COLORADO
Department of Transportation

Hazardous Materials GUIDANCE

March 2025







Table of Contents

Appendices

List of Figures

List of Tables

1. Introduction

This manual provides guidance on conducting hazardous materials assessments for the Colorado Department of Transportation (CDOT) and Local Public Agency (LPA) projects. The purpose and intent of this guidance is to help CDOT staff and environmental professionals (EPs) identify potential existing hazardous materials concerns as an integral step of the advanced planning and environmental documentation stages of project development and, when applicable, to facilitate project alternative selection.

There are three classes of action for project documentation under the National Environmental Policy Act (NEPA). From least complex to most complex, the classes of action are Categorical Exclusion (CatEx), Environmental Assessment (EA), and Environmental Impact Statement (EIS). Refer to the CDOT NEPA Manual for more information on NEPA or the classes of action (CDOT 2023a).

Most CDOT and LPA projects are completed as a CatEx under the Programmatic Agreement for Processing Categorical Exclusion Actions between the Federal Highway Administration (FHWA) and CDOT, with the most recent agreement dated June 2022 (CDOT 2022).

The level of effort required to conduct the hazardous materials assessment is based on several factors: the level of environmental NEPA documentation; the potential impacts to construction, materials management, human health and safety; whether an alternatives analysis is required beyond Build or No-Action alternatives; and consultation with the CDOT Environmental Project Manager (EPM) and CDOT regional/region Hazardous Materials Specialist. This guidance manual includes:

- An introduction to the regulatory background and guidance typically related to hazardous materials assessments for CDOT and LPA projects.
- Guidance on the hazardous materials assessment process as part of the NEPA evaluation and incorporation into the environmental documentation for NEPA clearance.
- Guidance on when to conduct subsurface investigations (including sampling of soils and groundwater) during the NEPA phase of CDOT and LPA projects.
- Guidance on when to conduct risk assessments for project activities.
- Qualifications of CDOT staff and/or consultants performing the hazardous materials assessment, that is EPs.

  CDOT recently adopted the AAI EP qualifications, which will **apply to all CDOT hazardous materials assessments**. Adopting these qualifications ensures that CDOT practitioners are qualified individuals completing analysis and providing recommendations, recognizing the current ASTM practice, and are familiar with ASTM updates, especially regarding new and emerging concerns such as per- and polyfluoroalkyl substances [PFAS]).

- Summary of the CDOT internal review process, clearance/approval, and qualifications of CDOT staff overseeing the hazardous materials assessment process.

Education and Experience 40 CFR 312.10

Hold a current Professional Engineer's or Professional Geologist's license or registration from a state, tribe, or U.S. territory (or the Commonwealth of Puerto Rico) and have the equivalent of three (3) years of full-time relevant experience; **OR**

Be licensed or certified by the federal government, a state, tribe, or U.S. territory (or the Commonwealth of Puerto Rico) to perform environmental inquiries as defined in § 312.21 and have the equivalent of three (3) years of full-time relevant experience; **OR**

Have a Baccalaureate or higher degree from an accredited institution of higher education in a discipline of engineering or science and the equivalent of five (5) years of full-time relevant experience; **OR**

Have the equivalent of ten (10) years of full-time relevant experience.

Relevant experience means: participation in the performance of all appropriate inquiries investigations, environmental site assessments, or other site investigations that may include environmental analyses, investigations, and remediation which involve the understanding of surface and subsurface environmental conditions and the processes used to evaluate these conditions and for which professional judgment was used to develop opinions regarding conditions indicative of releases or threatened releases (see § 312.1(c)) to the subject property.

For the purposes of qualifying as an environmental professional under the AAI final rule, relevant experience is: "Participation in the performance of environmental site assessments that may include environmental analyses, investigations, and remediation which involve the understanding of surface and subsurface environmental conditions and the processes used to evaluate these conditions and for which professional judgment was used to develop opinions regarding conditions indicative of releases of hazardous substances."

CDOT defines hazardous materials as:

> a broad category of materials that, because of their quantity, concentration, or physical or chemical characteristics, pose a significant present or potential hazard to human health and safety or to the environment if released into the environment. Hazardous materials include, but are not limited to, materials that are regulated as solid waste, hazardous waste, and other wastes contaminated with hazardous substances, radioactive materials, petroleum fuels, toxic substances, and pollutants.

Appendix A contains a glossary of commonly used terms and acronyms related to the CDOT hazardous materials assessment process.

Throughout this document, if no law, regulation, enforced guidance, or regulatory agency requires a specific action or process, the action or process may be adjusted at the discretion of the CDOT regional/region Hazardous Materials Specialist and/or the EP conducting the hazardous materials assessment.

1.1 Exclusions of this Document

CDOT may encounter hazardous materials during construction, even after hazardous materials assessments have been completed. In these instances, time-critical actions must be performed to minimize delays and to address worker health and safety and cost impacts affecting construction. For guidance and procedures on how CDOT handles both expected and unexpected hazardous materials concerns during construction, refer to the CDOT Standard Specifications for Road and Bridge Construction Section 250 - Environmental, Health and Safety Management, discussed in **Section 4.9.1**. Section 250 is always in place on CDOT projects, unless superseded by a **project special provision**.

This guidance also does not cover hazardous materials concerns associated with onsite activities during project construction, such as the waste generated onsite during construction; management of construction materials brought onsite; or onsite handling, storage, and/or disposal of hazardous materials. The CDOT Standard Specifications for Road and Bridge Construction Section 106 – Control of Material discusses requirements for new materials and rejection of unacceptable materials. State regulations also dictate materials management practices. Refer to **Section 2.2** for applicable state regulations.

1.2 Limitations

The following identify common limitations for hazardous materials assessments for CDOT projects:

- Because of the large number of sites involved in corridor or other large projects, it is typically not practical for CDOT to obtain site access to interview individual property owners. CDOT hazardous materials assessments generally do not include interviews of current and/or past owners and occupants of properties located within the project area. If interviews are to be conducted, coordination with the CDOT Right-of-Way (ROW) Acquisition Department and the CDOT Property Management Department is required before interviews are conducted. Refer to **Section 4.4.4** for more information.
- The hazardous materials assessment process is limited to data available from reporting agencies and observations of surface indicators when visibly accessible.
- Visual reconnaissance for hazardous materials assessments is generally limited to areas visible from public ROW and does not typically include access to fenced-in areas, building interiors, rear lots (alley side portion of adjacent sites), or areas not visible from public ROW. If the practitioner feels the need to gain site access, the practitioner shall notify the CDOT EPM for guidance. Refer to **Section 4.1.3** for more information.
- ASTM defines the continued viability of an environmental site assessment as being completed less than 180 days prior to the date of property acquisition. The time from completion of the hazardous materials assessment to completion of the ROW acquisition process for a transportation project typically exceeds ASTM's 180-day continued viability rule. **Section 5.2** further discusses this limitation.

With these limitations, it is not possible to have absolute certainty that any location is free of contamination. In these cases, the EP performing the review should identify the site (i.e., property) at an appropriate level of risk to construction, if applicable. The EP should also recommend further review of the site and/or the next steps to be taken if acquisition of property rights for ROW is required or if contaminant migration into the project area is of concern.

2. Hazardous Materials Regulations and Guidance

CDOT staff and consultants conducting or coordinating hazardous materials assessments and investigations should be familiar with the federal, state, and local environmental laws and regulations that apply to hazardous materials. This section summarizes the federal, state, and local environmental laws, regulations, and guidance most likely to apply to and associated with typical transportation projects with potential hazardous materials concerns. Because this regulatory overview is not all-inclusive, additional regulations could apply to a project depending on site-specific conditions. CDOT and its consultants must work together to ensure that the appropriate regulatory agencies are involved, as required. Additionally, it is important to keep track of and be aware of changes to laws and regulations (e.g., changes in tank regulations) that could affect a project. The following summarized laws and regulations are applicable as of January 2018.

Summary of Law and Regulations Acronyms

CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act
RCRA: Resource Conservation and Recovery Act
SDWA: Safe Drinking Water Act
AAI: All Appropriate Inquiry
FHWA: Federal Highway Administration Guidance
OSHA: Occupational Safety and Health Administration Regulations
NESHAP: National Emission Standards for Hazardous Air Pollutants
TSCA: Toxic Substances Control Act
VCUP: Voluntary Cleanup and Redevelopment Program

2.1 Federal Laws and Regulations

2.1.1 Comprehensive Environmental Response, Compensation, and Liability Act (42 United States Code Part 103, Sec. 9601 et seq.)

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) was enacted in 1980 (42 United States Code [U.S.C.] § 9601 et seq.) and subsequently amended by the Superfund Amendments and Reauthorization Act (SARA) (42 U.S.C. § 9601 et seq.). CERCLA (also known as "Superfund") is designed to clean up closed and abandoned sites contaminated with hazardous substances. The law authorized the U.S. Environmental Protection Agency (EPA) to identify the parties responsible for contamination of sites and to compel the parties to clean up the sites. Sites potentially impacted by hazardous substances are reported to EPA, and additional investigation is conducted. Based on the results of the investigation, EPA either determines that no further action is necessary at the federal level (but may refer the site to the state for additional activities) or places the site on the National Priorities List (NPL). Sites remain on the NPL until cleanup activities have been completed and the site is removed or delisted.

2.1.2 Resource Conservation and Recovery Act (40 Code of Federal Regulations Parts 260–299)

The Resource Conservation and Recovery Act (RCRA) (42 U.S.C. § 321 et seq.), enacted in 1976, establishes a framework for managing hazardous waste (Subtitle C), solid waste (Subtitle D), and underground storage tanks (USTs) (Subtitle I). RCRA Subtitle C authorizes EPA to develop regulations for cradle-to-grave management of hazardous waste; Subtitle D regulates the disposal of non-hazardous solid waste (e.g., municipal landfills, cleanup, and closure); and Subtitle I regulates USTs containing hazardous materials and petroleum products. States typically take the lead on implementing Subtitle D and Subtitle I, and EPA may authorize states to implement Subtitle C.

EPA has approved the State of Colorado to take the lead on RCRA Subtitles C, D, and I. **Section 2.2.1** discusses state regulations.

2.1.3 Title XIV of the Public Health Service Act ("Safe Drinking Water Act") (Public Law 93-523) and the National Primary Drinking Water Regulations (40 Code of Federal Regulations Part 141)

Congress enacted the Safe Drinking Water Act (SDWA) in 1974 to protect public health by regulating drinking water quality. The SDWA authorizes EPA to establish national drinking water standards such as Maximum Contaminant Levels (MCLs) and health-related standards (Health Advisory Levels) for both naturally occurring and man-made contaminants that may be found in the water supply, including underground sources. An MCL represents the maximum concentration of a substance that is legally allowed to occur in the drinking water supply.

2.1.4 U.S. Environmental Protection Agency Standards and Practices for All Appropriate Inquiry/ASTM Standard E1527-21

On January 11, 2002, the Small Business Liability Relief and Brownfield Revitalization Act, which amended CERCLA, was signed into law. This Act required that EPA develop regulations to establish federal standards and practices for conducting all appropriate inquiries (AAIs). This Act, generally referred to as AAI, is the most prevalent industry standard applicable to any public or private party that may potentially claim protection from CERCLA liability. The AAI Rule set federal standards for conducting environmental due diligence activities, such as visual reconnaissance and records review.

ASTM Standard E1527-05 "Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process" was developed for commercial real estate transactions to provide guidance on industry standards and aid with compliance with the provisions of the final AAI Rule.

Per ASTM rules, all standards are revisited no later than once every eight years to ensure market relevance. Thus, in February 2018, an E1527 Task Group met to review the ASTM Standard E1527-13 (updated from ASTM Standard E1527-05) to evaluate if Phase I ESAs have been prepared "consistent with good commercial and customary practice." Inconsistencies in process and quality signaled that improvements were necessary.

On February 13, 2023, ASTM released an update to ASTM Standard E1527, which was revised to ASTM Standard E1527-21.

To specifically address transportation projects for CDOT, modifications to the ASTM E1527-21 standard are needed. The ASTM E1527-21 standard process is consistent and complies with EPA's final AAI Rule and may be used to comply with the provisions of the final AAI Rule. During project planning stages, the ASTM Transaction Screen (E1528-22) can be used as a documentation tool for an individual site or parcel. However, the ASTM Transaction Screen is sufficient only when interviews with the property owners and/or operators are practical, when right of entry can be obtained, and when knowledge of the site and/or preliminary surveys do not indicate concerns.

2.1.5 Federal Highway Administration Guidance

FHWA has published guidance on hazardous materials and highway project development, including FHWA's technical memorandum *Interim Guidance – Hazardous Waste Sites Affecting Highway Project Development* (August 1988) and subsequent technical memorandum *Supplemental Hazardous Waste Guidance* (January 1997). FHWA's guidance stresses the identification of contaminated sites early in project development, early coordination with regulatory agencies, and avoidance of contaminated sites. The guidance outlines FHWA's recommended procedures for identifying and avoiding hazardous materials sites.

2.1.6 Occupational Safety and Health Administration Regulations

The Occupational Safety and Health Act of 1970 created the Occupational Safety and Health Administration (OSHA), which is tasked with setting and enforcing national standards for workplace health and safety. The Occupational Safety and Health Standards in 29 CFR 1910 and the Safety and Health Regulations for Construction outlined in 29 CFR 1926 provide the regulatory background for standards and/or regulations affecting highway project development and construction. These include worker exposure to asbestos, lead, and hazardous materials. Additionally, 1910 Subpart I and 1926 Subpart E stipulate the requirements for personal protective equipment.

2.1.7 National Emission Standards for Hazardous Air Pollutants

The air toxics provisions of the Clean Air Act (CAA) require EPA to develop and enforce regulations to protect the public from exposure to airborne contaminants known to be hazardous to human health. In accordance with Section 112 of CAA, EPA establishes National Emission Standards for Hazardous Air Pollutants (NESHAP). The list of hazardous air pollutants, or "air toxics," includes specific compounds known or suspected to cause cancer or other serious health effects. Asbestos is included within the scope of NESHAP regulations (40 CFR Part 61, Subpart M). Three of the major health effects associated with asbestos exposure are lung cancer, mesothelioma, and asbestosis.

Air toxics regulations under CAA specify work practices for asbestos to be followed during demolitions and renovations of all facilities, including, but not limited to, structures, installations, and buildings (excluding residential buildings that have four or fewer dwelling units). Regulations require a thorough inspection where the demolition or renovation operation will occur. Regulations also require the owner or the operator of the renovation or demolition to notify the Colorado Department of Public Health and Environment (CDPHE) for Colorado projects before any demolition or any renovations of buildings that contain a certain threshold amount of regulated asbestos containing material (ACM).

The rule requires work practice standards that control asbestos emissions. Work practices often involve removing all ACM, adequately wetting all regulated ACM, sealing the material in leak tight containers, and disposing of the ACM waste as expediently as practicable.

EPA does not consider residential structures that are demolished or renovated as part of a commercial or public project to be exempt from NESHAP. For example, the demolition of one or more houses as part of an urban renewal project, a highway project, or a project to develop a shopping mall, industrial facility, or other private development would be subject to NESHAP.

If the total amount of asbestos to be removed or disturbed is less than 260 linear feet, 160 square feet, or 35 cubic feet off facility components (if the material could not be measured previously), then the asbestos NESHAP does not require regulated ACM to be removed before demolition or renovation activities occur.

2.1.8 Toxic Substances Control Act

Lead-Based Paint

Lead was widely used in paints manufactured before 1978, when it was banned. Title IV of the Toxic Substances Control Act (TSCA), as well as other authorities in the Residential Lead-Based Paint Hazard Reduction Act of 1992, directs EPA to regulate lead-based paint (LBP) hazards. EPA, Housing and Urban Development (HUD), and CDPHE define LBP as paint having a lead content of greater than or equal to 1.0 milligram per cubic centimeter using X-Ray fluorescence analysis, or 0.5 weight percent using flame atomic absorption analysis.

Polychlorinated Biphenyls

Polychlorinated biphenyl (PCB) regulations, published pursuant to the TSCA statute, can be found in 40 CFR 761. PCBs are a group of man-made organic chemicals consisting of carbon, hydrogen, and chlorine atoms. PCBs were domestically manufactured from 1929 until manufacturing was banned in 1979. PCBs were used in hundreds of industrial and commercial applications including, but not limited to:

- Electrical, heat transfer, and hydraulic equipment
- Plasticizers in paints, plastics, and rubber products
- Pigments, dyes, and carbonless copy paper
- Other industrial applications

A more common use of PCBs is an additive to oil found in electrical transformers, motors, and hydraulic systems.

Per- and Polyfluoroalkyl Substances (PFAS)

Effective, July 8, 2024, EPA classified PFAS, specifically perfluorooctanoic acid (PFOA) and perfluorooctanoic sulfonic acid (PFOS), as hazardous substances under CERCLA, commonly known as the “Superfund” law. EPs must identify and report whether a subject property has the potential to encounter PFOA or PFOS.

PFAS, or per- and polyfluoroalkyl substances, are a large group of man-made chemicals that have been widely used in various industrial applications and consumer products since the 1940s. They are known for their resistance to water, oil, and heat, which makes them useful in products like nonstick cookware (e.g., Teflon), water-repellent clothing, stain-resistant fabrics and carpets, firefighting foams, and food packaging.

PFAS are forever chemicals and very mobile and able to travel long distances in the environment via air, surface water, and groundwater. They may also pose serious health risks, including reproductive and developmental effects, increased risk of cancers, hormone interference, increased cholesterol levels, and reduced ability to fight infections.

Industries that are known PFAS contributors include commercial printing, electronics, plating, fabric and textiles, cosmetics manufacturers, fire protection, food packaging, mining, airports, and more. **Table 2.1** lists examples of such industries identified by North American Industry Classification System (NAICS) codes.

Table 2.1. Industries That May Produce and/or Use PFOA and/or PFOS

NAICS Code	Potentially Affected U.S. Industrial Entities
488119	Aviation operations
314110	Carpet manufacturers
811192	Car washes
325	Chemical manufacturing
332813	Chrome electroplating, anodizing, and etching services
325510	Coatings, paints, and varnish manufacturers
325998	Firefighting foam manufacturers
562212	Landfills
339112	Medical devices
922160	Municipal fire departments and firefighting training centers, including federal agencies that use, trained with, and tested firefighting foams
311121 and 322130	Paper mills
325320	Pesticides and Insecticides
324	Petroleum and coal product manufacturing
324110 and 424710	Petroleum refineries and terminals
352992	Photographic film manufacturers
325612	Polish, wax, and cleaning product manufacturers
325211	Polymer manufacturers
323111 and 325910	Printing facilities where inks are used in photolithography
313210, 313220, 313230, 131240, and 313320	Textile mills (textiles and upholstery)
562	Waste management and remediation services
221320	Wastewater treatment plants

Source: Federal Register, Designation of Perfluorooctanoic Acid (PFOA) and Perfluorooctanesulfonic Acid (PFOS) as CERCLA Hazardous Substances

2.2 State Regulations

States can elect to obtain primacy over certain federal regulations. Generally, the state regulation is as strict or stricter than the federal regulation. In Colorado, two regulatory agencies enforce environmental regulations: CDPHE and Colorado Department of Labor and Employment Division of Oil and Public Safety (CDLE-OPS).

CDLE-OPS has established regulations for USTs, leaking USTs (LUSTs) and aboveground storage tanks (ASTs) that contain petroleum products (7 Colorado Code of Regulations [CCR] 1101-14). CDPHE may regulate USTs and ASTs that contain hazardous materials.

The Colorado Energy and Carbon Management Commission (CECMC) (formerly known as the Colorado Oil and Gas Conservation Commission) regulates the exploration and production of oil and gas resources throughout the state.

2.2.1 Waste Regulations

RCRA establishes a framework for managing both solid waste and hazardous waste. CDPHE has promulgated regulations for managing both solid waste (6 CCR 1007-2) and hazardous waste (6 CCR 1007-3).

Solid Waste

RCRA Subtitle D (40 CFR 239-259) is dedicated to non-hazardous solid waste. Solid waste regulations in Colorado are found in 6 CCR 1007-2, and they regulate solid waste sites and facilities in addition to siting and inspections for offsite hazardous waste disposal sites.

EPA defines a solid waste as any discarded solid, semi-solid, liquid, or contained gaseous material that is disposed of, burned, incinerated, or recycled. CDPHE regulates solid waste through the implementation of EPA regulations.

Hazardous Waste

RCRA Subtitle C (40 CFR 260-273) authorizes EPA to develop regulations for cradle-to-grave management of hazardous waste. In Colorado, CDPHE adopted the federal hazardous waste regulations and amended specific sections as necessary to meet the needs of the state (6 CCR 1007-3). Regulations are based on a “cradle-to-grave” system of regulating hazardous waste. This means that hazardous waste is tracked and regulated from the point of generation through storage and transportation to the point of treatment or disposal.

For a waste to be hazardous, it must first be a solid waste. A waste is considered hazardous based on its characteristics (ignitable, corrosive, reactive, or toxic) or because it is found on a list of wastes and waste streams that EPA has determined to be harmful to human health and the environment when not managed properly, regardless of the concentration of the waste. CDPHE regulates hazardous waste through the implementation of EPA regulations.

Regulated Asbestos-Contaminated Soil (RACS) is regulated by the CDPHE Hazardous Materials and Waste Management Division.

Mining Waste

Current and historical mining operations can be a source of waste that may be regulated under RCRA. For example, soil contaminated by flue dust may be impacted by arsenic and lead; groundwater may be impacted by arsenic, cadmium, copper, lead, and zinc due to the placement of mineral processing waste waters into unlined impoundments. When Congress amended RCRA in October 1980, it temporarily excluded "solid waste from the extraction, beneficiation, and processing of ores and minerals." This is typically referred to as the "Bevill exclusion." After 1980, EPA refined and clarified the scope of the Bevill exclusion.

Beneficiation involves separating and concentrating mineral value from extracted ore through physical activities including, but not limited to, grinding or crushing. Beneficiation activities are exempt from RCRA under the Bevill exclusion.

Mineral processing involves using processes that cause significant physical/chemical change to the ore or minerals. An example is the smelting of copper or lead. Mineral processing activities are not exempt from RCRA under the Bevill exclusion except for 20 specific process wastes identified in 40 CFR 261.4(b)(7).

Radiation Control

CDPHE, Hazardous Materials and Waste Management Division regulations (6 CCR 1007-1), last amended in 2023, provide guidance on radiation management. CDOT encounters radioactive soils from the historic use of uranium and other radioactive ore mining tailings. Common sources are fill material and concrete components. Potential regulatory agencies could include Department of Defense, EPA, and CDPHE.

2.2.2 Voluntary Cleanup and Redevelopment Program and Brownfields

The CDPHE VCUP works in conjunction with EPA's Brownfields program to facilitate cleanup and redevelopment of abandoned or underused properties where reuse is complicated by actual or perceived environmental contamination (EPA 2017). EPA and CDPHE have entered into a Memorandum of Agreement that allows CDPHE to review and concur with remedial plans and No Action Determinations with the assurance that EPA will not take action under Superfund. This eases concerns of environmental liability when a property transfers ownership. A critical component of VCUP is that CDPHE does not direct or oversee cleanup activities; the owner (typically through an environmental consultant) is responsible for verifying that cleanup activities will meet the standards applicable for the proposed use of the property. EPA's Brownfield fund provides financial incentives in the form of tax credits for certain approved expenditures paid by the owner.

2.2.3 Water Quality

Groundwater Quality Standards

CDPHE Water Quality Control Commission (WQCC) has promulgated standards for groundwater (5 CCR 1002-41), also known as Regulation 41, The Basic Standards for Ground Water. These standards are revised regularly, most recently in June 2020.

Additionally, WQCC has promulgated site-specific water quality classifications and standards for groundwater, found in Regulation 42. These standards apply to specific geographic areas of the state. These standards were revised in June 2020.

Surface Water Quality Standards

WQCC has promulgated standards for surface water throughout the state. Typically, standards vary based on the watershed in which the surface water feature is located and the classification of the stream. Upper stream segments are typically higher quality, cooler water segments; the lower down the stream segment, with more tributaries contributing to the stream, tends to result in lower quality water. The overall standards are found in Regulation 31, while Regulations 32 through 39 and their related appendices provide the classifications and water quality standards tables.

2.2.4 Soil Standards

Potentially contaminated soils (i.e., field screening observations such as soil that "looks bad, smells bad" or that contains debris), must be segregated at the time of excavation. Sampling and analysis must be conducted per the sampling protocol, and the results must be compared to the most recent EPA Residential Regional Screening Levels (RRSLs). The types of analyses depend on suspected contaminants, potential use, possible disposal options, or other criteria.

EPA RRSLs include the contaminant concentrations in soil that would be considered appropriate for unrestricted reuse, such as in residential areas and parks (EPA 2024b). Soil with contaminant concentrations that exceed the RRSL have restrictions on reuse (on- or off-site) including, but not limited to, environmental controls, institutional controls, or other measures documented by environmental covenants running with the title of the land. Alternately, these soils can be disposed of offsite, for example, in a landfill. Documentation of soil reuse and/or disposal locations must be provided to CDOT. If collected soil sample concentrations exceed EPA RRSL, the Contractor, in consultation with an environmental professional and CDOT, will evaluate the soil results to determine the appropriate disposition.

Arsenic Standards (exception to the RRSLs)

In Colorado, arsenic occurs naturally and often at concentrations greater than the RRSLs. CDPHE has prepared state-specific guidance related to evaluating arsenic concentrations in soil, specifically regarding analytical laboratory data collected from sites where arsenic impacts are not likely attributed to historical commercial or industrial use (CDPHE 2011). Guidance is based on the collection of more than 2,700 samples from 44 counties in Colorado, where the average concentration of arsenic in soils was 11 mg/kg. CDPHE has adopted a policy that if arsenic concentrations are lower than 11 mg/kg, and releases of arsenic due to historical commercial or industrial uses are not likely to have occurred at the site, the CDPHE value of 11 mg/kg can be used as the criterion for soil reuse evaluation versus EPA RRSL value for arsenic. Use of this policy must be discussed with the Contractor, environmental professional, CDOT Environmental PM, and CDOT Engineer and documentation must be provided for CDOT project files.

2.2.5 Storage Tanks

USTs and ASTs are commonly used for storage of gasoline and other petroleum products at retail fueling stations, auto repair facilities, and fleet service operators. Regulations for USTs and ASTs were not developed until the late 1970s and early 1980s. Therefore, a CDOT project may encounter historical USTs that are not registered or revealed through routine database searches.

The objective of CDLE-OPS is to enforce relevant federal and state regulations and statutes that protect human health and the environment. CDLE-OPS has promulgated regulations for managing USTs and ASTs that contain petroleum products and are used to dispense fuel (7 CCR 1101-14). USTs and ASTs that contain hazardous materials or petroleum products not regulated by CDLE-OPS are

regulated under RCRA (**Section 2.1.2**), which is within CDPHE's jurisdiction. For compliance issues, including releases from storage tanks, CDLE-OPS provides an enforcement coordinator who actively works with the regulated parties to resolve compliance issues, answer questions, offer guidance, and assist them with getting facilities back into compliance. CDLE-OPS provides guidance for remediation of releases and closure of facilities after remediation is complete. Most actions in response to a storage tank release are required by the owner/operator of the facility per the regulations and statutes, such as reporting the release to CDLE-OPS, assessing the risks of the release, conducting site characterizations/identifying chemicals of concern, proposing corrective actions, and requesting release event closure. CDLE-OPS supervises, reviews, and approves these actions and requirements to return facility conditions to compliance.

2.2.6 Oil and Gas Exploration and Production

In Colorado, CECMC regulates the oil and gas industry, which includes oil and gas exploration and production, wells, and related infrastructure such as pits to store fluids and tank batteries. U.S. Bureau of Land Management regulates the oil and gas industry when federal minerals are being extracted, including associated production facilities. A tank battery is a group of tanks that store oil or other liquids associated with wells.

3. Hazardous Materials Assessment Scoping and Purpose

The CDOT project scoping process is a critical first step in conducting hazardous materials assessments for CDOT projects. The project scoping process will identify the hazardous materials lead team member (e.g., a staff member from the specific CDOT Region, CDOT Environmental Programs Branch [EPB], or the consultant team). Next, the level of hazardous materials analysis to be conducted is determined (e.g., minimal or complete) and the method of required documentation is selected (e.g., ISA, MESA, Phase I ESA, etc.). The project scoping process will include a discussion of any specifics regarding what is currently known about the hazardous materials concerns in the area, if any agency concurrence or approval is required, and/or if any coordination has been previously conducted. Any additional project-specific concerns or requirements can also be discussed at this time. CDOT provides an Environmental Scoping Form, located on the CDOT website under Resources within the EPB program. The project scoping process is critical to determining the extent of the hazardous materials assessment.

Any of the hazardous materials guidance documents can be modified at the discretion of the CDOT regional/region Hazardous Materials Specialist.

A hazardous materials assessment typically helps CDOT staff to identify potential existing hazardous materials concerns during the advanced planning and environmental documentation stages of project development and to facilitate project alternative selection and mitigation strategies (such as avoidance), when applicable. A hazardous materials assessment would identify sites that are known to be, or may potentially be, contaminated with hazardous materials. For projects requiring an in-depth alternatives analysis (i.e., EAs and EISs), the hazardous materials assessment would inform CDOT on the potential risk of contaminated sites to project delivery, cost, and schedule.

CDOT requires hazardous materials assessments to be conducted as early as possible for projects to:

- Limit or avoid CDOT liability during the acquisition of property rights for ROW
- Assist in project alternatives evaluations and considerations
- Prevent delays or unexpected costs during construction
- Allow estimation of the cost of any required mitigation
- Supply information for property evaluation during the acquisition process
- Identify and recommend appropriate mitigation measures for public and worker health and safety concerns
- Prevent or minimize further hazardous materials releases into the environment
- Determine if any additional investigation is needed because of known or the possible presence of hazardous materials
- Develop specific materials management or institutional controls required during construction and include in project costing and schedule

Consistent with FHWA's waste guidance (1988, 1997), CDOT's primary purpose for conducting a hazardous materials assessment is to recognize potential contamination concerns early in the planning or project development processes so that avoidance/minimization of high-risk sites can be considered during project design (e.g., through alignment changes). According to FHWA's 1988 guidance:

> Avoidance is repeatedly stressed as the preferred option unless the risks and costs of proceeding with contaminated property can be justified….The emphasis on early investigation and avoidance/minimization of contaminated property is based on extensive experience showing that serious contamination can result in very excessive project delays, impacts, costs, and liability.

The following types of CDOT activities have a higher risk for encountering hazardous material contamination during construction:

- Projects with fee title (i.e., full) ROW acquisition, easements, or displacements present a liability risk to CDOT to clean up a contaminated site.
- Projects with structure removal or modifications present a risk due to heavy metal-based paint (i.e., LBP) or ACM in/on structures.
- Underground utility or pipeline relocations or modifications present a risk due to contaminants from pipes themselves or neighboring releases moving along lower resistance pipeline trenches.
- Installation of columns or piers presents a risk due to the probability of encountering groundwater that carries contamination long distances from the point source. Dewatering is also common and may require special water disposal if contaminated.
- Other excavations greater than 5 feet in depth can create the same risks as those associated with piers.
- Grading in urbanized areas presents a risk due to current and historic uses that commonly cause subsurface contamination, such as fuel stations and landfills.
- Excavation encountering groundwater in commercial, industrial, and agricultural support service areas presents similar risks as those associated with excavation and urban areas.

Examples of project circumstances that usually indicate low probability of hazardous waste involvement include, but are not limited to:

- Projects in rural or undeveloped areas with no evidence of previous contaminating uses
- Projects involving no change of profile grade, earthwork, or trenching
- Projects involving no new ROW or where the existing ROW has been recently studied for hazardous waste

An integral component of the CDOT planning and project development process involves thoroughly reviewing and investigating properties for past or present soils and/or groundwater contamination. These efforts are essential for the ROW acquisition cost and property appraisal process, development of options for owner-funded site remediation prior to CDOT acquisition, and planning for engineering options to minimize the necessary remediation and treatment of residual hazardous materials.

The appropriate level of review depends on the project type, proposed project design, surrounding land uses, ROW requirements, and other project-specific factors. Coordination and discussions with the CDOT Environmental Manager and/or the CDOT regional/region Hazardous Materials Specialist should occur during the project scoping process at the start of every project and on a regular basis to determine the appropriate level of assessment needed based on project-specific factors. If the scope of the project changes, the level of hazardous materials assessment should be reevaluated. If previously low or medium risk sites become high risk due to scope changes, additional review, such as a regulatory file review may be required (**Section 4.1.4**). The hazardous materials assessment is also reevaluated at major phases of project planning, such as Field Inspection Review, Final Office Review, and project advertisement.

3.1 Planning

CDOT conducts and oversees various planning-level projects, such as feasibility studies, Planning and Environmental Linkages (PEL) studies, or corridor studies. Planning-level studies may involve an environmental overview, which may summarize the baseline hazardous materials assessment findings, as well as the findings for other environmental resources and environmentally sensitive areas within the study area. Although hazardous materials assessments are not mandated during project planning stages, these types of projects provide an opportunity to collect preliminary information on potential hazardous materials concerns. It is beneficial to conduct a cursory review of hazardous materials concerns during planning projects because the information regarding potential hazardous materials concerns can assist with alternatives analysis and project decision-making. Planning-level types of studies with a hazardous materials assessment include a baseline evaluation (i.e., conducting agency environmental records review [**Section 4.1.1**] and conducting site reconnaissance or "desktop review" [**Section 4.1.3**]) to identify existing and previous land uses and potential hazardous materials associated with the project area.

3.2 Project Development and NEPA Studies

The project development phase includes projects requiring the completion of NEPA documentation (i.e., CatEx, EA, and EIS documentation) and projects that have entered the preliminary design phase. Hazardous materials information collected during the planning and NEPA process can be used to:

- Assess project alternatives during the alternatives screening and evaluation process to **assist alternatives analysis** based on impacts related to hazardous materials
- Evaluate the possible relationship between impaired groundwater and soils (or other conditions) that **may exacerbate existing conditions** of the impaired groundwater
- Understand if **additional evaluation is recommended** in future design/construction phases for particular sites (i.e., properties) related to hazardous materials, including, but not limited to, site characterization and/or remediation of soil and/or groundwater
- Determine **potential impacts to construction, materials management, and human health and safety**, including, but not limited to, heavy metal-based paint (i.e., LBP), ACMs, and potential subsurface investigation findings
- Understand what **additional specifications** must be included in the bid documents to avoid, manage, or remediate contaminated materials or hazardous wastes
- Identify if **specialized subcontractors** are required for contaminated materials management and worker health and safety plan (HASP) development

- Consider whether it is in CDOT's interest to **develop information** to conduct remediation, prepare a materials management plan (MMP), and/or clean up a site in advance of the project
- Assess the **cost of remediation** activities (useful for CDOT budgeting and/or improving the accuracy of contractor bids for projects with remedial activities)
- **Assess ROW** for impacts to construction or vice versa (i.e., if construction would impact the ROW process due to exacerbating site conditions)

It is important to link and carry forward any findings from the planning stages previously discussed in **Section 3.1** into the NEPA study.

During project development, most projects fall under the "Build" or "No-Action" alternative scenario and meet the guidelines of the Programmatic Agreement to be documented under NEPA as a Programmatic CatEx (e.g., pedestrian facilities, landscaping activities, routine roadway maintenance). In the case of CatEx documentation, where there is no Draft and Final environmental document, CDOT expects the appropriate hazardous material evaluation to confirm the presence/absence of hazardous materials before final approval of the CatEx documentation. Hazardous materials commitments/mitigation measures and findings are recorded within the CatEx and supporting documentation and within the NEPA document's Mitigation Tracking Table.

Projects where several design alternatives may be under consideration should evaluate potential hazardous materials concerns on all impacted and adjacent properties for each alternative analyzed. Unless an alternative can be ruled out of consideration through assessment of risk for encountering contamination, additional steps need to occur to assure hazardous materials sites are properly identified, assessed, and avoided when possible.

In the NEPA document, the information gathered should follow the steps outlined in **Chapter 4** and be sufficient to compare the scope of potential hazardous materials issues with the scope of the proposed project construction. When in-depth alternatives analysis occurs for environmental documentation, the information gathered should provide information adequate to determine a preferred alternative. Any detours, utility relocation actions, and potential improvements identified as part of the project should be evaluated as part of the study area regardless of project scope and level of environmental documentation. The environmental document summarizes the hazardous materials assessment findings and presents required mitigation measures that should be incorporated into the design plans and specifications. Thorough documentation of the hazardous materials assessment showing how sites were evaluated should be maintained with the project file.

During the NEPA process, the CDOT EPM, CDOT regional/region Hazardous Materials Specialist, Consultant Project Manager, and/or EP coordinate with the project roadway and bridge designers to communicate potential hazardous materials locations, concerns, and/or conflicts through the prepared documentation and scheduled coordination meetings. CDOT environmental and design staff coordinate various environmental concerns throughout the design process. Potential hazardous materials concerns/conflicts and/or mitigation measures will be addressed and identified on design plans, various design reports, hazardous materials assessment documents and reports, NEPA documents, and mitigation tracking tables. Roadway design plans and environmental plans are routed to the CDOT ROW Department for consideration during the ROW appraisal and purchase processes. The hazardous materials assessment report should be directly routed to the ROW Department upon completion and approval.

Following the completion of a hazardous materials assessment during NEPA, CDOT also revisits the hazardous materials assessment findings during later preliminary and final design phases to ensure that hazardous materials concerns discovered during the early planning phases have been considered and/or mitigated and carried forward into design and construction.

The Region Planning and Environmental Manager (RPEM) certifies environmental commitments, including hazardous materials commitments/mitigation measures, to be included in the advertised plans and specifications when the back of Form 128 is signed. Mitigation measures associated with EA and EIS level projects are organized via a Mitigation Tracking Table during the planning and NEPA process and then carried into design via environmental plan sheets and specifications. Regardless of the findings during the hazardous materials assessment process, the following CDOT standard commitment language may be incorporated into NEPA documents and design plans:

> In the event that project personnel encounter unknown soil or groundwater contamination, construction activities should cease immediately, and the procedures outlined in the CDOT Standard Specifications for Road and Bridge Construction Section 250 – Environmental, Health and Safety shall be followed.

In some cases, project-specific commitments regarding hazardous materials may also be included. These may apply to materials management, special wastes such as ACM and heavy metal-based paint (i.e., LBP), or human health or safety. Refer to **Section 4.9** for further discussion.

4. Hazardous Materials Assessment Process

CDOT defines the hazardous materials assessment process as "the activities required to identify the presence or likely presence of any hazardous materials within the study area." The primary objective of completing a hazardous materials assessment is to identify sites within the project area with concerns related to hazardous materials for use in the CDOT decision-making process, as discussed in **Chapter 3**.

Useful Definitions

Project Area: The limits of a project's construction activities (i.e., limits of disturbance).

Study Area: The limits of the area reviewed by the hazardous materials assessment (i.e., the area within the maximum search radius from the project area which is evaluated for hazardous materials concerns).

Hazardous materials assessments for site-specific projects are used to identify the potential for encountering contamination during construction, whether materials management or worker health and safety may be impacted, and to assess liability as part of acquisition. Accurately identifying potential concerns early is important for effective planning and efficient completion of a project. There are three categories for properties used to inform the likelihood for encountering hazardous materials, as well as the appropriate level of investigation, for a property. This is how the objective of identifying sites with concerns is realized. The three categories are:

- **Low Potential Site**: Through investigation, it is determined that it is unlikely that contamination would be encountered during construction.
- **Medium Potential Site**: Through initial investigation, it is unclear whether contamination is located in the project footprint. Subsequently, a subsurface investigation or further coordination with regulatory agencies determines it is unlikely that contamination would be in the project footprint. However, there is greater uncertainty than for a low potential site. On a case-by-case basis, a commitment to the Contractor and CDOT Project Manager to look for signs of contamination in specific areas can be included in the hazardous materials assessment and subsequently a MMP (when required) rather than proceeding with a subsurface investigation.
- **High Potential Site**: Through file review or subsurface investigation, it is determined that it is likely that contamination would be encountered during construction.

Based on the project scope of work and available information on the potential for contamination, the level of effort for documentation of the hazardous materials assessment could use one or more of the following: (1) an ISA, (2) a MESA, or (3) a Phase I ESA. All three of the listed documentation methods contain similar fundamental requirements and processes (see **Section 4.1**). Additionally, based on the information and recommendations provided in the initial hazardous materials assessment, further analysis of the property may be required, typically using a Phase I ESA or a Phase II ESA. The hazardous materials assessment for most CDOT projects would use the ISA method of documentation. Appendices G through I contain report templates for each method of documentation.

Figure 4.1 is a helpful reference to evaluate whether an ISA, a MESA, or a Phase I ESA should be completed. **Table 4.1** delineates the differences between an ISA, a MESA, and a Phase I ESA.

Figure 4.1. Hazardous Materials Assessment Decision Tree

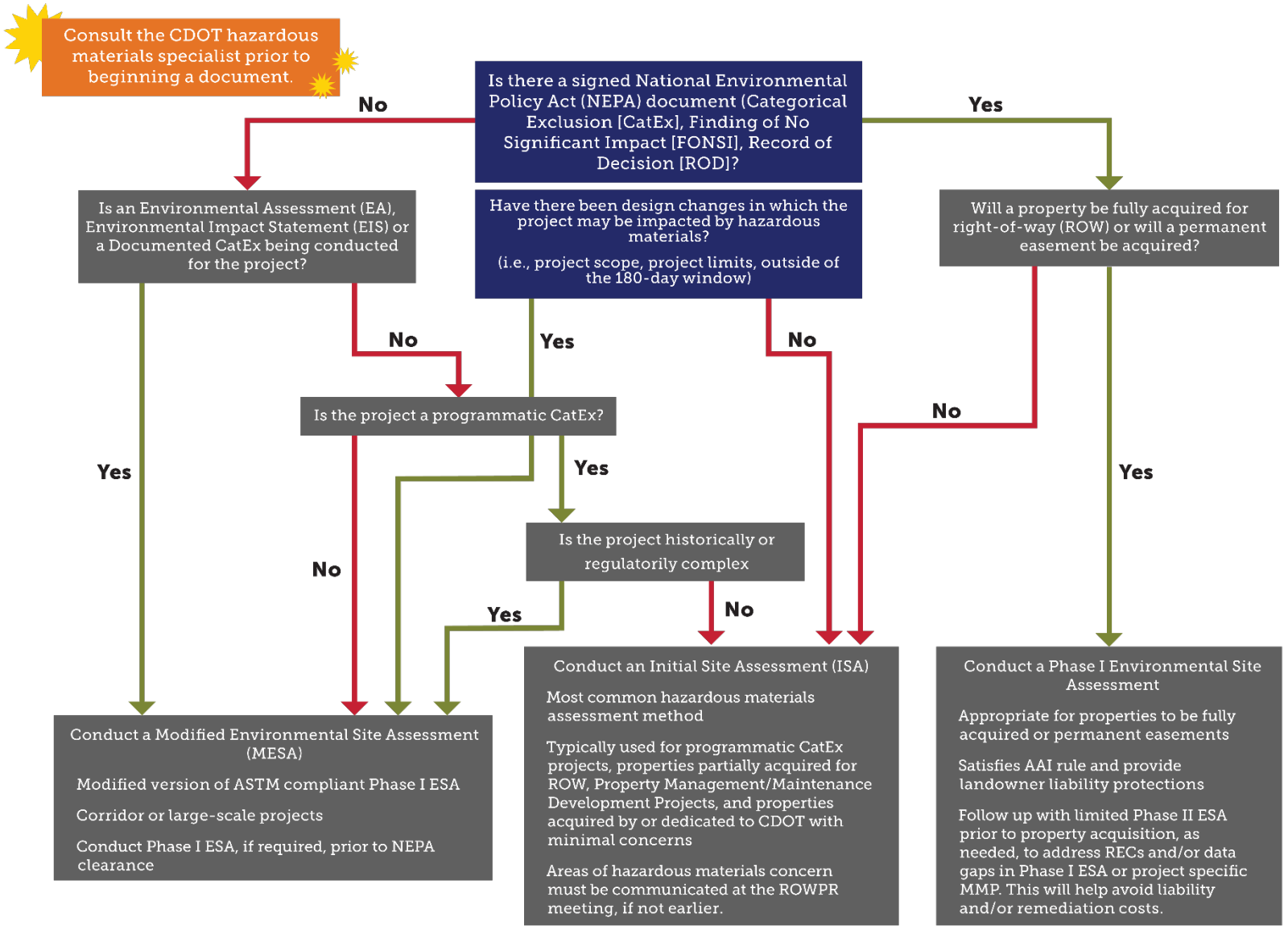


Table 4.1. CDOT Hazardous Materials Document Guidance Table

Consult the CDOT regional/region Hazardous Materials Specialist prior to beginning a document. Any of the following hazardous materials guidance documents can be modified at the discretion of the CDOT regional/region Hazardous Materials Specialist.

Item	Initial Site Assessment (ISA)	Phase I Environmental Site Assessment (Phase I ESA)	Modified Environmental Site Assessment (MESA)
When Prepared	In support of a Categorical Exclusion **OR** Right-of-Way Acquisition. For properties that are to be acquired by, dedicated to, or disposed by CDOT and **have minimal** hazardous materials concerns.	For properties that are to be acquired by or dedicated to CDOT and **have known** or **are suspected of** storing hazardous materials.	In support of a technical report for an Environmental Assessment (EA) or Environmental Impact Statement (EIS). At the discretion of the CDOT regional/region Hazardous Materials Specialist.
Purpose	Provide an approach that is less comprehensive than a MESA for clearance of the Hazardous Materials section of Form 128, or acquisition and dedication of right-of-way.	Provide a site-specific assessment of known or suspected soil and groundwater contamination, asbestos containing materials, and heavy metal-based paint for liability protection.	Corridor or project-wide assessment of soil and groundwater contamination, asbestos containing materials, and heavy metal-based paint.
Typical Limitations	Site access is preferred but may not be available.	Right-of-entry required. Site access necessary.	Site access is preferred but may not be provided and property owners may not be available for interviews.
Guidance / Resources	Colorado Department of Transportation. October 2003. Right of Way Manual. ASTM. E 1528-22 Standard Practice for Environmental Site Assessments: Transaction Screen Process. CDOT ISA Checklist Form #881	ASTM. E 1527-21 Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process.	ASTM. E 1527-21 Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process.

Item	Initial Site Assessment (ISA)	Phase I Environmental Site Assessment (Phase I ESA)	Modified Environmental Site Assessment (MESA)
Modifications	None.	Extend the ASTM Minimum Search Radius by 0.25—1 mile, at the discretion of the CDOT EP and/or where project footprint is uncertain. Briefly describe CDOT's most current plans regarding acquisition, excavation areas, temporary and permanent dewatering, and other issues that may affect liability in acquisition. Include a map that summarizes the important features of the project and locations of sites with recognized environmental conditions and those of concern that may affect the project.	Perform a limited site reconnaissance ("windshield survey") if site access is not available. Extend the ASTM project minimum search radius 0.25—1 mile, at the discretion of the CDOT EP and/or where the project footprint is uncertain. Include a general project description, including the project footprint and any ROW to be acquired. Briefly describe the environmental setting, such as topography, geology, and groundwater hydrology including estimated depth to groundwater and shallow groundwater flow direction. Include a map that summarizes the important features of the project and locations of sites with recognized environmental conditions and those of concern that may affect the project. Indicate if sites are up or downgradient of the corridor.

Item	Initial Site Assessment (ISA)	Phase I Environmental Site Assessment (Phase I ESA)	Modified Environmental Site Assessment (MESA)
Notes	Consider the potential for asbestos-containing materials and heavy metal-based paint, notably for the demolition of structures. Findings and conclusions should be specific and give an opinion for additional assessment or investigation. Information should include what monitoring during construction may be appropriate (and where) and what remediation or monitoring actions may be needed.	Include a general discussion of asbestos-containing materials, heavy metal-based paint, and suspected drug lab waste, notably for the demolition of structures. The site reconnaissance and historical document review should identify sites with potential concerns that could affect project design, ROW acquisition, construction, and decisions regarding the preferred alternative. Findings and conclusions should be specific and give an opinion for additional assessment or investigation. Information should include what monitoring during construction may be appropriate (and where) and what remediation or monitoring actions may be needed.	Include a general discussion of asbestos-containing materials, heavy metal-based paint, and suspected drug lab waste, notably for the demolition of structures. The site reconnaissance and historical document review should identify sites with potential concerns that could affect project design, ROW acquisition, construction, and decisions regarding the preferred alternative. Findings and conclusions should be specific and give an opinion for additional assessment or investigation. Information should include what monitoring during construction may be appropriate (and where), and what remediation or monitoring actions may be needed.

Note: The CDOT regional/region Hazardous Materials Specialist reserves the right to designate the appropriate hazardous materials document necessary.

4.1 Common Hazardous Materials Assessment Processes

Most CDOT projects are required to complete a baseline level of a hazardous materials assessment. All CDOT projects will begin with a scoping phase, in which the proposed project objectives, deliverables, and delineation of responsibilities are negotiated and finalized, as discussed in **Chapter 3**. The project scoping phase will determine the appropriate method of hazardous materials assessment documentation.

The hazardous materials assessment should be performed concurrently with the planning study or early in the NEPA process and should include a preliminary review of the existing and previous land use information for the area. Hazardous materials assessments must be completed before acquiring the property necessary for a project. The information gathered during the hazardous materials assessment provides enough detail about properties within the study area to allow for an effective decision-making process. **Sections 4.2, 4.3,** and **4.4** discuss the three documentation methods in detail for initial hazardous materials assessments. All three CDOT documentation methods contain common tasks included on **Figure 4.2** and discussed in the following subsections.

Figure 4.2. Common Hazardous Materials Assessment Process

4.1.1 Conduct Standard Environmental Database (Records) Review

CDOT has contracted with an outside firm to generate environmental database reports for hazardous materials clearances. Database searches should be completed in-house, whenever possible, because the database is already paid for and is regularly updated. If the CDOT-contracted database report cannot be obtained, a private database report may be ordered, provided the private database firm adheres to ASTM requirements.

An agency environmental database review is required for most projects. An agency environmental database review identifies known contamination sources and regulated or registered sites. An agency environmental database review consists of a search of federal, state, and tribal environmental databases. These databases contain information for sites (i.e., properties) with known contamination or sites that generate, treat, store, or dispose of hazardous materials that could have potential contamination concerns. Several existing databases also provide valuable information when additional details are needed or when the first database search does not provide enough information. Databases include EPA's Enforcement and Compliance History Online (ECHO), Facility Registry Service (FRS), Envirofacts/EnviroMapper Tool, CDPHE's Environmental Records, and the CDLE-OPS Petroleum Program also known as Colorado Storage Tank Information System (COSTIS-IA). **Appendix B** includes a list of contacts and resources.

CDOT requests the standard ASTM E1527-21 (or most current version) database search recommendations, including the standard environmental database sources and the approximate minimum search distances (**Table 4.2**). The search distances exceed the project area to assess the likelihood of contamination migrating from surrounding areas and affecting the project in terms of construction, materials management, and/or worker health and safety. Databases are searched for sites that lie within a specific distance beyond the project area, approximately 0.1-mile and ranging up to 1 mile (**Figure 4.3** and **Figure 4.4**) for active regulatory cleanup sites (e.g., VCP or Superfund). This is most commonly referred to as the study area. For linear transportation projects, the search distance is generally from the existing or proposed ROW (e.g., temporary or permanent), if known. Otherwise, the search distance is from edge-of-pavement or edge-of-ROW. For bridge projects, the search distance is generally from the edge of the bridge footprint.

The environmental database search is a quick and typically cost-effective way to search the environmental agency databases surrounding a CDOT project. The minimum search distances may be extended at the discretion of the EP completing the review, particularly if contamination may have potentially migrated into the project footprint from a source outside the standard search radii. For example, if the project scope of work involves excavation anticipated to encounter groundwater, contaminant plume migration may potentially impact construction; therefore, identifying adjoining properties that may pose a risk to project activities is critical. Because database search firms typically do not charge additional costs for larger search radii, any concerns of contamination outside the standard search radii should be investigated.

The approximate minimum search distance (**Table 4.2**) should include any ROW (e.g., temporary or permanent) that may be needed for construction and should be sufficient to evaluate minor scope changes, minor alignment shifts, and other possible redesign options to avoid hazardous materials involvement. For projects with alternatives analysis, the approximate minimum search distance should be sufficient to evaluate each potential alternative for hazardous materials concerns.

In addition to the review of the standard environmental record sources with minimum search radii, additional federal, state, and local record sources may be reviewed to enhance or supplement the hazardous materials assessment. Supplemental records may include:

- Local brownfield lists
- Local landfill/solid waste disposal sites
- Local hazardous waste or contaminated sites
- Local registered storage tanks list
- Local land records
- Local oil/gas facilities (CECMC)
- Local pipeline information (NPMS)
- Records of emergency release reports
- Records of contaminated public wells
- State LUST trust list
- State clandestine drug labs
- Other records the EP considers pertinent

CDOT provided or approved database reports (e.g., ERIS Database or EDR Radius Map Report) typically include a wide array of other record sources not listed on the ASTM list of standard environmental record sources. The EP will be responsible for determining which records are relevant to the hazardous materials assessment. Additionally, the EP may review files and records from alternative sources, such as onsite records, user-provided records, records from local agencies not contained in database reports, and interviews with regulatory officials or other individuals knowledgeable about the onsite environmental conditions.

The records review requires an evaluation of the physical setting of the property. The most common method for reviewing the physical setting is to use a current U.S. Geological Survey (USGS) 7.5 Minute Topographic Map (or equivalent) covering the project area; however, additional physical setting sources can provide information about the geologic, hydrogeologic, hydrologic, or topographic characteristics of the site. Topographic maps can be useful to evaluate whether a property is upgradient from the project. Additional sources are typically investigated when hazardous substances or petroleum products are likely to migrate into, out from, or within the project area, or when more information is generally obtained based on local good commercial and customary practice.

The physical setting can be useful for evaluating site risk, based primarily on relative elevation, depth of groundwater, and groundwater flow direction. Groundwater is the primary mechanism for transporting contamination from offsite and non-adjoining properties. By analyzing the physical setting and property concerns, many sites with concerns can be eliminated as potential risks or selected for additional assessment.

For example, a site with a petroleum release from a storage tank is located 250 feet from the project area. If the site is found to be a lower elevation than the project area and the reported or inferred groundwater flow direction is away from the project area, it would not be considered a risk. Conversely, if the site is found to be at a higher elevation and the flow of groundwater is toward the project area, additional analysis for the site may be required to determine if project activities are likely to encounter contamination.

Additionally, depth to groundwater can help evaluate the potential for project activities to encounter contamination. For example, if the project will require excavations to a depth of only 5 feet below ground surface and the reported depth to groundwater throughout the project area is estimated at 15–25 feet below ground surface, then potential contamination in the groundwater would not be expected to impact project activities.

Figure 4.3. Overview Map Depicting Hazardous Materials Review Search Distance from Limits of Construction for Linear Corridor Project

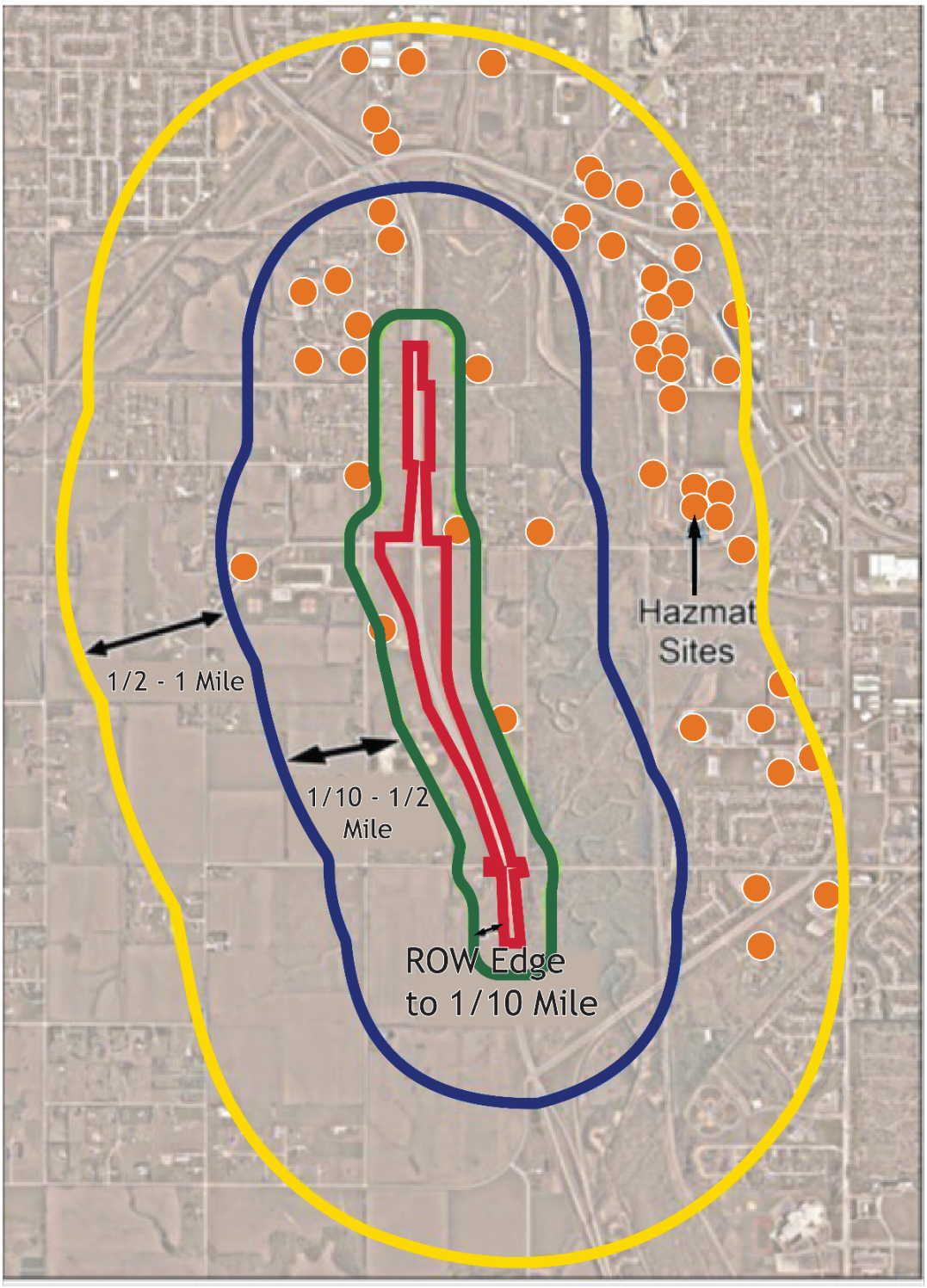


Figure 4.4. Overview Map Depicting Hazardous Materials Review Search Distance from Center of a Bridge Replacement Project

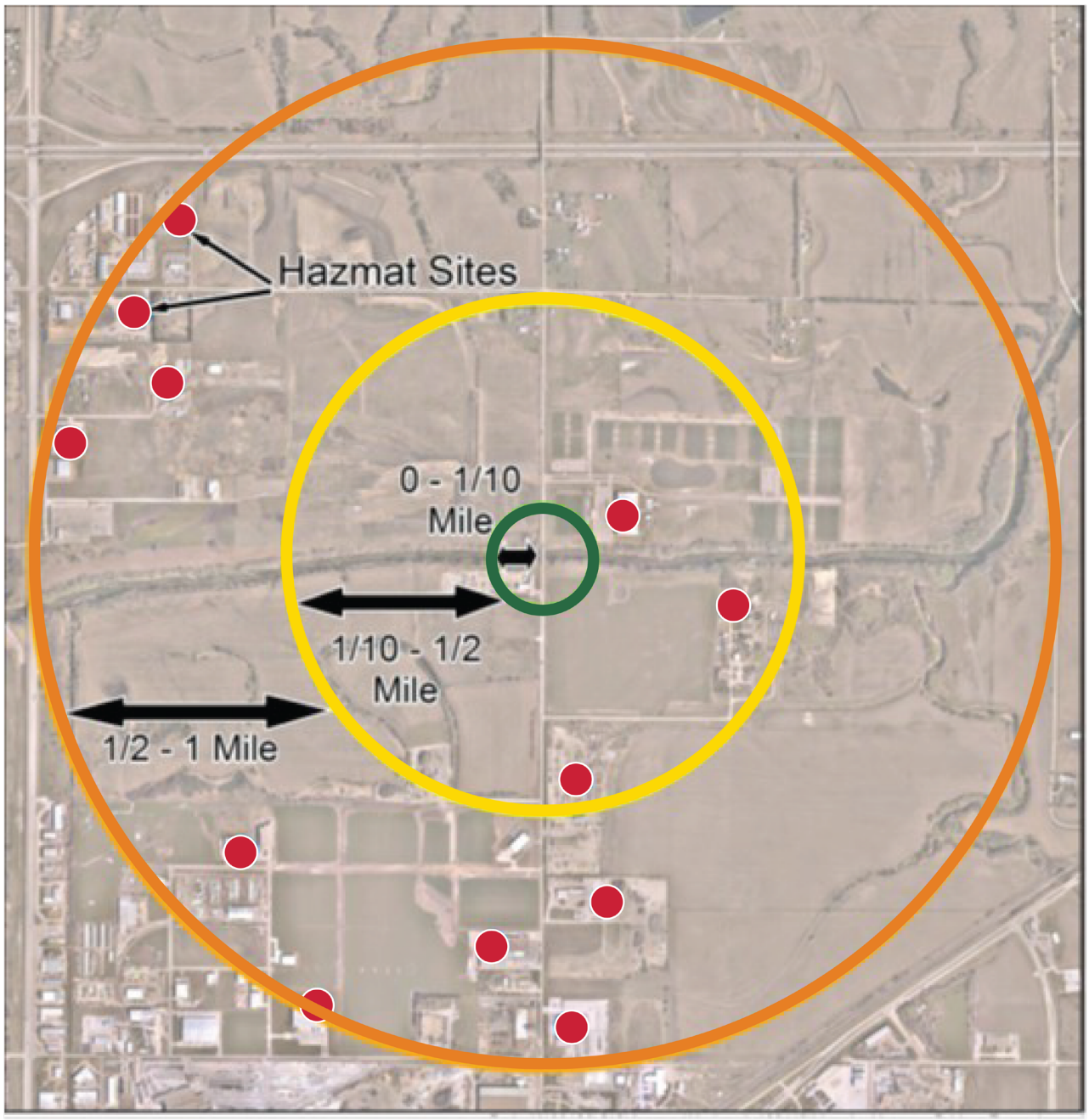


Table 4.2. Agency Environmental Database Descriptions and Approximate Minimum Search Distances (ASTM 2021)

Database	Description	Approximate ASTM Minimum Search Distance (mile)
Federal National Priorities List (NPL) site list	EPA database of uncontrolled or abandoned hazardous waste sites identified for priority remedial actions under the Superfund Program.	1.0
State- and tribal-equivalent NPL	List of state-/tribal-equivalent NPL.	1.0
Federal RCRA CORRACTS facilities list	EPA database of sites identified as needing corrective action after a release of a hazardous waste or constituent into the environment from an RCRA facility.	1.0
Federal Delisted NPL site list	EPA database of sites that may be deleted from the NPL where no further response is necessary.	0.5
Federal CERCLA – Superfund Enterprise Management System (SEMS) list and Federal list	EPA compilation of sites at which the potential exists for contamination originating from onsite hazardous substance storage or disposal. SEMS listed sites are either proposed to be or are on the NPL or are in the screening and assessment phase for possible inclusion on the NPL. Sites designated as SEMS-Archive have been removed and archived from the inventory of SEMS sites.	0.5
Federal RCRA NonCORRACTS Treatment, Storage, and Disposal (TSD) facilities list	EPA database of RCRA permitted facilities that generate, transport, store, treat, and/or dispose of hazardous waste. Transporters are individuals or entities that move hazardous waste from the generator offsite to a facility that can recycle, treat, store, or dispose of the waste. TSD facilities treat, store, and/or dispose of the waste.	0.5
State- and tribal-equivalent CERCLIS	List of state-/tribal-equivalent CERCLIS.	0.5
State, tribal, and local landfill (LF) and/or solid waste disposal site lists	Inventory of solid waste disposal facilities and landfills.	0.5
State and tribal LUST and aboveground storage tank (AST) lists	List of reported LUST and AST incidents.	0.5
State and tribal Voluntary Cleanup Program (VCP) sites	List of VCP sites.	0.5
State and tribal Brownfield sites	Inventory of potential Brownfields sites. Brownfields are typically defined as real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant.	0.5

Database	Description	Approximate ASTM Minimum Search Distance (mile)
State and tribal registered storage tank lists and local historical registered tanks	Aboveground Storage Tank (AST)/Underground Storage Tank (UST) – List of sites that registered the presence of ASTs/USTs.	Subject Property and Adjoining Properties
State and tribal institutional control/ engineering control registries	Inventory of sites within Colorado with institutional controls.	Subject Property Only
Federal RCRA generators lists – very small quantity generator (VSQG), small quantity generator (SQG), and large quantity generator (LQG) list	EPA database of facilities that generate, transport, store, treat, and/or dispose of hazardous waste. VSQGs generate less than 100 kilograms (kg) of hazardous waste or less than 1 kg of acutely hazardous waste per month. SQGs generate between 100 kg and 1,000 kg of hazardous waste per month. LQGs generate over 1,000 kg of hazardous waste or over 1 kg of acutely hazardous waste per month.	Subject Property and Adjoining Properties
Federal Emergency Response Notification System list	The National Response Center, U.S. Coast Guard database of information on reported releases of oil and hazardous substances.	Subject Property Only

4.1.2 Conduct Historical Records Review

Before the hazardous materials assessment is completed, a review of historical resources is typically required.

CDOT has adopted the ASTM E1527-21 definition of *standard historical sources*, which includes "those sources of information about the history of uses of the property" covering a period extending back to a property's first use or back to 1940, whichever is earlier (ASTM 2021). The most common historical sources that the consultant provides as part of a hazardous materials assessment include historical aerial photographs, USGS historical topographic maps, Sanborn Fire Insurance Maps, and/or reverse city directories in locations where available. It is recommended that at least two historical resources be reviewed. ASTM E1527-21 standard recommends reviewing as many of the standard historical resources as necessary to achieve objectives, those that are reasonably ascertainable, those likely to be useful, and those applicable to the subject property. If these historical resources are not reviewed, it must be stated why.

Other potential sources of historical information include county assessor websites, title records, building department records, zoning/land use records, and property tax files. These sources can be used to determine a building's age, if construction improvements have occurred, etc.

Consistent with the ASTM E1527-21 standard process, the goal of the historical review is to "develop a history of the previous uses of the subject property and surrounding area, in order to help identify the likelihood of past uses having led to recognized environmental conditions in connection with the subject property" (ASTM 2021). The historical sources evaluation should assess "all obvious uses of the property… from the present, back to the subject property's first developed use, or back to 1940, whichever is earlier" (ASTM 2021).

For the CDOT historical sources review, an internal search of every 10 years is acceptable if an area is not experiencing much change, or if the subject property use has not changed over an extended period of time (e.g., agricultural farmland that has been farmed since 1920 through 1970 or a building that has the same use in a 1915 Sanborn Fire Insurance Map as in the 1955 map). However, if the project is in a rapidly changing area, a search interval of every 5 years may be more appropriate. The hazardous materials assessment and project file should include findings from the historical sources. Discussion of the various types of historical sources follows. The environmental data service (e.g., ERIS) can obtain/provide these data in addition to the regulatory database for an additional fee.

It is up to the CDOT regional/region Hazardous Materials Specialist's discretion regarding the required historical sources to be reviewed (e.g., historical aerial photographs, topographic maps, Sanborn maps, etc.) as it varies project by project.

Historical Aerial Photographs

Aerial photographs have been collected for the continental United States since the mid-1930s, with variable coverage and frequency (generally based on an area's importance to national defense) (**Figure 4.5**). Aerial photographs offer an opportunity for direct observation of site conditions through a period of time. Observations may include the location of tanks, buildings, drums, pits, ponds, lagoons, stained/stressed vegetation, or other site development features that can indicate potential contaminant sources. Historical aerial photographs can be obtained from various sources, most commonly through environmental data service companies (e.g., ERIS) or Google Earth.

Figure 4.5. Examples of Historical Aerial Photographs

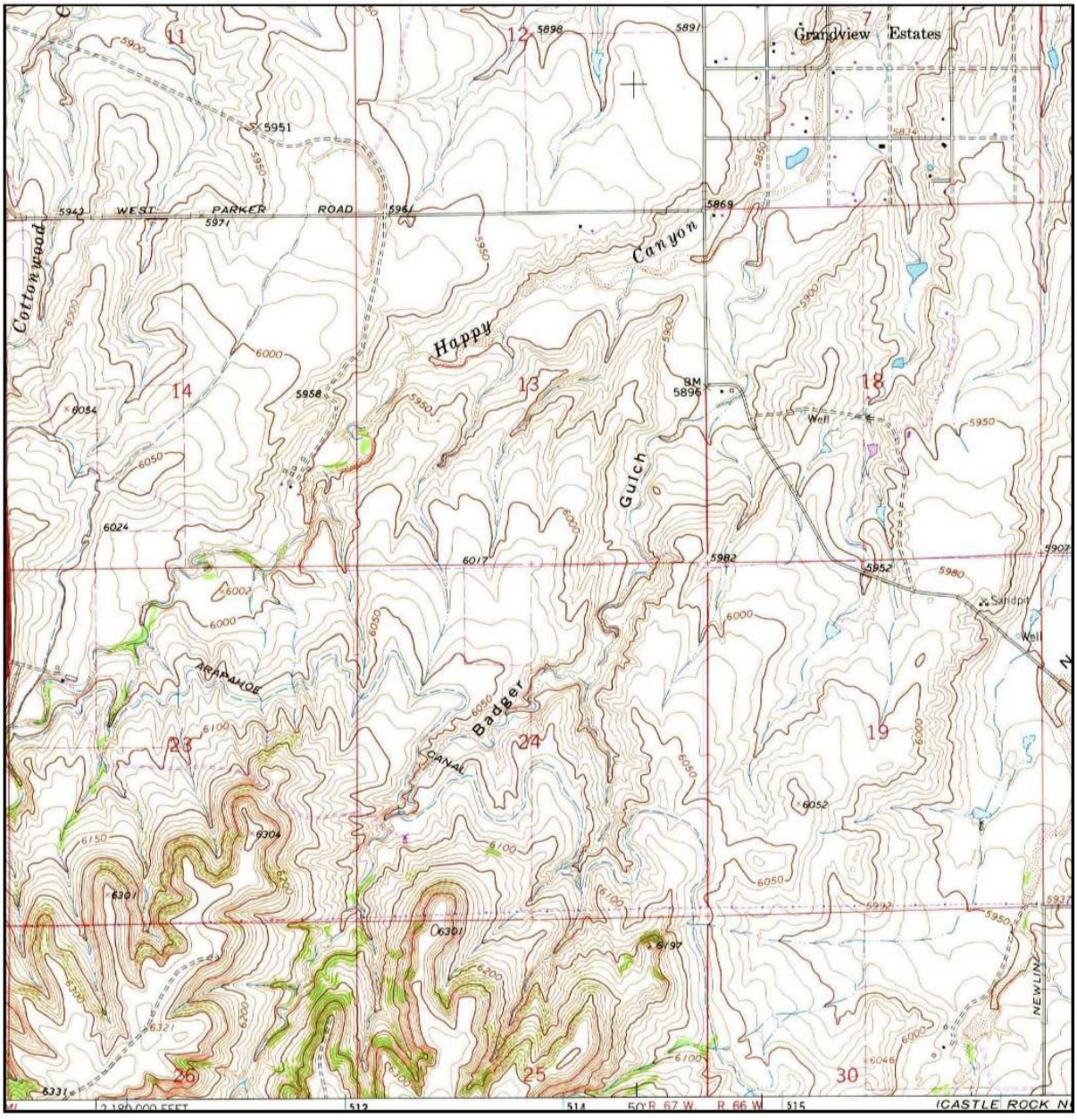
Tower Landfill – dated June 1993. Located west of Denver International Airport. Source: Google Earth

Tower Landfill – dated October 2015. The size of landfill substantially increased over previous decades. Source: Google Earth

U.S. Geological Survey Topographic Maps

USGS topographic maps have been prepared since the 1800s as part of the USGS mission to map the United States and survey its resources (**Figure 4.6**). Topographic maps use contour lines to show topographic features and symbols that represent other features such as streets, buildings, streams, mines, and vegetation. These maps are useful in identifying topographic and cultural features and site development over a period of time. USGS provides historical topographic maps through their web services (i.e., USGS Historical Topographic Map Explorer), although historical topographic maps may be obtained from other sources.

Figure 4.6. Example Historical Topographic Map

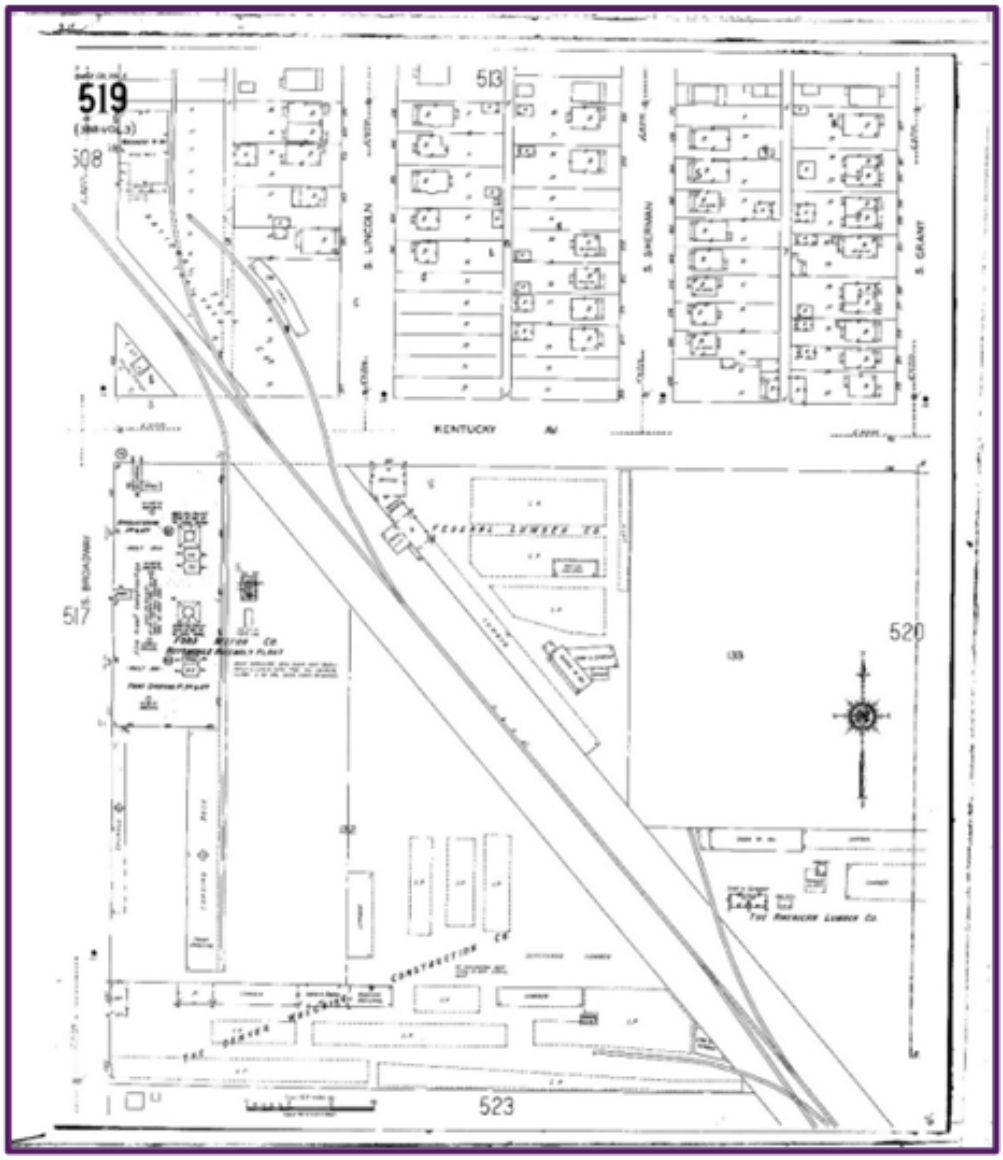


Source: EDR 2010.

Sanborn Fire Insurance Maps

Private companies have produced historical fire insurance maps (when available for an area) for more than 100 years. These maps include information about buildings, such as building uses and locations, on specified dates. One type of historical fire insurance map is the Sanborn Fire Insurance Map. Sanborn maps may identify pits, lagoons, tar wells, incinerators, gasholders, ASTs, USTs, and fueling facilities. Sanborn maps are typically available for urban areas but are generally not available for rural areas. Sanborn maps may be obtained from environmental data service companies (e.g., ERIS) or can be obtained from various municipal public libraries or government agencies based on location. **Figure 4.7** provides an example of a Sanborn map. Sanborn maps use a unique set of symbols and acronyms; a legend for Sanborn maps can be found online, typically produced by an environmental data service company.

Figure 4.7 Example Sanborn Fire Insurance Map



Source: Denver Public Library

4.1.3 Conduct Visual Reconnaissance

Most projects require a visual reconnaissance (i.e., site-inspection or site reconnaissance). A visual reconnaissance entails visually assessing the project corridor (e.g., highway widening project with many adjacent parcels) or project site (e.g., bridge replacement project with fewer adjacent parcels) and surrounding area to investigate the previous and current land uses for evidence of hazardous materials use, storage, or disposal. Generally, the visual reconnaissance is limited to areas visible from public ROW and does not include access to private properties, fenced-in areas, building interiors, or rear lots (alley side portion of adjacent sites). The visual reconnaissance can help verify building occupants, addresses, locations, and current subject property uses of sites identified in the agency environmental database review (**Section 4.1.1**). The staff performing the visual reconnaissance should also look for visible evidence of hazardous materials concerns at sites identified in the agency environmental database search, as necessary.

Appendix C includes a description and photo examples of reference items that may be identified during a visual reconnaissance. Phase I (**Section 4.4**) or Phase II (**Section 4.5**) investigations may be required at a later time if the project requires ROW acquisition.

It is important to record observations and findings resulting from the site reconnaissance while in the field. These observations can be recorded via field notes or via a visual reconnaissance form. CDOT ISA Form #881 (**Appendix D**) can be used as a visual reconnaissance form, regardless of the hazardous materials assessment method of documentation. Photographs should be taken of any identified or concerning environmental conditions observed during the site reconnaissance. Additionally, photographs of contained hazardous materials (e.g., PCBs in electrical transformers or aboveground petroleum storage tanks) should also be recorded. Hazardous materials assessment documentation typically requires a photo log to be attached to the documentation. **Appendix E** provides a photo log template.

For certain projects, a desktop review (i.e., geographic information system [GIS] review in lieu of a visual reconnaissance) using the most current aerial photography and available data layers may be sufficient. Approval by the CDOT EPM and/or the CDOT regional/region Hazardous Materials Specialist is needed in these cases. A desktop review would most commonly be approved for projects in areas that are largely rural and undeveloped where no known hazardous materials sites have been identified. Desktop review information and findings should be recorded in a memorandum or CDOT Form #881 and kept with the project file. If the desktop review reveals something of concern/interest, then the additional resources listed in **Appendix B** can be accessed or visual reconnaissance can be completed to verify information.

4.1.4 Conduct Detailed Regulatory File Review

When properties are identified during previous hazardous materials assessment steps, where the potential to impact construction, materials management, and/or worker health and safety is anticipated or known, CDOT requires additional research on these properties. Detailed records reviews can be conducted through several online databases and related organizations, such as the previously listed EPA ECHO, FRS, Envirofacts/EnviroMapper Tool, CDPHE's Environmental Records, and COSTIS-IA. These records management databases manage information such as corrective action plans, groundwater monitoring reports, and correspondence related to specific site(s) of interest. Additionally, previously conducted hazardous materials assessments and/or other relevant NEPA documentation may have been prepared for past projects near the current project study area. If previous project documentation potentially contains information relevant to the current project study area, the documentation should be obtained and reviewed.

The information obtained during a detailed records review can help CDOT determine if the identified sites could affect project activities and if additional investigation (i.e., subsurface investigation of soil and/or groundwater) is necessary. Information gathered during the detailed records review (e.g., location of spill, contaminants of concern, location of groundwater remediation system, extent of groundwater plume) can also be used during the project design and alternative selection process for applicable projects.

CDLE-OPS Release Closure Criteria

Tier I Closure: OPS has established Tier 1 RBSLs for chemicals of concern. To obtain a *No Further Action* (NFA) Tier 1 Closure, all chemicals of concern must be below Tier 1 RBSLs.

Tier II Closure: An NFA may be granted for a Tier 2 closure if three conditions of the release are met:

1) Fate and transport modeling predicts that points of exposure (POEs) will not become impacted in the future at concentrations above Tier 1 RBSLs
2) Impacted media concentrations are lower than the site-specific target levels for applicable exposure pathways
3) Point of compliance monitoring wells upgradient of the nearest POE are below Tier I RBSLs

Tier III Closure: Closure status for sites where dissolved-phase chemicals of concern can remain above Tier I RBSLs at the release property boundary but not beyond an adjoining public roadway. Must meet four criteria:

1) Contaminants have been removed to the maximum extent practicable
2) The public roadway property boundary is the only impacted POE
3) Post-remediation monitoring and fate and transport modeling is required
4) Offsite property owners must be notified that contamination is (or predicted to be) located beneath their property

Additional information and detailed descriptions can be found in CDLE-OPS's online Petroleum Program Guidance.

Note that sites may be listed as "closed" in the agency environmental records but still present a concern. Sites "closed" under Risk-Based Corrective Action that have received *No Further Action* (NFA) letters from CDLE-OPS could still warrant additional analysis. A detailed records review may be used to determine whether residual soil and/or groundwater contamination present onsite could impact construction, affect worker health and safety, and/or cause a materials management issue (despite having achieved the appropriate cleanup levels that the state requires). Sites may also be listed as "closed" if contamination is present above the RBSLs on the property but modeling and/or analysis has determined that the contamination will not migrate beyond the property. Properties "closed" under these circumstances could still impact construction and worker health and safety and/or cause a materials management issue if construction activities are to be conducted within the property.

Additionally, contamination that may have migrated beneath public roadways due to a release is typically not directly remediated and exceedances of the RBSLs may remain in place, having a potential to impact construction activities. This is a common procedure among Tier III closures.

In 2014, CDLE-OPS issued new closure criteria guidance (see call-out box on previous page). The new closure criteria established a "tiered closure approach" used by CDLE-OPS. This approach only applies to release events closed after October 2014.

CDLE-OPS records can provide a wide array of documents at the various stages of the CDLE-OPS release response process. The most common documents include the Site Characterization Report (SCR), Monitoring and Remediation Report (MRR), Corrective Action Plan (CAP), and No Further Action Request (NFAR). The content of the documentation is usually be implied by the type of report, but the preparers of these documents (typically environmental consultants contracted by the property owner/operator) historically varied in documentation style and structure.

Tip: When uncertain, consult the CDOT EPM or CDOT regional/region Hazardous Materials Specialist to determine whether a detailed records review is required for particular sites/properties of interest.

The EP determines which sites warrant a detailed records review based on the collected information that is available. If a detailed records review is conducted, all findings should be recorded in the hazardous materials assessment documentation. Copies of pertinent regulatory records should be included in the hazardous materials assessment appendices or attachments, varying depending on the level of documentation required for the project or site. Examples of pertinent records found in existing documents include site maps, groundwater flow maps, closure assessments, organizational (correspondence i.e., CDLE-OPS), and executive summaries of monitoring reports (**Figure 4.8**).

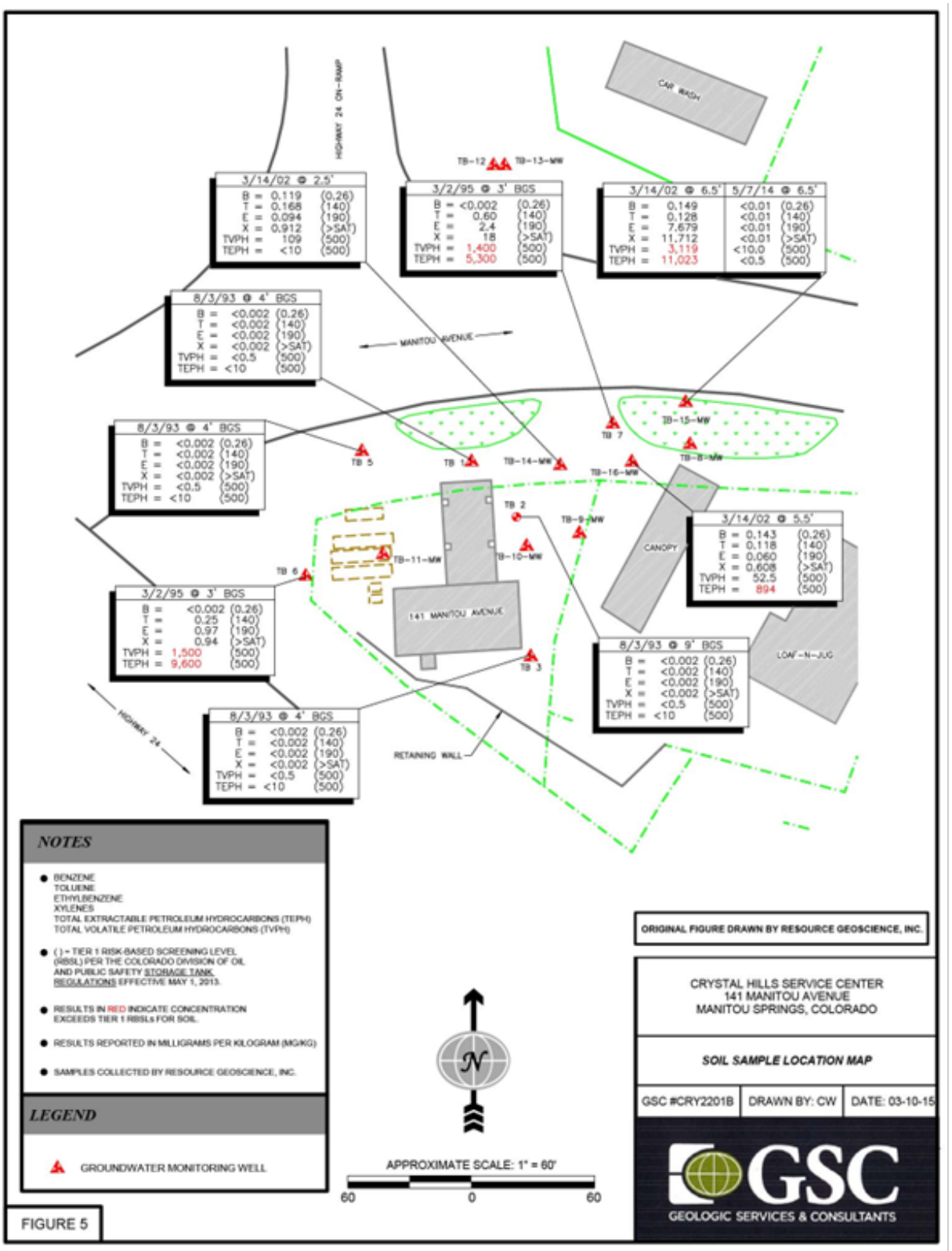
4.1.5 Interagency Coordination

Regulatory agencies can be great resources for additional information about a site or a property that is critical for determining potential impacts and issues relative to the project planning/scoping and/or alternatives analysis. Regulatory agencies typically become involved with a property or a site when regulated activities are reported on the property (e.g., ASTs and USTs or hazardous waste generation, TSD). Agencies may also become involved if a potential threat to human health and safety and/or the environment is identified, or if the potential exists for degradation of Waters of the U.S. In certain circumstances, site investigations may trigger regulatory oversight.

Multiple regulatory agencies, such as local agencies like city, county, and quasi-governmental agencies, may oversee sites depending onsite activities. Examples include county health departments, city fire departments, and state and county emergency management agencies. At the state level, these may include one or more Colorado or EPA departments or entities such as CECMC, CDPHE, and CDLE-OPS. In some cases, such as involvement with Superfund sites, EPA may be involved at the federal level. These entities are often responsible for inspecting regulated businesses and ordering cleanup activities for hazardous materials releases. Generally, the larger and more highly contaminated sites are predicted to be more actively regulated than smaller sites with low levels of contamination.

When conducting a hazardous materials assessment for a property or a site, it is critical to identify the involvement of regulatory agencies to ensure that project activities can be coordinated with existing hazardous materials management activities on the property. Coordinating with regulatory agencies can also provide information for making informed planning and scoping decisions during the project planning or alternatives analysis stage. The agencies listed in **Appendix B** have regulatory authority over water quality, air quality, hazardous materials, hazardous waste, and/or contaminated sites.

Figure 4.8. Example Regulatory File Site Map



4.1.6 Categories of Environmental Concerns and Conditions

ASTM uses four terms to describe the nature of contamination identified on a subject property:

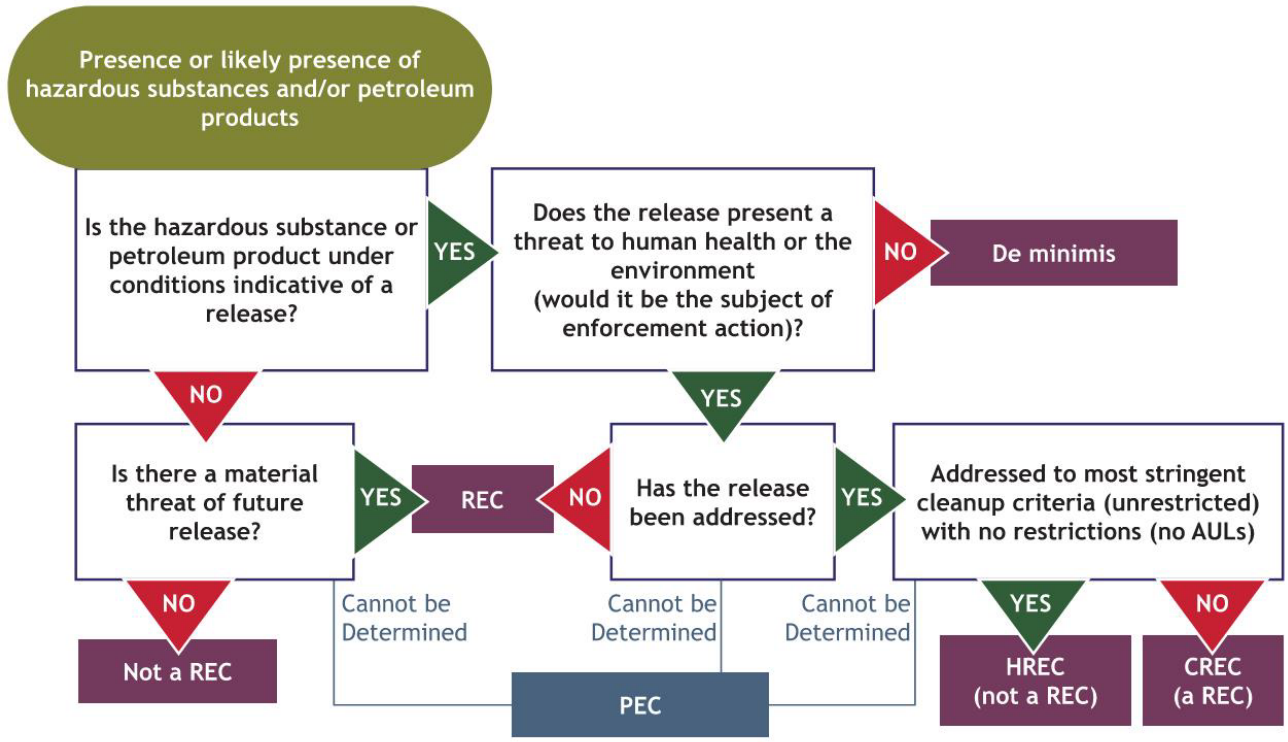
- **Recognized Environmental Condition (REC):** (1) The presence of hazardous substances or petroleum products in, on, or at the subject property due to a release to the environment; (2) the likely[1] presence of hazardous substances or petroleum products, in, on, or at the subject property due to a release or a likely release to the environment; or (3) The presence of hazardous substances or petroleum products in, on, or at the subject property under conditions that pose a material threat of a future release to the environment. A *de minimis* condition is not a recognized environmental condition (ASTM 2021).
- **Historical Recognized Environmental Condition (HREC):** A previous release of hazardous substances or petroleum products affecting the subject property that has been addressed to the satisfaction of the applicable regulatory authority or authorities and meets unrestricted use criteria established by the applicable regulatory authority or authorities without subjecting the subject property to any controls (for example, activity and use limitations [AULs] or other property use limitations). Before calling the past release an HREC, the EP must determine whether the past release is a REC at the time the Phase I ESA is conducted (for example, if there has been a change in the regulatory criteria). If the EP considers the past release to be a REC at the time the Phase I ESA is conducted, the condition shall be determined as a REC (ASTM 2021). HRECs are not RECs.
- **Controlled Recognized Environmental Condition (CREC):** A recognized environmental condition affecting the subject property that has been addressed to the satisfaction of the applicable regulatory authority or authorities with hazardous substances or petroleum products allowed to remain in place subject to implementation of required controls (for example, AULs or other property use limitations). For example, if a LUST has been cleaned up to a commercial use standard but does not meet unrestricted residential cleanup criteria, it would be considered a CREC. The "control" is represented by the limitation restriction that the property use remains commercial (ASTM 2021).
- ***De minimis* condition:** A condition related to a release that generally does not present a threat to human health or the environment and that generally would not be the subject of an enforcement action if brought to the attention of appropriate governmental agencies. A condition determined to be a *de minimis* condition is not a REC or a CREC (ASTM 2021).

Figure 4.9 presents a flowchart that provides a method for evaluating which term, if any, is appropriate for categorizing an identified hazardous materials issue.

In addition to the four ASTM defined terms, CDOT uses a term to classify *expected, anticipated*, or *unknown* with the potential to be contaminated environmental conditions. This term is not approved for the ASTM Phase I ESA for a single property process but can be used in Modified Environmental Site Assessments (MESA). The term is defined in the ASTM E1528-22 Limited Environmental Due Diligence: Transaction Screen Process standard.

[1] "Likely" is that which is neither certain or proved but can be expected or believed by a reasonable observer based on the logic and/or experience of the environmental professional, and/or available evidence, as stated in the report to support the opinion given therein.

Figure 4.9. Hazardous Materials Condition Flowchart



Potential Environmental Concern (PEC): The possible presence of any hazardous substances or petroleum products on a property under conditions that indicate the possibility of an existing release, a past release, or a threat of a future release of any hazardous substances or petroleum products into structures on the property or into the ground, groundwater, or surface water of the property. The term includes hazardous substances or petroleum products even under conditions in compliance with laws. (Note that the "threat of release" is generally understood to be present when hazardous substances or petroleum products are poorly managed [for example, in corroded tanks or damaged containers] but the release of contaminants has not yet occurred, and there is an opportunity to prevent a release of the contaminants) (ASTM 2022).

4.2 Hazardous Materials Assessment - Initial Site Assessment

CDOT most commonly uses the ISA as its hazardous materials assessment method. The ISA is a quick and relatively inexpensive method to identify hazardous materials concerns within a project area or potential property to be acquired. CDOT's ISA process was derived from the ASTM standard E1528 – Limited Environmental Due Diligence: Transaction Screen Process. CDOT uses the ISA to support a CatEx project or a ROW acquisition. An ISA can also be used for properties that are to be acquired by, dedicated to, or disposed of by CDOT, and that have minimal hazardous materials concerns. The ISA should be performed concurrently with the planning stage of a project or early in the NEPA process. The information gathered during the ISA should provide enough detail about properties within the study area to allow an effective decision-making process. **Figure 4.10** and **Figure 4.11** provide examples of projects that would use the ISA method of assessment. Additionally, the CDOT CatEx Criteria List can be used to confirm a project's Categorical Exclusion Status, which can be accessed through CDOT EPB.

Figure 4.10. CDOT Pavement Patching Project (Pothole Repair)

Figure 4.11. Newly Completed CDOT Resurfacing Project

4.2.1 Overview of the Initial Site Assessment

The ISA is completed by filling out CDOT Form #881 (**Appendix D**). The ISA and CDOT Form #881 refer to the same method of documentation and can be used interchangeably. CDOT Form #881 provides a structure for obtaining the necessary information to allow effective decision-making and to provide worker health and safety information. CDOT Form #881 contains eight sections that require input from the EP conducting the ISA. The following provide additional information and the general purpose of each section of the document.

Project Description: The first section includes the project name, general location, and main elements of the project, such as widen roadway with additional lanes, resurface bridge, or construct median. This section provides general information to allow the project to be quickly identified and understood by the CDOT EPM, CDOT regional/region Hazardous Materials Specialist, or any other interested party reviewing the document.

Project Features: The second section contains a series of checkboxes and fill-in blanks about project features such as:

- If structures will be acquired, modified, or demolished
- If ROW or easements will be required
- If utilities need to be relocated
- If there is excavation and the expected depth
- If groundwater will be encountered and at what depth, along with groundwater flow direction

This section provides a quick list of project features that may influence the project's potential to encounter hazardous materials. It also provides critical physical setting information to assist in predicting the potential to encounter hazardous materials within and adjoining the project area.

Records Review and Interview(s): The third section contains a series of checkboxes and fill-in blanks regarding the review of environmental records, including the standard ASTM record sources, CDLE-OPS, CDPHE, and CDOT when applicable. It also provides locations to note if topographic maps, aerial photographs, Sanborn maps, and/or local street directories were reviewed. The section also provides a blank for filling in information on the project area's historical land use(s) based on the investigated information. The final item in this section provides a blank for listing interviews that were conducted during the review. This section quickly identifies the records, maps, and individuals investigated during this process.

Site Reconnaissance and Description: The fourth section provides a location for information about the visual inspection of the project area and the adjacent area. This section requests a description of the land use(s) for the project area and the land use(s) for the adjacent land. This section also provides checkboxes for a quick assessment of the project area and adjacent area land use(s). Listed land use options are industrial, light industrial, commercial, residential, agricultural, undeveloped, and other with a blank for writing in a land use. Multiple land uses can be checked. This section provides an overview of land uses within and adjoining the project area.

Potential Environmental Concerns on the immediate project area or directly adjacent to it: The fifth section contains a table of potential environmental concerns (21 listed with a blank to add additional concerns). The presence of each concern should be responded to with "Yes," "No," "Expected," or "Unknown" relative to the project area and to the adjacent area. This section lists potential environmental concerns observed or identified during the investigation.

Findings/Conclusions: The sixth section requires a conclusion of the presence of hazardous materials or other wastes within or adjacent to the project area that may affect the project, responding with "Yes," "No," or "Unknown." This section then provides a blank space for an explanation of the findings and conclusion(s). The explanation of findings and conclusions can vary depending on the investigated project, but it is recommended that any potential environmental concern noted with "Yes" or "Unknown" in the previous section be expanded upon.

For example, if the "Surface Staining" potential environmental concern is listed with "Yes," a sentence within the explanation may state: "Spilled petroleum was observed on bare ground in the project area, located 50 feet north of the roadway." This section further explains the findings identified during the investigation and predicts if the concerns will potentially impact project activities.

Recommendations: The seventh section requires a recommendation(s) based on the findings and conclusions in the previous section. The provided options for recommendations are "Materials Management Plan," "Force Account," "Modified CDOT Specification(s)," and "Additional Assessment/Investigation." This section provides a blank space for an explanation of the recommendation(s), in which the rationale and purpose of the recommendation can be described.

Attachments: The eighth and final section of CDOT Form #881 provides a location to identify the attachments to be included with the ISA submittal. Potential attachments listed on CDOT Form #881 are "Environmental Database Map," "Modified CDOT Specification(s)," "General Plan Note(s)," "Maps & Figures," and "Agency File Data." Not all of these listed attachments are required but are requested to be included when applicable and/or available. The attachments should include any important supplemental information to aid in the CDOT EPM's and CDOT regional/region Hazardous Materials Specialist's review. Additional attachments can be added to the blank spaces in the table. For example, a photo log of the site reconnaissance is a commonly added attachment.

The basic steps for completing the ISA CDOT Form #881 are as follows:

- **Step 1:** Obtain basic proposed project features (e.g., project location, main project elements, if structure acquisition/modification/demolition is required, if ROW or easements are required).
- **Step 2:** Conduct agency environmental database review (**Section 4.1.1**).
- **Step 3:** Conduct basic historical review (**Section 4.1.2**).
- **Step 4:** Conduct site reconnaissance (**Section 4.1.3**).
- **Conditional Step:** If property contains potential hazardous materials issues, it may be prudent to conduct a detailed regulatory file review (**Section 4.1.4**).
- **Step 5:** Identify PECs based on previous steps (**Section 4.1.5**). **Appendix C** includes descriptions and examples for each PEC .
- **Step 6:** Summarize findings and conclusions.
- **Step 7:** Propose recommendations regarding hazardous materials concerns or lack thereof.
- **Step 8:** Finalize CDOT Form #881, compile necessary attachments with pertinent information, and submit to CDOT for review.

4.2.2 Finalize Document and Next Steps

CDOT Coordination

The CDOT EPM and/or the CDOT regional/region Hazardous Materials Specialist are responsible for communicating and providing copies of the various hazardous materials documentation and reports to the CDOT Engineer, CDOT ROW Acquisition Department, and CDOT Property Management Department.

Executive Summaries

Preparing an executive summary of the hazardous materials assessment to be attached to the documentation is useful as a quick reference to CDOT staff. The executive summary should discuss project activities, methods used in the hazardous materials assessment, assessment findings, and the EP's recommendations for next steps.

Once CDOT Form #881 has been completed as discussed in **Section 4.2.1**, the document needs to be finalized and submitted for review.

An internal quality assurance/quality control (QA/QC) review should be conducted before finalizing the documentation. The EPM typically conducts this review; however, if the EPM has prepared the ISA, another knowledgeable employee should be used for QA/QC. After the report has been reviewed internally, any necessary updates can be made to finalize the report.

The next step in finalizing CDOT Form #881 is for the EP investigator to sign and date the document in the "Completed by (Name and Title)" section. Once the document is signed, it can be converted to a PDF file. At this time, all listed attachments should be collected in PDF format and attached at the end of the CDOT Form #881 PDF. On request by the CDOT EPM and/or the CDOT regional/region Hazardous Materials Specialist or at the discretion of the EP preparing the ISA, a technical memo or report to accompany CDOT Form #881 may be required. This memo or report would be attached to the front of the CDOT Form #881 PDF packet. It is important to note that the ISA documentation is not constrained by the CDOT Form #881 if CDOT staff or the EP preparer believe additional documentation is appropriate. Once the packet is complete and all CDOT requests have been met, the CDOT Form #881 PDF packet should be submitted to the CDOT EPM for review.

The CDOT EPM will review the CDOT Form #881 PDF packet, and, if approved, will pass the packet on to the CDOT regional/region Hazardous Materials Specialist for final review. The CDOT regional/region Hazardous Materials Specialist will conduct a review and provide feedback about the document to the EPM. If CDOT reviewers request updates, the CDOT Form #881 document or the attachments should be updated appropriately and the revised date should be noted at the end of ISA Form #881. Once the document is determined to be completed correctly and approved by CDOT staff, the CDOT EPM will sign off on the ISA Form #881's CDOT EPM approval line and on the "Hazmat – ISA/MESA" resource clearance for the front page of the NEPA Determination / Project Certification Form (CDOT Form #128b).

If the CDOT EPM or CDOT regional/region Hazardous Materials Specialist believes there are outstanding concerns requiring additional investigation, a Phase I ESA and/or a subsequent Phase II ESA may be requested. The EP preparing the ISA may request additional investigation in the document's "Recommendations" section, although additional work must be approved by CDOT.

Once the ISA package is approved and CDOT Form #128b is signed for the "Hazmat – ISA/MESA" line, the hazardous materials assessment for the project is completed. Once all "Resource Clearances" are obtained for the front of CDOT Form #128b, the ROW acquisition process can begin.

4.3 Modified Environmental Site Assessment

The MESA method is an adapted version of the ASTM Phase I ESA (E1527-21) process. The MESA is most commonly used to support an EA or an EIS. The MESA is modified to allow a hazardous materials assessment to be conducted on a corridor or project-wide scale. Projects not classified as EAs or EISs can also use the MESA method at the discretion of the CDOT regional/region Hazardous Materials Specialist. **Figure 4.12** provides an example of a project that would use MESA documentation.

Figure 4.12. New Highway Under Construction

4.3.1 Overview of the MESA Process

The MESA method of documentation is typically conducted through the preparation of a MESA Technical Report. A MESA Technical Report structure is at the discretion of the EP conducting the site assessment and confirmed with the CDOT EPM and/or the CDOT regional/region Hazardous Materials Specialist. CDOT Regions may have varied preferences. **Appendix G** provides a template MESA Technical Report. The template MESA Technical Report is structured as follows:

- **Introduction**: The "Introduction" section provides a location for a detailed project description and discussion of alternative designs, if applicable. The section also discusses the methodology of the hazardous materials assessment and provides a detailed description of the environmental setting, regional geology, and regional hydrology.
- **Visual Reconnaissance**: The "Visual Reconnaissance" section provides a location to discuss the time, date, and areas visually inspected by the EP and/or team members. The section also typically includes information on the land uses within and adjoining the project area or the alternative proposed project areas.

- **Historical Use:** The "Historical Use" section provides a location to discuss the review of historical aerial images, historical topographic maps, and historical Sanborn Fire Insurance Maps. Local street directories or other historical documentation of land use and development in the project area may also be investigated.
- **Database Search and Site Screening:** The "Database Search and Site Screening" section provides a location to discuss the source and method of acquiring the environmental database information for sites within and adjoining the project area. This section typically provides a table listing the databases searched and the search radius used for each database. Occasionally, the CDOT EPM will recommend extending the ASTM minimum search radii by 0.25—1 mile for MESA projects, based on the EP's discretion. This section typically uses the following three subsections:
  - **Site Screening:** The "Site Screening" subsection discusses the methodology of screening environmental database records and determining which sites have the potential presence of contamination or could have an adverse impact on the project or alternatives. This subsection also typically provides the methodology used to classify sites into risk categories (low, medium, or high) and the circumstances that may require a detailed records review for the property. A supplemental appendix is typically included in reference to this subsection with a detailed table covering all sites identified in the environmental database review and their risk category, as well as other relevant information including listed databases of concern and if the site requires additional review. The MESA template in **Appendix F** includes an example of the table.
  - **Detailed Records Review:** The "Detailed Records Review" subsection discusses individual sites that were further investigated due to their potential to impact the project area.
  - **Additional Corridor-Wide Issues of Concern:** The "Additional Corridor-Wide Issues of Concern" subsection discusses non-site-specific concerns, such as heavy metal-based paint (i.e., LBP) or ACM on structures within the project area or oil and gas activity along the corridor.
- **Findings and Recommendations:** The "Findings and Recommendations" section revisits the methodology of the MESA and the limitations of the investigation. The section typically uses two subsections as follows:
  - **Findings**: The "Findings" subsection summarizes the sites identified along the project corridor(s) with PECs or RECs, HRECs, and CRECs. An appendix containing a table summarizing the findings on the PEC and REC sites is the recommended method of presenting site information when a significant number of sites are identified. The MESA template in **Appendix F** provides an example of the table. CDOT also requests all MESA projects provide a map that summarizes important project features and locations of sites with RECs and PECs that may affect the project. This map can be placed in this subsection or can be attached as an appendix if multiple maps are required to fully cover the project area at a reasonable scale.
  - **Recommendations:** The "Recommendations" subsection presents recommendations based on the hazardous materials findings. Recommendations commonly involve providing methods for addressing specifically identified hazardous materials issues, recommending HASPs or MMPs, and providing information on meeting regulatory standards and requirements.

The MESA Technical Report structure provided in the template is not a mandated report structure and can be modified at the EP's discretion. A MESA Technical Report could use the report structure outlined in the ASTM E1527-21 standard, detailed in **Section 4.4.3**.

The preparation of the MESA Technical Report using the template's outlined structure contains similar steps to those of the other hazardous materials assessment methods, as discussed in **Section 4.1** and outlined in **Section 4.2** for ISA documentation. The modified steps to completing the MESA are as follows:

- **Step 1:** Research the proposed project and potential alternative designs (e.g., location, project area size, general environmental setting for the project, depth and direction of groundwater in the area, potential structural impacts of project activities, and if excavation activities will be required, etc.).
- **Step 2:** Conduct an agency environmental database review as outlined in **Section 4.1.1**. As previously noted in the MESA structure outline, CDOT recommends extending the ASTM standard minimum search radii by 0.25—1 mile for MESA projects based on the EP's discretion. Due to the typical size of projects requiring MESA documentation, database search companies may also require special orders and often require additional preliminary information such as GIS shapefiles containing the limits of the project area.
- **Step 3:** Conduct a historical review as outlined in **Section 4.1.2**. Due to the typically large size of the study area, the historical review should focus on establishing generalized descriptions of land use over time. Evaluate specific sites with PECs identified during the historical review based on current environmental database records and during site reconnaissance if accessible.
- **Step 4:** Conduct the site reconnaissance as outlined in **Section 4.1.3**. Due to the large size of projects requiring MESA documentation, a limited site reconnaissance is recommended. Large corridor projects typically will not obtain site access, as the number of properties to investigate makes a traditional thorough site investigation impracticable. The limited site reconnaissance is often referred to as a "windshield survey" because the inspection is typically conducted from a vehicle. If specific properties are identified with environmental concerns in **Step 2** or **Step 3**, a more substantial site reconnaissance is recommended at those locations.
- **Step 5**: Based on the information obtained during **Step 2** through **Step 4**, properties of concern should be classified as a high, a medium, or a low potential site in terms of risk to the project as explained in **Chapter 4**.
- **Step 6 (if determined necessary)**: Conduct a detailed regulatory file review as outlined in **Section 4.1.4**. **Table 4.3** offers a guide to determine when additional detailed records reviews are recommended. **Table 4.3** is not a required tool but simply a recommendation. Determining the sites that require additional review is at the discretion of the EP.
- **Step 7**: Identify sites with PECs or RECs based on the information obtained through the previous steps as outlined in **Section 4.1.5**.
- **Step 8:** Summarize findings and conclude professional recommendations based on findings.
- **Step 9:** Create the technical report using the outlined template structure. The template structure is a recommendation, and alterations to the technical report structure can be made based on the EP's discretion.

Table 4.3. Detailed Records Review Site Evaluation Matrix

Distance from Proposed Project	Low Risk Potential Classification	Medium Risk Potential Classification	High Risk Potential Classification
Within 100 feet of the Project Area	Not Recommended	Recommended	Not recommended
Within 100 to 500 feet of the Project Area	Not recommended	Recommended	Recommended
500 to 1,000 feet from the Project Area	Not recommended	Not recommended	Recommended
Greater than 1,000 feet from the Project Area	Not recommended	Not recommended	Not recommended

4.3.2 Finalize Document and Next Steps

CDOT Coordination

The CDOT EPM and/or the CDOT regional/region Hazardous Materials Specialist is responsible for communicating and providing copies of the various hazardous materials documentation and reports to the CDOT Engineer, CDOT ROW Acquisition Department, and CDOT Property Management Department.

Executive Summaries

Preparing an executive summary of the hazardous materials assessment to be attached to the documentation is useful as a quick reference to CDOT staff. The executive summary should discuss project activities, methods used in the hazardous materials assessment, assessment findings, and the EP's recommendations for next steps.

The process of finalizing and submitting the MESA Technical Report to CDOT is similar to that used for the ISA as detailed in **Section 4.2.2**. The MESA Technical Report should undergo internal QA/QC review before the report is finalized. Once the document is internally reviewed, it can be packaged in PDF format with all necessary attachments. The completed package should then be delivered to the CDOT EPM or Project Manager. The MESA Technical Report will be reviewed, and if approved by the CDOT EPM or Project Manager, the completed package will be delivered to the CDOT regional/region Hazardous Materials Specialist for review. If the completed package is determined to have been completed correctly and is approved by CDOT staff, CDOT staff will sign off on the "Hazmat – ISA/MESA" resource clearance on the front page of the NEPA Determination /Project Certification Form (CDOT Form #128b).

If the CDOT EPM or CDOT regional/region Hazardous Materials Specialist believe outstanding concerns require additional investigation, a Phase I ESA and/or a subsequent Phase II ESA may be requested. The EP preparing the MESA Technical Report may request additional investigation in the document's "Recommendations" section. CDOT must approve any additional work.

Once the MESA package is approved and CDOT Form #128b is signed for the "Hazmat – ISA/MESA" line, the hazardous materials assessment for the project is completed. Once all "Resource Clearances" are obtained for the front of CDOT Form #128b, the ROW acquisition process can begin.

4.4 Phase I Environmental Site Assessment

The Phase I ESA is the ASTM designed method of conducting a hazardous materials assessment on a single property. The Phase I ESA is typically used in CDOT processes as a method of conducting additional investigation for a property identified with potential issues in either the ISA or MESA documentation. Additionally, properties to be fully acquired, as opposed to partially or temporarily acquired, are more likely to require a Phase I ESA if any potential concerns or known conditions exist on the property.

4.4.1 ASTM Standard E1527-21 Introduction

ASTM International is an international standards organization that develops and publishes voluntary consensus technical standards for a wide range of materials, products, systems, and services. ASTM has prepared standards for ESA methods. ASTM has developed a "Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process" known as E1527-21. The standard defines good commercial and customary practice in the United States for conducting a Phase I ESA of a parcel of commercial real estate with respect to the range of contaminants within the scope of CERCLA and petroleum products. As such, this practice is intended to permit a user to satisfy one of the requirements to qualify for the innocent landowner, contiguous property owner, or bona fide prospective purchaser limitations on CERLCA liability (ASTM 2021). The set of liability protections are known as "landowner liability protections" (LLPs). This E1527-21 process is consistent and complies with EPA's AAI Rule, as discussed in **Section 2.1.4.**

4.4.2 ASTM Standard E1527-21 Requirements and Process

As noted in **Section 4.4.1**, the E1527-21 standard process covers all requirements necessary to meet EPA's AAI Rule. The 10 criteria required to adequately address the AAI Rule are as follows (located in Section X1.5 of the ASTM E1527-21 standard):

1. The results of an inquiry by an EP (as defined by ASTM)
2. Interviews with past and present owners, operators, and occupants of the facility for the purpose of gathering information about the potential for contamination at the facility
3. Reviews of historical sources, such as chain-of-title documents, aerial photographs, building department records, and land use records, to determine previous uses and occupancies of the real property since the subject property was first developed
4. Searches for recorded environmental cleanup liens against the facility filed under federal, state, or local law
5. Reviews of federal, state, and local governmental records; waste disposal records; UST records; and hazardous waste handling, treatment, disposal, and spill records, concerning contamination at or near the facility
6. Visual inspections of the facility and of adjoining properties
7. Specialized knowledge or experience on the part of the defendant
8. The relationship of the purchase price to the value of the subject property, if the subject property was not contaminated
9. Commonly known or reasonably ascertainable information about the property
10. The degree of obviousness of the presence or likely presence of contamination at the property, and the ability to detect contamination by appropriate investigation

The listed criteria are consistent with the requirements of the ASTM E1527-21 standard (or most current version). The ASTM E1527-21 standard (or most current version) requires that the investigation be documented in a written report. The process for conducting a Phase I ESA and documenting the findings follows a similar process to that of the ISA and the MESA investigation methods. ASTM's standard requires a Phase I ESA to investigate the subject property and to obtain necessary information about the subject property and potential RECs through three main processes:

1. **Records Review:** The ASTM E1527-21 standard requires the acquisition and review of government environmental records that are reasonably ascertainable from standard sources. **Section 4.1.1** provides general information about the standard environmental records review process. The EP conducting the Phase I ESA is not obligated to identify, obtain, or review every possible record that might exist with respect to a property. ASTM defines record information that is reasonably ascertainable as (1) information that is publicly available, (2) information that is obtainable from its source within reasonable time and cost constraints, and (3) information that is practically reviewable (ASTM 2021). ASTM has established approximate minimum search distances for each standard environmental record source, shown in **Table 4.2**. If the subject property or any adjoining properties are identified on one or more of the standard environmental record sources, pertinent regulatory files and/or records associated with the listing should be reviewed. Additionally, to enhance and supplement the standard environmental record sources, detailed regulatory files from federal, state, tribal, or local environmental record sources shall be reviewed when reasonably ascertainable (similar to the process detailed in **Section 4.1.4**).

   In addition to the government environmental records review, ASTM requires a review of physical setting sources. ASTM also requires the review of a USGS 7.5 Minute Topographic Map (or equivalent) that covers the project site. **Section 4.1.1** provides additional details.

   The final subcomponent of the records review process is the review of historical use information, detailed in **Section 4.1.2.**

2. **Site Reconnaissance:** ASTM E1527-21 standard requires a site reconnaissance to obtain information potentially indicating the likelihood of identifying RECs in connection with the property. The ASTM E1527-21 standard site reconnaissance process differs from the methods detailed in **Section 4.1.3** because the commonly used CDOT site reconnaissance method is conducted for a transportation project and is not typically focused on a single subject property.

   The ASTM E1527-21 standard site reconnaissance requires the review of four major components of the subject property:

   a. **General Site Setting:** The general site setting should be used to determine and/or confirm current and past uses of the property, adjoining properties, and surrounding area. The reconnaissance should also determine and/or confirm the geologic, hydrogeologic, hydrologic, and topographic conditions to the extent that can be visually and/or physically observed. Based on observations during the site reconnaissance, the report shall generally describe the structures or other improvements observed on the subject property (e.g., note the number of buildings, number of stories of each building, approximate age of buildings, ancillary structures [if any]). Other important observations include the public thoroughfares adjoining the property; any roads, streets, and parking facilities on the property; source of potable water for the property; and method of sewage disposal for the subject property (ASTM 2021).

b. **Interior and Exterior Observations:** The interior and exterior observations portion of the site reconnaissance is designed to identify potential hazardous material or petroleum product concerns that could be located on the interior of structures or on the exterior of the subject property. Concerns to be identified and detailed in the report include, but are not limited to the following: hazardous substances and petroleum products; storage tanks (ASTs, USTs, vent pipes, fill pipes, or access ways indicating the presence of a UST); odors (strong, pungent, and/or noxious odors observed); pools of liquid (standing surface water, pools, or sumps containing liquids likely to be hazardous substances or petroleum products); drums (note any observed drums, whether or not they are leaking, unless the contents are known to not be hazardous substances or petroleum products); containers identified as containing hazardous substances or petroleum products; containers with unidentified substances suspected of being hazardous substances or petroleum products; and PCBs (electrical or hydraulic equipment known to contain PCBs or likely to contain PCBs).

c. **Interior Observations:** The interior observations portion is designed to identify releases or material threat of future releases of hazardous substances or petroleum products to the environment. Interior areas expected to be inspected include accessible common areas used by occupants or the public (e.g., lobbies, hallways, utility rooms, and recreation areas), maintenance and repair areas (including boiler rooms), and a representative sample of occupant spaces. It is not necessary to look under floors, above ceilings, or behind walls. Potential concerns to be identified and detailed in the report include, but are not limited to, heating/cooling (identify the means of heating and cooling, including the fuel source used); stains or corrosion (any stains or corrosion on floors, walls, or ceilings, excluding staining from water); and drains and sumps.

d. **Exterior Observations:** The periphery of the subject property shall be investigated, as well as the periphery of all structures on the property. The subject property shall be viewed from all adjacent public thoroughfares. Roads or paths with no apparent outlets observed on the subject property should be investigated to determine whether they were likely to have been used as an avenue for disposal of hazardous substances or petroleum products. Potential concerns to be identified and detailed in the report include, but are not limited to, pits, ponds, or lagoons; stained soil or pavement; stressed vegetation; solid waste (e.g., trash, construction debris, and demolition debris); wastewater; wells (including dry wells, irrigation wells, injection wells, abandoned wells, or other well types); and septic systems.

3. **Interviews:** ASTM E1527-21 standard breaks the interview component of the Phase I ESA into two sections:

   a. **Interviews with Past and Present Owners and Occupants**: Interviews with past and present owners are used to gather additional information relevant to determining RECs in connection with the property. The content of questions asked shall attempt to obtain information about uses and conditions (ASTM 2021). Useful questions can be found in the ASTM E1527-21 standard in **Appendix X3, User Questionnaire** or in the ASTM E1528-22 standard, **Transaction Screen Questionnaire**. Interviews may be conducted in person, by telephone, or in writing at the discretion of the EP. The interviews may be conducted before, during, or after the site visit, also at the discretion of the EP. However, the records review should be conducted before the site visit and/or any potential interviews.

   To interview the most knowledgeable person, the owner will be requested to designate a "key site manager." The key site manager is often the property manager, the chief physical plant supervisor, or the head maintenance person (ASTM 2021). The EP should attempt to schedule a mutually convenient appointment to conduct the interview with the key site manager. If scheduling an appointment is unsuccessful, another person with good knowledge of the subject property use and physical characteristics may be interviewed instead. Occupants of the subject property should also be interviewed, although it is not necessary to interview every occupant (ASTM suggests a reasonable number of occupants should be interviewed). If the subject property contains five or fewer occupants, a reasonable attempt shall be made to interview a representative of each; if there are more than five occupants, a reasonable attempt shall be made to interview the major occupant(s) or occupants whose operations are likely to indicate a REC on the subject property (ASTM 2021). If the subject property contains a multifamily residential property, residential occupants do not need to be interviewed. Interviews of past owners, operators, and occupants shall be conducted with those who are likely to have material information about the potential for contamination at the subject property to the extent that they have been identified and the information likely to be obtained is not duplicative of information already obtained from other sources (ASTM 2021).

   It is useful to ask the subject property owner and/or key site manager if they are willing to share any helpful documents. Examples of helpful documents include previous ESA reports; environmental compliance audit reports; environmental permits (including solid waste disposal permits, hazardous waste disposal permits, wastewater permits, National Pollutant Discharge Elimination System permits, underground injection permits); registrations for UST and AST tanks; registrations for underground injection systems; material safety data sheets; community right-to-know plan; safety plans (preparedness and prevention plans; spill prevention, countermeasure, and control plans; facility response plans); reports regarding hydrogeologic conditions on the subject property or surrounding area; notices or other correspondence from any government agency relating to past or current violations of environmental laws with respect to the subject property or relating to environmental liens encumbering the property; hazardous waste generator notices or reports; geotechnical studies; risk assessments; and recorded AULs.

   If the subject property to be acquired is abandoned, and there is evidence of potential unauthorized uses of the abandoned property or evidence of uncontrolled access to the abandoned property, interviews shall be conducted with one or more owners or occupants of adjoining or nearby properties (at least one must be interviewed).

b. **Interviews With State and/or Local Government Officials**: The process, question content, medium, timing, and most information detailed in the previous section regarding interviews with past and present occupants remains the same for interviews with state and/or local government officials. The key difference is who should be interviewed to satisfy the ASTM E1527-21 standard. A reasonable attempt shall be made to interview at least one staff member of any one of the following types of state and/or local government agencies: local fire department serving the property; state and/or local health agency or local/regional office of state health agency serving the area in which the subject property is located; state and/or local agency or local/regional office of state agency having jurisdiction over hazardous waste disposal or other environmental matters in the area in which the subject property is located; local agencies responsible for issuing building permits or groundwater use permits that document the presence of AULs that may identify a REC condition in the area in which the subject property is located (ASTM 2021).

The three processes for investigating the subject property and gathering information are designed to be used in concert with each other. If information from one source indicates a need for more information, other sources may be available to provide information (ASTM 2021). Once all reasonably ascertainable information is acquired and investigated, the report can be constructed.

4.4.3 Documentation for a Phase I Environmental Site Assessment

The Phase I ESA must be documented in a report format. ASTM E1527-21 standard includes a recommended report format and table of contents describing each section of the report. The recommended format is provided below (ASTM 2021):

1. **Summary:** This section summarizes the Phase I ESA process and may include findings, opinions, and conclusions.
2. **Introduction**: This section identifies the subject property (location and legal description) and the purpose of the Phase I ESA. This section also provides a place to discuss contractual details (including scope of work), limiting conditions, deviations, exceptions, significant assumptions, and special terms and conditions.
3. **User Provided Information**: This section presents information provided for the User's Responsibility section of the E1527-21 standard. User's responsibilities may include information from the User Questionnaire, if completed. For CDOT projects, the User is CDOT.
4. **Records Review**: This section reviews physical setting sources, standard and additional environmental record sources, and historical use information on the subject property and surrounding area as detailed in **Section 4.4.2** and the E1527-21 standard.
5. **Site Reconnaissance**: This section includes site reconnaissance observations as discussed in **Section 4.4.2** and the E1527-21 standard. Site reconnaissance includes the general site setting, interior and exterior observations, and uses and conditions of the subject property and adjoining properties.
6. **Interviews**: This section summarizes interviews conducted as detailed in **Section 4.4.2** and the E1527-21 standard with past and present owners, as well as state and local government officials.

7. **Evaluation**: This section documents the findings, opinions, and conclusions of the Phase I ESA as stated in the E1527-21 standard. This section also includes additional investigations, data gaps, and deletions. This section is also where EPs provide their statement, references, and signature as detailed in the E1527-21 standard.
8. **Non-Scope Considerations**: This section makes recommendations and summarizes additional services discussed in the E1527 standard but not part of the Phase I ESA practice.
9. **Appendices**: This section contains supporting documentation and the qualifications of the EP and other personnel who may have conducted the site reconnaissance and interviews. **Appendix H** presents a Phase I ESA Report Template.

4.4.4 Colorado Department of Transportation's Limitations When Conducting the Phase I Environmental Site Assessment for Transportation Projects

The ASTM E1527-21 standard was written for conducting a Phase I ESA of a single parcel of commercial real estate. CDOT projects do not typically involve single parcel transactions but instead require the evaluation of a project area associated with a transportation project, typically evaluating a multitude of properties that may be adjoining the project area or impacted by proposed project activities. Using the ASTM E1527-21 standard (or most current version) to conduct a Phase I ESA of a transportation project often encounters unavoidable limitations as discussed in **Section 1.2**.

The main limitations include but are not limited to:

- Inability to obtain site access to private properties
- Inability to conduct interviews with subject property owners
- Inability to detect the presence of potential contamination not reported in the regulatory databases in areas that could not be visually inspected (private properties without site access, interiors of structures, fenced-in areas, rear lots, or any other areas not visible from public ROW)
- Inability to obtain previously conducted Phase I ESA or other pertinent documentation conducted for private properties
- A Phase I ESA is valid for only 180 days, which is typically shorter than the necessary time required between the EA and the subject property acquisition for transportation projects

Due to the listed limitations, CDOT typically uses the ISA or MESA documentation method over the Phase I ESA method for transportation projects evaluating multiple properties.

The objectives of conducting an ISA or a MESA for a CDOT transportation project are significantly different from those of the ASTM E1527-21 Phase I ESA.

The main objectives of the ASTM E1527-21 standard method of the Phase I ESA are primarily to identify environmental concerns to meet the requirements of EPA's AAI Rule and to obtain one of the landowner liability protections. The ASTM compliant assessment method also provides the user with the ability to negotiate a fair value for the real estate transaction based on the presence or the lack of hazardous substance contamination or petroleum product contamination. Additionally, banks or potential lenders often request standard Phase I ESAs to evaluate the risk involved with a potential loan or an asset.

The main objectives of a CDOT hazardous materials assessment are to provide information for worker health and safety protections during construction activities, to provide information to the CDOT ROW Acquisition Specialists/Property Management Specialists, and to satisfy applicable regulatory standards as discussed in **Chapter 2**. However, the presence of hazardous substances or petroleum products is not typically used during ROW acquisition negotiations per the Uniform Act.

Additionally, CDOT staff typically do not conduct Phase I ESAs in-house but contract EPs to conduct necessary ASTM compliant assessments.

4.4.5 Finalize Document and Next Steps

CDOT Coordination

The CDOT EPM and/or the CDOT regional/region Hazardous Materials Specialist is responsible for communicating and providing copies of the various hazardous materials documentation and reports to the CDOT Engineer, CDOT ROW Acquisition Department, and CDOT Property Management Department.

Executive Summaries

Preparing an executive summary of the hazardous materials assessment to be attached to the documentation is useful as a quick reference to CDOT staff. The executive summary should discuss project activities, methods used in the hazardous materials assessment, assessment findings, and the EP's recommendations for next steps.

A Phase I ESA prepared entirely to the specifications and requirements outlined in ASTM E1527-21 standard, designed to satisfy EPA's AAI Rule and obtain an LLP, involving a commercial real estate transaction of a single property, shall be compiled in a report as described in **Section 4.4.3**. The draft Phase I ESA report should undergo internal QA/QC review before the report is finalized. Once the document is internally reviewed, it can be packaged in PDF format with all necessary attachments. The completed package should then be delivered to the CDOT EPM or Project Manager. The CDOT EPM or Project Manager will review the Phase I ESA, and if approved, the report will be delivered to the CDOT regional/region Hazardous Materials Specialist for review. Once the report has been approved and the Phase I ESA process is confirmed as completed, the Phase I ESA Report shall be archived and stored as proof of environmental due diligence being conducted for the acquisition of the subject property. Additionally, if the findings in the Phase I ESA identify outstanding concerns on the property, CDOT may request a Phase II ESA or another method of additional investigation.

If the Phase I ESA was an outstanding requirement related to NEPA clearance, in addition to a previously approved ISA or MESA for the transportation project, CDOT staff should sign off on the CDOT Form #128b "Hazmat – ISA/MESA" resource clearance at the time of approval.

4.5 Phase II Environmental Site Assessment

CDOT prefers that a Phase II ESA be conducted before the project's release to advertisement and, if possible, before ROW acquisition. Doing so allows a more informed property acquisition process and contractor bids to be more accurate. It also allows CDOT's Property Management Department to be informed on the site's management needs.

A Phase II ESA is typically performed to obtain scientifically valid data concerning actual subject property conditions. The ASTM E1903-19 standard describes the processes used to execute a Phase II ESA. To obtain scientifically valid data on subject property conditions, soil and groundwater sampling is typically conducted onsite; for this reason, Phase II ESAs are sometimes referred to as subsurface investigations. Occasionally, based on project-specific concerns, activities outside the scope of activities discussed in the ASTM E1903-19 standard may be conducted. Data collection may relate specifically to concerns identified as RECs or data gaps during the Phase I ESA. Data collection may also be used to obtain information determined to be important by the user of the report, regardless if such information was considered a REC or a data gap. The Phase II ESA scope of assessment can vary based on project-specific goals. This section discusses the general approach for a Phase II ESA.

4.5.1 Formulate the Question

During this step, the EP works with the user of the report to determine the question(s) to be answered by the Phase II ESA. These questions are typically reflected in the Statement of Objectives for the Phase II ESA. The Statement of Objectives typically forms part of the scope of work, proposal, contract, work order, or other document and should address schedule, cost, and limitations of the investigation.

4.5.2 Identify the Areas to be Investigated

The area(s) to be investigated are derived by evaluating the reasonably ascertainable information about the likely release areas and those areas that may be impacted by the release of petroleum products and/or hazardous substances. The presence of target analytes at the site may be due to a release, an intentional application, or natural origins.

For example, rocks and soil in Colorado are known to have naturally occurring concentrations of arsenic. Frequently, the naturally occurring or background concentration of arsenic is greater than the amount allowed by the federal government. Therefore, CDPHE has written a guidance document to assist with evaluating whether arsenic present at a site is due to a release or is naturally occurring. Additional information can be found in the CDPHE guidance document *Arsenic Concentrations in Soil – Risk Management Guidance for Evaluating*, accessible on the CDPHE website.

4.5.3 Develop a Conceptual Model

The conceptual model is "…a representation of hypothesized current site conditions which describes the physical setting characteristics of a site and the likely distribution of target analytes that may have resulted from a known or likely release." It is "… based on all reasonably ascertainable information relevant to the objectives of the investigation and the professional judgement of the environmental professional." The key components of a conceptual model are discussed in the following subsections.

Target Analytes

Target analytes are the substances that are or may be present or potentially released into the environmental media (e.g., soil, surface water, groundwater, soil vapor, rock, sediment, or air) and are of interest for the Phase II ESA. A goal of the Phase II ESA is to further evaluate the presence and to quantify the concentrations of these substances at the site. Various techniques are used, such as visual observation, field screening, and/or chemical testing.

Fate and Transport

This term fate and transport refers to the processes that occur or have occurred to the target analytes once they are released into the environmental media. Processes are influenced by the physical, chemical, and biological characteristics of the target analyte and of the environmental media.

Media

Environmental media include soil, surface water, groundwater, soil vapor, rock, sediment, or air that is or may be impacted by the target analytes at a site. Characteristics of the media will influence the distribution of the target analytes within the media. For example, how wet or how dry a medium is (i.e., moisture content) or how porous a medium is can affect the fate and transport of a substance through the environmental media.

4.5.4 Plan the Sampling and Chemical Testing

At a minimum, the data and results of the chemical testing for the target analytes should be reproducible. Samples should be collected from locations relevant to the objectives of the Phase II ESA and in the areas likely to have the highest concentrations of the target analytes, and/or where construction could likely encounter impacted media. Typically, it is not the goal to define the lateral and vertical extent of target analytes throughout the site; rather, to evaluate the presence/absence and concentration if present. Appropriate preparations need to be conducted prior to sampling, including locating and, if necessary, clearing utilities and providing necessary safety training to individuals conducting the subsurface investigation.

Care should be given to address certain issues such as the maximum amount of time that can pass before the data derived from the sample analysis is questionable (i.e., holding time); preservatives for the sample (e.g., ice or acidification); and the type of container in which the sample should be collected.

4.5.5 Coordinate with Regulatory Agencies

CDOT Coordination

The CDOT EPM and/or the CDOT regional/region Hazardous Materials Specialist are responsible for communicating and providing copies of the various hazardous materials documentation and reports to the CDOT Engineer, CDOT ROW Acquisition Department, and CDOT Property Management Department.

Executive Summaries

Preparing an executive summary of the hazardous materials assessment to be attached to the documentation is useful as a quick reference for CDOT staff. The executive summary should discuss project activities, methods used in the hazardous materials assessment, assessment findings, and the EP's recommendations for the next steps.

Coordination with CDPHE, Colorado Department of Water Resources (CDWR), EPA, CECMC, CDLE-OPS, FHWA, U.S. Army Corps of Engineers, United States Fish and Wildlife Service, and other regulatory agencies may be necessary before initiating ground-disturbing activities on a CDOT project. Coordination may be needed for permitting, solid and/or hazardous waste management and disposal, and tank removals. The project-specific scenarios should be discussed with the CDOT regional/region Hazardous Materials Specialist and/or qualified EPs.

4.5.6 Conduct the Sampling

Samples should be collected as specified in the Phase II ESA scope of work. Sampling should be conducted in accordance with industry standard procedures, and samples should be maintained under chain-of-custody protocol from collection through analysis. Deviations from the sampling plan should be documented in writing with an explanation of why the sampling could not be accomplished as planned.

4.5.7 Validate Conceptual Model

Once the chemical data results are received, they should be evaluated in conjunction with the field observations to determine whether the information is consistent with the conceptual model.

4.5.8 Develop Conclusions of the Phase II Environmental Site Assessment

The conclusions of the Phase II ESA will be based on interpretation of all results and findings and consistency with the validated conceptual model. The conclusions must answer the question(s) the investigation was designed to answer.

4.5.9 Prepare Written Report

A written report discussing the objectives, findings, interpretations, conclusions, and recommendations shall be prepared. The report shall be written such that the Phase II ESA could be reproduced by another entity. Recommendations should clearly detail the next steps for mitigating hazardous materials concerns on the project. **Appendix I** provides a table of contents template for a Phase II ESA report.

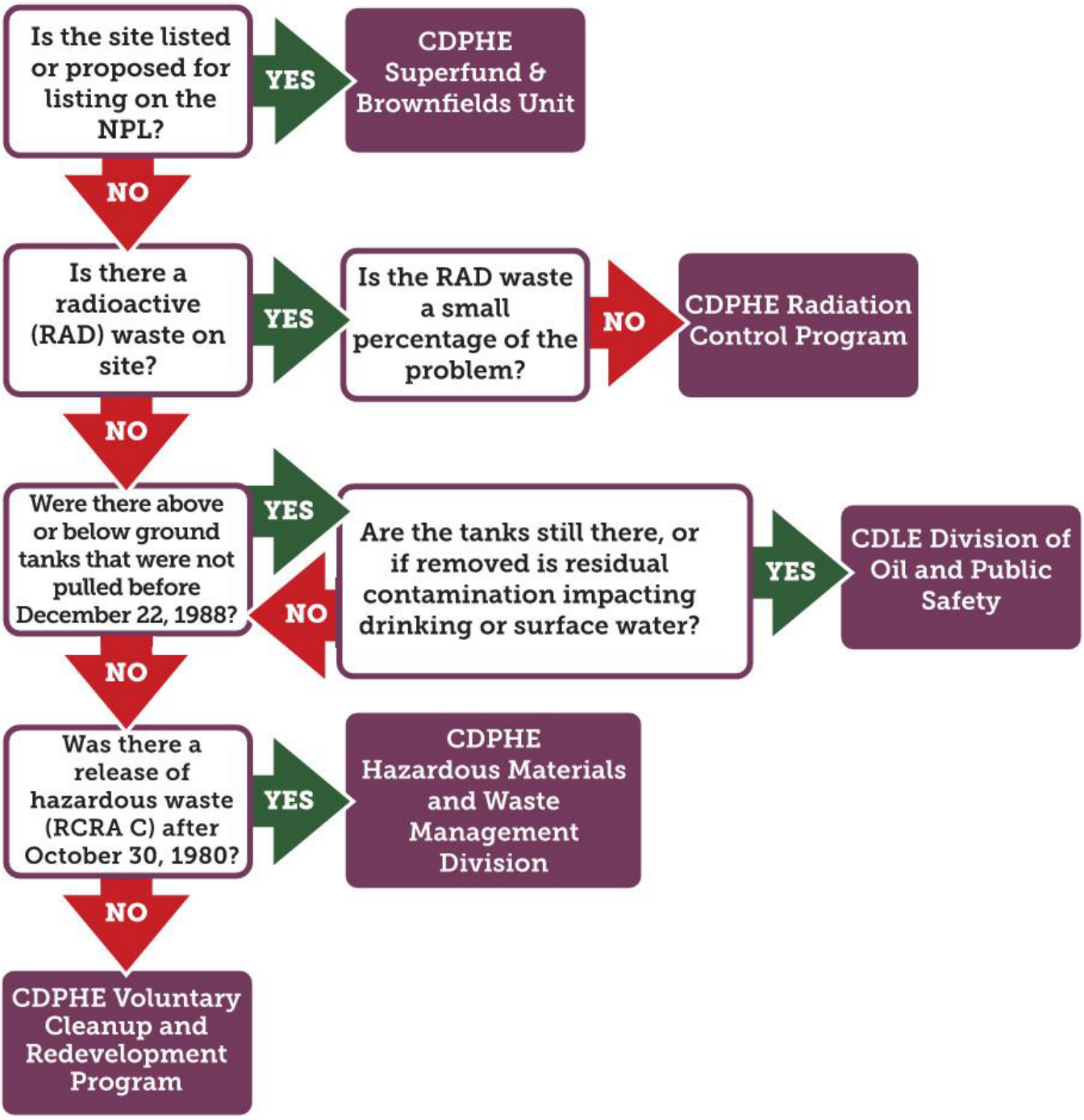
4.5.10 Finalize Document and Next Steps

A completed Phase II ESA report should undergo internal QA/QC review before finalizing the report. Once the document is internally reviewed, it can be finalized and delivered to the CDOT EPM or Project Manager by the requested method of delivery (e.g., PDF, physical copy, digital copy, etc.). The CDOT EPM or Project Manager will review the Phase II ESA report, and if approved, the report will be delivered to the CDOT regional/region Hazardous Materials Specialist for review. If CDOT staff determine that the document is completed correctly and approve the document, CDOT staff will then sign off on the "Hazardous Materials – Phase II" resource clearance for the back page of the NEPA Determination/Project Certification form (CDOT Form #128b). If the Phase II ESA is not associated with a NEPA project or the NEPA project has been completed before the Phase II ESA has been conducted, CDOT Form #128b sign-off will not be required.

The timing at which a Phase II ESA is conducted can vary based on project management and scheduling. If the Phase II ESA occurs before subject property acquisition, the approved Phase II ESA report should be delivered to the CDOT ROW Acquisition Department. After property acquisition is completed, the approved Phase II ESA report should be delivered to the CDOT Property Management Department. If the subject property has been acquired before the Phase II ESA has been conducted, the approved Phase II ESA report should be delivered directly to the CDOT Property Management Department.

If the results of the Phase II ESA require action by the subject property owner (typically CDOT), contact the RPEM and the CDOT Property Management Department to determine the next actions for the property. **Figure 4.13** provides a flowchart for determining what regulatory agency will oversee the remediation of the subject property based on the site conditions.

Figure 4.13. Post-Investigation/Site Characterization Next Step Agency



4.6 Remedial Investigation and Feasibility Study

Project Schedule Tip

If a project requires additional investigation or remediation, CDOT prefers the work to be conducted during the property acquisition phase of a project. By providing a clean site or a site with managed contaminants, the contractor bids will be more realistic. Additionally, conducting investigation and remediation work during project planning alleviates management issues for the CDOT Property Management Department.

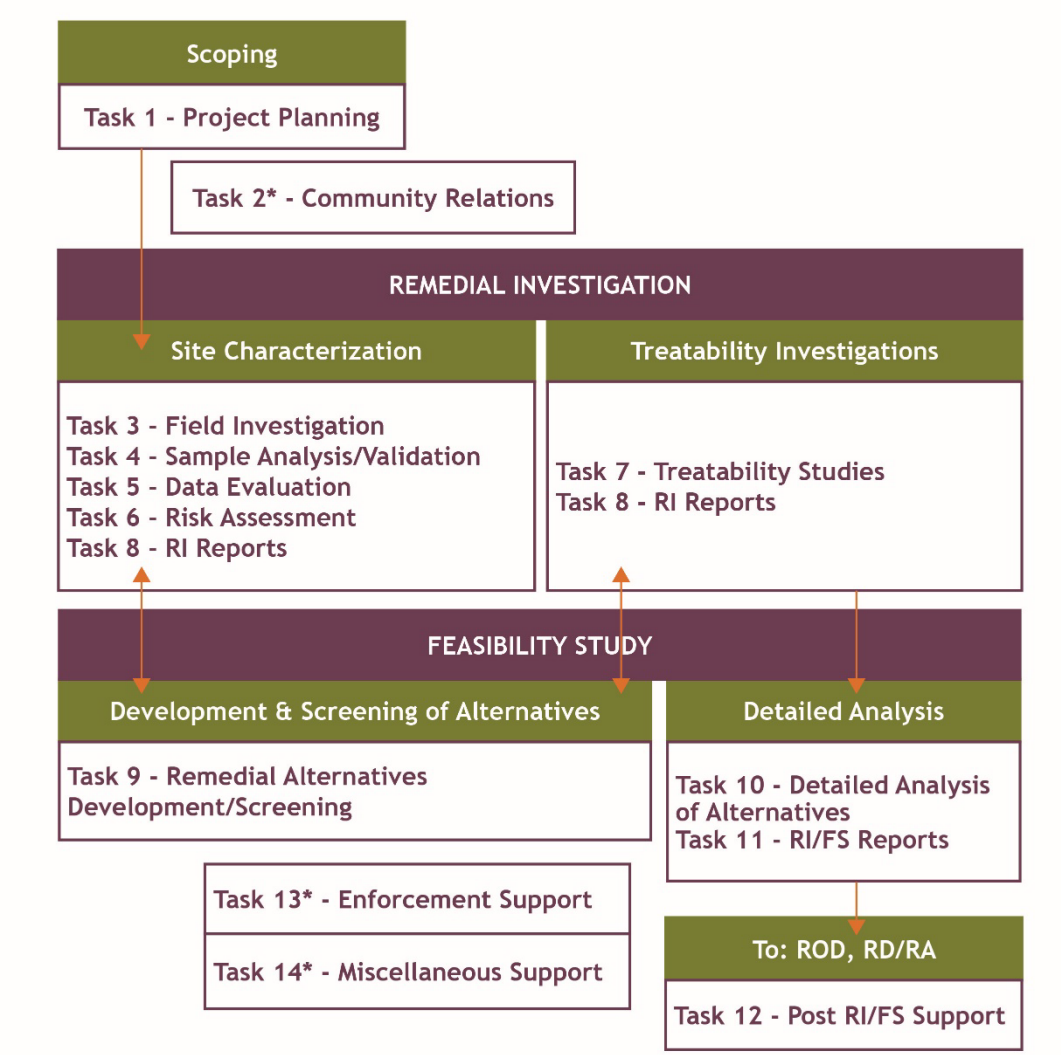
The remedial investigation and feasibility study (RI/FS) is a dynamic and flexible process that can be tailored to specific circumstances for individual sites but is most used for sites with a CERCLA nexus (EPA 1988). The purpose of a Remedial Investigation/Feasibility Study (RI/FS) process is to gather information sufficient to support an informed risk management decision regarding which remedy appears to be the most appropriate for a given site. The purpose of the remedy selection process is to implement remedies that eliminate, reduce, or control risks to human health and the environment. The RI/FS process is typically conducted after a Preliminary Assessment, a Site Investigation, or NPL Listing.

4.6.1 Overview of the Remedial Investigation/Feasibility Study Process

The RI/FS process is not a rigid step-by-step approach conducted identically for each scenario. The project manager is responsible for determining the best process to conduct an efficient and effective RI/FS to achieve high-quality results in a timely and cost-effective manner. **Figure 4.14** provides an overview of the general RI/FS process.

The two most substantial tasks involved in the RI/FS process are the remedial investigation and the feasibility study. Both tasks should be used concurrently to improve and advance the objectives of the entire RI/FS process. The following subsections provide additional information on these two critical tasks.

Figure 4.14. Remedial Investigation/Feasibility Study Process Flowchart



Remedial Investigation

The purpose of the RI is to collect data necessary to adequately characterize the site for developing and evaluating effective remedial alternatives. To characterize the site, the lead agency shall, as appropriate, conduct field investigations, including treatability studies, and conduct a baseline risk assessment. The RI provides information to assess the risks to human health and the environment and to support the development, evaluation, and selection of appropriate response alternatives.

Feasibility Study

The primary objective of the FS is to ensure that appropriate remedial alternatives are developed and evaluated such that relevant information concerning the remedial action options can be presented to a decision-maker and an appropriate remedy selected. The FS may be developed to address a specific site problem or the entire site. The development and evaluation of alternatives shall reflect the scope and complexity of the remedial action under consideration and the site problems being addressed. Development of alternatives shall be fully integrated with the site characterization activities of the RI (**Remedial Investigation**).

4.6.2 Finalize the Remedial Investigation/Feasibility Study Process and Next Steps

As previously noted, the RI/FS process identifies an appropriate remedy for the contamination located on the site. A remedy is selected based on nine evaluation criteria: overall protection of human health and the environment; compliance with applicable or relevant and appropriate requirements (i.e., federal, state, or local environmental laws); long-term effectiveness and permanence; reduction of toxicity, mobility, or volume through treatment; short-term effectiveness; implementability; cost; state acceptance; and community acceptance.

Typically, the remedial selection action is a two-step process:

1. Identify a preferred alternative and present it to the public in a proposed plan, for review and comment.
2. Review the public comments and consult with the state (or supporting agency) to determine if the alternative remains the most appropriate remedial action for the site or site problem.

The lead agency shall make the final remedy selection, which shall be documented in a Record of Decision (ROD). Additional information is provided in the regulatory document for the RI/FS process (**40 CFR 300.430**).

Once the final ROD is signed, a Remedial Design/Remedial Action document shall be prepared based on the specifications detailed in the ROD. All cleanup activities with EPA federal funding are reviewed by EPA's National Risk-Based Priority Panel. The Remedial Design/Remedial Action will detail the actions to accomplish the selected remedy and meet all objectives outlined in the ROD. The site cleanup will then be conducted including construction, post-construction operation and maintenance monitoring, 5-year reviews, and eventual deletion from the NPL, if applicable.

The CDOT Property Management Department manages projects requiring RI/FS processes. **Section 4.8** details objectives and responsibilities of the CDOT Property Management Department, regarding hazardous materials.

4.7 Delivery and Contracting Methods

Sections 4.7.1, 4.7.2, and 4.7.3 describe in detail the delivery and contracting methods that CDOT commonly uses:

- Design-Bid-Build (DBB)
- Design-Build (DB)
- Construction Manager/General Contractor (CM/GC)

Section 4.7.4 summarizes hazardous materials processes and requirements regarding CDOT's delivery and contracting methods.

4.7.1 Design-Bid-Build

If the project delivery method is DBB, after the design level survey is received, the preliminary design phase of the project begins. A Field Inspection Review (FIR) meeting is held to review the site conditions with 30 percent plans complete. The plans are reviewed with all CDOT specialty units, local governments if applicable, and utility company representatives to identify the tasks needed to complete the project. The preliminary cost estimate is developed and compared to the available budget. Once the design is at the stage where the ROW limits can be identified, plans can be prepared, and acquisition initiated. Final Design proceeds until the Plans, Specification and Estimate package is 95 percent complete. A Final Office Review (FOR) meeting is then conducted to complete the review process. Project funding is then obligated and authorized once all clearances are obtained and then the project is advertised for construction.

4.7.2 Design-Build

If the project delivery method is DB and if the owners can perform the design effort, the plans are developed to approximately the 30 percent level to be used to select a DB team of designers and contractors to complete the project. An engineering firm may be contracted to develop the 30 percent design plans. Factors used in selecting the DB team include qualifications, duration, price, and innovation.

4.7.3 Construction Manager/General Contractor

If the project delivery method is CM/GC, CDOT or a local agency will contract separately with a designer and a construction manager. The agency can perform design or contract with an engineering firm to provide facility design. A contractor is selected to give construction management input during the design process and to perform construction management services and construction work. The CM/GC will negotiate with the agency for a mutually agreeable contract amount. If the CM/GC and agency cannot reach a mutually agreeable negotiated contract amount or they choose not to negotiate, the project will be advertised for competitive bid.

4.7.4 Overview of Hazardous Materials Processes and Requirements for Colorado Department of Transportation

For each project delivery and contracting method, CDOT or the local agency managing the contract is responsible for previously identifying hazardous materials that may require management or disposal during construction. Hazardous materials may exist on the surface or subsurface, in groundwater or surface water, or on structures to be demolished or modified as part of the construction work. Hazardous materials may also be mixed with soil, water, building matrices, and/or other waste materials. Copies of all hazardous materials documents, including ISAs, MESAs, Phase I ESAs, Phase II ESAs, ACM and heavy metal-based paint inspections and abatement, etc., will be made available to the Prime Contractors as part of the project documents and listed in the project special provisions for construction.

The CDOT EPM must communicate and provide copies of the various reports to the CDOT Project Engineer for inclusion in the project documents and for listing in the project special provisions as part of the review of the project plan set. In some circumstances, CDOT may complete required or recommended remediation activities on owned or recently acquired properties before advertising the project for construction. In this situation, updated property conditions would be documented and hazardous materials related construction requirements would be reduced or eliminated appropriately.

If hazardous materials are known and/or suspected, the CDOT Project Engineer may develop a project special provision to the Section 250 Environmental, Health and Safety Management Specification for inclusion in the final project plans and specifications for advertisement. The Section 250 Environmental, Health and Safety Management project special provision will require that the contractor develop an MMP and HASP for submittal to CDOT when appropriate. The contractor shall submit the MMP and HASP to the CDOT Project Engineer for acceptance before beginning construction operations. The CDOT Project Engineer will review and provide comments and/or accept the plan(s) after submittal. After receiving comments from the CDOT Project Engineer, the contractor will revise the MMP and HASP according to those comments and immediately implement any prescribed procedures.

The contractor shall comply with all provisions set forth within the reviewed MMP and HASP and maintain documentation of all pertinent certifications of all subcontractors that shall be available upon request by CDOT. The contractor shall comply with all applicable requirements, including, but not limited to, all federal, state, and local environmental laws and regulations and the Standard Specifications for Road and Bridge Construction, Section 250 Environmental, Health and Safety Management and any project special revisions for the management and disposal of hazardous materials.

Before demolishing any structures or removing utility lines, the contractor shall determine the presence or absence of ACMs if not previously identified. If ACMs are present, the contractor shall conduct abatement in accordance with Section 250 Environmental, Health and Safety Management of the CDOT Standard Specifications, the Project Special Provision, any revised Section 250 specification, the Air Quality Control Commission's Regulation 8, and relevant OSHA and other state and federal requirements.

The contractor shall coordinate all work with CDOT and shall not discuss or negotiate with any regulatory agencies or third parties on behalf of CDOT. The contractor shall notify CDOT within 24 hours if contacted by any regulatory agencies or third parties concerning hazardous materials associated or potentially associated with the contract requirements. The contractor shall manage all hazardous materials, including soils, groundwater, surface water, and other contaminated substances to prevent exposure to the environment, project personnel, and the public, and to prevent any contamination of non-contaminated areas. The contractor shall classify such wastes according to one of the following categories:

1. Hazardous waste as defined under RCRA requiring offsite disposal and/or treatment
2. Contaminated soils requiring offsite disposal
3. Soils to be stockpiled for further characterization
4. Soils with concentrations of waste constituents below regulatory concern that can be reused without restriction
5. Wastewater requiring offsite disposal and/or treatment
6. Impacted water to be held for further characterization
7. ACM discovered during construction or demolition
8. Heavy metal-based paint (i.e., LBP) associated with structures, signage, light posts, etc.
9. Waste material to be contained for further characterization
10. Contaminated groundwater requiring onsite treatment or offsite disposal

The contractor shall submit a scope of work to the CDOT Project Engineer for approval before beginning any remediation work activities. The contractor shall use the most cost-effective approach in performing any remedial action deemed necessary. Any materials not requiring offsite disposal and/or treatment, as determined, shall not be sampled, characterized, stockpiled, or disposed of as part of the remedial efforts.

The contractor shall not allow hazardous substances to be spilled or tracked offsite at any time during the work.

The contractor shall be responsible for locating storage facilities and disposal sites for hazardous materials that are to be removed from the work site.

The contractor shall maintain documentation of completed waste profiles, manifest forms, and/or bill-of-lading forms for proper transportation and disposal of materials offsite. This information shall be available at all times for review by CDOT. The contractor shall be held responsible for ensuring that all requirements of the transporter and the receiving disposal facility and the federal, state, and local statutes, rules, regulations, and ordinances are complied with and are properly documented.

The contractor shall submit monthly tracking reports to CDOT for review of all activities associated with the contract. The contractor shall coordinate with CDOT to determine the format of the report prior to the associated construction activities.

As necessary, the contractor shall develop a Sampling Analysis Plan (SAP) to identify and characterize potential hazardous materials that were not previously identified and may be encountered during the work. The SAP shall also provide monitoring/screening during construction activities to provide safety controls in areas previously not identified. In addition to complying with Section 250 of the Standard Specifications, the SAP shall include:

1. Data quality objectives
2. Sample collection procedures (field screening, borehole drilling/abatement, monitoring well construction, soil, groundwater, and decontamination)
3. Quality control
4. Field equipment calibration procedures/frequency
5. Quality assurance objectives (data)
6. Provisions for corrective action, if needed

The contractor shall distribute the HASP to all employees who could potentially be exposed to hazardous materials. The HASP shall be displayed or made available on the construction site at all times. The contractor shall develop and maintain onsite all industrial hygiene information, including "right-to-know" information. In addition to meeting the requirements of Section 250 of the Standard Specifications, the HASP shall include the following provision:

> The contractor shall maintain documentation and provide information to CDOT, as requested, regarding potential or actual exposure to the public. The contractor shall maintain records of all related incidents and notify CDOT and appropriate State authorities immediately.

4.8 Colorado Department of Transportation Property Management

The Property Management Program provides management of project-related land, improvements, and general ledger properties owned by CDOT for CDOT's use. This includes the necessary services and expertise to develop, maintain, lease, and dispose of property when CDOT no longer needs it.

In conjunction with these property management duties, Property Management also ensures that all facilities acquired or constructed by CDOT for CDOT's use are constructed in accordance with all applicable laws and regulations.

The CDOT ROW Manual clarifies existing statutes, rules, policies, and procedures related to the CDOT Property Management Program. The CDOT ROW Manual provides guidance in all phases of acquiring, managing, and disposing of real property. It is based on federal and state statutes, rules, policies, and procedures related to real estate, condemnation, and relocation. The CDOT ROW Manual also establishes uniform procedures for each property management activity and its implementation to create an effective program. The ROW acquisition phase of a project includes the clearance of the acquired ROW. This infers not only the vacation of structures but also the removal of all improvements (e.g., utilities and wells), as well as any hazardous wastes in the way of constructing the highway project.

Disposing of acquired improvements may be considered a ROW item when the clearing is performed separately from the contract for the physical highway construction. It may be more expedient to contract for ROW clearance separately from the construction contract because of the size of the project, the number of improvements to be removed, and the length of time between the acquisition of the improvements and the beginning of project construction. The acquiring agency is responsible for the preservation of improvements and for reasonable safety measures relative to the preservation of the acquired property and protection of lawful occupants when the agency has acquired ownership and possession of property.

Both CDOT Headquarters and Regional/Region staff perform property management functions. The following provide a general breakdown of responsibilities:

- The Property Management Section in the Central Office maintains a complete inventory of all excess, remainder, office, and maintenance site parcels including improvements. The Property Management Program Manager manages this Section with the assistance of existing staff and coordination with the appropriate Regional/Region personnel. The Property Management staff in the Central Office manage all properties turned over by the Regions to the Section for rental and/or disposal.
- The Hazardous Materials Unit in the Central Office is responsible for the clearing and/or demolition of project property improvements. This also includes ACM and heavy metal-based paint inspections and abatement, air monitoring/final clearances, UST removal, and cleanup of petroleum and/or hazardous substance contamination.

4.9 Project-Specific Commitments, Mitigation Measures, and Special Circumstances

4.9.1 Colorado Department of Transportation Standard Specifications for Road and Bridge Construction Section 250 – Environmental, Health and Safety Management

Every two years, CDOT releases a new version of the CDOT Standard Specifications for Road and Bridge Construction (refer to current version). This specification book contains a comprehensive list of all CDOT standard specifications, as well as descriptions, instructions, and requirements for each specification. Standard specifications are to be used on all contract work awarded by CDOT. The specification book is a vital resource used by contractors during construction activities to maintain compliance with CDOT standards and requirements. **Figure 4.15** presents a photo of the 2023 edition of the Standard Specifications.

Specification 250 Environmental, Health and Safety Management contains most specifications related to hazardous materials issues related to CDOT projects. EPs conducting hazardous materials assessments for CDOT projects should be familiar with the contents of this standard specification. A few of the subjects discussed in the Section 250 Specification include health and safety officers, HASPs, heavy metal-based paint management (to include LBP), material handling procedures, management of samples, ACM management, and methamphetamine lab sites. Recommendations by the EP in hazardous materials assessment documentation should be consistent with the content in the Section 250 Specification, as well as other relevant standard specifications.

Figure 4.15. 2023 CDOT Standard Specifications for Road and Bridge Construction

Standard specifications can be supplemented or modified to suit specific contracts or projects. CDOT occasionally modifies or updates specifications between releases of the full specifications book. These modified specifications are known as "**Revision of Section** #" or a "**Standard Special Provision.**" Additionally, the agency preparing design plans for a CDOT project may provide modified or supplemental specifications, when necessary, to ensure that the contractor meets design criteria. Agency prepared specifications are known as "**Project Special Provisions.**"

The standard specifications book, standard special provisions, project special provision templates, and other related documents can be found on CDOT's website, under the Business Center – Design & Construction Project Support.

Standard Specification

A general term applied to all directions, provisions, and requirements pertaining to performance of the work.

(a) *Standard Specifications*: CDOT's printed book (including errata) titled *Standard Specifications for Road and Bridge Construction* (CDOT 2023b). The book is divided into three parts, namely:

1. General Provisions (Division 100)
2. Construction Details (Divisions 200 thru 600)
3. Material Details (Division 700) 101.02 101-10

(b) *Supplemental Specifications*: Additions and revisions to the Standard Specifications that are adopted subsequent to the issuance of the printed book.

The outline for "Work" items in the Construction Details contains the following:

1. Description
2. Materials
3. Construction Requirements
4. Method of Measurement
5. Basis of Payment

Special Provision

Additions and revisions to the standard and supplemental specifications covering conditions specific to an individual project or group of projects. Special provisions fall within one of the two following categories and take precedence as specified in subsection 105.09.

(a) *Project Special Provisions*. Additions and revisions to the Standard and Supplemental Specifications, specific to the project.

(b) *Standard Special Provisions*. Additions and revisions to the Standard and Supplemental Specifications, specific to a selected group of projects or that are intended for temporary use.

4.9.2 Materials Management Plans

An MMP provides a guidance document to manage contaminated materials, if encountered, during the site development/project activities. The MMP is designed to minimize potential releases to the environment, to facilitate proper storage and disposal of materials developed during construction activities, to specify the quality of imported fill material, and to minimize project delays through planning. The MMP should be developed in accordance with the requirements and recommendations in the CDOT Standard Specification 250 as discussed in **Section 4.9.1**. The project contractor most commonly develops the MMP, although the job may be outsourced to an environmental consulting firm or the EP who conducted the hazardous materials assessment. The contractor is responsible for following all appropriate regulations, obtaining the proper permits, and incorporating environmental information from the MMP into their safety plan. The contractor is also responsible for providing the MMP to its staff and subcontractors for compliance with the MMP.

Appendix K provides an MMP template prepared by the City and County of Denver. The template is simply a recommended format for an MMP. The format of the MMP must be tailored to be site- or project-specific based on initial investigations/findings or scope of work/task specific based on the guidance of the EP and project team. CDOT approval of the MMP is required per contractor provisions.

4.9.3 Health and Safety Precautions

Section 250 of the Standard Specifications for Road and Bridge Construction discusses Environmental, Health and Safety Management. Section 250 includes monitoring the project for contaminants or suspected soil and groundwater contaminants; managing solid, special, and hazardous waste; and managing visual emissions associated with hazardous waste, when encountered on the project.

Prospective bidders, including subcontractors, are required to review the environmental documents available for a project. The contract will list known or suspected areas of contamination. A health and safety officer, monitoring technician, and HASP shall be required when stated in the contract. The contractor alone bears the responsibility for determining that the work is accomplished in strict accordance with all applicable federal, state, and local laws, regulations, standards, and codes governing special waste, petroleum, and hazardous substance encounters and releases.

4.9.4 Asbestos Containing Materials

ACM may be found in multiple locations on CDOT projects. Likely sources include, but are not limited to, bridge decks, existing buildings, buried building materials, utility lines and other pipes, or materials buried in the soil from historical landfilling activities. The contractor is required to adhere to all applicable rules and regulations regarding ACM. A Certified Asbestos Building Inspector (CABI) must conduct all asbestos inspections. **Asbestos Containing Material in Structures** discusses ACM in building materials when the building is above-grade.

Asbestos Containing Material in Structures

During a project visual reconnaissance, the EP should note if any suspect ACM is potentially present. If suspect ACM is present on structures associated with a project that requires demolition activities such as, but not limited to, bridges that are being widened, replaced, or redecked, sampling must be conducted by a CABI. The sampling can occur anytime during project planning, and the results are typically incorporated in the contract documents. The sampling must occur before the contract goes to construction. The CDOT Property Management Department typically conducts or commissions the sampling. Additionally, many structures and bridges have previously been investigated; it is recommended that coordination with the EPM/CDOT regional/region Hazardous Materials Specialist and/or the CDOT Property Management Department be completed prior to sampling.

According to OSHA, EPA, and CDPHE, bulk samples of suspect ACM with asbestos concentrations greater than 1 percent are classified as ACMs and are a regulated material. If a structure is scheduled for renovation or demolition, friable samples that contain trace amounts of asbestos (1 percent or less) must be further analyzed by a more accurate point-count analysis to determine if they exceed the 1 percent threshold, or the materials must be assumed to contain asbestos and be classified as a regulated material.

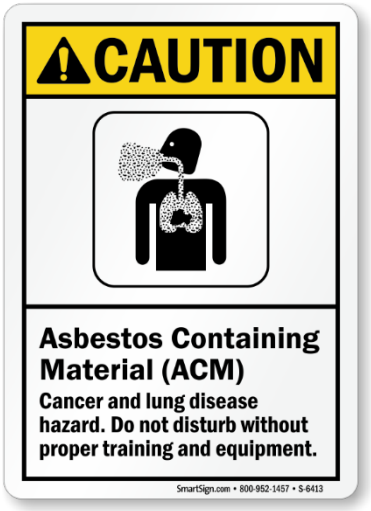
EPA and OSHA distinguish between friable and non-friable forms of asbestos materials. Friable materials can be crumbled or reduced to powder by hand pressure when dry. Non-friable materials cannot be crumbled, pulverized, or reduced to powder by hand pressure when dry. Friable materials are more likely to be released into the air, especially if impacted or damaged during normal use, renovation, or demolition of a building. Therefore, the distinction between friable and non-friable asbestos materials is important.

EPA further segregates non-friable asbestos materials into Category I and Category II. Category I non-friable asbestos materials include floor tiles and roofing felts. Removal of these asbestos materials is not required prior to demolition if they are in good condition and not friable and/or rendered friable. Category II asbestos materials are all other non-friable asbestos materials and may be required to be removed prior to demolition if those materials will be rendered friable. **Figure 4.16** depicts an example sign that may be posted within a building that contains asbestos containing materials.

Whether removed or remaining in a structure during demolition, the confirmed or presumed asbestos materials are subject to EPA NESHAP and OSHA regulations. In 40 CFR 61.145, NESHAP requires that each owner or operator of a demolition activity provide the administrator with written notice of intent. CDPHE has implemented the NESHAP program.

CDOT's Hazardous Waste Management Unit is responsible for providing technical assistance and eliminating environmental impedances on CDOT-owned facilities/structures, particularly as related to asbestos or other hazardous materials evaluations. The CDOT regional/region Hazardous Materials Specialist will coordinate directly with the Hazardous Waste Management Unit as needed.

Figure 4.16. Signage for Asbestos Containing Material



Asbestos Containing Material in Soil

ACM that has been buried or incorporated into soil is regulated under Section 5.5 of the Colorado Solid Waste Regulations. During excavation activities, if building materials are encountered, a CABI with forty (40) verifiable hours of direct experience implementing Section 5.5 shall evaluate them for the presence of asbestos and handle them according to Colorado Solid Waste Regulations.

CDOT has also developed a Regulated Asbestos Contaminated Soil Management Standard Operating Procedure. This procedure was prepared before the most recent iteration of Section 5.5 of the Colorado Solid Waste Regulations was adopted. The most recent regulation shall be followed. The Standard Operating Procedure (SOP) provides written procedures that are the minimum requirements for the proper training, handling, packaging, and disposal of Regulated Asbestos Contaminated Soils (RACS) or ACM during soil-disturbing activities for CDOT properties or projects. The SOP should be followed whenever soil excavation or disturbance will occur in areas where asbestos is known or suspected to exist.

Section 5.5 of the Colorado Solid Waste Regulations does not require characterizing asbestos in soil unless the material will be disturbed in some manner.

4.9.5 Heavy Metal-Based Paint

Heavy metal-based paint (i.e., LBP) surveys are required when renovation or demolition activities are planned. This requirement is for general disclosure purposes to provide contractors with information about those materials containing the highest levels of lead or chromium (for bridge inspections) to supplement presumptions that all painted surfaces contain some level of lead. **Figure 4.17** depicts chipping paint on a bridge girder. This disclosure is provided to those contractors that may impact painted materials that may be encountered for a specific structure (e.g., bridge, wall, rail, building). Screening is also conducted to provide general information about demolition/renovation waste characterization/disposition (proper disposal).

Figure 4.17. Heavy Metal-Based Paint Chipping

The OSHA Construction Industry Standard for Lead (29 CFR 1926.62) covers demolition activities involving heavy metal-based paint (to include LBP) and lead- or chromium-containing paint. This standard addresses issues such as worker training, medical evaluations, personal protective equipment, exposure assessment, air monitoring, hygiene facilities and practices, and HASPs. OSHA regulations do not define a minimum concentration of lead as a threshold for action. Thus, even concentrations below EPA/HUD/CDPHE levels are covered under OSHA regulations.

Additionally, lead-containing materials require a hazardous waste determination pursuant to 40 CFR 262.11 and 40 CFR 261.24. It is a standard industry approach that demolition waste characterization should be performed on structures containing heavy metal-based paint. This procedure is the Toxicity Characteristic Leaching Procedure (TCLP), where a composite sample representative of all building components to be demolished (i.e., all heavy metal-based paint coated and non-heavy metal-based paint coated materials from the structure) is submitted to the laboratory for analysis.

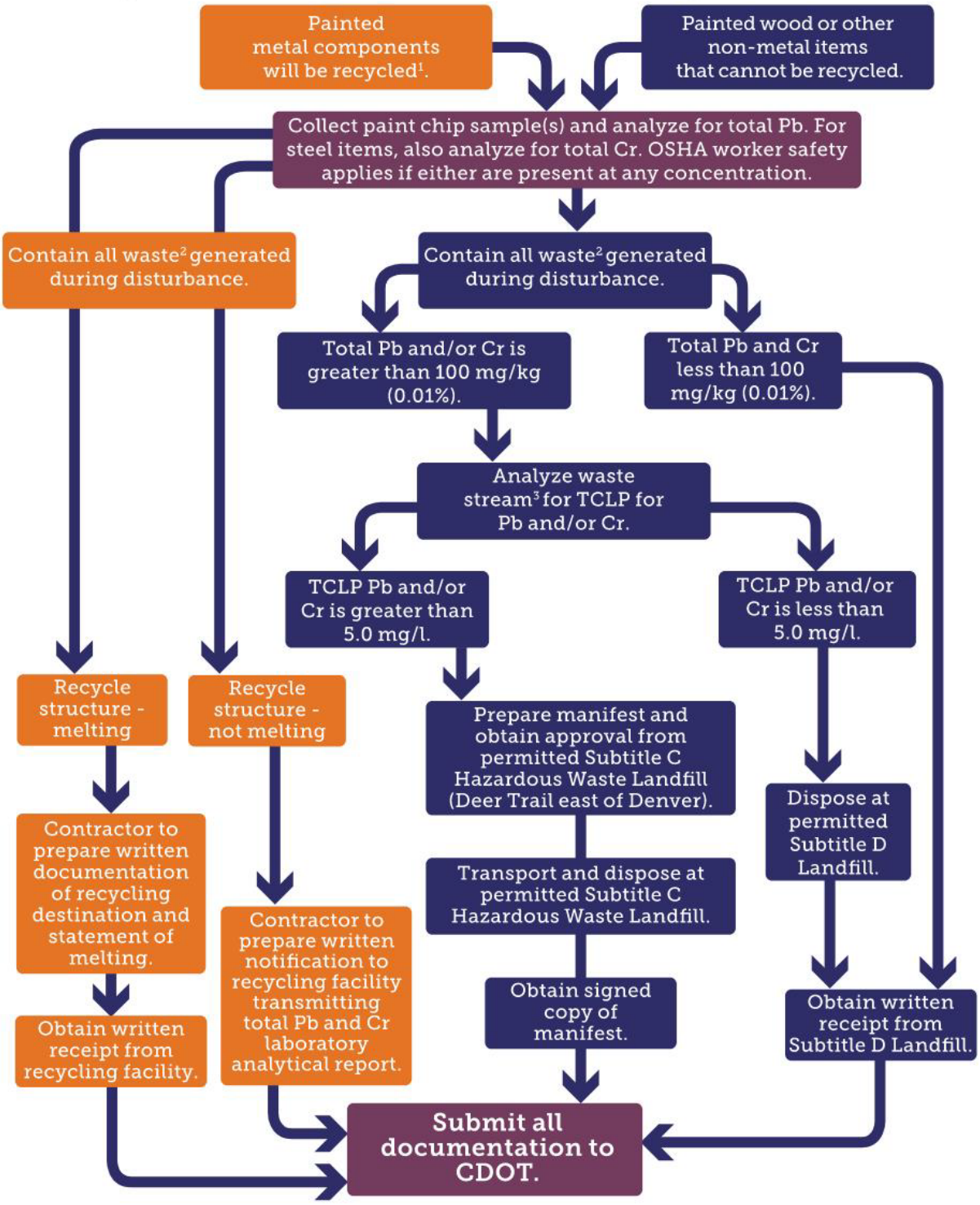
The Toxicity Characteristic limit for lead is 5 parts per million in the leachate. Materials that exceed this limit must be disposed of as hazardous waste, or recycled, if the material is metallic. Materials that do not exceed this limit may be disposed of as solid waste or recycled. The types and locations of heavy metal-based paint and the regulatory requirements should be disclosed to the demolition contractor and/or salvage contractor to avoid accidental disturbance and for contractor compliance with applicable regulations (to ensure proper worker protection).

During a project visual reconnaissance, the EP should note if any potential heavy metal-based paint material is suspected to be present on bridge structures. If heavy metal-based paint (to include LBP) is suspected to be present on bridge structures associated with a project, an investigation of potential heavy metal-based paint would be warranted.

For bridge inspections, the paint should also be sampled and lab analyzed for chromium to be in compliance with OSHA's Chromium (VI) standard, 29 CFR 1926.1126. If chromium is identified at a detectable concentration, OSHA worker protection applies and hazardous waste determination limits for disposal are the same as for lead.

Figure 4.18 depicts the typical paint management process; however, the CDOT Property Management Department typically conducts or commissions sampling on CDOT-owned facilities/structures, particularly as related to heavy metal-based evaluations. The CDOT regional/region Hazardous Materials Specialist will coordinate directly with Property Management as needed.

Figure 4.18. Heavy Metal-Based Paint Flowchart



Legend Pb: Lead. Cr: Chromium. mg/kg: milligrams per kilogram. mg/l: milligrams per liter. TCLP: toxicity characteristic leaching procedure. [1] If paint on the structure (e.g., rails, girders, signal/light poles, etc.) was applied by a powder-coating process, it should be assumed that the paint contains lead and metal components should be removed and recycled in accordance with CDOT Specification 250.04 and OSHA Regulation 1926.62. [2] paint chips, flakes, dust, building component. [3] Collect a proportionate sample of all building components including paint.

4.9.6 Polychlorinated Biphenyls

During a project visual reconnaissance, the EP should note if the presence of any potential PCB-containing transformers or other equipment is suspected. **Figure 4.19** depicts pole mounted transformers. This equipment can be identified by PCB-containing blue stickers that say either "No PCBs" or "PCB-free." If PCB-containing transformers or other equipment is suspected to be present, CDPHE requires that they be managed and disposed of according to the TSCA regulations in coordination with EPA. Releases of PCBs into the environment at levels requiring action under TSCA are to be managed or remediated according to TSCA regulations and in coordination with EPA. If present, the utility owner is responsible for transformer equipment, including those that are PCB-containing, and for maintaining and/or replacing equipment with PCB-free equipment. Any electrical equipment with no label or unknown concentration is assumed to be "PCB contaminated equipment" per EPA regulation and should be managed by the utility company accordingly.

Figure 4.19. Three Pole-Mounted Transformers

4.9.7 Per- and Polyfluoroalkyl Substances (PFAS)

PFAS are forever chemicals, very mobile, and able to travel long distances in the environment via air, surface water, and groundwater. They may also pose serious health risks, including reproductive and developmental effects, increased risk of cancers, hormone interference, increased cholesterol levels, and reduced ability to fight infections.

Knowledge and understanding of PFAS is evolving; however, at a minimum, a Hazardous Material Clearance shall review PFAS Environmental Database layers and the CDPHE PFAS Mapping site to evaluate the potential to encounter PFAS on a project.

The primary impact to CDOT projects (at this time) is CDPHE Dewatering Permit impacts. See the CDPHE *Overview of Per- and Polyfluoroalkyl Substances (PFAS) Requirements under the Dewatering General Permit Program* (CDPHE 2020).

As guidance is released on "How to Address PFAS in a NEPA Clearance," CDOT will release an addendum or guidance on their website.

4.9.8 Railroads and Railyards

Typical environmental concerns associated with railroad facilities include coal dust, coal fines, heavy metals, arsenic, diesel fuel, petroleum greases and oil, polyaromatic hydrocarbons, creosote from railroad ties, pesticides/herbicides used for pest and weed control, coal ash, PCBs in oil used for dust suppression, and leaks and spills from loading and unloading practices. **Figure 4.20** depicts the railyard adjacent to Central 70.

Figure 4.20. Central 70

4.9.9 Historical Gas Stations

Historical gas stations used various petroleum products and hazardous substances during the fueling and maintenance of vehicles. Substances commonly associated with historical gas stations include leaded gasoline, unleaded gasoline, diesel, kerosene, used oil, fuel additives, hydraulic fluids that may contain PCBs, petroleum distillates, and solvents. These facilities typically used USTs to store petroleum products and hazardous substances. These tanks were often located near major intersections, and as departments of transportation extended ROWs, these tanks frequently became buried beneath or near roadways. The tanks shown on **Figure 4.21** and **Figure 4.22** are examples of the typically constructed single-wall steel tank that eventually corrode in the soil and release contents to the subsurface.

Other concerns from historical gas stations include subgrade hydraulic lifts, which may contain hydraulic oil that has PCBs.

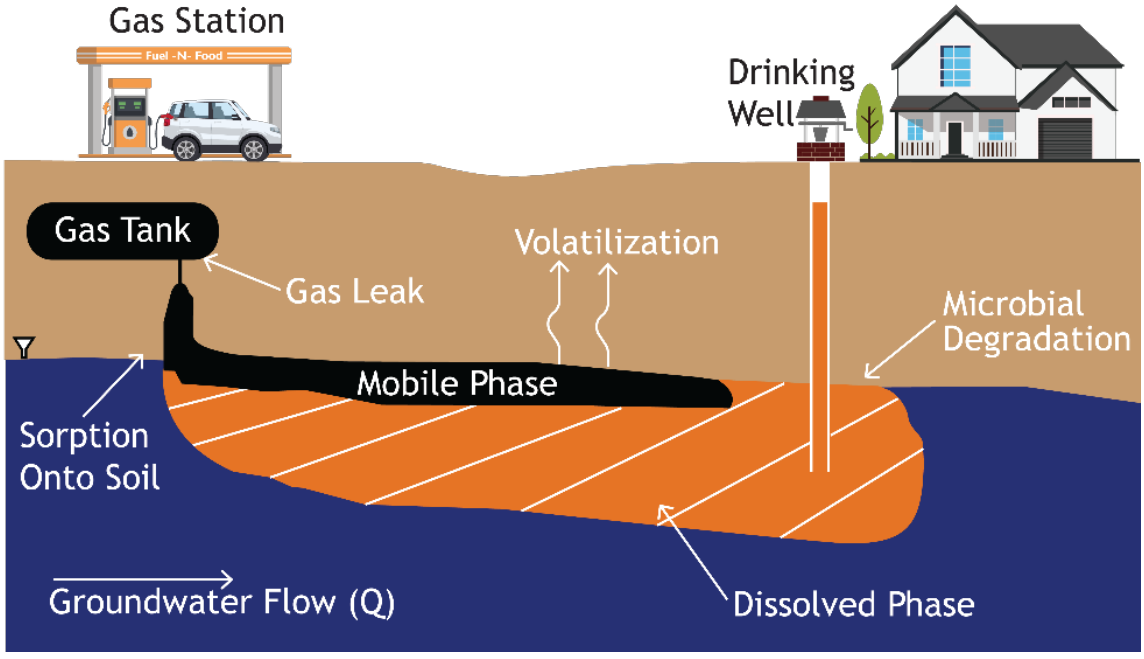
Depending on the type of petroleum product or hazardous substance, the type of soil at the property, and the depth to groundwater, the petroleum products or hazardous substances could migrate vertically and laterally and may impact groundwater or surface water. The vapors can also migrate laterally, frequently along subsurface utility corridors, and into nearby buildings.

Figure 4.21. Steel Underground Storage Tank Being Excavated

Figure 4.22. Steel Underground Storage Tank Leaking During Excavation

USTs at historical gas stations may have been removed from the site or may remain in the ground. Additionally, if the USTs were removed, the impacted soil may or may not have been removed. The reuse or disposal of this soil depends on the level of impacts and the type of contaminants present in it. **Figure 4.23** shows an example of subsurface containment migration from a leaking underground storage tank and the impacts to the soil, groundwater, and nearby residences.

Figure 4.23. Schematic of Containment Migration from a Leaking Underground Storage Tank



4.9.10 Groundwater Monitoring Wells

The CDWR regulates the construction and abandonment of groundwater wells (e.g., monitoring/observation wells, domestic water wells, irrigation wells, and commercial production wells). 2 CCR 402 2 provides the rules and regulations for water well construction, pump installation, cistern installation, and monitoring and observation hole/well construction.

Monitoring wells are identified by performing a cursory review of the registered wells database and during visual reconnaissance activities. However, only monitoring wells that can be identified from public ROW are typically captured during the visual reconnaissance. **Figure 4.24** and **Figure 4.25** provide examples of both a flush-mounted groundwater monitoring well and an above-grade groundwater monitoring well.

Figure 4.24. Flush-Mounted Surface Completion of a Groundwater Monitoring Well

Figure 4.25. Above-Grade Completion of a Groundwater Monitoring Well

Pursuant to 2 CCR 402-2, a licensed well construction contractor and/or an authorized individual must conduct or supervise well construction and abandonment activities. Also, new wells, wells whose ownership has changed, replacement wells, etc., must be registered with the CDWR within 60 days after completion of construction. CDWR also requires a Notice of Decommissioning (i.e., abandoning) a well within 60 days after the abandonment is completed.

Identifying wells within the project area and their determining exact locations is very useful for project decision making. Additionally, locating wells and providing the locations to the project designers can help prevent accidental encounters during project activities. Wells, if present, should be avoided if possible. If they cannot be avoided, the project may be responsible for proper abandonment and/or replacement if desired by the well owner.

4.9.11 Dewatering

Dewatering can be a necessary component of construction activities on a temporary or permanent basis. A permit through the CDPHE Water Quality Control Division is required for dewatering operations. During dewatering operations, water that may be impacted will be pumped and discharged to an approved location.

If uncontaminated water will be discharged, a construction dewatering general permit, along with passive treatment, will be required.

If potentially contaminated water will be discharged, a remediation general permit will be needed, and active treatment may be required.

During the dewatering process, discharge monitoring reports must be submitted to CDPHE if required by the permit.

4.9.12 Solid Waste Handling

Examples of solid waste that may be encountered on CDOT projects include tires, landfills (documented and undocumented), discarded household trash, and debris left inside or outside buildings that will be acquired and demolished. One of the primary issues is determining if a waste encountered on a project is a solid waste. If not, it may be considered a hazardous waste or universal waste, which will likely need handling and disposal different from that of a solid waste. Solid waste can also include the building debris from demolition of buildings. Caution must be used since building debris can contain asbestos, which has its own set of regulations that must be followed.

Due to the different handling and disposal types (e.g., solid waste, hazardous waste, universal waste), it is important to segregate "wastes" that may be encountered on a CDOT project. Wastes may also include contaminated soil and/or groundwater extracted during drilling and/or grading activities. CDOT does not allow soils that are above the RRSL (discussed in **Section 2.2.4**) on CDOT property.

4.9.13 Landfills

A landfill is a location to dispose of refuse and other waste materials, typically by burying it and covering it with soil. Occasionally, reclaimed excavated gravel pits are used as landfills. Current regulations limit the materials that can be disposed of in specific types of landfills. However, historical landfills can contain a wide variety of waste material, including, but not limited to, household waste, biological waste, and potentially hazardous waste. Historical landfills typically were not lined; waste was simply placed on the ground. As waste in a landfill degrades, gases such as methane and other contaminants are generated. Additionally, as waste degrades, the ground surface above the landfill typically subsides. Environmental concerns related to landfills include surface subsidence, unknown contents, soil and/or groundwater impacts, and generation and transmission of gases including methane. While methane is not toxic, it is a highly explosive compound and can displace oxygen, thereby creating a significant health and safety hazard. **Figure 4.26** depicts the Mesa County landfill with trash and heavy machinery.

Figure 4.26. Mesa County Landfill

4.9.14 Oil and Gas Wells

Environmental concerns associated with oil and gas exploration and production include, but are not limited to, petroleum hydrocarbons (e.g., gas and oil), explosive environments due to methane gas, hydrogen sulfide gas, mercury, and amines. Drilling fluid (e.g., drilling mud) is a liquid mixture commonly used during the drilling of oil and natural gas wells. Produced water is a component of some oil and gas production activities. It is water that is removed from the geologic formation to allow oil and gas to flow more freely to the surface. Produced water is typically impacted with petroleum hydrocarbons and is considered a waste product that is usually injected into deep injection wells for disposal. Drilling fluid and/or produced water can be stored in disposal pits or other typically temporary storage structures on oil and gas sites. Liquid storage structures near oil and gas activity should be assessed for management practices and potential releases when access is available. **Figure 4.27** depicts a typical oil well derrick.

Figure 4.27. Oil Well in Weld County

Oil- and gas-related wastes can be exempt from RCRA and CERCLA regulations. It is important to understand the applicable laws and regulations if these potentially hazardous materials are encountered. The CECMC and U.S. Bureau of Land Management, as previously discussed in **Section 2.2.6**, can provide additional relevant information on laws and regulations.

Another major concern with oil and gas wells is the potential presence of unmarked gathering lines and other pipelines within the project area. Additionally, unmarked and unknown pipelines are often found to contain ACM. Further information on unknown or unmarked pipelines is discussed in **Section 4.9.15**.

4.9.15 Pipelines

Underground pipelines are a prevalent component of a utility distribution network. They transmit natural gas, water, wastewater, oil and gas, and produced water. Underground utilities should be located before beginning any activities that involve digging, drilling, or excavating. A call to Colorado 881, by dialing 8-1-1, will notify utility companies in the area of planned excavation activities. If a specific utility company has underground utilities in the area, they will mark them on the ground surface with paint, flags, stakes, or "whiskers." If they do not have utilities in the area, they will issue an "all clear" notification.

Additionally, historical pipelines with unknown or unmarked locations (including lateral oil and gas supply lines) that are no longer operating may be encountered during project activities. These historical pipelines can present construction risks as they may have released or are currently releasing hazardous materials and/or explosive gases.

Utility locates are not an exact science. If and when digging near marked utilities, it may be helpful to "pothole" or hydrovac ahead of the actual excavation equipment to confirm pipeline locations. Some utility companies require a representative to be present during excavation activities. Even with additional utility locate efforts, unmarked historical pipelines may not be discovered when present in the area.

4.9.16 Methamphetamine Laboratories

Approximately 53 chemicals are known to be associated with methamphetamine labs. Typical classes of contaminants include acids, bases, solvents, metals, and petroleum distillates. Hazards include corrosivity, flammability, poison, and reactivity. CDPHE has promulgated rules and regulations that govern the cleanup of methamphetamine labs and the qualifications of cleanup contractors (Colorado Revised Statute Title 25, Article 18.5 and 6 CCR 1014-3). The person performing the decontamination must be certified by the State Board of Health in CDPHE. The cleanup must meet state standards. If a methamphetamine lab is suspected, contact the local fire department for additional guidance. **Figure 4.28** shows a methamphetamine laboratory.

Figure 4.28. Methamphetamine Laboratory

4.9.17 Clean Fill

Using clean fill associated with a CDOT project is a site-specific concern. The CDOT Project Engineer must first approve any fill that is to be considered clean for use or reuse associated with a CDOT project. The contents of clean fill can vary depending on applicable regulations, project and adjoining land uses, and naturally occurring contaminants in the vicinity.

4.9.18 Spill Procedures

For each construction project, CDOT will require that the contractor prepare a Spill Prevention Control and Countermeasures Plan. The contractor shall perform inspections per the Colorado Discharge Permit System – Stormwater Construction Permit (CDPSSCP) to assure that construction best management practices (BMPs) are adequate for the site conditions of the project and are in good working condition. The contractor shall prevent the discharge of any sediment or pollutants into any storm drains or receiving waters during the life of the CDPSSCP.

4.10 History of Mining

4.10.1 Mine Tailings

Mine tailings and mining waste are the materials left over after the process of separating the valuable fraction from the uneconomic fraction of a material. Mining in Colorado includes three primary commodities: sand and gravel, hard rock mining for ore, and coal. An additional sector of mining and material processing is uranium or other radioactive materials. This section will not discuss sand and gravel operations. It will focus on historical, **unregulated mines and related facilities** as modern mining sites are typically designed and operated under modern regulations.

4.10.2 Hardrock and Coal Mining

Mining in Colorado began in the mid-to-late 1800s and focused primarily on ore deposits such as silver and gold derived from bedrock/hardrock. At that time, the potentially negative effects of mining and the subsequent waste materials were not of concern. Today, however, the negative effects of mining on human health and the environment are well known. Colorado first adopted hard rock mining and reclamation standards in 1975, and the federal government adopted mining and reclamation regulations in 1977. The result of this is approximately 23,000 legacy mine sites that were disturbed prior to environmental regulations.

Currently, the Colorado Department of Natural Resources (DNR) Division of Reclamation and Mining Safety (DRMS) regulates hard rock and coal mining and reclamation.

4.11 Project Concerns and Impacts from Mining

Concerns on CDOT projects from legacy hardrock mining include acid mine drainage, erosion and sedimentation, cyanide and other chemicals used to extract material, contaminated surface water and groundwater, and subsidence.

Acid generation is primarily due to the oxidation of metallic sulfides. The pH of acid mine water can be as low as 2.5; pure water has a pH of 7. These conditions result in the dissolution of the minerals associated with the metallic sulfides and release of toxic metal cations (e.g., lead, copper, silver, manganese, cadmium, iron, and zinc). In addition, the concentration of dissolved anions (e.g., sulfate) also increases. Acid generation and drainage affect both surface water and groundwater. The sources of surface water contamination are leachate from mine openings, seepage and discharges from waste rock, tailings, groundwater seepage, and surface water runoff from waste rock and tailings piles.

Mined materials, such as waste rock or tailings, that have been used for construction or other purposes (e.g., road base, rock drains, and fill material) can also develop acid mine drainage. On CDOT projects, earthen materials with elevated metal concentrations that must be moved or disposed may need special handling and characterization. Additionally, dewatering and/or water control/diversion activities may need additional permitting and/or treatment prior to discharge.

Screening of mine tailings and waste rock is possible for some heavy metals in the field using a handheld x-ray fluorescence (XRF) meter. However, results should be confirmed by laboratory analysis. Additional parameters may be necessary for acceptance at offsite disposal facilities.

Erosion and sedimentation at legacy mine sites can vary due to the extent of surface disturbance, prevalence of vegetative cover, type of soil, and the length and degree of hill slope. Disturbed areas with little or no vegetative cover, soil high in silt, or steep slopes are areas most susceptible to erosion. Sedimentation affects surface water and wetlands more than any other media.

Cyanide has been used for over a century, specifically with gold extraction and as a pyrite depressant in base metal flotation. More recently, cyanide has been used for leaching gold heaps. The most common cyanide compound used in mining is sodium cyanide (NaCN). Leakage from linear failure at heaps can allow the direct release of cyanide and other toxic constituents into the environment.

Other chemicals associated with mining activities include petroleum products, solvents, acids, and reagents.

Surface water and groundwater are collective terms that include springs, wetlands, brooks, streams, rivers, ponds, lakes, and aquifers. Water that percolates through waste piles and tailings can become contaminated with heavy metals, which can contaminate both groundwater and surface water.

Mining activities can increase sediments and suspended solids in surface water.

Mining subsidence is the surface impact of collapsing overlying strata into mined-out voids. Subsidence may be observed as sinkholes or troughs, which can interrupt surface water drainage patterns, affecting ponds, streams, and wetlands. Subsidence can also pose a physical hazard to workers and equipment.

More recent mine sites may have control measures such as lined tailing ponds or liquid impoundments. Leakage from these containment features can contaminate surface water or groundwater.

4.11.1 Metals in Soil

Metals in soil can be due to slag and other deposits from smelter activities. Fine slag dust may be deposited onsite and adjacent surfaces.

Weathering of slag can release metals into soil. Metals in surface soil or fine slag dust could enter ambient air as windblown dust that could be transported to and deposited in surface soil in adjacent areas. Metals in surface material can leach to subsurface soil and from there to groundwater. Metals can be found in surface water due to runoff, wind-blown deposition, leaching, or other processes.

The primary routes of exposure for people include ingestion, inhalation, and dermal. Inhalation and ingestion are the main routes of exposure; dermal absorption of metals in soil across skin is likely to be minor.

4.11.2 Uranium and Radioactive Materials

Uranium and radioactive materials can be encountered in various ways on CDOT projects. The two most common are:

- Uranium mill tailings and radioactive contamination due to undocumented reuse of radioactive materials
- Former facilities with radioactive material handling, processing, and milling operations

Uranium, vanadium, and radium mining in Colorado occurred primarily in the western and southwestern part of the state (Mesa, Montrose, and San Miguel counties). However, uranium deposits were also mined in other parts of the state, such as Weld, Jefferson, Fremont, Moffatt, and other counties.

Radioactive processing activities (i.e., mills) occurred at known locations throughout the state with most located in the western part of the state (Grand Junction, Gunnison, two mills in Rifle, Durango, Maybell, Naturita, and two mills in Slick Rock). Mills would crush ore and separate uranium compounds from the waste material, waste tailings sands, which were piled at the mills. These tailings contained most of the original radioactivity since only uranium was recovered during the milling process. Locations such as Rocky Flats and Denver Radium also processed and/or used radioactive materials. Low levels of radioactivity are present in the groundwater beneath Lowry Landfill due to radioactive materials discarded in the landfill.

Between the 1940s and 1980s, it was common practice to use waste tailings (e.g., uranium mill tailings) for offsite construction activities. Uses included utility bedding, concrete bedding, structural backfill (including homes and commercial buildings), railroad track bedding, curb and gutter fill, steep slopes, patios, river islands, general fill (such as residential yards), road and sidewalk base material, and incorporation into concrete mix, stucco, and brick production. Documentation regarding uranium mill tailings reuse/deposition locations is rare. Natural processes, such as water and wind, transported tailings offsite. These uranium mill tailings remain radioactive, emitting gamma radiation and breaking down to radon gas. Gamma radiation can penetrate skin and clothes and damage human tissue and DNA, leading to cancer.

It is estimated that up to 500,000 cubic yards of uranium mill tailings remain in unknown locations outside controlled disposal sites in western Colorado. These undocumented residual tailing deposits tend to be near communities where the mills were located; however, tailing deposits can be encountered at almost any location. If uranium mill tailings may be encountered during construction, CDOT may require field screening and an MMP.

Processes for addressing uranium mill tailings during CDOT construction activities can vary based on factors such as location, anticipated volume of tailings, level of radioactivity, and availability of offsite storage/disposal. The CDPHE Hazardous Materials and Waste Management Division Uranium Mill Tailings program provides guidance for handling, managing, and disposing of uranium mill tailings in the *Uranium Mill Tailings Management Plan* (CDPHE 2019). The City of Durango, in conjunction with CDPHE, has also prepared a management plan specific to the Durango area.

It is important to note that radioactive waste may also be encountered due to various other, non-mining sources, such as x-rays.

Radioactive materials including uranium can be regulated by federal, state, or local agencies.

CDOT and CDPHE have gamma meters for use at no charge on CDOT projects to screen for radioactive materials and gamma radiation.

4.12 Past Projects with Significant Hazardous Material Concerns

This section briefly discusses multiple previously completed projects with significant hazardous materials concerns or unique issues. These projects should be used as examples of overcoming difficulties when conducting hazardous materials assessments or mitigating hazardous materials risks involved with a project.

4.12.1 US 6 Bridges Design-Build

The US 6 Bridges DB project reconstructed approximately 1.25 miles of US Highway 6 (US 6) as it intersects I-25. Work included completely replacing six deficient bridges constructed circa 1956, plus constructing six additional new bridges. The project was in a historically industrialized area of the City and County of Denver with various concerns, including landfill material; elevated concentrations of heavy metals, various volatile organic compounds, and/or petroleum hydrocarbons, pesticides, and low-level radionuclides, as well as structures containing heavy-metal contaminated paint and ACMs. Multiple hazardous materials assessments were prepared for the project, as well as several Limited Phase II ESAs for the corridor.

Lesson Learned: Because all potential hazardous materials concerns could not be identified and planned for, the project team implemented an adaptive management process to quickly respond if an issue arose. This approach, combined with environmental training of all onsite project and construction personnel to identify and notify the Environmental Compliance Manager of potential hazardous materials, allowed the project team to proactively respond to potential issues as they arose and to continue with project construction while maintaining the project schedule. **Figure 4.29** shows a simplified process of reaching environmental compliance and project completion when a hazardous materials issue is encountered.

Figure 4.29. Addressing a Hazardous Materials Issue

4.12.2 Interstate 70 Twin Tunnels

The I-70 Twin Tunnels project included boring through rock to expand the Twin Tunnels from two lanes to three lanes in each direction. A legacy of hardrock and placer mining had occurred in the vicinity for more than 100 years. To evaluate these conditions, many soil and groundwater samples were collected, and a Phase I ESA was completed. For mitigation, an MMP was developed in cooperation with CDOT, EPA, and CDPHE. This CDOT project was given the FHWA's 2013 Environmental Excellence Award for Environmental Streamlining.

Lessons Learned: This project required the hazardous materials evaluation of a complex site. To accomplish the evaluation, soil samples and groundwater samples were analyzed before the Phase I ESA was completed. Typically, soil samples and groundwater samples are analyzed as part of a Phase II ESA, commonly triggered by the recommendation for additional investigation by the Phase I ESA report. Additionally, the major regulatory agencies were involved in the development of the MMP. Through cooperation with CDOT, EPA, and CDPHE, the MMP was created with unanimous support. By altering the typical flow of hazardous materials assessment processes and engaging regulatory agencies in the preparation of the project mitigation plans, the completion of the hazardous materials assessment and mitigation measures was substantially streamlined, thereby reducing time and cost.

4.12.3 Central-70

The proposed reconstruction of I-70 through the eastern portion of Denver involved acquiring more than 100 parcels of land. Of this 10-mile-long reconstruction project, approximately 2 miles was completed within a 30-foot-deep excavated trench. The historical uses of the properties in this area included various industrial, commercial, and residential uses. The potential to encounter a range of hazardous materials and/or petroleum product impacts to soil and/or groundwater was relatively likely. Multiple structures were demolished, with abatement of ACM in building materials required prior to demolition.

Lessons Learned: CDOT transportation projects can often be located near historical hazardous materials concerns, particularly when the projects are located within metro Denver. When a project corridor is a significant length (10 miles for this Central-70 project) through a highly contaminated area, evaluating database listed sites and identified hazardous materials concerns on a property-by-property basis is not manageable or fiscally reasonable. With cooperation from CDOT, EPA, CDPHE, and the Project Manager/EP, the project team devised a reasonable mitigation method that did not require the evaluation of every potential source of contamination within the project area. An MMP outlining the potential hazardous materials issues that could be encountered is likely the most appropriate mitigation method, although other unanimously agreed upon methods could be used instead or in addition to the MMP.

5. Risk Management and Other Considerations

This section identifies risks and other considerations associated with the CDOT hazardous materials assessment process.

5.1 Risk Management

The level of risk associated with a project will vary based on project activities, project location, history of the area, and types of sites (i.e., properties) surrounding the project. Conducting a hazardous materials assessment does not eliminate all risks and is not a guarantee regarding potential impacts. **Chapter 3** includes a list of CDOT project activities that have a higher potential for encountering hazardous materials contamination during construction. In general, if these project activities are located within current or former industrial areas, developed areas, or areas with older multitenant retail properties with a greater likelihood of high-risk tenants over time (e.g., dry cleaners, fueling stations), there is a higher risk of encountering hazardous materials concerns.

5.2 Other Considerations

Report Shelf Life: Based on the ASTM E1527-21 standard or most current version, a Phase I ESA is valid for fewer than 180 days. Between 180 days and 1 year, a Phase I ESA requires an update to the interviews with owners, operators, and occupants; searches for recorded environmental cleanup liens; reviews of federal, tribal, state, and local government records; visual inspections of the subject property and adjoining properties; and declaration by the EP responsible for the assessment or update.

The ASTM-based shelf-life for a Phase I ESA report does not correlate well to transportation project scheduling and delivery, as it typically requires more than 180 days between the time the Phase I ESA is completed and the end of the property acquisition process. Therefore, for CDOT transportation projects, the shelf-life of a Phase I ESA is tied to the NEPA process. When the Phase I ESA for a transportation project has been finalized and approved by the CDOT Specialist, CDOT Form 128 – NEPA Determination / Project Certification Form provides clearance for the hazardous materials assessment. The completed Form 128 is considered valid unless a CDOT Reevaluation is required (i.e., CDOT Form 1399). The following represent the most common reasons for conducting a reevaluation:

- The project is proceeding to the next major approval or action [23 CFR 771.129(c)]
- Project changes such as laws, policies, guidelines, design, environmental setting, impacts or mitigation
- More than 3 years have elapsed since FHWA's approval of the project or the study

Additionally, the CDOT EPM may request a reevaluation of the Phase I ESA or other hazardous materials assessment at their discretion.

6. Delineation of CDOT Responsibilities

A project is initiated with the assignment of a CDOT Project Manager. The Project Manager guides the project through the remainder of the process. The Project Manager is required to involve the RPEM in the development of Form 1048A Project Scoping/Clearance Record, which is used in conjunction with the Project Development Manual, to scope the project and track documentation or activity sign-off dates.

The RPEM will involve NEPA/resources specialists who represent hazardous materials to:

- Identify environmental considerations during the early stages of project definition
- Identify environmental issues that could impact schedule or budget

The CDOT Project Manager or hazardous materials resource specialist will coordinate with CDOT ROW and CDOT Property Management if property is to be acquired for ROW as part of the project. CDOT ROW and Property Management should be involved in the early stages of project definition to coordinate regarding any additional subsurface environmental investigation or survey of existing structures requiring demolition. In addition, CDOT Property Management should be involved in the long-term remediation of any hazardous materials concerns, including the design and implementation of any remediation systems. Copies of all hazardous materials assessments should be provided to CDOT ROW and Property Management for review and coordination.

7. CDOT Environmental Professionals and Assessors

Per 40 CFR §312.10, and adopted by ASTM and CDOT, an Environmental Professional is defined as follows:

1. A person who possesses sufficient specific education, training, and experience necessary to exercise professional judgment to develop opinions and conclusions regarding conditions indicative of releases or threatened releases (see §312.1(c)) on, at, in, or to a property, sufficient to meet objectives and performance factors in §312.20(e) and (f).
2. Such a person must (i) hold a current Professional Engineer's or Professional Geologist's license or registration from a state, tribe, or U.S. territory (or Commonwealth of Puerto Rico) and have the equivalent of three (3) years of full-time relevant experience; or (ii) be licensed or certified by the federal government, a state, tribe, or U.S. territory (or the Commonwealth of Puerto Rico) to perform environmental inquiries as defined in §312.21 and have the equivalent of three (3) years of full-time relevant experience; or (iii) have a Baccalaureate or higher degree from an accredited institution of higher education in a discipline of engineering or science and the equivalent of five (5) years of full-time relevant experience; or (iv) have the equivalent of ten (10) years of full-time relevant experience.*
3. An Environmental Professional should remain current in their field through participation in continuing education or other activities.
4. The definition of Environmental Professional provided above does not preempt state professional licensing or registration requirements such as those for a professional geologist, engineer, or site remediation professional. Before commencing work, a person should determine the applicability of state professional licensing or registration laws to the activities to be undertaken as part of the inquiry identified in §312.21(b).
5. A person who does not qualify as an Environmental Professional under the foregoing definition may assist in the conduct of all appropriate inquiries in accordance with this part if such a person is under the supervision or responsible charge of a person meeting the definition of an environmental professional provided above when conducting such activities.

*Relevant Experience, as used in the definition of Environmental Professional in this section, means participation in the performance of all appropriate inquiries investigations, environmental site assessments, or other site investigations that may include environmental analyses, investigations, and remediation which involve the understanding of surface and subsurface environmental conditions and the processes used to evaluate these conditions and for which professional judgment was used to develop opinions regarding conditions indicative of releases or threatened releases (see §312.1(c)) to the subject property.

For the purposes of qualifying as an environmental professional under the AAI final rule, relevant experience is:

> Participation in the performance of environmental site assessments that may include environmental analyses, investigations, and remediation which involve the understanding of surface and subsurface environmental conditions and the processes used to evaluate these conditions and for which professional judgment was used to develop opinions regarding conditions indicative of releases of hazardous substances.

The AAI EP qualifications will **apply to all CDOT hazardous material assessments**. This ensures that CDOT practitioners are qualified individuals completing analysis and providing recommendations, recognizing the current ASTM practice, and are familiar with ASTM updates, especially regarding new and emerging concerns.

8. References

ASTM International (ASTM). 2019. ASTM Designation E1903-19, Standard Practice for Environmental Site Assessments: Phase II Environmental Site Assessment Process.

ASTM. 2021. ASTM Designation E1527-21, Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process.

ASTM. 2022. ASTM Designation E1528-22, Limited Environmental Due Diligence: Transaction Screen Process.

City and County of Denver. n.d. Materials Management Plan – Draft Template.

Colorado Department of Public Health and Environment (CDPHE). 2011. Regulations Pertaining to Solid Waste Disposal Sites and Facilities, 6 CCR 1007-2, Part 1. August.

CDPHE. 2019. Uranium mill tailings management plan. June (updated).

CDPHE. 2020. Overview of Per- and Polyfluoroalkyl Substances (PFAS) Requirements. July.

Colorado Department of Transportation (CDOT). 2023a. CDOT NEPA Manual.

CDOT. 2023b. Standard Specifications for Road and Bridge Construction.

CDOT. 2022. Programmatic Agreement for Processing Categorical Exclusion Actions between FHWA and CDOT. June.

Environmental Data Resources, Inc. (EDR). 2010. EDR Historical Topographic Map Report. Inquiry Number 2677453.4. January 14.

Environmental Protection Agency (EPA). 1988. Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA.

EPA. 2017. Brownfields All Appropriate Inquiries. https://www.epa.gov/brownfields/brownfields-all-appropriate-inquiries

EPA. 2024a. Designation of Perfluorooctanoic Acid (PFOA) and Perfluorooctanesulfonic Acid (PFOS) as CERCLA Hazardous Substances. https://www.epa.gov/superfund/designation-perfluorooctanoic-acid-pfoa-and-perfluorooctanesulfonic-acid-pfos-cercla. May 8

EPA. 2024b. Regional Screening Level (RSL) Resident Soil Table (TR=1E-06, HQ=1). November.

Federal Highway Administration (FHWA). 1997. Supplemental Hazardous Waste Guidance. January.

FHWA. 1988. Technical Memorandum Interim Guidance – Hazardous Waste Sites Affecting Highway Project Development. August.

Google Earth. 2018. https://www.google.com/earth/.

Appendix A. List of Acronyms and Glossary of Terms

List of Acronyms

AAI	All Appropriate Inquiry
ACM	asbestos containing material
AST	Aboveground Storage Tank
BMP	Best Management Practice
CAA	Clean Air Act
CABI	Certified Asbestos Building Inspector
CatEx	Categorical Exclusion
CCR	Code of Colorado Regulations
CDLE-OPS	Colorado Department of Labor and Employment – Division of Oil and Public Safety
CDOT	Colorado Department of Transportation
CDPHE	Colorado Department of Public Health and Environment
CDWR	Colorado Department of Water Resources
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERCLIS	Comprehensive Environmental Response Compensation and Liability Information System
CESQC	conditionally exempt small quantity generator
CFR	Code of Federal Regulations
CM/GC	Construction Management/General Contractor
CECMC	Colorado Energy and Carbon Management Commission
COSTIS	Colorado Storage Tank Information System
CREC	Controlled Recognized Environmental Condition
DB	Design-Build
DBB	Design-Bid-Build
DOE	United States Department of Energy
EA	Environmental Assessment
ECHO	Enforcement and Compliance History Online
EIS	Environmental Impact Statement
EP	Environmental Professional
EPB	Environmental Programs Branch

EPM	Environmental Project Manager
ESA	Environmental Site Assessment
FHWA	Federal Highway Administration
FRS	Facility Registry Service
FS	Feasibility Study
GIS	geographic information system
HASP	Health and Safety Plan
HREC	Historical Recognized Environmental Condition
HUD	Housing and Urban Development
ISA	Initial Site Assessment
kg	kilogram
LBP	lead-based paint
LF	local landfill
LLP	landowner liability protection
LPA	Local Public Agency
LQC	large quantity generator
LUST	leaking underground storage tank
MCL	Maximum Contaminant Level
MESA	Modified Environmental Site Assessment
MMP	Materials Management Plan
NEPA	National Environmental Policy Act
NESHAP	National Emission Standards for Hazardous Air Pollutants
NFA	No Further Action
NFRAP	No Further Remedial Action Planned
NPL	National Priorities List
OSHA	Occupational Safety and Health Administration
PFAS	Per- and Polyfluoroalkyl Substances
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanoic sulfonic acid
PCB	polychlorinated biphenyl
PEC	Potential Environmental Concern (or Condition)
PEL	Planning and Environmental Linkages
QA/QC	quality assurance/quality control
RACS	regulated asbestos contaminated soil

RBSL	Risk Based Screening Level
RCRA	Resource Conservation and Recovery Act
REC	Recognized Environmental Condition
RI	Remedial Investigation
ROD	Record of Decision
ROW	right-of-way
SAP	Sampling Analysis Plan
SARA	Superfund Amendments and Reauthorization Act
SDWA	Safe Drinking Water Act
SOP	Standard Operating Procedure
SQG	small quantity generator
TSCA	Toxic Substances Control Act
U.S.C.	United States Code
USEPA	U.S. Environmental Protection Agency
USGS	U.S. Geological Survey
UST	underground storage tank
VCP	Voluntary Cleanup Program
VCUP	Voluntary Cleanup and Redevelopment Program
WQCC	Water Quality Control Commission

Glossary of Terms

Activity and Use Limitations (AULs) – As defined by ASTM International (ASTM), legal or physical restrictions or limitations on the use of, or access to, a site or facility.

Institutional Controls – Institutional controls are non-engineering measures designed to prevent or limit exposure to hazardous substances left in place at a site, or assure effectiveness of the chosen remedy. Institutional controls may be easements, restrictive covenants, and/or zoning ordinances.

Engineering Controls – Engineering controls are structural (physical) modifications to a property or facility to reduce or eliminate the potential for exposure to hazardous substances or petroleum products in the soil or groundwater on the site.

All Appropriate Inquiry (AAI) – As defined by ASTM and Environmental Protection Agency (EPA) (through Comprehensive Environmental Response, Compensation, and Liability Act [CERCLA]) as the process of conducting inquiry "into the previous ownership and uses of the property consistent with good commercial or customary practice…that will qualify a party to a commercial real estate transaction for one of the threshold criteria for satisfying the Landowner Liability Protections (LLPs) to CERCLA liability." Essentially, conducting AAI consists of environmental due diligence conducted prior to a property transaction to determine whether a property may have been contaminated by past or current activity, for a user (for example, the prospective purchaser) to be exempt from liability for contamination that existed on a property prior to the property transaction.

Approximate minimum search distance – As defined by the ASTM, the approximate minimum search distance is the area for which records must be obtained and reviewed. This area may include areas outside the project area and shall be measured from the project boundary, not a centroid within the project area. The typical search distance for regulatory records is approximately one mile from the project area boundary.

Asbestos Containing Material (ACM) – Asbestos is the name given to a number of naturally occurring, fibrous silicate minerals mined throughout the world for its unique properties, such as thermal insulation, chemical and thermal stability, and high tensile strength. Asbestos is commonly used as an acoustic insulator, thermal insulation, fire proofing, and in other building materials. The term ACM applies to products and building materials that are known to contain asbestos (as evidence by product specifications or by testing of the material for asbestos content). Common ACM include some vinyl floor tiling, certain ceiling tiles, and older pipe insulation.

ASTM International (ASTM) – A developer of international voluntary consensus standards. ASTM standards are developed by committees of relevant industry professionals who meet regularly in an open and transparent process to deliver standards, test methods, specifications, guides, and practices. ASTM E 1527-21 is the standard practice for Phase I Environmental Site Assessments (ESAs); this standard meets the requirements of EPA's AAI.

Brownfields – As defined by CERCLA, properties where the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant. Generally, brownfield sites are considered blighted properties by the local development community and municipality.

BTEX – Benzene, toluene, ethylbenzene, and xylenes are the four contaminants typically associated with releases of petroleum products, such as gasoline fuel, that are among the most soluble and mobile constituents of concern.

Clandestine Drug Laboratories (CDL) – Locations where law enforcement agencies have reported finding chemicals or other items that indicated the presence of either CDLs (i.e., methamphetamine labs) or dump sites. The locations are not verified by the U.S. Department of Justice and should be verified with local authorities and local health departments.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) – The federal law that created Superfund and promulgated EPA to control, clean up, and designate liability for abandoned, uncontrolled or inactive hazardous waste sites. Under CERCLA, potential responsible parties who are found responsible for a site contaminated with hazardous substances or wastes are liable for the costs of removal and cleanup. Hazardous substances are defined in CERCLA.

Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) – The list of sites compiled by EPA that EPA has investigated or is currently investigating for potential hazardous substance contamination for possible inclusion on the National Priorities List (NPL).

CERCLIS No Further Action Planned (NFRAP) – CERCLIS NFRAP sites are sites that have been removed and archived from the CERCLIS site inventory. The CERCLIS NFRAP status indicates that, to the best of EPA's knowledge, assessment at a site has been completed and that EPA has determined no further assessment, investigation, or remediation will be done for this site and it will not be added to the NPL. A CERCLIS NFRAP status does not necessarily mean that no hazard is associated with a given site; it only means that, based on available information, the location is not judged to be a potential NPL site. The status may also change at a later time based on new information or other considerations that may require listing the site on the NPL.

Controlled Recognized Environmental Condition (CREC) – A recognized environmental condition affecting the subject property that has been addressed to the satisfaction of the applicable regulatory authority (for example, as evidenced by the issuance of a no further action letter or equivalent, or meeting risk-based criteria established by regulatory authority), with hazardous substances or petroleum products allowed to remain in place subject to the implementation of required controls (for example, AULs or other property use restrictions). For example, if a leaking underground storage tank has been cleaned up to a commercial use standard, but does not meet unrestricted residential cleanup criteria, this would be considered a controlled recognized environmental condition. The "control" is represented by the restriction that the property use remain commercial.

Contaminated Materials – A general phrase not defined in federal or state statutes or regulations but includes hazardous wastes under RCRA, hazardous substances under CERCLA, and other regulated materials such as petroleum-contaminated soil that must be handled as nonhazardous waste.

Cross-gradient – A site is considered topographically cross-gradient from the project area when, based on topographic relief, it is at the same elevation in relation to the project area and/or parallel to the project area in regard to drainage and groundwater flow direction.

Data Failure – A failure to achieve the historical research objectives even after reviewing standard historical sources that are readily available.

Data Gap – A lack of or an inability to obtain information required by this practice *despite good faith* efforts by the environmental professional to gather such information. Data gaps may result from incompleteness in any of the activities required by this practice, including, but not limited to, visual reconnaissance (i.e., inability to conduct the site visit), and interviews (i.e., an inability to interview the key site manager, regulatory officials, etc.).

De minimis – A condition that generally does not present a threat to human health or the environment and that generally would not be the subject of an enforcement action if brought to the attention of appropriate governmental agencies. Conditions determined to be de minimis conditions are not recognized environmental conditions or controlled recognized environmental conditions.

Down-gradient – A site is considered topographically down-gradient from the project area when, based on topographic relief, it is lower in elevation than the project area and downstream from the project area regarding drainage and groundwater flow direction.

Environmental Due Diligence – The standards for conducting environmental due diligence are set forth by EPA in Title 40 CFR 312: Innocent Landowners, Standard for Conducting All Appropriate Inquiry, which references the ASTM E 1527-21 Standard Practice for ESAs. The standards leave it up to the environmental professional to determine the level of assessment warranted for an acquisition; the level depends upon the nature of the acquisition.

Environmental Lien – A charge, security, or encumbrance upon title to a property to secure the payment of a cost, damage, debt, obligation, or duty arising out of response actions, cleanup, or other remediation of hazardous substances or petroleum products on a property, including, but not limited to, liens imposed pursuant to CERCLA and similar state or local laws.

Environmental Professional (EP) – The individual practitioner responsible for completing the hazardous material assessment as defined by CDOT in Section 7.0 of this guidance; and/or a person meeting the education, training, and experience requirements as set forth in 40 Code of Federal Regulations §312.10(b).

Environmental Site Assessment (ESA) – The process by which a person or an entity seeks to determine if a particular parcel of real property is subject to RECs; also known as Hazardous Material Assessment. For CDOT usage, the process is applied to a multitude of parcels within or adjacent to a transportation project's study area.

Federal Insecticide, Fungicide, & Rodenticide Act (FIFRA)/Toxic Substance Control Act (TSCA) Tracking System – The FIFRA/TSCA tracking system lists administrative cases and pesticide enforcement actions and compliance activities related to FIFRA, including inspections. During a regulatory database search, facilities that are on the tracking system typically handle, store, or transport pesticides.

Hazardous Materials – CDOT's definition of hazardous materials is a broad category of materials that, because of their quantity, concentration, or physical or chemical characteristics, pose a significant present or potential hazard to human health and safety or to the environment if released into the environment. Hazardous materials include, but are not limited to, materials that are regulated as solid waste, hazardous waste, and other wastes contaminated with hazardous substances, radioactive materials, petroleum fuels, toxic substances, and pollutants.

Hazardous Substance – A substance defined as a *hazardous substance* pursuant to CERCLA 42 United States Code (U.S.C.) §9601(14), as interpreted by EPA regulations and the courts: "(A) any substance designated pursuant to section 1321(b)(2)(A) of Title 33, (B) any element, compound, mixture, solution, or substance designated pursuant to section 9602 of this title, (C) any *hazardous waste* having the characteristics identified under or listed pursuant to section 3001 of the Resource Conservation and Recovery Act of 1976 (RCRA), as amended, (42 U.S.C. §6921) (but not including any waste the regulation of which under RCRA (42 U.S.C.§§6901 et seq.) has been suspended by Act of Congress), (D) any toxic pollutant listed under section 1317(a) of Title 33, (E) any hazardous air pollutant listed under section 112 of the Clean Air Act (42 U.S.C. §7412), and (F) any imminently hazardous chemical substance or mixture with respect to which the Administrator (of EPA) has taken action pursuant to section 2606 of Title 15. The term does not include petroleum, including crude oil or any fraction thereof that is not otherwise specifically listed or designated as a *hazardous substance* under subparagraphs (A) through (F) of this paragraph, and the term does not include natural gas, natural gas liquids, liquefied natural gas, or synthetic gas usable for fuel (or mixtures of natural gas and such synthetic gas)."

Hazardous Waste – Any hazardous waste having the characteristics identified under or listed pursuant to section 3001 of RCRA, as amended, (42 U.S.C. §6921) (but not including any waste the regulation of which under RCRA (42 U.S.C. §§6901-6992k) has been suspended by Act of Congress). RCRA is sometimes also identified as the Solid Waste Disposal Act. RCRA defines a *hazardous waste*, at 42 U.S.C. §6903, as: "a solid waste, or combination of solid wastes, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may—(A) cause, or significantly contribute to an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness; or (B) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed."

High Potential Site – Through file review or subsurface investigation, it has been determined that it is likely that contamination would be encountered during construction.

High Risk Site – Contamination is likely to exist within the study area for the proposed project alternatives. The extent, nature, and concentration of contamination are such that materials and management would be high in cost and could create substantial delays in project delivery. Human health and safety plans would require in-depth planning, would be high in costs, and require a quality assurance/quality control (QA/QC) process. Correspondence with agencies may be required. CDOT's preference is the avoidance of contaminated sites that pose a high risk to the project.

Historic Recognized Environmental Concern (HREC) – A previous release of hazardous substances or petroleum products affecting the subject property that has been addressed to the satisfaction of the applicable regulatory authority and meeting unrestricted use criteria established by the applicable regulatory authority, without subjecting the subject property to any controls (for example, AULs or other property use limitations). Before calling the past release a historic recognized environmental condition, the environmental professional must determine whether the past release is a recognized environmental condition at the time the Phase I ESA is conducted (for example, if there has been a change in regulatory criteria). If the environmental professional considers the past release to be a recognized environmental condition at the time the Phase I ESA is conducted, the condition shall be determined as a REC.

Initial Site Assessment (ISA) – The most commonly used environmental site assessment method by CDOT. The ISA is a quick and relatively inexpensive method to identify hazardous materials concerns within a project area or potential property to be acquired. CDOT uses the ISA in support of a Categorical Exclusion (CatEx) project or a Right-of-Way Acquisition (partial property acquisition). It can also be used for properties that are to be acquired by, dedicated to, or disposed of by CDOT and have minimal hazardous materials concerns. The documentation is completed by filling in the CDOT Form #881.

Landowner Liability Protections (LLP) – Historically, under CERCLA, the owner or operator of a contaminated property could be held responsible for the property's cleanup based solely on their current ownership of the property. In 2002, the Small Business Liability Relief and Brownfields Revitalization Act changed the liability landscape by providing projections from CERCLA liability to landowners who meet certain statutory criteria. The liability protections are for landowners who qualify as (1) bona fide prospective purchasers, (2) contiguous property owners, or (3) innocent landowners. The LLPs are self-implementing and EPA generally will not need to be involved in site-specific determinations about the potential applicability.

Heavy Metal Based Paint – Paint containing lead (lead-based paint [LBP]) was banned from use in 1978 but is still found in residential and commercial properties. Heavy metal based paint testing is often required for painted properties or structures built before 1978.

Low Potential Site – Through investigation, it is determined that it is unlikely that contamination would be encountered during construction.

Low Risk Site – It is unlikely that contamination is located within the study area for the proposed project alternatives. There is low risk to the overall project, the natural environment, and human health and safety.

Material Threat – A physically observable or obvious threat that is reasonably likely to lead to a release that, in the opinion of the environmental professional, is threatening and might result in impact to public health or the environment.

Medium Potential Site – During the investigation, it was determined that it is unclear whether contamination is located in the project footprint. A subsurface investigation or further coordination with regulatory agencies determines it is unlikely that contamination would be located in the project footprint. On a case-by-case basis, a commitment to the Contractor and CDOT Project Manager to look for signs of contamination in specific areas can be included in the hazardous material assessment and subsequently a Materials Management Plan (when required) rather than proceeding with a subsurface investigation.

Medium Risk Site – Potential contamination exists within the study area for the proposed project alternatives. The extent, nature, and concentration of contamination are such that potential materials and management would pose minimal delays and low cost and could be handled by the Contractor prior to or during construction. Any human health and safety plan would be minimal in scope and easy to implement. Correspondence with regulatory agencies may be required.

Modified Environmental Site Assessment (MESA) – A hazardous materials assessment documentation method prepared in support of an Environmental Assessment (EA) or Environmental Impact Statement (EIS). Typically, MESAs are used for corridor or project-wide assessments of hazardous materials concerns.

National Priorities List (NPL) – A list of properties compiled by EPA that are classified with the highest priority for cleanup based on EPA's Hazard Ranking System.

Phase I Environmental Site Assessment (ESA) - A hazardous material assessment documentation method for properties to be acquired by or dedicated to CDOT and have known or are suspected of storing hazardous materials. A Phase I ESA is a site-specific assessment.

Phase II Environmental Site Assessment (ESA) – A hazardous material assessment method whose purpose is to acquire scientifically valid data concerning property conditions. Sampling of soil, groundwater, surface water, soil gas, or indoor air may be necessary to confirm whether there has been a release of hazardous substances or petroleum products.

Polychlorinated Biphenyls (PCBs) – A class of more than 200 compounds, PCBs were widely used for many applications, especially as dielectric fluids in transformers, capacitors, and coolants. Due to PCB's toxicity and classification as a persistent organic pollutant, the United States Congress in 1979 and the Stockholm Convention on Persistent Organic Pollutants banned PCB production in 2001.

Petroleum Products – Those substances included within the meaning of the *petroleum exclusion* to CERCLA, 42 U.S.C. §9601(14), as interpreted by the courts and EPA; that is, petroleum, including crude oil or any fraction thereof which is not otherwise specifically listed or designated as a *hazardous substance* under subparagraphs (A) through (F) of 42 U.S.C. § 9601(14), natural gas, natural gas liquids, liquefied natural gas, and synthetic gas usable for fuel (or mixtures of natural gas and such synthetic gas). (The word fraction refers to certain distillates of crude oil, including gasoline, kerosene, diesel oil, jet fuels, and fuel oil, pursuant to Standard Definitions of Petroleum Statistics.)

Pesticide – According to EPA, any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any pest. Pests can be insects, mice and other animals, unwanted plants (weeds), fungi, or microorganisms like bacteria and viruses. Though often misunderstood to refer only to *insecticides*, the term pesticide also applies to herbicides, fungicides, and various other substances used to control pests. Under FIFRA, a pesticide is also any substance or mixture of substances intended for use as a plant regulator, defoliant, or desiccant.

Potential Environmental Concern (PEC) – The possible presence of any hazardous substances or petroleum products on a property under conditions that indicate the possibility of an existing release, a past release, or a threat of a future release of any hazardous substances or petroleum products into structures on the property or into the ground, ground water, or surface water of the property. The term includes hazardous substances or petroleum products even under conditions in compliance with laws. (Note that the “threat of release” is generally understood to be present when hazardous substances or petroleum products are poorly managed, for example, in corroded tanks or damaged containers, but the release of contaminants has not yet occurred, and there is an opportunity to take response action to prevent a release of the contaminants.)

Per- and polyfluoroalkyl substances (PFAS) – A large group of man-made chemicals perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS), as well as their salts and structural isomers, that have been widely used in various industrial applications and consumer products since the 1940s. They are known for their resistance to water, oil, and heat, which makes them useful in products like non-stick cookware (e.g., Teflon), water-repellent clothing, stain-resistant fabrics and carpets, firefighting foams, and food packaging.

Perfluorooctanoic Acid (PFOA) – A type of PFAS that, as of July 8, 2024, is classified as a hazardous substance under CERCLA, commonly known as the “Superfund” law. Environmental professionals must identify and report whether a subject property has the potential to encounter PFOA.

Perfluorooctanesulfonic Acid (PFOS) - A type of PFAS that, as of July 8, 2024, is classified as a hazardous substance under CERCLA, commonly known as the "Superfund" law. Environmental professionals must identify and report whether a subject property has the potential to encounter PFOA.

Pollutant – A waste matter that contaminates the water, air, or soil.

Project Footprint – In relation to hazardous materials, the area on a project site where excavation or work occurs to construct the project improvements, including work on such features as the roadway and structures (i.e., bridge). The project footprint includes vertical and horizontal attributes of the project's construction activity, including depth of excavation. If no excavation or work is occurring in portions of the hazardous material and environmental study area/project area, it is considered outside the project footprint. For example, if there is contamination under the roadway, it does not mean the contamination is within the project footprint if excavation will not encounter it.

Resource Conservation and Recovery Act (RCRA) – The Resource Conservation and Recovery Act (RCRA) (42 U.S.C. § 321 et seq.), enacted in 1976, establishes a framework for the management of hazardous waste (Subtitle C), solid waste (Subtitle D), and underground storage tanks (USTs) (Subtitle I). RCRA Subtitle C authorizes EPA to develop regulations for cradle-to-grave management of hazardous waste; Subtitle D regulates disposal of non-hazardous solid waste (municipal landfills, cleanup, and closure); and Subtitle I regulates USTs containing hazardous materials and petroleum products. States typically take the lead on implementing Subtitle D and Subtitle I, and EPA may authorize states to implement Subtitle C.

Risk Based Corrective Action (RBCA) – A consistent decision-making process used to assess actual or likely human and/or environmental risk of exposure to a chemical release and determine appropriate remedial actions in response to such releases.

RCRA Generators – Under the RCRA, facilities that generate, transport, store, treat, and/or dispose of hazardous waste as defined by RCRA must register as a Large Quantity Generator (LQG), Small Quantity Generator (SQG), or Very Small Quantity Generator (VSQG) based on the amount of hazardous waste generated per month.

LQG – > 1,000 kilograms (kg) of hazardous waste or > 1 kg of acutely hazardous waste per month

SQG – Between 100 kg and 1,000 kg of hazardous waste per month

VSQG – < 100 kg of hazardous waste, or < 1 kg of acutely hazardous waste per month.

Reasonably Ascertainable – Information is considered *reasonably ascertainable* if it is publicly available, obtainable from its source within reasonable time and cost constraints, and is provided in a manner that, upon review, yields information relevant to the property without extraordinary review of irrelevant data.

Recognized Environmental Conditions (RECs) - The presence of hazardous substances or petroleum products in, on, or at the subject property due to release to the environment; (2) the likely[2] presence of hazardous substances or petroleum products in, on, or at the subject property due to a release or likely release to the environment; or (3) presence of hazardous substances or petroleum products in, on, or at the subject property under conditions that pose a material threat of a future release to the environment. Example: a leaking underground storage tank containing a petroleum product. A de minimis condition is not a recognized environmental condition.

Sensitive Receptors – Any residence including private homes, condominiums, apartments, and living quarters; education resources such as preschools and kindergarten through grade twelve (K-12) schools; daycare centers; community centers; and healthcare facilities such as hospitals or retirement and nursing homes. A sensitive receptor also includes long-term care hospitals, hospices, prisons, or similar live-in housing facilities.

Toxicity Characteristic Leaching Procedure (TCLP) – TCLP is a test method used to determine if a material exhibits the characteristics of toxicity as defined in the RCRA.

Transformer – An electrical equipment box used to transfer an alternating current or voltage from one electric circuit to another by means of electromagnetic induction. Transformers are typically pole-mounted or pad-mounted (on a concrete pad on the ground surface).

Up-gradient – A site is considered topographically up-gradient from the project area when, based on topographic relief, it is higher in elevation than the project area and upstream from the project area regarding drainage and groundwater flow direction.

[2] "Likely" is that which is neither certain or proved but can be expected or believed by a reasonable observer based on the logic and/or experience of the environmental professional, and/or available evidence, as stated in the report to support the opinion given therein.

Appendix B. List of Contacts and Resources

This is not a comprehensive list and should be supplemented with local jurisdiction information as appropriate. The list was based on information available at the time this guidance was completed and is subject to change as new information becomes available over time. These companies and subsidiaries are not specifically endorsed by CDOT but are provided as options. A brief description of the use of each contact is provided but is not necessarily an exhaustive description of available services. A website is provided, valid as of December 2023 (if the listed website link is no longer functioning, simply search for the listed contact using an online search engine).

ASTM International: A source for standard practices for environmental site assessments, which includes the most commonly used E1527-21 for Phase I Environmental Site Assessments.

Website: https://www.astm.org/

Bureau of Land Management: A source for information regarding the handling of resources within public federal lands.

Website: https://www.blm.gov/

Colorado Aerial Photo Service: A private company that can provide historical aerial photographs for areas around the state of Colorado.

Website: http://www.coloradoaerialphoto.com/

Colorado Department of Labor and Employment - Oil and Public Safety: The regulatory agency responsible for managing those who own or operate amusement rides and devices, commercial boilers, conveyances (elevators and escalators), retail fueling facilities, and those who are permitted to use high explosives.

Website: https://www.colorado.gov/ops

Colorado Department of Labor and Employment - Oil and Public Safety's Colorado Storage Tank Information System: CDLE-OPS's database for registered facilities, storage tanks, and release events.

Website: https://socgov18.my.site.com/s/

Colorado Department of Labor and Employment - Oil and Public Safety's Petroleum Event Map: An interactive GIS map that provides the location of all currently open and closed petroleum release events in the state of Colorado.

Website: https://gis.colorado.gov/openpetroleum/

Colorado Department of Natural Resources: The principal department of the Colorado state government responsible for the development, protection, and enhancement of Colorado's natural resources. Contains the Colorado Division of Reclamation, Mining, and Safety and Colorado Oil and Gas Conservation Commission, as well as other divisions that may be relevant to hazardous materials assessments.

Website: https://dnr.colorado.gov/

Colorado Department of Transportation: The principal department of the Colorado state government that administers state government transportation responsibilities in the state. This guidance document is designed for use by CDOT staff and CDOT contracted organizations.

Website: https://www.codot.gov/

Colorado Department of Public Health and Environment: The principal department of the Colorado state government responsible for public health and environmental regulation. Many of the hazardous materials conditions encountered during site assessments are overseen by CDPHE as described in the Guidance Manual.

Website: https://www.colorado.gov/cdphe

Colorado Department of Public Health and Environment – Environmental Covenants and Use Restrictions: A location to obtain records regarding environmental covenants and use restrictions for properties in the state of Colorado.

Website: https://www.colorado.gov/pacific/cdphe/hmcovenants

Colorado Department of Public Health and Environment – Environmental Records Search Map: An interactive GIS map which provides the location of various hazardous materials related sites (Solid waste facilities, VCUP sites, CDPHE Institutional Controls, UMTRA sites, Brownfield properties, and Superfund/NPL sites.)

Website: https://cdphe.colorado.gov/hm/gis-data

Colorado Department of Public Health and Environment – PFAS Mapping: An accumulation of GIS maps that include Colorado's PFAS map series from sampling efforts across the state where water, soil, sediment, and fish were evaluated for PFAS.

Website: https://cdphe.colorado.gov/pfas-mapping

Colorado Department of Public Health and Environment – Superfund Sites: Provides a list of all Colorado's active Superfund sites, as well as contact information for each site. An interactive map of these Superfund sites and various CERCLA-related resources can also be found at this location.

Website: https://www.colorado.gov/pacific/cdphe/superfund-sites

Colorado Department of Public Health and Environment - Voluntary Cleanup and Redevelopment Program: A comprehensive resource for CDPHE's VCUP in the state of Colorado, including an interactive map, cleanup guidance and policy, and links to the relevant statute and memorandum of agreement.

Website: https://www.colorado.gov/pacific/cdphe/voluntary-cleanup

Colorado Energy and Carbon Management Commission (formerly known as Colorado Oil and Gas Conservation Commission): The division of the Colorado Department of Natural Resources responsible for the development of Colorado's oil and gas natural resources in a manner consistent with the protection of public health, safety, and welfare, including the environment and wildlife resources.

Website: https://ecmc.state.co.us/#/home

Colorado Division of Reclamation, Mining, and Safety: The division of the Colorado Department of Natural Resources responsible for mineral and energy development, policy, regulation and planning. The division is comprised of the Office of Mined Land Reclamation and the Office of Active and Inactive Mines.

Website: **https://maps.dnrgis.state.co.us/drms/Index.html?viewer=drms**

Colorado Division of Water Resources State Engineer: The agency responsible for administering water rights, issuing water well permits, representing Colorado in interstate water compact proceedings, monitoring streamflow and water use, and several other responsibilities. Water well permits can be relevant to hazardous materials assessments.

Website: https://dnr.colorado.gov/divisions/division-of-water-resources

Denver Public Library: A public source for a wide array of resources such as Sanborn Fire Insurance Maps and other historical maps.

Website: https://www.denverlibrary.org/

Environmental Protection Agency EnviroMapper Tool: An EPA mapping service linked to their Envirofacts database and several other databases.

Website: https://enviro.epa.gov/enviro/em4ef.home

EPA Enforcement and Compliance History Online: An EPA tool that provides an assessment of a facility's compliance with environmental regulations.

Website: https://echo.epa.gov/

EPA Facility Registry Service: An EPA database that provides facility data for facilities subject to regulation.

Website: https://www.epa.gov/enviro/facility-registry-service-frs

EPA My Environment Service: An EPA database that provides an overview of environmental conditions for a specific address, zip, city, county, waterbody, park, etc.

Website: https://enviro.epa.gov/myenvironment/

Google (Earth and Street View): A useful tool for investigating a project area and the project vicinity without physically visiting the location. Can also be used as a source for historical aerial photographs dating back typically to the 1990s.

Website: https://www.google.com/earth/

Website: https://www.google.com/streetview/

National Aerials Resources: A private company that provides historical aerial photographs.

Website: http://www.aerialsearch.net/

National Pipeline Mapping System Public Map Viewer: An online mapping tool that enables the public to view NPMS pipeline, liquefied natural gas plan, and breakout tank data, as well as various other related information.

Website: https://pvnpms.phmsa.dot.gov/PublicViewer/

U.S. Geological Survey: A scientific agency of the U.S. government that studies the landscape of the U.S., its natural resources, and the natural hazards that threaten it. The most common usage of the USGS for hazardous materials assessment is the acquisition of historical topographic maps. A link to the USGS Historical Topographic Map Explorer is provided below.

Website: https://www.usgs.gov/

Website: https://livingatlas.arcgis.com/topoexplorer/index.html

The Uranium Mill Tailings Remedial Act: The specific content of the Uranium Mill Tailings Remedial Act. Additionally, a link to the website for CDPHE's management of uranium mill tailings sites is provided below.

Website: https://www.congress.gov/bill/95th-congress/house-bill/13650

Website: https://www.colorado.gov/pacific/cdphe/uranium-mills-tailings-site

Appendix C. Detailed Visual Reconnaissance Guidance

The Initial Site Assessment (ISA) CDOT Form #881 is the recommended tool for recording relevant information and observations during a visual reconnaissance. The Form #881 provides a section to discuss the "Site Reconnaissance & Description" and allows the user to record various relevant information regarding the site visit, including the inspection date, project area land use(s) description, and adjacent land use(s) description.

Form #881 also provides a section to record Potential Environmental Concerns observed within and directly adjacent to the project area. A description of the items listed in the Form #881 Potential Environmental Concerns section, as well as other noteworthy concerns, are provided in the following sections of this appendix (**C1 through C24**). This appendix is intended to be used as a reference during site visits and to assist with the identification of Potential Environmental Concerns. It is important to note that the response options for each Potential Environmental Concern on Form #881 are "Yes," "No," "Expected," or "Unknown." Additionally, Form #881 should not constrain the visual reconnaissance if it is appropriate to further document information, at the discretion of the environmental professional.

During a site visit, other items not listed in the ISA may be identified as having potential hazardous materials concerns. If in doubt about whether something seen on a site visit may be a concern, be sure to document it with a photograph so it can be further assessed back in the office. In general, various types of facilities may occur within, adjacent to, or nearby CDOT projects that typically generate, treat, store, or dispose of hazardous materials and are included in **Table C-1**.

Table C-1. Facilities with Potential Hazardous Materials Concerns

Facilities	Potential Contaminants
Auto body or repair shops	Solvents, petroleum products, degreasers, antifreeze, lead-acid batteries, and per- and polyfluoroalkyl substances (PFAS)
Coal storage yards and coal gasification plants (former manufactured gas plants [FMGPs])	Polynuclear aromatic hydrocarbons (PAHs), metals, petroleum products, and PFAS
Chemical spill areas (if known)	Spilled material including PFAS
Dry cleaners	Dry cleaning fluids, solvents and volatiles
Electroplating factories	Solvents, metals, and PFAS
Foundries	Phenols and metals
Furniture refinishers	Solvents and thinners
Gasoline service stations	Petroleum products, solvents, degreasers, antifreeze, batteries
Incinerators (e.g., municipal, spent product, other)	Various contaminants
Landfills (e.g., municipal, spent product, other)	Various contaminants including PFAS; may require removal of disposed material or capping of fill
Manufacturers: electronics, paint, shoes, etc.	Various contaminants
Metal shop or metal finishing/fabricating plants	Solvents, cyanide, metals, acids, cutting oils, and PFAS
Print shops, photographic processors	Solvents, some metals, PFAS
Railyards and tracks	PAHs, some metals, petroleum products, herbicides
Reconditioners of drums, barrels, tanks, etc.	Various contaminants
Recyclers (e.g., batteries, solvents)	Various contaminants
Sludge Management area	Metals and other contaminants including PFAS
Scrap yard/salvage yard	Metals, petroleum products, polychlorinated biphenyls (PCBs), solvents
Transformer yards/electrical substations	PCBs
Grain Elevators and Cooperatives	Historical use of fumigants, such as 80/20 (carbon tetrachloride), petroleum products, bulk fertilizer and pesticide storage

Source: New York State Department of Transportation, Environmental Procedures Manual (1999), with modifications

C1. Underground Storage Tanks

Underground storage tanks (USTs) can range in size from 250 gallons to 20,000 gallons or more. Typically, UST sites are identified in the environmental records report. Evidence of USTs of any size should be documented during the site visit. USTs are commonly associated with gas stations and maintenance facilities. Typically, USTs contain petroleum products including new oil, used oil, gasoline, diesel, heating oil, etc. USTs are also commonly associated with dry cleaning and manufacturing facilities. In older buildings, tanks used for heating oil are considered underground by the CDLE-OPS if they are in a basement (below ground level) or lower level of a building that is partially below ground level (i.e., walk-outs, hillsides, etc.). Buildings with generators may also have associated USTs in basements or below ground level.

What to look for: Fill caps and vents in groups (one tank per set of cap and vent). Areas of square or rectangular concrete that appear incongruous with the area around it and/or vent pipes on the side of a building. Old structures that are typical of filling stations/auto repair shops that may have been renovated or repurposed. Buildings that are retrofitted commonly have garage doors for vehicle bays that are converted to windows or patios.

Typical modern filling station.

Fill caps and vents in a concrete surface.

Old filling station repurposed for a new use.

UST removal associated with a transportation project.

C2. Liquid Waste

Liquid waste includes pits, ponds, lagoons, etc. that may have been used in connection with waste disposal (i.e., industrial process water, oil and gas activity) or waste treatment activities. Concerns include leaching of constituents through the ground surface and/or settling of heavy metals. Other concerns also include leach fields related to septic systems.

What to look for: Man-made drainage structures, pits, lagoons, etc., septic system cleanouts, leach fields (grass that is greener than the surrounding area), discolored water, distressed vegetation, or obvious waste water discharge.

Detention pond at an agricultural chemical manufacturing facility.

Produced water pit at a natural gas well.

C3. Aboveground Storage Tanks

Aboveground storage tanks (ASTs) are situated above ground and have a capacity of 250 gallons or more. Evidence of ASTs of any size should be documented during the site visit. Storage tanks are often cylindrical in shape, perpendicular to the ground with flat bottoms, and with a fixed or floating roof. The design and operation of storage tanks often depend on the nature of the fluid needing to be contained.

What to look for: Cylindrical containers made out of metal (usually steel) or hard plastics. Secondary containment structures (or lack thereof), condition of equipment lines, connectors, pumps, etc. Evidence of corrosion or weakening (i.e., integrity) of the tank structure. Where the tank is located to other features, such as water resources, drainage ways, floor drains, and what type of surface the tank is sitting on (e.g., bare ground, concrete, asphalt, etc.).

ASTs at a manufacturing plant.

Typical used oil AST, with secondary containment in a concrete structure.

ASTs associated with a farm property adjacent to highway right-of-way.

AST at a natural gas well adjacent to the highway.

C4. Wells

Different types of wells may be present adjacent to a highway right-of-way and include domestic, commercial, industrial, irrigation, municipal, and contamination monitoring. Wells have the potential to be contaminated from highway runoff and also may require relocation due to construction activities.

What to look for: Rural residences may have their own domestic well or be part of a rural water district. Well caps can be in grass areas, parking lots, street right of way, etc. In locations where vehicle traffic, mowing, or aesthetics is not a concern, a post-mounted cap (i.e., casing) can be used (pictured below right).

Rural residences and farmsteads typically have a domestic drinking water well.

Monitoring wells in a non-commercial setting.

Flush-mount monitoring well.

C5. Electrical/Transformer Equipment

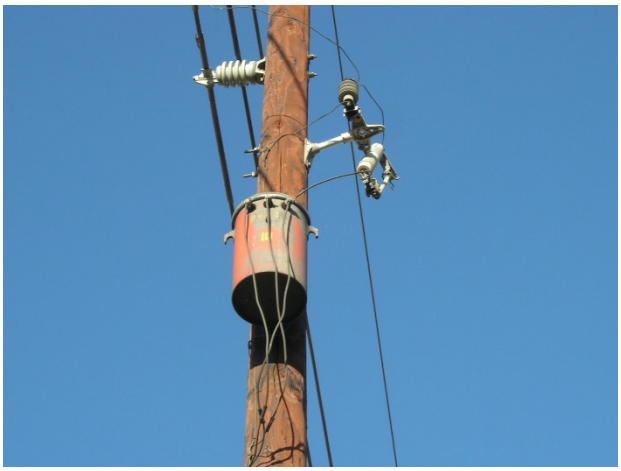
A transformer is a device that transfers electricity from one circuit to another through inductive coils. Transformers contain dielectric fluids as a coolant and insulating fluid (i.e., transformer oil). Pre-1979 transformers likely used transformer oil that contained PCBs. Because of the physical characteristics of PCBs, they linger in the environment and are also considered a carcinogen.

What to look for: Pad- or pole-mounted transformers, evidence of leaks from these transformers, and/or blue "No PCBs" or "PCB-free" stickers.

Pad-mounted electrical transformer with a No PCBs label.


Pole-mounted electrical transformers. (Note drums in bottom half of picture).


Pole-mounted electrical transformer in highway right-of-way.


An older pole-mounted transformer.

C6. Cisterns, Sumps, and Drains

Cisterns, sumps, drains, and septic systems are in-ground structures that drain, collect, or store liquids (i.e., wastewater in septic systems). Drains include grated inlets, interior floor drains, and floor sinks.

What to look for: Drains including grated inlets, interior floor drains, and floor sinks. Inquire whether the drains are connected to sanitary sewer, combined sewer, or storm sewer. Cisterns may be located within the basement of some older/historical buildings, old/historical residences, farmsteads, or rural residences.

Drain pipe observed on the property of a foundry facility.

Likely residential septic system port.

A set of storm sewer inlets along a roadway.

C7. Barrels, Drums, Containers

Barrels, drums, or containers are used to store various materials, including petroleum products. Typically, they have a 55-gallon capacity; however, some may be in other capacities such as 30-gallon or 5-gallon buckets.

What to look for: Identify drums that are located within poor storage locations. Look at the condition and integrity of the drum and note any signs of corrosion or obvious holes. Also check for secondary containment and labeling to determine the substance the barrel/drum/container holds. Note how many barrels/drums/containers are present.

Two 55-gallon drums (to the right of the garage) associated with property adjacent to highway right-of-way. One drum is tipped over.

Multiple aerosols, paint cans, 5-gallon buckets, and a parts washer with a 30-gallon drum.

C8. Surface Staining (soil staining, stressed vegetation, evidence of spills or releases)

Stained soil or pavement is considered anything that looks out of the ordinary in relation to the surrounding area. Surface staining and stressed vegetation may be indicators of a spill or a release of hazardous materials, which could be a one-time event or an ongoing issue.

What to look for: Oil residues, sheens, or standing liquid. Irregular shaded outlines on pavement and in low-lying areas. Areas of vegetation struggling or non-apparent compared to the surrounding vegetation and could be resulting from a condition other than drought (which would likely be more widespread and a uniform stress on the vegetation).

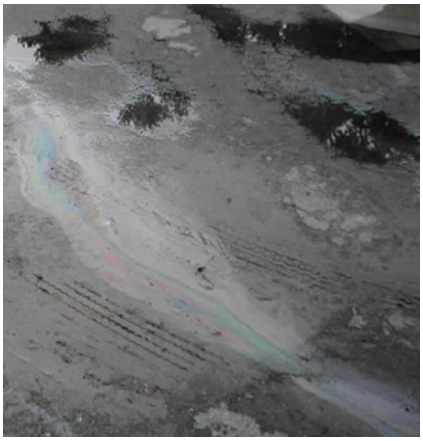
Stressed vegetation.

Surficial staining from a leaking vehicle. Presumably, motor oil, but other possibilities include antifreeze, transmission fluid, etc.

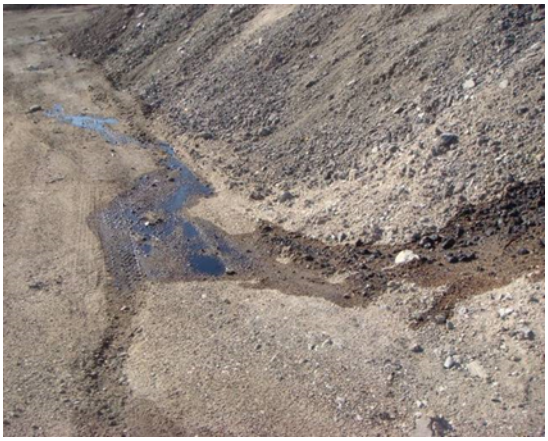
C9. Oil Sheen

Oil residues, sheens on water, or standing liquid may indicate a leak or a spill. Oil in water will settle on the surface of the water and depending on the thickness of the layer shimmer with different colors, creating a rainbow-like appearance.

What to look for: Oil residue on the banks of a water resource, edges of a puddle in a low-lying paved area. Look for the rainbow-like reflection typical of oil sheens.



View of a rainbow-like sheen on wet soil.



Wetted soil with a dark liquid residue.

C10. Suspected Methamphetamine Laboratory Waste

Methamphetamine laboratories, or other clandestine drug laboratories (CDLs), present a uniquely dangerous situation. The chemicals used to create methamphetamine are common household chemicals, medications, and/or common commercial/agricultural chemicals. Methamphetamine lab waste includes many dangerous products that may look like carelessly dumped trash along roadsides, in abandoned vehicles, public storage areas, or rest stop areas. Many of the products that could be encountered are a physical hazard to humans due to the risk of explosion and the release of hazardous gases. Identification of possible methamphetamine lab waste should be considered as part of every hazardous materials review because it presents a serious worker health and safety issue. Known locations are typically provided in the environmental database report; however, not all sites have been reported. The following are indicators of methamphetamine lab waste.

What to look for:

- Pseudoephedrine blister packs and products found in cold medicine and diet pills
- Lab flasks
- Champagne bottles
- Camp stoves
- Bags or bottles containing kitty litter, duct tape, and hoses
- Containers with separated liquids
- Plastic coolers
- Car batteries
- Epson salts

- Table salt
- Kerosene
- Denatured alcohol
- Rubbing alcohol
- Muriatic acid
- Pyrex
- Stained coffee filters
- Hot plates
- Propane tanks with blue staining around valve area
- Lithium batteries
- Syringes
- Small butane torches
- Match books with no strikers
- Iodine crystals
- Charcoal lighter fluid
- Mineral spirits
- Lacquer thinner
- Battery acid
- Kitty litter bags
- Odors such as cat urine, rotten eggs, ammonia, or acetone

If you believe you have come across a methamphetamine laboratory or CDL, leave immediately and report the lab to the local police department.

Methamphetamine laboratory.

Trash bag that has been gathered and taped around a propane tank and tube. The tube funnels vapors during the drug manufacturing process. These old propane tanks are often called “death bags.”

Waste from methamphetamine lab.

C11. Chemical Storage

Chemical storage includes the storage of any or all types of non-petroleum substances. Most chemicals have particular storage requirements, such as outside storage, storage in a temperature-controlled environment, plastic container storage, steel container storage, etc. Material Safety Data Sheets (MSDS) should be used to track all chemicals kept on a specific property. It is important to note that MSDS are rarely collected or reviewed as part of the hazardous materials assessment process for CDOT projects. However, if a property-specific assessment is being performed as part of the right-of-way process, a review of MSDS could be included as part of the hazardous materials assessment.

What to look for: Multiple 5-gallon buckets in one location, 55-gallon drums, 110-gallon plastic totes, ASTs (i.e., 250 gallons or more). Secondary containment, spill response kits, condition of storage area and containers, MSDS sheets on-site, etc.

55-gallon drum storage area.

Covered hazardous materials storage area with secondary containment.

C12. Structure Construction Prior to 1980 – Suspect Asbestos Containing Material

Asbestos is a toxic substance that may exist in or on highway structures (e.g., bridge decks) and other structures (e.g., buildings), particularly if they were constructed before 1980. Asbestos is regulated under the federal Toxic Substances Control Act (TSCA) and the Clean Air Act (CAA) and presents a worker health and safety concern due to the potential negative health impacts associated with the inhalation of asbestos fibers. Asbestos can be broken into small, unseen fibers that remain airborne indefinitely and travel long distances. There is no known safe level of asbestos exposure. CDPHE permits asbestos abatement and demolition projects. If asbestos site(s) are identified in the environmental records report, other sites within the vicinity should be assessed for their potential to contain asbestos containing material (ACM) if developed during a similar timeframe as the identified site(s). In transportation projects, the most likely direct sources of ACM are insulation for structures (conduits or bridge decks), facility building materials, or buried building demolition debris.

What to look for: For transportation projects, most concerns with ACM are related to its presence on utility pipes or structures that will be demolished or disturbed that date pre-1980. For structures, vinyl floor tile and linoleum in 8x8 or 9x9 tiles are likely to contain ACM. Other materials include acoustic and popcorn ceiling textures, mastic, window caulking, flashing, siding, and some roofing materials, etc. **NOTE: Only certified ACM inspectors should make observations regarding potential or suspect ACM. ACM can be confirmed only through certified lab testing**.

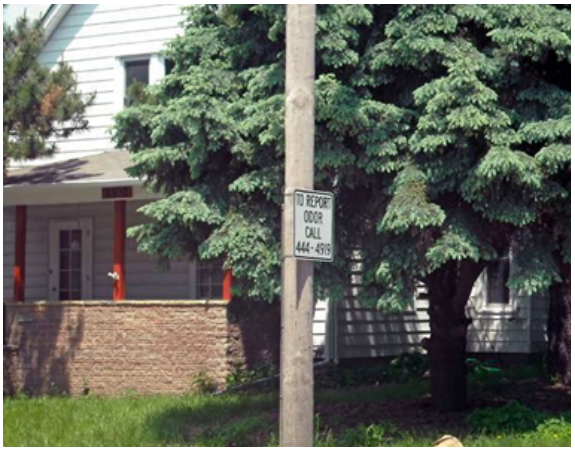
Old pipes adjacent to the highway right-of-way.

Potential ACM in fabric insulation inside a sand dome.

C13. Odors (Strong, Pungent, or Noxious)

Odors can be an indicator of a chemical release, or in an industrial area, a manufacturing use, etc.

What to smell for: If an odor is overwhelming, causes lightheadedness, or nausea, leave the site immediately and report it to emergency services (this is considered a noxious odor). Strong and pungent odors are noticeable and may get stronger as the possible source is approached. Note what odors smell like (e.g., in an agricultural community the rotten egg smell would typically be ammonia) and the direction of the possible source (particularly if the odor is noticeable only with the breeze/wind). It is important to never open a container to smell it.



Sign says, "To Report Odor call 444-4919" and is posted in an area that may experience wastewater treatment plant odors.

Anhydrous ammonia tanks typically seen in agricultural communities.

C14. Painted/Preserved Materials (Heavy Metal Based Paint)

Work that includes the removal of paint or items covered with paint containing lead, chromium, or other heavy metals may pose potential health impacts to project personnel and the public. Heavy metals are hazardous substances that potentially exist on steel highway structures, bridge railing, and other structures (e.g., buildings) associated with transportation projects, particularly if they were constructed before 1978. Due to the potential negative health impacts associated with heavy metal exposure, the presence of heavy metal paint presents a worker health and safety concern. Project personnel can be exposed to the toxic effects of heavy metals through inhalation or ingestion of heavy metal-based paint chips, dust, or debris during construction or materials management activities. The potential toxic effects of exposure to heavy metal paint chips, dust, or debris are also a public health and environmental risk. Paint containing heavy metals, in particular, may need to be removed prior to demolition if the metals are leachable at concentrations greater than regulatory levels. Where heavy metal painted surfaces would be removed via torching, additional health and safety monitoring requirements are applicable.

What to look for: Peeling, chipping, or cracking paint on pre-1978 structures.

Paint on old buildings may contain heavy metal-based paint.

Paint on old bridges may contain heavy metal-based paint.

Chipping paint on a bridge rail may contain heavy metal-based paint

Chipping paint on a commercial property.

C15. Oil/Gas Wells/Natural Gas Pipeline

Gas pipelines for natural gas and petroleum pipelines are common in Colorado. Pipeline leaks could occur but rarely go unnoticed or unresolved. Pipelines are always worth noting when observed in the field as they could impact construction of the roadway asset. Unmarked pipelines are common surrounding oil and gas well locations to move product to larger collection pipelines. These smaller unmarked pipelines pose a risk for projects that involve excavation within or adjoining the right-of-way. Oil and gas well locations can be located on the CECMC Interactive Map website.

What to look for: Gas pipelines are always yellow or yellow and black in Colorado. Always check for a label to confirm the type of pipeline. In newer subdivisions, natural gas pipelines typically follow the major electrical transmission lines.

Gas line marker and regulator (background).

Gas pipeline vent pipes adjacent to highway right-of-way.

Gas well adjacent to highway right-of-way.

Oil well adjacent to highway right-of-way.

A gas well located adjacent to highway right-of-way on the left of the highway; an unmarked collection pipeline on the right of the highway.

C16. Protected/Fenced/Placarded Areas

Sometimes fenced/placarded area(s) may be of concern because the property use cannot be observed or confirmed.

What to look for: "Keep Out" or "No Trespassing" signs, security fence, any coming and going of equipment, company vehicles, and/or any indication of possible use.

"No Dumping" sign on fenced property. It is uncertain what the property may have been used for in the past or currently.

"No Trespassing" sign on private property adjacent to highway right-of-way. Evidence of hazardous materials storage on property.

C17. Exposed/Buried Landfill

Landfills are a place, a location, a tract of land, an area, or a premise used for the disposal of solid wastes as defined by state solid waste regulations. Exposed gas vents could indicate the presence of a landfill. The environmental database report may identify currently operating landfills and historical landfills, but unreported landfills and miscellaneous dumping locations will likely not be identified.

Possible landfill activity adjacent to highway right-of-way.

Vent pipe that may be connected to a former landfill beneath the ground surface.

Mounds and remnant terraces for landfill activity.

C18. Miscellaneous Storage, Dumping, Stockpile, Surface Trash, Debris, Evidence of Dumping, Imported Fill

Demolition or construction debris is considered concrete, brick, asphalt, and other building material discarded on a property. Stockpiles and miscellaneous dumping may include soil, rock, ash, or other waste materials. Surface trash may include general litter often associated with roadside trash that has accumulated.

What to look for: Evidence of truck tracks, indicating possible dumping activity. Piles of debris, soil, rock, or miscellaneous trash that appear to be random in placement. Trash, litter, and debris strewn over the ground surface.

Debris piles (e.g., pallets and concrete), litter, and a stockpile of soil on an otherwise vacant lot.

Ash waste stockpiles at a steel foundry. Litter and some broken pallets are also strewn about.

Miscellaneous storage including old tires, pallets, 55-gallon drums adjacent to highway right-of-way.

Miscellaneous dumping at a property adjacent to highway right-of-way.

C19. Batteries

Vehicle and heavy equipment batteries can leak battery acid if not properly stored or disposed of and can leave behind heavy metals in the soil.

What to look for: Batteries that are not stored on pallets or shelves (must be off the floor), indoors, and/or in good condition. Generally, vendors pick up old batteries when new batteries are delivered.

Old batteries stored in a "trash" corral. Notice the stained soil.

Old batteries stored outside and exposed to the elements. Also, AST with secondary containment.

C20. Railroad Tracks/Railyards

Concerns with railroad facilities include derailments, leaks from railcars, spills or releases from fluid carrying railcars, loading and unloading areas, and maintenance activities. Rail facilities are always worth noting when observed in close proximity to a project since unreported contamination is commonly associated with these facilities.

What to look for: Linear corridors that may now be undeveloped could be former railway corridors (can be confirmed through aerial photography and land records). Old structures shaped as half-moons may be a former railroad roundhouse where railcar maintenance took place (typically confirmed on aerial photography and Sanborn Fire Insurance Maps). Loading and unloading areas at grain elevators, manufacturing facilities, etc.

Railroad access line for an ethanol plant.

Historical railroad roundhouse and maintenance yard.

C21. Vehicle Maintenance and Repair Activities

Vehicle maintenance activities may include the handling, storage, and use of solvents, petroleum products, degreasers, antifreeze, and lead-acid batteries.

What to look for: Observe adjacent properties for vehicle maintenance bays and potential automobile maintenance activities if vehicle bays are not evident, such as piles of scrap car parts; piles of tires; businesses that sell, rent, or store vehicles; or highway department maintenance facilities.

Vehicle bays adjacent to highway right-of-way.

Vehicle bays adjacent to highway right-of-way.

Evidence of a former vehicle maintenance bay and former hydraulic lift.

C22. Evidence of Remediation Activities

Evidence of remediation activities may include the presence of remediation equipment and groundwater monitoring wells. Monitoring wells are those that are installed to sample for groundwater quality or presence of contamination.

What to look for: Remediation equipment, such as Baker tanks, and groundwater monitoring wells caps.

Baker remediation tank in highway right-of-way.

Typical groundwater remediation sheds.

Typical in-ground monitoring well.

Groundwater remediation shed in the background with a monitoring well in the foreground

C23. Mine Tailings and Mining Waste

Mine tailings and mining waste are the materials left over after the process of separating the valuable fraction from the uneconomic fraction of an ore. These mine tailings and waste can cause potential environmental issues due to their instability in the environment (e.g., high acidity, raise suspended solids in water bodies, radioactivity, etc.) and toxic material contents (most commonly arsenic and mercury). The most common method of storing tailings and mining waste is in tailing ponds or impoundments; tailing pond releases to the environment are most commonly due to failure of these containment systems. Additionally, some areas historically used tailings for fill material, road base, and components for brick and concrete. Colorado locations that fall into this category are Boulder, Cameo, Cañon City, Clifton, Collbran, Craig, De Beque, Delta, Dove Creek, Durango, Fruita, Gateway, Glade Park, Grand Junction, Parachute, Leadville, Loma, Mack, Maybell, Mesa, Molina, Naturita, Nucla, Orchard Mesa, Palisade, Plateau City, Redlands, Rifle, Salida, Sky Way, Slick Rock, Uravan, Whitewater, Silt, Bedrock, and Olathe. Radioactive soils/tailings are also a concern as they are not visibly evident, and the use of gamma radio meters is required to detect presence.

What to look for: Contained ponds with a slurry on or adjacent to mining facilities, discolored natural water bodies on or adjacent to mining facilities (typically yellow/orange due to iron precipitate), stockpiles of mining waste (small rocks, discolored dirt, etc.)

Animas River, Durango, Colorado, after a large mine waste spill.

Trucks dumping mining waste at the edge of stockpiles.

Emergency tailing ponds constructed in response to a spill.

C24. Per- and Polyfluoroalkyl Substances (PFAS)

PFAS, or per- and polyfluoroalkyl substances, are a large group of man-made chemicals that have been widely used in various industrial applications and consumer products since the 1940s. They are known for their resistance to water, oil, and heat, which makes them useful in products like non-stick cookware (e.g., Teflon), water-repellent clothing, stain-resistant fabrics and carpets, firefighting foams, and food packaging.

PFAS are forever chemicals, very mobile, and able to travel long distances in the environment via air, surface water, and groundwater. They may also pose serious health risks, including reproductive and developmental effects, increased risk of cancers, hormone interference, increased cholesterol levels, and reduced ability to fight infections.

What to look for: Airports, car washes, chemicals, paint, carpet, firefighting foam manufacturers, landfills, paper mills, printing facilities, among others.

PFAS are often found in landfills.

Carpet manufacturer.

Car washes often collect contaminants from the roadway.

Appendix D. Initial Site Assessment Form #881

The CDOT Form #881 hyperlink can be found online at the Colorado Department of Transportation Environmental Programs Hazardous Materials webpage.

Website: https://www.codot.gov/programs/environmental/hazardous-materials

Appendix E. Photograph Log Template

[Insert Photo]	[Insert Photo]
Photo #1: [Insert Caption]	Photo #2: [Insert Caption]
[Insert Photo]	[Insert Photo]
Photo #3: [Insert Caption]	Photo #4: [Insert Caption]
[Insert Photo]	[Insert Photo]
Photo #5: [Insert Caption]	Photo #6: [Insert Caption]

[Add additional pages as necessary]

Appendix F. Completed Initial Site Assessment Form #881

Appendix G. Modified Environmental Site Assessment Report Template

[Project Name]

[Location, County, State]

Modified Environmental Site Assessment

Prepared for:

[CDOT or LPA]
[Department]
[Address]
[City, State, Zip Code]

Prepared by:

[insert preparers names (do not include company names)]

[Month Year]

Table of Contents

Appendices

List of Figures

Page

List of Tables

List of Abbreviated Terms

A	
ACM	asbestos-containing materials
AST	aboveground storage tank
ASTM	American Society for Testing and Materials
C	
CAA	Clean Air Act
CDH	Colorado Department of Health
CFC	chlorofluorocarbons
CFR	Code of Federal Regulations
CDOT	Colorado Department of Transportation
CDLE-OPS	Colorado Department of Labor and Employment Division of Oil and Public Safety [formerly Oil Inspection Section (OIS)]
CDPHE	Colorado Department of Public Health and Environment [formerly the Colorado Department of Health (CDH)]
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
CGS	Colorado Basic Standards for Groundwater
CECMC	Colorado Energy and Carbon Management Commission
CORRACTS	RCRA corrective action
E	
EIS	environmental impact statement
EPA	U.S. Environmental Protection Agency
EPB	CDOT Environmental Programs Branch
ERIS	Environmental Risk Information Services
ERNS	Emergency Response Notification System
F	
FHWA	Federal Highway Administration
FINDS	Facility Index System

	H
HMA	Hazardous Materials Assessment
HMIRS	Hazardous Materials Incident Report System
	I
ISA	Initial Site Assessment
	L
LUST	leaking underground storage tank
	M
MESA	Modified Environmental Site Assessment
mg/kg	milligrams per kilogram
MMP	Materials Management Plan
MTBE	methyl tertiary-butyl ether
	N
NEPA	National Environmental Policy Act
NESHAP	National Emission Standards for Hazardous Air Pollutants
NFA	No Further Action
NFRAP	No Further Remedial Action Planned
NPL	National Priority List
	O
OSHA	Occupational Safety and Health Administration
	P
PCBs	polychlorinated biphenyls
PCE	perchloroethylene
ppb	parts per billion
ppm	parts per million
PSI	Preliminary Site Investigation

R	
RBSL	risk based screening levels
RCRA	Resource Conservation and Recovery Act
RCRIS	Resource Conservation and Recovery Information System
RCRA LQG	Resource Conservation and Recovery Act Large Quantity Generator
RCRA SQG	Resource Conservation and Recovery Act Small Quantity Generator
RCRA TSD	Resource Conservation and Recovery Act Transportation, Storage, and Disposal Facility
RI/FS	Remedial Investigation/Feasibility Study
T	
TCE	trichloroethylene
TSCA	Toxic Substances Control Act
TSD RCRA	Treatment, Storage, or Disposal Facility
U	
µg/L	micrograms per liter
USGS	United States Geological Survey
UST	underground storage tank
V	
VCUP	Voluntary Cleanup Program

[NOTE TO THE REPORT PREPARER: This document was established to serve as a template to assist with developing a Modified Environmental Assessment Report. Sections with red text in brackets are instructions to the report preparer or are to be filled in for each specific project. All instructions with red text in brackets should be removed before finalizing the document.]

1. Introduction

[Include a detailed project description and discussion of alternative designs, if applicable. This section also discusses the methodology of the Hazardous Materials Assessment (HMA) and describes the environmental setting, regional geology, and regional hydrology in detail.]

In accordance with the National Environmental Policy Act of 1969 (NEPA) and its related regulations, Federal Highway Administration (FHWA) and Federal Transit Administration (FTA), in cooperation with Colorado Department of Transportation (CDOT), are preparing an [Environmental Impact State (EIS) / Environmental Assessment (EA)] for the [project name]. [Company name], acting on behalf of CDOT, conducted a Modified Environmental Site Assessment (MESA) in support of the [EIS/EA].

Highway corridors generally consist of areas where light industrial and commercial businesses historically or currently operate. These types of businesses, such as gasoline service stations, automotive repair facilities, and larger truck stop establishments, typically use underground storage tanks (UST) or aboveground storage tanks (AST) to store petroleum projects, waste oil, and/or other hazardous materials. Such facilities are also often regulated based on their current hazardous waste generation management activities. Consequently, areas with light industrial and commercial use present a risk of having the presence of soil and groundwater contamination as the result of past spills or releases of hazardous substances, including petroleum projects. [Historic railroad operations within the project area also present the risk of having the presence of contamination due to an accumulation over time of drips, leaks, spills, and hydrocarbon exhaust residues from rail traffic and the transport and storage of hazardous materials.] Other typical hazardous materials concerns associated with transportation projects include the presence of heavy metal-based paint or asbestos-containing materials (ACMs) on highway structures or within older buildings (pre-1980) that will be demolished during right-of-way acquisition.

The objective of the MESA is to provide information needed for planning efforts related to properties (sites) within the project area that pose a potential risk of environmental contamination from hazardous materials. Thoroughly assessing and investigating properties within the project area for past or present soils and/or groundwater contamination are integral components of the planning process. Planning efforts include right-of-way acquisition costs and property appraisals, options for owner-funded site remediation prior to CDOT acquisition, property avoidance, and planning for engineering options to minimize the necessary remediation and treatment of residual hazardous materials.

Due to their contaminated nature, hazardous materials require specific materials management, handling, worker health and safety, and disposal practices. If contamination of soils and/or groundwater is suspected, avoidance or mitigation measures can be implemented when reasonably possible. Encountering soil and groundwater contamination during the construction process without prior knowledge of contamination has the potential to affect the project in terms of mitigation, cost, schedule, and project personnel health and safety issues.

This MESA has been prepared with a level of detail appropriate for the development and screening of design alternatives for the [project name]. In certain cases, potential environmental conditions or recognized environmental conditions, which are further defined in **Section 1.3**, may be present but could not be confirmed without additional inspection or investigation, which is beyond the scope of this MESA. It is anticipated that additional assessment and/or field investigations may be

needed to assist in right-of-way acquisition and development of specific materials management or institutional controls that may be required during construction. **Chapter 5** provides recommendations pertaining to additional assessment and investigation.

1.1 Project Description

[Describe the purpose of the project. Describe the regional study area limits, include counties, communities, and metropolitan planning organizations. Include a figure.]

The MESA project area consists of the project footprint of the [number] build alternative packages [Package _ and _; add as many alternatives as needed]. Each package has [highway and transit components], briefly described below. In addition to the packages, a No-Action Alternative is included in the [project].

1.1.1 Alternative Package A

[Describe Alternative Package A.]

1.1.2 Alternative Package B

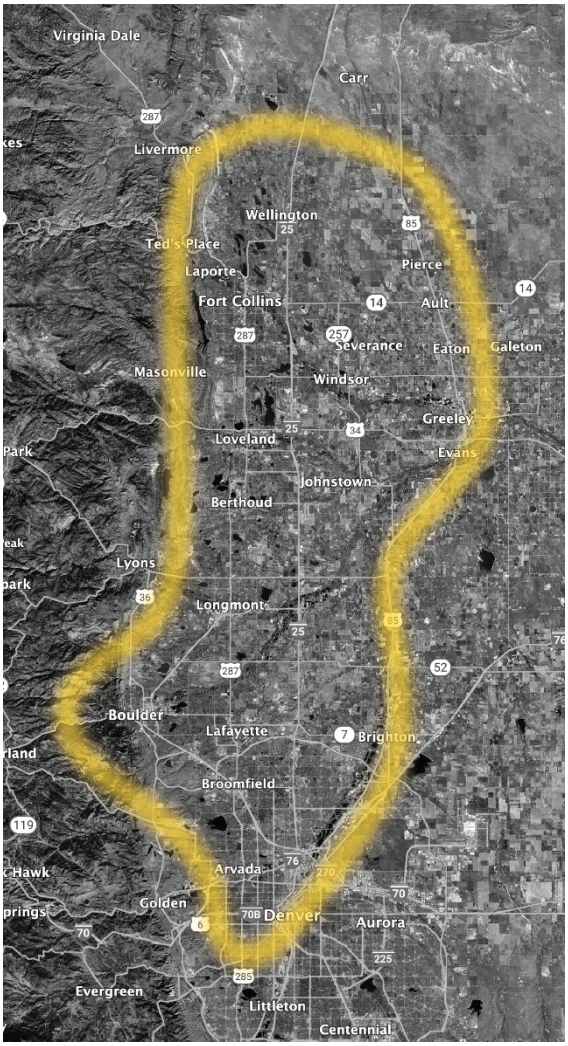
[Describe Alternative Package B.]

[Add as many alternatives as needed.]

1.1.3 No-Action Alternative

The No-Action Alternative is a conservative estimate of safety and maintenance improvements that will need to be constructed if the build alternatives are not built. [Include descriptions of activities expected to occur under the No-Action Alternative.]

Figure 1-1. [Project] Regional Study Area [example figure]



1.2 Guidance Modifications and Limitations

This MESA was prepared for FHWA, FTA, and CDOT for their sole use and reliance. Reliance on this report by any other person(s) or entity(ies) is strictly at their own risk, and [company name] makes no warranties to person(s) or entity(ies) other than to FHWA, FTA, and CDOT who use the information provided in this report. If any other person(s) or entity(ies) want to rely on this report, [company name] will require such parties agree to our contract terms in writing.

[Company name] performed this work for the sole purpose of assisting in the identification of potential and recognized environmental conditions, as defined in **Section 1.3**, associated with properties with the project area. The scope of work commissioned for this project does not represent an exhaustive study, but rather a reasonable inquiry consistent with CDOT hazardous materials guidance (CDOT Environmental Programs Branch [EPB], 2025), as modified from the ASTM International (ASTM) Designation E 1527-21, "Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process" (ASTM, 2021) and U.S. Environmental Protection Agency (EPA) Standards and Practices for All Appropriate Inquiries [40 Code of Federal Regulations (CFR) Part 312] (EPA, 2023).

Any findings and recommendations presented in this report are geared specifically to address the issues regarding hazardous materials that would affect the planning and design of the construction project. This MESA has been prepared with a level of detail appropriate for the [project name] NEPA documentation and identifies sites with potential and recognized environmental conditions associated with the project area. **Section 1.3** defines the terms "sites with potential environmental conditions" and "sites with recognized environmental conditions."

[Company name] assessment and findings presented herein are based on observation of current conditions within the project area and a review of readily available standard historical sources and environmental agency databases. Modifications to the standard Phase I Environmental Site Assessment process include:

- [Company name] assessment did not include interviews of current and/or past owners and occupants or properties located within the project area.
- [Company name] assessment did not include a search for environmental cleanup liens.
- [Company name] visual site assessment was limited to areas visible from public right-of-way and did not include access to fenced-in areas, interiors of buildings, rear lots (alley side portion of adjacent sites), or areas not visible from public right-of-way.
- This assessment did not attempt to detect the presence of potential environmental contamination that may exist in areas that could not be visually inspected.

The agency data screening is only as accurate as the [environmental database provider] mapping. When possible, the actual location of sites was verified during site reconnaissance activities and agency file review. Based on this information, sites were remapped, as necessary.

This MESA was non-intrusive. Sampling of soils, groundwater, and/or surface waters was beyond the scope of this MESA. Other environmental liabilities to a property owner, such as identifying the presence of ACMs, radon, or heavy metal-based paint were also beyond the scope of investigation for this MESA. The presence or absence of such conditions cannot be confirmed without additional investigation.

This MESA does not guarantee that no contamination exists on sites within the project area beyond that described at the time this report was written. Therefore, conclusions presented herein are not necessarily indicative of future conditions or operating practices surrounding the project area. No warranties, expressed or implied, are made. All conclusions and recommendations represent the professional opinions of the [Company name] personnel involved with the MESA and the results should not be considered a legal interpretation of existing environmental conditions.

1.3 Terminology

This section briefly explains some of the terminology commonly used within the MESA report.

- **Hazardous Materials:** The term hazardous materials is an all-inclusive term for materials regulated as solid waste, hazardous waste, and other wastes contaminated with hazardous substances, radioactive materials, petroleum fuels, toxic substances, and pollutants.
- **Sites with Recognized Environmental Conditions:** For this MESA, sites within the project area were identified as having recognized environmental conditions. Recognized environmental conditions, as defined by ASTM, include sites with "the presence or likely presence of any hazardous substances or petroleum products on a property under conditions

that indicate an existing release, a past release, or a material threat of a release of any hazardous substances or petroleum products into structures on the property or into the ground, groundwater, or surface water of the property" (ASTM, 2021).

- **Sites with Potential Environmental Conditions:** Sites identified within the project area as having potential environmental conditions (e.g., evidence of storage, handling, or disposal of hazardous materials) during site reconnaissance and historical review activities that could not be confirmed without additional inspection or investigation are distinguished in the MESA as sites with potential environmental conditions.

1.4 Methodology

The methodology for this MESA is based on CDOT hazardous materials guidance (CDOT EPB, 2025) as modified from the ASTM Designation E 1527-21, "Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process" (ASTM, 2021) and EPA Standards and Practices for All Appropriate Inquiries [40 CFR Part 312] (EPA, 2023). **Section 1.2** presented modifications to this guidance.

The methodology used to identify sites with recognized or potential environmental conditions within the project area included the following steps:

- Performed a limited site reconnaissance ("windshield survey") of properties within the project area from public right-of-way to identify current site activities and potential contamination sources adjacent to the project corridors.
- Reviewed readily available standard historical sources, including aerial photographs, U.S. Geological Survey (USGS) topographic maps, and Sanborn Maps to identify historical land uses within the project area.
- Contracted ERIS to conduct a regulatory database search of readily available local, state, tribal, and federal environmental agency databases for sites with potential or recognized environmental conditions up to 1.0 mile from the project area, as dictated by ASTM Standard E1527-00/1527-21. The specific search distances used were equal to or greater than the ASTM E1527-21 approximate minimum search distances and are described in detail in **Table 4-1**. Due to the size of the study area, the ERIS reports were obtained for the project corridors as the alternatives for those corridors were developed. These ERIS reports obtained for the [project name] project are included **[Appendix A]**.
- Screened sites identified in the regulatory databases based on distance from the proposed right-of-way, known environmental site conditions, and, in certain cases, groundwater flow direction. **[Appendix B]** summarizes the results of the screening process.
- Reviewed previous CDOT, Colorado Department of Public Health and Environment (CDPHE) records, Colorado Department of Labor and Employment Division of Oil and Public Safety (CDLE-OPS) records, and other available records from local, state, and federal agencies regarding properties with recognized environmental conditions within the project area.
- Identified properties within the project area requiring additional evaluation or investigation to assist in project design, specific-materials management/institutional controls that may be required during construction, or the right-of-way acquisition process, if full acquisition is necessary.

1.5 Environmental Setting

[Describe the land use (e.g., agricultural, commercial, light industrial, residential) in the project area and surrounding area and climate.]

1.6 Regional Geology

[Describe the regional geology.]

1.7 Regional Hydrology

1.7.1 Surface Water

[Describe the river basin, list the main watersheds, and describe the hydrology and stream flow regime characteristics of the watersheds.]

1.7.2 Groundwater

[Include information about aquifers and groundwater usage. Include information on groundwater depth and flow direction.]

Bedrock Aquifers

[Describe the bedrock aquifers.]

Alluvial Aquifers

[Describe the alluvial aquifers.]

Groundwater flow direction varies within the regional project area but generally moves downstream and toward drainages. Groundwater flow direction can also be influenced by bedrock topography, recharge and discharge area, soil and bedrock heterogeneity, and proximity to water pumping wells (Colorado Geologic Survey, 2003). Groundwater flow may also be independently influenced by water table elevations and may flow from areas with high water table elevations to areas with lower water tables elevations, which may not be consistent with the direction of flow for surface water. Local groundwater conditions may be significantly influenced by the position of underlying valleys and paleochannels within the bedrock surface (Colorado Geological Survey, 2003). [Confirmation of the direction of groundwater flow beneath the project area was beyond the scope of this MESA.]

2. Site Reconnaissance

[Include time, date, and areas visually inspected by the Environmental Professional and/or team members. Include information on land use within and adjoining the project area or the proposed alternatives project areas.]

To obtain information indicating the presence of potential or recognized environmental conditions, a limited site reconnaissance was conducted, which consisted of a "windshield survey" of sites along the [project footprint].

Table 2-1. Summary of Limited Site Reconnaissance Activities

Project Corridor	Date Site Reconnaissance Conducted	Site Inspector

[Name(s)], environmental scientists with [company name], performed site reconnaissance activities performed for this MESA. The visual inspection included the identification of current land use and observable site activities with potential contamination sources for properties located adjacent to the project corridors, such as:

- Presence of ASTs and secondary containment for spill prevention
- Evidence of USTs, including fill ports, vent pipes, and fueling facilities
- Disposal of solid waste, waste management practices, and general good housekeeping of waste storage/disposal areas
- Evidence of on-site dumping and landfilling
- Handling and storage of hazardous materials, such as the presence of 55-gallon drums, tote containers, etc.
- Presence of drains, sumps, septic systems, wastewater discharges, pits, ponds, or lagoons

Due to the large size of the project area and the lack of finalized right-of-way plans identifying specific right-of-way and acquisition requirements at the time the site reconnaissance activities were performed, the "windshield survey" was conducted from public right-of-way. The interior of buildings, fenced areas, and rear lots (alley side portion of each site) were not inspected during the site reconnaissance. Additionally, interviews with current and/or past owners or occupants of the properties located within the project area were not conducted to limit interactions with potential acquisition owners/tenants without the presence of CDOT Right-of-Way personnel. **Section 1.2** discussed modifications to the ASTM E1527-21 standard guidance on site reconnaissance and project limitations.

Site reconnaissance activities did not include the identification of pole-mounted electrical transformers or other types of equipment that have been historically associated with the use of polychlorinated biphenyls (PCBs) as a dielectric fluid coolant and stabilizer. EPA defines PCB equipment as containing greater than 500 parts per million (ppm) PCBs; "PCB contaminated equipment" as containing 50 to 500 ppm PCBs; and "non-PCB equipment" as containing less than

50 ppm PCBs. However, any electrical equipment with no label or unknown concentration is assumed to be "PCB contaminated equipment" per EPA regulation.

[Appendix C] lists sites with potential environmental conditions and recognized environmental conditions identified during the site reconnaissance. **[Appendix D]** contains figures identifying the sites with potential and recognized environmental conditions.

2.1 General Land Use Descriptions

2.1.1 [Project Location Corridor]

[Describe land use (i.e., ranging from residential to commercial, light industrial, and agricultural). Describe interchanges, residential areas, cities, rivers, mining operations, landfills, reservoirs, airports, industrial parks, state recreation areas, commercial facilities, retail centers, auto salvage yards, etc.]

2.1.2 [Railroad Corridor (if needed)]

[Describe land use (i.e., ranging from residential to commercial, light industrial, and agricultural). Describe interchanges, residential areas, cities, rivers, mining operations, landfills, reservoirs, airports, industrial parks, state recreation areas, commercial facilities, retail centers, auto salvage yards, etc.]

3. Historical Use

[Include the review of the historic aerial photographs, historic topographic maps, and historic Sanborn Fire Insurance Maps. Local street directories or other historical documentation of the land use and development in the project area may be investigated.]

To evaluate the past uses of the project area and identify any sites with potential environmental conditions, [company name] reviewed historic aerial photographs, USGS topographic maps, and Sanborn Fire Insurance Maps. **Table 3-1** summarizes the historical records reviewed. The objective of the historical review is to "establish a history of the previous uses of the property and surrounding area, in order to help identify the likelihood of past uses having led to recognized environmental conditions" (ASTM, 2021). Due to the large size of the [EIS/EA] regional study area, the historical review research focused on establishing a generalized description of land-use over time. **[Appendix C]** lists sites with potential environmental conditions identified during the historical use review. **[Appendix D]** contains figures identifying the sites with potential environmental conditions.

Table 3-1. Summary of Historical Records Reviewed [if needed]

Historical Record	Description
USGS Topographic Maps	USGS topographic maps have been prepared since the 1800s as part of the USGS mission to map the United States and survey its resources. Topographic maps show prominent and cultural features. These resources are useful in identifying topographic and cultural features and site development over a period of time.
Sanborn Fire Insurance Maps	Private companies have produced historical fire insurance maps for over 100 years. Historical fire insurance maps include information about buildings, such as building uses and locations at specified dates.
Aerial Photographs (reviewed at Colorado Aerial Photo Service)	Aerial photographs have been collected for the continental United States since the mid-1930s, with variable coverage and frequency (generally based on an area's importance to national defense). Aerial photographs offer an opportunity for direct observation of site conditions through a period of time. These observations may include the locations of tanks, drums, pits, ponds, lagoons, stained/stressed vegetation, or other site development features that can indicate potential contaminant sources.

3.1 Aerial Photographs

[Identify where the aerial photos were obtained, what year-intervals were requested, and what year-intervals were received. What are the oldest photographs available? List dates of photographs reviewed.]

The objective of the aerial review for this MESA was to identify major land use changes and features in the project area.

[Describe the project area history deduced from the aerial photographs, including a reference to **Table 3-2**.]

Table 3-2. Summary of Aerial Photo Review [if needed]

Date of Aerial Photo	Land Use Changes

3.2 Historical Topographic Maps

[Company name] reviewed available historical USGS topographic maps for the areas surrounding [project footprint]. The dates of the topographic maps ranged from [date to date].

Table 3-3. Summary of Historical Topographic Map Review [if needed]

Date and Scale	Description

3.3 Sanborn Fire Insurance Maps

[Company name] reviewed available historical Sanborn Fire Insurance Maps for the areas surrounding [project footprint]. The dates of the Sanborn Fire Insurance Maps reviewed ranged from [date to date].

Table 3-4. Summary of Sanborn Fire Insurance Map Review [if needed]

Date of Sanborn Map	Land Use Changes

4. Database Search and Site Screening

[Include the source and method of acquiring the environmental database information for sites within and adjoining the project area. **Table 4-1** lists databases searched and search radius used for each database. CDOT recommends extending the ASTM standard minimum search radii by 0.25 mile to 1 mile for MESA projects based on the Environmental Professional's discretion.]

[Company name] contracted ERIS, Inc. [insert other company if not ERIS] to conduct a database search of local, state, tribal, and federal environmental records for information relating to sites extending up to 1.5 miles from the project areas, as dictated by the ASTM Standard E1527-21. Database records searched prior to the implementation of the EPA All Appropriate Inquiry rule (i.e., data collected prior to 2006) included federal, state, and local records/sources, while data collected beginning in 2006 also included a search of tribal records. The ERIS reports are located in **[Appendix A]**. **Table 4-1** describes each database searched and the approximate minimum search distances.

Table 4-1. Database Description and Approximate Minimum Search Distances

Database	ASTM Approximate Minimum Search Distance* (mile)
Federal National Priorities List site list (NPL) — EPA's database of uncontrolled or abandoned hazardous waste sites identified for priority remedial actions under the Superfund Program.	1.5
Federal Delisted NPL Site List	0.5
Federal Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) and Federal CERCLIS No Further Remedial Action Planned (NFRAP) site list — EPA compilation of sites at which the potential exists for contamination originating from on-site hazardous substance storage or disposal. Sites designated as CERCLIS NFRAP indicate that No Further Remedial Action is Planned.	1.0
Federal RCRA Corrective Action (CORRACTS) facilities list — Sites identified as needing Corrective Action after a release of a hazardous waste or constituent into the environment from an RCRA facility.	1.5
Federal Resource Conservation and Recovery Act (RCRA) treatment, storage, or disposal (TSD) facilities — RCRA permitted TSD facilities.	1.0
Federal Resource Conservation and Recovery Act (RCRA) generators list — Facilities that are regulated based on current hazardous waste generation management activities.	0.75
Federal/State Emergency Response Notification System (ERNS) List — Database of public complaints and reports of unverified releases or incidents.	0.75
State and tribal-equivalent NPL	1.0
State and tribal-equivalent CERCLIS	0.5

Database	ASTM Approximate Minimum Search Distance* (mile)
State and tribal landfill (LF) and/or solid waste disposal (SWF) site lists — Inventory of solid waste and landfill facilities.	1.0
State and tribal leaking storage tank lists (LUST) — List of closed or unremediated reported LUSTs and CO Trust list — List of all complaint sites where there is no known responsible party.	1.0
State and tribal registered storage tank lists — Aboveground Storage Tank (AST)/Underground Storage Tank (UST) — List of sites that registered the presence of ASTs/USTs with the Colorado Department of Labor and Employment Division of Oil and Public Safety (CDLE-OPS).	0.75
State and tribal voluntary cleanup (VCUP) sites — Sites being addressed under the Colorado Department of Public Health and Environment (CDPHE).	1.5
State and Tribal Brownfield Sites	0.5
Drycleaners	0.25

*Approximate Minimum Search Distances varied for each corridor. The distance listed in this table represents the greatest distance search for each database. The specific search distances used were equal to or greater than the E1527-00/ASTM E1527-21 approximate minimum search distances.

Colorado Division of Natural Resources Office of Water Resources Registered Well database not searched.

Source: ASTM, 2021.

4.1 Site Screening

[Include methods used to screen environmental database records and determine which sites have the potential presence of contamination or could have an adverse impact on the project or alternatives. Include methods used to classify sites into risk categories (low, medium, high) and the circumstances requiring a detailed records review for a site. **Appendix B** shows an example table for sites selected for detailed review.]

Sites identified in the ERIS database record search were screened to determine which sites would potentially have the presence of contamination (existing or residual) from hazardous materials and could have an adverse impact on the project alternatives. The screening process consisted of identifying sites listed in the ERIS database report that lie within 1,500 feet of the proposed project right-of-way for each [alternative package]. Sites were identified as being less than 100 feet, 100 to 500 feet, 500 to 1,000 feet, or 1,000 to 1,500 feet of the project footprint.

The ERIS sites were then ranked with a high, medium, or low designation based on the distance from the project footprint and the type of site. The site ranking categories are defined as:

- **Low**: Sites with minimal indications of an existing release, past release, or material threat of a release of any hazardous substances or petroleum products into the ground (soil), groundwater, or surface water. Examples include residential sites or commercial sites with activities that do not require the use of hazardous substances or petroleum products (more than 55 gallons/year), Resource Conservation and Recovery Information System (RCRIS)

database hazardous waste generators with no reported violations, facilities with ASTs/USTs with no reported leaks or spills, and sites reported on the Facility Index System (FINDS).

- **Medium:** Sites with moderate indications of an existing release, a past release, or a material threat of a release of any hazardous substances or petroleum products into the ground (soil), groundwater, or surface water. Examples include RCRA hazardous waste generators with reported violations, sites reported on the Emergency Response Notification System (ERNS) list, and facilities with leaking underground storage tanks (LUSTs).
- **High**: Sites with indications of a known existing or past release of any hazardous substances or petroleum products into the ground (soil), groundwater, or surface water and the possibility for large-scale migration from the contaminant source. Examples include sites listed on the National Priority List (NPL) or Superfund, sites included on the Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS), RCRA permitted treatment, storage, or disposal (TSD) facilities, RCRA Corrective Action Sites (CORRACTS), sites in the Colorado Voluntary Cleanup program (VCUP), and State active and historical solid waste landfills.

Of the [number] ERIS sites identified within 1,500 feet of the project alternatives and having a potential impact on the project, [number] sites were ranked low; [number] sites were ranked medium, and [number] sites were ranked high.

A detailed records review was conducted for the sites within 100 feet of the project footprint with a medium and high ranking, sites within 100 feet to 500 feet of the project footprint with a medium and high ranking, and sites from 500 to 1,000 feet of the project footprint with a high ranking. Sites identified in the ERIS located greater than 1,000 feet from the project footprint were judged relatively unlikely to have impacts on project activities.

Table 4-2. Detailed Review Site Evaluation Matrix

Distance from Proposed Project Right-of-Way	Environmental Condition Classification — Low	Environmental Condition Classification — Medium	Environmental Condition Classification — High
Within 100 ft of the Project Area	Not recommended	Recommended	Recommended
Within 100 to 500 ft of the Project Area	Not recommended	Recommended	Recommended
500 to 1,000 ft from the Project Area	Not recommended	Not recommended	Recommended
Greater than 1,000 ft	Not recommended	Not recommended	Not recommended

[Appendix B] lists all sites selected for detailed review.

4.2 Detailed Records Review

[Describe individual sites that were further investigated due to their potential to impact the project area.]

The objective of the detailed records review was to examine available information regarding the extent of any known impacts from hazardous materials to soil, groundwater, and surface water associated with sites within the project area. The detailed review consisted of researching available CDPHE or CDLE-OPS records for information concerning properties with potential or recognized environmental conditions in the project area.

Many of the sites are closed LUST sites. A LUST site is defined as closed/cleanup complete when "the owner and/or operator has not necessarily removed all contamination, but instead actions taken have met the criteria that the state uses for determining adequate clean up." A CDLE-OPS no further action (NFA)/closure letter states that any contamination levels on-site are below state cleanup levels and that no further investigation or remedial action was required at the time the letter was issued.

Although a LUST site may be closed, residual soil and groundwater contamination may present a concern for worker health and safety and materials management.

Table 4-3 summarizes the CDPHE and CDLE-OPS soil and groundwater standards that are referenced in the following sections.

Table 4-3. Summary of Soil and Groundwater Standards

Constituent	Groundwater CGSs[1]	Groundwater RBSLs[2]	Soil – RBSLs[2] Subsurface Soil	Soil – RBSLs[2] Residential Surficial Soil	Soil – RBSLs[2] Industrial Surficial Soil
Benzene	5.0 µg/l	5 µg/l	0.26 mg/kg	2.8 mg/kg	6.8 mg/kg
Cis-1,2-Dichloroethene (also called dichloroethylene)	70 µg/l	–	–	–	–
Ethylbenzene	700 µg/l	700 µg/l	190 mg/kg	2,100 mg/kg	16,000 mg/kg
Methyl tertiary-butyl ether (MTBE)	–	20 µg/l	–	–	–
Perchloroethylene (PCE) (also known as tetrachloroethylene)	5 µg/l	–	–	–	–
Toluene	1,000 µg/l	1,000 µg/l	140 mg/kg	4,000 mg/kg	31,000 mg/kg
Trichloroethylene (TCE)	5 µg/l	–	–	–	–
Xylenes (total)	1,400 to 10,000 µg/l	1,400 µg/l	260 mg/kg	–	–
1,2 Dichloroethane	0.38 to 5 µg/l	–	–	–	–
Barium (dissolved) [3]	2.0 mg/l	–	–	–	–
Cadmium (dissolved)[3]	0.005 mg/l	–	–	–	–
Chromium (dissolved)[3]	0.1 mg/l	–	–	–	–
Lead (dissolved)[3]	0.05 mg/l	–	–	–	–
Mercury (dissolved)[3]	0.002 mg/l	–	–	–	–
Total petroleum hydrocarbons (TPH)	–	–	500 mg/kg	500 mg/kg	500 mg/kg

CGSs – Colorado Basic Standards for Groundwater
RBSLs – Risk-Based Screening Levels
µg/l – micrograms per liter
mg/l – milligrams per liter
mg/kg – milligrams per kilogram
MTBE – methyl tertiary-butyl ether
PCE – perchloroethylene
TCE – trichloroethylene
TPH – total petroleum hydrocarbons

References:

[1] Groundwater Organic Chemical Standards from Colorado Department of Public Health and Environment Water Quality Control Commission. 2020. 5 CCR 1002- 41, Regulation No. 41, The Basic Standards for Groundwater. Effective June 30, 2020.

[2] Tier 1 Risk-Based Screening Levels (RBSLs) from Colorado Department of Labor and Employment Division of Oil and Public Safety (OPS). Petroleum Storage Tank Owner/Operator Guidance Document. https://ops.colorado.gov/release-response/release-closure-criteria

[3] Domestic Water Supply – Human Health Standards from Colorado Department of Public Health and 02-41, Regulation No. 41, The Basic Amended November 8, 2004. Effective March 22, 2005.

The following sections summarize the findings of the detailed review of sites with potential and recognized environmental conditions identified within the project area.

[Describe all sites with potential and recognized environmental conditions within the project area. Include type of site (gas station, tractor dealership, etc.), regulatory status (LUST, UST, AST, FINDS, RCRA SQG, etc.), description of release, history of site (years of operation), dates of tank removal (and size), details of site investigations, details of remediation activities, if groundwater monitoring has occurred or is occurring, and lastly, if the site presents a liability and why (residual contamination encountered during subsurface activities could present a worker health and safety and materials management concern) or if the site does not present a liability and why.]

Historical landfill areas were identified near the project footprint and are listed in **Table 4-4**. [if needed]

Table 4-4. Additional Sites with Recognized Environmental Conditions [if needed]

Location	Use/Contents	Environmental Concerns
		Unknown groundwater contamination or potential methane
		Unknown groundwater contamination or potential methane

Due to the potential presence of methane gas associated with historic landfills, these sites present a potential explosion hazard and worker health and safety concern. Methane gas and other landfill gases can migrate along drains, trenches, and underground utility corridors or within natural subsurface geology up to distances over 1,500 feet.

A total of [number] sites with known hazardous materials spills (ERNS and/or Hazardous Materials Incident Report System [HMIRS] database sites) were identified within 500 feet of the project alternatives. [Number] of the sites are associated with the [project] and are listed in **Table 4-5**.

Table 4-5. Hazardous Materials Spills Sites [if needed]

Site Address

4.3 Additional Corridor-Wide Issues of Concern

[Discuss non-site specific concerns, such as heavy metal-based paint, asbestos-containing material, or oil and gas activity within the project area.]

4.3.1 Heavy Metal-based Paint

Heavy metals, such as lead and chromium, are hazardous substances that potentially exist on steel highway and railroad structures and/or bridges within the project area, particularly if they were constructed before 1980. Several federal statutes regulate heavy metals as either a hazardous substance, hazardous waste, toxic substance, or air contaminant. These regulations include the RCRA, Comprehensive, Environmental, Response, Compensation, and Liability Act (CERCLA), Toxic Substances Control Act (TSCA), and the Clean Air Act (CAA), under the National Emission Standards for Hazardous Air Pollutants (NESHAP) program. Due to the potential negative health impacts associated with heavy metals exposure, the presence of heavy metal-based paint presents a worker health and safety concern. Project personnel can be exposed to the toxic effects of heavy metals through inhalation or ingestion of heavy metal paint chips, dust, or debris during construction or materials management activities. Consequently, for purposes of this MESA, highway and railroad structures within the project area have been identified as sites with potential environmental conditions due to the potential presence of heavy metal-based paint, particularly if they were constructed before 1980, when heavy metal-based paints were widely used. Conducting a survey to determine the presence or absence of heavy metal-based paint was beyond the scope of this MESA.

4.3.2 Asbestos

Asbestos is a toxic substance that may exist on highway and railroad structures and buildings within the project area, particularly if they were constructed before 1980. Asbestos is regulated under the federal TSCA and CAA and presents a worker health and safety concern due to the potential negative health impacts associated with inhalation of asbestos fibers. Consequently, for purposes of this MESA, highway and railroad structures within the project area have been identified as sites with potential environmental conditions due to the potential presence of asbestos. Conducting a survey to determine the presence or absence of asbestos was beyond the scope of this MESA.

4.3.3 Oil and Gas Facilities

[Date, Company Name] conducted a site screening to determine the number of oil and gas facilities, including oil and gas wells, that could have potential impacts on project construction activities. The potential exists for subsurface releases or gas exploration, development, and production wastes (i.e., drilling fluids) and petroleum or gas products into surrounding soils and groundwater; however, these releases may not be directly visible/observable at the oil and gas facilities, or along the associated gathering and transmission pipeline. As a result, all oil and gas facilities/associated transmission lines that may be impacted or disturbed constitute a site with potential environmental conditions.

[Number] oil and gas facilities (existing and planned) were identified throughout the project area, as shown in **Table 4-6**.

Table 4-6. Oil and Gas Facilities within the Project Area [if needed]

Screening Distance	# of Wells*
1,000 to 1,500 feet	
500 to 1,000 feet	
100 to 500 feet	
Less than 100 feet	

*Additional oil and gas facilities may have been developed that could impact the project since the initial site screening was conducted.

5. Findings and Recommendations

[Revisit the methods and limitations of the MESA.]

[Company name] performed this MESA based on CDOT hazardous materials guidance (CDOT EPB, 2025) as modified from the ASTM Designation E 1527-21, "Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process" (ASTM, 2021) and EPA Standards and Practices for All Appropriate Inquiries [40 CFR Part 312] (EPA, 2023). Modifications to this guidance are presented in **Section 1.2**. Any findings and recommendations presented in this MESA are geared specifically to address the issues regarding hazardous materials that would affect a project planning, design, and construction project. This MESA has been prepared with a level of detail appropriate for the [project name] NEPA documentation and identifies sites with potential and recognized environmental conditions associated with the project area.

The findings and recommendations of this MESA must be viewed in recognition of certain limiting conditions. Results of this MESA are based on a limited visual site inspection, observation of current conditions within the project area, and review of readily available standard historical sources and environmental agency databases.

Due to limitations, the complete environmental history of sites within the project area may not be fully identified solely by the performance of site reconnaissance activities, historical, and agency document reviews. During this assessment, [company name] has relied on information provided by outside parties, such as regulatory agencies. [Company name] has made no independent investigations as to the validity, completeness, or accuracy of such information provided by third-party sources. For the purposes of this MESA, such third-party information is assumed to be accurate unless contradictory evidence is noted. [Company name] does not express or imply any warranty regarding information provided by third-party sources.

5.1 Findings

[Summarize the sites identified along the project area with potential environmental conditions and recognized environmental conditions. Due to the large number of sites, often **Appendix C** and **Appendix D** are referenced.]

[Appendix C] contains a table summarizing the sites with potential environmental conditions (PECs) and sites with recognized environmental conditions (RECs) identified along the project corridor. The recommended mitigation for each site with regard to the [project name] is also included in this table. **[Appendix D]** contains figures identifying the sites with potential and recognized environmental conditions.

5.2 Recommendations

[Make recommendations based on the hazardous materials findings. Recommendations commonly involve providing methods for addressing specifically identified hazardous material issues, recommend Health and Safety plans or Materials Management Plans, and provide information on meeting regulatory standards and requirements.]

Based on the findings of the MESA, [company name] makes the following recommendations.

5.2.1 Right-of-Way Acquisition

The process of identifying, evaluating, and mitigating hazardous waste during right-of-way acquisition is identified in Chapter 3 of the CDOT Right-of-Way Manual (CDOT, 2021). Projects requiring right-of-way or easements follow these guidelines to avoid, to the greatest extent possible, acquisition of contaminated property and to ensure protection for employees, workers, and the community before, during, and after construction. Right-of-way to be acquired may be modified during final design.

The right-of-way acquisition process for sites with potential and recognized environmental conditions includes three-steps (CDOT, 2021):

- **Initial Site Assessment (ISA):** The ISA is similar to a MESA or Phase I Environmental Site Assessment and involves site reconnaissance, historical land use review, and database search activities. An ISA is performed on properties to be acquired by or dedicated to CDOT. For properties that will be partially acquired for right-of-way, an ISA, based on CDOT Form #881 Initial Site Assessment Checklist and in accordance with CDOT hazardous materials guidance (CDOT EPB, 2025), should be performed. For properties that will be fully acquired for right-of-way, a site-specific Phase I Environmental Site Assessment, in accordance with ASTM E 1527-21, Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process (ASTM, 2021), EPA Standards and Practices for All Appropriate Inquiries [40 CFR Part 312], and CDOT hazardous materials guidance (CDOT EPB, 2025), should be performed. The Meth Lab ISA checklist should be used to assist in the assessment of properties for right-of-way acquisition (CDOT, 2024).
- **Preliminary Site Investigation (PSI):** The PSI is an investigation performed on properties with potential environmental conditions. A PSI involves a drilling/sampling and analytical program to establish preliminary information regarding environmental conditions on the property. The objective of the PSI is to assist in the decision-making process regarding the potential liability associated with acquiring a property and to provide information regarding health and safety issues for construction workers and the public. This process is often referred to as a Phase II Environmental Site Assessment.
- **Remedial Investigation/Feasibility Study (RI/FS):** The RI/FS is a detailed, comprehensive investigation that further delineates the magnitude of contamination on a property. The RI/FS details the mitigation and cleanup strategies and estimates the cost for the cleanup and mitigation of contaminated property. [Based on known conditions, no RI/FS was recommended for any property that would be acquired as part of the project.]

5.2.2 Removal of Structures/Obstructions

Pole-mounted electrical transformers were not identified as part of site reconnaissance activities. However, project plans and specifications will identify relocation of overhead electrical utility lines and pole-mounted transformers. Performance of the work set forth in the project plans and specifications will be conducted in accordance with any easement agreement between CDOT and/or private landowners. [if applicable]

All drinking water and groundwater monitoring wells located within the proposed construction area, including any that were not previously identified, will be abandoned and plugged according to CDOT Section 202.02 in Standard Specifications for Road and Bridge Construction (CDOT, 2023) and in conformance with the Colorado Department of Natural Resources Division of Water Resources

State Engineer Water Well Construction Rules, specifically Rule 16, "Standards for Plugging, Sealing, and Abandoning Wells and Boreholes" (Colorado Department of Natural Resources, 2018). [if applicable]

The Colorado Energy and Carbon Management Commission (CECMC) regulates the cleanup of oil and gas wells and associated facilities. The CECMC cleanup standard for petroleum contaminated soil is 500 ppm TPH in sensitive areas with the potential to impact groundwater (CECMC, 2024). A typical cleanup standard used by CDOT for materials management is the CDLE-OPS cleanup standard of 500 ppm TPH; therefore, CDOT would be responsible for cleanup of this soil. A Materials Management Plan (MMP) and a Health and Safety Plan, as required by Section 250.03 of the CDOT Standard Specifications for Road and Bridge Construction (CDOT, 2023), is also recommended for use when oil and gas facilities are encountered.

5.2.3 Contaminated Soil and Groundwater Management

Encountering soil and groundwater during construction without prior knowledge can potentially affect the project in terms of cost, schedule, and agency and public relations. An MMP, as required by Section 250.03 of the CDOT Standard Specifications for Road and Bridge Construction (CDOT, 2023), will be prepared for areas with known soil and groundwater contamination. Construction specifications will be written to include review of the MMP by the CDOT Regional Environmental Manager.

Structural excavation, such as caisson and retaining wall construction, may require the dewatering of contaminated groundwater. If dewatering is necessary, groundwater brought to the surface will be managed according to Section 107.25 of the CDOT Standard Specifications for Road and Bridge Construction (CDOT, 2023) and permitted by the CDPHE Water Quality Control Division, in accordance with Section 402 of the Clean Water Act.

5.2.4 Regulated Materials Clearance

Environmentally regulated materials may be present in buildings and structures that could be demolished as part of the project. Prior to demolition of any structures, an asbestos survey, heavy metal-based paint survey, and miscellaneous hazardous materials survey will be conducted at each parcel, where applicable. Regulated materials abatement will be conducted in accordance with Section 250, Environmental, Health, and Safety Management, of the CDOT Standard Specifications for Road and Bridge Construction (CDOT, 2023) and relevant Occupational Health and Safety Administration (OSHA) regulatory details. Basic regulatory requirements for the type of materials that may be encountered in the project area are summarized in this section.

5.2.5 AST and UST Management

Sites with ASTs and USTs will most likely be acquired for right-of-way for [Package __ and Package __]. In conjunction with final design, a detailed review of the CDLE-OPS files related to these properties would identify the results of any site investigations conducted, remedial systems or actions installed at the properties, and quarterly monitoring requirements. If any of these sites are identified as having active leaking tanks, coordination with CDLE-OPS would be required prior to parcel acquisition. If site characterization and/or remediation have not been completed, the CDLE-OPS may require CDOT to complete these activities after acquisition.

The OPS requirements may include:

- Removal of any ASTs/USTs
- Excavation and management of petroleum contaminated soil
- Modifications to or redesign of remediation systems
- Replacement of any monitoring wells destroyed during construction
- Long-term groundwater monitoring
- During the right-of-way acquisition process, additional properties may require similar actions depending on the results of the ISAs

5.2.6 Health and Safety Plans

Prior to construction activities, a Health and Safety Plan, as required by Section 250.03 of the CDOT Standard Specifications for Road and Bridge Construction (CDOT, 2023), will be developed. Construction specifications shall be written to include review of the Health and Safety Plan by the CDOT Regional Environmental Manager. In addition, some site-specific requirements may be applicable as discussed in this section.

5.2.7 Mine Gas Management [if needed]

Due to the potential presence of remnant methane gas associated with historic landfills, these sites present a potential explosion hazard and worker health and safety concern. Methane gas and other landfill gases can migrate along drains, trenches, and underground utility corridors or within natural subsurface geology up to distances over 1,500 feet.

If abandoned landfills or coal mines are present below and/or within 1,000 feet of construction activities, the Health and Safety Plan will need to include provisions for assessing and monitoring air quality at all utility trenches, drainage structures, and similar underground construction (i.e., caissons) areas before and during intrusive activities to ensure worker safety. Under 29 CFR Part 1926.651(g) Specific Excavation Requirements, Hazardous Atmosphere, OSHA requires testing the atmosphere of excavations greater than 4 feet in depth before employees enter the excavation where oxygen deficient (less than 19.5 percent oxygen) environments exist or could reasonably be expected to exist. OSHA also requires that precautions be taken to prevent employee exposure to atmospheres containing less than 19.5 percent oxygen and other hazardous atmospheres.

CDOT Specification 250.02 states that monitoring equipment shall be capable of meeting the set standards of one percent of the lower explosive limit for flammable gas with an instrument measurement increment of one percent and 19 percent oxygen with an instrument measurement increment of 0.1 percent.

5.2.8 Asbestos and Materials Containing Heavy Metal-based Paint

By law, all friable ACM must be removed from structures, including bridges, prior to demolition, and soils if encountered in excavated landfill or building debris, buried utilities, or other ACMs. The contractor performing the asbestos abatement must be licensed to perform such work and obtain permits from CDPHE. Improper abatement can lead to the release of asbestos in soils and the need for soil remediation.

Third-party certification is required to document that the abatement was completed in accordance with regulatory requirements. The certification is needed to obtain the demolition permits for the structures. All ACM must be bagged and labeled for transport and disposal at a facility permitted to accept ACM.

Heavy metal-based paint may need to be removed prior to demolition if the heavy metals are leachable at concentrations greater than regulatory levels. Where heavy metal-based painted surfaces would be removed via torching, additional health and safety monitoring requirements are applicable.

5.2.9 Other Regulated Materials

Prior to demolition, regulated materials must be removed from any structures and appropriately recycled or disposed. Bills of lading or waste manifests are usually completed to document proper management of these materials. Typical materials include PCB-containing ballasts, fluorescent bulbs, mercury-containing equipment (i.e., switches, meters), electronic equipment, containerized regulated liquids such as paints, solvents, oil, grease, hazardous materials, pesticides, and herbicides, and chlorofluorocarbon (CFC)-containing equipment (equipment must be emptied before equipment is removed).

6. References

[add references as needed]

American Society for Testing and Materials (ASTM). 2021. *ASTM Designation E 1527-21, Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process*.

Colorado Department of Natural Resources. 2018. *State Engineer Water Well Construction Rules*. Division of Water Resources. July 1.

Colorado Department of Transportation (CDOT). 2023. *Standard Specifications for Road and Bridge Construction*.

Colorado Department of Transportation (CDOT). 2024. *Right of Way Manual*. Chapter 3, "Right of Way Appraisals, Procedures, and General Information." May.

Colorado Department of Transportation Environmental Programs Branch (EPB). 2025. *Hazardous Materials Guidance*.

Colorado Geological Survey (CGS). 2003. Colorado Geological Survey Groundwater *Atlas of Colorado*. *Colorado Geological Survey Special Publication 53*. Prepared by Ralf Topper, K.L. Spray, W.H. Bellis, J.L. Hamilton, and P.E. Barkmann.

Colorado Energy and Carbon Management Commission (CECMC). 2024. Exploration and Production Waste Management 900 Series. December 15.

United States Environmental Protection Agency (EPA). 2023. *Standards and Practices for All Appropriate Inquiries, Final Rule*. Federal Register 70 (February 13): 66070-66113.

7. Signatures and Qualifications

The preceding report has been prepared in accordance with standard industry practice for performance of a Modified Environmental Site Assessment and includes the applicable portions of the procedures codified in ASTM 1527-21, Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process, U.S. EPA Standards and Practices for All Appropriate Inquiries, and CDOT hazardous materials guidance. The end user of this report may rely on the contents, findings, and conclusions to be accurate within the limitations stated herein. The report also complies with specific requirements supplied by the Client. [Company name] performed this work for the sole purpose of assisting in the evaluation of potential and recognized environmental conditions associated with the properties within the project area.

The following sections provide the qualifications of the Environmental Professionals who conducted this Modified Environmental Site Assessment.

[Environmental Professional's Name]

[Education]

[Training]

[Biography including years of experience and other projects completed]

_____ [signature block]
Qualified Assessor / Report Preparer

[Name]

[Title]

[Repeat as many times as needed.]

Appendix A. ERIS Reports

Appendix B. Summary of Sites Selected for Detailed Review

Parcel No.	Site Address	Distance Screening	Identified Concerns	Potential Environmental Concern Rating	Selected for Detailed Review	Alternative Package [ ]	Alternative Package [ ]

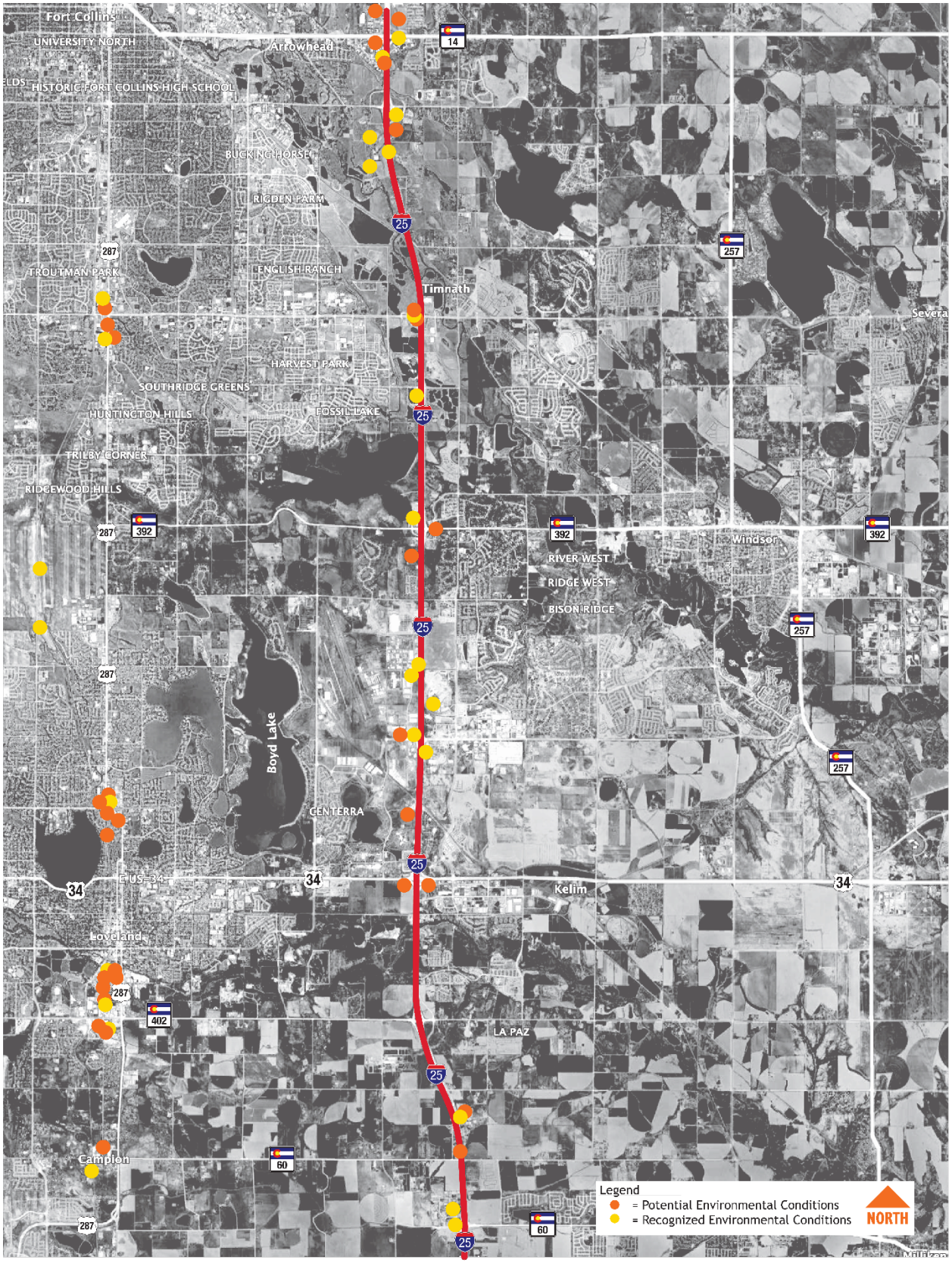
Appendix C. Summary of Sites Selected for Detailed Review

Note: PIN = Parcel Identification Number ISA =Initial Site Assessment
PSI = Preliminary Site Investigation H&S = Health and Safety MMP = Materials Management Plan

PIN	Type of Condition	Site Description	Site Name	Site Address	ISA	PSI	H&S and MMP

Appendix D. Figure of Sites with Potential and Recognized Environmental Consequences

[Example Below]



Appendix H. Phase I Environmental Site Assessment Report Template

Adapted from the ASTM Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process E 1527-21.

Table of Contents

8. Non-Scope Services

[This section presents a summary of the additional services beyond the ASTM required services.]

9. Appendices

[This section contains supporting documentation and the qualifications of the environmental professional and other personnel who may have conducted the site reconnaissance and interviews.]

Appendix I. Phase II Environmental Site Assessment Report Template

Adapted from the ASTM Standard Practice for Environmental Site Assessments: Phase II Environmental Site Assessment Process E 1903-19.

Table of Contents

9. Tables (as applicable)

a. Samples Collected
b. Test Screening Data
c. Monitoring Well and Water Level Measurements
d. Soil Analytical Data
e. Groundwater Analytical Data
f. Other Media Analytical Data

10. Figures (As applicable)

a. Site Location Map
b. Site Plan with Likely Release Areas and Exploration Locations
c. Groundwater Contour Plan with Inferred Groundwater Flow Directions
d. Geologic Cross-Section
e. Site Plan with Chemical Testing Results

11. Appendices (As applicable)

a. Prior Assessment Reports
b. Selected Reference Documents
c. Photographic Log
d. Subsurface Exploration Logs and Monitoring Well Construction Details
e. Laboratory Reports with Quality Control Information

Appendix J. Quality Assurance/Quality Control Checklist For Hazardous Materials Assessments

CDOT Environmental

Hazardous Materials Assessment Checklist

Instructions for Use: This checklist is to be completed by the CDOT EPM or regional/region hazardous materials specialist upon receipt of the Hazardous Materials Assessment packet from the Environmental Professional who prepared the documentation. The CDOT EPM or regional hazardous materials specialist should complete this checklist before approving the Hazardous Materials Assessment and signing off on Form #128b.

Project No.:	Project Name and Location:	
Control No.:	Date of Review:	This form was completed by:

No.	Task Description or Questions (Check Yes, No, N/A for completion)	Yes	No	N/A	If No, Define Corrective Action	Details or Information Used to Verify Content	Additional Comments
1.	Are the Project Name, Project Number and Control Number correct?	☐	☐	☐			
2.	Are all required supporting documents to the Memo included (Visual Reconnaissance Form, Photolog, database search results, map)?	☐	☐	☐			
3.	Was the review prepared by or QA/QC'd by a CDOT defined Environmental Professional?	☐	☐	☐			
4.	Is the Environmental Study Area shown on a map in relation to the limits of construction and in relation to the sites identified?	☐	☐	☐			
5.	Based on map and database search, were the appropriate search radii used to evaluate the project area (search radii based on CDOT HazMat Guidance)?	☐	☐	☐			

No.	**Task Description or Questions** (Check Yes, No, N/A for completion)	Yes	No	N/A	If No, Define Corrective Action	Details or Information Used to Verify Content	Additional Comments
6.	Have the CDPHE PFAS mapping layers been reviewed? Has the PFAS data within the database report been reviewed and verified?	☐	☐	☐			
7.	Has the topographic gradient for the project area been identified?	☐	☐	☐			
8.	If the project is a bridge replacement or repair project, is there evidence of potential LBP? If so, was the standard commitment included in the Summary Memo?	☐	☐	☐			
9.	If there are structures on-site that will be impacted by construction, is there potential for Asbestos Containing Materials (ACM)? If so, was the standard commitment included in the Summary Memo?	☐	☐	☐			
10.	If there are moderate or high-risk sites identified, does the Summary Memo explain if or how construction may or may not be affected?	☐	☐	☐			
11.	If there are no moderate or high-risk sites identified, does the Summary Memo explain how this is known?	☐	☐	☐			
12.	Based on the evaluation, is the recommendation appropriate?	☐	☐	☐			
13.	If, based on the evaluation, a more detailed assessment is required, does a subsurface investigation need to be completed? If so, has this been done?	☐	☐	☐			

No.	**Task Description or Questions** (Check Yes, No, N/A for completion)	Yes	No	N/A	If No, Define Corrective Action	Details or Information Used to Verify Content	Additional Comments
14.	Have the moderate and/or high-risk sites that were listed throughout the Memo been addressed by an Environmental Commitment to be carried forth into the NEPA CatEx document Block 18b?	☐	☐	☐			
15.	Are the environmental commitments stated in such a way that a responsible party is identified for carrying out each required activity (who, what, when, where, etc.)?	☐	☐	☐			

Appendix K. Materials Management Plan Template

Materials Management Plan
Draft Template

Project Name
Project Location/Address

Prepared for:

Name
Address
City, State, Zip Code

Prepared by:

Name
Address
City, State, Zip Code

Month Yea]

Add additional project information and photographs as needed to the title page

Note: This is a generic MMP template, and it must be tailored to be site- or project-specific based on initial investigations/findings or SOW/task-specific based on the guidance of the Environmental Professional and project team.

Table of Contents

Attachments

[Possible attachments include Site Location, Soil Analytical Results, Groundwater Analytical Results, Groundwater Potentiometric Map, Area of Potentially Contaminated Soil, Area of Potentially Contaminated Groundwater]

List of Figures

List of Tables

1. Introduction

[Include project location, current use, planned site use/redevelopment, who the work is being conducted for, general scope of work to be performed/planned soil and or groundwater disturbing activities, and generally why the MMP is needed.]

Figure 1-1. [Title]

2. Purpose

[Modify the following example language to meet project-specific needs.]

The purpose of this Materials Management Plan (MMP) is to provide a guidance document to manage contaminated materials, if encountered, during site development. The MMP is designed to minimize worker exposure to potentially contaminated material, minimize the potential of releases to the environment, facilitate proper disposal of materials developed during construction activities, and specify the quality of imported fill material. The general contractor is responsible for following all appropriate regulations, obtaining the proper permits, and incorporating environmental information from this MMP into their safety plan. The general contractor is also responsible for providing this MMP to its staff and subcontractors and for compliance with the MMP. Through implementation of this MMP, CDOT will be notified immediately of potential environmental-related findings pertaining to construction activities at the site.

3. Project Contacts

[Modify the following example to meet project-specific needs.]

Table 3-1. Example List of Contacts

Organization	Role/Responsibility	Contact Information
Colorado Department of Transportation, and [list the specific department]	CDOT Project Engineer [additional information as needed]	Name Organization Office phone number Cell number Email
Colorado Department of Public Health and Environment	Environmental Quality Technical Oversight	Name Organization Office phone number Cell number Email
[Name of General Contractor]	General contractor, construction project management; immediate notification to CDOT of potential environmental concerns	Name Organization Office phone number Cell number Email
[Name of Major Subcontractors (as needed)]	[Example: Dewatering contractors under general contractor; immediate notification to CDOT of potential environmental concerns]	Name Organization Office phone number Cell number Email
[Name of Environmental Firm]	Materials Management Plan implementation; immediate notification to CDOT of unknown/unidentified environmental concerns	Name Organization Office phone number Cell number Email

4. Environmental Responsibilities

The project team, either via the CDOT project engineer or the general contractor, will hire an environmental firm to have a trained Environmental Professional onsite to implement the MMP. [The following examples of responsibilities should be edited to meet project-specific needs.]

- Environmental Professional responsibilities:
  - Be a competent individual experienced with a) field identification of potentially contaminated material and potential environmental finds (e.g., abandoned underground storage tanks, asbestos awareness), b) characterization, c) management, and d) disposal.
  - If needed for the project, a Certified Asbestos Building Inspector (CABI) will be trained and certified in accordance with Air Quality Control Commission Regulation No. 8, (5 Code of Colorado Regulations [CCR] 1001-10, Part B) with 40 verifiable hours of on-the-job asbestos in soils experience on a minimum of three asbestos soils projects.
  - Be onsite when work is conducted within areas of known or suspected contamination as identified in **Section 5, Environmental Background**, of the MMP. Be on call when work is conducted outside those areas.
  - Perform field screening in adherence to the MMP.
  - Complete daily field notes.
  - Track and/or sign tickets and manifests for material hauled offsite for either reuse or disposal.
  - Ensure adherence to the MMP.
  - Provide daily updates to the CDOT project engineer.
  - Notify CDOT project engineer immediately of any unexpected environmental conditions.
- General contractor responsibilities:
  - Provide all necessary equipment and personnel (i.e., health and safety officer, foreman, laborers, etc.) to implement the MMP.
  - Coordinate with the Environmental Professional and the CDOT project engineer before beginning work to review the implementation of MMP requirements.
  - Provide asbestos awareness training to site personnel who will conduct soil work.
  - Adhere to the MMP.
  - Ensure that their subcontractors adhere to the MMP.
  - Ensure that disposed nonhazardous and solid material go to a CDOT approved landfill.
  - Ensure that waste material is not disposed on site, in storm drains, in sanitary sewers, in streams, or in other waterways.

4.1 Project Health and Safety Plan

Workers and managers associated with intrusive site activities will be required at a minimum to undergo a one-time health and safety orientation meeting at the start of the project, such as a brief onsite description of site conditions or in coordination with asbestos awareness training. A site-specific safety management plan will be prepared as required by the construction contract, and it will incorporate information as required by 29 Code of Federal Regulations (CFR) 1910 and 29 CFR 1926. The general contractor may share its plan with its subcontractors or require each subcontractor to prepare its own plan.

5. Environmental Background

[Describe the environmental issues/concerns associated with the site and their current status. For example, this section may describe historical gasoline stations and current cleanup actions, fill material, historical urban fill, past disposal of coal-based fill material, building debris with potential asbestos material, potential for asbestos in soil, and known or potential soil and groundwater contamination.]

[Provide figures and maps as needed to show the areas where these environmental concerns may be encountered during redevelopment work. The more the MMP can define the area and depth of known contaminated material, the more streamlined the field process may be.]

6. Materials Management

[Examples of information are provided below for dust, soil, construction debris, stormwater, groundwater, historical urban fill debris, asbestos, other miscellaneous wastes, and disposal. However, the materials of concern subsequent subsections will be project-specific. Summarize the project-specific materials of concern and then discuss in detail below.]

[Include the following statement in the MMP.]

If **unknown/unidentified** underground storage tanks, drums, odorous soil, stained soil, asbestos-cement pipe, Transite, building debris, or waste materials are encountered during the project, the general contractor shall immediately stop work in the area of the discovery and immediately notify the CDOT project engineer of the discovery. Following discussions with the CDOT project engineer, additional characterization, remediation, and/or analyses may be required. Work may continue in other areas of the project site while the discovery is resolved.

6.1 Dust

[Include the following statement in the MMP.]

The general contractor shall take reasonable measures to prevent particulate matter from becoming airborne and to prevent the visible discharge of fugitive particulate emissions beyond the property boundary on which the emissions originate. The measures taken must be effective in the control of fugitive emissions at all times on the site, including periods of inactivity such as evenings, weekends, and holidays, as well as any other period of inactivity.

Additionally, the general contractor will determine if the minimum requirements for an Air Pollution Emissions Notice (APEN) in accordance with 5 CCR 1001 – Air Quality Control Commission are met and obtain the permit if required. Such requirements may include whether the project site is less than 25 contiguous acres and whether site work will be less than 6 months in duration.

6.2 Soil

[Soil may be excavated from a project site possibly due to contamination or excess soil, and the initial paragraph(s) for this section should summarize when soil will be generated at the project site (e.g., excavation, caisson drilling, etc.). Soil excavation procedures must include the following text:] If debris other than household trash, landscaping debris or natural rock are encountered during excavation activities, then work must stop immediately in the area of discovery. A CABI will need to determine if the excavated debris contains Regulated Asbestos Contaminated Soil (RACS). Refer to **Section 6.7** for additional information concerning RACS.

6.2.1 Soil Management

[Review the project-specific types of contaminated soil that may be encountered, when samples should be collected, analyses needed, criteria for determining when soil must be disposed, manifesting, field screening protocol, stockpiling soil, and disposal. It is assumed that the project has conducted Phase II type environmental investigations.]

CDOT's general approach for managing soil is as follows and should be incorporated into the site-specific MMP as appropriate.

Clean Soil

- Reuse onsite
  - No testing is required, but an Environmental Professional will be onsite to verify that there are no field indications of contamination or construction debris.
- Export offsite
  - **To another City property**: An initial sample will be collected for laboratory analysis of site-specific constituents of concern. Additional samples will be collected for analyses when there is a change in soil characteristics. An Environmental Professional will be onsite when the soil is either stockpiled or direct loaded into trucks to verify that there are no field indications of contamination or construction debris.

    To a third party's property: Soil samples, representative of the site, will be collected every 500 cubic yards or as determined by the CDOT project engineer for analysis of an extensive list of potential contaminants per the City's guidance document (see **Attachment X**). An Environmental Professional will be onsite when the soil is either stockpiled or direct loaded into trucks to verify that there are no field indications of contamination or construction debris.

  - Material is considered suitable for offsite reuse if a) laboratory analytical results meet the Colorado Department of Public Health and Environment (CDPHE) residential standards and the CDPHE guidance for arsenic, and b) field observations indicate no construction debris and no contamination (e.g., no odor, no staining, and field measurements representative of background conditions).
- Disposal
  - A representative soil sample will be analyzed for the site-specific constituents of concern, and CDOT will obtain the approval for disposal at an approved landfill. The landfill will accept soil as "clean" when it is free of contaminants, debris, organic material, and objects greater than 6-inches in any dimension.

Imported Soil

[If fill material will be brought onto the site, the following language must be included in the MMP.]

Any fill material or soil to be moved to and placed on CDOT-owned property or placed on real property to be transferred to CDOT must be free of known contamination (observed or previously documented) and be acceptable for unrestricted residential use.

Contaminated Soil

Soil containing debris or constituents at concentrations exceeding residential standards is not available for unrestricted reuse on the project site or other city-owned properties without approval from the CDOT project manager. If soil is known or suspected of being contaminated, the following steps should be followed:

- Known contamination
  - Areas of known contamination will be documented during pre-construction environmental investigations, and maps/figures of these areas will be included in the MMP.
  - The contaminated soil will be analyzed for the site-specific constituents of concern during the investigation work.
  - CDOT will prepare disposal profiles and obtain disposal manifests.
  - Each type of contaminated soil (e.g., petroleum, asbestos, historical urban fill, etc.) requires its specific manifest; they are not interchangeable.
  - When known contamination is encountered during construction work, it may either be temporarily stockpiled or directly loaded and hauled to the CDOT approved landfill with the appropriate manifest.
  - Additional sampling and laboratory analytical results are not required for this known contamination unless field observations indicate a change in the type of contaminants. The need for and type of analyses will first be discussed with CDOT.
- Unanticipated soil contamination
  - If field indications of soil contamination are encountered outside the area of known contamination, and CDOT concurs that the field characteristics indicate that it is the same type of soil as the known contamination, then the soil will be disposed using the previously obtained manifests. No additional testing will be required.
  - Whenever different types of contamination are encountered based on field observations, work will temporarily stop in that immediate area so that the soil may be sampled and analyzed. The types of constituents to be analyzed will be discussed with CDOT and typically rushed results will be requested from the laboratory. Work in the immediate area may be stopped pending receipt and review of laboratory data.
  - If potential asbestos-containing material or RACS is encountered by the asbestos-awareness trained personnel, work must immediately stop in the area. A CABI will be called to the site to conduct sampling as discussed later within this MMP and within the attached document “Asbestos-Contaminated Soil Standard Operating Procedure.”
  - As determined by the CDOT project engineer, either CDOT or the general contractor will prepare the disposal profile and obtain the manifests for disposal at the CDOT-approved landfill.

6.2.2 Field Screening Protocol

Field screening will consist of monitoring the soil for odors, headspace, ambient air measurements, and staining that does not include natural variations such as mottling or iron staining. For headspace readings, a soil sample will be placed in a sealed lock-tight plastic bag or equivalent container until volatile constituents equilibrate inside the bag. The headspace will be measured

using a photoionization detector (PID). A headspace reading of 50 parts per million (ppm) or less is considered to represent background conditions. If work is conducted within historical urban fill, then methane readings of the work-space will also be monitored with a flammable gas monitor. Monitoring will be performed in and downwind of work areas. If PID readings exceed 50 ppm or methane readings at or exceeded 5% of the Lower Explosive Level (LEL), then work in that immediate area will stop and appropriate action taken to mitigate the threat.

6.2.3 Soil Sampling Protocol

Samples for laboratory analytical analyses may be collected using equipment such as a backhoe, hand-auger, or sampling spoon. To eliminate loss of potential volatile organic constituents (VOCs), samples will be collected from newly excavated side walls, excavation floor, or several inches beneath the surface of stockpiled soil. If composite soil samples are collected, representative subsamples will be placed in a mixing bowl and thoroughly mixed except those samples for VOC analysis. For VOCs, portions of the subsamples will be placed directly into the sample container. Soil samples will be placed into clean laboratory-supplied containers, capped, labeled, and placed in ice-chilled containers for transport to a certified laboratory under strict chain-of-custody protocol.

6.2.4 Stockpiling Soil

Soil that is known or suspected to be contaminated may be stockpiled onsite; however, it must be placed on 6-mil or greater plastic sheeting. Clean soil that is stockpiled is not required to be placed on plastic sheeting. Stockpiled soil must be managed, such as by covering with plastic sheeting, to prevent dust. Additionally, stormwater best management practices (BMPs) will be implemented to prevent runoff.

Stockpiled soil that is saturated (e.g., excavated from below the water table) will be placed on 6-mil plastic sheeting that is sloped to collect the water in a plastic-lined sump. Accumulated water will be sampled, if not previously sampled, and disposal options will be reviewed with the CDOT project engineer.

Stockpiled soil should be within fenced areas (i.e., within the project site fenced area) to limit unauthorized access. The number of onsite stockpiles and the length of time they are onsite should be held to a minimum.

6.3 Construction Debris

Prior to demolition activities, an Environmental Professional and/or a CABI should evaluate construction material, whether as a still-standing building or observed as remnants buried in the subsurface, for the presence of regulated building materials.

If, prior to excavation, existing buildings will be demolished and debris removed from the site, the general contractor will at a minimum:

- Obtain a building demolition permit from CDPHE Air Quality Control Division
- Remove Asbestos Containing Building Material, except for Category I nonfriable ACM from buildings
- Inspect the footprint and surrounding areas of the former building for ACM

If the material is free of heavy metal-based paint and asbestos, it may be recycled if deemed appropriate by the CDOT project engineer. If it is disposed of, it must go to an approved landfill.

6.4 Stormwater

The general contractor will obtain a General Permit for Stormwater Discharges Associated with Construction Activity from CDPHE Water Quality Control Division. This is also referred to as the Colorado Discharge Permit (CDPS) number COR400000. Per CDPHE, "Storm water Construction Permit coverage is required by State and Federal regulations for storm water discharged from any construction activity that disturbs at least one acre (or is part of a larger common plan of development or sale that will disturb at least one acre)." The general contractor is responsible for complying with the permit.

6.5 Groundwater

When redevelopment activities encounter groundwater, the CDOT project engineer, with assistance from the environmental consultant, will determine whether offsite disposal, potential reuse onsite, or obtaining a permit and treating the water onsite is most feasible for the project. Project specific groundwater laboratory analytical results are required to make this determination and to assess which permit may be obtained.

Most CDOT projects will require either (1) a Colorado Discharge Permit (CDPS) COG080000 Discharges from Short-term (<2 years) Construction Dewatering Activities or (2) a CDPS COG317000 Discharges from Short-term (<2 years) Remediation Activities. CDPHE Water Quality Control Division issues both permits.

Generally, COG080000 permits are issued only if it can be proven that the project site and surrounding area have no environmental concerns. COG317000 permits are issued when there are onsite and/or area environmental concerns and when groundwater quality does not meet the numeric standards of the receiving surface water, even if the groundwater concentrations represent background conditions.

The general contractor is responsible for ensuring that water is managed in accordance with applicable federal, state, and local regulations and for meeting all requirements of a permit. The general contractor cannot discharge groundwater to a public stormwater system without obtaining the proper permits.

6.6 Historical Urban Fill Debris

Historical urban fill may be encountered during CDOT construction activities. Most of these historical urban fill areas contain construction and demolition debris and/or household trash. At these locations, the historical urban fill debris may be excavated and disposed at the CDOT approved landfill after first obtaining the landfill approval and manifests. Sampling and laboratory analysis are typically not required under this scenario.

During excavation, a CABI will be onsite to observe and ensure that suspect RACS are identified and appropriate action taken prior to disposal. RACS may be present as individual pieces of asbestos wrapped pipe, Transite, or debris (**Section 6.7**). However, asbestos may also be found in certain types of ash layers within historical urban fill areas and is considered RACS. If it is found in these ash layers, then the project must implement the CDPHE Asbestos-Contaminated Soil Guidance Document for asbestos containing soil and prepare a separate BMP document for CDOT and CDPHE approval before beginning site work and included as part of the MMP. The BMP may be written so that the asbestos ash layers are segregated and managed as RACS.

Examples of non-RACS environmental materials of concern in historical urban fill areas include drums, batteries, electronic waste, auto bodies, tires, medical waste, pesticide containers, and stained or odorous soil. These materials may be screened, sampled, and stockpiled as described in **Sections 6.2, 6.3**, and **6.4** until they are characterized for disposal.

6.7 Asbestos In Soil

[Include the following language in the MMP.]

In the event that RACS, as described in the CDPHE 6 CCR 1007-2 Part 1 – Regulations Pertaining to Solid Waste Sites and Facilities, Section 1.2 Definitions and Section 5.5 (Management of Regulated Asbestos-Contaminated Soil (RACS)), effective January 14, 2015, is encountered during soil disturbing activities, the CDPHE Asbestos-Contaminated Soil Guidance Document (CDPHE, 2007) will be followed. Any changes to the implementation of the soil guidance document would be done under a notification to CDPHE (24 hour or 10 days) for their approval. The notification to CDPHE addressing compliance with the new rules or specific project circumstances can be submitted via the project's environmental consultant or the CDOT project engineer.

6.8 Infectious Waste

The proper management of infectious wastes begins with identification. Given that the potential infectious wastes are associated with historical urban fill, it is likely that waste materials will not have many of the common identification, labeling, and containerization characteristics observed with medical wastes today. The following information has been provided to aid the general contractor and Environmental Professional in identifying potentially infectious wastes. The CDOT project engineer and CDPHE will be notified if infectious waste is encountered.

EPA, Centers for Disease Control (CDC), and OSHA all have recommended classifications to deal with potentially infectious waste matter, with the primary emphasis being medical wastes. Based on EPA's classification, the following materials should be treated as infectious wastes:

- Isolation wastes
- Cultures, stocks and associated biologicals
- Human blood and blood products
- Pathological wastes like body parts, tissues, organs, and fluids removed during surgery, pathology or biopsy
- Sharps (edged or pointed metal, glass, or plastic medical equipment) such as hypodermic needles, syringes, intravenous needles, scalpel blades, lances, disposable pipettes, capillary tubes, laboratory equipment, glass slides, test tubes, and broken glass
- Animal carcasses, body parts, and bedding
- Personal protective equipment, swabs, pipettes, spreaders, gloves, specimen and culture containers, cups, petri dishes, and flasks
- Laboratory waste such as intravenous tubing, drainage tubing, pouches, dressings, disposable filters, towels, aprons, gowns, bedding, pads
- Dialysis unit wastes

If field monitoring during construction work in fill areas uncovers any of the aforementioned materials, they will be managed as infectious wastes. Following identification of waste materials, the work in the immediate area will be suspended to properly profile the waste for disposal per CCR 25-15-403.

- Restrict access to the infectious waste with fencing or other material.
- Wet the waste to reduce potential for airborne migration of materials.
- Excavate, log, and containerize the infectious waste. Once placed in appropriate containers, label the infectious waste and place it in a secured storage area until removal by a registered infectious waste management company.
- Individuals involved in excavating, identifying, and segregating infectious waste will wear personal protective equipment appropriate to the type of infectious waste encountered. At a minimum, all workers involved in identifying and segregating infectious waste will wear disposable overalls and booties, disposable gloves, work boots, and clear plastic full face mask.

6.9 Other Special Wastes

Special wastes could include items such as drums, chemical or fuel containers, batteries, tar, sludge, slag/coal/ash, materials that are hazardous waste, and potential polychlorinated biphenyls (PCBs) containing equipment (transformers, light ballasts, voltage regulators, capacitors, and circuit breakers). These materials may be present in small quantities and can be difficult to characterize. Upon identification of special wastes, excavation at that immediate location will cease until the Environmental professional can complete additional assessment as coordinated with CDOT. The Environmental Professional will attempt to assess special wastes, including prudent and safe observation for the following:

- Markings and or labels on containers/drums, condition of the containers/drums (i.e., rust, holes, damage, corrosion), and other indications of contents
- Indications of unsafe conditions, including swelling drums, leaking, fumes, odors, etc.
- Conditions of materials associated with the special wastes
- Assessment for evidence of release, obtained by using field instruments (i.e., PID, LEL) and professional judgment

Only under the direction of the environmental professional and after discussions with the CDOT project engineer will handling of any special wastes be completed. When handling is required, the following precautions will be taken:

- Handling will be minimized whenever possible.
- When necessary, handling will be employed by mechanical means including the use of site excavation equipment.
- Pressurized/swelling drums, suspected explosives, potential shock-sensitive materials, or other potentially dangerous items will not be handled until a person with appropriate experience with these situations has been consulted.
- All special wastes will be placed on 6-mil plastic sheeting and covered until the Environmental Profession completes additional assessment (the time frame will allow for laboratory testing and obtaining a profile and manifest for disposal).

- All stockpiles of special waste will be covered immediately or containerized and will remain covered or containerized until final removal.
- The Environmental Professional will further evaluate suspicious materials. When additional assessment of this material indicates that the material does not meet applicable regulatory requirements for disposal as a non-hazardous waste, the Environmental Professional and the CDOT project engineer will arrange for offsite disposal at a licensed facility.
- Where the Environmental Professional and CDOT determine suspicious material is non-hazardous through additional assessment, the material may be disposed as non-hazardous solid waste.

Waste may be hazardous if it contains a listed hazardous waste or enough hazardous constituents to exhibit a hazardous waste characteristic. Listed wastes are discussed in 6 CCR 1007-3 Part 261 Subpart D. Testing and disposal will be coordinated with the CDOT project engineer.

6.10 Monitoring Wells

If groundwater monitoring wells could be encountered during excavation and construction activities, then the following procedures will be followed.

Work will be conducted around monitor wells so as not to disturb their construction. If this is not possible, the well will be properly abandoned in accordance with the CDOT Standard Specification rules and then replaced after construction if required, as coordinated and conducted by the Environmental Professional. CDOT will be notified and provided coordinates and construction details of monitoring wells to be abandoned.

6.11 Disposal

[Include the following language in the MMP.]

The general contractor shall direct non-recyclable, non-hazardous solid wastes from the CDOT-owned or controlled property or facilities to an approved landfill for disposal.

As determined by the CDOT project engineer for the site, either the general contractor or CDOT may a) set up the disposal account with the CDOT approved landfill, b) complete the waste profile forms, and c) obtain manifests from WM for the CDOT approved landfill. As practical, the material will be profiled, and manifests will be obtained before site work begins.

If the soil is determined to be hazardous based on the analytical data, then special waste management and disposal options will be discussed with the CDOT project engineer. Hazardous, liquid, and slurry waste cannot be disposed of at the CDOT approved landfill.

7. Decontamination

Equipment that has come into contact with contaminated material, such as RACS, will be decontaminated before leaving the site to minimize the potential of contaminating offsite properties. Decontamination procedures will include using hand tools such as shovels, brooms, and brushes to remove the material from the equipment. If the Environmental Professional determines it to be necessary, the equipment will be further decontaminated with a pressure washer. The spent decontamination water will be collected in plastic-lined basins and pumped into water-tight containers. The general contractor will be responsible for analyzing the wastewater and coordinating with CDOT to dispose of the decontamination water.

8. Complaints

The general contractor will immediately report to the CDOT project engineer any complaints. Additionally, any environmental-related complaint, such as noise, odor, or dust, will be immediately reported to the CDOT project engineer. Complaints should be addressed within 24 hours.

9. Site Security

10. Reporting

The Environmental Professional will complete a summary report outlining the implementation of this MMP, which will include the following:

- Description of the work completed
- Summary of the Environmental Professional onsite observations
- Electronic deliverable of field observation log book(s)
- Summary of materials that were managed and the procedures used
- Quantities and disposition of materials managed
- Description of field and laboratory sampling and results
- Waste manifests
- Maps showing the locations of pertinent features
- Labeled site photograph
- Any other pertinent project information

Attachment A. [Title]

Attachment B. [Title]