Conceptual Site Model
DQI	Data Quality Indicator
DQO	Data Quality Objective
DU	Decision Unit
EDD	Electronic Data Deliverable
EDL	Environmental and Disposal Liabilities
EPA	U.S. Environmental Protection Agency
ESD	East Side District
ESV	NPS Ecological Screening Value
FSP	Field Sampling Plan
GPS	Global Positioning System
HASP	Health and Safety Plan
H_0	Null Hypothesis
H_A	Alternative Hypothesis
IDW	Investigation-Derived Waste
ISM	Incremental Sampling Methodology
ITRC	Interstate Technology and Regulatory Council
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
LIMS	Laboratory Information Management System

MD	Matrix Spike Duplicate
MDL	Method Detection Limit
mg/kg	Milligram per Kilogram
MS	Matrix Spike
NCP	National Oil and Hazardous Substances Pollution Contingency Plan (AKA, National Contingency Plan)
NPS	National Park Service
NRCS	Natural Resources Conservation Service
PAH	Polycyclic Aromatic Hydrocarbons
PCB	Polychlorinated Biphenyls
PCOPC	Preliminary Contaminant of Potential Concern
PDF	Portable Document Format
PVC	Polyvinyl Chloride
RCRA	Resource Conservation and Recovery Act.
RSL	Regional Screening Level
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control
RCRA	Resource Conservation and Recovery Act
RL	Reporting Limit
ROMO	Rocky Mountain National Park
SAP	Sampling and Analysis Plan
SI	Site Investigation
SOP	Standard Operating Procedure
SU	Sampling Unit
TCLP	Toxicity Characteristic Leaching Procedure
TCRA	Time Critical Removal Action
TEF	Toxic Equivalency Factor
TEQ	Toxic Equivalency Quotient
TSCA	Toxic Substances Control Act
U.S.C.	United States Code

1 Introduction

The National Park Service (NPS) is conducting a Site Investigation (SI) to determine the applicability of a Time Critical Removal Action (TCRA) in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the framework provided in the National Oil and Hazardous Substances Pollution Contingency Plan (also known as the National Contingency Plan, NCP) to address possible contamination in East Troublesome Wildfire Structural Fire Debris Sites (the Site), located within the Rocky Mountain National Park (ROMO or the Park) near Denver, Colorado. The site includes 26 burned structures.

This SAP will be used to document the sampling approach at 26 burn sites to be performed during a Site Inspection (SI) used to support the need for a TCRA under CERCLA. The SAP includes confirmation sampling post removal action to determine if removal goals have been attained at sites where removal actions are performed.

Based upon NPS experience at other structure burn sites resulting from wildfire, release of certain CERCLA hazardous substances above applicable screening levels and risk-based removal goals has been nearly ubiquitous, and removal actions required. Assuming this holds true at the ROMO sites, a TCRA will be performed in general accordance with *NPS Memorandum: Adoption of Presumptive Remedy for Contaminated Sites* (NPS, 2021c) and the Colorado Department of Public Health and Environment (CDPHE) *East Troublesome Wildfire October 2020 Cleanup Handouts* (CDPHE, 2020). The intent of the removal action is to return the sites to baseline conditions by removing hazardous substances released into the environment at or from the Site that are initially present at concentrations that exceed NPS accepted screening levels and also exceed naturally occurring site-specific background concentrations. NPS may choose to perform human health and ecological risk assessments at the Site to establish risk-based removal goals.

The historical presence of building materials, maintenance and cleaning chemicals, and batteries on the Site, suggest the potential presence of hazardous substances including metals, PCBs, dioxins/furans, and asbestos, defined under CERCLA. Possible releases of these contaminants may have occurred when the structures burned during the East Troublesome Wildfire in October 2020. The Park's records and field observations indicate that maintenance and cleaning liquids, fluorescent lights and light ballasts, small amounts of fuel or fuel containing equipment (e.g. generators), and/or batteries were stored or used in various buildings within the Site. There is the potential that some of these items released CERCLA hazardous substances during the fire, while others may have been incinerated and not released to soil or present in ash.

In 2021, the Park performed limited ash sampling of debris from four burned structures and determined there was some indication that concentrations of metals are potentially hazardous. Previous asbestos building surveys were completed on eight structures with asbestos containing material (ACM) identified in two of the eight. The Park plans to remove building debris and ash

so they do not pose a health and safety risk to workers and visitors, and to limit potential releases of CERCLA hazardous substances through wind and water erosion.

NPS will complete a SI utilizing Incremental Sampling Methodology (ISM) to sample ash and soil as described in this Sampling and Analysis Plan (SAP) to evaluate if a TCRA under CERCLA is appropriate and necessary. The SAP will be executed in two phases, an initial "presence/absence" sampling event of each burn site and site-specific background locations to document post-fire site conditions (Phase I) and a post-removal confirmation sampling to determine if removal goals are met and closure is warranted (Phase II). Both phases are outlined in this SAP.

The Phase I sampling event was conducted between September 26 and October 6, 2022, in accordance with this Draft SAP dated September 22, 2022. This SAP was updated to include the Phase I sampling data results and refine the Phase II confirmation sampling approach.

1.1 CERCLA, NPS, and State Authority

NPS is authorized under CERCLA, 42 United States Code (U.S.C.) §§ 9601 *et seq*. and Executive Order 12580, as amended by Executive Order 13016, to respond as the federal Lead Agency to any release or threatened release of hazardous substances, and/or any release or threatened release of a pollutant or contaminant that may present an imminent and substantial danger to public health or welfare, on or from land under the jurisdiction, custody, or control of NPS.

In addition, NPS has a number of substantive requirements that apply to response actions addressing releases of hazardous substances on NPS land (see NPS, 2014) including the NPS Organic Act of 1916 (54 U.S.C. §§100101 et. seq.), which requires NPS to manage parks in order to conserve the scenery, natural and historic objects, and wildlife and to provide for their enjoyment by such means as will leave them unimpaired for the enjoyment of future generations. NPS Management Policies 2006 further requires that NPS protect park resources and values from unacceptable impacts, including impacts associated with contamination.

In October 2020, the CDPHE issued guidance for addressing asbestos in Residential and Public and Commercial structures completely destroyed by the East Troublesome Wildfire where only ash and debris remain. The CDPHE Guidance is included in **Appendix 4**. CDPHE enforces asbestos requirements under Colorado Regulation No. 8, Part B and has also been delegated the authority and obligation to enforce the federal National Emission Standards for Hazardous Air Pollutants (NESHAP) regarding asbestos in public and commercial buildings. For residential properties and public and commercial buildings the CDPHE is waiving some of the asbestos requirements of Colorado Regulation 8, Part B. CDPHE has confirmed that the NPS structures destroyed during the East Troublesome Fire can be addressed under the CDPHE guidance. According to the CDPHE guidance, the ash and debris at burn sites can be removed and properly

disposed of without requiring pre-removal or post-removal asbestos sampling. The guidance provides specific requirements for the cleanup of the burn sites associated with the East Troublesome Fire. Except for two burn sites (Vault Toilet and Grand Lake Entrance Station) that were sampled in accordance with a CDPHE-approved plan, NPS has elected to not perform asbestos sampling prior to the removal action, as advised by CDPHE. Asbestos sampling will be included in this SAP as a component of the confirmation sampling only.

CERCLA's implementing regulations, codified in the NCP, 40 Code of Federal Regulations Part 300, establish the framework for responding to such releases and threatened releases. The NCP prescribes two similar processes for responding to releases: removal actions and remedial actions (see NCP Sections 300.400 through 300.440). In accordance with the NCP (40 CFR Part 300, Subpart §300.415), the following factors are used in considering the appropriateness of a removal action:

1. Actual or potential exposure to nearby human populations, animals, or the food chain from hazardous substances, pollutants, or contaminants
2. Actual or potential contamination of drinking water supplies or sensitive ecosystems
3. Hazardous substances, pollutants, or contaminants in drums, barrels, tanks, or other bulk storage containers, that may pose a threat of release
4. High levels of hazardous substances, pollutants, or contaminants in soil largely or near the surface that may migrate
5. Weather conditions that may cause hazardous substances, pollutants, or contaminants to migrate or be released
6. Threat of fire or explosion
7. The availably of other appropriate federal or state response mechanisms to respond to the release
8. Other situations or factors that may pose threats to public health or welfare of the United States or the environment.

If environmental samples are to be collected under either process, a SAP is required (see NCP Sections 300.415 and 300.430).

The SAP for SI activities includes the Field Sampling Plan (FSP) and the Quality Assurance Project Plan (QAPP). The FSP describes the number, types, analyses, and locations of samples. The QAPP describes the investigation's organization, functional activities, and measures necessary to achieve the goals of the investigation.

1.2 Purpose of Field Sampling

The former buildings within the Site included an office, rustic staff seasonal accommodations, barns, a garage, a ranger station, and outdoor toilets. None of these buildings were used for industrial purposes. Small quantities of cleaning chemicals, fuels, batteries, and building

materials containing CERCLA hazardous substances may have been stored in the buildings. Some historical building materials or equipment may have also contained hazardous substances like polychlorinated biphenyls (PCBs), lead-based paint, and asbestos. Uncontrolled releases of the CERCLA hazardous substances may have occurred during the East Troublesome Wildfire, and these substances may remain in ash or the underlying soil. The purpose of the SI is to assess building debris, ash, and soil for suspected Preliminary Contaminants of Potential Concern (PCOPC) including metals, PCBs, and dioxin and furan contamination at the Site to establish whether a release or potential release of hazardous substances, pollutants, or contaminants has occurred (presence or absence of contamination above NPS screening levels and baseline conditions). The SI will also establish site-specific background/reference concentrations for PCOPCs at six locations representative of the burned building sites but unaffected by structural fires. The SI results will be used to determine whether a TCRA or other response action under CERLCA is appropriate. Additionally, data will be utilized to evaluate probable disposal requirements. Confirmation sampling will be conducted after the removal action to evaluate metals, asbestos, and dioxin and furan contamination and compare the concentrations of Contaminants of Concern (COC) with site-specific background/reference concentrations collected from six independent background locations, promulgated state soil standards, or risk-based removal goals that may be established through human health and ecological risk assessments.

This SAP describes NPS's sampling program. Data obtained from this investigation will be used to address the data quality objectives (DQOs) detailed in Section 4 of this SAP. Data collected during the SI will be used to determine if Site conditions warrant removal. Post-removal confirmation data will be used to determine if removal goals are met.

1.3 Site Location

The following information can be used to locate the Site:

- Site name: East Troublesome Wildfire Structural Fire Debris Sites
- Site address: No addresses;
    - East Side District (ESD)/Big Thompson Watershed: two developed areas off Fern Lake Road in Larimer County (see Figure 1)
    - Colorado River District (CRD): five areas along the Trail Ridge Road corridor in Grand County (See Figure 2)
- Site Environmental and Disposal Liabilities (EDL) number: Not Available
- Coordinates: Longitude and latitude (approximate)
    - ESD: Fern Lake Road area in an east-west corridor from 40.3543 degrees north, -105.5846 degrees west

  - CRD: Trail Ridge Road corridor in a north-south corridor from 40.3076 degrees north, -105.8419 degrees west to 40.2729 degrees north, -105.8352 degrees west
  - Coordinates for each individual structure can be found in Table 1A

- United States Geological Survey 7.5-minute quadrangles: Trail Ridge Road area on Grand Lake, Colorado (2019); Fern Lake Road area on McHenry's Peak, Colorado (2019)

2 Site Description, Previous Investigations, and Conceptual Site Model

The development and ongoing update/refinement of a clear and thorough conceptual site model (CSM) is a critical component for verifying that key Site elements are considered before samples are collected and to assist the planning team in developing the DQOs (Section 4), as well as assisting the field team in making decisions. Figure 4 is a graphical depiction of the preliminary CSM, identifying potential exposure pathways.

2.1 Key Site Features

2.1.1 Site Description

ROMO spans nearly 266,000 acres of mountains and forest located northwest of Denver, Colorado. The mountain ridges near the center of ROMO form the top of the Continental Divide, and the ground elevation in the Park ranges from 7,600 feet to 14,259 feet (NPS, 2021a). ROMO was established in 1915 with the stated purpose "to preserve the high-elevation ecosystems and wilderness character of the southern Rocky Mountains within its borders and to provide the freest recreational use of and access to the park's scenic beauties, wildlife, natural features and processes, and cultural objects" (NPS, 2013). Many of the buildings within ROMO were constructed by ranchers before or after the Park was established to serve the growing tourism industry and were rented to guests into the 1950s (NPS, 2015).

Between October 21 and 24, 2020, the East Troublesome Fire spread from west to east across ROMO (NPS, 2021b). The wildfire destroyed three buildings in the ESD and 23 buildings on the western side of the Park, also known as the CRD. The burned building names, structure numbers, construction dates, and locations are listed in Table 1A. The most recent use of the building is given in the building name. The buildings were typically located in subalpine forests or meadows.

2.1.2 Operational History

Barns, tack sheds, lodges, and cottages reflect the ranching and dude ranch tourism history of the Park. After the 1960s, the lodges and cottages were converted to seasonal staff housing, whereas barns, garages, and sheds stored materials and equipment for livestock management and trails maintenance, and other material storage, including historic artifacts. There is no history of industrial use within ROMO since 1915.

One building destroyed during the fire, the Grand Lake Entrance Station (Building 1141), hosted offices and restrooms. Another was a modern vault toilet at the Harbison Meadow Picnic Area (Building 1183).

NPS prepared an inventory of burned buildings in early 2021 (NPS, 2021b). The inventory report includes photographs of each building before and after the fire, and a building and site condition assessment that records each building's historic status, size, potential hazards, and floor structure (e.g., concrete slab, foundation walls, or piers).

After the fire event, burn areas were fenced off to limit access, erosion barriers were placed on downgradient slopes, and the Fern Lake Patrol Cabin Site (014) was covered by a tarp. Due to their front country locations, proximity to areas of public access, and physical safety hazards, NPS removed remaining standing structures, building debris and ash from the Grand Lake Entrance Station (1141) and Harbison Meadow Picnic Area Vault Toilet (1183) in 2021. A concessionaire removed ash and building debris from the Moraine Stables Bunkhouse (893) and Moraine Stables Dorm (1086) shortly after the fire in 2020. To reduce physical safety hazards, NPS removed large debris from the Fern Lake Patrol Cabin (014), leaving smaller debris and ash. A concrete slab and other hard surfacing remain at the Grand Lake Entrance Station (1141). In 2022, Harbison Meadow Picnic Area Vault Toilet (1183) was completely removed and rebuilt in approximately its original location. Shallow surface soils within an approximate five-to-eight-foot buffer surrounding concrete surfaces and structures at the Grand Lake Entrance Station (1141) and Harbison Meadow Picnic Area Vault Toilet (1183) were removed to a depth of approximately six inches during debris removal activities. Construction activity near the Timber Creek Road Camp Barn Tack Shed (572) resulted in the placement of a small amount of fill material within the burn site. It does not appear that potential contaminated debris or soil was removed from the Tack Shed area.

2.1.3 Waste Characteristics

With limited to no industrial history in the Park, the releases from the wildfire are primarily related to building materials. As shown in Table 1A, most of the buildings were constructed between 1925 and 1945, with some constructed in the 2010s. The buildings were typically rustic wood construction with stained exteriors, limited interior finishes, and electrical power. The vault toilet (1183), Fern Lake Patrol Cabin (014), and several buildings in the Green Mountain Ranch (GMR) - Onahu Ranch Areas had no running water and/or electricity. Because it was commonly contained in older building materials, asbestos may be present in ash. Building components in some older structures may have been covered with lead-based paint. NPS has identified two buildings, the Timber Creek Road Camp Barn (783) and the northern portion of the Betty Dick Garage (831), where fluorescent lighting was known or suspected to be installed. At least ten light ballasts were observed in the Betty Dick Garage (831) debris. Older fluorescent light ballasts may contain PCBs. Although plastic is not hazardous, some plastics, including polyvinyl chloride (PVC), contain chlorine and can form dioxins when burned. There are no records or reports of chlorine-based solvents (another possible dioxin source) stored in the buildings, and no reason to suspect their presence. Various metals may have been present in building materials or in items that were stored in the buildings, including batteries, wiring, piping, white goods, etc. Petroleum and greases may have been stored in some buildings, but

these are more likely to have burned than to have been released to the ground. Asbestos was previously detected in buildings GMR Mineral Cottage (731) and GMR Arapaho Cottage (733). Other potential hazardous materials such as custodial chemicals, aerosols, and compressed gasses (e.g., propane) may have been present in small quantities, and likely consumed by the fire. Polynuclear aromatic hydrocarbons (PAHs) will have been released as the buildings burned, but because burning forests also release PAHs, NPS presumes that a cleanup of other hazardous substances will also address building-related PAHs.

CERCLA hazardous substances may be present in ash or in soil at the former buildings. Based on the types of contaminants (metals, asbestos, PCBs, and dioxins/furans), the absence of water application during the fire, and the knowledge that NPS has not disturbed the ash at most locations, NPS expects impacts to be limited to shallow surface soil.

2.1.4 Site Geology and Hydrogeology

Surface soil at the burned building sites consists of three general types classified by the Natural Resources Conservation Service (NRCS; United States Department of Agriculture, 2021). On the western side of the Park, all buildings south of the Betty Dick Garage (831), the soil in the top 6 inches below ground surface (bgs) is very sandy to very stony loam with parent material derived from granite and/or gneiss and/or schist. Mucky peat is mapped on the fringes of the building areas but is likely not similar to the soil at the buildings.

At the northern end of the western side of the Park, the Betty Dick Garage (831) is surrounded on two sides by the Colorado River. Soil here is mapped by NRCS as mucky peat with parent material derived from alluvium over sandy and gravelly glaciofluvial deposits derived from granite and/or gneiss and/or schist. Thus, soil around the Betty Dick Garage (831) is finer than at other western locations.

On the eastern side of the Park, NRCS maps the soil as very gravelly sandy loam derived from granite and/or gneiss and/or schist. Around the Fern Lake (014) cabin site, the surface soil contains mostly decomposed plant material. Therefore, concentrations of metals are expected to be naturally lower in these surface soils than at other locations where more rocks are present.

2.1.5 Site Hydrology

The Betty Dick Garage (831) is bordered on its north and west sides by the Colorado River, the cabins in the northern portion of the GMR area are near a small unnamed pond, and the Fern Lake Ranger Station (014) is near the shore of Fern Lake. Migration of ash or evidence of stormwater runoff from burn sites has not been observed during multiple site visits and impacts to surface water are not anticipated. If ash and building debris have been mobilized by rainwater runoff or flooding, NPS will evaluate those impacts in a separate investigation phase. Erosion mitigation methods have been installed at several of the structures.

2.1.6 Local Climate

With elevations typically above 8,000 feet, the wildfire debris sites at ROMO are often snow covered. On the western side of the Park, mean annual precipitation is approximately 19 inches, in the form of rain or snow, whereas the eastern side of the Park receives an average of 13 inches (NPS, 2017). NRCS reports the frost-free period is between 40 and 60 days at elevations lower than 9,000 feet (e.g., the Betty Dick Garage) and between 20 and 50 days at higher elevations (e.g., the Fern Lake area) (United States Department of Agriculture, 2021). July and August bring warm daytime temperatures in the 70s and 80s in degrees Fahrenheit, although nights are close to freezing.

2.1.1 Vegetation and Wildlife

ROMO has an abundance of diverse biotic communities. Both natural and man-made disturbances such as fire, non-native species invasions, and disturbed lands from historic homesteading, ranching, and logging activities have all impacted the biodiversity of ROMO. Based on a search of the NPS ROMO species list database, approximately 756 invertebrates, 1113 different vascular plants, 273 birds, and 70 mammals that are or may be present at various periods of the year within ROMO (NPSpecies - The National Park Service biodiversity database. https://irma.nps.gov/npspecies/). The wide diversity of bird and mammals cover the full range of potential ecological receptors including both avian and mammalian herbivores, insectivores, omnivores, and carnivores. No vascular plants are federally or state listed as threatened or endangered. A list of mammal and bird species federally and/or state-listed as threatened or endangered is provided below:

Mammals

- Lynx (*Lynx canadensis*) – Federal Threatened, State Endangered
- Wolverine (Gulo gulo) – State Endangered
- River Otter (Lontra canadensis) – State Threatened

Birds

- Yellow-billed Cuckoo (*Coccyzus americanus)* – Federal Threatened

2.1.2 Sensitive Environments

National park land is recognized as a sensitive environment worthy of the highest levels of protection. However, the former building sites are not in otherwise ecologically sensitive environments. Several structures, including the Fern Lake Ranger Station (014) and many of the buildings in the GMR and Onahu Ranch areas were historic, and several building sites contain chimneys and stone foundation materials that are culturally significant. Numerous historic artifacts remain within the burned footprint of the Betty Dick Garage (831) and are likely present

at the Onahu Lodge (575) site. Numerous historic sites are located in the near vicinity of the Fern Lake Ranger Station (014).

2.2 Summary of Previous Investigations

There is no history of suspected contaminant releases at the former buildings prior to the fire. Previous investigations are summarized below:

Asbestos Building Surveys 2005

Four asbestos building surveys were conducted in 2005 at buildings GMR Mineral Cottage (731), GMR Parika Cottage (732), GMR Arapaho Cottage (733) and the Onahu Ranch Lodge (575). It is unknown if the samples were collected by a CABI or in accordance with an approved SAP. It is also unknown if the surveys were comprehensive to address all potential suspect asbestos containing materials (ACM) or were limited in scope. Results were analyzed by the Division of Federal Occupational Health (DFOH) National Environmental Reference Laboratory (NERL) in compliance with guidelines established by EPA in method EPA-600/R-93-116. Laboratory reports and cover letters were produced titled *BLDG 731, 732, & 733 (CRD)*, February 21, 2005, and *BLDG 575 (CRD)*, August 8, 2005. Asbestos was non-detect for material collected from the Onahu Lodge (575) and the Parika Cottage (732). Asbestiform mineral fibers indicative of Chrysotile was detected at 2-4% in the wall board compound in the Mineral Cottage (731) and the Arapaho Cottage (733).

Broadbent Asbestos and Metals Sampling 2021

In January of 2021, samples of homogeneous suspected ACM and/or ash and debris were collected at the Grand Lake Entrance Station (1141), Harbison Meadow Picnic Area Vault Toilet (1183), Timber Creek Road Camp Barn (783), and the Timber Creek Road Camp Barn Tack Shed (572). Sampling results were presented in a report by Broadbent and Associates titled *Limited Hazardous Building Material Survey*, February 28, 2021. Limited Asbestos and metals sampling was conducted. Some asbestos samples were collected by a CABI in accordance with Broadbent's *Sampling and Analysis Plan*, January 22, 2021, approved by CDPHE. A total of 36 bulk samples of suspect ACM, 24 from the Grand Lake Entrance Station (1141), 9 from the Vault Toilet (1183), and 3 from the Tack Shed (572), were collected on January 27, 2021 and submitted to EMLab P&K Labs, LLC of Arvada, Colorado, for analysis. EMLab is a CDPHE-registered asbestos laboratory and is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP No. 200525-0) for bulk asbestos fiber analysis. A total of 6 composite ash/debris samples were collected (3 five-point aliquot composite samples from the Vault Toilet [1183], 1 eight-point aliquot composite sample from the Tack Shed [572], and 2 eight-point aliquot composite samples from the Barn [783]) on January 27, 2021, and submitted to EMLab P&K Labs, LLC for analysis. The ash/debris samples were analyzed for the presence/absence of asbestos by Transmission Electron Microscopy (TEM) via method ASTM D7521- 16. No asbestos was detected in any sample. Of the composite ash samples collected,

only those from the Vault Toilet (1183) were included in the CDPHE-approved sampling plan. While the ash results for the Barn (783) and Tack Shed (572) suggest asbestos is not present, CDPHE does not consider these data suitable to make a defensible presence/absence determination.

Broadbent also collected a total of 5 ash/debris samples for RCRA 8 metals analysis on January 27, 2021, and submitted to Eurofins Test America of Denver, Colorado. One eight-point aliquot composite sample was collected from each of the following three buildings: Grand Lake Entrance Station (1141), Vault Toilet (1183), and Tack Shed (572). Two eight-point aliquot composite samples were collected from the Barn (783). The samples were analyzed for Total Metals (ICP) in accordance with EPA SW-846 Method 6010C and for total mercury (CVAA) in accordance with EPA SW-846 Method 7471B. Lead was detected at 130 milligrams per kilogram (mg/kg) and 210 mg/kg in ash samples from the Barn (783) and Tack Shed (572), respectively, and one Barn (783) sample contained 150 mg/kg of arsenic. The Barn (783) and Tack Shed (572) samples were analyzed by TCLP. No arsenic was detected by TCLP in the Barn (783) sample. The Barn (783) sample was reported to contain 0.024 milligrams per liter (mg/L) lead which is less than the TCLP Limit of 5.0 mg/L. The Tack Shed (572) sample was reported to contain 10 mg/L Lead by TCLP which exceeds the regulatory limit. The analytical report indicates detection of lead in the laboratory method blank. Therefore, this result may be biased high.

BB&E SI 2022 (Phase I of this SAP)

BB&E completed the Phase I SI sampling event in accordance with the draft SAP between September 27 and October 6, 2022. All 26 burned structures and six background locations were sampled using ISM. Surface samples (0 to 3-inches) were collected from 40 equal weight aliquots, where soil/ash was present and accessible, at each sampling unit (SU) and combined to make one ISM replicate sample. If soil/ash was not present or accessible within an aliquot it was not sampled, and a larger quantity of soil/ash was collected from other aliquots to gather enough material for analysis. Structures where less than 40 aliquots were collected include:

- Structure 853 Green Mountain Ranch Pumphouse – three (3) aliquots from the center of the structure footprint were not sampled due to presence of concrete pad with no soil/ash on surface. The collection of 37 aliquots provides a representative sampling of soil/ash at the site. The exclusion of three (3) aliquots is not anticipated to impact data results.
- Structure 587 Onahu Ranch Pumphouse – eight (8) aliquots were not sampled due to lack of accessibility (deep well pit). The soil/ash samples collected from 32 aliquots around the structure pit are assumed to be representative of the site, however, samples were not collected from bottom of pit.
- Structure 572 Timber Creek Road Camp Barn Tack Shed – three (3) aliquots were not sampled due to the presence of unknown non-native fill; this was in accordance with the SAP. Based on the initial site visit NPS elected to exclude three (3) aliquots in the

southwest corner of the structure footprint due to concerns that this material was placed at the site after the fire. The area was excluded from sampling to mitigate the chance of unknown fill material impacting the ISM replicate. The collection of 37 aliquots provides a representative sampling of soil/ash at the site. The exclusion of three (3) aliquots is not anticipated to impact data results.

- Structure 1183 Harbison Vault Toilet - 18 aliquots were not sampled due to the presence of new construction on site footprint. The soil/ash samples collected from 22 aliquots around the new construction are assumed to be representative of the site. The footprint covered by the new construction is not exposed to human or ecological receptors.
- Structure 1141 Grand Lake Entrance Remit Office - 11 aliquots from the center of the structure footprint were not sampled due to presence of concrete pad with no soil/ash on surface. The collection of 29 aliquots provides a representative sampling of soil/ash at the site. The exclusion of 11 aliquots is not anticipated to impact data results.

At each background/reference location and at the Grand Lake Entrance Station (1141) three replicates were collected. The background/reference ISM replicates were used to calculate a site-specific background/reference concentration using the Interstate Technology Regulatory Council's (ITRC's) updated Microsoft Excel workbook ISM 95% calculator. If an analyte was reported as not detected, then one half of the detection limit for that analyte was used for the purposes of calculating the 95% UCL.

Based on the results of sampling conducted at 26 burned structures and six background/reference locations, it has been determined that concentrations of one or more metals exceed the risk-based screening levels (RBSL) (i.e. lowest of the Environmental Protection Agency (EPA) Regional Screening Level for Residential exposure from Soil or the NPS Screening Level Risk Assessment (SLERA) Constituent of Potential Ecological Concern (COPEC) Selection Ecological Screening Value (ESV) for soil), identified in Table 6A, and background/reference concentrations at all 26 sites. Beryllium was not detected above project RBSLs at any site. No PCBs or hexavalent chromium were detected above method detection limits at any location.

The total dioxin/furan toxic equivalency quotient (TEQ) exceeded RBSL and background/reference concentrations at 19 of the 26 sites.

Eight burned structures were analyzed for TCLP metals; only the Timber Creek Road Camp Tack Shed (572) burned structure failed TCLP analysis for lead. Therefore, the ash/soil at this site should be classified as hazardous waste.

Table 2A on this SAP provides the methods and sample counts for the Phase I sampling event. Table 6A provides the project action limits and laboratory-specific detection limits. Table 7 provides the site-specific background concentrations calculated based on the sampling results. Results of the site investigation will be presented in a TCRA SI Report.

2.2.1 Data Quality/Usability

Asbestos Building Surveys 2005

The data quality of these results is unknown due to lack of information on sample collection practices. It is not known if a CABI collected the samples. Analysis of the samples was performed by an accredited laboratory in accordance with appropriate methods. While the quality of this data in unknown, the positive asbestos results cannot be discredited due to the hazardous nature of the material. Building debris at sites Mineral Cottage (731) and the Arapaho Cottage (733) are assumed to contain a small quantity of asbestos based on these 2005 results. Based on the size of these structures it is highly unlikely that asbestos-containing material is present above the regulatory trigger levels. NPS representatives have confirmed with CDPHE staff that the two structures where ACM was reported to be detected in unknown quantities could be cleaned up in accordance with Section I of the CDPHE East Troublesome Wildfire October 2020 Cleanup Handouts.

Broadbent Asbestos and Metals Sampling 2021

The Broadbent asbestos sample collection and analysis for the Grand Lake Entrance Station (1141) and Harbison Meadow Picnic Area Vault Toilet (1183) was performed in accordance with a CDPHE-approved SAP and the results are considered of adequate quality and usability to make a presence/absence determination. The Timber Creek Road Camp Barn (783) and the Timber Creek Road Camp Barn Tack Shed (572) were not included in the CDPHE-approved SAP. Based on the results no asbestos was present in the ash/debris at the Grand Lake Entrance Station (1141) and Harbison Meadow Picnic Area Vault Toilet (1183). While asbestos was not detected in ash and homogeneous materials sampled at the Timber Creek Road Camp Barn (783) and the Timber Creek Road Camp Barn Tack Shed (572), CDPHE considers these data unsuitable for making presence/absence determinations. Despite the negative results, the ash and debris at these locations is presumed to contain friable asbestos for the purposes of removal and disposal.

The Broadbent metals results were used to develop the more robust sampling approach developed within this SAP. This SAP includes ISM sampling and confirmation sampling of all the metals included in the Broadbent 2021 analysis suite plus additional metals. The metals data are of adequate quality and usability to make hazardous waste determinations based upon the TCLP for the RCRA 8 metals. Additionally, the Broadbent 2021 metals data provide insights into the concentrations of these metals in structural fire ash material shortly after the fire and before approximately two years of exposure to the elements. For instance, the concentrations of arsenic in the ash samples from the Grand Lake Entrance Station (1141) and Harbison Meadow Picnic Area Vault Toilet (1183) were 1.3 and 0.68 mg/kg respectively and lower than concentrations detected in soil samples collected during the SI from these two sites after debris and soil removal. These arsenic concentrations are also lower than the concentration in the associated site-specific background location. Total chromium concentrations in ash samples from these two sites were lower than those detected in soils after debris and soil removal. Mercury

concentrations were also not detected (Method Detection Limit (MDL) of 0.0057 to 0.0065 mg/kg) in the five ash samples collected by Broadbent. The TCLP exceedance at the Timber Creek Road Camp Tack Shed (572) was substantiated by BB&E's SI sampling which also resulted in a TCLP exceedance for lead at the site.

BB&E SI 2022 (Phase I of this SAP)

The Phase I SI data was collected and analyzed in accordance with this SAP. All analytical data, except as noted, is considered valid for evaluating the presence or absence of suspected site contaminants, establishing site-specific background/reference concentrations, and comparing Site data to human health and ecological screening levels and site-specific background/reference concentrations. The Mercury MDL of around 0.06 mg/kg was greater than lowest RBSL of 0.013 mg/kg. There are no sites where Mercury is the sole driver of a cleanup response. Mercury was only detected in a single Site replicate at an estimated concentration of 0.09J mg/kg and was not detected in any background replicate. Coupled with the Broadbent metals data demonstrating that mercury was not present in fresh ash samples from four sites at an MDL of around 0.006 mg/kg this indicates that mercury is unlikely to be a significant site-related contaminant. Hexavalent chromium was analyzed in 10% of the samples to evaluate whether hexavalent chromium was a component of total chromium. Hexavalent chromium was not detected at any location sampled; however, the MDL of 0.6 mg/kg was above the lowest RBSL of 0.3 mg/kg. The non-detect results indicate that hexavalent chromium is negligible in total chromium results and hexavalent chromium is not a COC.

The data collected during the Phase I SI demonstrates a TCRA is warranted and is used to refine the Phase II confirmation sampling approach.

2.2.2 Preliminary Identification of Data Gaps

Migration of contaminants of potential concern horizontally and vertically is unknown. The presence or absence of surface soil contaminants of potential concern within the boundary and immediate perimeter of the structures has been determined by the Phase I SI analysis. The Phase II confirmation sampling will identify if vertical migration has occurred below the ash/debris pile plus 3 to 6 inches of soil. Migration of contaminants horizontally, including to adjacent surface water bodies, was mitigated by erosion control measures. No step out samples beyond the building 5-foot perimeter have been collected. Adverse soil impacts from the structure fires are expected to be confined to the locations of debris deposition. The five-foot buffer extending around each burn site is considered adequate to assess soil impacts related to the structure fires.

2.2.3 Contaminants of Potential Concern

PCOPCs included seventeen Title 22 metals, hexavalent chromium, PCBs, Dioxins/Furans, and asbestos based on the historical presence of building materials, maintenance and cleaning chemicals, batteries, and fluorescent light ballasts on the Site. The full suite of analytes,

screening levels, and project action levels is provided in Table 6A (Phase I) and Table 6B (Phase II). There are no records or reports of chlorine-based solvents (another possible dioxin source) stored in the buildings, and no reason to suspect their presence. Petroleum and greases may have been stored in some buildings, but these are more likely to have burned than to have been released to the ground. Other potential hazardous materials such as custodial chemicals, aerosols, and compressed gasses (e.g., propane) may have been present in small quantities, and likely consumed by the fire. Polynuclear aromatic hydrocarbons (PAHs) will have been released as the buildings burned, but because burning forests also release PAHs, NPS presumes that a cleanup of other hazardous substances will also address building-related PAHs.

The Phase I sampling results collected and analyzed in accordance with this SAP investigated for metals, dioxins/furans, PCBs, and hexavalent chromium. No PCBs or hexavalent chromium were detected at any of the sites analyzed. Metals and dioxins/furans are the primary COCs for the Phase II confirmation sampling event and the primary drivers of the site cleanup. Asbestos will also be included in the Phase II confirmation sampling approach.

2.2.4 Media of Potential Concern

Soil is the primary media of concern. Surface water bodies exists adjacent to the GMR area, Betty Dick Garage (831), and Fern Lake Ranger Cabin (014). Migration of contaminants to these surface water bodies was mitigated by erosion control measures and no evidence of migration of ash and contaminants from the burn sites was observed during multiple site visits.

2.3 Current and Future Property Use Scenarios

The extent of destruction from the wildfires at all buildings is either complete or severe enough to leave the buildings unusable. The Park may consider replacing some of these buildings, but currently desires to remove the ash and debris that is currently limiting visitation and reuse of the sites. The Grand Lake Entrance Station (1141), Harbison Vault Toilet (1183), and Timber Creek structures (783 and 572) will be rebuilt and returned to their original use. Some of the former building sites, including the GMR/Onahu Ranch area, Fern Lake (014), Betty Dick Garage (831), and Moraine Park structures (893 and 1086), will likely be restored to natural conditions for the immediate future. No residential occupancy of the building sites is anticipated.

2.4 Conceptual Site Model

The East Troublesome Wildfire burned buildings that were occupied, contained electronic equipment, or were being used to store chemicals and batteries, which may have resulted in CERCLA hazardous substance releases. High temperatures from the fire may have changed chemical structure of some contaminants, while releasing others from previous physical containment. For example, depending on the heat of the fire, PCBs, if present, may have been destroyed, converted to dioxins, or released in oil to surrounding materials. Other materials, such

as asbestos which may have previously been used in insulation and other construction materials, do not burn and now may be present in ash and debris. NPS staff report and Phase I field event observations indicate that ash and debris from the buildings is generally contained within or near the buildings' footprints. In some locations where building floors were wood, little or no ash is visible and hazardous substance releases may be present in surface soil below or immediately surrounding the former buildings.

A site visit was conducted on 9/29/2021 and 10/08/2021 to review site conditions and to support the development of this SAP. Removal of ash and debris has been completed at four structures including the Grand Lake Entrance Station (1141), Moraine Park Stable Bunk House (893) and Dorm (1086), and the Harbison Picnic Area Vault Toilet (1183). The majority of the sites are closed and barricaded from the public with fencing. The Fern Lake Ranger Station (014) is covered with tarping. Soil erosion mitigation methods (e.g. straw waddles) are in place at structures with existing debris. Observations during the site visit confirmed that ash and debris is contained within the footprint or in the immediate vicinity of the former structure. The structure footprint is generally clearly visible, excluding the Moraine Park Stables structures (893 and 1086) where debris was removed and no structures remain. The amount of ash and debris present at the structures varied with some structures having very little ash remaining and a few structures including Onahu Ranch Lodge (575) having between several inches and several feet of ash and debris in areas. Debris observed typically included building materials, wall board, bricks, scrap metal, white goods, metal storage lockers, maintenance equipment, large historic farming equipment, containers, light ballasts, and others. Appendix 3 includes photos taken during the site visit.

The building sites are not in wetlands and the water table is expected to be deeper than 6 feet bgs. Apart from the Grand Lake Entrance Station (1141) and the Harbison Picnic Area Vault Toilet (1183), the sites have not been excavated, and soils are not expected to have been affected below the near surface. Groundwater is not expected to be affected because liquid contaminants, like petroleum, would have burned or vaporized in the fire.

Except for the Betty Dick Garage (831), Fern Lake Ranger Station (014), and cabins in the northern portion of the GMR area, no surface water is close to the buildings. At the present time, structural fire ash and debris is not believed to have entered surface water through precipitation runoff due to topography, erosion control methods and no observed runoff channels noted during multiple site visits performed in 2021 and 2022. Vertical migration to approximately 3-6 inches bgs will be evaluated as part of the Phase II confirmation sampling.

Ecological receptors that may be exposed to contaminants include mammals, birds, and insects that may be foraging in the debris and ash and plants beginning to grow in the disturbed soil. Potential human receptors include recreational visitors, trespassers, and NPS contractors/workers.

The CSM is presented as Figure 4.

3 DQO Planning Team and Stakeholders

Identifying an appropriate DQO Planning Team is key to successfully developing DQOs. The DQO Planning Team should include the primary decision makers and project team members, such as risk assessors or remediation engineers, who will use the data generated as a result of the DQOs. The size of the DQO Planning Team will often depend on the size and complexity of the site under investigation (EPA, 2006).

3.1 DQO Planning Team

The DQO Planning Team develops the project DQOs according to the DQO process. The DQO process is iterative, and team members may be added or changed to address technical issues that were not initially identified. Table 3.1 below provides the DQO Planning Team for this project.

Table 3.1: DQO Planning Team

Name	Project Role	Area of Expertise
Paul Torcoletti CERCLA Project Manager NPS Regional Office Serving Interior Regions 6, 7 & 8 Paul_Torcoletti@nps.gov	Provides information about current and future use of the Site, ensures consistency with NPS Environmental Compliance and Cleanup Division requirements	Federal Government Lead
Will Mchugh, PE ROMO Project Manager william_mchugh@nps.gov	Park coordination, confirmation of Park objectives	ROMO Point-of-Contact
Elyse Kutsche, Phase I Project Manager, BB&E ekutsche@bbande.com	Point-of-contact for NPS, manage and oversee BB&E team	BB&E Lead
TBD Phase II	Point-of-contact for NPS, manage and oversee BB&E team	TBD

3.2 Decision Makers

The decision makers have the ultimate authority for making final decisions regarding the selection of DQOs based on the recommendations of the DQO Planning Team. The decision makers for this project are Paul Torcoletti, NPS Federal Government Lead and Will Mchugh ROMO Point-of-Contact. Mr. Mchugh receives input and direction from the ROMO management team including the Superintendent and Division Managers.

3.3 Stakeholders

Stakeholders are parties who may be affected by the results of the investigation and/or persons who may later use the data resulting from the DQO process.

Stakeholders identified for the wildfire debris sites in ROMO are:

- Rocky Mountain Conservancy
- Continental Divide Research Learning Center
- Colorado Department of Public Health and Environment
- ROMO NPS Staff and temporary workers
- NPS, Interior Regions 6, 7, & 8
- ROMO visitors

4 Data Quality Objectives

The DQO process specifies anticipated project decisions, the data quality required to support those decisions, specific data types needed, data collection requirements, and analytical techniques necessary to generate the specified data quality. The process also ensures that the resources required to generate the data are justified.

The DQO process consists of the following seven steps:

1. State the Problem.
2. Identify the Goal of the Investigation.
3. Identify the Information Inputs.
4. Define the Boundaries of the Investigation.
5. Develop the Analytic Approach.
6. Specify Performance or Acceptance Criteria.
7. Develop the Plan for Obtaining Data.

The following subsections detail each step in the DQO process for this investigation.

4.1 State the Problem

The buildings damaged by the East Troublesome Wildfire were constructed between the 1930s and 2000s and were used to store various materials at the time of the fire. Building materials may have contained lead paint, asbestos, PCBs, wallboard, metal items, and plastics. Maintenance chemicals and batteries may have been stored in some of the buildings and released by the fire. NPS wishes to determine whether CERCLA hazardous substances are present in soil and ash at concentrations above risk-based screening levels and local background concentrations. Based on the results a determination will be made to remove ash and impacted surface soil or support a no further action relative to surface soils. The end goal of a removal action is to restore these building sites to background conditions for the Park to use in the future.

There are two primary problem statements for these wildfire debris sites:

1. There are currently insufficient soil data to determine if the potential exists for residual contamination above risk-based screening levels and local background/reference concentrations (requiring additional response actions).
2. The characteristics of waste debris, ash, and soil required for selecting appropriate disposal facilities are unknown.

4.2 Identify the Goal of the Investigation

The primary goal of this investigation is to provide sufficient data of adequate quality to decide whether hazardous substances in surface soils and ash at the former buildings are above risk-

based screening levels and background/reference concentrations. Following removal, the confirmation sampling will assess whether subsurface soils are above background/reference concentrations or risk-based removal goals established though human health and ecological risk assessments. The secondary goal of the investigation is to characterize the waste for disposal. To achieve these goals, the field investigation is designed to perform the following functions:

1. Assess the potential presence of PCOPCs in ash and surface soil at former building sites above NPS screening levels and background concentration. Phase I will determine "presence/absence" and Phase II will be confirmation sampling to compare with background/reference concentrations or risk-based removal goals that may be established.
2. Collect representative background/reference surface soil samples to evaluate PCOPC concentrations.
3. Characterize waste for disposal.

No ecological or human health risk assessments will be performed during the SI. However, NPS reserves the ability to perform human health and ecological risk assessments. PCOPCs include Title 22 metals, hexavalent chromium, PCBs, dioxins/furans, and asbestos; the full suite of analytes, screening levels, and project action levels is provided in Tables 6A and 6B.

4.2.1 Principal Investigation Questions

The principal investigation questions support efficient collection of data needed to resolve the investigation problems identified in Section 4.1. Decision-making principal investigation questions (decision questions) will lead to the development of decision statements.

Principal Decision Questions and Statements

- *Decision Question 1:* Do PCOPC concentrations, excluding asbestos, in ash and soil at former buildings exist above NPS screening levels and background/reference concentrations?

Statement: Determine if the PCOPCs in soil/ash at each former structure is present above NPS screening levels and background/reference concentrations. Asbestos will not be sampled during this Phase and will be managed in accordance with CDPHE East Troublesome Fire Guidance Documentation.

- *Decision Question 2:* Does the soil and ash at any sampled location meet the criteria of a hazardous waste?

Statement: Determine if the soil and ash at any sampled location is characterized as hazardous waste.

- *Decision Question 3*: After removal action, do COC concentrations, including asbestos, in the presumed clean soil at former building footprints exceed background/reference concentrations, risk-based removal goals, if established, and/or are determined to be an

asbestos-contaminated soil in accordance with Code of Colorado Regulations (CCR), Regulation No. 8, Section III.S.5 (CCR, 2021).

Statement: Evaluate the nature of COCs in the presumed clean soil at the former building locations compared to background/reference concentrations, risk-based removal goals that may be developed, and CDPHE asbestos-contaminated soil definition. Background/reference concentration and CDPHE asbestos-contaminated soil limits are provided in Table 6B.

Principal Estimation Questions and Statements

- *Estimation Question 1*: What is the volume of ash, debris, and soil at each former building?

Statement: Estimate the volume of ash, debris, and soil at each former building by performing sampling, observations, and in-field measurements, yielding the extent and depth of total ash and debris to support removal action. Identify estimated quantities of scrap metal and potential hazardous materials, such as chemical containers, compressed gases, light ballast, and batteries.

4.3 Identify Information Inputs

The purpose of this step is to identify data required to answer the principal investigation questions listed in Section 4.2.1 and to determine which inputs require environmental measurements.

4.3.1 Previous Data Usability

The National Geochemical Database for Soil shows no samples collected within ROMO north of Grand Lake (United States Geological Survey, 2021). Therefore, regional background soil concentrations of metals are uncertain and will not be used. Site-specific background samples will be collected as part of the Phase I sampling event.

A study of dioxins and furans in surface soils in the front range around Denver, Colorado, indicates that, in general, these compounds are present in higher concentrations near industrial areas than in agricultural and open land (EPA, 2002). Therefore, the dioxin and furan anthropogenic background (these are also referred to as “reference” samples) concentrations can be expected to vary depending on where they are collected. The EPA (2002) study can be used to provide qualitative comparisons to site-specific reference concentrations but will not be used for decision making.

Asbestos inspections were completed in 2021 by a Broadbent CABI in accordance with a CDPHE-approved SAP with no asbestos identified in homogeneous materials and/or ash and debris at the Grand Lake Entrance Station (1141) and the Harbison Picnic Area Vault Toilet (1183). Asbestos sampling at these locations is considered complete (Broadbent, 2021). The Broadbent CABI also inspected he Timber Creek Road Camp Barn (783) and Tack Shed (572); however, sampling of these two Sites was not included in the CDPHE-approved SAP and are not

considered by CDPHE to provide a definitive presence/absence determination for asbestos. Limited sampling of ash for total and TCLP RCRA 8 metals was also performed by Broadbent within these four building structures. These previously collected metals data were considered suitable to inform ash and debris disposal requirements for the demolition of remaining structures and removal of ash, debris and soil from the Grand Lake Entrance Station (1141) and the Harbison Picnic Area Vault Toilet (1183); however, will not be used to independently answer other principal decision questions due to the limited scope of this sampling event and the fact that the Phase I SI sampling event provides a more thorough data set. These metals data do provide valuable insights in the concentrations of total RCRA 8 metals in ash at these four locations within several months after the fire and prior to significant exposure to the elements. It should be noted that a TCLP lead exceedance at the Timber Creek Road Camp Tack Shed (572) was detected in both the Phase I SI data and the Broadbent data. Historic asbestos sampling was completed in 2005 at buildings 731, 732, 733 and the Onahu Ranch Lodge (575). These historic asbestos data will not be used to answer principal decision questions due to age, unknown status of any potential abatement, and unknown collection protocols.

Data captured and analyzed during the Phase I SI sampling event in accordance with the Draft SAP is suitable for use to address principal investigation questions. The results of the Phase I SI sampling will be presented in a TCRA Site Investigation Report and used to refine the confirmation sampling approach.

4.3.2 Data to be Collected in the Current Investigation

The new data required to answer the principal investigation questions are as follows. The decision questions developed in Section 4.2.1 are repeated for reference.

Decision Question 1: Do PCOPC concentrations, excluding asbestos, in ash and surface soil at former buildings exist above NPS screening levels and background concentrations?

Samples of ash and surface soil will be collected utilizing ISM techniques and will be analyzed for:

- California Title 22 Test CAM 17 metals, as follows: antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, mercury, molybdenum, nickel, selenium, silver, thallium, vanadium, and zinc. This metals list includes the Resource Conservation and Recovery Act list of eight metals (RCRA 8) that may be classified as hazardous by toxicity.
- Hexavalent Chromium (10% of collected samples and background samples).
- PCB Aroclors in buildings where fluorescent light ballasts were observed or suspected to potentially be present, identified in Table 2A. The PCB Aroclors are listed in Table 6A.

- The list of dioxins and furans with toxic equivalency factors, identified in the Dioxins and Furans section of Table 6A. Calculate the TEQ for evaluation to screening limits and background.

Six background/reference locations will be sampled in triplicate utilizing ISM and will be analyzed for the same suite of contaminants, as applicable. Site-specific background/reference concentrations will be calculated using the ITRC ISM Calculator (v.3.0, August 2020) for Calculating 95% UCL with ISM Data.

Decision Question 2: Does the soil and ash at any sampled location meet the criteria of a hazardous waste?

Samples of ash and soil will be analyzed by TCLP (following application of the 20 to 1 rule) and PCB, where applicable, to characterize the waste for disposal. TCLP analyses will include:

- RCRA 8 metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver)

Estimation Question 1: What is the volume of ash, debris, and soil at each former building?

Volumes at each location will be estimated by measuring the depth of ash and debris present at each former building, and recording the areal dimensions of ash, debris, and soil, assuming a soil excavation depth of 0.5 ft. Estimates of scrap metal volumes will be made and potential hazardous materials identified, where visible. Following excavation of the contaminated material at each SU, confirmation sampling will be performed to determine the presence/absence of any remaining material above background concentration.

Decision Question 3: After removal action, After removal action, do COC concentrations, including asbestos, in the presumed clean soil at former building footprints exceed background/reference concentrations, risk-based removal goals, if established, and/or are determined to be an asbestos-contaminated soil in accordance with Code of Colorado Regulations (CCR), Regulation No. 8

After removal of ash/debris pile plus up to 6 inches of underlying shallow soil, ISM sampling will be completed at each former structure for the COCs identified above NPS screening levels and background/reference concentrations in Phase I (Decision Question 1). ISM samples will be collected in triplicate. Based on the Phase I SI completed in 2022, the COCs identified above NPS screening levels include:

- California Title 22 Test CAM 17 metals (excluding beryllium), as follows: antimony, arsenic, barium, cadmium, chromium, cobalt, copper, lead, mercury, molybdenum, nickel, selenium, silver, thallium, vanadium, and zinc.
- The list of dioxins and furans with toxic equivalency factors, identified in the Dioxins and Furans section of Table 6B. Calculate the TEQ for evaluation to screening limits and background.

Asbestos in soil will be sampled by a CABI in accordance with the following:

- A visual inspection of each site, as applicable, will be performed to determine if remaining suspected ACM is present. Remaining suspect ash or debris identified by the CABI will be removed and disposed off-site.
- For all sites requiring asbestos sampling identified in Table 2B, divide each sampling area into maximum ~400 sq foot grids.
- Collect 10 systematic random aliquots of soil (tablespoon or teaspoon – whatever is an appropriate volume) from each grid and create a composite sample.
- Laboratory homogenizes and analyses by PLM CARB 435 Level B with reporting limit to 0.1%
- Field duplicates at 10%.

4.4 Define the Boundaries of the Investigation

4.4.1 Spatial Boundaries

The former building sites currently exist in various states depending on the extent of fire damage. At most locations, the footprint of the building is visible because there is a concrete slab, foundation wall, placed stones, or piers present. Ash and debris—for example, fallen walls—may be present within and just outside the footprint. The sampling unit (SU) will be defined as follows:

- If a partial or full concrete slab is present, the SU will include ash and debris that can be crushed by hand (e.g., no metal, melted plastic, or bricks) present on the concrete slab, and soil within a 5-foot perimeter of the slab and/or former building footprint.
- If a concrete slab is not present, or is removed, the SU will include the ash and soil within the building footprint as well as the 5-foot perimeter. If the former building had a wooden floor and the former building location cannot be defined visually, the spatial extent of the SU will include the approximate former building location based on historical photos and NPS discretion, visible ash, and a buffer of 5 feet in each direction.
- After removal, the SU will include soils from the base of the soil excavation area, including areas below slabs that are removed.

The total area of each SU is included in Table 1A. Each building will be one SU, excluding the larger sites such as the Onahu Ranch Lodge and Betty Dick Garage which will be divided into two SU's to maintain a SU size of approximately 2,500 square feet or less.

The SU area sizes are based on the assumption that ash and soil will become mixed if removed by heavy equipment and the full building footprint plus a 5-foot perimeter will be removed

during the removal action. Additionally, the Species Checklist for ROMO identifies several species of shrew as present. Shrews, which are small insectivorous burrowing mammals, are generally recognized as having the smallest mammalian home ranges typically evaluated by the NPS in ecological risk assessments. NatureServe *(https://explorer.natureserve.org/)* identifies shrew home ranges as being small with an average home range in California of 3,638 square feet. The maximum SU area of approximately 2,500 square feet is smaller than the typical home ranges of shrews and are not so large that any receptor ranges would be excluded.

The vertical extent of the sampling profile during Phase I is the full depth of ash and debris that can be crushed by hand, in addition to 3 inches in soil, where present. This depth assumes that ash and debris will accumulate on surface soil and does not migrate into deeper layers without mechanical mixing, which has been limited. Post-removal confirmation sampling will include soils from 0-3 inches below the excavation base.

No horizontal step out samples will be taken during this investigation. Based on visual inspections of each burn site, soil impacts from structure ash and debris deposition are expected to be limited to building footprints and 5-foot buffer.

Background soil samples will be collected from locations that burned in the wildfire but are unlikely to have been affected by releases from buildings. The area of each background SU is not to exceed 2,500 square feet. The 0-to-0.25-foot (3 inch) depth of soil will be sampled.

Figures 1 and 2 indicate the location and general size of the burned structures. Figures 3a-3f depict the location and size of the background SUs.

4.4.2 Temporal Boundaries

Sampling of the solid media (ash and soil) is not anticipated to involve temporal constraints. The sampling program does not involve surface water or seeps that would typically require seasonal timing for sampling. Seasonal constraints, such as the onset of winter conditions and snow cover may impose a temporal constraint on the ability to perform sampling. Delays of several days could also be encountered if a major precipitation event occurs during planned sampling dates. Concentrations of contaminants in solid media are not expected to be affected by seasonal or shorter-term temporal constraints.

The Phase I sampling event was conducted in fall of 2022. The removal action is anticipated for 2023, with Phase II confirmation sampling occurring immediately after or concurrent with the removal action. The NPS may elect to complete the removal action in phases as time, weather, and funding allows.

4.4.3 Decision Units

Each SU will be a decision unit (DU).

The data from the DUs will be used to answer the Principal Investigation Questions.

4.4.4 Sampling Units

Sampling Units (SUs) are user-defined areas for which samples are collected to determine a representative concentration for that area. Each building site is an SU for all PCOPCs except dioxins and furans and asbestos, as described below. Except for asbestos analysis, all soil and ash samples will be collected using ISM. At each building SU, one (Phase I) or three (Phase II) ISM replicates composed of 40 increments will be collected for metals analysis and PCB analysis, where applicable. For Phase I dioxin and furan sampling, SUs will be comprised of individual or multiple similar buildings, and a total of 40 increments will be sampled at each SU to produce one or three ISM replicates. For Phase II confirmation asbestos sampling, one or more sampling grids of approximately 400 sq. ft. will be defined at each site, depending on the size of the Site footprint.

One replicate at each SU will be sufficient for the initial Phase I presence/absence determination due to the small size of each SU and the collection of 40 increments at each SU. The maximum grid size will be 7.6 square feet for each aliquot which will compensate for heterogeneity of contaminant distribution in target material given the spatial variability of hazardous material stored within the previously existing buildings. Three ISM replicates will be taken at each SU during the Phase II confirmation sampling event. These data will be used for decision making purposes and to determine whether COC remain at the sites above background/reference concentrations or risk-based removal goals, if developed.

For dioxins and furans, the rustic buildings used for seasonal housing are likely to have few dioxin and furan sources. During Phase I sampling, buildings that are close together, constructed of similar materials, and are the same vintage will be a single SU at the following locations (Table 2A specifies which cottages comprise each SU):

- Four cottages and the tool shed at Onahu Ranch Area
- Three cottages and one shed on the east side of the GMR Area
- Five cottages on the west side of the GMR Area

During Phase II confirmation sampling, each individual building will be sampled for dioxins and furans and no buildings will be grouped to form a single SU. Table 2B specifies Phase II confirmation sampling.

The contaminant background/reference SUs will also be sampled by ISM, with three replicate ISM samples consisting of 40 increments collected at each SU. Collecting three replicates at each background/reference SU is necessary to assess heterogeneity in soils and to calculate defensible UCL95 concentrations. Because soil types vary over the large geographical range of ROMO, background locations will be selected at the following general areas:

- Very sandy to very stony loam samples will be collected near the:
  - Moraine Stables buildings
  - Fern Lake building
  - Timber Creek Road Area
  - The Green Mountain buildings
  - The Grand Lake Entrance Station building
- Fine-grained peat soils will be collected near the:
  - Betty Dick Garage

4.5 Develop the Analytic Approach

This section defines the analytic or evaluation approach that will be used to answer the principal investigation questions and what screening values or standards will be used.

4.5.1 Decision or Estimation Parameters

This section details the population parameters that will be applied to the sample population to draw conclusions or make inferences about the data set and to compare the sample population results to the action levels defined in the following section.

- *Decision Question 1*: Do PCOPC concentrations, excluding asbestos, in ash and surface soil at former buildings exist above risk-based screening limits and site-specific background/reference concentrations?

Decision Parameter: ISM samples of soil/ash will be compared to risk based screening limits and site-specific background concentrations to determine presence or absence and support the need for a removal action. Dioxin/Furan results will be used to generate the site total TEQ, calculated by multiplying the result for each dioxin/furan and dioxin/furan-like compound by its toxic equivalency factor (TEFs) (Van den Berg et al., 2006), and summing the results. The TEQ will be compared to the 2,3,7,8-TCDD screening level and will be the only result evaluated for decision making purposes. If the PCOPC exceeds both the risk-based screening limit and the site-specific background/reference concentration, then a removal action will be considered to remove the ash/debris plus up to 6 inches of soil. Otherwise, the ash/soil will be considered below site-specific background/reference concentration. Data results from the Phase I SI will be utilized to further refine the Phase II sampling approach.

- *Decision Question 2:* Does the soil and ash at any sampled location meet the criteria of a hazardous waste?

Decision Parameter: Concentrations of total metals in the soil and ash sample will be compared initially to TCLP action levels using the "20 to 1 rule" (i.e., the concentration in milligrams per kilogram will be divided by 20 to estimate the leached concentration in milligrams per liter). If this screening-level result exceeds the TCLP limit for hazardous waste, the sample will be

analyzed by TCLP for the metal that exceeded the limit. Where PCBs are confirmed above action levels in samples, then all debris, soil, and ash will be assumed PCBs contaminated waste for disposal in accordance with the Toxic Substances Control Act (TSCA). PCB sampling will only be performed at sites where fluorescent lighting ballasts were known to exist prior to the fire. Ash/debris determined to be hazardous for metals and/or PCBs will be disposed of at an approved landfill authorized to accept hazardous waste.

- *Decision Question 3*: After removal action, do COC concentrations, including asbestos, in the presumed clean soil at former building footprints exceed baseline background/reference concentrations and/or are determined to be an asbestos-contaminated soil in accordance with CCR, Regulation No. 8, Section III.S.5?

Decision Parameter: Concentrations of COCs in presumed clean soil samples will be compared to site-specific background/reference concentrations and risk-based removal goals, if developed. Asbestos samples will be compared to CDPHE asbestos-contaminated soil definition of greater than 1% friable asbestos. If either COC or Asbestos concentrations exceed these limits, then additional soil removal will be performed. Otherwise, no further action at the site will be required.

- *Estimation Question 1*: What is the volume of ash, debris, and soil at each former building?

Estimation Parameter: The ash, debris, and soil volumes will be delineated sufficiently during the Phase I sampling event to assess removal quantity.

4.5.2 Action Levels

The SI action levels will be determined based on NPS risk-based screening limits and the results of the background/reference sampling. The results of the background/reference sampling will form the project reference concentrations, also known as baseline conditions. Human health and ecological screening levels were used to select appropriate risk-based screening limits and the laboratory detection limits (Table 6A and 6B). If the PCOPC concentration exceeds the risk-based screening level, the concentration will also be compared to Site background/reference concentrations for the area. A result that exceeds both the risk-based screening levels and the background concentration indicates that the soil must be evaluated for additional response actions, such as further soil removal. Samples with metal results that exceed the hazardous waste TCLP criterion using the 20 to 1 rule will be analyzed by TCLP for each metal exceeding the 20 to 1 rule criterion.

During the confirmation sampling phase, soil will be analyzed for asbestos and compared to the CDPHE definition for asbestos-contaminated soil of greater than 1% friable asbestos.

The following project screening levels will be used to select project risk-based screening limits and background concentrations.

- Human health:
  - EPA RSL for Resident Soil, target cancer risk of 1E-06 and target hazard quotients of 0.1 (EPA, 2021).
- Ecological:
  - NPS ESVs for Soil – *Screening Level Ecological Risk Assessment Contaminant of Potential Ecological Concern Selection ESV, lowest ESV from Table 5: Soil ESVs for Plants and Soil Invertebrates and Table 6: Soil ESVs for Birds and Mammals* (NPS, 2018). This document reviews candidate sources for ecological screening levels and selects the most appropriate ESVs.
- Asbestos:
  - CCR, Regulation No. 8, Section III.S.5 defines asbestos-contaminated soil as any soil containing visible friable ACM or any soil with greater than 1% friable asbestos content in the top 1" of soil. (CCR, 2021)
- Background/reference concentration:
  - Six background/reference locations will be sampled in representative shallow soil profiles near the former structure locations. Triplicate ISM samples will be collected from each background/reference location. Site-specific background/reference concentrations will be calculated using the ITRC ISM Calculator (v.3.0, August 2020) for Calculating 95% UCL with ISM Data. Data U flagged, indicating that it is below the detection limit, will be input into the ISM calculator as ½ the detection limit value.

4.6 Performance or Acceptance Criteria

The purpose of this step is to establish the criteria needed to obtain data that can be used to answer the principal investigation questions accurately and with confidence.

4.6.1 Quality Assurance/Quality Control

Quality assurance/quality control (QA/QC) measures will be implemented during the investigation to limit variability, mitigate the potential for false positive and/or false negative error, and increase the accuracy and defensibility of the collected data.

Standard operating procedures (SOPs) for field and laboratory work will be used to achieve acceptable data quality for the purposes of determining the nature and extent of contamination, site delineation, and for risk screening and assessments. Internal corporate SOPs that will be used for this project are listed in Table 4 and are available upon request. Laboratory SOPs are listed in Table 4 and are available upon request; all SOPs are for internal use and are not for distribution.

Field and laboratory precision and accuracy are specified in Table 9, including detection limits and reporting limits as necessary to meet the project goals.

Laboratory Quality Assurance/Quality Control

The laboratory project manager who will coordinate all analytical services for the Phase I sampling event is Henry Pelitire of Australian Laboratory Services Global (ALS Global). Personnel contact information is provided it Table 3. The laboratory for the Phase II confirmation sampling event is undetermined. The laboratory project manager will be identified prior to performance of Phase II confirmation sampling.

Lab certifications and audits provide an evaluation of the lab's capability to perform the necessary analysis with acceptable precision and accuracy. ALS Global is certified through the National Environmental Laboratory Accreditation Program (NELAP). The laboratory selected for Phase II confirmation sampling shall be NELAP certified.

The numbers and types of the QA/QC samples are specified in Table 2A and 2B (field QC samples) and Table 9 (laboratory QC samples) and are consistent with EPA requirements and industry standards.

Laboratory achievable limits, including limit of quantification (LOQ) and method detection limit (MDL), are presented in Table 6A and 6B.

Field QA/QC

The field team will rely on SOPs to guide sample collection and documentation, which will reduce potential variability introduced during sample collection. A list of SOPs is provided in Table 4. The field team will also follow procedures presented in Section 5 of this SAP.

Field/Laboratory Quality Control Samples

The following QC samples are planned, as summarized in Table 2A and 2B:

- MS/MS duplicate (MD) samples will be collected and analyzed at a frequency of approximately 5 percent (i.e., one per 20 samples) of the total sample set.
- One equipment blank sample will be collected from the non-dedicated sampling equipment for the entire Phase I field effort. For Phase II sampling, equipment blank samples will be collected for each type of non-dedicated sampling equipment at a frequency of one per 20 samples or one per day, whichever is fewer.
- Method blanks and laboratory control samples will be analyzed by the laboratory in accordance with applicable analytical methods and equipment.

A sample identification protocol for identifying field QC samples is provided in Section 5.2.1.

Decontamination Procedures

Section 5.1.3 describes how the field team will decontaminate field equipment and how often that procedure will be conducted and documented.

Instrument/Equipment Testing, Inspection, and Maintenance

Electrical or mechanized sampling equipment will be rented; testing, inspection, or maintenance will be performed by the rental agency. Equipment that is found to be non-functional in the field will be returned and replaced immediately.

Instrument/Equipment Calibration and Frequency

No sampling equipment requiring field calibration will be used.

Inspection/Acceptance of Supplies and Consumables

The Field Team Leader will be responsible for ordering all necessary equipment and materials and inspecting items before use. All items that will contact samples must be new or properly decontaminated before use.

Special Training and Certification

All field personnel who collect samples during this investigation must have a valid 40-hour (or 8-hour refresher, as appropriate) Hazardous Waste Operations and Emergency Response training certificate. No additional special training is required. Personnel performing asbestos inspections, asbestos sampling, and developing asbestos sampling plans shall be a CDPHE certified CABI.

Field Audits

A field audit will not be performed during this investigation.

Data Quality Indicators

Data usability will be assessed mainly using data quality indicators (DQIs), which will be represented by the following and are presented for each analytical group, including acceptance criteria and corrective action, in Table 9:

- Precision: field precision will be assessed using field duplicates; laboratory precision will be assessed using the laboratory control sample and duplicate (LCS/LCSD); precision in the sample matrix will be assessed using MS/MDs.
- Accuracy: field accuracy will be assessed using equipment blanks; laboratory accuracy will be assessed using method blanks, calibration criteria, and LCS recoveries; accuracy in the sample matrix will be assessed using the MS recovery results.
- Representativeness: will be assessed through field equipment blanks and laboratory method blanks; and qualitatively for all data by verifying that sampling procedures and

locations were followed as designed, validating the data received for PCOPCs, and checking that DQOs were met.

- Completeness: will be assessed by comparing the number of samples that are not rejected to the planned number of samples; if fewer than 95 percent of sample results are usable, the program will be reevaluated to determine if additional samples are required.
- Comparability: will be achieved by using the same analytical laboratory and same analytical methods for all samples, by following the same SOPs for sample collection and handling. Comparability will be assessed by evaluating whether DQOs were met and SOPs were followed.
- Sensitivity: laboratory sensitivity will be assessed using LCS and calibration criteria; sensitivity in the samples will be assessed based on the sample-specific RL achieved for PCOPCs.

4.6.2 Decision Error Limits and Uncertainty Evaluation

The project decision makers will use analytical results and a DQO evaluation to decide whether additional investigations may be needed. Upon the receipt of sample analytical results, each of the principal investigation questions will be addressed using the "Statistical Hypothesis Testing" method, as outlined in "Guidance on Systematic Planning Using the Data Quality Objectives Process" (EPA, 2006).

The tolerable limits on decision errors, which are used to establish performance goals for the data collection design, are specified in this step. Decision-makers are interested in knowing the true value of the concentrations and/or measurements. Because measured data can only estimate these values, decisions that are based on these data could be in error (decision error). The decision-maker cannot know the true value of a constituent concentration for two reasons:

- Concentrations may vary over time and space. Limited sampling may miss some features of this natural variation because it is usually impossible or impractical to measure every point of a population. Sampling design error occurs when the sampling design is unable to capture the complete extent of natural variability that exists in the true state of the environment.
- Analytical methods and instruments are never perfect; hence, a measurement can only estimate the true value of an environmental sample. Measurement error refers to a combination of random and systematic errors that inevitably arise during the various steps of the measurement process.

The combination of sampling design error and measurement error is the total study error. Because it is impossible to eliminate total study error, basing decisions on sample data may lead to a decision error. The probability of a decision error is controlled by adopting a scientific approach in which the data are used to select between the baseline condition (the null hypothesis

[H_0]) and the alternative condition (the alternative hypothesis [H_A]). The null hypothesis is presumed to represent the de facto, true condition going into the test. The baseline condition is retained until the data indicates that it is highly unlikely to be true. A false rejection, or "Type I" decision error, refers to the type of error made when the null hypothesis is rejected when it is actually true. A false acceptance, or "Type II" decision error, refers to the type of error made when the null hypothesis is accepted when it is actually false. The probability of a Type I error is called alpha (α) and the probability of a Type II error is called beta (β). The confidence level is related to α and the statistical power is related to β.

For Decision Question 1 (Do PCOPC concentrations, excluding asbestos, in ash and surface soil at former buildings exist above risk-based screening limits and background/reference concentrations?). This will be split into two questions; the first whether the risk-based screening levels are exceeded and second whether the site-specific background/reference concentrations are exceeded.

To assess whether concentrations exceed risk-based screening levels, a simple “yes/no” decision will be made by comparing the sample results (one ISM value or the ITRC UCL 95% value in the case of Grand Lake Entrance station) to risk-based screening levels without considering the variability associated with the measured results. As described in EPA’s DQO Guidance (EPA, 2006), in this situation, no formal statistical hypothesis tests are performed; therefore, it is not necessary to specify tolerable limits on decision errors.

The comparison of Site concentrations to background/reference concentrations assumes that concentrations are “Site-related” until proven otherwise. Based on other similar fire sites and the material present within the former structures, there is good cause to believe that the true value of at least some PCOPCs are above background concentrations therefore the baseline condition should correspond to this situation and require data to demonstrate otherwise. Thus, the null and alternative hypotheses are as follows:

> H_0: The DU analyte concentration exceeds the UCL 95% background concentration; the analyte is a Site-related contaminant.
>
> H_A: The DU analyte concentration does not exceed the UCL 95% background concentration; the analyte is not a Site-related contaminant.

A Type I error for Question 1 (falsely rejecting the null hypothesis or concluding the DU concentration does not exceed background when it actually does) is considered the more severe type of error as it would cause the dismissal of a Site-related PCOPC, based on the minimum values recommended in EPA (2002a) for a Form 2 background test. The consequences of retaining the baseline condition that site contamination is present when, in reality it is not (false acceptance or Type II error), are less averse to human and ecological health. The baseline condition is assumed to hold unless convincing information from the collected data is available to support rejecting the baseline for the alternative condition. Due to this conservative approach that assumes cleanup will occur, one replicate will be collected from each SU.

To assess whether DU concentrations exceed the UCL 95% background/reference concentration, a simple "yes/no" decision will be made by comparing the sample result to the UCL 95% background/reference concentration without considering the variability associated with the measured DU results. The UCL 95% background/reference concentrations will be calculated using the three ISM replicates collected at each background SU. As described in EPA's DQO Guidance (EPA, 2006), in this situation, no formal statistical hypothesis tests are performed; therefore, it is not necessary to specify tolerable limits on decision errors.

For Decision Question 2 (Does the soil and ash at any sampled location meet the criteria of a hazardous waste?), the null and alternative hypotheses are as follows:

> H_0: The ash and soil sample concentration is greater than or equal to RCRA characteristic limits for hazardous waste; the material would be disposed of as hazardous waste in a hazardous waste landfill permitted by EPA, or by a State authorized RCRA disposal facility.
>
> H_A: The ash and soil sample concentration are less than RCRA characteristic limits for hazardous waste; the material can be disposed as non-hazardous solid waste in an appropriately licensed facility in accordance with the CDPHE *East Troublesome Wildfire October 2020 Cleanup Handouts*.

Given that further waste characterization will likely be required by the disposal facility prior to disposal of ash and soil, a simple "yes/no" decision will be made by comparing sample results to RCRA characteristic limits for hazardous waste without considering the variability associated with the measured results. As described in EPA's DQO Guidance (USEPA, 2006), in this situation, no formal statistical hypothesis tests are performed; therefore, it is not necessary to specify tolerable limits on decision errors.

For Decision Question 3 (After removal action, do COC concentrations, including asbestos, in the presumed clean soil at former building footprints exceed site-specific background/reference concentrations, risk-based removal goals, if established, or CCR, Regulation 8 asbestos contaminated soil definition. This will be split into two questions; the first whether the asbestos limit is exceeded and second whether the site-specific background concentrations or risk-based removal goals, if established, are exceeded.

To assess whether concentrations exceed the asbestos limit, a simple "yes/no" decision will be made by comparing the asbestos results to the asbestos screening limit without considering the variability associated with the measured results. As described in EPA's DQO Guidance (EPA, 2006), in this situation, no formal statistical hypothesis tests are performed; therefore, it is not necessary to specify tolerable limits on decision errors.

To assess whether Site concentrations exceed background/reference concentrations or risk-based removal goals, the null and alternative hypotheses are as follows:

H_0: The confirmation sampling DU analyte 95% UCL concentration exceeds the 95% UCL background concentration or risk-based removal goals, if established; the analyte is a Site-related contaminant.

H_A: The confirmation sampling DU analyte 95% UCL concentration does not exceed the 95% UCL background concentration or risk-based removal goals, if developed; the analyte is not a Site-related contaminant. If true, the site footprint would be assumed clean and no further action taken.

To assess whether DU concentrations exceed the UCL 95% background/reference concentration or risk-based removal goals, if established, a simple "yes/no" decision will be made by comparing the UCL 95% exposure point concentration for each DU to the corresponding site-specific UCL 95% background/reference concentration without considering the variability associated with the measured DU results. The UCL 95% background/reference concentrations and DU exposure point concentrations will be calculated using the three ISM replicates collected at each SU. As described in EPA's DQO Guidance (EPA, 2006), in this situation, no formal statistical hypothesis tests are performed; therefore, it is not necessary to specify tolerable limits on decision errors.

4.6.3 Data Validation and Usability

Data verification includes methods to evaluate the data's completeness, correctness, and conformance to the analytical method as well as procedural and/or contractual requirements. Data validation is the process of evaluating the analytical quality of the data, including both laboratory and field processes.

Data Verification

The following items will be reviewed by the Contractor Project Manager to verify data:

- Generated by the field team: field notes, daily progress reports, chain-of-custody records, corrective action documentation, project-related correspondence

The following items will be reviewed by the Laboratory Project Manager or their designated representative:

- Data generated by the laboratory: equipment calibration, testing, maintenance, and inspection logs

The following items will be reviewed by the Laboratory Project Manager and Contractor Project Manager to verify data:

- Generated by the field team: chain-of-custody upon sample receipt
- Generated by the laboratory: laboratory reports (including hold times and intake temperature of samples); raw data and reported results for samples, standards, QC checks, and QC samples

Data Validation

Data validation by an independent chemist will not be performed for the Phase I SI data. Level III data reporting will be completed by the laboratory. If the data will be used in an additional report such as an Engineering Evaluation/Cost Analysis or Remedial Investigation, data validation may be required.

Data validation shall be performed on the Phase II confirmation sampling data. Applicable EPA data validation Guidance includes Guidance on Environmental Data Verification and Data Validation - EPA QA/G-8 (EPA, 2002), National Functional Guidelines for Inorganic Superfund Methods Data Review (EPA, 2020), National Functional Guidelines for Organic Superfund Methods Data Review (EPA, 2020), and Guidance for Labeling Externally Validated Laboratory Analytical data for Superfund Use (EPA, 2009). The Contractor shall qualify or reject data, as indicated by verification and validation process and prepare data validation reports documenting the validation process and results. Phase II laboratory data shall receive stage 2B validation checks as recommended in Guidance for Labeling Externally Validated Laboratory Analytical data for Superfund Use (EPA, 2009).

4.7 Plan for Obtaining the Data

The purpose of this step is to describe a resource-effective data collection design for generating data that will satisfy the DQOs specified in the preceding six steps. The planned investigation tasks are outlined in Section 5.

5 Field Sampling Plan

5.1 General Site Procedures

5.1.1 Site Preparation, Preparation, and Restoration Procedures

The sampling will be conducted in a two-Phased approach, 1) determine presence or absence of PCOPCs and measure the volume of ash, debris, and soil for disposal to support removal decisions and 2) after removal action is complete, preform confirmation sampling to determine whether site closure or further removal is warranted. No excavation or sampling below a depth of 0.25 feet bgs will be performed during the Phase I sampling and pre-excavation clearance is not required. Phase II confirmation sampling will be performed at soil surface depth (0-0.25 feet from base of excavation area) subsequent to the removal action (removal of up to 6 inches of soil), to confirm all cleanup goals have been met or to support further removal actions.

Public visitation to the Site during field work is not expected. Contact information for ROMO's Project Manager Mr. Paul Torcoletti will be provided to people who express interest in the field work. NPS will be responsible for confirming that no active wiring is present at the structures. If wiring is present and unable to be removed prior to field activities NPS and field personnel will participate in lockout tagout (LOTO), using CFR 1910.147 App A. Site workers may inform visitors that NPS is investigating ash and soil at former buildings destroyed in the East Troublesome Wildfire to evaluate whether additional response actions are required.

After completing ground-disturbing activities, reasonable efforts will be made to restore locations and disturbed ground surfaces to the pre-investigation condition and in accordance with contract specifications. Following the completion of work at each location, all investigation-derived waste (IDW) will be removed. Decontamination and/or purge water and soil cuttings will be transported to the IDW staging area and transferred to appropriate containers for subsequent off-site disposal by the contractor.

5.1.2 Archeological Recordation

The NPS will be responsible for NEPA Section 106 cultural compliance assessment for the proposed Phase I Site sampling activities. Site work will not be allowed to proceed until compliance is completed.

The use of a small-diameter bit for coring during sampling will limit disturbance to the Site subsurface. Because the Site surface soil has been extensively disturbed, it is unlikely that historically significant artifacts will be discovered. If a suspected historically significant artifact is encountered during the investigation, the activity will be halted until an NPS staff member can evaluate the item and the area. Large historically significant artifacts (e.g., farm equipment, etc.)

are present and readily identifiable at the Betty Dick Garage (831) and Onahu Lodge (575). These items will not be damaged during sampling, but may be moved to facilitate sampling, with approval from NPS staff.

During removal, the removal contractor shall furnish an archeological monitor to inspect ground disturbing activities at Sites identified by NPS and in accordance with contract specifications.

5.1.3 Equipment Decontamination Procedures

Portable sampling equipment will be decontaminated before leaving each building location. Decontamination fluids will be captured in buckets or other closing containers and will be transferred to drums or small containers for disposal. Drums of IDW will be in an area that can be easily accessed by a waste removal truck. Non-IDW trash, such as wrappers and unused tubing trimmings, will be disposed of in bins or dumpsters provided by or at a location specified by NPS. Personnel will remove dust, ash, and soil from clothing and boots before leaving each building location. Hand-held equipment will be decontaminated before use and after completion of work at a structure or background location.

The decontamination will be conducted using the following procedure:

1. Visible soil (or other material) will be removed using a dry brush and available clean water.
2. The equipment will be washed in non-phosphate detergent (e.g., Alconox®) and potable water.
3. The equipment will be rinsed in de-ionized water and allowed to air dry.
4. Equipment may be air dried or wiped dry with paper towels.
5. Cover with clean plastic bag or aluminum foil between locations.

5.1.4 Mapping and Surveying

The perimeter (four corners) of the building ash and debris will be recorded using a global positioning system (GPS) with submeter accuracy if satellite reception is adequate. Adequate reception will be achieved when the GPS can connect to at least four satellites with a position dilution of precision of 8 or less. If GPS coordinates cannot be recorded at the submeter level, personnel will use a tape measure to measure the ash and debris extent at each former building location.

5.1.5 Dust, Vapor, Odor, and Noise Control

Sampling activities are not anticipated to create excessive dust, vapor, odor, or noise. Any noise, odor, or dust complaints received by the public will be evaluated immediately on-site, and practices will be changed to mitigate the situation. The ROMO Point-of-Contact and NPS

Federal Government Lead will also be informed immediately of the complaint and the response measures.

5.1.6 Damage to Site Structures

Parts of damaged buildings may be unstable. Personnel will use caution around unsecured building materials to avoid further damage. Contingency planning for damage to any existing structures, archeological artifacts, and/or the environment (beyond intentional cutting/clearing and minor rutting) during the sampling activities includes the following:

- The Field Team Lead shall be responsible for assessing and documenting damage occurred during site activities. Documentation will include photographs of the damage. The Contractor Project Manager, ROMO Point-of-Contact, and the Federal Government Lead will be immediately notified of the damage.
- No active utilities should be present, however, in the event an active utility is damaged, the utility owner shall be notified immediately. Utility providers are to be determined upon receipt of the pre-mark clearance.
- The Contractor shall not attempt to make repairs except to prevent the release of ash or building materials to a previously unimpacted area. The Contractor will photograph repairs.
- No chemicals are expected to be present, however, if the event spills of petroleum that cause a film or sheen on surface water or any spills of other hazardous substances in reportable quantities occur they shall be reported to the National Response Center at (800) 424-8802 as soon as possible and the CDPHE at (877) 518-5608 within 24-hours of discovery.
- Equipment refueling shall be performed off-site.

5.2 Sample Handling

This section describes the sample handling protocol for environmental samples collected during the investigation.

Non-dedicated sampling equipment will be decontaminated according to the specifications in Section 5.1.3 before initiating sampling activities and will be protected from contamination until ready for use.

Sample containers will be clean, unused, and supplied by the selected laboratory. Following sampling, sample containers will be packed and transported via overnight shipping to the laboratory. All samples except asbestos will be placed in coolers with ice and maintained at ≤6°C in a secure location with the chain-of-custody throughout sample transport. The laboratory will

be responsible for notifying Field Team Lead as soon as possible of any inconsistencies or breakage upon receipt, and within one day at the latest. The laboratory will obtain approval from Environmental Contractor prior to disposing of any samples.

5.2.1 Sample Labeling

Samples will be assigned a unique sample identifier shown on the chain-of-custody form and sample container labels. Table 5B summarizes the sample nomenclature for all samples, including MS/MDs and equipment blanks.

Sample container labels will indicate the sample identifier, date and time of collection, identity of the sample collector, and type of analysis required. Labels will be completed using waterproof ink.

5.2.2 Sample Handling and Chain-of-Custody

Field forms and chain-of-custody records will be used to maintain a record of sample collection, custody, and receipt by the laboratory. A chain-of-custody form supplied by the laboratory will list the sampler's initials, sample identifier, date and time of collection, matrix, preservative, and requested analyses. Accompanying chain-of-custody form(s) will be completed for each cooler of samples. The original form will be placed in the cooler in a waterproof plastic bag and a copy will be retained by the sampler.

The following packaging procedures will be followed for each sampling shipment container.

1. Double-pack ice in zip locked plastic bags.
2. If present, seal all cooler drain plugs with sturdy tape to prevent melting ice from leaking out of the cooler during shipment.
3. Line the bottom of each cooler with bubble wrap to prevent breakage during shipment.
4. Check sample container screw caps for tightness.
5. Ensure that packing tape is covering all sample labels to prevent water damage from potential melting ice.
6. Wrap all glass sample containers in bubble wrap to prevent breakage.
7. Seal all sample containers in heavy duty, plastic zip-lock bags.
8. Place samples in a sturdy cooler(s).
9. Ice used to chill/preserve samples will be double sealed in two zip lock plastic bags and placed on top and around the samples.
10. Fill empty space in the cooler with bubble wrap or Styrofoam peanuts to prevent movement and breakage during shipment.
11. Sign Chain-of-Custody forms, insert the form into a zip-lock plastic bag, and tape the sealed bag onto the inside cooler lid.
12. Custody seal the container lid.

13. Securely tape the cooler shut with sturdy packing tape and ensure that the tape covers the custody seals.

Samples will be delivered to the laboratory as required by hold times during or after the field program via overnight carrier. The waybill will be retained for recordkeeping. Common carrier tracking numbers will be indicated in the field book or on field forms.

5.2.3 Documentation and Records

A daily record of field activities will be recorded by the Field Manager; this Daily Log will be transmitted to the NPS Point-of-Contact and NPS Federal Government Lead before 11:00 am on the next business day when possible. Field forms will be used where appropriate.

The Daily Field Report template is included as Appendix 1. Additional notes may be kept in field logbooks.

5.3 Investigation-Derived Waste Sampling and Disposal

IDW includes all equipment decontamination liquid and all soil from cores not provided for sampling. No decontamination liquids will be released to the ground or to surface waters. Water used for decontaminating equipment will be placed in a drum. IDW soils will be placed in a separate drum. Final disposal facility selection will be based on waste acceptance policies, capacity, and pricing, and will be approved by NPS in advance. A sample will be collected from the IDW water drum and the IDW soil drum (it is expected that only 1 drum will be required for each type of IDW storage) for the characterization data required by the disposal facility, which is anticipated to be toxic characteristic leaching procedure analytes, ignitability, corrosivity, and reactivity. If an additional drum is required for IDW storage, then one sample will be collected per drum.

PPE (masks, gloves, booties, etc.) and other generated waste (paper towels, plastic bags, etc.) will be disposed off-site as general municipal waste.

NPS shall be identified as the generator of wastes for the purpose of regulatory or policy compliance. The Environmental Contractor will collect and manage a bill of lading (for non-hazardous wastes) or manifest (for hazardous waste) for the IDW shipment and will be signed by a signing authority from NPS. Waste will be removed as soon as possible for disposal at an appropriate facility, based on analytical results. All project waste operations will be conducted in accordance with applicable regulations and requirements. The shipping documents will also be signed by the driver prior to the waste leaving the Site; these documents will accompany the shipment of waste while in transit at all times. The certified disposal facility ticket will be collected by the Environmental Contractor and provided to NPS to maintain information related to these wastes, including all disposal analyses by waste type, manifest/bill of lading, and disposal facility weight ticket.

5.4 Health and Safety

A health and safety plan (HASP) that covers all Environmental Contractor employees is in Appendix 2. Each subcontractor who will be performing activities that could result in contact with or release of contamination is responsible for preparing a separate HASP that covers their own specific activities, and for providing staff who are appropriately trained in the Occupational Safety and Health Administration's Hazardous Waste Operations and Emergency Response 1910.120 requirements. Safety at the Site is a top priority.

5.5 Ash/Soil Investigation

Samples of ash, debris that can be crushed by hand, and soil will be collected using ISM techniques. The surface soil interval is 0-0.25 feet bgs. Each DU is approximately 2,500 square feet or less. Samples will be collected using a stainless steel spoon or appropriate coring device. One replicate ISM sample will be collected from each building SU during Phase I, three replicate ISM samples will be collected form each SU during Phase II, and three replicates will be collected from each background SU.

The ash and soil samples for Phase I and II will be analyzed for the chemicals identified in Section 4.3.2 and Tables 2A and 2B of this SAP. Samples will be analyzed for TCLP metals and PCBs (where appropriate) to determine waste disposal requirements as indicated in Section 4.3.2. Asbestos will be sampled during the confirmation phase.

5.5.1 Ash/Soil Sampling Locations

Each former building listed in Table 1A will be sampled. As detailed in Table 2A and 2B, each building Site will be one or more SUs for metals and PCBs, where applicable. During Phase I sampling, ash, debris, and soil increments will be combined at some similar buildings for the dioxin and furans samples, for reasons presented in Section 4.4.1. During Phase II confirmation sampling each SU will be sampled individually and no SU's will be combined for any laboratory analyses.

SU sites will be categorized and sampled according to present conditions at each structure. The sampling rationale is listed below, incorporates the variability of present conditions based on observations gathered during site visits completed in September-October 2021.

1. Concrete slab with no building debris: This condition is present at two structures (Grand Lake Entrance Station and Harbison Meadow Picnic Area Vault Toilet). Sampling will be performed around the 5-foot perimeter of the concrete slab.
2. Concrete slab is present with debris. This condition is present at five structures. The ISM grid will encompass the concrete slab and 5-foot perimeter of the concrete slab. Sampling will be completed within the prescribed ISM grid to the best accuracy possible while refraining from shifting or relocating large debris and where soil/ash remains on

the concrete slab. Where debris including concrete or metal impede the sampling point, the field crew will sample the best available material or omit the target aliquot if necessary.

3. Soil building footprint with no building debris: There are two structures in this category (Moraine Park structures). The ISM grid will encompass the building footprint, as best as can be estimated, and a 5-foot perimeter around the footprint.
4. Soil building footprint with existing debris: This condition is present at 17 structures. The ISM grid will encompass the building footprint, as best as can be determined, and 5-foot perimeter of the building footprint. Sampling will be completed within the prescribed ISM grid to the best accuracy possible while refraining from shifting or relocating large debris. Where debris impedes the sampling point, the field crew will sample the best available material or omit the target aliquot if necessary.
5. After removal, all ash and debris will have been removed from each Site. Concrete slabs and foundations will be removed from most sites where originally present but will remain at the Betty Dick Garage (Site ID 0831). Phase II confirmation samples will be collected from the floor of the excavation area of each Site, which includes a 5-foot buffer surrounding original building footprints/debris field. For sites where concrete slabs and foundations were removed, the ISM sampling grids will include the areas formerly occupied by slabs and foundations.

Background/reference locations are listed in Table 2A. As discussed in Section 4.4.1, the following soil types will be sampled:

- Very sandy to very stony loam samples will be collected near the:
  - Moraine Stables building
  - Fern Lake building
  - Timber Creek Road Camp buildings
  - the Green Mountain buildings
  - The Grand Lake Entrance Station building

- Fine-grained peat soils will be collected near the:
  - Betty Dick Garage

5.5.2 Ash/Soil Sampling Protocol

A measuring tape and GPS will be used to record the boundaries of each ash/soil SU. The boundaries of the SU will be marked using flagging tape, pin flags, or stakes. Markers will be removed after sampling. A description of the SU will be recorded.

At the surface soil ISM background locations, in advance of sampling, the SUs will be inspected and areas of potential anthropogenic contamination, such as vehicle trails, cigarette disposal areas, or observable dumping, will be avoided. The background SU will be relocated to avoid

anthropogenic contamination, if present. The sampler will compare the soil type to that at the building locations. The mucky peat mapped on the fringes of the building areas should not be considered representative background soil because it is generally much finer with more organics. The SU may be reshaped to avoid these areas (e.g., changed from a square to a rectangle) or moved to a nearby location with a similar elevation and lithological characteristics that are similar those at the buildings in the general area. The background areas will include burned forested or meadow areas.

The contents of each former building sample will include ash, debris that can be crushed by hand, and soil. No samples will be collected beneath concrete slabs. A digital scale will be used to weigh 40-50 grams of material for each increment (40 increments will weigh 1-2 kilograms). Soil samples will be collected using a stainless-steel spoon, scoopula, or other appropriate sampling/coring device. If refusal is encountered due to obstructions within the subsurface, the sampler will retrieve the available material and move to the next aliquot for sampling. Ash and debris samples above concrete slabs/foundations will be collected using a stainless-steel spoon or scoopula. Sampled material will be placed directly into the sample container, with no mixing or sieving in the field. Because asbestos may be present, sampling personnel will avoid creating dust, and will mist the soil lightly with distilled water, if necessary, to control dust.

BB&E will complete the Phase I ISM soil/ash sampling in accordance with the sampling approach below and dependent on the site characterization outlined in Section 5.5.1. Phase II ISM sampling will be completed after removal action. The approximate size of each SU and aliquot is included in Table 1A. This sampling approach is further detailed below:

- Concrete slab with debris removed: ISM will be completed around building perimeter and 5-foot buffer to collect 0- 0.25-foot soil sample increments. Material will be collected from 40 increments and composited to make one replicate (Phase I) or three replicates (Phase II).
- Concrete slab with debris present: ISM will be completed on concrete where ash is still present and accessible and around building perimeter including 5-foot buffer to collect 0-0.25-foot soil sample increments. Material will be collected from 40 increments and composited to make one replicate (Phase I) or three replicates (Phase II).
- Dirt base with debris removed: ISM will be completed within building footprint and perimeter including 5-foot buffer to collect 0-0.25-foot soil sample increments. Material will be collected from 40 increments and composited to make one replicate (Phase I) or three replicates (Phase II).
- Dirt Base with debris present: ISM will be completed in building footprint to collect ash (if present) or surface soil layer beneath moveable debris and around building perimeter including 5-foot buffer to collect 0-0.25-foot soil/ash sample increments. Material will be collected from 40 increments and composited to make one replicate (Phase I) or three replicates (Phase II).

Asbestos sampling will be conducted during Phase II confirmation sampling in accordance with the instructions below:

- A visual inspection of each site, as applicable, will be performed to determine is any remaining suspected ACM is present. If suspect ash and debris is identified, it will be removed and disposed off-site by the removal contractor.
- For all sites requiring asbestos sampling, divide each sampling area into maximum ~400 sq foot grids.
- Collect 10 systematic random aliquots of soil (tablespoon or teaspoon – whatever is an appropriate volume) from each grid and create a composite sample.
- Laboratory homogenizes and analyses by PLM CARB 435 Level B with reporting limit to 0.1%
- Collect 10% Field duplicates.

5.5.3 Ash/Soil Field Measurements

Soil SU boundaries (four corners) will be recorded with a submeter GPS (if an acceptable signal can be acquired, as described in Section 5.1.4) or will be measured with a measuring tape.

5.5.4 Soil Analytical Measurements/Methods

Phase I Sampling Measurements/Methods

ISM soil samples will be analyzed for the following analytes and analytical methods during the Phase I sampling event. The laboratory will process soil ISM samples, including drying, disaggregating, sieving (2mm), and subsampling using the 2-Dimensional Slabcake method, in accordance with ITRC ISM Update Section 5 (ITRC, 2020) or comparable laboratory SOPs. All results will be reported on a dry weight basis. Milling will not be performed. The Phase I ISM samples will be analyzed for:

- Total metals: California Title 22, Test CAM 17 metals antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, mercury, molybdenum, nickel, selenium, silver, thallium, vanadium, and zinc.
- Hexavalent Chromium (10% of samples)
- Total PCBs: Aroclors listed in Table 6A (two Sites)
- Dioxins and furans: Congeners listed in Table 6A
- TCLP metals: RCRA 8 metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver); the RCRA 8 metal(s) that exceeded the screening level in Table 8 using the 20 to 1 rule.

Phase II Confirmation Sampling Measurements/Methods

ISM soil samples will be analyzed for the following analytes and analytical methods during the Phase II confirmation sampling event. The laboratory will process soil ISM samples, including drying, disaggregating, sieving (2mm), and subsampling using the 2-Dimensional Slabcake method, in accordance with ITRC ISM Update Section 5 (ITRC, 2020) or comparable laboratory SOPs. All results will be reported on a dry weight basis. Milling will not be performed. The Phase II ISM samples will be analyzed for the following based on the results of the Phase I sampling event:

- Total metals: California Title 22, Test CAM 17 metals (excluding beryllium) including: antimony, arsenic, barium, cadmium, chromium, cobalt, copper, lead, mercury, molybdenum, nickel, selenium, silver, thallium, vanadium, and zinc.

- Dioxins and furans: Congeners listed in Table 6B.

- Asbestos samples will be collected as described in Section 5.5.2. The laboratory will homogenize and analyze by PLM CARB 435 Level B with reporting limit to 0.1%

6 Data Management

This section describes how data are managed from the point when it is generated through use and storage. Project data, communications, and other information will be stored by the Environmental Contractor in a format useable to project personnel for at least 10 years following the investigation.

6.1 Documentation Control Systems

6.1.1 Project Document Control System

The Contractor Project Manager will maintain and manage hard copies and/or electronic copies of all project related documents. Electronic copies of information relating to this project are maintained on the project network files, which are backed up once per day.

6.1.2 Data Recording

Data generated during this project will be captured electronically and entered by hand into bound field or laboratory logbooks or preprinted forms. Computer generated laboratory data will be managed using the laboratory information management system (LIMS); the LIMS used by each environmental laboratory are described in their QA documentation.

6.1.3 Field Audit and Response Actions

A desktop (i.e., not in-field) field sampling audit will be performed during sampling by the Contractor Project Manager. The field sampling audit will include the following:

- a brief interview with field staff involved in sampling to determine their familiarity with the SAP requirements;
- a review of all field forms related to the sampling that was performed; and,
- a review of the chain-of-custody forms that were submitted with samples.

Results of the field sampling audit are intended to confirm that proper protocols are being followed, or to make improvements to the systems that are in-place. Audit findings may be communicated to the sampling team during the audit if immediate changes are necessary.

6.2 Data Quality Assurance Procedures

The Field Team Leader and Project Manager will monitor the progress of sample collection to verify that samples are collected as planned. The list of planned samples will be compared to the list of samples collected to confirm nomenclature accuracy and analysis. Samples will be dropped off at the nearest overnight shipping location each day for shipment to the laboratory.

The laboratory must maintain a formal Quality Management Plan to which they adhere, and which addresses all data generating aspects of daily operations. All data generation processes will be reviewed and modified as needed to meet project objectives. Periodic audits of field operations will be performed to check that data collection, documentation, and QA/QC procedures are being followed.

Data generation processes will be reviewed and modified as needed to meet project objectives. Periodic desktop (i.e., not in-field) audits of field operations will be performed to check that data collection, documentation, and QA/QC procedures are being followed. Data entries created from hand-written notes will be QA checked by another person for accuracy.

6.2.1 Laboratory Data Transmittal

Laboratory data for the Phase I sampling event are managed by ALS Global's LIMS beginning with the sample receiving process. The laboratory is required to provide laboratory data reports (sample results, QC summary information, and supporting raw data) including electronic data deliverables (EDDs) within the turnaround times specified in Table 5A. The laboratory for the Phase II confirmation sampling event is undetermined. Laboratory data transmittal procedures for the Phase II Confirmation sampling shall be provided prior to initiation of sampling.

6.2.2 Data Storage and Retrieval

Completed forms, logbooks, photographs, data packages, and electronic files will be transmitted regularly to the Contractor Project Manager. The laboratory will maintain copies of all documents it generates as well as backup files of all electronic data relating to the analysis of samples. All project data will be submitted to NPS at the end of the investigation.

7 Assessment and Oversight

This section describes the measures that will be employed to ensure that this SAP is implemented properly.

7.1 Assessment and Corrective Actions

All BB&E staff who are responsible for data control for Phase I sampling are specified in Table 3. BB&E personnel and subcontractors will report to the Contractor Project Manager. The Contractor Project Manager is responsible for performing or coordinating the quality reviews specified in Table 3. The Contractor Project Manager is also responsible for ensuring that corrective actions are implemented if QA problems are identified during quality reviews. Environmental Contractor staff responsible for data control and quality reviews for Phase II confirmation sampling shall be identified prior to initiation of sampling.

7.1.1 Laboratory Audit and Response Actions

No laboratory audit will be completed for this project, including Phase I and Phase II sampling. ALS Global is NELAP, NVLAP, and ORELAP certified. No laboratory selection has been made for the Phase II confirmation sampling event; however, the laboratory will be NELAP certified.

7.2 Quality Assessment Reporting

The Field Team Leader will be responsible for preparing daily reports documenting field activities, which will be reviewed by the Contractor Project Manager before being sent to NPS. The Laboratory Project Manager will be responsible for sending an e-mail acknowledging sample login to the Contractor Project Manager within a day of sample login. The Laboratory Project Manager will be responsible for producing the laboratory data package with EDD to the Contractor Project Manager within five weeks after the last sample was received.

7.2.1 Data Verification

Table 11 lists data verification and validation procedures that will be implemented during the investigation.

7.2.2 Data Validation

No data validation will be performed for the Phase I SI data. Appropriate backup information will be obtained from the laboratory for a data validation to be performed later, if necessary. Formal data validation will be performed on Phase II Confirmation sampling as described in Section 4.6.3 and Table 11.

7.3 Reconciliation with DQOs and Data Usability

The data usability assessment will be led by the Contractor Project Manager named in Table 3. The data usability assessment will be presented in the SI Report (Phase I) and Removal Action Completion Report (Phase II) and will proceed as follows:

- Step 1: Review the project's objectives and sampling design: Review the key outputs defined during systematic planning (i.e., DQOs) to make sure they are still applicable. Review the sampling design for consistency with stated objectives. This provides the context for interpreting the data in subsequent steps.

- Step 2: Review the data verification and validation outputs: Perform a review of the completeness of analytical results. Review the data verification and validation assessment. Perform basic calculations and summarize the data (using graphs, maps, tables, etc.). Look for patterns, trends, and anomalies (i.e., unexpected results). Review deviations from planned activities (e.g., number and locations of samples, holding time exceedances, damaged samples, and SOP deviations) and determine their impacts on the data usability. Evaluate implications of unacceptable QC sample results.

- Step 3: Document data usability and draw conclusions: Determine if the data can be used as intended, considering implications of deviations and corrective actions. Evaluate the DQIs against the activities performed and the data collected. Assess the performance of the sampling design and identify limitations on data use. Update the CSM and document conclusions. Prepare the data usability summary report in as a narrative and/or in a table.

8 Investigation Outputs

This section describes the reporting required at the end of the Phase I SI and Phase II confirmation sampling. Daily reports, as described in Section 5.2.3 and Section 8.1, also will be prepared.

8.1 Daily Reports

Following completion of each day of field work, a Daily Report will be submitted to the NPS Project Manager. The Daily Report will include the following information:

- A summary of the field work completed including dates and times that each activity was performed, and personnel associated with each activity, including key and/or relevant observations.
- Deviations from the SAP, including deviations from SOPs.
- Captioned photographs of the fieldwork.
- A table listing samples collected and relative documentation (e.g., sample identification, collection date and time, location, depth intervals, etc.).

8.2 Field Activities Report

A Field Activities Report will be submitted within 15 days of field work completion. Included in the Field Activities Report are:

- Summary of completed work
- Deviations from the SAP
- Status of IDW storage and disposition
- Completed field forms
- Daily logs
- Photographs of field activities

8.3 Draft, Draft Final, and Final Site Investigation Report (Phase I only)

A draft SI Report will be submitted to NPS within 4 weeks of receipt of the data. NPS will communicate the deadline for each report version upon issuing comments.

The report will describe the sampling activities performed, results of debris, ash, and soil samples, presentation of the methodologies used to determine Site background or reference concentrations and resultant background/reference concentrations, comparison of results to background/reference concentrations, estimates of ash, debris, and soils quantity, and conclusions.

A photographic log, laboratory data, field forms, data verification forms, and IDW disposal documentation will be provided as appendices.

The draft SI Report will be revised based on comments provided by NPS and reissued as a draft final version.

Electronic files containing data from field activities will be forwarded with the draft final report deliverable, after all data verification and QA/QC activities are complete, and will include:

- Copies of the signed chain-of-custody forms in Adobe Portable Document Format (PDF).
- Sample location data in Excel.
- Sample analysis results and laboratory reports in PDF.
- Sample results in Excel as Electronic Data Deliverable from the laboratory.
- Tabulated sample results in Excel (i.e., tables included in SI Report).
- Field parameter data in PDF.
- Site fieldwork photographs in .jpg format and a photographic log in PDF.

If NPS determines that revisions to the Draft Final SI Report are necessary, such revisions will be made to address NPS comments and a final revision will be submitted to NPS, including any changes to the electronic files specified above.

8.4 Draft, Draft Final, and Removal Action Completion Report (Phase II only)

A draft Removal Action Completion Report (RACER) detailing activities performed will be submitted to NPS within 30 days following the completion of field activities or receipt of all final laboratory data, whichever is later. The RACER shall detail all removal activities, including the results of confirmation sampling and analysis performed in accordance with this SAP.

In addition to documenting the removal activities, the RACER will thoroughly describe and document the confirmation sampling activities performed, results of soil samples, comparison of validated results to background/reference concentrations and risk-based removal goals, if established, recommendations for future actions, and conclusions. Tables and figures will be utilized to present confirmation sampling results.

A photographic log of sampling activities, laboratory data, field forms, chain of custody forms, data verification and validation forms/reports, and IDW disposal documentation will be provided as appendices.

Separate electronic files containing data from field activities will be provided with the draft final, and final report deliverables, after all data verification, validation, and QA/QC activities are complete, and will include:

- Copies of the signed chain-of-custody forms in Adobe Portable Document Format (PDF).
- Sample location data in Excel (decimal degree format).
- Sample results in Excel as Electronic Data Deliverable from the laboratory.
- Tabulated sample results in Excel (i.e., tables included in RACER).
- Sample analysis results and laboratory reports in PDF.
- Field parameter data in PDF.
- Site fieldwork photographs in .jpg format and a photographic log in PDF.

The draft RACER will be revised based on comments provided by NPS and reissued as a draft final version. Review and response deadlines will be designated by NPS.

If NPS determines that revisions to the Draft Final RACER are necessary, such revisions will be made to address NPS comments and a final version will be submitted to NPS, including any changes to the electronic files specified above. Review and response deadlines will be designated by NPS.

9 References

Broadbent and Associates. (2021, February 28). Limited Hazardous Building Material Survey Rocky Mountain National Park - Four Structures, Grand Lake Entrance Station, Grand Lake, Colorado.

Code of Colorado Regulation (CCR). 2021. Air Quality Control Commission, Regulation Number 8, Control of Hazardous Air Pollutants, 5 CCR 1001-10. March.

Colorado Department of Public Health and Environment (CDPHE). 2014. Colorado Arsenic Concentrations in Soil: Risk management guidance for evaluating. July. Retrieved from https://oitco.hylandcloud.com/Pop/docpop/docpop.aspx.

Environmental Protection Agency (EPA). (2002). Denver Front Range Study of Dioxins in Surface Soil, Summary Report. July. Retrieved from www.epa.gov/sites/production/files/documents/r8_frontrangedioxin.pdf.

---. (2002). Guidance on Environmental Data Verification and Data Validation, EPA QA/G-8. EPA/240/R-02/004. November.

---. (2006). Guidance on Systematic Planning Using the Data Quality Objectives Process. EPA/240/B-06/001. February.

---. (2009). Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use. EPA 540-R-08-005. January.

---. (2020). National Functional Guidelines for organic Superfund Methods Data Review. EPA-542-R-20-005. November.

---. (2020). National Functional Guidelines for Inorganic Superfund Methods Data Review. EPA-542-R-20-006. November.

---. (2021). Regional Screening Levels (RSLs) – Generic Tables, Tables as of November 2022. Retrieved from https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables.

Interstate Technology & Regulatory Council (ITRC). 2020. Incremental Sampling Methodology (ISM) Update ISM-2. Washington, D.C.: Interstate Technology & Regulatory Council, ISM-2 Team. www.itrcweb.org.

National Park Service (NPS). (2013, May). Foundation Document, Rocky Mountain National Park, Colorado. Retrieved from https://www.nps.gov/romo/learn/management/upload/ROMO_Foundation_Document.pdf

---. (2014). *NPS-Specific CERCLA ARARs and TBCs.*

---. (2015, December 1). Historic Buildings, Rocky Mountain National Park. Retrieved from https://www.nps.gov/romo/learn/historyculture/historic_buildings.htm.

---. (2017, May 25). Weather, Rocky Mountain National Park. Retrieved from https://www.nps.gov/romo/planyourvisit/weather.htm.

---. (2018). NPS Protocol for the Selection and Use of Ecological Screening Values for Non-Radiological Analytes [Revision 3], Contaminants Cleanup Branch, Park Facility Management Division. November.

---. (2021a, April 15). Park Statistics, Rocky Mountain National Park. Retrieved from https://www.nps.gov/romo/learn/management/statistics.htm.

---. (2021b, January 12). Rocky Mountain National Park, October 21-24, 2020, East Troublesome Fire Event: Impacted Buildings Inventory (Draft 2).

---. (2021c, May 25). NPS Memorandum Adoption of Presumptive Remedy for Contaminated Sites, 4A (ENV-2502).

United States Department of Agriculture. (2021). Web Soil Survey, National Resource Conservation Service. Retrieved from https://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx.

United States Geological Survey. (2021). National Geochemical Database (Map). Retrieved from https://mrdata.usgs.gov/ngdb/soil/map-us.html.

Van den Berg et al., (2006). Van den Berg M, Birnbaum LS, Denison M, De Vito M, Farland W, Feeley M, Fiedler H, Hakansson H, Hanberg A, Haws L, Rose M, Safe S, Schrenk D, Tohyama C, Tritscher A, Tuomisto J, Tysklind M, Walker N, Peterson RE. The 2005 World Health Organization reevaluation of human and Mammalian toxic equivalency factors for dioxins and dioxin-like compounds. Toxicol Sciences. Oxford University Press, Cary, NC, 93(2):223-241

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TABLE 1A FORMER BUILDING LOCATION DETAILS

Structure Name	Structure Number	Built	Latitude and Longitude	SU size (sq ft)[1,2]
Big Thompson Watershed				
Moraine Stables Bunk House / Mess House, also known as (aka) Moraine Park Stables Mess Hall *(note: building debris removal completed)*[3]	0893	1985	40.357830, -105.612755	2,835
Moraine Stables Dorm, aka Moraine Park Stables Residence *(note: building debris removal recently completed)*	1086	1990	40.357834, -105.612530	2,304
Fern Lake Ranger Station, aka Fern Lake Patrol Cabin	0014	1925	40.338166, -105.676515	1,224
Colorado River District				
Timber Creek Road Camp Barn	0783	1930	40.264573, -105.836474	2,046
Timber Creek Road Camp Barn Tack Shed	0572	N/A	40.264478, -105.836623	792
Betty Dick Garage	0831	1962	40.325828, -105.857889	3,601 (total) 1,800 (each SU)
Grand Lake Entrance Station, aka Remit Office *(note: building demolition and debris removal recently completed, only soil surrounding building requires sampling)*	1141	2010	40.272274, -105.834722	1,695
Harbison Meadow Picnic Area Vault Toilet *(note: building demolition and debris removal recently completed, only soil surrounding building requires sampling)*	1183	2015	40.282388, -105.838723	1,055
Onahu Ranch Lodge	0575	1945	40.303210, -105.844466	3,315 (total) 1,658 (each SU)
Onahu Ranch Abasaw Aw Xa Cottage	0583	1945	40.302655, -105.844994	1,143
Onahu Ranch Ho Ta Ta Ha Cottage	0577	1935	40.303484, -105.843769	836
Onahu Ranch Na Ha Non Cottage	0578	1935	40.303603, -105.843710	1,000
Onahu Ranch Bakuni Cottage	0579	1935	40.30369, -105.84395	882

Structure Name	Structure Number	Built	Latitude and Longitude	SU size (sq ft)[1,2]
Onahu Ranch Pumphouse	0587	Pre - 1945	40.302717, -105.844604	359
Onahu Ranch Tool Shed	0624	1939	40.302589, -105.844717	540
Green Mountain Ranch Barn	0724	1935	40.304903, -105.843068	1,134
Green Mountain Ranch Pumphouse	0853	N/A	40.306077, -105.843026	648
Green Mountain Ranch Pioneer Cottage	0727	1938	40.305817, -105.843253	884
Green Mountain Ranch Wood Storage Shed	0728	1930	40.305907, -105.843129	624
Green Mountain Ranch Mineral Cottage	0731	1935	40.306351, -105.842737	1,872
Green Mountain Ranch Parika Cottage	0732	1939	40.306556, -105.842620	1,325
Green Mountain Ranch Arapaho Cottage	0733	1939	40.306493, -105.843415	1,173
Green Mountain Ranch Onahu Cottage	0734	1939	40.306386, -105.843677	1,260
Green Mountain Ranch Cumulus Cottage	0735	1939	40.306103, -105.843791	1,089
Green Mountain Ranch Cirrus Cottage	0737	1939	40.305638, -105.843843	990
Green Mountain Ranch Meadow Cottage	0740	1939	40.304465, -105.844373	1,085

Notes:

[1] SU size includes structure footprint and 5-foot perimeter step out on all sides.

[2] For Phase II Asbestos confirmation sampling each structure will be divided into sampling areas of ~400 sq. ft.

[3] Moraine Stables Bunk House building will be a single SU, as it only 12% larger than 2,500 sq. ft.

TABLE 1B SOIL SAMPLING LOCATION DETAILS

Sample ID	Location	Reason for Sampling
B-*[Structure Number]*	Where former building footprint is visible and/or ash is present. DU includes the building footprint and a 5 foot wide perimeter around all sides of the building. If debris extends beyond the footprint (e.g., a wall collapsed) a 5 foot wide perimeter around the building + debris footprint. DU is not to exceed 2,500 square feet.	Waste characterization and/or to determine if soil can be left in-place.
S-*[Structure Number]*	Where former building footprint is not visible. Some ash may be in the soil. DU includes a square or rectangular area not to exceed 50 feet x 50 feet.	Waste characterization and/or to determine if soil can be left in-place.
R-#	In a burned area with the same soil type as the nearby building sites. No evidence of other buildings, waste piles, or structures should be within 100 feet.	Establish background/reference concentrations.

TABLE 2A PHASE I - SAMPLE TYPES AND TOTAL NUMBER OF CONTAINERS FOR ENVIRONMENTAL SOIL SAMPLING

Structure Number	MATRIX	DEPTH	TYPE	TITLE 22 METALS BY 6020A, MERCURY BY 7471B, Waste Disposal TCLP[1]	Chrome VI by 7196	PCBs by 8082A	Dioxins & Furans by 8290
0893	Soil/Ash	0-0.25 ft	Moraine Stables Bunk House / Mess House, also known as (aka) Moraine Park Stables Mess Hall	1	0	0	0
1086	Soil/Ash	0-0.25 ft	Moraine Stables Dorm, aka Moraine Park Stables Residence	1	0	0	0
Moraine	Soil/Ash	0-0.25 ft	1 DU with 20 increments at each of the two buildings at Moraine Lake (0893 and 1086)	0	0	0	1
0014	Soil/Ash	0-0.25 ft	Fern Lake Ranger Station, aka Fern Lake Patrol Cabin	1	1	0	1
0783	Soil/Ash	0-0.25 ft	Timber Creek Road Camp Barn	1	1	1	1
0572	Soil/Ash	0-0.25 ft	Timber Creek Road Camp Barn Tack Shed	1	0	0	1
0831	Soil/Ash	0-0.25 ft	Betty Dick Garage (2 SUs)	2	1	2	2
1141	Soil/Ash	0-0.25 ft	Grand Lake Entrance Station (triplicate ISM)	3	0	0	3
1183	Soil/Ash	0-0.25 ft	Harbison Meadow Picnic Area Vault Toilet	1	0	0	1
0575	Soil/Ash	0-0.25 ft	Onahu Ranch Lodge (2 SUs)	2	0	0	2
0583	Soil/Ash	0-0.25 ft	Onahu Ranch Abasaw Aw Xa Cottage	1	0	0	0
0577	Soil/Ash	0-0.25 ft	Onahu Ranch Ho Ta Ta Ha Cottage	1	0	0	0
0578	Soil/Ash	0-0.25 ft	Onahu Ranch Na Ha Non Cottage	1	0	0	0
0579	Soil/Ash	0-0.25 ft	Onahu Ranch Bakuni Cottage	1	0	0	0

Structure Number	MATRIX	DEPTH	TYPE	TITLE 22 METALS BY 6020A, MERCURY BY 7471B, Waste Disposal TCLP[1]	Chrome VI by 7196	PCBs by 8082A	Dioxins & Furans by 8290
0624	Soil/Ash	0-0.25 ft	Onahu Ranch Tool Shed	1	0	0	0
OnahuCott	Soil/Ash	0-0.25 ft	1 DU with 8 increments at each of the four cottages and tool shed at Onahu Ranch (0583, 0577, 0578, 0579, 0624)	0	0	0	1
587	Soil/Ash	0-0.25 ft	Onahu Ranch Pumphouse	1	0	0	1
0724	Soil/Ash	0-0.25 ft	Green Mountain Ranch Barn	1	0	0	1
0727	Soil/Ash	0-0.25 ft	Green Mountain Ranch Pioneer Cottage	1	0	0	0
0728	Soil/Ash	0-0.25 ft	Green Mountain Ranch Wood Storage Shed	1	0	0	0
0731	Soil/Ash	0-0.25 ft	Green Mountain Ranch Mineral Cottage	1	0	0	0
0732	Soil/Ash	0-0.25 ft	Green Mountain Ranch Parika Cottage	1	0	0	0
GrMtnEast	Soil/Ash	0-0.25 ft	1 DU with 10 increments at each of the three cottages and one shed on the east side of the Green Mountain area (0727, 0728, 0731, 0732)	0	0	0	1
0733	Soil/Ash	0-0.25 ft	Green Mountain Ranch Arapaho Cottage	1	0	0	0
0734	Soil/Ash	0-0.25 ft	Green Mountain Ranch Onahu Cottage	1	0	0	0
0735	Soil/Ash	0-0.25 ft	Green Mountain Ranch Cumulus Cottage	1	0	0	0
0737	Soil/Ash	0-0.25 ft	Green Mountain Ranch Cirrus Cottage	1	0	0	0
0740	Soil/Ash	0-0.25 ft	Green Mountain Ranch Meadow Cottage	1	0	0	0

Structure Number	MATRIX	DEPTH	TYPE	TITLE 22 METALS BY 6020A, MERCURY BY 7471B, Waste Disposal TCLP[1]	Chrome VI by 7196	PCBs by 8082A	Dioxins & Furans by 8290
GrMtnWest	Soil/Ash	0-0.25 ft	1 DU with 8 increments at each of the five cottages on the west side of the Green Mountain area (0733, 0734, 0735, 0737, 0740)	0	0	0	1
0853	Soil/Ash	0-0.25 ft	Green Mountain Ranch Pumphouse	1	0	0	1
R-Moraine	Soil/Ash	0-0.25 ft	Northwest of the Moraine Stables structures, See Figure 3a	3	0	0	3
R-Fern	Soil/Ash	0-0.25 ft	North of the Fern Lake Ranger Stations, See Figure 3b	3	1	0	3
R-Timber Creek	Soil/Ash	0-0.25 ft	South of the paddock area at Timber Creek Road Camp, See Figure 3c	3	1	0	3
R-Green	Soil/Ash	0-0.25 ft	Located in the center of the Green Mountain area, west of Structure 0724, See Figure 3d	3	0	0	3
R-Betty Dick	Soil/Ash	0-0.25 ft	West of the Betty Dick Ranch building, See Figure 3e	3	0	0	3
R-Grand Lake Entrance	Soil/Ash	0-0.25 ft	South of the Grand Lake Entrance Station, See Figure 3f	3	0	0	3
Matrix spike	Soil/Ash	0-0.25 ft	1 MS and 1 MSD per ~20 DUs. Mark label and COC.	3	1	1	2
Matrix spike duplicate	Soil/Ash	0-0.25 ft	1 MS and 1 MSD per ~20 DUs. Mark label and COC.	3	1	1	2
Field Duplicates	Soil/Ash	0-0.25 ft	1 field dup per ~10 DU. Mark label and COC.	5	1	1	4
Equipment Blank: EB-Drill	Aqueous	N/A	Field Quality Control	1	1	1	1

Structure Number	MATRIX	DEPTH	TYPE	TITLE 22 METALS BY 6020A, MERCURY BY 7471B, Waste Disposal TCLP[1]	Chrome VI by 7196	PCBs by 8082A	Dioxins & Furans by 8290
IDW Drum[2]	Soil/Ash	N/A	Waste Disposal	1 (TCLP only, if needed)	0	1 (only if needed)	0
IDW Drum[2]	Aqueous	N/A	Waste Disposal	1 (TCLP only, if needed))	0	0	0
Totals				62	9	8	45

Notes:

Title 22 Metals = California Title 22, Test CAM 17 Metals antimony, arsenic, barium, beryllium, cadmium, chromium total, cobalt, copper, lead, mercury, molybdenum, nickel, selenium, silver, thallium, vanadium, and zinc.

Chrome VI will be analyzed on 10% of the samples.

[1] Enough sample will be gathered to reserve a portion of soil/ash for TCLP analysis. If a metal may be hazardous based on the 20 to 1 rule, analysis for Waste Disposal: TCLP will be completed for metals that exceeded the limit.

[2]IDW will only be sampled for PCBs if PCBs are detected at the structures. IDW drums will be analyzed for Waste Disposal: TCLP if a metal may be hazardous on the 20 to 1 rule.

TABLE 2B PHASE II –SAMPLE TYPES AND TOTAL NUMBER OF CONTAINERS FOR ENVIRONMENTAL CONFIRMATION SOIL SAMPLING

Structure Number	MATRIX	DEPTH	TYPE	TITLE 22 METALS BY 6020A, MERCURY BY 7471B	Dioxins & Furans by 8290	Asbestos, PLM CARB 435 Level B
0893	Soil	0-0.25 ft	Moraine Stables Bunk House / Mess House, also known as (aka) Moraine Park Stables Mess Hall	3	3	7
1086	Soil	0-0.25 ft	Moraine Stables Dorm, aka Moraine Park Stables Residence	3	3	6
0014	Soil	0-0.25 ft	Fern Lake Ranger Station, aka Fern Lake Patrol Cabin	3	3	3
0783	Soil	0-0.25 ft	Timber Creek Road Camp Barn	3	3	5
0572	Soil	0-0.25 ft	Timber Creek Road Camp Barn Tack Shed	3	3	2
0831	Soil	0-0.25 ft	Betty Dick Garage (2 SUs)	6	6	9
1141[1,2]	Soil	0-0.25 ft	Grand Lake Entrance Station	0	0	0
1183[1,2]	Soil	0-0.25 ft	Harbison Meadow Picnic Area Vault Toilet	0	0	0
0575	Soil	0-0.25 ft	Onahu Ranch Lodge (2 SUs)	6	6	9
0583	Soil	0-0.25 ft	Onahu Ranch Abasaw Aw Xa Cottage	3	3	3
0577	Soil	0-0.25 ft	Onahu Ranch Ho Ta Ta Ha Cottage	3	3	2
0578	Soil	0-0.25 ft	Onahu Ranch Na Ha Non Cottage	3	3	3
0579	Soil	0-0.25 ft	Onahu Ranch Bakuni Cottage	3	3	2
0624	Soil	0-0.25 ft	Onahu Ranch Tool Shed	3	3	2
587	Soil	0-0.25 ft	Onahu Ranch Pumphouse	3	3	1

Structure Number	MATRIX	DEPTH	TYPE	TITLE 22 METALS BY 6020A, MERCURY BY 7471B	Dioxins & Furans by 8290	Asbestos, PLM CARB 435 Level B
0724	Soil	0-0.25 ft	Green Mountain Ranch Barn	3	3	3
0727	Soil	0-0.25 ft	Green Mountain Ranch Pioneer Cottage	3	3	2
0728	Soil	0-0.25 ft	Green Mountain Ranch Wood Storage Shed	3	3	2
0731	Soil	0-0.25 ft	Green Mountain Ranch Mineral Cottage	3	3	5
0732	Soil	0-0.25 ft	Green Mountain Ranch Parika Cottage	3	3	4
0733	Soil	0-0.25 ft	Green Mountain Ranch Arapaho Cottage	3	3	3
0734	Soil	0-0.25 ft	Green Mountain Ranch Onahu Cottage	3	3	3
0735	Soil	0-0.25 ft	Green Mountain Ranch Cumulus Cottage	3	3	3
0737	Soil	0-0.25 ft	Green Mountain Ranch Cirrus Cottage	3	3	3
0740	Soil	0-0.25 ft	Green Mountain Ranch Meadow Cottage	3	3	3
0853	Soil	0-0.25 ft	Green Mountain Ranch Pumphouse	3	3	2
Subtotal – Site Samples				78	78	87
Matrix spike	Soil	0-0.25 ft	1 MS and 1 MSD per ~20 DUs. Mark label and COC.	4	4	0
Matrix spike duplicate	Soil	0-0.25 ft	1 MS and 1 MSD per ~20 DUs. Mark label and COC.	4	4	0
Field Duplicates	Soil	0-0.25 ft	1 field dup per ~10 DU. Mark label and COC.	8	8	9
Equipment Blank: EB-Spoon	Soil	N/A	Field Quality Control - one per 20 samples per matrix, per sampling equipment type (or one per day, whichever is more frequent).	8	8	0

Structure Number	MATRIX	DEPTH	TYPE	TITLE 22 METALS BY 6020A, MERCURY BY 7471B	Dioxins & Furans by 8290	Asbestos, PLM CARB 435 Level B
Totals				102	102	96

Notes:

Title 22 Metals = California Title 22, Test CAM 17 Metals (excluding beryllium) antimony, arsenic, barium, cadmium, chromium total, cobalt, copper, lead, mercury, molybdenum, nickel, selenium, silver, thallium, vanadium, and zinc.

Asbestos = PLM CARB 435 Level B with reporting limit to 0.1%. Collect 10 systematic random aliquots of soil (tablespoon or teaspoon – whatever is an appropriate volume) from each grid and create a composite sample. Grid size will be a maximum of ~400 sq. ft.

[1] Sampling of this location is not anticipated. If NPS deems additional sampling is necessary it will be performed in accordance with this SAP.

[2] No Asbestos confirmation sampling required. Previous analysis demonstrates no Asbestos present in ash/debris.

TABLE 3 PERSONNEL ROLES AND RESPONSIBILITIES

ORGANIZATION	PROJECT TITLE, NAME, AND CONTACT INFORMATION	RESPONSIBILITIES
National Park Service (NPS)	*CERLCA Project Coordinator, Federal Government Lead* Paul Torcoletti paul.torcoletti@nps.gov	Approve changes to sampling and analysis plan (SAP) before implementation. Approve corrective actions for field work and/or laboratory work before implementation if actions will affect the data quality or usability. Review and approve the sampling report.
NPS, Rocky Mountain National Park (ROMO)	*ROMO Contact* William Mchugh william_mchugh@nps.gov	Review the SAP before implementation. Provide access to the Site and provide logistical information during the field work. Coordinate ROMO responses if required by work stoppages or emergencies. Review the sampling report.
Phase I - BB&E Consulting Phase II - TBD	*Cleanup Lead/ Field Team Lead* Kira Fillar kfillar@bbande.com	Discuss the need for corrective actions for field work and/or laboratory work with the Federal Government Lead and Legal Lead, as appropriate. Lead the field work and document daily activities in field notes and a daily progress report. Maintain equipment calibration logs on-site. Verify completeness of and file all field notes, daily progress reports, equipment calibration logs, chains of custody, shipping documents, corrective action forms, laboratory reports, and other project-related correspondence electronically on the contractor's server. Carry out corrective actions as directed by the Contractor Project Manager
Phase I - BB&E Consulting Phase II - TBD	*Contractor Project Manager* Elyse Kutsche ekutsche@bbande.com	Point of contact with NPS and DOI. Manage all project phases. Review daily reports and submit to the Federal Government Lead. Determine the need for corrective action for laboratory issues in conjunction with the Laboratory Project Manager and Data Validator, as appropriate. Finalize the draft and final sampling reports.

ORGANIZATION	PROJECT TITLE, NAME, AND CONTACT INFORMATION	RESPONSIBILITIES
Phase I - BB&E Phase II - TBD	*SAP Preparer* Will Laugher wlaugher@bbande.com	Prepare the QAPP. Prepare the draft and final sampling reports.
Phase I - ALS Global Phase II - TBD	*Laboratory Project Manager* Henry Pelitire henry.pelitire@alsglobal.com	Main point of contact at laboratory for all sample container ordering, shipping, sample receiving/logins, and chain of custody questions. Notify the Cleanup Lead of the need for corrective action for analytical issues. Provide the laboratory data package with electronic data deliverables within 4 weeks of sample receipt.

TABLE 4 STANDARD OPERATING PROCEDURES

TITLE, REVISION DATE AND/OR NUMBER	ORIGINATING ORGANIZATION	MATRIX/ANALYTICAL GROUP	MODIFIED FOR PROJECT WORK?
Field SOPs			
Phase I - LSASDPROC-300-R4. [SOPs cover documentation, deviations from SOPs, decontamination, sampling, etc.] Phase II - TBD	Phase I - BB&E Inc. Phase II - TBD	Ash/Soil	No
Phase I Field Instructions – Prepared specifically for Phase I sampling event. See SAP Appendix 1. Phase II - TBD	Phase I - BB&E Inc. Phase II - TBD	Ash/Soil	No
Laboratory SOPs			
ISM Prep	Phase I - ALS Kelso Phase II - TBD	Ash/Soil, All Analytes excluding Asbestos, Refer to Section 5 of ITRC ISM Update (https://ism-2.itrcweb.org)[1]	No
Metals			
Digestion	Phase I - ALS Kelso Phase II - TBD	Ash/Soil, 3050B	No
Metals method	Phase I -ALS Kelso Phase II - TBD	Ash/Soil, SW-846 6020A	No
Chrome VI	Phase I - ALS Middletown Phase II – N/A	Ash/Soil, 7196	No
Mercury method	Phase I - ALS Middletown Phase II - TBD	Ash/Soil, 7471B	No

TITLE, REVISION DATE AND/OR NUMBER	ORIGINATING ORGANIZATION	MATRIX/ANALYTICAL GROUP	MODIFIED FOR PROJECT WORK?
TCLP for metals	ALS Middletown Phase II - TBD	Ash/Soil, 13/11-6010/7470/7471	No
PCBs			
PCBs method	Phase I - ALS Middletown Phase II – N/A	Ash/Soil, SW-846 8082A	No
Dioxins and Furans			
Dioxin and furan method	Phase I - ALS Houston Phase II - TBD	Ash/Soil, SW-846 8290	No
Asbestos			
Asbestos method	Phase I – N/A Phase II - TBD	Soil, PLM CARB 435 Level B	No

Notes:
The cited Standard Operating Procedures (SOPs) are to be used for field work performed during this project. SOPs are proprietary, prepared for internal use only, and are not for distribution.

[1] ITRC (Interstate Technology & Regulatory Council). 2020. Incremental Sampling Methodology (ISM) Update ISM-2. Washington, D.C.: Interstate Technology & Regulatory Council, ISM-2 Team. www.itrcweb.org.

TABLE 5A SAMPLE CONTAINERS, PRESERVATION, AND HOLD TIMES

ANALYTE/ANALYTE GROUP *	MATRIX	METHOD/(LABORATORY SOP[1])	CONTAINER(S) (SIZE & TYPE PER SAMPLE)	PRESERVATION	HOLDING TIME	DATA PACKAGE TURNAROUND
Metals	Soil Ash	EPA Method SW-846 6020A, 7471B	2 - 32 oz Glass jars (when D/F analysis included in sample) or 1-gallon Ziploc bag.	≤6°C	28 days (mercury), 180 days (other)	10 business days
Chrome VI	Soil Ash	EPA Method 7196		≤6°C	28 days	10 business days
TCLP Metals	Soil Ash	EPA Method 13/11-6010/7470/7471		≤6°C	28 days (mercury), 180 days (other)	10 business days
PCBs	Soil Ash	EPA Method SW-846 8082A		Cool 4°C ± 2°C	40 days	10 business days
Dioxins and furans	Soil Ash	EPA Method SW-846 8290A		Cool 4°C ± 2°C	40 days	10 business days
Asbestos	Soil Ash	PLM CARB 435 Level B	Glass jar or 1-quart Ziploc bag	None	7/40 days	10 business days
IDW - metals	Soil/ ash	EPA Method SW-846 6020A, 7471B	Glass jar or 1-quart Ziploc bag	≤6°C	28 days (mercury), 180 days (other)	10 business days
IDW – PCBs	Soil/ash	EPA Method SW-846 8082A	Glass jar or 1-quart Ziploc bag	Cool 4°C ± 2°C	40 days	10 business days
IDW - Asbestos	Soil/ash	Asbestos – PLM	16 oz Glass jar	None	7/40 days	10 business days
IDW	Aqueous	Metals only	2 (125 mL) nitric	≤6°C, pH <2 with HNO_3		10 business days

Notes:

* = Laboratory accreditation expiration dates will be provided in each data package received. Accreditation certifications will be updated throughout the project.

[1] Laboratory SOPs are listed in Table 4.

°C = degrees Celsius

Laboratory Information: Phase I - ALS Kelso, 1317 S. 13th Ave, Kelso, WA 98626, Henry Pelitire, henry.pelitire@ALSGlobal.com +1 360 577 7222

ALS Houston, 10450 Stancliff Road suite 210, Houston, TX 77099, Corey Grandits, corey.grandits@alsglobal.com, +1 281 530 5656

Phase II - TBD

TABLE 5B SAMPLE NOMENCLATURE

Sample Group	Structure Number	Matrix	Sample Unit (1 digit)	Sample (Replicate) Number (2 digit)
B- (*Ash, debris, and soil from a location where a building slab, foundation walls, or concrete piers define the former structure)*	Structure number (see Table 2A)	SA (soil/ash)	# *(e.g. B- 0732- SA- 1)*	## *(e.g. B- 0732- SA- 1-01)*
S- (*Ash, debris, and soil from a location where the former structure is no longer visible)*	Structure number (see Table 2A)	SA (soil/ash)	# *(e.g. S- 1086- SA-1)*	## *(e.g. S- 1086- SA-1-01)*
R- *(background/reference)*	Geographic area abbreviation (GLE, GMR, TC, MP, FL, BD)	SA (soil/ash)	# *(e.g. R-FL-SA-1)*	## *(e.g. R-FL-SA-1-03)*
C#- *(Confirmation soil sampling, where C# is round of confirmation sampling for each SU)*	Structure number (see Table 2B)	S (soil)	# (e.g. C1-0732-S-1)	## (e.g. C1-0732-S-1-02)
IDW *(Waste drums)*	NA	SA (soil/ash) or L (liquid), if applicable		## *(e.g. IDW- SA- 01)*
EB- (*Equipment blank*)	Sampling equipment identifier (drill)	L (liquid)		## *(e.g. EB- drill- L- 01)*
Dup – *(Duplicate)*	NA	SA (soil/ash)	# *(e.g. Dup-1)*	## *(e.g. Dup-1-01)*

TABLE 6A PHASE I - PROJECT ACTION LIMITS AND LABORATORY-SPECIFIC DETECTION/REPORTING LIMITS FOR SOIL SAMPLING

Analyte	CAS Number	Screening Levels		Project Action Levels		Approximate Achievable Laboratory Limits	
		US EPA Residential Regional Screening Level (Soil) (RSL)[1]	NPS Soil Ecological Screening Value[2]	Risk-Based Screening Level	Background Concentrations[3]	Limit of Quantitation (LOQ)	Method Detection Limit (MDL)
	Metals (mg/kg) – EPA Methods 6020B & 7471B						
Antimony	7440-36-0	3.1	0.248	**0.248**	See Table 7	0.05	0.02
Arsenic[4]	7440-38-2	0.68	0.25	**0.25**	See Table 7	0.2	0.06
Barium	7440-39-3	1,500	17.2	**17.2**	See Table 7	0.05	0.02
Beryllium	7440-41-7	16	2.42	**2.42**	See Table 7	0.02	0.006
Cadmium	7440-43-9	0.71	0.27	**0.27**	See Table 7	0.02	0.007
Chromium	16065-83-1	12,000[5]	0.34	**0.34**	See Table 7	0.2	0.06
Cobalt	7440-48-4	2.3	13	**2.3**	See Table 7	0.02	0.006
Copper	7440-50-8	310	14	**14**	See Table 7	0.3	0.04
Lead	7439-92-1	400	0.94	**0.94**	See Table 7	0.05	0.02
Mercury[4]	7439-97-6	1.1	0.013	**0.013**	See Table 7	0.02	0.002

Analyte	CAS Number	Screening Levels		Project Action Levels		Approximate Achievable Laboratory Limits	
		US EPA Residential Regional Screening Level (Soil) (RSL)[1]	NPS Soil Ecological Screening Value[2]	Risk-Based Screening Level	Background Concentrations[3]	Limit of Quantitation (LOQ)	Method Detection Limit (MDL)
Molybdenum	7439-98-7	39	0.52	**0.52**	See Table 7	0.05	0.02
Nickel	7440-02-0	150	10	**10**	See Table 7	0.2	0.03
Selenium[4]	7782-49-2	39	0.331	**0.331**	See Table 7	0.3	0.09
Silver	7440-22-4	39	2	**2**	See Table 7	0.02	0.004
Thallium	7440-28-0	0.078	0.027	**0.027**	See Table 7	0.02	0.004
Vanadium	7440-62-2	39	0.714	**0.714**	See Table 7	0.2	0.03
Zinc	7440-66-6	2,300	6.62	**6.62**	See Table 7	0.5	0.2
Hexavalent Chromium (mg/kg) – EPA Method 7196A							
Chromium VI	18540-29-9	0.3	12.01	**0.3**	NC[6]	2	0.6
	PCB Aroclors (mg/kg) – EPA Method 8082A						
PCB Aroclor-1016	12674-11-2	0.41	1.1	**0.41**	NC[6]	0.010	0.0021
PCB Aroclor-1221	11104-28-2	0.2	No ESV	**0.2**	NC[6]	0.020	0.0021
PCB Aroclor-1232	11141-16-5	0.17	No ESV	**0.17**	NC[6]	0.00017	0.0021

Analyte	CAS Number	Screening Levels		Project Action Levels		Approximate Achievable Laboratory Limits	
		US EPA Residential Regional Screening Level (Soil) (RSL)[1]	NPS Soil Ecological Screening Value[2]	Risk-Based Screening Level	Background Concentrations[3]	Limit of Quantitation (LOQ)	Method Detection Limit (MDL)
PCB Aroclor-1242	53469-21-9	0.23	0.041	**0.041**	NC[6]	0.010	0.0021
PCB Aroclor-1248[4]	12672-29-6	0.23	0.0073	**0.0073**	NC[6]	0.010	0.0021
PCB Aroclor-1254	11097-69-1	0.12	0.041	**0.041**	NC[6]	0.010	0.0021
PCB Aroclor-1260	11096-82-5	0.24	0.88	**0.240**	NC[6]	0.010	0.0021
	Dioxins and Furans (ng/kg) – EPA Method 8290						
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD) (Screening level is a TEQ value)[4]	1746-01-6	4.8	0.29	**0.29**	See Table 7	1	0.15
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	40321-76-4	No RSL	Use TEQ[7]	Use TEQ[7]	See Table 7	2.5	0.15
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	39227-28-6	No RSL	Use TEQ[7]	Use TEQ[7]	See Table 7	2.5	0.2
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	57653-85-7	No RSL	Use TEQ[7]	Use TEQ[7]	See Table 7	2.5	0.2
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	19408-74-3	No RSL	Use TEQ[7]	Use TEQ[7]	See Table 7	2.5	0.2

Analyte	CAS Number	Screening Levels		Project Action Levels		Approximate Achievable Laboratory Limits	
		US EPA Residential Regional Screening Level (Soil) (RSL)[1]	NPS Soil Ecological Screening Value[2]	Risk-Based Screening Level	Background Concentrations[3]	Limit of Quantitation (LOQ)	Method Detection Limit (MDL)
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	35822-46-9	No RSL	Use TEQ[7]	Use TEQ[7]	See Table 7	2.5	0.2
Octachlorodibenzo-p-dioxin (OCDD)	3268-87-9	No RSL	Use TEQ[7]	Use TEQ[7]	See Table 7	5	1
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	51207-31-9	No RSL	Use TEQ[7]	Use TEQ[7]	See Table 7	1	1
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	57117-41-6	No RSL	Use TEQ[7]	Use TEQ[7]	See Table 7	2.5	0.5
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	57117-31-4	No RSL	Use TEQ[7]	Use TEQ[7]	See Table 7	2.5	0.5
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	70648-26-9	No RSL	Use TEQ[7]	Use TEQ[7]	See Table 7	2.5	0.5
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	57117-44-9	No RSL	Use TEQ[7]	Use TEQ[7]	See Table 7	2.5	0.5
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	60851-34-5	No RSL	Use TEQ[7]	Use TEQ[7]	See Table 7	2.5	0.5
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	72918-21-9	No RSL	Use TEQ[7]	Use TEQ[7]	See Table 7	2.5	0.5

Analyte	CAS Number	Screening Levels		Project Action Levels		Approximate Achievable Laboratory Limits	
		US EPA Residential Regional Screening Level (Soil) (RSL)[1]	NPS Soil Ecological Screening Value[2]	Risk-Based Screening Level	Background Concentrations[3]	Limit of Quantitation (LOQ)	Method Detection Limit (MDL)
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	67562-39-4	No RSL	Use TEQ[7]	Use TEQ[7]	See Table 7	5	0.5
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	55673-89-7	No RSL	Use TEQ[7]	Use TEQ[7]	See Table 7	5	0.5
Octachlorodibenzofuran (OCDF)	39001-02-0	No RSL	Use TEQ[7]	Use TEQ[7]	See Table 7	5	1.15

[1] USEPA Regional Screening Levels (RSLs) Resident Soil Generic Tables - Target risk 1E-06, Target HQ 0.1 (November 2022).
[2] Lowest SLERA COPEC Selection ESV for mammals, birds, plants, and invertebrates across all NPS-approved sources for soils (Table 5 and 6 of NPS Protocol for the Selection and use of Ecological Screening Values for Non-Radiological Analytes).
[3] Background concentrations will be determined from each of the six background locations and compared to the projects sites in the immediate vicinity.
[4] Laboratory will report results to MDL for these analytes.
[5] No RSL available for Chromium (total). EPA RSL for Chrome III used = 12,000 mg/kg
[6] NC=Not calculated. Analyte not detected above MDL and background concentrations not calculated.
[7] Individual congeners should be multiplied by toxicity equivalence to calculate TEQ. TEQ should be evaluated relative to TCDD. TEQ = Toxic equivalency quotient, calculated by multiplying the result for each dioxin/furan and dioxin/furan-like compound by its toxic equivalency factor (TEF), and summing the results. Use World Health Organization (WHO) 2005 TEFs (*The 2005 World Health Organization reevaluation of human and Mammalian toxic equivalency factors for dioxins and dioxin-like compounds*, October 2006). Use ½ the Detection Limit for non-detected congeners when calculating total TEQ. Compare the TEQ to the 2,3,7,8-TCDD screening level.

TABLE 6B PHASE II - PROJECT ACTION LIMITS AND LABORATORY-SPECIFIC DETECTION/REPORTING LIMITS FOR CONFIRMATION SOIL SAMPLING

Analyte	CAS Number	Screening Levels		Project Action Levels		Approximate Achievable Laboratory Limits	
		US EPA Residential Regional Screening Level (Soil) (RSL)[1]	NPS Soil Ecological Screening Value[2]	Risk-Based Screening Level	Background Concentrations[3]	Limit of Quantitation (LOQ)	Method Detection Limit (MDL)
	Metals (mg/kg) – EPA Methods 6020B & 7471B						
Antimony	7440-36-0	3.1	0.248	**0.248**	See Table 7	0.05	0.02
Arsenic[4]	7440-38-2	0.68	0.25	**0.25**	See Table 7	0.2	0.06
Barium	7440-39-3	1,500	17.2	**17.2**	See Table 7	0.05	0.02
Cadmium	7440-43-9	0.71	0.27	**0.27**	See Table 7	0.02	0.007
Chromium	16065-83-1	12,000[5]	0.34	**0.34**	See Table 7	0.2	0.06
Cobalt	7440-48-4	2.3	13	**2.3**	See Table 7	0.02	0.006
Copper	7440-50-8	310	14	**14**	See Table 7	0.3	0.04
Lead	7439-92-1	400	0.94	**0.94**	See Table 7	0.05	0.02
Mercury[4]	7439-97-6	1.1	0.013	**0.013**	See Table 7	0.02	0.002
Molybdenum	7439-98-7	39	0.52	**0.52**	See Table 7	0.05	0.02
Nickel	7440-02-0	150	10	**10**	See Table 7	0.2	0.03
Selenium[4]	7782-49-2	39	0.331	**0.331**	See Table 7	0.3	0.09
Silver	7440-22-4	39	2	**2**	See Table 7	0.02	0.004
Thallium	7440-28-0	0.078	0.027	**0.027**	See Table 7	0.02	0.004
Vanadium	7440-62-2	39	0.714	**0.714**	See Table 7	0.2	0.03
Zinc	7440-66-6	2,300	6.62	**6.62**	See Table 7	0.5	0.2
	Dioxins and Furans (ng/kg) – EPA Method 8290						
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD) (Screening level is a TEQ value)[4]	1746-01-6	4.8	0.29	**0.29**	See Table 7	1	0.15

Analyte	CAS Number	Screening Levels		Project Action Levels		Approximate Achievable Laboratory Limits	
		US EPA Residential Regional Screening Level (Soil) (RSL)[1]	NPS Soil Ecological Screening Value[2]	Risk-Based Screening Level	Background Concentrations[3]	Limit of Quantitation (LOQ)	Method Detection Limit (MDL)
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	40321-76-4	No RSL	Use TEQ[6]	Use TEQ[6]	See Table 7	2.5	0.15
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	39227-28-6	No RSL	Use TEQ[6]	Use TEQ[6]	See Table 7	2.5	0.2
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	57653-85-7	No RSL	Use TEQ[6]	Use TEQ[6]	See Table 7	2.5	0.2
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	19408-74-3	No RSL	Use TEQ[6]	Use TEQ[6]	See Table 7	2.5	0.2
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	35822-46-9	No RSL	Use TEQ[6]	Use TEQ[6]	See Table 7	2.5	0.2
Octachlorodibenzo-p-dioxin (OCDD)	3268-87-9	No RSL	Use TEQ[6]	Use TEQ[6]	See Table 7	5	1
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	51207-31-9	No RSL	Use TEQ[6]	Use TEQ[6]	See Table 7	1	1
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	57117-41-6	No RSL	Use TEQ[6]	Use TEQ[6]	See Table 7	2.5	0.5
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	57117-31-4	No RSL	Use TEQ[6]	Use TEQ[6]	See Table 7	2.5	0.5

Analyte	CAS Number	Screening Levels		Project Action Levels		Approximate Achievable Laboratory Limits	
		US EPA Residential Regional Screening Level (Soil) (RSL)[1]	NPS Soil Ecological Screening Value[2]	Risk-Based Screening Level	Background Concentrations[3]	Limit of Quantitation (LOQ)	Method Detection Limit (MDL)
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	70648-26-9	No RSL	Use TEQ[6]	Use TEQ[6]	See Table 7	2.5	0.5
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	57117-44-9	No RSL	Use TEQ[6]	Use TEQ[6]	See Table 7	2.5	0.5
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	60851-34-5	No RSL	Use TEQ[6]	Use TEQ[6]	See Table 7	2.5	0.5
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	72918-21-9	No RSL	Use TEQ[6]	Use TEQ[6]	See Table 7	2.5	0.5
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	67562-39-4	No RSL	Use TEQ[6]	Use TEQ[6]	See Table 7	5	0.5
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	55673-89-7	No RSL	Use TEQ[6]	Use TEQ[6]	See Table 7	5	0.5
Octachlorodibenzofuran (OCDF)	39001-02-0	No RSL	Use TEQ[6]	Use TEQ[6]	See Table 7	5	1.15
	Asbestos (%) – Polarized Light Microscopy (PLM) by CARB 435 Level B						
Asbestos	1332-21-4	1%[7]	None	**1%**	NA	<0.1%	

[1] USEPA Regional Screening Levels (RSLs) Resident Soil Generic Tables - Target risk 1E-06, Target HQ 0.1 (November 2022).
[2] Lowest SLERA COPEC Selection ESV for mammals, birds, plants, and invertebrates across all NPS-approved sources for soils (Table 5 and 6 of NPS Protocol for the Selection and use of Ecological Screening Values for Non-Radiological Analytes).
[3] Site Specific Background concentrations determined from each of the six background locations and compared to the projects sites in the immediate vicinity.
[4] Laboratory will report results to MDL for these analytes.
[5] No RSL available for Chromium (total). EPA RSL for Chrome III used = 12,000 mg/kg

[6] Individual congeners should be multiplied by toxicity equivalence to calculate TEQ. TEQ should be elevated relative to TCDD. TEQ = Toxic equivalency quotient, calculated by multiplying the result for each dioxin/furan and dioxin/furan-like compound by its toxic equivalency factor (TEF), and summing the results. Use World Health Organization (WHO) 2005 TEFs (*The 2005 World Health Organization reevaluation of human and Mammalian toxic equivalency factors for dioxins and dioxin-like compounds*, October 2006). Use ½ the detection limit for non-detected congeners when calculating total TEQ. Compare the Total TEQ to the 2,3,7,8-TCDD screening level.

[7] Code of Colorado Regulations, Regulation Number 8, Section III.S.5. "Any soil containing visible friable ACM or any soil with greater than 1% friable asbestos content in the top 1 inch of soil-is, for the purposes of this subsection, asbestos-contaminated soil. Where the surface area of the asbestos-contaminated soil exceeds the trigger levels, or the volume of contaminated soil to be removed exceeds the volume equivalent of a 55-gallon drum, the General Abatement Contractor (GAC) and the building owner must comply with all of the requirements in Section III.T. (Asbestos Spill Response), and must remove gross, visible surface debris, and either remove the top 2 inches of soil, or seal the area with concrete or other impenetrable material."

TABLE 7 SITE SPECIFIC BACKGROUND CONCENTRATIONS

Analyte	CAS Number	Background Concentrations[1]					
		Moraine Park	Fern Lake	Betty Dick Ranch	Grand Lake Entrance/Harbison	Green Mountain Ranch	Timber Creek Road Camp
	Metals (mg/kg) – EPA Methods 6020B & 7471B						
Antimony	7440-36-0	0.11	0.19	0.06	0.14	0.09	0.06
Arsenic	7440-38-2	3.64	5.24	3.55	4.40	3.89	2.64
Barium	7440-39-3	110.23	353.48	179.69	184.73	129.32	88.80
Beryllium	7440-41-7	0.49	0.44	1.05	1.03	0.62	0.35
Cadmium	7440-43-9	0.28	0.62	0.41	0.37	0.22	0.22
Chromium	16065-83-1	23.98	15.82	27.23	26.75	27.65	13.94
Cobalt	7440-48-4	5.98	9.56	7.44	11.52	7.59	4.14
Copper	7440-50-8	5.98	9.56	7.44	11.52	7.59	4.14
Lead	7439-92-1	35.48	60.50	14.59	21.76	16.98	16.36
Mercury	7439-97-6	0.03	0.035	0.032	0.031	0.034	0.03
Molybdenum	7439-98-7	1.07	1.20	1.37	1.94	0.85	0.51
Nickel	7440-02-0	12.10	9.19	16.78	15.76	16.06	8.68
Selenium	7782-49-2	0.33	0.38	0.39	0.77	0.18	0.19
Silver	7440-22-4	0.06	0.35	0.11	0.18	0.05	0.02
Thallium	7440-28-0	0.26	0.31	0.27	0.25	0.26	0.16
Vanadium	7440-62-2	26.92	28.04	36.80	45.71	36.86	20.81
Zinc	7440-66-6	83.76	138.26	96.99	90.47	83.88	40.61
	Dioxins and Furans (ng/kg) – EPA Method 8290						
Total TEQ[2]	Calculated	0.814	1.315	0.455	0.742	8.045	1.227

[1] 95% upper confidence limits (UCL) calculated from three ISM replicates using the Interstate Technology Regulatory Council's (ITRC's) updated Microsoft Excel workbook ISM 95% calculator (ITRC 2020a). When an analyte as not detected, one half of the detection limit was used for the purposes of calculating the 95% UCL.

[2] Toxic equivalency quotient (TEQ), calculated by multiplying the result for each dioxin/furan and dioxin/furan-like compound by its TEF and summing the results. Use World Health Organization (WHO) 2005 TEFs (*The 2005 World Health Organization reevaluation of human and Mammalian toxic equivalency factors for dioxins and dioxin-like compounds*, October 2006). U flagged data = 0.5 detection limit value.

TABLE 8 HAZARDOUS WASTE CHARACTERIZATION CRITERIA

Samples will be analyzed by the Toxicity Characteristic Leaching Procedure (TCLP) if the total metals concentrations exceed the TCLP limit using the "20 to 1 rule" (i.e., the mg/kg result divided by 20)

Metal	**TCLP Limit (mg/L)**
Arsenic	5
Barium	100
Cadmium	1
Chromium	5
Lead	5
Mercury	0.2
Selenium	1
Silver	5

TABLE 9 LABORATORY QUALITY CONTROL AND DATA VALIDATION CRITERIA

QUALITY CONTROL CHECK	EXPLANATION	RUN FREQUENCY	ACCEPTANCE CRITERIA	CORRECTIVE ACTION
Matrix: All	Analytical Group: Metals (6020A)			SOP: LIST
Method Blank (MB)	Reagent water containing all reagents specific to the method that is carried through the entire analytical procedure, including preparation and analysis.	One per sample preparation batch of up to 20 samples.	MB Target analytes < LOQ.	Re-preparation and re-analysis of all samples associated with an unacceptable MB is required when reportable concentrations are determined in the samples.
Laboratory Control Sample (LCS)/LCS Duplicate (LCSD)	Known value standard from a source other than the calibration standards. LCS must contain all analytes of interest and must be carried through the entire analytical procedure.	One per sample preparation batch up to 20 samples.	Recovery within 80 – 120%; RPD ≤ 20%.	Re-preparation and re-analysis of the batch.
Matrix Spike & Matrix Spike Duplicate ("MS" or "MD")	An MS is a field sample to which known concentrations of target analytes have been added. An MD or lab duplicate is a second aliquot of the same sample prepared and analyzed along with the sample and MS. The MS/MD results are used to determine the effect of a matrix on the precision and accuracy of the analytical process.	One MS/MD pair must be processed for every 20 samples of the same matrix.	Recovery 75 – 125% except if the sample concentration is > 4x the spike level (spike swamped out).	Analyst shall determine if the MS is spiked properly. Recovery < 30%: re-digest and re-analyze associated sample(s). Otherwise, if LCS/LCSD is in-control, lab qualify data.

QUALITY CONTROL CHECK	EXPLANATION	RUN FREQUENCY	ACCEPTANCE CRITERIA	CORRECTIVE ACTION
Matrix: All	Analytical Group: PCBs (8082A)			SOP: LIST
MB	Reagent water containing all reagents specific to the method that is carried through the entire analytical procedure, including preparation and analysis.	One per sample preparation batch of up to 20 samples.	MB Target analytes < LOQ.	Re-preparation and re-analysis of all samples associated with an unacceptable MB is required when reportable concentrations are determined in the samples.
LCS	Known value standard from a source other than the calibration standards. LCS must contain all analytes of interest and must be carried through the entire analytical procedure.	One per sample preparation batch up to 20 samples.	Recovery within 30 – 120%; RPD ≤ 30%.	Re-preparation and re-analysis of the batch.
MS/MSD	An MS is a field sample to which known concentrations of target analytes have been added. An MSD is a duplicate of the MSD.	One MS/MSD pair must be processed for every 20 samples of the same matrix.	Recovery within 10-120%; RPD ≤ 30%.	Analyst shall determine if the MS is spiked properly. Recovery < 30%: re-digest and re-analyze associated sample(s). Otherwise, if LCS/LCSD is in-control, lab qualify data.

QUALITY CONTROL CHECK	EXPLANATION	RUN FREQUENCY	ACCEPTANCE CRITERIA	CORRECTIVE ACTION
Matrix: All	Analytical Group: Dioxins and furans (8092A)			SOP: LIST
LCS	Known value standard from a source other than the calibration standards. LCS must contain all analytes of interest and must be carried through the entire analytical procedure.	One per sample preparation batch up to 20 samples.	Recovery within 70 – 130%; RPD ≤ 20%.	Re-preparation and re-analysis of the batch.
MS/MSD	An MS is a field sample to which known concentrations of target analytes have been added. An MSD is a duplicate of the MS.	One MS/MSD pair must be processed for every 20 samples of the same matrix.	Recovery within 70 – 130%; RPD ≤ 30%.	Analyst shall determine if the MS is spiked properly. Recovery < 30%: re-digest and re-analyze associated sample(s). Otherwise, if LCS/LCSD is in-control, lab qualify data.

TABLE 10 LABORATORY DATA DELIVERABLES

RECORD	Metals	PCBs	Dioxins & Furans	Asbestos	TCLP Metals
Narrative	x	x	x	x	x
Chain of custody	x	x	x	x	x
Sample Receipt Report	x	x	x	x	x
Summary results	x	x	x	x	x
Quality control (QC) summary results*	x	x	x	x	x
QC association information (batch identifications)	x	x	x	x	x
Chromatograms/Spectra					
Instrument raw data (all calibration reports, QC sample raw data, sample raw data for all analyses including dilutions and re-analyses, and preparation/extraction information)					
Laboratory bench sheets/logs (all bench sheets must be included)					
Preparation Logs (as applicable)	x	x	x	x	x
Electronic data deliverables	x	x	x	x	x

* QC summary results: MB; matrix duplicates; LCS/LCSD (if no MS/MSD); MS/MSD; Surrogate, Serial Dilutions; Post Digestion Spikes; ICAL (calibration type, individual standard concentrations, individual response factors, individual abundances, average response factors, correlation coefficients, & linear dynamic range results); ICV & CCV (along with associated concentrations & percent recoveries or percent differences); Method specific forms (tune, interference check summaries and internal standard summaries); all aforementioned summary forms for second column or detector including percent difference between the two analytical results; preparation logs (including records supporting special techniques applied by the lab (e.g. Incremental Sampling Methodology (ISM) subsampling to allow validator evaluation of QC checks)). Note this list is a composite for both organics and inorganics and so not all elements apply to all analytical parameters.

TABLE 11 DATA VERIFICATION AND VALIDATION PROCEDURES

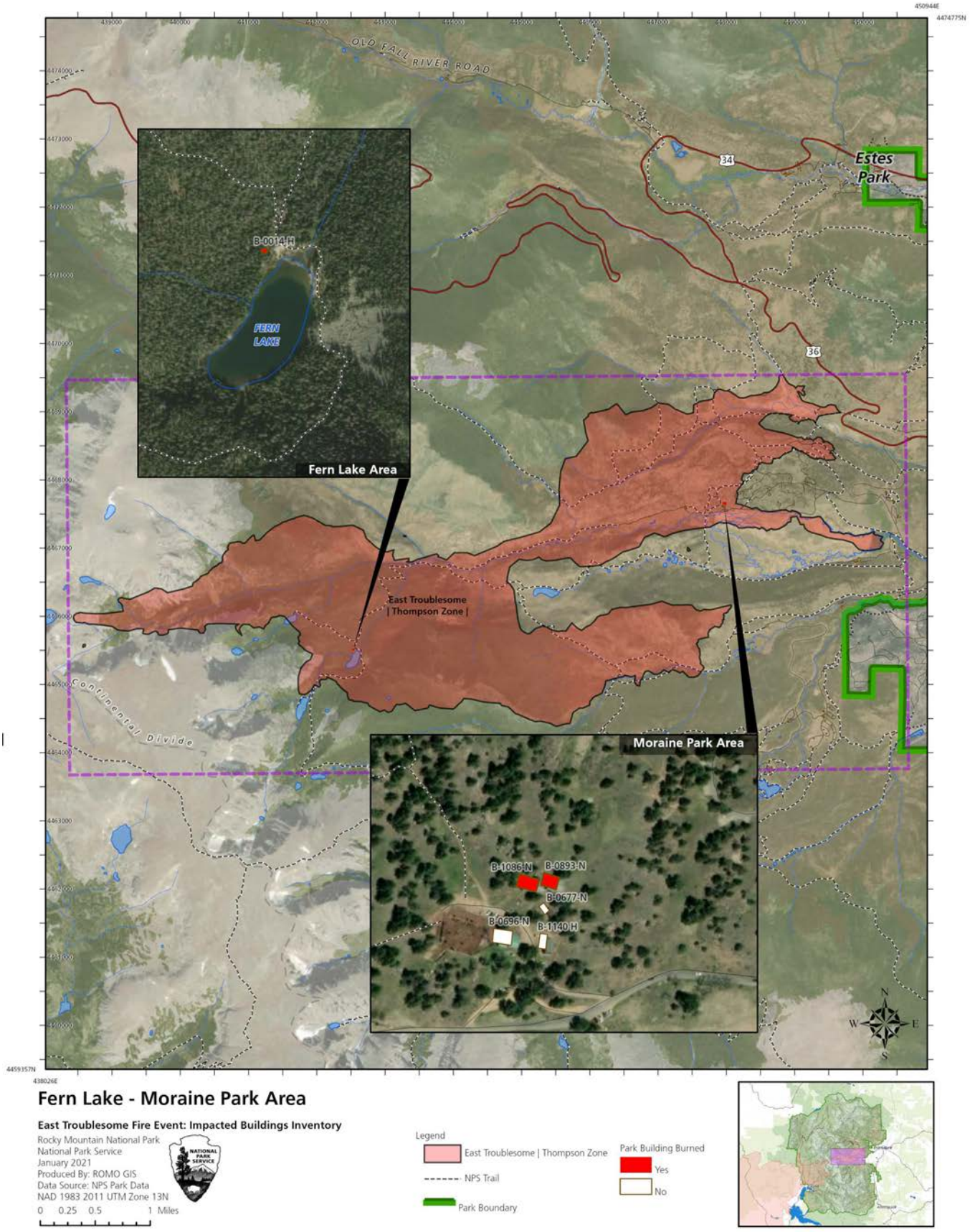
ITEM/DESCRIPTION	VERIFICATION (COMPLETENESS)	VALIDATION (CONFORMANCE TO SPECIFICATIONS)
Planning Documents/Records		
1. Approved quality assurance project plan (QAPP)	x	Phase I - No data validation of these documents and records Phase II – No validation of these documents and records
2. Contract	x	
3. Field standard operating procedures (SOPs)	x	
4. Laboratory SOPs	x	
Field Records		
5. Field logbooks	x	Phase I - No data validation Phase II - Field records will be reviewed to assess conformance with standard procedures and to identify deviations that may affect analytical data quality. Potential impacts will be qualitatively evaluated in validation reports.
6. Equipment calibration records	x	
7. Chain-of-custody forms	x	
8. Sampling diagrams/surveys	x	
9. Sediment description logs	x	
10. Relevant correspondence	x	
11. Deviations	x	
12. Field corrective action reports	x	
Analytical Data Package		
13. Cover sheet (laboratory identifying information)	x	Phase I - No data validation is planned Phase II – Validation performed consistent with Stage 2B of "Guidance for Labeling Externally Validated Laboratory Data for Superfund Use" (EPA, 2009)
14. Case narrative	X	
15. Inter-laboratory chain-of-custody documents	X	
16. Sample receipt records	X	
17. Sample chronology (i.e., dates and times of receipt, prep, analysis)	X	
18. Laboratory bench sheets and instrument logs		

ITEM/DESCRIPTION	VERIFICATION (COMPLETENESS)	VALIDATION (CONFORMANCE TO SPECIFICATIONS)
19. LOD/LOQ establishment and verification	X	
20. Standards traceability		
21. Instrument calibration records		
22. Definition of laboratory qualifiers	X	
23. Results reporting forms	X	

Asbestos sampling data will not require data validation.

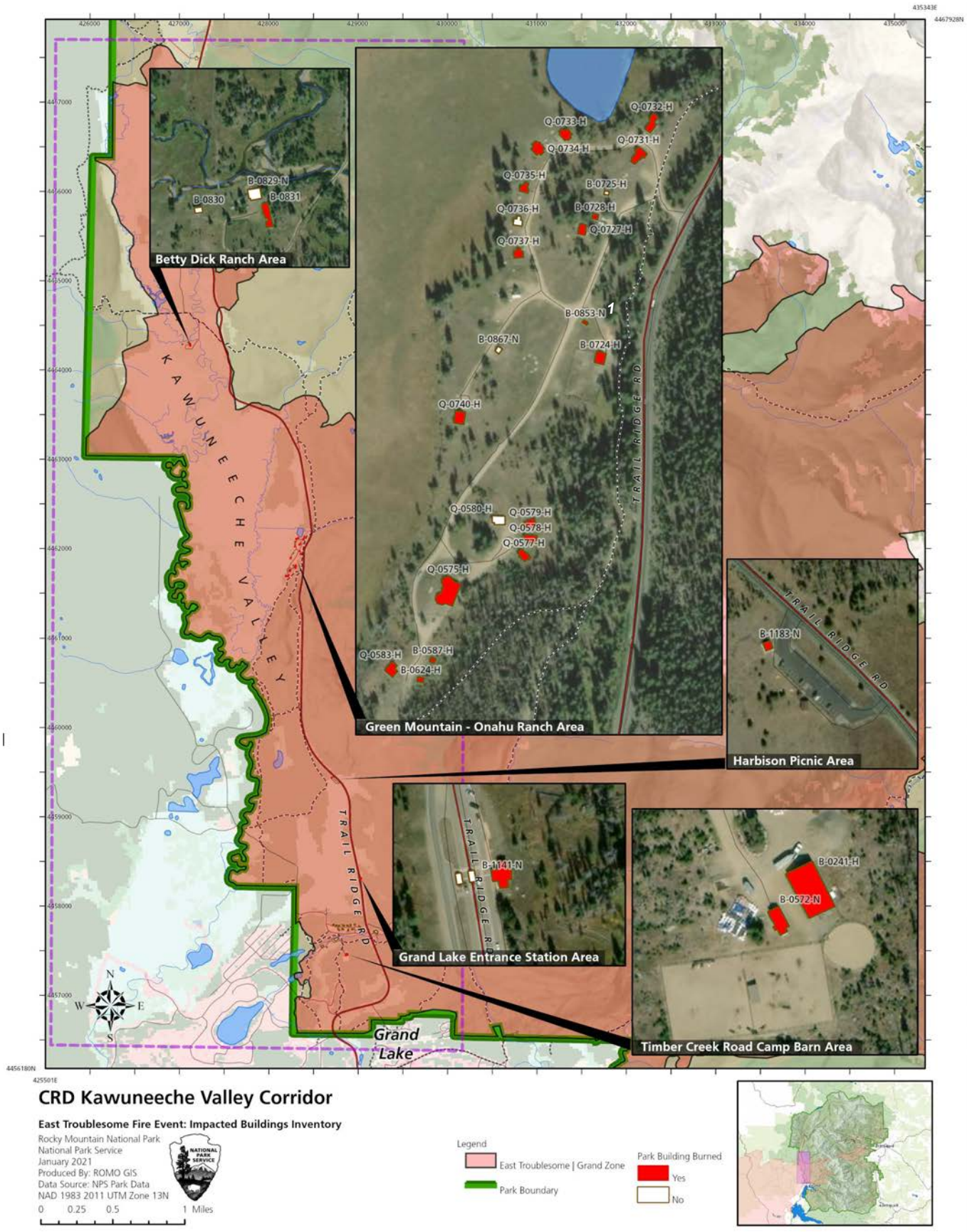
Figures

Figure 1 East Side District Building Locations



Source: ROMO East Troublesome Fire Event: Impacted Buildings Inventory (NPS, 2021)

Figure 2 Colorado River District Building Locations



Source: ROMO East Troublesome Fire Event: Impacted Buildings Inventory (NPS, 2021)

Note 1: B-0853 is incorrectly located. B-0853 is located where B-0725 is marked.

Figure 3a
Green Mountain Ranch Background Location
Green Mountain - Onahu Ranch Area
Time Critical Removal Action Site Inspection Sampling and Analysis Plan
Rocky Mountain National Park - Estes Park, CO

N

BB&E

Document Path: H:\IT\GIS\NPS\ROMO (Rocky Mountain National Park)\Figures\ISM Post-Sampling\Onahu_post\[Background] Onahu Ranch.mxd

Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community
WHL 9/23/22, KMD 12/20/22

Figure 3b
Timber Creek Road Camp Background Location
Timber Creek Road Camp Buildings
Time Critical Removal Action Site Inspection Sampling and Analysis Plan
Rocky Mountain National Park - Estes Park, CO

N

BB&E

Document Path: H:\IT\GIS\NPS\ROMO (Rocky Mountain National Park)\Figures\ISM Post-Sampling\Timber Creek_post\[Background] Timber Creek.mxd

Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community
WHL 9/26/22, KMD 12/20/22

Figure 3c
Grand Lake Entrance Background Location
Grand Lake Entrance Buildings
Time Critical Removal Action Site Inspection Sampling and Analysis Plan
Rocky Mountain National Park - Estes Park, CO

N

BB&E

Document Path: H:\IT\GIS\NPS\ROMO (Rocky Mountain National Park)\Figures\ISM Post-Sampling\Grand Lake_post\Grand Lake Entrance Background.mxd

Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community
WHL 9/29/22, KMD 12/20/22

Figure 3d
Betty Dick Ranch Background Location
Betty Dick Ranch Area
Time Critical Removal Action Site Inspection Sampling and Analysis Plan
Rocky Mountain National Park - Estes Park, CO

N

BB&E

Document Path: H:\IT\GIS\NPS\ROMO (Rocky Mountain National Park)\Figures\ISM Post-Sampling\Betty Dick_post\[Background] Betty Dick Ranch.mxd

Service Layer Credits: © 2023 Microsoft Corporation © 2022 Maxar ©CNES (2022) Distribution Airbus DS
WHL 9/29/22, KMD 12/19/22

Figure 3e
Moriane Park Stables Background Location
Moraine Park Stables Buildings
Time Critical Removal Action Site Inspection Sampling and Analysis Plan
Rocky Mountain National Park - Estes Park, CO

N

BB&E

Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community
WHL 9/29/22, KMD 12/20/22

Document Path: H:\IT\GIS\NPS\ROMO (Rocky Mountain National Park)\Figures\ISM Post-Sampling\Moraine Park_post\[Background] Moraine Park Stables.mxd

Figure 3f
Fern Lake Background Location
Fern Lake Buildings
Time Critical Removal Action Site Inspection Sampling and Analysis Plan
Rocky Mountain National Park - Estes Park, CO

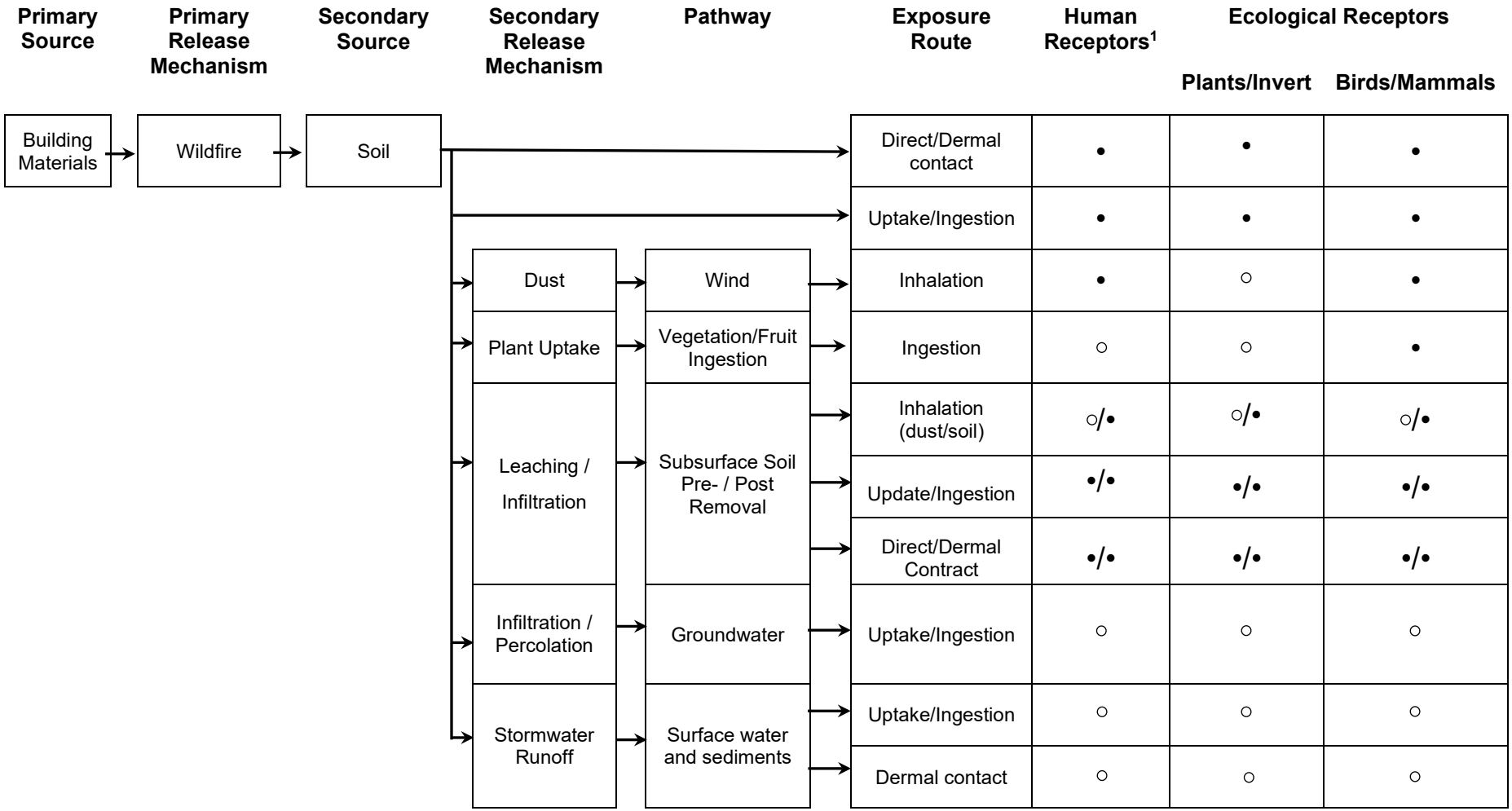
N

BB&E

Document Path: H:\IT\GIS\NPS\ROMO (Rocky Mountain National Park)\Figures\ISM Post-Sampling\Fern Lake_post\[Background] Fern Lake.mxd

WHL 9/29/22, KMD 12/20/22

Figure 4
Conceptual Site Model for Potential Soil Exposure Pathways
Time Critical Removal Action Sampling and Analysis Plan
Rocky Mountain National Park- Estes Park, CO



- • Indicates a potentially complete exposure pathway.
- ○ Indicates pathway is incomplete or believed to be negligible.

[1]. Recreational visitors, trespassers, park employees and construction workers/contractors. Residential exposure is considered highly unlikely based on anticipated future Site use.

Appendix 1 - Field Forms

Rocky Mountain National Park TCRA SI Sampling Event

These field instructions have been developed to describe and guide the field activities required to perform sampling activities with ash/soil sampling in support of the TCRA at 26 burned structures and 6 background locations within Rocky Mountain National Park (ROMO). This sampling event will be used to fill data gaps, further refine the CSM, and determine presence/absence of contaminants of potential concern (COPC).

These Project Instructions include details on each burned structure. ISM will be utilized to collect surface layer ash/soil samples. The majority of the burned structures will be sampled with one ISM replicate. The background locations and the Remit Office site will be sampled with triplicate ISM replicates. Each ISM sample will consist of 40 aliquots. Most sites will be one Decision Unit (DU), excluding the two largest sites (Betty Dick Ranch and Onahu Lodge) which are two DUs. Former structure locations shown in Figures.

Site Location: West side of ROMO including the Timber Creek Camp Barn area, Remit Office, Harbison Vault Toilet, 18 structures at the Green Mountain housing area, and the Betty Dick Ranch. East Site of ROMO includes two structures at the Moraine Stables area and the Fern Lake Ranger Cabin.

Field Schedule:

Tuesday September 27: Mobilization to field. Drop IDW drums at Green Mountain area, select location in center of Green Mountain area and away from public road, if possible. **Gate entrance needed for Green Mountain**, NPS will dummy lock the gate on Tuesday morning. Remove fence sections to navigate vehicle through away. ISM grid and sample Green Mountain structures. **Wait for Dan Jackson to identify background location** and stake corners. See Figures.

Wednesday - Thursday September 28 – 29: Continue sampling at Green Mountain, including 18 former structures and 1 background location.

September 29 AM – Ship Cooler by 10 AM with samples from the 27th – 28th.

Friday September 30: ISM grid and sample Timber Creek Road Camp Barn structures (2) and background location. See Figures.

Monday October 3: ISM grid and sample Grand Lake Entrance Station, Harbison Vault Toilet, and one background location. See Figures.

Tuesday October 4: ISM grid and sample Betty Dick Ranch and background location. **Gate entrance needed** for Green Mountain, contact Will for access. See Figures.

Wednesday October 5 AM: Ship Cooler by 10 AM with samples from the 29th – 4th.

Wednesday October 5: Hike to Fern Lake. ISM grid and sample Fern Lake structure and background location. See Figures.

Thursday October 6: ISM grid and sample two Moraine Stables structures and one background. See Figures.

Monday October 10: Ship Cooler with samples from the 5th-6th.

Soil sampling activities and decontamination will be performed in Modified **Level D** protection. Please review the site specific HASP prior to field activities.

Project Roles and Responsibilities

Role	Contact	Phone Number
Project Manager (PM)	Elyse Kutsche	248-648-0490
Subject Matter Expert (SME)	Brent Jacobs	970-669-2999
Field Team Lead (FTL)/Site Safety Coordinator (SSC)	Kira Fillar	269-967-0127
Field Team Member	Celeste Holtz	517-673-1792
Field Team Member	Preston Sewell	303-775-6920
Field Team Member	Will Laughner	989-615-4920
H&S Manager	Tom Barzyk	248-766-4143

NPS Information

Role	Contact	Phone Number
NPS PM	Paul Torcoletti	720-355-1456
Site Point of Contact	Will Mchugh	970-227-6620
Site Point of Contact (Historical artifacts)	Daniel Jackson	402-297-8779

Subcontractors

Role	Company	Point of Contact	Phone Number
Sample Laboratory	ALS	Elizabeth Parker	717-702-2248

Daily Reports

The FTL will provide daily reports to the project team each evening that will include items such as work completed/in progress, "unusual" observations during sampling, copies of field logs from work completed, sample summary, and any changes/issues. The PM should be notified **IMMEDIATELY** if there are any schedule impacts which may cause delays to the current schedule or impacts in cost. The FTL will also scan and email (or upload to Sharepoint) the log files. Note that these daily updates will be key to ongoing tracking of site activities.

Health and Safety Requirements

All project activities must be conducted in accordance with the site specific HASP.

General activities/ PPE:

- FTL to visually monitor site for dust and mitigate any sign of dust generation via handheld water sprayer.
- A daily H&S meeting conducted prior to beginning work each day.
- FTL will monitor weather to advise on work stoppages in the event of possible hail, lighting, high winds, or other extreme weather.
- Modified Level D protection will be required during all drilling activities
- Modified Level D PPE will include:
    - Hard hat (where falling tree hazards are present)
    - Reflective Vest
    - Gloves

- Disposable boot covers
- Steel Toed Shoes
- N-95 mask (if dust present)

Field Activities

Ash/Soil Sampling

The following sections break down the sampling activities by each area within the park. The ISM procedures, sample counts, and site-specific information needed for the ash/soil sampling is provided under each section.

ISM grid instructions: Evaluate the size and shape of the DU to be sampled. Verify the length and width of DU with field instruction diagrams. Mark the four corners of the DU with a wooden stake or marking paint. Measure the GPS coordinates at each corner with the trimble unit. Name the GPS coordinate point in the trimble unit according to the Structure #-DU #-direction designation (NW, SE, etc.) and record in logbook. Subdivide the grid into 40 equal sub quadrants using a tape measure and the associated structure figure. Mark the grid using a lead-free, water based spray paint. Record grid deviations in the logbook.

When ISM samples are being analyzed for dioxins/furans the sample container must be a glass jar. In order to collect the required sample size we will use two 32 oz glass jars per ISM sample. The lab will then combine these jars and complete the ISM prep. **Jars are to be labeled "1 of 2" and "2 of 2" in all cases where multiple jars are used for one sample.**

Soil/ash samples will be collected from the 0-3" surface layer. Samples may be collected using a stainless-steel sampling spoon, where soil is non-compacted, or a 2" diameter auger, where soil is heavily compacted. A hammer can be used to loosen compacted soil. Approximately 40 g of soil/ash will be collected from each aliquot from the 0-3" layer. All 40 increments will be combined to create one 1-2 kg ISM sample. The sampling equipment will be decontaminated using deionized water after completion of each ISM sample collection, i.e. after 40 aliquots have been collected.

All background locations will have 3 ISM replicate samples collected.

Green Mountain Ranch (GMR) Area

Located 3 miles north of the Kawuneeche Visitor center on the west side of Trail Ridge Road. The former housing area is gated off. Request daily access from NPS. The structure number in the table below progress from north to south.

Structure Name	Structure #	Decision Unit #	Sample Analyte(s)	Sample ID	Container	Sample Footprint (ft)
GMR Parika Cottage	0732	1	Metals (6020/7470)	S-732-SA-1-01	Gallon Zip Lock	53' x 25'
GMR Mineral Cottage	0731	1	Metals (6020/7470)	S-731-SA-1-01	Gallon Zip Lock	45' x 31'
GMR Wood Storage Cottage	0728	1	Metals (6020/7470)	S-728-SA-1-01	Gallon Zip Lock	26' x 24'
GMR Pioneer Cottage	0727	1	Metals (6020/7470)	S-727-SA-1-01	Gallon Zip Lock	34' x 26'
GRM-East (0732, 0731,	GRME	1 (10 random	Dioxins/Furans	S-GRME-SA-1-01	2 32 oz jars	NA

0728, 0727)		aliquots from each structure)	(8290)			
GMR Arapaho Cottage	0733	1	Metals (6020/7470)	S-733-SA-1-01	Gallon Zip Lock	40’ x 33’
GMR Onahu Cottage	0734	1	Metals (6020/7470)	S-734-SA-1-01	Gallon Zip Lock	40’ x 36’
GMR Cumulus Cottage	0735	1	Metals (6020/7470)	S-735-SA-1-01	Gallon Zip Lock	33’ x 30’
GMR Cirrus Cottage	0737	1	Metals (6020/7470)	S-737-SA-1-01	Gallon Zip Lock	33’ x 30’
GMR Meadow Cottage	0740	1	Metals (6020/7470)	S-740-SA-1-01	Gallon Zip Lock	38’ x 32’
GMR-West (733, 734, 735, 737, 740)	GMRW	1 (8 random aliquots from each structure)	Dioxins/Furans (8290)	S-GRMW-SA-1-01	2 32 oz jars	NA
GMR Barn	0724	1	Metals, Dioxins/ Furans (6020/7470/8290)	B-724-SA-1-01	2 32 oz jars	44’ x 32’
GMR Pumphouse	0853	1	Metals, Dioxins/ Furans (6020/7470/8290)	B-853-SA-1-01	2 32 oz jars	24’ x 28
Onahu Ranch Bakuni Cottage	0579	1	Metals (6020/7470)	S-579-SA-1-01	Gallon Zip Lock	25’ x 40’
Onahu Ranch Na Ha Non Cottage	0578	1	Metals (6020/7470)	S-578-SA-1-01	Gallon Zip Lock	25’ x 40’
Onahu Ranch Ho Ta Ta Ha Cottage	0577	1	Metals (6020/7470)	S-577-SA-1-01	Gallon Zip Lock	25’ x 40’
Onahu Ranch Abasaw Aw Xa Cottage	0583	1	Metals (6020/7470)	S-583-SA-1-01	Gallon Zip Lock	36’ x 40’
Onahu Ranch Tool Shed	0624	1	Metals (6020/7470)	S-624-SA-1-01	Gallon Zip Lock	27’ x 20’
OnahuCott (0583, 0577, 0578, 0579,	OC	1 (8 random aliquots	Dioxins/ Furans (8290)	S-OC-SA-1-01	2 32 oz jars	NA

0624)		from each structure)				
Onahu Ranch Lodge	0575	2	Metals, Dioxins/ Furans (6020/7470/8290)	B-575-SA-1-01	2 32 oz jars	83' x 55' (2 DUs)
			Metals, Dioxins/ Furans (6020/7470/8290)	B-575-SA-2-01	2 32 oz jars	
Onahu Ranch Pumphouse	0587	1	Metals, Dioxins/ Furans (6020/7470/8290)	S-587-SA-1-01	2 32 oz jars	18' x 18'
GMR Background	R-GMR	1	Metals, Dioxins/ Furans (6020/7470/8290)	R-GMR-SA-1-01 R-GMR-SA-1-02 R-GMR-SA-1-03	2 32 oz jars 2 32 oz jars 2 32 oz jars	TBD on-site

Notes:

Onahu Ranch Lodge will be split into two DUs. The structure has a partial basement and has areas where accessibility is limited or potentially dangerous. Field team should not weight load the main floor of the structure where a basement is present in case of collapse. Field team will use best judgement when navigating around the site and sampling the exposed basement areas. Do not enter any areas where egress is limited, or soil/debris collapse is possible.

Pumphouse pit: This site is a 16 foot deep pit. Do not enter the pit. Samples will be collected from the exterior of the pump house. If able to safely gather a scoop of material from the pit without entry this is permissible.

Timber Creek Road Camp

Located adjacent to the Kawuneeche Visitor center across Trail Ridge Rd. Head west on road 491 (US National Park Rd), take first left and continue to end of the road.

Structure Name	Structure #	Decision Unit #	Sample Analytes)	Sample ID	Container	Sample Footprint (ft)
Timber Creek Road Camp Barn	0783	1	Metals/ PCBs/ Chrome VI/ Dioxins_Furans (6020/7470/7196/8082 /8290)	B-783-SA-1-01	2 32 oz jars	66' x 30'
Timber Creek Road Camp Barn Tack Shed	0572	1	Metals/ Dioxins_Furans (6020/7470/8290)	B-572-SA-1-01	2 32 oz jars	21' x 34'
Timber Creek Road Camp	R-TC	1	Metals/PCBs/Chrome VI/ Dioxins_Furans (6020/7470/7196/8082	R-TC-SA-1-01	2 32 oz jars	45' x 45'

Background			/8290)			
			Metals/PCBs/Dioxins_Furans (6020/7470/8082/8290)	R-TC-SA-1-02 R-TC-SA-1-03	2 32 oz jars 2 32 oz jars	

Notes:

Timber Creek Road Camp Barn has a concrete pad and significant burned debris present on the pad including metal nails, containers, storage cabinets, wheel barrels, etc. Where ash/soil is present on the pad beneath the debris, field team will attempt to remove burned debris with a small shovel to access ash/soil for sampling. If debris is too thick to shovel through, presents a safety risk, or is immovable the ISM aliquot will be skipped and the reason for skipping noted in the field log.

Timber Creek Road Camp Tack Shed has a concrete pad. **The southwest corner of the building perimeter is to be excluded from the ISM grid as it is fill material of unknown origin and date.** This material is a fine grain gravel of light color and easily identified as non-native.

Remit Office/ Grand Lake Entrance Station

Located just north of the Kawuneeche Visitor center along the east side of Trail Ridge Road. The only parking is just past the entrance gates on the east side of Trail Ridge.

Structure Name	Structure Number	Decision Unit #	Sample Analyte(s)	Sample ID	Container	Sample Footprint (ft)
Remit Office	1141	1	Metals/ Dioxins_Furans (6020/7470/8290)	B-1141-SA-1-01 B-1141-SA-1-02 B-1141-SA-1-03	2 32 oz jars 2 32 oz jars 2 32 oz jars	51’ x 39’
Grand Lake Entrance Background	R-GLE	1	Metals/ Dioxins_Furans (6020/7470/8290)	R-GLE-SA-1-01 R-GLE-SA-1-02 R-GLE-SA-1-03	2 32 oz jars 2 32 oz jars 2 32 oz jars	50’ x 40’

Notes: Samples at the Remit Office should be taken below fill material that was brought in post removal. Using a shovel scrape 2 to 4 inches of fill material to expose native soil beneath. Collect ISM aliquot samples from this soil layer.

Harbison Vault Toilet

Navigate to the Harbison Meadows Picnic Site. Located approximately 1.3 miles north of the Kawuneeche Visitor center. The former Vault toilet is located on the north end of the parking area.

Structure Name	Structure Number	Decision Unit #	Sample Analyte(s)	Sample ID	Container	Sample Footprint (ft)

Harbison Vault Toilet	1183	1	Metals/ Dioxins_Furans (6020/7470/8290)	B-1183-SA-1-01	2 32 oz jars	26' x 28'

Notes: Do not sample where concrete pad was present. Sample only edge area around concrete pad removal area.

Betty Dick Ranch

Located 5 miles north of the Kawuneeche Visitor center. Turn left on an unnamed dirt road on the west side of Trail Ridge Road. At the T in the road, turn left and proceed under road dead ends at the farmhouse. The area is gated off. Request daily access from NPS.

Structure Name	Structure Number	Decision Unit #	Sample Analyte(s)	Sample ID	Container	Sample Footprint (ft)
Betty Dick Barn	0831	2	Metals, PCB, Chrome VI, Dioxins_Furans (6020/7470/7196/8082/8290)	B-831-SA-1-01 B-831-SA-2-01	2 32 oz jars 2 32 oz jars	90' x 38' (2 DUs)
Betty Dick Background	R-BD	1	Metals, PCB, Dioxins_Furans (6020/7470/8082/8290)	R-BD-SA-1-01 R-BD-SA-1-02 R-BD-SA-1-03	2 32 oz jars 2 32 oz jars 2 32 oz jars	40' x 36'

Moraine Park Stables

Navigate to Moraine Park, Estes Park, CO. If google maps is unable to locate, take Bear Lake road to Moraine Park Road, to Fern Lake Road. The Moraine Park Stables are located on the north side of the north, about 1 mile from the turn onto fern lake road. If you hit Cub Lake Trailhead, you've passed it.

Structure Name	Structure Number	Decision Unit #	Sample Analyte(s)	Sample ID	Container	Sample Footprint (ft)
Moraine Stable Bunk House	0893	1	Metals (6020/7470)	S-893-SA-1-01	Gallon Zip Lock	43' x 65'
Moraine Stables Dorm	1086	1	Metals (6020/7470)	S-1086-SA-1-01	Gallon Zip Lock	43' x 50'

Moraine Combined (0893, 1086)	MC (20 aliquots from each structure)	1	Dioxins_Furans (8290)	S-MC-SA-1-01	2 32 oz jars	NA
Moraine Park Background	R-MP	1	Metals/ Dioxins_Furans (6020/7470/8290)	R-MP-SA-1-01 R-MP-SA-1-02 R-MP-SA-1-03	2 32 oz jars 2 32 oz jars 2 32 oz jars	50' x 50'

Note: There is no visible footprint at the Moraine Park buildings. The structure corners were staked and GPS marked in Oct 2022.

Fern Lake

From the Moraine Park Stables, continue until Fern Lake Road dead ends at a trailhead parking lot. Take the Fern Lake trailhead 3 miles to fern lake. The former structure is located on the north side of fern lake directly off the trail.

Structure Name	Structure Number	Decision Unit #	Sample Analyte(s)	Sample ID	Container	Sample Footprint (ft)
Fern Lake	0014	1	Metals, Chrome VI, Dioxins_Furans (6020/7470/7196/8290)	S-14-SA-1-01	2 32 oz jars	33' x 36'
Fern Lake Background	R-FL	1	Metals, Chrome VI, Dioxins_Furans (6020/7470/7196/8290)	R-FL-SA-1-01	2 32 oz jars	36' x 40'
			Metals, Dioxins_Furans (6020/7470/8290)	R-FL-SA-1-02 R-FL-SA-1-03	2 32 oz jars 2 32 oz jars	

MS/MSD – No need to collect independent MS/MSD sample. Label site sample for lab to split.

- 1 MS per ~20 DUs = 3 MS
- 1 MSD per ~20 DUs = 3 MSD
- Suggested sites include: Betty Dick Barn (1 DU with CR VI), Green Mountain Ranch Barn 724, and Harbison Meadow Vault Toilet. But field team may assess site conditions and select sites to sample.
- Label as: S-structure #-DU#-MS or MSD

Field Dups.

- 1 Dup per ~10 DUs = 5 Dups.

- Suggested sites include: Betty Dick Barn (both DUs), Green Mountain Ranch barn 724, Green Mountain Ranch Arapaho Cottage 733, and Harbison Meadow Vault Toilet. But field team may assess site conditions and select sites to sample.
- Label as: S-structure #-SA – DU# - Sample Number
- Sample Number will follow original ISM sample number, i.e. if one ISM replicate is collected at structure 724 the ISM sample will be labeled 01 and the field dup will be labeled 02.
- Record in field log book which sample ID for field dups.

Equipment Blank

- Equipment Blanks labeled EB-Drill-L-01 or EB-Spoon-L-01
- Hold time for Cr VI EB sample very short. Confirming with lab if they can do a 48 hour hold. Cr VI EB will need to be taken day prior to shipping.

IDW

- Sample Soil and liquid drum. Soil drum to include separate Asbestos sample.

GPS Logging

A Trimble 7x unit will be used to record the GPS coordinates of the four corners of each ISM grid. Log each point with the "structure #-DU 1-directional identification (i.e. NW, SE, etc.). Record the point ID in the logbook.

Shipping Information

Samples can be dropped off and shipped from the following locations:

- **FedEx Onsite – Dollar General**
  230 W Agate Ave
  Granby, Colorado 80446
  Closes 10 PM
  Latest drop off time to be sent out the following day: express – none, ground – 10 AM, but can drop off after that and would be sent out next day
- **FedEx Onsite – Safeway**
  40 County Rd 804
  Fraser, Colorado 80442
  Closes 8 PM
  Latest drop off for express is 12 noon, ground 10 AM. Same as above, can drop off later in the day for next day shipment.
- **FedEx Onsite – Dollar General**
  451 Stanley Ave
  Estes Park, Colorado 80517
  Closes 10 PM
  Latest drop off for express – 10:45 AM, ground 10 AM. Same as above, can drop off later in the day for next day shipment.

Ship samples to:

301 Fulling Mill Road

Middletown, PA 17057

Decontamination

The following is a summary of decontamination procedures:

- All sampling equipment will undergo a thorough decontamination between each ISM sample collection (40 aliquots) to ensure no cross-contamination occurs.
- The decontamination process will be the following: remove all visible particulate matter and dispose as IDW soil, deionized water rinse, followed by liquinox/alconox solution wash. Rinse with deionized water.

Site Clean-up and Demobilization

Following the completion of testing activities, all materials, equipment, and personnel shall be demobilized from the work area. The work area shall be free of debris daily. Each day, unnecessary equipment shall be removed from the work area and stored in a safe place such as a site vehicle or storage shed.

All work areas shall be restored as closely as possible to pre-work conditions.

IDW Management

During this investigation, small quantities of waste will be generated in the form of excess soil, spent PPE, and decontamination fluids. Soil and liquid waste will be segregated and stored separately in 55-gallon drums. All drums will be moved to the staging location specified by NPS personnel but assumed to be in the Green Mountain Ranch area. PPE will be disposed of in trash bags as municipal waste.

IDW drums will be staged at Green Mountain. While actively sampling, IDW will be containerized in 5-gallon buckets. At the end of each sampling day, the IDW will be transported to the drum staging area and transferred to the drums.

The field team will access the ability to transport the IDW drums from the west side of the park to the east side. If this is possible, the drums will be transported via pickup truck to the east side of the park and stored there until profiling. If not possible, IDW generated from the east side sampling activities will be transported via 5-gallon buckets to the Green Mountain staging area.

Below is an IDW Summary:

IDW Summary

IDW Type	IDW Storage/Transport Container	IDW Staging/Disposal Area	IDW Sampling/Handling	Samples Needed?
Soil Waste	Steel, 55-gallon, open-head drums	GMR	Label as Pending Analysis	Yes; will be profiled.
Decon Fluids	Steel, 55-gallon, open-head drums	GMR	Label as Pending Analysis	Yes; will be profiled.

Field Documentation

This section presents the documentation procedures that will be followed during the performance of field activities. Daily activities must be documented in field log books.

Field Logs

Field log books will serve as a daily record of events, observations, and measurements during field activities. All information pertinent to sampling activities will be recorded in log books. The log books are bound with pages numbered sequentially, written with permanent ink. Entries in the log book will include:

- Names of field crew;
- Name of person recording entries;
- Date (MM/DD/YY format) and time (24-hour format) of site entry and exit;
- Weather conditions;
- Level of Health and Safety;
- Morning Health and Safety briefing;
- Location of work;
- Field measurements; and,
- Field observations including drawings and figures, if appropriate;
- Corrections done by crossing out entry with a single line; dates and initials for any changes;
- No blank or skipped pages. Blank portions of pages must have a line drawn through it with a date and signature.

Once completed, field logbooks and data forms become accountable documents and are maintained as part of the project files.

Sample Custody and Documentation

Samples will be stored in an ice-filled cooler and accompany a completed chain-of-custody form until delivered to the ALS laboratory. Samples will be shipped overnight. Samples will not be shipped on a Friday, instead samples collected Thursday or Friday will be help in ice-filled coolers over the weekend and shipped on Monday.

Completed chain-of-custody forms will be required for all samples to be analyzed. Chain-of-custody forms will be initiated by the sampling crews in the field during the sampling events. The chain-of-custody form will contain the sample's unique identification number, sample date and time, sample description, sample type, sample preservation, and analyses required. The original chain-of-custody form will accompany the samples to the laboratory. Copies will be made prior to shipment for field documentation. The chain-of-custody forms will remain with the samples at all times. The samples and signed chain-of-custody form will remain in the possession of the sampling crew until samples are delivered to the laboratory or the express carrier. Copies of COCs are to be scanned and/or saved in the project folder.

Location Nomenclature

A systematic field sample identification nomenclature has been developed. Consistent nomenclature has been designed to facilitate entry, management, and manipulation of field and analytical data in the project database.

Each sample will be assigned a unique sample ID, indicated in the tables under the Field Sampling Section, using the following system:

1) Sample Location Type: A unique letter which describes the sample location type:

B – Ash, debris, and soil from a location where a building slab, foundation walls, or concrete piers define the former structure.

S - Ash, debris, and soil from a location where the former structure is no longer visible

R – Background

IDW – Waste Drum

EB – Equipment Blank

2) Structure Number: The former building number indicated by NPS.

3) Sample Matrix: The third set of two characters will correspond to the sample matrix as follows:

SA – Soil/ash
L – Liquid (in the case of an equipment blank, liquid IDW)

4) Decision Unit: A one digit number indicating the DU. Each site will have 1 or 2 DUs.

5) Sample Number/ISM replicate: A two digit number indicating the sample number, i.e. the ISM replicate number. Each site will have 1 or 3 replicates. Each background location will have 3 replicates.

6) QA/QC Identified: The last set of two digits will represent sample type as follows:

MS – matrix spike
MD – matrix spike duplicate

The chain-of-custody will be filled out to include contact information, project name, project number, sample IDs, date and time collected, and analysis performed.

Figures

Attachments

Appendix 2 – Health and Safety Plan

SITE HEALTH AND SAFETY PLAN

Prepared For:

National Park Service
12795 W. Almeda Parkway
Lakewood, CO 80228

Prepared By

BB&E, Inc.
Northville, Michigan

October 2021

BB&E
CONSULTING ENGINEERS & PROFESSIONALS

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FIGURES

ATTACHMENTS

LIST OF ACRONYMS

ACM	Asbestos-containing material
AQCC	Air Quality Control Commission
BB&E	BB&E, Inc.
CABI	Certified Asbestos Building Inspector
CDC	Center for Disease Control and Prevention
CDPHE	Colorado Department of Public Health & Environment
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COC	Chemicals of Concern
CRD	Colorado River District
dB	Decibels
ESD	East Side District
HAZWOPER	Hazardous Waste Operations and Emergency Response
HEPA	High Efficiency Particulate Air
HSP	Health and Safety Plan
ISM	Incremental sampling methodology
NPS	National Park Service
OSHA	Occupational Safety and Health Administration
PCB	Polychlorinated biphenyls
PLM	Polarized light microscopy
PM	Project Manager
PPE	Personal protective equipment
RCRA	Resource Conservation and Recovery Act
RSL	Regional Screening Level
SAP	Sampling and Analysis Plan
SDS	Safety Data Sheet
SOW	Scope Of Work
TEM	Transmission electron microscopy
USEPA	United States Environmental Protection Agency

1.0 INTRODUCTION

This Health and Safety Plan (HSP) defines field procedures to be utilized in conjunction with performance of ash and soil sampling activities scheduled to be conducted by BB&E, Inc. (BB&E) at sites within Rocky Mountain National Park. These sites are located within the East Side District (ESD)/Big Thompson Watershed, located near Estes Park, Colorado; and sites within the Colorado River District (CRD) located near Grand Lake, Colorado.

BB&E is conducting these sampling activities per Contract No. 140D0419A0020, Task Order No. 140P1221F0008 dated September 9, 2021.

This HSP will be kept on site during field activities and will be reviewed as necessary. The plan will be amended or revised as project activities or conditions change or when supplemental information becomes available. This plan adopts procedures in the project Sampling and Analysis Plan (SAP) prepared in conjunction with this HSP. The Field Safety Officer and Site Superintendent are to be familiar with the SAP and the contents of this HSP. BB&E personnel and subcontractors conducting field activities are required to review and acknowledge the contents of this HSP by signing **Attachment 1**.

This HSP does not supersede or in any way relieve subcontractors of their obligations under any applicable Occupational Safety and Health Administration (OSHA) regulations including 29 CFR 1910.120 Occupational Safety and Health Standards and 29 CFR 1926: Health and Safety Regulations for Construction.

BB&E personnel working on this site meet the training requirements of 29 CFR 1910.120: Hazardous Waste Operations and Emergency Response (HAZWOPER). Documentation of this training will be provided to NPS Project Manager (PM) prior to sampling activities.

The health and safety procedures set forth in this HSP are based on the site conditions and chemical hazards known or expected to be present using site data available at the time this HSP was written. This HSP is subject to review and revision by BB&E when it is deemed necessary by actual site conditions encountered during field activities.

2.0 PROJECT INFORMATION AND DESCRIPTION

2.1 Project Information

PROJECT NO: 02050083
CLIENT: National Park Service (NPS)
PROJECT/SITE NAME: Rocky Mountain National Park
SITE ADDRESS: Park Entrance Rd, Estes Park, CO 80517 & Trail Ridge Rd, Grand Lake, CO 80447
BB&E PROJECT MANAGER: Mrs. Elyse Kutsche
BB&E OFFICE: Northville, MI
DATE HEALTH AND SAFETY PLAN PREPARED: October 11, 2021
DATE(S) OF SITE WORK: TBD, Expected Fall 2021 and/or Spring 2022.
SITE ACCESS: Coordinate with Rocky Mountain NPS for site access
PREVAILING WEATHER: Mountainous conditions with sudden changes in temperature and precipitation exist. Afternoon thunderstorms/hailstorms are common in the spring months. Prevailing winds are from the west, heavy wind and wind gusts are typical year round.

2.2 Site Description and History

Most of the sites are located within the west side of the Rocky Mountain National Park, with three sites located on the east side. The sites are comprised of 26 buildings in total. The sites on the western side of the park consist of the Betty Dick Ranch, the Grand Lake Entrance Station Area, the Green Mountain – Onahu Ranch Area, the Harbison Picnic Area, and the Timber Creek Road Camp Barn Area, shown in Figure 2. Sites on the east side of the park consist of the Fern Lake Area and Moraine Park Area, shown in Figure 3. The area of interest at the Betty Dick Ranch Area is the Betty Dick Garage. The area of interest at the Grand Lake Entrance Station Area is the Entrance Station Remit Office. Areas of interest at the Green Mountain Ranch consist of the Arapaho Cottage, the Barn, the Cirrus Cottage, the Cumulus Cottage, the Nimbus Cottage, the Meadow Cottage, the Mineral Cottage, the Old Pumphouse, the Onahu Cottage, the Parika Cottage, the Pioneer Cottage, and the Wood Storage Shed. Areas of interest at the Onahu Lodge Area are the Abasaw Aw Xa Cottage, the Ba Haa Thoson Cottage, the Bakuni Cottage, the Ho Ta Ta Ha Cottage, the Lodge, the Na Ha Non Cottage, the Pumphouse, and the Tool Shed. The Harbison Meadows Picnic Area consists of the Vault Toilet. The Timber Creek Road Camp Barn Area consists of the Camp Barn and Camp Barn Tack Shed. The area of interest at Fern Lake is the Fern Lake Patrol Cabin. Areas of interest at the Moraine Park area consist of the Stables Mess Hall and Stables Residence.

The Betty Dick Ranch is located north of the Grand Lake Entrance Station, within the flood plain of the Colorado River. The Grand Lake Entrance Station Area is located along Trail Ridge Road, north of the Kawuneeche Visitor Center. The Green Mountain – Onahu Ranch Area is located just west of the Trail Ridge Road, north of the Harbison Picnic Area and along the eastern edge of the Colorado River floodplain. The Harbison Meadows Picnic Area is located just north of the Grand Lake Entrance Station, along Trail Ridge Road. The Timber Creek Road Camp Barn area is located at the southern terminus of County Road 491, south of the National Park Services Building. The

Fern Lake Patrol Cabin is located just north of Fern Lake and accessed by a 7 mile round trip hike. The Moraine Park Stables Mess Hall and Stables Residence are located north of Fern Lake Road and west of the Moraine Park Campground.

All sites fall within the Rocky Mountain National Park property, which is owned and operated by the NPS. Activities at the sites include equipment storage and maintenance, customer service operations, cafeteria operations, concession operations, staff and visitor lodging, and restroom facilities.

Based on the historical presence of known or suspected materials at the site locations and previous sampling conducted by the NPS, soils and ash at the site locations could have been impacted by the East Troublesome Wildfire burning structural materials and causing the release of potentially hazardous substances contained within affected building materials, maintenance and cleaning chemicals, batteries and light bulbs, and other unknown materials presence on site.

2.3 Scope of Work

BB&E will conduct sampling of ash and soil at all 26 building areas located within the affected areas of the East Troublesome wildfire burn. The objective is to determine the presence and quantification of potentially hazardous substances released due to burning of building materials, maintenance and cleaning chemicals, batteries and light bulbs, and other unknown materials present at sampling locations, for proper hazardous waste disposal.

In accordance with the Final SAP, ash and soil samples will be collected from all 26 existing sampling units using Incremental sampling methodology (ISM) sampling procedures. Asbestos sampling will be conducted using bulk sampling of suspect asbestos-containing material (ACM) for polarized light microscopy (PLM) analysis and composited grab samples of the ash and soil material for transmission electron microscopy (TEM) analysis. Samples will be submitted for laboratory analysis of asbestos, California Title 22 Test CAM 17 metals, polychlorinated biphenyls (PCB) aroclors, dioxins and furans, and Resource Conservation and Recovery Act (RCRA) 8 metals. Analytical data will be compared to the appropriate risk-based screening criteria and/or regulatory criteria established by the NPS Ecological Screening Values and the United States Environmental Protection Agency (USEPA) Regional Screening Levels (RSLs) for Human Health.

3.0 ORGANIZATIONAL STRUCTURE

This section of the HSP describes lines of authority, responsibility, and communication as they pertain to health and safety functions at this site. The purpose of this section is to identify the personnel who impact the development and implementation of this HSP and to describe their roles and responsibilities. This section also identifies other subcontractors involved in work operations and establishes the lines of communication among them for safety and health matters.

The organizational structure of this site's safety and health program is consistent with OSHA requirements in 29 CFR 1910.120(b)(2) and provides the following site-specific information:

- The Project Manager who has the responsibility and authority to direct all hazardous waste operations.
- The Field Safety Officer who has the responsibility and authority to develop and implement this HSP and verify compliance.
- Other personnel needed for hazardous waste operations and emergency response and their general functions and responsibilities.
- The lines of authority, responsibility, and communication for safety and health functions.

This section will be reviewed and updated as necessary to reflect the current organizational structure at this site.

All site personnel have the responsibility and authority to stop work on a specific task if it may endanger the employee, co-workers, or the environment. There will be no reprise for questioning or stopping work which poses an uncontrolled risk.

All personnel and visitors on this site must comply with the requirements of this HSP. The specific responsibilities and authority of management, safety and health, and other personnel on this site are detailed in the following paragraphs.

CORPORATE HEALTH AND SAFETY MANAGER

The Corporate Health and Safety Manager is Mr. Thomas Barzyk. The Corporate Health and Safety Manager is responsible for ensuring all project team members maintain appropriate health and safety certifications and training for work anticipated to be conducted under the project and is responsible for reviewing and approving this Site Specific HSP. The Corporate Health and Safety Manager has complete autonomy, including the authority to direct the stoppage of work on any activity for health and safety reasons.

PROJECT MANAGER

The Project Manager (PM) for this site is Mrs. Elyse Kutsche. The PM has responsibility and authority to direct all work. The PM coordinates safety and health functions with the Field Safety Officer, has the authority to oversee and monitor the performance of the Field Safety Officer, bears ultimate responsibility for the proper authority to oversee and monitor the performance of the Field

Safety Officer, and bears ultimate responsibility for the proper implementation of this HSP. The qualified alternate PM for this site is Mr. Thomas Barzyk.

FIELD SAFETY OFFICER

The Field Safety Officer for this site is Ms. Celeste Holtz. The Field Safety Officer has full responsibility and authority to develop and implement this HSP and to verify compliance. The Field Safety Officer reports to the PM. The Field Safety Officer is on site or readily accessible to the site during all work operations and has the authority to halt site work if unsafe conditions are detected.

SITE SUPERINTENDENT

The Site Superintendent for this site is Ms. Celeste Holtz. The Site Superintendent is responsible for field operations and reports to the PM. The Site Superintendent ensures the implementation of the HSP requirements and procedures in the field. Due to the size of the project, the Site Superintendent and Field Safety Officer is the same individual.

PROJECT SCIENTIST/ENGINEER

The Project Scientist/Engineer for this site is Mr. Preston Sowell. The Project Scientist/Engineer is responsible for conducting the field work and reports to the PM.

4.0 SITE DESCRIPTION AND HAZARD SUMMARY

4.1 Summary of Known or Suspected Chemical Hazards

The former buildings within the Site included an office, staff rustic seasonal accommodations, barns, garage, ranger station, and outdoor toilets. None of these buildings were used for industrial purposes. Small quantities of cleaning chemicals, fuels, batteries, and building materials containing Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) hazardous substances may have been stored in the buildings. Some historical building materials or equipment may have also contained hazardous substances like PCBs, lead paint, and asbestos. Uncontrolled releases of the CERCLA hazardous substances may have occurred during the East Troublesome Wildfire, and these substances may remain in ash or underlying soil. The Park has performed ash sampling of debris from two partially burned and two completely destroyed buildings, and there is some indication that concentrations of metals are potentially hazardous. The purpose of this investigation is to assess building debris, ash, and soil for suspected metals, asbestos, PCBs, and dioxin and furan contamination at the Site to establish whether a release or potential release of hazardous substances, pollutants, or contaminants has occurred or could occur. There is the potential that some of these items released CERCLA hazardous substances during the fire to soil or ash and may be encountered when performing the planned field activities at the site.

Asbestos fibers may be present in resident ash and soil on the ground surface, produced from burning of potentially asbestos containing materials within the cabins and former structures. BB&E and their contractors will take necessary precautions when sampling potentially asbestos containing ash and soils, by use of appropriate personal protective equipment, in addition to wetting the ground surface with de-ionized water to prevent dust from soil disturbance when sampling. All asbestos sampling will be completed by a Certified Asbestos Building Inspector (CABI). Personnel sampling asbestos suspected or confirmed site will make use of full-face air-purifying respirators, equipped with High Efficiency Particulate Air (HEPA) filters, booties, and disposable gloves during soil sampling activities. Respirators will not be required when engineering controls can be used to control airborne dust levels in personnel breathing zone. Following sampling, personnel will decontaminate sampling equipment and dispose of booties and gloves in sealed refuse bags for appropriate disposal.

4.2 Summary of Known or Potential Physical Hazards

A variety of physical hazards are expected to be encountered as part of the performance of the scope of work (SOW). Potential physical hazards which may be encountered during this project are described below.

HEAVY EQUIPMENT

Heavy equipment is not planned to be utilized as part of current field activities.

SEVERE WEATHER CONDITIONS

The Field Safety Officer has the authority, should severe weather threaten, to place the site activities on standby, cease operations and/or evacuate the site as deemed necessary. Weather conditions on site cannot be controlled. Site personnel are to be aware of the warnings of impending severe weather and the precautions that are to be taken when severe weather threatens. The Field Safety Officer will monitor severe weather conditions via radio when severe weather is expected to be present.

TEMPERATURE STRESS

Hot or cold weather is generally a consideration at any site and cannot be controlled. Site workers need to be aware of engineering controls which can reduce temperature stress, the signs and symptoms of temperatures stress and first aid measures for victims of temperature stress. The Field Safety Officer will be responsible for instructing site workers on the temperature stress risks on individual work days.

NOISE

Hearing protection is required when working in close proximity to heavy equipment, the level of noise interferes with communications, or the sound level exceeds 85 decibels (dB). Generally, if site personnel cannot hear someone speaking at a normal conversational level when they are three feet away, site personnel will be required to wear hearing protection at all times. The Field Safety Officer will assist site personnel in determining the requirements for hearing protection.

CONFINED SPACES

Confined space entry is not planned or anticipated on this project and is not allowed in the scope of this HSP. Should a confined space entry situation be encountered, the Field Safety Officer must be notified and provisions for confined space entry must be added to this HSP.

EXCAVATIONS

Excavations are not planned or anticipated as part of current field activities.

ELECTRICAL

No electrical work is planned as part of current field activities. NPS will ensure that all power has been discounted to the structures prior to sampling activities. BB&E staff should treat suspicious electrical wiring, electrical boxes, charged material, etc. with care and contact NPS personnel prior to digging or coming into contact with this type of material.

SLIPS, TRIPS AND FALLS

Good housekeeping will be maintained at the site. Trip hazards will be removed, marked, or guarded. Large debris is present at several building locations. The BB&E team will use caution to sample around this debris when removal/shifting is not possible. Extreme caution shall be used

when working on or around slippery surfaces. All necessary precautions will be taken to prevent personnel from injuries caused by slick surfaces.

BACK STRAIN

Proper lifting techniques shall be used when handling heavy or bulky loads, such as sampling equipment or sample coolers. Personnel shall lift with legs, keeping backs straight, and loads close to their bodies. Avoid twisting at the waist during lifting. Personnel shall receive help from others when loads appear to be too heavy. Mechanical means of lifting is the preferred method and will be used whenever possible.

ANIMAL/INSECT/VEGETATION

Bears, elk, moose, rodents, snakes, stray animals, stinging insects, and poison sumac are all environmental hazards that may be encountered during daily site operations. Site investigation to identify the hazards prior to work related activities is essential. The information obtained can then be passed on to site personnel. Site-specific procedures shall be instituted should there be a reasonable potential for these hazards.

ALTITUDE SICKNESS

On site work will be conducted at elevations of greater than 7,800 feet above mean sea level, thus onsite personnel may be subject to altitude sickness and will monitor symptoms including headache, nausea, dizziness, fatigue, loss of appetite, and shortness of breath. It is recommended and will be monitored that onsite personnel drink plenty of fluids to maintain hydration at high altitude.

BURN ZONE HAZARDS

Working within a burn zone carries unique dangers including fallen trees and limbs, loose soil, and unstable existing vegetation. Hard hats will be required and worn at all times within the burn zones. Appropriate footwear will be worn to including proper hiking shoes with good tread, support, and foot coverage.

REMOTE SITE WORK

The Fern Lake Cabin within the East Side District will pose unique challenges for site personnel, given its remote location along Fern Lake. Cell reception may be inhibited given its location, and the site is only accessible by trail. BB&E personnel will discuss appropriate measures with NPS personnel for the best means of emergency exit routes and emergency contact measures, if the need should arise while conducting sampling activities. Additional measures will be taken to be aware of potential animal dangers in the park, such as bears, mountain lions, elk, and moose, to avoid any potential encounters. These precautions will include traveling with a NPS staff member and BB&E team member. If a bear or mountain lion is spotted, those personnel will apply any

large predator training techniques involving standing upright and facing the animal, making loud noises, and making efforts to appear larger in effort to ward off an attack.

5.0 SITE CONTROL

5.1 Site and Project Boundaries

Figure 1 depicts the project location where sampling activities will be conducted.

5.2 Site Security/Security Clearance

The Field Safety Officer is responsible for controlling access to the work site during sampling activities. No visitors will be permitted to enter the work areas without obtaining permission from the Field Safety Officer or Site Superintendent. All subcontractors will also be cleared by the Field Safety Officer or Site Superintendent prior to entering work area.

Personnel performing field activities at the site will complete the required Determination of Fitness application in order to obtain security clearance prior to the commencement of field activities. No employee shall be allowed to perform any work under this contract without receiving prior clearance from NPS.

5.3 Site Communications

Communication equipment will be on-site and available as necessary to support on-site communications. Cellular telephones and a current list of emergency contact numbers at this site are located in the field vehicle at the site and included in **Section 7.0** of this HSP.

5.4 Work Schedule

BB&E anticipates that field work will be conducted in Fall 2021 or Spring 2022. Field work will be completed Monday through Friday, from approximately 8:00 AM to 6:00 PM. Weekend or after-hours work, if required, will be coordinated with NPS personnel.

5.5 Training and Medical Surveillance

BB&E field personnel and all subcontractor personnel completing field activities have completed the required initial 40 Hour HAZWOPER Course and annual 8–Hour HAZWOPER refresher training in compliance with 29 CFR 1910.120(e)(8).

Contractor and personnel performing soil-disturbing activities, in an area with asbestos waste or asbestos contaminated soil, are required to complete an asbestos awareness training in accordance with the 2005 OSHA standards set forth at 29 CFR 1926.1101(k)(9)(vii). Additionally, the individual is required to complete asbestos-contaminated soil training that provides necessary information to perform their duties in a way that ensures compliance with the requirements of Section 5.5 of the Colorado Department of Public Health & Environment (CDPHE) Solid Waste Regulations. The training must be conducted by an asbestos supervisor, Building Inspector or Project Designer, certified in accordance with Air Quality Control Commission (AQCC)

Regulation No. 8, Part B, and who has a minimum of (6) months experience in asbestos-contaminated soil management.

Contractor personnel completing Asbestos sampling activities will possess a current Colorado asbestos certification in accordance with the provisions set forth in AQCC Regulation No. 8, Part B.

5.6 COVID-19 Response Plan

BB&E has developed a separate Corporate COVID-19 Response Plan, compliant with Center for Disease Control and Prevention (CDC) requirements, to outline general BB&E policies and guidelines to aid in the protection of employees, workspaces, and clients. The plan includes appropriate prevention efforts (i.e., administrative controls and policies, housekeeping procedures, personal protective equipment [PPE], surveillance, etc.) implemented by BB&E to minimize or eliminate employee exposure. The COVID-19 Response Plan is a separate, controlled plan that evolves with new information and guidance from local, state, and federal health officials and is available upon request. In addition, BB&E will follow local client specific COVID-19 protocols when accessing or visiting client facilities and/or properties. At a minimum, BB&E employees will maintain safe distance requirements and will utilize face masks or facial coverings when ideal social distancing guidelines cannot be maintained.

6.0 LEVELS OF PROTECTION

All on-site work for this project (ash and soil sampling activities), in non-asbestos contaminated areas, is anticipated to be performed in Modified Level D including safety shoes, safety glasses, reflective vest, disposable gloves and booties, and hard hats. Site work (ash, soil, and bulk material sampling) in asbestos contaminated areas or unconfirmed areas will be conducted in Level C including safety shoes, boot covers, safety glasses, reflective vest, disposable gloves, hard hats, and full-face air-purifying respirators, equipped with HEPA cartridges, unless engineering controls are able to be put in place to control airborne dust levels in personnel breathing zone. Face shields and hearing protection are not required. Should an upgraded level of PPE be determined by the Field Safety Officer and Site Superintendent to be required, based upon site conditions, personnel will immediately cease work operations and demobilize from the job site until appropriate PPE can be obtained or site conditions have returned to levels where Level C or Level D PPE is appropriate.

Four common levels of protection are listed below.

Level D

- Work Uniform and reflective vest
- Safety Boots - Steel toe/steel shank
- Hard Hat (as needed)
- Safety Glasses with side shields
- Face Shield
- Hearing Protection

Level D-Modified

- Safety Boots - Steel toe/steel shank
- Hard Hat
- Safety Glasses with side shields
- Face Shield
- Hearing Protection
- Outer Gloves
- Boot Covers
- Chemical Resistant Clothing
- Inner Gloves

Level C

- Face Shield
- Outer Gloves
- Boot Covers
- Full-Face Air Purifying Respirator
- Respirator Cartridge - Type: combo/HEPA
- Hearing Protection
- Safety Boots - Steel toe/steel shank
- Hard Hat
- Chemical Resistant Clothing
- Inner Gloves

Level B

- Face Shield
- Outer Gloves
- Boot Covers
- Chemical Resistant Clothing
- Hearing Protection
- Safety Boots - Steel toe/steel shank
- Hard Hat
- Inner Gloves
- Positive Pressure/Pressure Demand Self Contained Breathing Apparatus or Airline Respirator with Escape Bottle

7.0 EMERGENCY CONTACT INFORMATION

The following table includes contact information for local emergency service providers.

Emergency Provider	Telephone
Ambulance/Police/Fire	911
Poison Control Center	1-800-222-1222
National Response Center	1-800-424-8802

The following information includes contact information for project personnel.

Role	Contact Name	Business Phone	Mobile Phone
Corporate Health & Safety Manager	Thomas Barzyk	248-489-9636 x 302	248-766-4143
Project Manager	Elyse Kutsche		248-648-0490
Field Safety Officer	Celeste Holtz	248-489-9636 x 307	517-673-1792
Field Team	Preston Sowell		303-775-6920
Alternate Field Team Personnel	Drew Jackson		678-588-6441
Asbestos Field Team Lead	Jim Dennison		970-266-8000

The following information includes contact information for NPS personnel.

Role	Contact Name	Business Phone	Mobile Phone
NPS Project Manager	Paul Torcoletti		720-355-1456
NPS Cultural Coordinator	Dan Jackson		402-297-8779
NPS Civil Engineer Support	Will Mchugh	970-586-1315	970-227-6620

8.0 EMERGENCY ROUTES

The following section provides driving directions to Estes Park Hospital in Estes Park, CO, the nearest hospital from the east side or west side of Rocky Mountain National Park if Trail Ridge Road is open. If Trail Ridge Road is closed the nearest hospital to the west side of the park is St. Anthony Hospital in Lakewood, CO.

Driving Directions (from east side)

- Head east on US-36 E/Moraine Ave (2.4 miles)
- Turn right onto Crags Drive (0.1 miles)
- Continue onto Moccasin Circle Drive (0.6 miles)
- Continue onto Fir Ave (335 feet)
- Turn Left onto Prospect Ave (236 feet)
- Turn left into Estes Park Hospital Emergency Room
  555 Prospect Ave, Estes Park, CO, 80517
  (970) 586-2317

Driving Directions (from west side if Trail Ridge Road is open)

- Head north on US-34 E (37.2 miles)
- Continue onto US-36 E (6.5 miles)
- Turn right onto Crags Drive (0.1 miles)
- Continue onto Moccasin Circle Drive (0.6 miles)
- Continue onto Fir Ave (335 feet)
- Turn Left onto Prospect Ave (236 feet)
- Turn left into Estes Park Hospital Emergency Room
  555 Prospect Ave, Estes Park, CO, 80517
  (970) 586-2317

Driving Directions (from west side if Trail Ridge Road is closed)

- Head south on US-34 E (37.2 miles)
- Turn left onto Co Hwy 61 (0.9 miles)
- Continue onto N 2nd St (0.3 miles)
- Turn left onto E Diamond Ave (0.2 miles)
- Turn right onto 4th St (0.3 miles)
- Turn left onto US-40 E/E Agate Ave (46.0 miles)
- Merge onto I-70 E (28.3 miles)
- Take exit 261 for US-6 E/6th Avenue (0.3 miles)
- Continue onto US-6 E (2.2 miles)
- Exit onto Union Blvd (0.2 miles)
- Merge onto Union Blvd (0.5 miles)
- Use the left 2 lanes to turn left onto W 2nd Pl (0.1 miles)

- Turn right at the 1st cross street onto Healing Way (0.3 miles)
- Turn left (69 feet)
- Turn right (194 feet)
- Keep right (64 feet)
- Turn right into St Anthony Hospital Emergency Room

11600 W 2nd Pl, Lakewood, CO 80228

The Hospital Route Map is included as **Attachment 3** to this HSP.

9.0 EMERGENCY PROCEDURES

9.1 Site Evacuation

The evacuation signal for the site is three short blasts of a horn, either on a motor vehicle or on an air horn. Evacuation routes and assembly points will be determined at the site by the Field Safety Office. All workers will be notified of routes and assembly points during daily safety meetings.

9.2 First Aid

A first aid kit will be located in the field vehicle at the site. Should a medical emergency develop which is beyond the capability or resources of on-site personnel, injured personnel will be immediately transported to the hospital described above for urgent care. Hospital route maps are included in **Attachment 3**.

9.3 Spill Containment

No hazardous materials or liquids will be utilized for this project which would require the use of spill equipment or containment. Pre-preserved laboratory containers will contain preservation liquids. Any incidental spills will be contained with sorbent material and/or pads and disposed of properly.

10.0 REFERENCES

National Park Service (NPS), 2021. *Request for Quote (RFQ)*, August 6, 2021.

Section 5, Solid Waste Regulations, 6 C.C.R. § 1007-2 (2014).

Regulation No. 8 Control of Hazardous Air Pollutants, Part B, 5 C.C.R. § 1001-10 (2020).

FIGURES

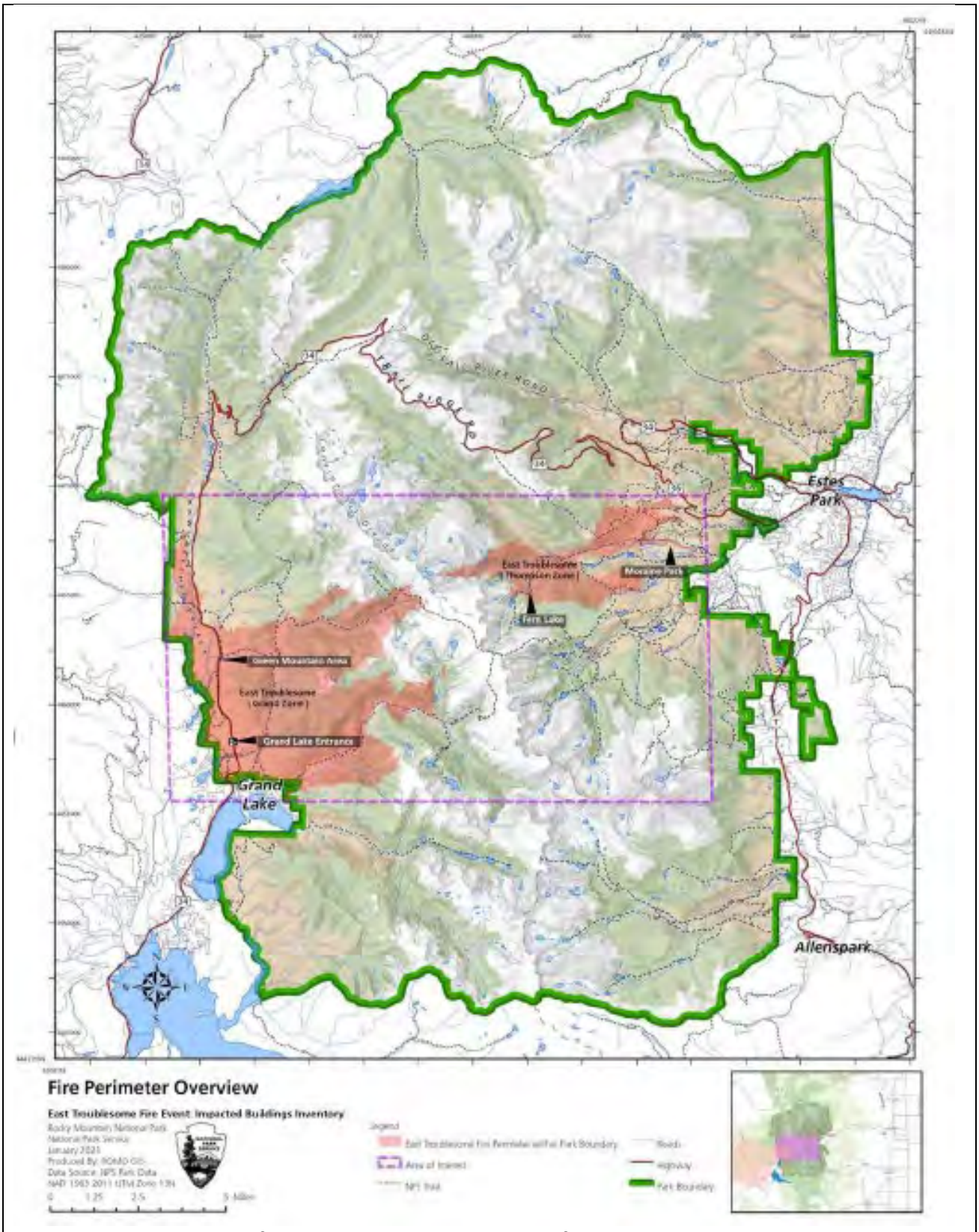


Figure 1. Site overview of eastern and western site areas for East Troublesome Fire Event.

ATTACHMENTS

Attachment 1

Employee Sign-Off Form

Employee Sign-Off Form

All BB&E employees working on or visiting this site are to sign below, indicating that they have read this HSP, understand its contents, have been given opportunity to discuss its contents with the Field Safety Officer and agree to abide by its requirements. The supervisors of all subcontractors are to sign below, indicating that they have read this HSP, understand its contents, and have been given opportunity to discuss its contents with the Field Safety Officer. All subcontractors and visitors, however, are explicitly covered under their own HSP and are governed by the procedures contained therein.

Date	Name	Employer	Signature

It is the responsibility of the Field Safety Officer to have a completed and signed copy of this HSP returned to the BB&E Health and Safety Manager for inclusion in the project file.

Attachment 2

Subcontractor Health & Safety Plan

Century Environmental Hygiene Health & Safety Plan

Inspecting and sampling the burned building remains exposes employees to a variety of potential health and safety risks. These include but aren't limited to:

- Exposure to asbestos and other chemicals including PCBs, heavy metals, waste oil, paint etc.
- Slips and falls in unstable debris
- Cuts from any sharp metal
- Mice, insects

The Contractor's field personnel must conduct work, at a minimum, in Level D attire according to the unless the Contractor's Health and Safety Officer (HSO) identifies that additional protection may be required. The PPE ensemble will include:

- Safety shoes
- Disposable booties or coveralls. Wear coveralls if needed to avoid getting char or ash on clothing.
- Eye protection, as necessary
- Half face APR with P100 – wear if airborne dust is present
- Nitrile gloves
- Hard hat as necessary
- Hi-vis vest

Either verify there is no wiring to each structure or participate in LOTO.

Altitude sickness. Drink plenty of water and self-monitor for symptoms of altitude sickness:

- headache.
- feeling and being sick.
- dizziness.
- tiredness.
- loss of appetite.
- shortness of breath.

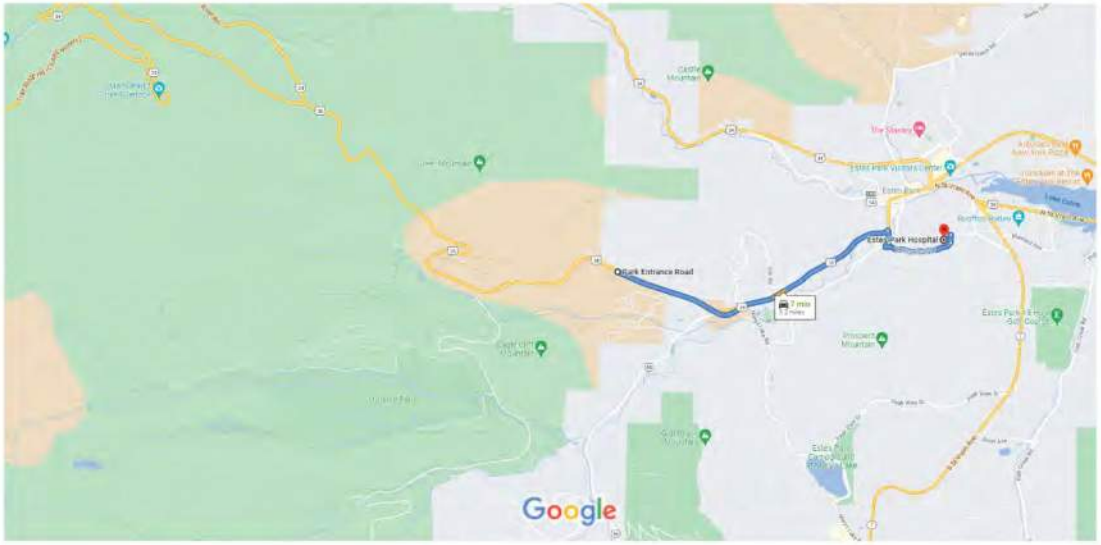
Attachment 3

Hospital Route Maps

Google Maps

Park Entrance Rd, Estes Park, CO 80517 to hospital near rocky mountain national park

Drive 3.2 miles, 7 min



Map data ©2021 2000 ft

Park Entrance Rd

Estes Park, CO 80517

1. Head southeast on US-36 E/Moraine Ave — 2.4 mi
2. Turn right onto Crags Dr — 0.1 mi
3. Continue onto Moccasin Cir Dr — 0.6 mi
4. Continue onto Fir Ave — 335 ft
5. Turn left onto Prospect Ave — 236 ft
6. Turn left
   Destination will be on the right — 121 ft

Estes Park Hospital

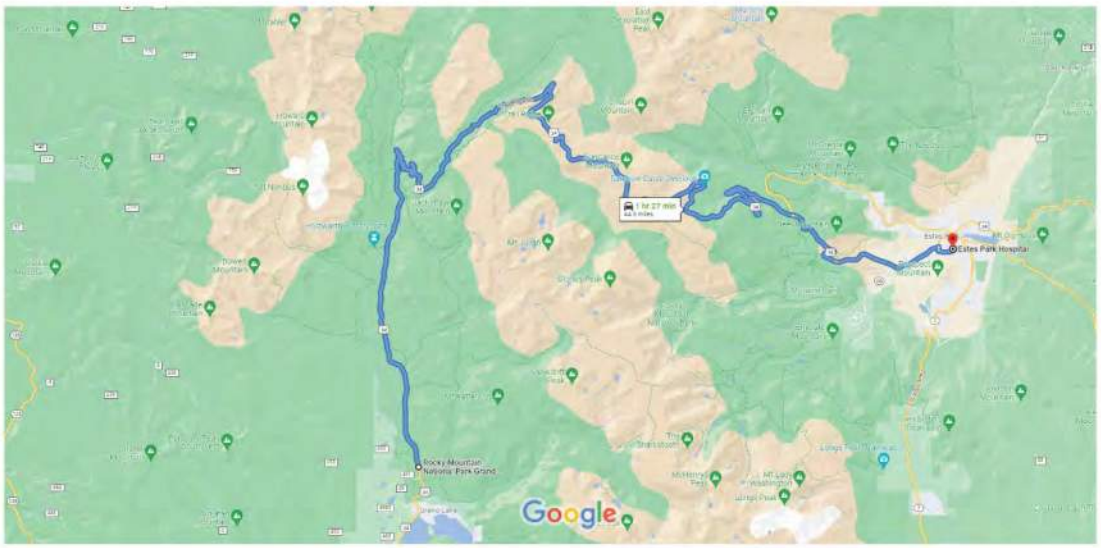
555 Prospect Ave, Estes Park, CO 80517

These directions are for planning purposes only. You may find that construction projects, traffic, weather, or other events may cause conditions to differ from the map results, and you should plan

Google Maps

Rocky Mountain National Park Grand Lake Entrance to hospital near rocky mountain national park

Drive 44.5 miles, 1 hr 27 min



Map data ©2021 Google 2 mi

Rocky Mountain National Park Grand Lake Entrance

Rocky Mtn NP Grand Lake Entrance / Toll Station, Rocky Mountain National;= Park, Trail Ridge Rd, Grand Lake, CO 80447

1. Head north on US-34 E
   - ⚠ Toll road
   - ⚠ Parts of this road may be closed at certain times or days

   37.2 mi
2. Continue onto US-36 E

   6.5 mi
3. Turn right onto Crags Dr

   0.1 mi
4. Continue onto Moccasin Cir Dr

   0.6 mi
5. Continue onto Fir Ave

   335 ft
6. Turn left onto Prospect Ave

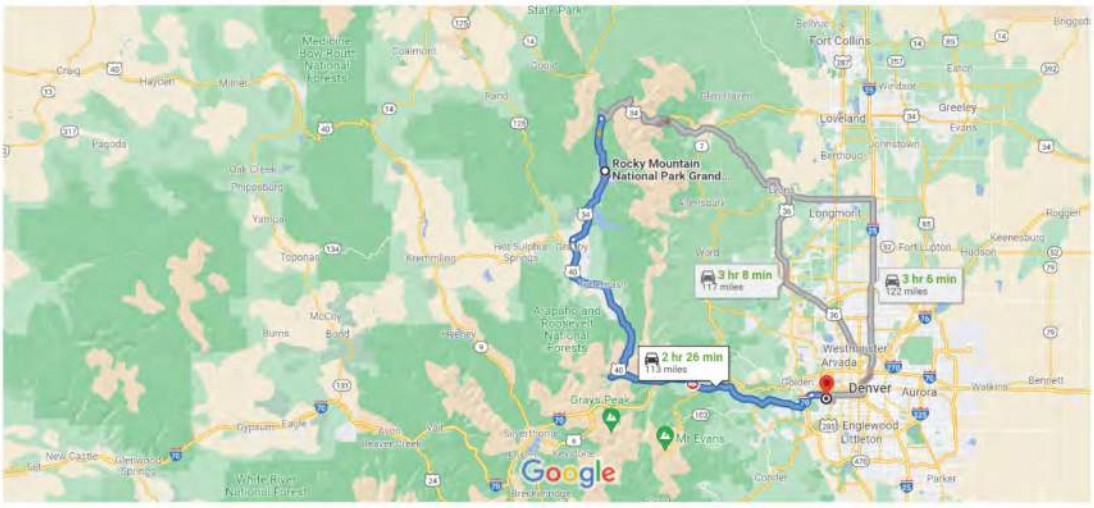
   236 ft
7. Turn left
   - ℹ Destination will be on the right

   121 ft

Google Maps

Rocky Mountain National Park Grand Lake Entrance to St. Anthony Hospital Emergency Room

Drive 113 miles, 2 hr 26 min



Map data ©2021 Google 10 mi

Rocky Mountain National Park Grand Lake Entrance
Rocky Mtn NP Grand Lake Entrance / Toll Station, Rocky Mountain National;= Park, Trail Ridge Rd, Grand Lake, CO 80447

Follow US-34 E, US-40 E and I-70 E to Union Blvd in Lakewood. Take the Union Blvd exit from US-6 E

2 hr 25 min (112 mi)

↑ 1. Head north on US-34 E
⚠ Toll road
⚠ Parts of this road may be closed at certain times or days

9.5 mi

↶ 2. Make a U-turn
⚠ Toll road
⚠ Parts of this road may be closed at certain times or days

24.2 mi

↰ 3. Turn left onto Co Hwy 61

0.9 mi

↑ 4. Continue onto N 2nd St

0.3 mi

↰ 5. Turn left onto E Diamond Ave

0.2 mi

6. Turn right onto 4th St

0.3 mi

7. Turn left onto US-40 E/E Agate Ave

46.0 mi

8. Merge onto I-70 E

28.3 mi

9. Take exit 261 for US-6 E/6th Avenue

0.3 mi

10. Continue onto US-6 E

2.2 mi

11. Exit onto Union Blvd

0.2 mi

Continue on Union Blvd to your destination

4 min (1.0 mi)

12. Merge onto Union Blvd

0.5 mi

13. Use the left 2 lanes to turn left onto W 2nd Pl

0.1 mi

14. Turn right at the 1st cross street onto Healing Way

0.3 mi

15. Turn left

69 ft

16. Turn right

194 ft

17. Keep right

Destination will be on the right

66 ft

St Anthony Hospital Emergency Room
11600 W 2nd Pl, Lakewood, CO 80228

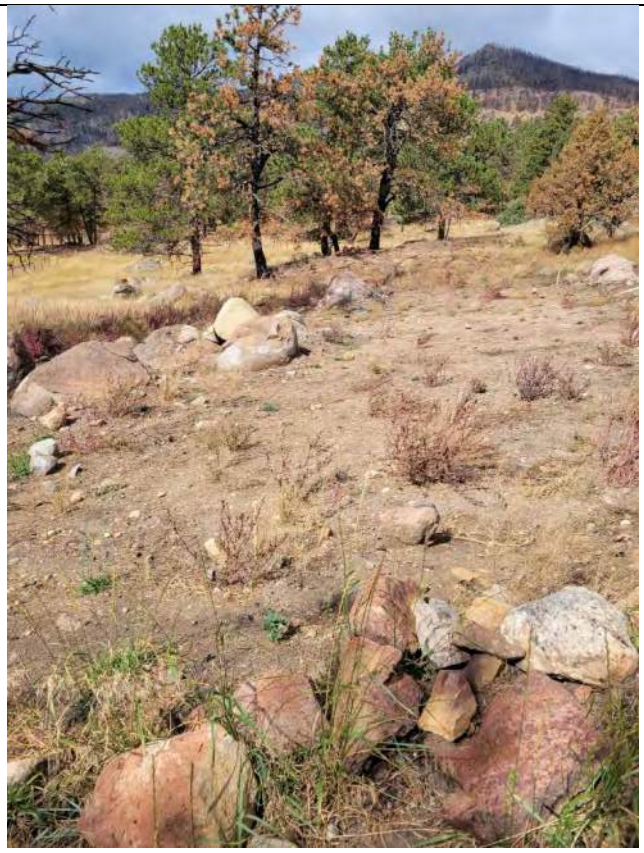
These directions are for planning purposes only. You may find that construction projects, traffic, weather, or other events may cause conditions to differ from the map results, and you should plan your route accordingly. You must obey all signs or notices regarding your route.

Appendix 3 – Site Photos

East Troublesome Fire Damaged Structures
Rocky Mountain Nation Park

The photos presented below were captured during two site visits conducted on 9/29/2021 and 10/08/2021.

Building: B-0893, Moraine Park Stables Mess Hall
Park Region: East Site District
Date: 9/29/2021



East Troublesome Fire Damaged Structures
Rocky Mountain Nation Park

Building: B-1086, Moraine Park Stables Residence
Park Region: East Site District
Date: 9/29/2021

East Troublesome Fire Damaged Structures
Rocky Mountain Nation Park

Building: B-0014, Fern Lake Patrol Cabin
Park Region: East Site District
Date: 9/29/2021

East Troublesome Fire Damaged Structures
Rocky Mountain Nation Park

Building: B-0241, Timber Creek Road Camp Barn
Park Region: Colorado River District
Date: 10/8/2021

East Troublesome Fire Damaged Structures
Rocky Mountain Nation Park

Building: B-0572, Timber Creek Road Camp Barn Tack Shed
Park Region: Colorado River District
Date: 10/8/2021

East Troublesome Fire Damaged Structures
Rocky Mountain Nation Park

Building: B-1141, Grand Lake Entrance Remit Office
Park Region: Colorado River District
Date: 10/8/2021

East Troublesome Fire Damaged Structures
Rocky Mountain Nation Park

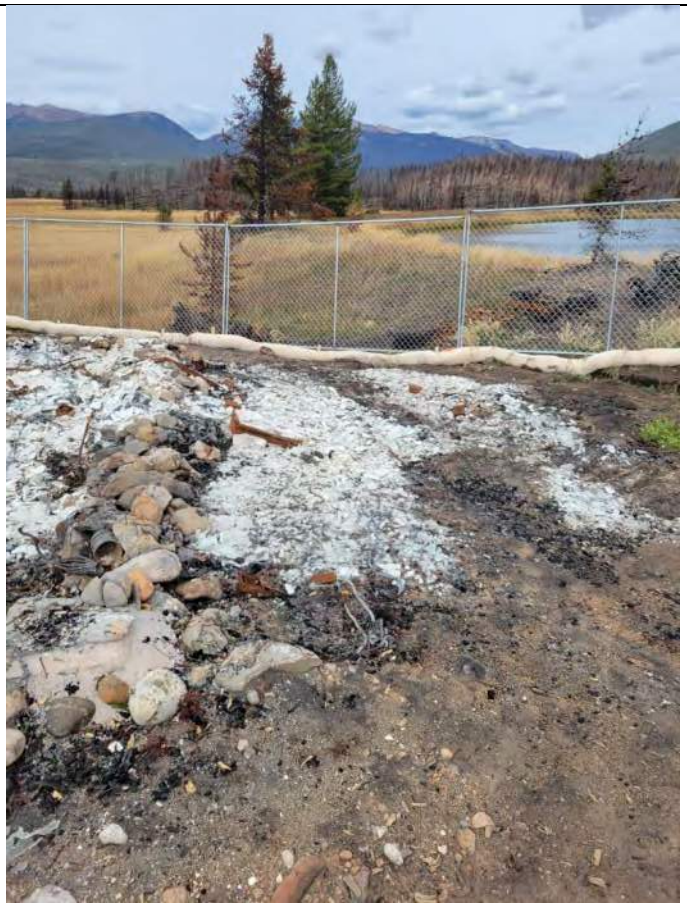
Building: Q-0731, Green Mountain Ranch Mineral Cottage
Park Region: Colorado River District
Date: 10/8/2021

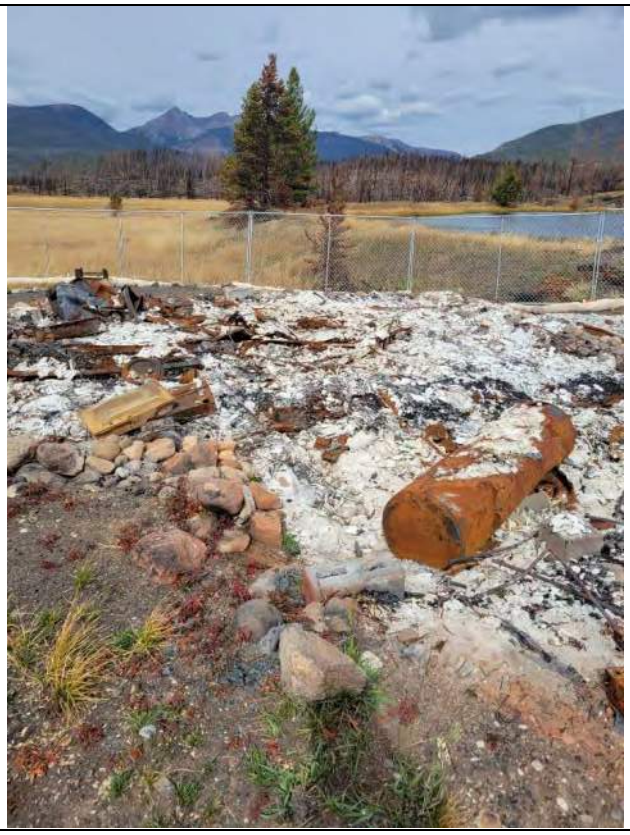
East Troublesome Fire Damaged Structures
Rocky Mountain Nation Park

Building: Q-0732, Green Mountain Ranch Parika Cottage
Park Region: Colorado River District
Date: 10/8/2021

East Troublesome Fire Damaged Structures
Rocky Mountain Nation Park

Building: Q-0733, Green Mountain Ranch Arapaho Cottage
Park Region: Colorado River District
Date: 10/8/2021





East Troublesome Fire Damaged Structures
Rocky Mountain Nation Park

Building: Q-0734, Green Mountain Ranch Onahu Cottage
Park Region: Colorado River District
Date: 10/8/2021

East Troublesome Fire Damaged Structures
Rocky Mountain Nation Park

Building: Q-0735, Green Mountain Ranch Cumulus Cottage
Park Region: Colorado River District
Date: 10/8/2021

East Troublesome Fire Damaged Structures
Rocky Mountain Nation Park

Building: Q-0737, Green Mountain Ranch Cirrus Cottage
Park Region: Colorado River District
Date: 10/8/2021

East Troublesome Fire Damaged Structures
Rocky Mountain Nation Park

Building: Q-0740, Green Mountain Ranch Meadow Cottage
Park Region: Colorado River District
Date: 10/8/2021

East Troublesome Fire Damaged Structures
Rocky Mountain Nation Park

Building: B-0853, Green Mountain Ranch Old Pumphouse
Park Region: Colorado River District
Date: 10/8/2021

East Troublesome Fire Damaged Structures
Rocky Mountain Nation Park

Building: B-0724, Green Mountain Ranch Barn
Park Region: Colorado River District
Date: 10/8/2021

East Troublesome Fire Damaged Structures
Rocky Mountain Nation Park

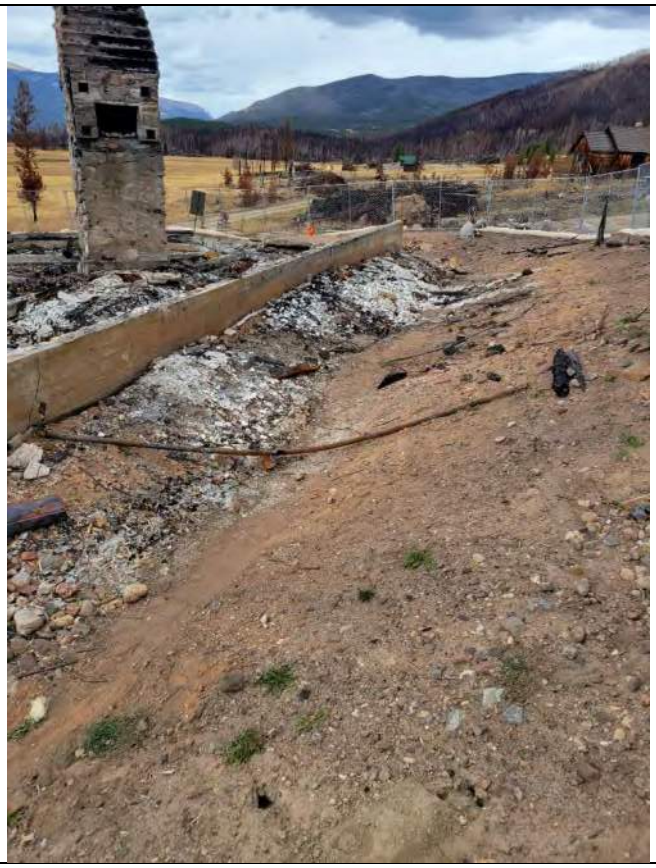
Building: Q-0727, Green Mountain Ranch Pioneer Cottage
Park Region: Colorado River District
Date: 10/8/2021

East Troublesome Fire Damaged Structures
Rocky Mountain Nation Park

Building: B-0728, Green Mountain Ranch Wood Storage Shed
Park Region: Colorado River District
Date: 10/8/2021

East Troublesome Fire Damaged Structures
Rocky Mountain Nation Park

Building: Q-0575, Onahu Ranch Lodge
Park Region: Colorado River District
Date: 10/8/2021



East Troublesome Fire Damaged Structures
Rocky Mountain Nation Park

Building: Q-0575, Onahu Ranch Lodge - continued
Park Region: Colorado River District
Date: 10/8/2021

East Troublesome Fire Damaged Structures
Rocky Mountain Nation Park

Building: Q-0577, Onahu Ranch Ho Ta Ta Ha Cottage
Park Region: Colorado River District
Date: 10/8/2021

East Troublesome Fire Damaged Structures
Rocky Mountain Nation Park

Building: Q-0578, Onahu Ranch Na Ha Non Cottage
Park Region: Colorado River District
Date: 10/8/2021

East Troublesome Fire Damaged Structures
Rocky Mountain Nation Park

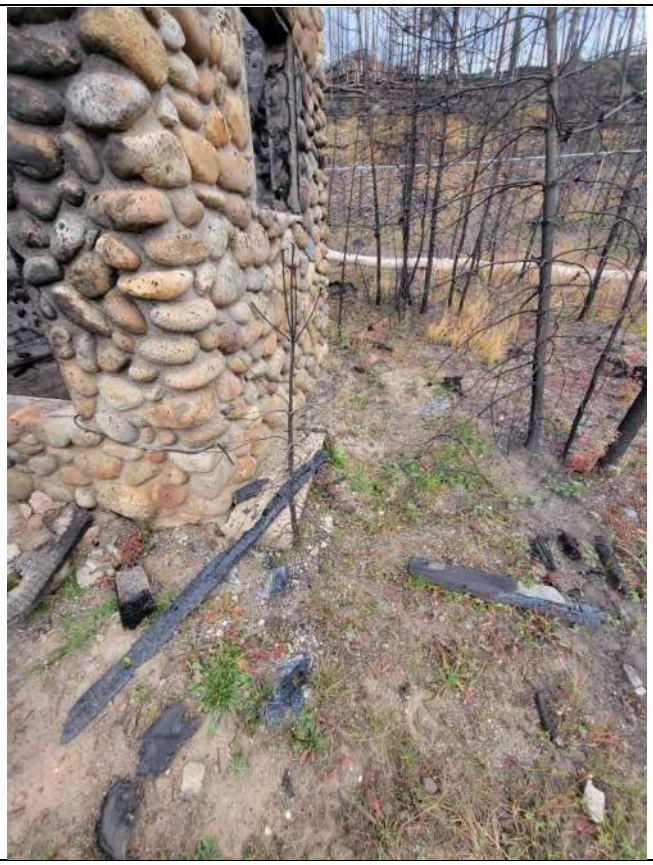
Building: Q-0579, Onahu Ranch Bakuni Cottage
Park Region: Colorado River District
Date: 10/8/2021

East Troublesome Fire Damaged Structures
Rocky Mountain Nation Park

Building: Q-0583, Onahu Ranch Abasaw Aw Xa Cottage
Park Region: Colorado River District
Date: 10/8/2021

East Troublesome Fire Damaged Structures
Rocky Mountain Nation Park

Building: Q-0587, Onahu Ranch Pumphouse
Park Region: Colorado River District
Date: 10/8/2021

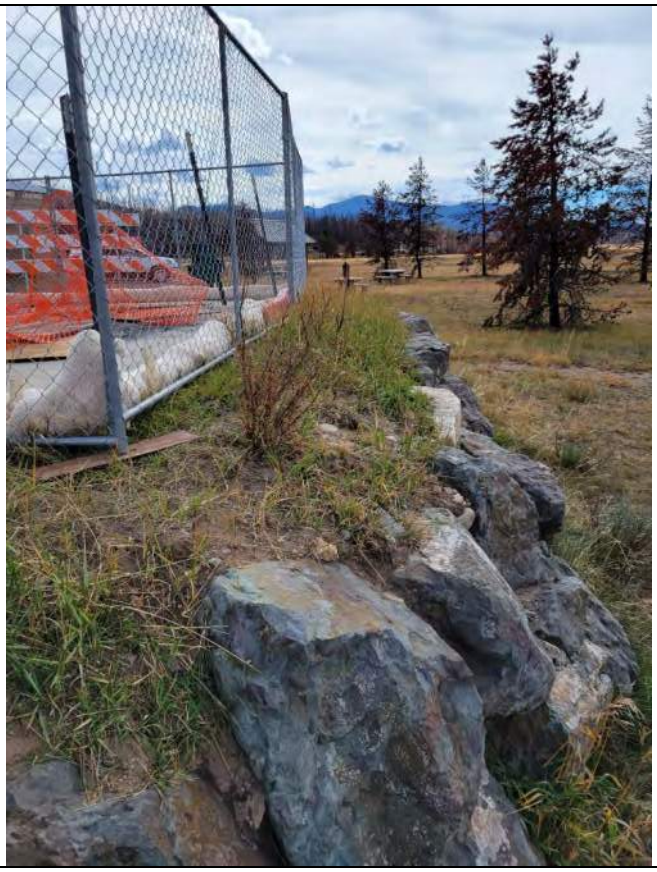


East Troublesome Fire Damaged Structures
Rocky Mountain Nation Park

Building: Q-0624, Onahu Ranch Tool Shed
Park Region: Colorado River District
Date: 10/8/2021

East Troublesome Fire Damaged Structures
Rocky Mountain Nation Park

Building: B-1183, Harbison Ranch Picnic Area Vault Toilet
Park Region: Colorado River District
Date: 10/8/2021



East Troublesome Fire Damaged Structures
Rocky Mountain Nation Park

Building: Q-0587, Betty Dick
Park Region: Colorado River District
Date: 10/8/2021

East Troublesome Fire Damaged Structures
Rocky Mountain Nation Park

Building: Q-0587, Betty Dick – continued.
Park Region: Colorado River District
Date: 10/8/2021

Appendix 4 – CDPHE East Troublesome Fire Guidance Documents

Asbestos

East Troublesome Wildfire, October 2020
Public and Commercial Buildings

Ash and debris from burned structures may contain toxic substances due to the many synthetic and other materials that may be present in buildings. For example, car batteries or mercury light bulbs, lead-based paint, plastic items and other potentially toxic materials may have been present in the buildings prior to the fire. Public and commercial structures may contain larger amounts of these materials. People should take precautions when entering buildings that are partially damaged by the fire or when handling any materials from buildings completely destroyed by the fire. They should wear protective clothing and equipment to avoid skin contact with debris and inhalation of ash.

One particular concern in handling debris from structures damaged or destroyed by wildfires is the possible exposure to asbestos fibers. Asbestos is a known carcinogen and exposure to asbestos fibers can cause or contribute to the development of various diseases including asbestosis, mesothelioma and lung cancer. Asbestos fibers have been commonly used in a variety of building materials including wall and ceiling textures, drywall, insulation, sheet vinyl flooring and floor tiles. Asbestos-containing materials that are in good condition should not pose a hazard. However, materials that are damaged or disturbed can release asbestos fibers creating a potential exposure risk for people working on site or on neighboring sites.

Colorado enforces asbestos requirements under Colorado Regulation No. 8, Part B. It also has been delegated the authority and obligation to enforce the federal National Emission Standards for Hazardous Air Pollutants (NESHAP) regarding asbestos in public and commercial buildings. For residential properties, including commercial residential buildings with four or fewer dwelling units, the Colorado Department of Public Health and Environment is able to waive some of the asbestos requirements of Colorado Regulation 8, Part B. Please see the specific documents developed for residential properties affected by the East Troublesome Wildfire. Colorado cannot waive federal requirements for Public and Commercial buildings.

I. Addressing asbestos in Public and Commercial structures completely destroyed by the fire where only ash and debris remain.

Safe Handling of Ash and Debris

The ash/debris should be handled in a manner that will minimize potential exposure to asbestos fibers and other hazardous materials in the debris.

- **As**h/debris must be wetted to minimize dust; packaged inside a container (such as an end-dump roll-off or truck) lined with double 6-mil plastic sheeting with the sheeting completely closed over the material and sealed once the container is loaded.
- Soil under/surrounding the building should be scraped to ensure that all ash and building debris has been removed from the site.
- Contractors should consult with the Occupational Safety and Health Administration (OSHA) at (303) 844-4500 (Englewood) or 303-844-5285 (Denver) to determine training and personal protective equipment that will be required for those handling this material.

Proper Disposal of Ash and Debris

Ash and debris from buildings that were destroyed by must be disposed of at an approved landfill. The following landfills can accept ash and debris from public and commercial buildings destroyed by this fire that cannot be safely characterized for the presence of asbestos.

Tower Landfill, Inc.
8480 Tower Road
Commerce City
Steve Derus, 720-590-4046

Denver Arapaho Disposal Site
3500 S. Gun Club Road
Aurora
Chris Anderson: 720.876.2633

Buffalo Ridge Landfill
11655 WCR 59
Keenesburg
Michelle Wittenbrink: 303-229-8085

Foothills Landfill
8900 Hwy 93, Golden
Steve Derus, 720-590-4046

Front Range Landfill
1830 Weld CR 5, Erie
Randy Tourville: 303-673-9431

No other landfills are currently approved to accept ash and debris from buildings completely destroyed by this fire. In order to get approval to accept these materials, landfills must request and receive permission from the Hazardous Materials and Waste Management Division (HMWMD) which will include agreement to implement certain best management practices designed to protect landfill workers and nearby public from potential asbestos hazards.

- Please contact the landfill before loads are taken there to confirm waste acceptance, to alert them that the material is coming and to initiate a waste profile. The landfill should be informed that the material has come from the fire area and may contain suspect asbestos-containing materials or other hazardous materials. Please take debris directly to the landfill.
- Recycling of metal and concrete foundations is permissible under the following circumstances: Metal debris must be washed clean of ash/debris prior to recycling. If you wish to recycle a concrete foundation, the concrete must be inspected by a Colorado certified asbestos building inspector to determine that it is free of asbestos-containing materials prior to recycling.

Notification and Permitting Requirements

State demolition permitting requirements are waived. However, the building owner or contractor must submit written notification to the CDPHE Indoor Environment Program. This notification should be done using the Public and Commercial Disposal Notification Form, East Troublesome Wildfire, October 2020.

II. Addressing asbestos in damaged Public and Commercial structures where the building must be demolished and where sampling building materials for the presence of asbestos cannot be done safely.

Building owners must work with appropriate local officials overseeing the fire response to determine whether a partially damaged structure can be safely inspected. Local government ordered demolitions based on a determination that the building is structurally unsound and in danger of imminent collapse waive the requirements to inspect and remove regulated asbestos containing material provided. However, all debris must be treated as friable asbestos waste.

- Provide written notification (10 working days in advance) to the Indoor Environment Program for all demolitions. Emergency provisions may allow notice to be made 24 hours instead of 10 working days.
- Ash/debris must be wetted to minimize dust; packaged inside a container (such as an end-dump roll-off or truck) lined with double 6-mil plastic sheeting with the sheeting completely closed over the material and sealed once the container is loaded.
- Soil under/surrounding the building should be scraped to ensure that all ash and building debris has been removed from the site.
- Ensure there is an asbestos trained supervisor on the jobsite with documentation posted.

- **In addition, Contractors should consult with the Occupational Safety and Health Administration (OSHA) at (303) 844-4500 (Englewood) or 303-844-5285 (Denver) to determine training and personal protective equipment that will be required for those handling this material.**
- All debris must be treated as friable asbestos waste and can only be disposed of in a landfill that meets the Asbestos NESHAP requirements. The following are the landfills permitted to accept this waste:

Tower Landfill, Inc. 8480 Tower Road Commerce City Steve Derus, 720-590-4046	Denver Arapaho Disposal Site 3500 S. Gun Club Road Aurora Chris Anderson: 720.876.2633	Buffalo Ridge Landfill 11655 WCR 59 Keenesburg Michelle Wittenbrink: 303-229-8085

Notification and Permitting Requirements

State demolition permitting requirements are waived. However, the building owner or contractor must submit written notification to the CDPHE Indoor Environment Program. This notification should be done using the state Demolition Notification Application Form except the section for sign-off by the certified Asbestos Building Inspector and Asbestos Removal Contractor should be left blank. There is no fee required for submission. The form may be found here:
https://environmentalrecords.colorado.gov/HPRMWebDrawer/RecordHtml/1298245

III. Addressing asbestos in buildings only partially damaged by the fire *and* where sampling building materials for the presence of asbestos can be done safely:

Building materials must be inspected by a Colorado certified asbestos building inspector prior to renovation/demolition or debris handling activities impacting the building materials. If asbestos-containing material is present in amounts greater than the trigger levels, they must be removed in accordance with Colorado Regulation No. 8, Part B - Asbestos. Known friable asbestos-containing materials must be disposed of at a landfill that can accept friable asbestos waste.

IV. If there is known asbestos-containing material above regulatory trigger levels in a building, the owner must follow the requirements of Colorado Regulation No. 8, Part B.

For buildings that had been previously inspected and found to contain asbestos-containing materials or were previously known to contain asbestos in amounts greater that the state trigger levels, asbestos abatement permits and demolition permits are required. Known friable asbestos-containing materials must be disposed of at a landfill that can accept friable asbestos waste.

Asbestos Consulting Firms (asbestos inspectors):
https://environmentalrecords.colorado.gov/HPRMWebDrawer/RecordView/1140204
Asbestos Abatement Contractors:
https://environmentalrecords.colorado.gov/HPRMWebDrawer/RecordView/1248240
Asbestos Landfills:
https://environmentalrecords.colorado.gov/HPRMWebDrawer/RecordView/1140205

For additional asbestos information, please contact the CDPHE Indoor Environment Program at: 303-692-3100 or cdphe.asbestos@state.co.us

Asbestos

East Troublesome Wildfire, October 2020 – Residential Property only

The ash deposited by a wildfire burning grass/trees is relatively nontoxic and similar to ash that might be found in your fireplace. However, any ash and debris from burned structures may contain more toxic substances due to the many synthetic and other materials that may be present in buildings. For example, car batteries or mercury light bulbs, lead-based paint, plastic items and other potentially toxic materials may have been present in the buildings prior to the fire. People should take precautions when entering buildings that are partially damaged by the fire or when handling any materials from buildings completely destroyed by the fire. They should wear protective clothing and equipment to avoid skin contact with debris and inhalation of ash.

One particular concern in handling debris from residential structures damaged or destroyed by wildfires is the possible exposure to asbestos fibers. Asbestos is a known carcinogen and exposure to asbestos fibers can cause or contribute to the development of various diseases including asbestosis, mesothelioma and lung cancer. Asbestos fibers have been commonly used in a variety of building materials including wall and ceiling textures, drywall, insulation, sheet vinyl flooring and floor tiles. Asbestos-containing materials that are in good condition should not pose a hazard. However, materials that are damaged or disturbed can release asbestos fibers creating a potential exposure risk for building occupants and neighbors. To address this, Colorado law has detailed requirements related to the proper identification, handling and disposal of asbestos-containing materials.

For residential structures that are damaged or destroyed by wildfires, following all of these requirements may not be possible or feasible. In recognition of this, the following modified procedures for dealing with residential structures damaged or destroyed by this wildfire must be followed:

I. Addressing asbestos in residential buildings completely destroyed by the fire where only ash and debris remain, or where sampling building materials for the presence of asbestos cannot be done safely[1]:

Safe Handling of Ash and Debris

The ash/debris should be handled in a manner that will minimize potential exposure to asbestos fibers and other hazardous materials in the debris.

- **Ash/debris must be wetted to minimize dust; packaged inside a container (such as an end-dump roll-off or truck) lined with double 6-mil plastic sheeting with the sheeting completely closed over the material and sealed once the container is loaded.**
- **Soil under/surrounding the building should be scraped to ensure that all ash and building debris has been removed from the site.**
- **Contractors should consult with the Occupational Safety and Health Administration (OSHA) at (303) 844-4500 (Englewood) or 303-844-5285 (Denver) to determine training and personal protective equipment that will be required for those handling this material.**

Proper Disposal of Ash and Debris

Ash and debris must be disposed of at an approved landfill. The following landfills can accept ash and debris from residential buildings destroyed or damaged by this fire that cannot be safely characterized for the presence of asbestos.

[1] Building owners should work with appropriate local officials overseeing the fire response to determine whether a partially damaged structure can be safely inspected.

Tower Landfill, Inc.
8480 Tower Road
Commerce City
Steve Derus, 720-590-4046

Denver Arapaho Disposal Site
3500 S. Gun Club Road
Aurora
Chris Anderson: 720.876.2633

Buffalo Ridge Landfill
11655 WCR 59
Keenesburg
Michelle Wittenbrink: 303-229-8085

Foothills Landfill
8900 Hwy 93, Golden
Steve Derus, 720-590-4046

Front Range Landfill
1830 Weld CR 5, Erie
Randy Tourville: 303-673-9431

No other landfills are currently approved to accept ash and debris from buildings completely destroyed by this fire. In order to get approval to accept these materials, landfills must request and receive permission from the Hazardous Materials and Waste Management Division (HMWMD) which will include agreement to implement certain best management practices designed to protect landfill workers and nearby public from potential asbestos hazards.

- **Please contact the landfill before loads are taken there to confirm waste acceptance, to alert them that the material is coming and to initiate a waste profile. The landfill should be informed that the material has come from the fire area and may contain suspect asbestos-containing materials or other hazardous materials. Please take debris directly to the landfill.**
- **Recycling of metal and concrete foundations is permissible under the following circumstances: Metal debris must be washed clean of ash/debris prior to recycling. If you wish to recycle a concrete foundation, the concrete must be inspected by a Colorado certified asbestos building inspector to determine that it is free of asbestos-containing materials prior to recycling.**

Notification and Permitting Requirements

State demolition permitting requirements are waived. However, the building owner or contractor must submit written notification to the CDPHE Indoor Environment Program. This notification should be done using the Disposal Notification Form, East Troublesome Wildfire, October 2020.

II. Addressing asbestos in buildings only partially damaged by the fire *and* where sampling building materials for the presence of asbestos can be done safely:

Remaining building materials must be inspected by a Colorado certified asbestos building inspector prior to renovation/demolition or debris handling activities impacting the building materials. If asbestos-containing material is present in amounts greater than the trigger levels, they must be removed in accordance with Colorado Regulation No. 8, Part B - Asbestos. Known friable asbestos-containing materials must be disposed of at a landfill that can accept friable asbestos waste.

III. If there is known asbestos-containing material above regulatory trigger levels in a building, the owner must follow the requirements of Colorado Regulation No. 8, Part B.

For buildings that had been previously inspected and found to contain asbestos-containing materials or were previously known to contain asbestos in amounts greater that the state trigger levels, asbestos abatement permits and demolition permits are required. Known friable asbestos-containing materials must be disposed of at a landfill that can accept friable asbestos waste.

Asbestos Consulting Firms (asbestos inspectors):
https://environmentalrecords.colorado.gov/HPRMWebDrawer/RecordView/1140204
Asbestos Abatement Contractors:
https://environmentalrecords.colorado.gov/HPRMWebDrawer/RecordView/1248240
Asbestos Landfills:
https://environmentalrecords.colorado.gov/HPRMWebDrawer/RecordView/1140205

For additional asbestos information, please contact the CDPHE Indoor Environment Program at: 303-692-3100 or cdphe.asbestos@state.co.us