


EPA Region 8 Site Assessment Sampling and Analysis Plan				
	Site Name:	Highway 24 Mill Site Inspection	SSID:	B8E5
	City, State	Colorado Springs, Colorado	EPA ID #:	CON000821192
	EPA Site Assessment Manager:	Ryan Dunham	Contract TO/TD:	68HE0820D0001 / 2083-2301-08
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	Prepared by:	Tetra Tech, Inc., START V, Brian Croft, Matt LaFemina	Revision Number:	2
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	<p>The Sampling and Analysis Plan (SAP) is implemented under the Region 8 Site Assessment Quality Assurance Project Plan (QAPP), dated March 2023. The SAP provides site-specific details that supplement, and are used in combination with, the Site Assessment QAPP (Tetra Tech 2023a) and the Region 8 Superfund Technical Assessment and Response Team (START) V SA and Targeted Brownfields Assessment (TBA) Data Management Plan (DMP) (Tetra Tech 2022a).</p>			

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1.0 Approval Page

Title	Name	Signature & Date
EPA DAO/ Site Assessment Manager	Ryan Dunham	
START Project Quality Assurance Manager	Rob Tisdale	
START Project Manager	Matt LaFemina	

Notes: DAO = Delegated Approving Officer; EPA = U.S. Environmental Protection Agency; START = Superfund Technical Assessment and Response Team

2.0 Project Management

Tetra Tech, Inc., (Tetra Tech) provides project management services for this project under the Superfund Technical Assessment and Response Team (START) contract and in accordance with an EPA-approved Site Assessment (SA) QAPP (Tetra Tech, 2023a). Key personnel having site-specific roles and responsibilities are listed in Section 2.1. A full organizational chart for Site Assessment projects can be found in Section 2.0 of the QAPP. Analytical services are being provided by certified laboratories under the EPA Contract Laboratory Program (CLP).

2.1 Project/Task Organization

The primary personnel supporting this project and their roles are listed below. Check marks indicate SAP distribution.

Organization	Title	Name & Contact	SAP Recipient
EPA	WAM/SAM/OSC/COR	Ryan Dunham (dunham.ryan@epa.gov) (303) 523-7315	<input checked="" type="checkbox"/>
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Notes: CLP = contract laboratory program; DAO = Delegated Approving Officer; EPA = U.S. Environmental Protection Agency; OSC = On-Scene Coordinator; QA = Quality Assurance; SAM = Site Assessment Manager; START = Superfund Technical Assessment and Response Team; WAM = Work Assignment Manager; COR = Contracting Officer Representative.

2.2 Problem Definition and Background

The Highway 24 Mill site encompasses an area surrounding the former Golden Cycle Mill mining facility and associated tailings pile near the A-1 Mobile Village in Colorado Springs, Colorado (Figure 1). Elevated lead and arsenic concentrations have been found in soils at the A-1 Mobile Village, and historically around the former mill and the currently existing smokestack area of the site. The contamination sources at the site are largely bare soil affected by historical emissions from a large smokestack at the center of the site. There is potential for hazardous substances to migrate via the adjacent surface water pathway and via current and past releases associated with air deposition. Outlying areas in proximity to the site have not been sampled to assess extent of contamination from historical sources.

2.3 Project/Task Description

START shall provide support functions for the EPA's Site Assessment efforts at the Site. These functions shall result in the completion of a CERCLA Site Inspection (SI). General on-site activities will include sampling of environmental media (soil, surface water, and sediment) and documentation (photos, site conditions, sample locations, etc.). Field activities will take place in the summer of 2023.

The main resource constraint to this project is property access. All access-related tasks will be handled by the EPA Site Assessment Manager (SAM) and START shall not collect samples from any properties to which access has not been granted.

2.4 Project Schedule

Activity	Estimated Start Date	Estimated Completion Date	Time Constraints/Potential for Schedule Delays
Draft SAP	4/24/2023	5/5/2023	
Final SAP	TBD	TBD	Five business days after receipt of EPA comments
CLP Laboratory Procurement	TBD	TBD	Upon finalization of SAP
Field Sampling Activities	Summer 2023	Summer 2023	Tentative dates contingent upon SAP approval, access agreements, and field conditions
CLP Laboratory Results	TBD	TBD	15 business days after receipt by laboratory
Stage 2A Data Validation Report	TBD	TBD	10 business days after receipt from laboratory
Draft Trip Report	TBD	TBD	5 business days after receipt of validated data
Final Trip Report	TBD	TBD	5 business days after receipt of EPA comments on draft

2.5 Quality Objectives/Criteria

The objectives for this project are intended to support decisions regarding the need for further investigation or cleanup actions at the site as described in Section 2.4.1.2 of the QAPP.

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

1. State the problem,
2. Identify the goal of the study,
3. Identify the information inputs,
4. Define the boundaries of the study,
5. Develop the analytic approach,
6. Specify performance or acceptance criteria, and
7. Develop the plan for obtaining data.

During the first six steps of the process, the planning team develops decision performance criteria that will be used to develop the data collection design. The final step of the process involves developing the plan to obtain required data. A brief discussion of these steps and their application to this project are provided in the following sections.

2.5.1 Step 1: State the Problem

From approximately 1901 until February 1949, a total of 14.3 million tons of ore from the Cripple Creek Mining District in Colorado were processed by the Golden Cycle Mill milling facility located in Colorado Springs, El Paso County, Colorado. The processing yielded 12.5 million tons of tailings, which historically covered approximately 170 acres (Morrison Knudsen Corporation, 1993).

Previous investigations at the site have documented elevated concentrations of arsenic and lead in soils around the former mill and the currently existing 196-foot-tall concrete smokestack at the center of the site, as well as in soils at the A-1 Mobile Village located adjacent to the southeastern portion of the tailings pile.

In 2000 and 2002, the mine waste on the former mill property began redevelopment under a Colorado Department of Public Health (CDPHE) voluntary cleanup (VCUP) agreement. Tailings were mixed with clean soils and were used as fill for the housing development. Two feet of clean soils were used to cap areas where residential homes were built. One foot of clean soils was used as a cap for the remainder of the site. A deed restriction was placed on the property with an attached Operations and Maintenance Plan. Historical aerial photographs show that approximately three-quarters of the former mill property have been redeveloped and the large tailings pile has been significantly reduced and graded to continue expansion of the existing housing development.

In May 2022, EPA collected soil samples from individual lots located in the A-1 Mobile Village to characterize metals concentrations in surface soils. Composite soil samples were collected from 83 individual lots and 14 common areas and analyzed for total metals. Three off-site background areas were also sampled in Sondermann Park which is located approximately 2 miles north of the A-1 Mobile Home Village. Samples were taken at two depths: specifically, at 0 to 1 inch and 1 to 6 inches depth intervals. Composite subsampling targeted exposed, bare soils observed in each lot (Tetra Tech, 2023b).

A-1 Mobile Village soil sampling results indicated that lead and arsenic concentrations were consistently elevated with respect to those measured in off-site background soils. Concentrations of arsenic in soils in the 0 to 1 inch depth interval ranged from 19 to 100 mg/kg, and lead ranged from 50 to 640 mg/kg. In the 1 to 6 inches depth interval, arsenic concentrations ranged from 15 to 140 mg/kg, and lead concentrations ranged from 48 to 700 mg/kg. Off-site background concentrations ranged from 7.1 to 36 mg/kg for arsenic and lead, respectively, in the 0 to 1 inch depth interval and 7.4 to 37 mg/kg, respectively, in the 1 to 6 inches depth interval. These results indicate that the A-1 Mobile Village soils may be impacted from mine wastes associated with the former Golden Cycle Mill milling facility (Tetra Tech, 2023b).

Additional data are needed to further assess the nature of contamination associated with potential airborne migration of contaminants from the former mill, particularly in soil and surface water. This information is also needed to characterize metals concentrations in native soils over a representative geographic area to gauge the relative impacts from the former mill to surrounding neighborhoods that were in existence during former mill operations. Based on the history of operations and analytical results for previous investigations, additional sampling is necessary.

2.5.2 Step 2: Identify the Goals of the Study

The purpose of this step is to define the Principal Study Questions (PSQs) that data collection efforts will attempt to resolve. The PSQs help determine appropriate data inputs. Estimation statements are used to identify specific decisions or information that may be used to gain a greater understanding of existing environmental conditions.

Three PSQs have been identified:

- PSQ1 – What is the nature of metals concentrations in surface soils, surface water and sediment in the vicinity of the former mill/roaster stack site?
- PSQ2 – What is the nature of metals concentrations in background surface soils, surface water, and sediment from upgradient areas not likely impacted by historical milling operations?
- PSQ3 – Do metals concentrations in surface soils significantly exceed background and impact adjacent surface water bodies in the vicinity of the former mill/roaster stack site or exceed relevant health or environmentally-based benchmarks?

Estimation Statements

PSQ1 – What is the nature of metals concentrations in surface soils in the vicinity of the former mill/roaster stack site?

Collection and laboratory analysis of surface soil samples from various properties within the vicinity of the site will be conducted to determine metals concentrations.

PSQ2 – What is the nature of metals concentrations in background surface soils, surface water, and sediment from upgradient areas not likely impacted by historical milling operations?

Background surface soil sampling and laboratory analysis will be conducted in areas not anticipated to be impacted by former milling operations.

Background co-located surface water and sediment sampling and laboratory analysis will be conducted in locations that are upstream and representative of surface water that is not anticipated to be impacted by former milling operations.

Information on metals concentrations in background surface soils, surface water and sediment will be used to determine site attribution and estimate the degree to which source areas may have impacted soils, sediment or water quality in the vicinity of the site.

PSQ3 – Do metals concentrations in surface soils significantly exceed background and impact adjacent surface water bodies in the vicinity of the former mill/roaster stack site or exceed relevant health or environmentally-based benchmarks?

Surface water and sediment sampling and laboratory analysis will be conducted in locations that are upstream, adjacent to, and downstream of the former milling operations. Metals concentrations in collected surface soils, co-located surface water and sediment will be compared to background and relevant human health screening levels, water quality standards, and ecologically based toxicity benchmarks. This evaluation will be used in interpreting and presenting the context of analytical results with regard to potential human and ecological health impacts from former milling operations. This PSQ will also be used to characterize the degree of migration and potential for exposure/risks and assist in decision-making by the agencies and stakeholders.

2.5.3 Step 3: Identify Information Inputs

The purpose of this step is to identify the data required to answer the PSQs listed in Section 2.5.2. The primary information and decision inputs will be data generated from field observations, field instruments, environmental sampling, and laboratory analyses of surface soil, surface water and sediment samples. The required data to answer the PSQs are as follows:

- Metals concentrations in surface soil and co-located surface water and sediment samples collected from the vicinity of the site.
- Metals concentrations in surface soil and co-located surface water and sediment samples collected from background locations.
- Applicable human health and ecologically based soil, surface water and sediment screening levels for metals.

Collection of field measurements associated with sample collection activities will include:

- Determining sample locations.
- Recording geospatial sample location data.
- Collecting in situ water quality parameter measurements at surface water sampling locations.
- Photographing sample locations, recording sample descriptions and other notable observations in an electronic data collection device (EDCD) or a field notebook.
- Recording all required sample information on Chain of Custody (COC) forms.
- Documenting deviations from the SAP.

Analytical laboratory actions will include:

- Documenting receipt of samples.
- Determining if sample handling procedures are within acceptable limits.
- Laboratory analyses of surface soil, surface water and sediment samples for total and dissolved (surface water samples only) metals and mercury.
- Documenting deviations from the SAP and the Tetra Tech *Programmatic Quality Assurance Project Plan for Region 8 Site Assessment Task Order (Revision 2)*.
- Reporting results to appropriate data delivery system (i.e., Scribe).

The following factors will be evaluated in the overall decision-making process:

- Laboratory analytical results to assess the potential for metals concentrations in surface soil, surface water and sediment samples that may contribute to exposures and exceedances of human health and environmental benchmarks.
- Comparison of laboratory analytical results of receptor locations to background concentrations.

2.5.4 Step 4: Define the Boundaries to the Study

The objective of this step is to define the spatial and temporal components of the study area. The scale of the decision making for the estimation statements is defined by combining the population of interest with the spatial and temporal boundaries of the site. Practical constraints that could interfere with sampling are also identified. Implementing this step helps ensure that the data are representative of the population.

Spatial Boundaries

The study area boundary includes the following areas:

- Soil Exposure Pathway: 4-mile radius surrounding the site as measured from the approximate center of the former mill/roaster stack site (Figures 1 and 3). Surface soil samples will be collected using a composite sampling design. Samples will be collected at two depth intervals: 0 to 1 inch and 1 to 6 inches below ground surface (bgs). Composite subsamples will be collected from similar sized sampling areas (decision units) as previously sampled and consistent with sampling conducted at the A-1 Mobile Village lots.
- Surface Water and Sediment Migration Pathway: 15-mile target distance limit as measured from the probable point of entry (PPE) in Fountain Creek near the A-1 Mobile Village (Figure 2). Surface water grab and sediment composite samples will be collected from upstream, adjacent, and downstream of the PPE in Fountain Creek.
- Appropriate background soil and upstream surface water areas that are not anticipated to be impacted by former milling operations. Given the known wind direction and understanding of potential fate and transport mechanisms, proposed background sampling locations should not be impacted from metals that may have migrated from the site. Sampling results from proposed background locations will be evaluated with respect to metals concentrations in samples that are collected at locations that are anticipated to be downwind from the site. Such comparisons will be used to evaluate the validity of fate and transport mechanism assumptions and may lead to a reclassification of background locations.

Temporal Boundaries

Sampling is anticipated to occur between June and September 2023 at locations where property access is granted. Decisions related to future data collection will be made based on data collection activities described herein.

Scale of Inference

The sampling design should be sufficient in characterizing metals concentrations in surface soils collected from similarly sized decision units as was used in related/previous sampling at the A-1 Mobile Village and at potential up- and downwind sampling locations based on local wind rose/predominant wind direction available for the area (Midwestern Regional Climate Center, 2023). The soil sample type, depths, and size of the spatial area replicate the sampling methodology used during the May 2022 A-1 Mobile Village sampling event to the greatest extent possible so that results are readily comparable.

Results from sample collection and analysis methods described in this SAP can only be used to characterize metals concentrations in soil and surface water/sediment for the time in which samples were collected. While it is not anticipated that metals concentrations would significantly differ from when the A-1 Mobile Village was sampled, external factors such as land use changes and other environmental perturbations could influence metals concentrations between sampling events.

Composite sampling will be used to characterize metals concentrations in soil. GPS coordinates for each subsample collection location used to make each composite will be documented. This should establish a level of reproducibility in the unlikely case that follow up confirmation sampling is required.

2.5.5 Step 5: Develop the Analytic Approach

Analytical methods and results associated with the data and sample collection effort will be used to assess whether surface soil, sediment and water in the vicinity of the former mill/roaster stack site are potentially impacted by metals from former milling operations. In addition, metals concentrations in soils, sediment and water collected from proposed sampling locations will be used to assess potential risks to human health and the environment.

Analysis of background samples allows for a comparative analysis of metals concentrations that may be associated with the site. Analytical results for surface soil, surface water and sediment samples will be used to provide screening of metals concentrations by comparing to the site-specific background concentrations as well as:

- Surface Soil: EPA Residential Screening Levels (RSL).
- Surface Water: Colorado Water Quality Standards (Regulation 31: The Basic Standards and Methodologies for Surface Water).
- Sediment: Consensus-based Probable Effect Concentrations (PEC) and relevant sediment aquatic toxicological information.

Soil samples will be analyzed for a common suite of total recoverable metals, including mercury. Co-located surface water and sediment samples will be analyzed for total recoverable and dissolved metals using the same suite of metals as soil samples. Water samples will also be analyzed for dissolved calcium and magnesium so that hardness can be estimated and major anions.

Sample collection, handling, and analytical procedures are critical in generating data of known quality and defensibility. These procedures include, but are not limited to, following guidance provided in the SAP, documenting deviations from the SAP, adhering to data and sample COC procedures, and implementing field and analytical quality assurance and quality control (QA/QC) measures.

2.5.6 Step 6: Specify Performance or Acceptance Criteria

The purpose of this step is to specify the tolerable limits on decision errors, which are used to establish performance goals for the data collection design. For this project, the number of samples is intended to provide representativeness over the spatial boundaries established for the site.

In order to mitigate the potential for false positive or false negative errors associated with field sampling, sample collection processes will be consistent with established and relevant Standard Operating Procedures (SOPs). This includes the collection of duplicate samples and subsequent analysis using relative percent deviation (RPD). A decontamination procedure will be implemented and may include the use of disposable sampling equipment. For laboratory analyses of samples, QA/QC steps, such as the use of laboratory control samples (LCS), matrix spike/matrix spike duplicate (MS/MSDs), and blank samples will be used.

Surface soil, surface water, and sediment duplicate samples will be collected at a rate of at least 1 per 10 field samples and used to determine sampling precision and the correlation between samples. A control limit of 35% shall be used for the soil and sediment RPD in duplicate pairs in which both samples are \geq five times the contract required quantitation limit. According to the EPA (2017a) *National Functional Guidelines for Inorganic Superfund Methods Data Review*, a control limit of 20% for surface water for the RPD shall be used for original and duplicate sample values that are \geq five times the contract required quantitation limit. Note, that these requirements are laboratory guidelines which may not apply to all field situations.

For laboratory analysis of samples, QA/QC steps (such as using LCS, MS/MSDs, blanks, etc.) will be consistent with EPA Contract Laboratory Program (CLP) Region 8 requirements. Data collection, sample processing, chemical analyses, and reporting will follow steps and requirements described in EPA-approved SOPs. Appropriate QA/QC measures will be in place (e.g., collection of field duplicates, laboratory splits, and calibration data) as specified in this SAP to reduce the risk of sampling and analytical error.

Analytical data will be evaluated in accordance with precision, accuracy, representativeness, completeness, and comparability parameters through use of LCS, calibration data, and results of MS/MSD samples. This data evaluation effort and associated criteria used to reduce and/or quantify error are described in Section 2.5.7.3.

2.5.7 Step 7 Develop Plan for Collecting Data

The sections below describe the plans for sampling locations; criteria, action limits, and laboratory limits; and precision, accuracy, representativeness, completeness, comparability, and sensitivity criteria.

2.5.7.1 Sampling Locations

Proposed sampling locations mostly include publicly owned properties (i.e., federal, state, county, local government). However, samples may also be collected at a few private properties depending on access approval. Proposed surface soil and water sampling locations are shown on Figure 3. For planning purposes, the following numbers of samples are proposed:

- Surface Soil: 33 locations within a 4-mile radius from the former mill/roaster stack site
- Co-located Surface Water and Sediment: 3 locations on Fountain Creek that are upstream, adjacent, and downstream of the former mill/roaster stack site.

Sampling will target native soils that appear to be of the same composition (color and texture) as those sampled in the A-1 Mobile Village that have not been obviously moved or recently amended. Reconnaissance of proposed locations found that such soils are present near older trees, established non-ornamental vegetation, and in natural areas not recently

disturbed. Exposed, bare soil areas will be targeted within a 900¹ square foot decision unit placed over each property. The decision unit placement will consider availability of bare soils so that composite subsamples can be collected from at a minimum of five locations. Coring devices will be used to collect soils from the 0 to 1 inch and 1 to 6 inches depth horizons at each subsample location. Collected soil will be containerized according to separate depth horizons until all subsamples are collected for a given composite. Composite samples will be transported back to the laboratory to be dried and sieved. Each composite sample will be placed into and shaken through a newly decontaminated number 100 mesh sieve. The sieved, 150-micron fraction will be submitted to that laboratory for metals analysis. Samples results will be reported on a dry weight basis.

Surface water grab samples will be collected from the thalweg of Fountain Creek. Sampling locations will be accessed by wading in from the bank. Samples will be collected in order from downstream to upstream in quick succession. to reduce variability associated with diurnal changes in flow. Care will be taken not to disturb bottom sediments when collecting samples.

Sediment grab samples will be co-located and collected in the approximate area of the surface water samples from Fountain Creek. Sediment will be collected AFTER the surface water to avoid unnecessary turbulence/interference during surface water sample collection. Fine sediment will be identified from within the co-located area of the surface water. The sample will be composited by collecting 5 subsample aliquots. Sediment samples will not be sieved but will likely need to be dried in the laboratory prior to being analyzed. Samples results will be reported on a dry weight basis.

Actual soil and co-located surface water/sediment sample locations will be documented using EDCDs (field iPads) at the grab sample location for water and from the center point of composite subsample locations at the time of collection. A nested EDCD survey will be used to document the exact sampling point for each subsample that is used to make each composite soil sample. A brief description of the sampling locations will be recorded in the EDCD for each composite sample. Field documentation information will consist of the property ID, sample coordinates, date, and time.

EPA (2017) SOPs *Field Data Collection Using GPS [Global Positioning System] and Collector for ArcGIS* and *Survey123 for ArcGIS* will be followed when using EDCDs. Photographs will be collected using the EDCD to document notable observations encountered when sampling. Deviations from the SAP or applicable SOPs will be recorded in the EDCD and will be discussed with the Site Assessment Manager and/or other field managers.

2.5.7.2 Criteria, Action Limits, and Laboratory Detection Limits

Practical Quantitation Limit (PQLs) for the EPA analytical methods will be used to analyze surface soil, surface water, and sediment samples. In order to determine if matrix PQLs are low enough to be useful, they will be compared to the lowest available EPA Residential RSLs (soil) and Colorado aquatic life water quality standards (surface water). Note that multiple constituents of concern, including arsenic and cadmium, have surface water PQLs which are above the matrix-specific screening levels. Sediment matrix is primarily being collected to assess potential migration and as supplemental information for aquatic life conditions, but PQLs for soil are considered acceptable for these objectives and for comparison to consensus-based sediment benchmarks. Note that the reported PQLs are only estimates based on the average sensitivity of the laboratory instruments. In the event that actual PQLs exceed the screening criteria, the SAM will evaluate the data to determine if the DQOs were met and assess the impact or limitations on the project.

¹ Decision unit area of 900 square feet generally mirrors lot sizes sampled in the A-1 Mobile Village during the May 2022 Garner Street SI sampling event (Tetra Tech, 2023b); For example, the median property size of a random 20% of the A-1 Mobile Village lots is 936.14 square feet and the average lot size is 887.67 square feet.

2.5.7.3 Precision, Accuracy, Representativeness, Completeness, Comparability, and Sensitivity

This section describes how data generated during the course of this project will be validated. The documentation of the data evaluation effort will be in the form of the worksheets prepared during validation. These worksheets will be included as an appendix to a report associated with this sampling and analysis effort. The report will be prepared to identify problems that may affect data usability or require that the data be qualified. The data validation report will discuss all precision, accuracy, representativeness, completeness, comparability, and sensitivity parameter results from the data validation and overall usability of the data for project objectives. Any biases associated will also be discussed. Biases refer to the systematic or persistent distortion of a measurement process that causes errors in one direction. The extent of bias will be determined by evaluating the laboratory initial calibration/continuing calibration verification, laboratory control sample/laboratory control sample duplicate (LCS/LCSD), blank spikes, and MS/MSD samples.

The data will be assessed for the following criteria:

- *Precision* – The measure of agreement among repeated measurements of the same property under identical or substantially similar conditions that is expressed as the RPD between the sample pairs. Acceptable RPD is 35% for soil and sediment samples, and acceptable RPD is 20% for water samples (EPA, 2017a).
 - Field duplicates: RPD criteria met?
 - Laboratory duplicates: RPD criteria met?
 - Method of standard dilution performed and criteria met?
 - MS/MSD: RPD criteria met? (If applicable)
- *Accuracy* – The measure of how close measured values are to the true values being measured. Accuracy analyses are helpful in identifying systematic errors associated with sampling and analysis methods.
 - MS/MSDs: Are percent recovery (%R) criteria met?
 - LCS/LCSD samples: Are %R criteria met?
 - Are initial and continuing calibration %R criteria met?
 - Are interference check sample %R criteria met?
 - Are inductively coupled plasma serial dilution %R criteria met?
- *Representativeness* – The measure of the degree to which data accurately and precisely represent a characteristic of a population parameter, variations at a sampling point, a process condition, or an environmental condition.
 - Sampling procedures and design: criteria met?
 - Holding times and preservation: criteria met?
 - Custody: all COC forms complete and provided in data package?
 - Blanks: contaminants present?
- *Completeness* – A measure of the amount of valid data obtained from a measurement system. The actual percentage of completeness is less important than the effect of completeness on the data set. Completeness will be assessed by the total number of samples collected versus the number of samples planned.
 - The number of valid analytical results is comparable with the number determined necessary during establishment of DQOs.
- *Comparability* – The qualitative term that expresses the confidence that two data sets can contribute to common interpretation and analysis. Comparability is used to describe how well samples within a data set, as well as two independent data sets, are interchangeable.
 - Data compares with similar analysis and data sets?
 - Sample collection methods comparable to similar data sets?
 - Laboratory analytical methods comparable to similar data sets?

- *Sensitivity* – The ability to discriminate between small differences in analyte concentrations related to the rate of change in response when there is a small change in stimulus; this is reflected in the calibration curve.
 - Did chemical analyses meet or exceed PQLs documented in the SAP?

Uncertainty of validated data will be evaluated by the EPA SAM and START Project Manager or their designee to determine if the DQOs were met. In the event that the DQOs were not met, they will be reviewed to determine if they are achievable and may be revised if necessary, and the data may be further evaluated to determine the impact to the project. Data usability and limitations will be evaluated by the EPA SAM.

A variety of data will be collected for this project; some data are critical to achieve the established DQOs and project objectives, and some are primarily for informational purposes or will be used to supplement critical data. The following specifies each type of data and its purpose:

Data Type	Purpose	
	Critical	Informational
Surface soil samples and corresponding analytical results	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Co-located surface water and sediment samples and corresponding analytical results	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Water quality parameters (collected with YSI)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
EDCD documentation	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Data Quality Objectives (DQOs) for measurements during this project will be addressed by evaluating Precision, Accuracy, Representativeness, Completeness, Comparability, and Sensitivity (PARCCS) in accordance with Sections 2.4.2 and 5.3 of the QAPP (including Appendix A-2 of the QAPP (Laboratory QA/QC Requirements). Laboratory reporting limits and method detection limits have been compared to the project-specific screening requirements and are sufficient to satisfy the project objectives (Attachment 1).

2.6 Special Training/Certifications

Required training and certifications are outlined in Section 2.5 of the QAPP and in the Site Health and Safety Plan, dated May 3, 2023.

2.7 Documentation and Records

Anticipated project documents/deliverables, records, and essential electronic files generated for this project are provided below and will be prepared in accordance with Section 2.6. of the QAPP. Documents will be managed in accordance with the START V Quality Management Plan.

Document/Record Title	Generated by
Health and Safety Plan (HASP)	Tetra Tech
Sampling and Analysis Plan (SAP)	Tetra Tech
Interactive Geospatial Map Viewer	Tetra Tech

RCMS 1900-55	Tetra Tech
Trip Report	Tetra Tech
Site Inspection Report	Tetra Tech

3.0 Data Generation and Acquisition

The data generation and acquisition activities associated with this sampling event, including process design, sampling methods, sample handling and custody, analytical methods, quality control and data management as shown in the following sub-sections.

Data will be managed and archived in accordance with the TBA and SA Data Management Plan and Attachment 2 of this SAP (Site-Specific Data Management Summary).

3.1 Sampling Process Design

Sample Media					
<input checked="" type="checkbox"/>	Surface Water	<input checked="" type="checkbox"/>	Sediment	<input type="checkbox"/>	Groundwater
<input type="checkbox"/>	Indoor Air	<input type="checkbox"/>	Outdoor Air	<input checked="" type="checkbox"/>	Soil
<input type="checkbox"/>	Soil Gas	<input type="checkbox"/>	Tissue	<input type="checkbox"/>	Other [Explain]

Sample Design					
<input type="checkbox"/>	Random Sampling	<input type="checkbox"/>	Transect Sampling	<input checked="" type="checkbox"/>	Biased/Judgement Sampling
<input type="checkbox"/>	Systematic Random Sampling	<input checked="" type="checkbox"/>	Opportunity Sampling	<input type="checkbox"/>	Systematic Grid
<input type="checkbox"/>	Screening with Definitive Confirmation	<input checked="" type="checkbox"/>	Definitive Sampling	<input type="checkbox"/>	Screening without Definitive Confirmation
<input type="checkbox"/>	Stratified Random Sampling	<input type="checkbox"/>	Incremental Sampling	<input type="checkbox"/>	Other [Explain]

Sampling Narrative:

Proposed sampling locations mostly include publicly owned properties (i.e., federal, state, county, local government). However, samples may also be collected at a few private properties depending on access approval. QA/QC steps (such as LCS, field duplicates, MS/MSD's blanks, etc.) will be consistent with the EPA CLP Region 8 Requirements.

Soil Sampling: 33 locations are proposed within a 4-mile radius from the former mill stack site. Sampling will target native soils that appear to be of the same composition (color and texture) as those samples in the A-1 Mobile Village that have not been obviously moved or recently amended. Exposed, bare soil areas will be targeted within an approximately 900 square feet decision unit. Coring devices will be used to collect soils from the 0 to 1 inch and 1 to 6 inches depth intervals at each subsample location. Duplicate samples will be used at a rate of 1 per 10 field samples to determine sampling precision and the correlation between samples. Collected soil will be containerized according to the separate depth intervals until all

subsamples are collected for a given composite. Composite samples will be sieved by the laboratory using a 100-mesh sieve and the sieved, 150-micron fraction will be submitted to the laboratory for analysis of total metals and mercury (see Table 2). Analytical results will be compared to EPA RSLs for residential soil.

Surface Water Sampling: Grab samples will be collected from the thalweg (middle/deepest point of stream) of Fountain Creek. Sampling locations will be accessed by wading in from the bank. Samples will be collected in quick succession from downstream to upstream to reduce variability associated with diurnal changes in flow. Care will be taken not to disturb bottom sediments when collecting samples. In-situ water quality parameters will also be gathered at each surface water sampling location using a YSI or equivalent water quality meter. Samples will be shipped to a laboratory for analysis of metals (total and dissolved, including mercury) as well as hardness for filtered samples and anions for unfiltered samples. Specific anions to be measured include sulfate, alkalinity, chloride, fluoride, bromide nitrate and nitrite (see Table 2). Analytical results will be compared to Colorado Water Quality Standards (Regulation 31: The Basic Standards and Methodologies for Surface Water).

Sediment Sampling: Composite samples will be co-located and collected in the approximate area of the surface water samples from Fountain Creek. Sediment samples will be collected after the surface water samples to avoid unnecessary turbulence/interference during surface water sampling. Fine sediment will be identified from within the co-located area of the surface water sample and will be composited by collecting 5 subsample aliquots. Sediment samples will be shipped to a laboratory for analysis of total metals, including mercury. Analytical results will be compared to consensus-based sediment benchmarks.

3.2 Sampling Methods

The following table lists the required methods and standard operating procedures (SOPs) for this sampling event. SOPs provide step-wise-processes for consistent sampling and documentation of field work and specify: field equipment, consumables, proper methodology (calibration, monitoring, sample collection, etc.), considerations, references, and field forms/documentation required for each sampling method.

Matrix	Sample Type (in-situ/laboratory)	Collection Method (Screening/Grab/ Composite)	Field/Analytical Parameter	Standard Operating Procedure
Surface Water	In-situ	Grab	Metals (total and dissolved) and mercury, hardness, anions	#2013, Surface Water Sampling 2209-20, Operation of the YSI 556 Multi-Probe Water Quality System
Sediment	In-situ	Composite	Metals, mercury	#2016, Sediment Sampling
Soil	In-situ	Composite	Metals, mercury	#2012, Soil Sampling (in review)
All	NA	NA	NA	#2006, Sampling Equipment Decontamination 024-3, Recording Notes in Field Logbooks

Soil:

1. Upon arrival to the site, field teams will don all necessary PPE and walk the entire property to determine the best location for sampling. Characteristics to look for include native areas with soil that is bare, exposed and does not obviously appear to have been recently amended. Areas composed of fresh topsoil or fill material such as flower beds, garden areas, freshly planted vegetation, etc. will be avoided.
2. Once appropriate sampling locations have been identified, field teams will mark the corners of sampling decision units (DU's) with colored pin flags. GPS coordinates of all corners will be recorded using a mobile GPS instrument (Trimble R1) and an electronic data collection tool such as Field Maps and/or Survey123. Every DU is not required to have the same dimensions to get to a 900 ft²-sized DU. For example, a DU could be rectangular or triangular-shaped so long as the total square footage is a uniform and contiguous 900 ft². Subsample locations will be spatially distributed within the DU with an emphasis on bare/native soil. Therefore, DU placement should consider availability of bare/native soil. Grass plugs may need to be removed in some cases to expose underlying soil.
3. A newly decontaminated handheld coring device with a hollow-stem auger will be used to collect samples at two depth intervals: 0 to 1 inch and 1 to 6 inches. If subsurface conditions do not allow for use of the coring device, a handheld trowel will be used. Rocks, roots and other objects will be removed as best as possible so that only soil is collected. Five subsamples will be collected at each location and depth interval and composited together to make a single sample for each interval. When applicable, duplicate subsamples will be collected immediately adjacent to the main subsample at a rate of 1 per 10 field samples.
4. After soil is collected at each depth interval, the sample will be placed in a Ziploc bag (separate bags for each depth interval) and labeled with the corresponding sample ID. All samples will be double-bagged.
5. Once each sample is collected, an electronic data collection tool will be used to log sample information such as sample ID, depth interval, GPS coordinates, photographs. Subsamples will also be logged in the electronic data collection tool by adding a sub form within the parent form. Each subsample record will also contain depth interval, GPS coordinates, photographs, etc.

6. Each sample will be placed in a cooler on ice to be transported off-site where it will be homogenized, sieved, and transferred to 4oz. jars for laboratory analysis.
7. All holes will be backfilled using the existing soil that is on-site. Since each hole is only 6 inches deep, it will be sufficient to brush the surrounding soil into the hole. If necessary, fine-grain silica sand will also be used to return the sample locations to their original grade.
8. Prior to being removed from each site, all sampling equipment will be decontaminated.
9. A field blank will be collected by pouring deionized water over the newly decontaminated coring device. This water will then be containerized and shipped for laboratory analysis to assess the effectiveness of field decontamination procedures. This field blank will only be analyzed for total recoverable metals.

Surface Water:

1. Surface water will be sampled in order from downstream to upstream.
2. Samples will be collected from the thalweg (middle/deepest point) of the stream.
3. Field teams will don all necessary PPE before wading into the water. Personal flotation devices (PFD's) will be worn if the water is greater than 3ft deep.
4. If wading into the stream causes disturbance of sediment, the sample will not be collected until the sediment has settled and the stream has returned to equilibrium.
5. Once the sediment has settled, sample containers will be dipped just below the surface of the water with care being taken to not spill any preservative. Efforts will be made to avoid collecting any floating debris (plants, bugs, leaves, etc.). A field duplicate sample will be collected concurrently with a chosen field sample. For dissolved metals analysis, surface water samples will be filtered in the field using a peristaltic pump with a filter attached to one end of the Teflon tubing. Samples will be pumped from a secondary containment vessel, through the filter and into the field sample container.
6. An electronic data tool will be used to log sample information such as sample ID, GPS coordinates and photographs.
7. If wading into the stream is not possible, samples will be collected using a decontaminated cup attached to the end of an extendable rod.
8. All samples will be containerized, placed in a cooler on ice and transported off site.
9. All sampling equipment will be decontaminated prior to leaving each location.
10. One field blank will be collected at a chosen sample location using deionized (DI) water. The total metals and anions samples will be made by pouring DI water into the similar sample bottles used to collect and transport field surface water samples. The dissolved metals blank sample will be made by filtering and containerizing DI water using the same materials as field surface water samples. This field blank will also be documented using the electronic data collection tool.

Sediment:

1. Like the approach for surface water sampling, sediment sampling will also be conducted by moving downstream to upstream in quick succession.
2. Sediment samples will be collected immediately after surface water samples in each location.
3. Stainless steel spoons will be used to collect fine sediment from 5 subsample aliquots near the surface water sample location. Sediment aliquots will be transferred directly into the sample jar and then homogenized. Care will be taken

to avoid any vegetation, larger pebbles and rocks, or roots that might be present in the sediment. Subsample aliquots will be spatially distributed within an area that encompasses two meters up and downstream of the surface water sample collection location.

4. An electronic data tool will be used to log sample information such as sample ID, GPS coordinates and photographs.
5. Samples will be containerized, placed in a cooler on ice and transported off site.
6. All sampling equipment will be decontaminated prior to leaving each location.
10. An equipment blank will be collected by pouring deionized water over the newly decontaminated sampling device. This water will then be containerized and shipped for laboratory analysis to assess the effectiveness of field decontamination procedures. This field blank will only be analyzed for total recoverable metals.

The START Field Team Leader is responsible for ensuring that the SOPs are understood by the field team and available for reference in the field during sampling. SOPs are available online at the following address:

https://response.epa.gov/site/site_profile.aspx?site_id=2107.

The START Field Team Leader or his/her designee will inspect field equipment and consumables before use. Spare parts or replacement equipment and supplies will be provided by the vendor.

Field data will be managed as described in Attachment 2 – Site Specific Data Management Summary. Field forms that are not electronic are attached with this SAP.

3.3 Sample Handling and Custody

The Chain of Custody form and requirements will be strictly adhered to as detailed in Section 3.3.2 of the QAPP. A copy of the completed Chain of Custody for this project will be maintained by the Tetra Tech Project Manager. Sample disposal will be managed by the laboratory.

3.4 Analytical Methods

Laboratory parameters, methods, sample containers, holding time and preservation requirement for this project are provided in Table 2 and Attachment 1. Sample turnaround time will be 15 days).

3.5 Field/Laboratory QA/QC

Requirements for field and laboratory QA/QC will be conducted in accordance with Sections 2.4.2 and 3.5 of the QAPP. A summary of the field and QC samples is provided in Table 2.

3.6 Data Management

Project data management shall adhere to the Region 8 START V SA and TBA Data Management Plan. The key data management components for this project are outlined in the Site-Specific Data Management Summary (Attachment 2). Hardware and software will be tested and maintained as discussed in the Region 8 START V Quality Management Plan (Tetra Tech 2022).

4.0 Assessment and Oversight

Performance and system audits will be completed to ensure that field sampling activities and laboratory analyses are performed following the procedures as outlined in Section 4.0 of the START V SA QAPP (Tetra Tech 2023). Deviations

from these procedures will be documented during and after the field and laboratory activities and will be presented in the Trip Report.

5.0 Data Validation and Usability

The QA activities that will be performed to ensure that the collected data are scientifically defensible, properly documented, and of known quality, and meet project objectives are described in the START V SA QAPP Section 5.0 (Tetra Tech 2023). Tetra Tech will perform a stage 2A validation of data received from the laboratory.

Deviations from these activities (not known prior to sampling) will be assessed and documented in the Trip Report.

6.0 References

Tetra Tech. 2023a. Superfund Technical Assessment and Response Team V Contract. EPA Region 8 Site Assessment Quality Assurance Project Plan (QAPP). Revision 3. March.

U.S. Environmental Protection Agency (EPA). 1991. Guidance for Performing Preliminary Assessments Under CERCLA. Office of Emergency and Remedial Response. EPA/540/G-91/013. September. Accessed on-line at: <https://semspub.epa.gov/work/HQ/157081.pdf>

Morrison Knudsen Corporation (MKC). 1993. Preliminary Assessment, Gold Hill Tailings Site. December.

Tetra Tech. 2023b. Garner Street Soils Letter Report – Final (Revision 2). March.

Midwestern Regional Climate Center (MRCC) cli-MATE Tools. 2023. Colorado Springs USAF Academy Wind Rose Map. Accessed on-line at: [cli-MATE: MRCC Application Tools Environment \(purdue.edu\)](https://cli-MATE.MRCC.Application.Tools.Environment(purdue.edu))

Tetra Tech. 2022. Superfund Technical Assessment and Response Team V Quality Management Plan. April.

U.S. Environmental Protection Agency (EPA). 2022. Regional Screening Levels (RSLs) – Generic Tables. November.

United States Geological Survey (USGS). 2000. Prediction of Sediment Toxicity Using Consensus-Based Freshwater Sediment Quality Guidelines. June. Accessed on-line at: [Prediction of Sediment Toxicity Using consensus-Based Freshwater Sediment Quality Guidelines \(usgs.gov\)](https://www.usgs.gov/prediction-of-sediment-toxicity-using-consensus-based-freshwater-sediment-quality-guidelines)

Colorado Department of Health and Environment (CDPHE). 2021. Regulation No. 31 – The Basic Standards and Methodologies for Surface Water. 5 CCR 1002-31. December.

TABLES

Table 1.

Site: Highway 24 Mill Site (Colorado Springs, CO)				Project Title: Highway 24 Mill Site Inspection	
Sample Identification, Location, and Rationale					
Sample Number/Identification	Matrix	Latitude	Longitude	Location Description	Rationale
HWY-SS01-0-1 through HWY-SS07-0-1; HWY-SS10-0-1 through HWY-SS35-0-1 HWY-SS01-1-6 through HWY-SS07-1-6; HWY-SS10-1-6 through HWY-SS35-1-6	Soil	TBD	TBD	See Figure 3	Assess metals concentrations
HWY-SW-06, HWY-SW-08 and HWY-SW-09	Surface Water	TBD	TBD	See Figure 3	Assess metals concentrations
HWY-SD-06, HWY-SD-08 and HWY-SD-09	Sediment	TBD	TBD	See Figure 3	Assess metals concentrations

Notes:

*HWY = Highway 24 Mill Site**SS = Surface Soil**SW = Surface Water**SD = Sediment**0-1 = 0-to-1 inch sample interval**1-6 = 1-to-6-inch sample interval*

Table 2.

Site: Highway 24 Mill Site (Colorado Springs, CO)						Project Title: Highway 24 Mill Site Inspection				
Field Sampling Summary, Analytical Parameters, and Laboratory Quality Control Requirements										
Matrix	Parameter	Analytical Method	Container Type	Preservative	Holding Time	Estimated No. of Field Samples	No. of Field Duplicates	No. of Blanks *	No. of MS/MSD Samples	Volume of MS/MSD **
Soil	Metals	SFAM01.0 ICP-MS	4-oz. glass jar	None	180 days	66	4 (0 to 1-inch) 4 (1 to 6-inch)	1 EB per team (TRM only)	3	3x 4oz. jar
	Mercury			< 6° C	26 days					
Surface Water	Metals (total & dissolved)	SFAM01.0 ICP-MS	500mL PTFE	HNO ₃ to pH<2 / < 6°C	180 days	3	1	1 FB (TRM, DM, and anions)	1	3x 500mL PTFE
	Mercury		1L PTFE	HNO ₃ to pH < 2	26 days					
	Hardness		1L PTFE or HDPE	HNO ₃ to pH<2 / < 6°C	180 days					
	Anions		1L PTFE or HDPE	None / < 6°C	***					
Sediment	Metals	SFAM01.0 ICP-MS	4-oz. glass jar	None	180 days	3	1	1 EB (TRM only)	1	3x 4oz. jar
	Mercury			None / < 6°C	26 days					

Notes:

*Check the appropriate number of duplicates and blanks identified in Appendix A, QA/QC Sample Requirements and Sample Container, Preservation, and Holding Time Requirements) in the Site Assessment QAPP. FD = Field Duplicate (generally, one per 10 samples); EB = Equipment blank (one per type for decontaminated sampling equipment); FB = Field Blank (one per 20 samples per field matrix, with a minimum of one FB).

**Matrix Spike/Matrix Spike Duplicate (MS/MSD) volumes are indicated in the last column, as appropriate.

***Holding time for nitrate, nitrite, and orthophosphate is 24 hours; other anions have a hold time of 26 days.

TRM = Total Recoverable Metals

DM = Dissolved Metals

Table 3.

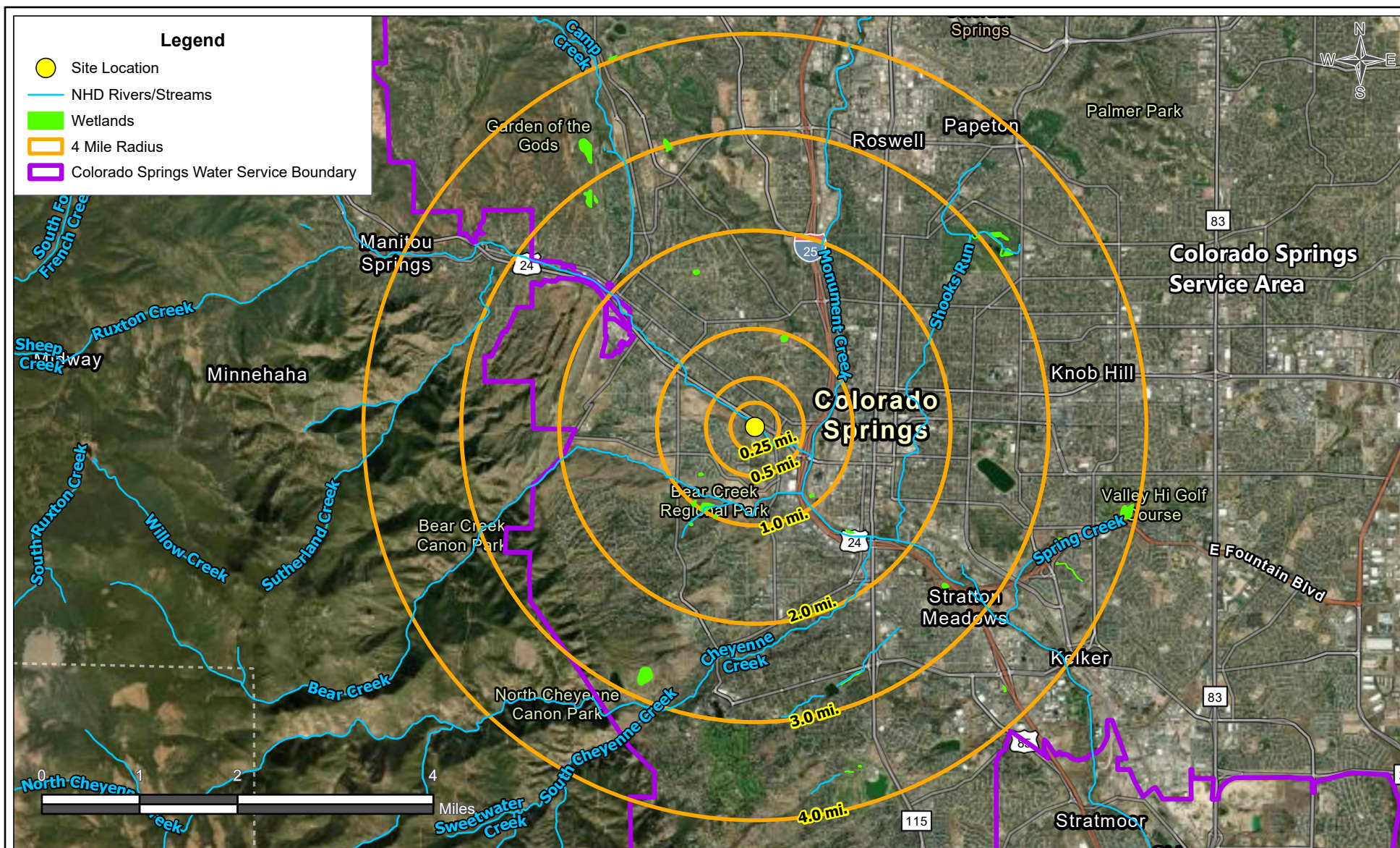
Sample Locations				
Location ID	Media	Parcel Owner	Location	Sample ID
1	Soil	COLORADO SPRINGS CITY OF	602 S ELEVENTH ST	HWY-SS01-0-1; HWY-SS01-1-6
2	Soil	COLORADO SPRINGS CITY OF	24-14-67	HWY-SS02-0-1; HWY-SS02-1-6
3	Soil	COLORADO SPRINGS CITY OF	1117 W CUCHARRAS ST	HWY-SS03-0-1; HWY-SS03-1-6
4	Soil	COLORADO SPRINGS CITY OF	N LIMIT ST	HWY-SS04-0-1; HWY-SS04-1-6
5	Soil	EL PASO COUNTY	S TWENTY FIRST ST	HWY-SS05-0-1; HWY-SS05-1-6
6	Soil, sediment, surface water	COLORADO SPRINGS CITY OF	S TWENTY SEVENTH ST	HWY-SS06-0-1; HWY-SS06-1-6; HWY-SD-06; HWY-SW-06
7	Soil	EL PASO COUNTY	1762 CREEK CROSSING	HWY-SS07-0-1; HWY-SS07-1-6
8*	Sediment, surface water	COLORADO DEPARTMENT OF TRANSPORTATION	RIGHT-OF-WAY	HWY-SD-08; HWY-SW-08
9	Sediment, surface water	COLORADO DEPARTMENT OF TRANSPORTATION	RIGHT-OF-WAY	HWY-SD-09; HWY-SW-09
10	Soil	COLORADO SPRINGS CITY OF	820 GARNER ST	HWY-SS10-0-1; HWY-SS10-1-6
11	Soil	COLORADO SPRINGS CITY OF	44 BOULDER CRESCENT ST	HWY-SS11-0-1; HWY-SS11-1-6
12	Soil	COLORADO SPRINGS CITY OF	1326 S TEJON ST	HWY-SS12-0-1; HWY-SS12-1-6
13*	Soil	COLORADO SPRINGS CITY OF	11/14/1967	HWY-SS13-0-1; HWY-SS13-1-6
14	Soil	COLORADO SPRINGS CITY OF	MANITOU BLVD	HWY-SS14-0-1; HWY-SS14-1-6
15	Soil	COLORADO SPRINGS CITY OF	S SIERRA MADRE ST	HWY-SS15-0-1; HWY-SS15-1-6
16	Soil	COLORADO SPRINGS CITY OF	126 CIMINO DR	HWY-SS16-0-1; HWY-SS16-1-6
17	Soil	EL PASO COUNTY	S EIGHTH ST	HWY-SS17-0-1; HWY-SS17-1-6
18	Soil	COLORADO SPRINGS CITY OF	1200 E BOULDER ST	HWY-SS18-0-1; HWY-SS18-1-6
19	Soil	COLORADO SPRINGS CITY OF	N CHESTNUT ST	HWY-SS19-0-1; HWY-SS19-1-6
20	Soil	COLORADO SPRINGS CITY OF	N WAHSATCH AVE	HWY-SS20-0-1; HWY-SS20-1-6
21	Soil	COLORADO SPRINGS CITY OF	RIGHT-OF-WAY	HWY-SS21-0-1; HWY-SS21-1-6
22*	Soil	COLORADO SPRINGS CITY OF	2500 HAGERMAN ST	HWY-SS22-0-1; HWY-SS22-1-6
23	Soil	MFAB LLC	1010 W COLORADO AVE	HWY-SS23-0-1; HWY-SS23-1-6

Sample Locations				
Location ID	Media	Parcel Owner	Location	Sample ID
24	Soil	COLORADO SPRINGS CITY OF	218 S EIGHTH ST	HWY-SS24-0-1; HWY-SS24-1-6
25	Soil	9 PROPERTIES LLC		HWY-SS25-0-1; HWY-SS25-1-6
26	Soil	COLORADO SPRINGS CITY OF	502 E MORENO AVE	HWY-SS26-0-1; HWY-SS26-1-6
27	Soil	COLORADO SPRINGS CITY OF	DORCHESTER DR	HWY-SS27-0-1; HWY-SS27-1-6
28	Soil	COLORADO SPRINGS CITY OF	2300 W UINTAH ST	HWY-SS28-0-1; HWY-SS28-1-6
29*	Soil	COLORADO SPRINGS CITY OF	2102 NAEGELE RD	HWY-SS29-0-1; HWY-SS29-1-6
30	Soil	EL PASO COUNTY	S EIGHTH ST	HWY-SS30-0-1; HWY-SS30-1-6
31	Soil	LOAD & LOCK ON GALLEY	1311 W COSTILLA ST	HWY-SS31-0-1; HWY-SS31-1-6
32*	Soil	COOKSEY JERRY D	1332 S TWENTY FIRST ST	HWY-SS32-0-1; HWY-SS32-1-6
33	Soil	COLORADO SPRINGS CITY OF	14-14-67	HWY-SS33-0-1; HWY-SS33-1-6
34	Soil	COLORADO SPRINGS CITY OF	GARNER ST	HWY-SS34-0-1; HWY-SS34-1-6
35	Soil	COLORADO SPRINGS CITY OF	11/14/1967	HWY-SS35-0-1; HWY-SS35-1-6

Notes:

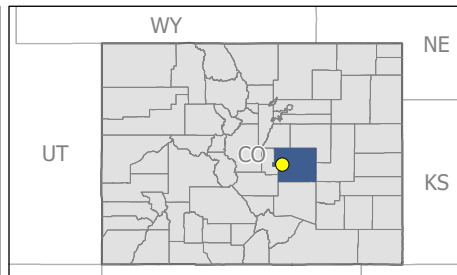
* = Field duplicate sample location

FIGURES



Notes:

Source:
 Background: ESRI World Imagery
 Rivers/Streams: USGS National Hydrography Data Set (NHD)
 Wetlands: US Fish and Wildlife NWI
 Spatial Reference: WGS 1984 Web Mercator Auxiliary Sphere
 Coordinate System



United States
Environmental
Protection Agency

Region 8 START V
 TD: 2083-2208-02

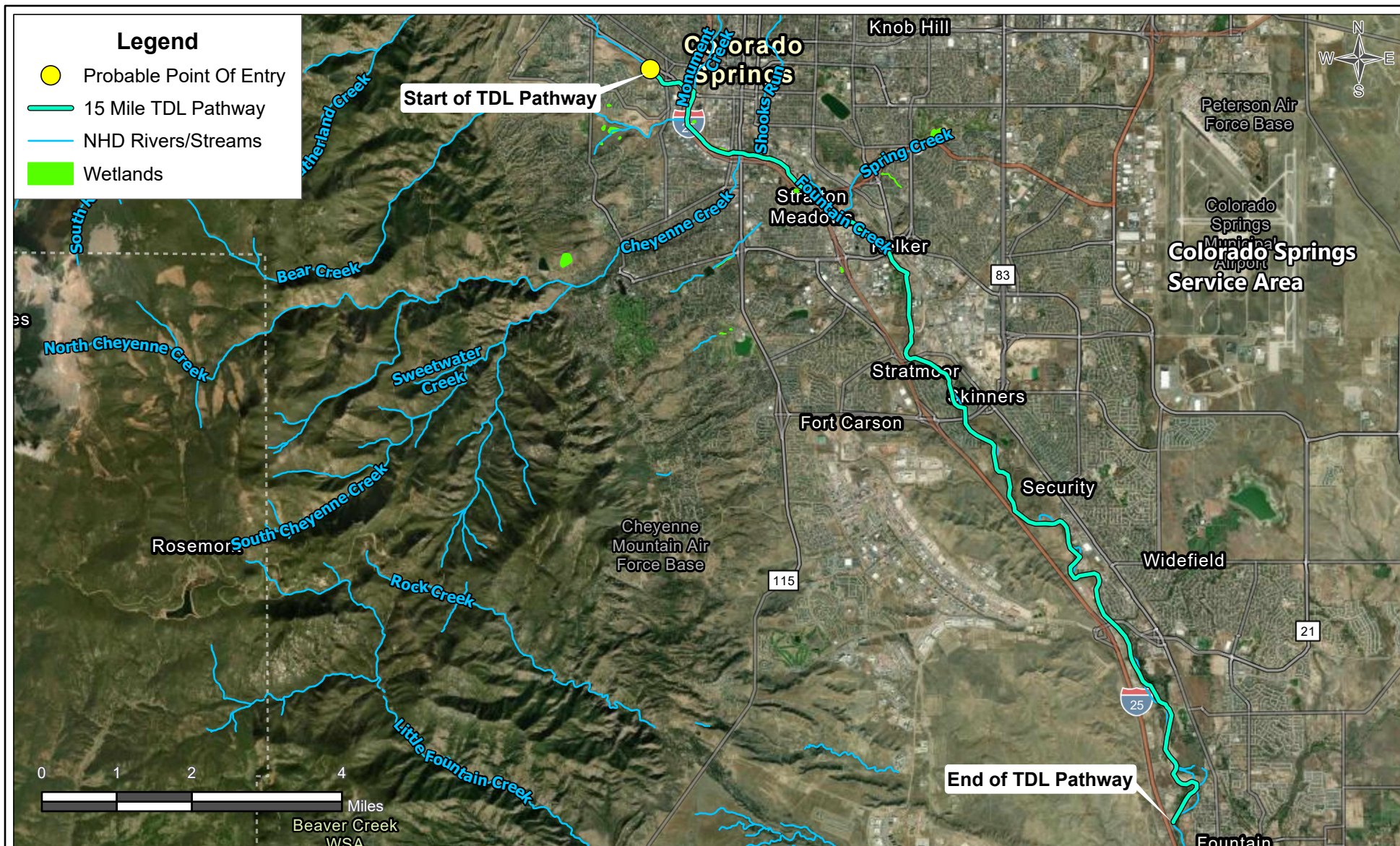


TETRA TECH

Analyst: M. Caldwell
 Date: 5/16/2023

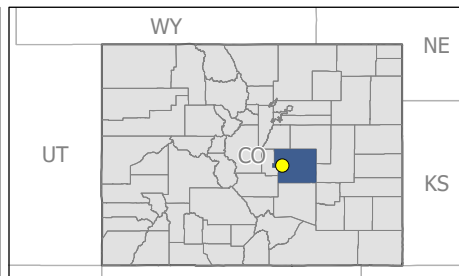
Garner Street Soils Site
 Colorado Springs, El Paso County
 Colorado

Figure 1
4-Mile Radius Target
Distance Limit



Notes:

Source:
 Background: ESRI World Imagery
 NHD Rivers/Streams: USGS National Hydrography Data Set (NHD)
 Wetlands: US Fish and Wildlife NWI
Spatial Reference: WGS 1984 Web Mercator Auxiliary Sphere Coordinate System



United States
Environmental
Protection Agency

Region 8 START V
TD: 2083-2208-02



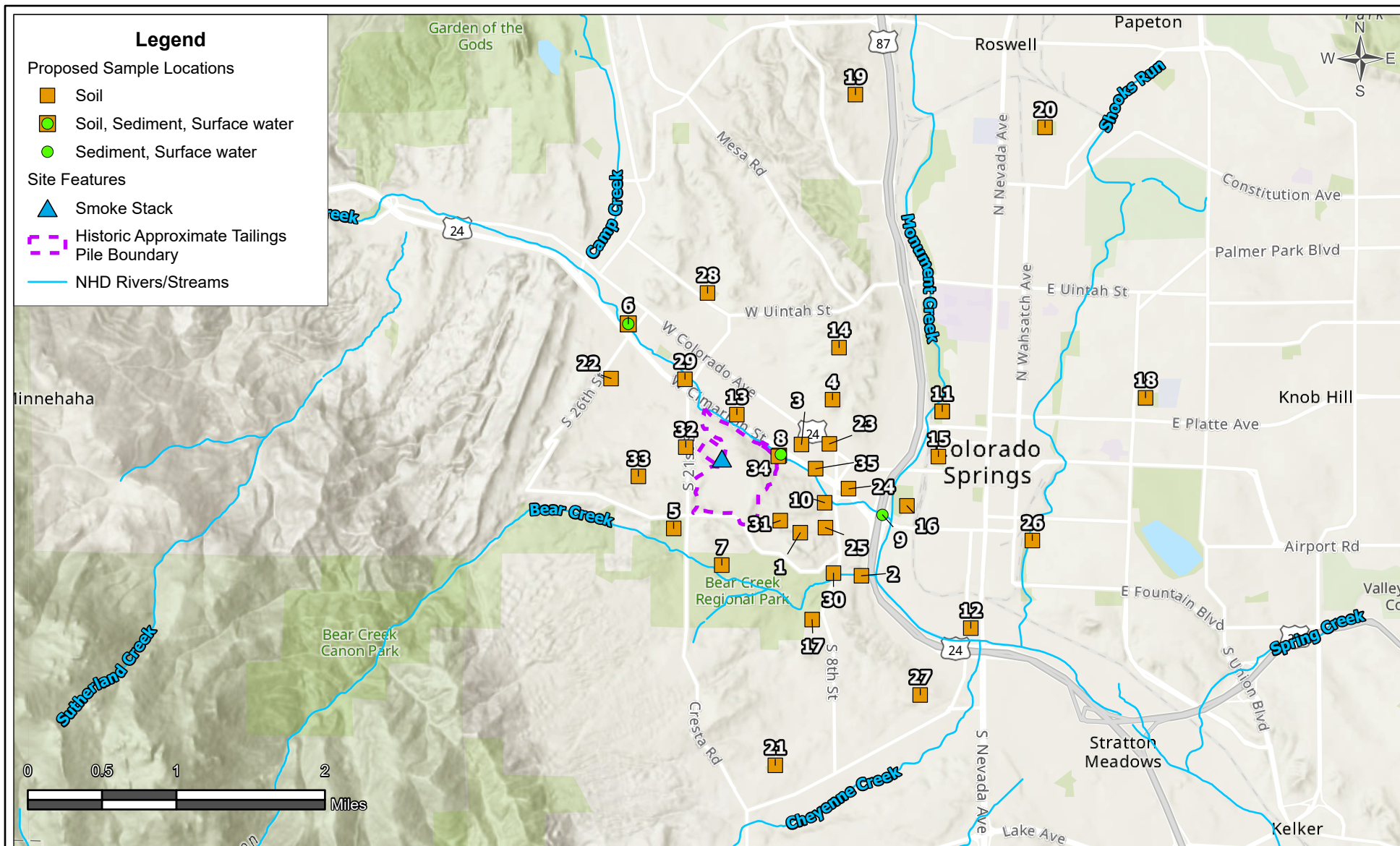
TETRA TECH

Analyst: M. Caldwell
Date: 5/16/2023

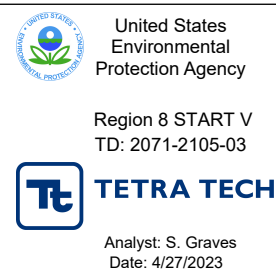
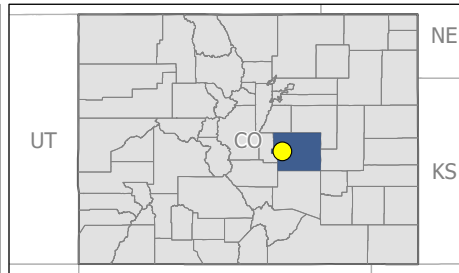
Hwy 24 Mill Site

Colorado Springs, El Paso County
Colorado

Figure 2
15 Mile Downstream Target
Distance Limit



Source:
 Background: Esri Topographic Map
 Proposed Sample Locations: EPA/START (2023)
 Smoke Stack and Tailings Pile: digitized from the On Site
 Sample Locations Figure (Morrison Knudsen Corp, June 1994)
 NHD Rivers/Streams: USGS NHD Data Set
 Spatial Reference: WGS 1984 Web Mercator Auxiliary Sphere
 Coordinate System



Highway 24 Mill Site Inspection
 Colorado Springs, El Paso County, Colorado

Figure 3
Proposed Sample Locations

Attachment 1
Site-Specific Analyses by Matrix

Potential Contaminants of Interest, Laboratory Limits and Action Levels

Matrix = Soil				
Site: Highway 24 Mill Site (Colorado Springs, CO)			Project Title: Highway 24 Mill Site Inspection	
Analyte (Potential Contamination of Interest)	Laboratory Method Detection Limit (mg/kg)	Laboratory Minimum Reporting Limit (mg/kg)	Fraction Evaluated (total or dissolved)	Project Screening Requirements (mg/kg)
				Res. RSL
Aluminum	TBD based on lab	NE	Total	77,000
Antimony		1		31
Arsenic		0.5		0.7
Barium		5		15,000
Beryllium		0.5		160
Cadmium		0.5		7
Calcium		NE		NE
Chromium		1		NE
Cobalt		0.50		7
Copper		1		3,100
Iron		NE		55,000
Lead		0.5		400
Magnesium		NE		NE
Manganese		0.5		1,800
Nickel		0.5		1,500
Potassium		NE		NE
Selenium		2.5		390
Silver		0.5		390
Sodium		NE		NE
Thallium		0.5		0.8
Vanadium		2.5		390
Zinc		2.5		23,000
Mercury		0.1		11

Notes:

TBD = To Be Determined.

NE = Not Established

mg/kg = milligrams per kilogram

Res. RSL = EPA Regional Screening Level for Residential Soil November 2022 (TR=1.0E-06, HQ=1.0)

Matrix = Sediment

Site: Highway 24 Mill Site (Colorado Springs, CO)			Project Title: Highway 24 Mill Site Inspection	
Analyte (Potential Contamination of Interest)	Laboratory Method Detection Limit (mg/kg)	Laboratory Minimum Reporting Limit (mg/kg)	Fraction Evaluated (total or dissolved)	Project Screening Requirements (mg/kg)
				Consensus-Based PEC
Aluminum	TBD based on lab	NE	Total	NE
Antimony		1		NE
Arsenic		0.5		33
Barium		5		NE
Beryllium		0.5		NE
Cadmium		0.5		4.98
Calcium		NE		NE
Chromium		1		111
Cobalt		0.50		NE
Copper		1		149
Iron		NE		NE
Lead		0.5		128
Magnesium		NE		NE
Manganese		0.5		NE
Nickel		0.5		48.6
Potassium		NE		NE
Selenium		2.5		NE
Silver		0.5		NE
Sodium		NE		NE
Thallium		0.5		NE
Vanadium		2.5		NE
Zinc		2.5		459
Mercury		0.1		1.06

Notes:

mg/kg = milligrams per kilogram

PEC = Probable Effect Concentrations

NE = Not Established

Matrix = Surface Water

Site: Highway 24 Mill Site (Colorado Springs, CO)			Project Title: Highway 24 Mill Site Inspection		
Analyte (Potential Contamination of Interest)	Laboratory Method Detection Limit (µg/L)	Laboratory Minimum Reporting Limit (µg/L)	Fraction Evaluated (total or dissolved)	Project Screening Requirements (ug/L) ¹	
				EPA Tap-water RSL	CO Water Quality Standard
Aluminum	TBD based on lab	20	Total & Dissolved	20,000	73 ^{(a)(2)}
Antimony		2		7.8	5.6 ^(c)
Arsenic		1		0.052	0.02 ^(c)
Barium		10		3,800	490 ^(b)
Beryllium		1		25	4.0 ^(b)
Cadmium		1		1.8	0.25 ^{(a)(2)}
Calcium		500		NE	NE
Chromium		2		NE	11 ^(a)
Cobalt		1		6.0	NE
Copper		2		8.0	2.7 ^{(a)(2)}
Iron		200		14,000	300 ^(b)
Lead		1		NE	0.54 ^{(a)(2)}
Magnesium		500		NE	NE
Manganese		0.5		NE	50 ^(b)
Nickel		1		NE	16 ^{(a)(2)}
Potassium		500		NE	NE
Selenium		5		100	4.6 ^(a)
Silver		1		94	0.03 ^{(a)(2)}
Sodium		500		NE	NE
Thallium		1		0.20	0.24 ^(c)
Vanadium		5		86	NE
Zinc		5		6,000	2,000 ^(c) or TBD*
Mercury		0.2	Total	NE	2.0 ^(d)
Bromide		0.5	Total	NE	NE
Chloride		0.5		NE	250 ^(b) (mg/L)
Fluoride		0.2		800	2.0 ^(d) (mg/L)
Nitrate		0.2		32,000	10 ^(d) (mg/L)
Nitrite		0.2		2,000	1.0 ^(d) (mg/L)
Orthophosphate		0.2		NE	NE
Sulfate		0.5	Dissolved	NE	250 ^(b) (mg/L)

Notes:

Where multiple criteria apply to CO Water Quality Standard, the lowest value will apply.

TBD = To Be Determined.

mg/L = milligrams per liter

ug/L = micrograms per liter

NE = Not Established

NA = Not Applicable

1 = Units reported in ug/L unless otherwise stated

2 = Based on default hardness value of 25mg/L

a = Chronic Aquatic Life Standard (CO Regulation 31: The Basic Standards and Methodologies for Surface Water)

b = Domestic Water Supply; Chronic (CO Regulation 31: The Basic Standards and Methodologies for Surface Water)

c = Water + Fish; Chronic (CO Regulation 31: The Basic Standards and Methodologies for Surface Water)

d = Domestic Water Supply; Acute (CO Regulation 31: The Basic Standards and Methodologies for Surface Water)

e = Agriculture; Chronic (CO Regulation 31: The Basic Standards and Methodologies for Surface Water)

Attachment 2

Site-Specific Data Management Summary

Site-Specific Data Management Summary

The Superfund Technical Assessment Response Team (START) will follow the processes described in the Regional Data Management Plan (DMP), approved April 2022 and complete the following tables to document an understanding of the site-specific data management activities associated with the project.

Data Stream Summary

Site: Highway 24 Mill Site (Colorado Springs, CO)			Project Title: Highway 24 Mill Site Inspection		
Data Streams	Data Type	Data Type Description	Collection Tools	Deliverable(s)	Repository
Recon/Site Data	Field Observations	Georeferenced data associated with a recon/site visit	Field Logbook Survey123	Site Figures	Region 8 DB Server, EPA GeoPlatform Deliverable: EPA SA Teams/Share Point Site
	Field Mapping	Georeferenced spatial data (points, lines, areas) associated with a recon/site visit.	Survey123	Geospatial Map Viewer Site Figures	
	Field Photos	Georeferenced photos associated with a recon/site visit	Survey123	None	
Sampling Data	Sampling	Sample descriptors and location data	Survey 123 Scribe	Scribe Project	Region 8 DB Server, Scribe.NET Deliverable: EPA SA Teams/Share Point Site
	Analytical	Soil Surface Water Sediment	Laboratory EDD		
	Monitoring	Water Quality Parameters	YSI		
Other Data/Existing Information	None	None	None	None	None

Note: Modify default table entries as needed to accurately capture data streams and deviations from the DMP. Delete rows that are not relevant to the project.

DB – Database

EDD – Electronic Data Deliverable

EPA – U.S. Environmental Protection Agency

GIS – Geographic Information System

UAS – Unmanned Aerial System

QAPP – Program Quality Assurance Project Plan

Data Reporting/Visualization Summary

Site: Highway 24 Mill Site (Colorado Springs, CO)		Project Title: Highway 24 Mill Site Inspection	
Task	Deliverable	Format	Repository
Conduct a Site Inspection	Trip Report and Site Inspection Report	PDF Report	EPA SA Teams/SharePoint Site
Create an interactive geospatial map viewer	Esri Map Viewer	Esri Map Viewer	Hosted on EPA GeoPlatform

Attachment 3
EPA Region 8 Quality Assurance
Document Review Crosswalk

Quality Assurance Project Plan for Region 8 Site Assessment Task Orders, Revision 3, March 2023; with Sampling and Analysis Plan for the Highway 24 Mill Site

EPA REGION 8 QA DOCUMENT REVIEW CROSSWALK

QAPP/FSP/SAP for: (check appropriate box)	Entity (grantee, contract, EPA AO, EPA Program, Other)	Regulatory Authority	2 CFR 1500 for Grantee/Cooperative Agreements
<input type="checkbox"/> GRANTEE	Tetra Tech, Inc.	and/or	<input checked="" type="checkbox"/> 48 CFR 46 for Contracts
<input checked="" type="checkbox"/> CONTRACTOR			<input type="checkbox"/> Interagency Agreement (FFA, USGS)
<input type="checkbox"/> EPA			<input type="checkbox"/> EPA/Court Order
<input type="checkbox"/> Other			<input type="checkbox"/> EPA Program Funding
Document Title [Note: Title will be repeated in Header]	Quality Assurance Project Plan for Region 8 Site Assessment Task Orders, Revision 3, March 2023; with Sampling and Analysis Plan for the Highway 24 Mill Site	Funding Mechanism	<input type="checkbox"/> EPA Program Regulation
QAPP/FSP/SAP Preparer	Tetra Tech, Inc.		<input type="checkbox"/> EPA CIO 2105
Period of Performance (of QAPP/FSP/SAP)	March 2023 to February 2028 (SA QAPP); and for schedule indicated in this Sampling and Analysis Plan	Date Submitted for Review	5/5/23
EPA Project Officer	Ryan Dunham	PO Phone #	
EPA Project Manager		PM Phone #	
QA Program Reviewer or Approving Official	Teresa Williams	Date of Review	

Documents Submitted for QAPP Review (QA Reviewer must complete):

1. QA Document(s) submitted for review:

QA Document	Document Date	Document Stand-alone	Document with QAPP
QAPP	March 2023	No – QAPP + SAP	
FSP			
SAP	NA, SAP template	No	Yes
SOP(s)			

2. WP/SOW/TO/PP/RP Date _____
WP/SOW/TO/RP Performance Period _____

3. QA document consistent with the:
 WP/SOW/PP for grants? ☐ Yes / ☐ No
 SOW/TO for contracts? ☐ Yes / ☐ No

4. QARF signed by R8 QAM ☐ Yes / ☐ No / ☐ NA
Funding Mechanism ☐ IA / ☒ contract / ☐ grant / ☐ NA
Amount _____

Notes for Document Submittals:

- A QAPP written by a Grantee, EPA, or Federal Partner must include for review: Work Plan(WP) / Statement of Work (SOW) / Program Plan (PP) / Research Proposal (RP) and funding mechanism
- A QAPP written by Contractor must include for review:
 - Copy of Task Order Work Assignment/SOW
 - Reference to a hard or electronic copy of the contractor's approved QMP
 - Copy of Contract SOW if no QMP has been approved
 - Copy of EPA/Court Order, if applicable
 - The QA Review must determine (with the EPA CO or PO) if a QARF was completed for the environmental data activity described in the QAPP.
- Field Sampling Plan (FSP) and/or Sampling & Analyses Plan (SAP) must include the Project QAPP or must be a stand-alone QA document that contain all QAPP required elements (Project Management, Data Generation/Acquisition, Assessment and Oversight, and Data Validation and Usability).
 - SOPs must be submitted with a QA document that contains all QAPP required elements.

Summary of Comments (highlight significant concerns/issues): The Tetra Tech, Inc. **must address the comments in the Summary of Comments, as well as those identified in the Comment Sec(s) that includes a "Response (date)" and Resolved (date)".**

Quality Assurance Project Plan for Region 8 Site Assessment Task Orders, Revision 3, March 2023; with Sampling and Analysis Plan for the Highway 24 Mill Site

Element	Acceptable Yes/No/NA	Page/ Sec	Comments
A. Project Management			
A1. Title and Approval Sheet			
a. Contains project title	Yes	QAPP Title Page and Page iv SAP (table at top of page 1)	Acronyms: Att = Attachment; SAP = Sampling and Analysis Plan; QAPP = Quality Assurance Project Plan; SAP = Sampling and Analysis Plan; Sec = Section
b. Date and revision number line (for when needed)	Yes	QAPP Title Page and text headers SAP (table at top of page 1)	
c. Indicates organization's name	Yes	QAPP Title Page SAP (table at top of page 1, see Prepared by:)"	
d. Date and signature line for organization's project manager	Yes	QAPP Page iv (program manager) SAP (Section 1.0, project manager)	
e. Date and signature line for organization's QA manager	Yes	QAPP Page iv SAP Section 1.0 (table)	
f. Other date and signatures lines, as needed	Yes	QAPP Page iv SAP Section 1.0 (table)	
A2. Table of Contents			
a. Lists QA Project Plan information Secs	Yes	QAPP Pages i-iii SAP N/A	
b. Document control information indicated	Yes	QAPP (title page) SAP (table on page 1)	
A3. Distribution List			
Includes all individuals who are to receive a copy of the QA Project Plan and identifies their organization	Yes	QAPP Page v, Table 1, SAP (Section 2.1 table)	
A4. Project/Task Organization			
a. Identifies key individuals involved in all major aspects of the project, including contractors	Yes	QAPP Sec 2.1, Pages 3-9, Sec 2.1, Exhibit 1, and Table 2 SAP (Sec 2.1)	

Quality Assurance Project Plan for Region 8 Site Assessment Task Orders, Revision 3, March 2023; with Sampling and Analysis Plan for the Highway 24 Mill Site

Element	Acceptable Yes/No/NA	Page/ Sec	Comments
b. Discusses their responsibilities	Yes	QAPP Pages 3-8, Sec 2.1, Figure 1, and Table 2 SAP Sec 2.1	
c. Project QA Manager position indicates independence from unit generating data	Yes	QAPP Page 4, Sec 2.1.6; and Page 7, Figure 1, Project Org; and Page 8, Table 2, row 6	
d. Identifies individual responsible for maintaining the official, approved QA Project Plan	Yes	QAPP Sec 2.1.6, Page 4, Sec 2.1.6, Page 8, Table 2; and Exhibit 1, Page 7	
e. Organizational chart shows lines of authority and reporting responsibilities	Yes	QAPP Exhibit 1, Page 7	
A5. Problem Definition/Background			
a. States decision(s) to be made, actions to be taken, or outcomes expected from the information to be obtained	Yes	QAPP Sec 2.2, Pages 9-11 SAP Sec 2.2	
b. Clearly explains the reason (site background or historical context) for initiating this project	Yes	QAPP Sec 2.3, Pages 11-12, Sec 2.3 SAP Secs 2.2 and 2.3	
c. Identifies regulatory information, applicable criteria, action limits, etc. necessary to the project	Yes	QAPP Sec 1, Pages 1-2, Sec 1; Sec 2.4.3, Page 22 (Action Limits/Levels) Sec 6.0, page 66 (references) SAP, Sec 3.2-3.4 (and Att 1 to SAP, Table 1 with action/screening levels columns)	
A6. Project/Task Description			
a. Summarizes work to be performed, for example, measurements to be made, data files to be obtained, etc., that support the project's goals	Yes	QAPP Sec 2.3, Pages 11-12 SAP (Sec 2.3)	
b. Provides work schedule indicating critical project points, e.g., start and completion dates for activities such as sampling, analysis, data or file reviews, and assessments	Yes	QAPP Section 2.3, Pages 11-12 SAP Sec 2.4	
c. Details geographical locations to be studied, including maps where possible	Yes	QAPP Sec 2.3, page 11 SAP Table on Page 1 (site name, city, state); Secs 2.2-2.3 and Figures	
d. Discusses resource and time constraints, if	Yes	QAPP Sec 2.3, Page 11	

Quality Assurance Project Plan for Region 8 Site Assessment Task Orders, Revision 3, March 2023; with Sampling and Analysis Plan for the Highway 24 Mill Site

Element	Acceptable Yes/No/NA	Page/ Sec	Comments
applicable		SAP Secs 2.3 and 2.4 (with table)	
A7. Quality Objectives and Criteria			
a. Identifies: - performance/measurement criteria for all information to be collected and acceptance criteria for information obtained from previous studies, - including project action limits and laboratory detection limits, and - range of anticipated concentrations of each parameter of interest	Yes	QAPP Sec 2.4, Pages 13-24, including Table 3 and Sec 2.4.3, pages 22-23; Sec 5.3.4, Page 61-62; Appendix A (new Table A-2) SAP Sec 2.5, Sec 3.4 (Att 1 to SAP, tables with matrices for each medium showing detection/reporting limits)	
b. Discusses precision	Yes	QAPP Sec 2.4.1.6 and Table 3, pages 15-18; Sec 2.4.2.1, Pages 18-19 and Section 5.3.1, Pages 55-56; Appendix A (new Table A-2) SAP Sec 2.5	
c. Addresses bias	Yes	QAPP Sec 2.4.1.6 and Table 3, pages 15-18; Sec 2.4.2.4; Pages 19-21 Section 5.3.2, Pages 57-60; Appendix A (new Table A-2) SAP Sec 2.5	
d. Discusses representativeness	Yes	QAPP Sec 2.4.1.6 and Table 3, pages 15-18; Sec 2.4.2.2, Pages 19-21, Sec 5.3.3, Page 60; Appendix A (new Table A-2) SAP Sec 2.5	
e. Identifies the need for completeness	Yes	QAPP Sec 2.4.1.6 and Table 3, pages 15-18; Sec 2.4.2.3, Page 21; Sec 5.3.5, Page 62; Appendix A (new Table A-2) SAP Sec 2.5	
f. Describes the need for comparability	Yes	QAPP Sec 2.4.1.6 and Table 3, pages 15-18; Sec 2.4.2.4, Page 21; Sec 5.3.6, Pages 63-64; Appendix A (new Table A-2) SAP Sec 2.5	

Quality Assurance Project Plan for Region 8 Site Assessment Task Orders, Revision 3, March 2023; with Sampling and Analysis Plan for the Highway 24 Mill Site

Element	Acceptable Yes/No/NA	Page/ Sec	Comments
g. Discusses desired method sensitivity	Yes	QAPP Sec 2.4.1.6 and Table 3, Page 15-18; Sec 2.4.2.5, Pages 21-22; Sec 5.3.4, Pages 64-65; Appendix A (new Table A-2); App B (Field Equipment) SAP (Sec 2.5)	
A8. Special Training/Certifications			
a. Identifies any project personnel specialized training or certifications	Yes	QAPP Table 2, Pages 8-9 and Sec 2.5, Pages 23-24 SAP Sec 2.6	
b. Discusses how this training will be provided	Yes	QAPP Table 2, Pages 8-9 and Sec 2.5, Pages 23-24	
c. Indicates personnel responsible for assuring training/certifications are satisfied	Yes	QAPP Sec 2.1 (responsibilities), page 3-7; Table 2, Pages 8-9 and Sec 2.5, Pages 23-24	
d. identifies where this information is documented	Yes	QAPP Table 2, Pages 8-9 and Sec 2.5, Pages 23-24	
A9. Documentation and Records			
a. Identifies report format and summarizes all data report package information	Yes	QAPP Sec 1.0, page 1 (SA guidance); Sec 2.6, Page 24-26 (SA report content); Sec 3.3.1, Pages 31-34 (Sample and Documentation); Sec 3.10, Pages 43-44 (Data Management) SAP Sec 2.7 and Att 2 to SAP - SSDMS	Acronym: SSDMS = Site-Specific Data Management Summary
b. Lists all other project documents, records, and electronic files that will be produced	Yes	QAPP Sec 2.6, Pages 24-26; Sec 3.3.1, Pages 31-34 (Sample and Field Documentation); Sec 3.10, Pages 43-44 (Data Management) SAP Sec 2.7 and Att 2 to SAP - SSDMS	
c. Identifies where project information should be kept and for how long	Yes	QAPP Sec 2.6, Pages 24-26; Sec 3.3.1, Pages 31-34; Sec 3.10, Page 43-44; Sec 4.3, Page 49-50; SAP Sec 2.7 and Att 2 to SAP –	Sec 4.3 also refers to the contract and the contract Quality Management Plan which also addresses records management and retention.

Quality Assurance Project Plan for Region 8 Site Assessment Task Orders, Revision 3, March 2023; with Sampling and Analysis Plan for the Highway 24 Mill Site

Element	Acceptable Yes/No/NA	Page/ Sec	Comments
		SSDMS	
d. Discusses back up plans for records stored electronically	Yes	QAPP Sec 2.6, Pages 24-26; Sec 3.10, Page 43-44 SAP Sec 2.7 and Att 2 to SAP - SSDMS	
e. States how individuals identified in A3 will receive the most current copy of the approved QA Project Plan, identifying the individual responsible for this	Yes	QAPP Sec 2.1.6, Page 4 (Roles and Responsibilities); Sec 2.6, Pages 24-26 (Documentation and Records, first full paragraph, page 25)	
B. Data Generation/Acquisition			
B1. Sampling Process Design (Experimental Design)			
a. Describes and justifies design strategy, indicating size of the area, volume, or time period to be represented by a sample	Yes	QAPP Sec 3.1, Pages 27 SAP Secs 2.2, 2.3, 2.5.7.1, 3.1 and Figures 2-3	
b. Details the type and total number of sample types/matrix or test runs/trials expected and needed	Yes	QAPP Sec 3.1, Page 27 SAP Secs 3.1 and 3.2, Tables 1 and 2	
c. Indicates where samples should be taken, how sites will be identified/located	Yes	QAPP Sec 2.4, Page (Project Task/Description), Pages 11-12, Sec 2.4 1, Pages 13-16 (DQOs); and Sec 3.1, Page 27 (Sampling Process Design) SAP, Sec 3.1, Table 1, and Figures 1-3	
d. Discusses what to do if sampling sites become inaccessible.	Yes	QAPP Sec 2.3, Page 12 (bullets) and Sec 5.1, page 51 (field deviations) SAP, Sec 3.1 (bullets)	
e. Identifies project activity schedules such as each sampling event, times samples should be sent to the laboratory, etc.	Yes	QAPP, page 11-12, Section 2.3 (bottom page 12 states where schedule is provided in SAP); App A (addresses holding times) SAP Sec 2.4 (project schedule) and Table 2 (holding times)	
f. Specifies what information is critical and what is for informational purposes only	Yes	QAPP Sec 2.4.1.7, Page 16 SAP, Sec 2.5 (table of data types and	

Quality Assurance Project Plan for Region 8 Site Assessment Task Orders, Revision 3, March 2023; with Sampling and Analysis Plan for the Highway 24 Mill Site

Element	Acceptable Yes/No/NA	Page/ Sec	Comments
		purposes)	
g. Identifies sources of variability and how this variability should be reconciled with project information	Yes	QAPP Sec 3.9, Page 43; Sec 5.3.1, Pages 57-58; Sec 5.3.3, Page 62 SAP Sec 5.0	
B2. Sampling Methods			
a. Identifies all sampling SOPs by number, date, and regulatory citation, indicating sampling options or modifications to be taken	Yes	QAPP Secs 3.1-3.3, Pages 27-34 (specifically, Sec 3.2, page 28) and App C (List of SOPs) SAP Sec 3.2, sampling methods and table of SOPs	Each project-specific SAP identifies the media to be sampled, sampling procedures, sample identification, sample custody procedures, and relevant SOPs. The SAP attaches the referenced EPA, state, or Tetra Tech SOPs identified for the site work.
b. Indicates how each sample/matrix type should be collected	Yes	QAPP Secs 3.1-3.3, Pages 27-34 (specifically, Sec 3.2, page 27) and App C (List of SOPs) SAP Sec 3.2, sampling methods and table of SOPs	
c. If in situ monitoring, indicates how instruments should be deployed and operated to avoid contamination and ensure maintenance of proper data	Yes	QAPP Sec 3.7.1 (page 40); App B (Field Equip.) SAP Secs 3.1 and 3.2	Note: Generally, in-situ monitoring is not conducted for Site Assessment (SA) projects. Details on any such monitoring would be included in a project-specific SAP (if this requirement arose due to EPA direction and/or SA project needs).
d. If continuous monitoring, indicates averaging time and how instruments should store and maintain raw data, or data averages	N/A	Sec 3.7.1 (page 40); QAPP App B (Field Equipment) SAP Sec 3.2	Note: Generally, continuous monitoring is not conducted for SA projects. Details on any such monitoring would be included in a project-specific SAP (if this requirement arose due to EPA direction or SA project needs).
e. Indicates how samples are to be homogenized, composited, split, or filtered, if needed	Yes	QAPP Sec 3.2, page 28 (sampling methods), App C (List of SOPs) SAP Sec 3.2, sampling methods, including table of SOPs	

Quality Assurance Project Plan for Region 8 Site Assessment Task Orders, Revision 3, March 2023; with Sampling and Analysis Plan for the Highway 24 Mill Site

Element	Acceptable Yes/No/NA	Page/ Sec	Comments
f. Indicates what sample containers and sample volumes should be used	Yes	QAPP Sec 3.2, Page 28 (sampling methods); Appendix A (Table A-1, QA/QC Sample Requirements and Sample Container, Preservation, and Holding Time Requirements) SAP Table 2	
g. Identifies whether samples should be preserved and indicates methods that should be followed	Yes	QAPP Appendix A (Table A-1, QA/QC Sample Requirements and Sample Container, Preservation, and Holding Time Requirements) and C (List of SOPs) SAP Table 2	
h. Indicates whether sampling equipment and samplers should be cleaned and/or decontaminated, identifying how this should be done and by-products disposed of	Yes	QAPP Sec 3.2, page 28 (sampling methods); Att C (List of SOPs) (for example SOPs #2006, #2049; and SOP 002-5) SAP Sec 3.2, table with SOPs	
i. Identifies any equipment and support facilities needed	Yes	QAPP Appendix B (Field Equipment) SAP Section 3.2	
j. Addresses actions to be taken when problems occur, identifying individual(s) responsible for corrective action and how this should be documented	Yes	QAPP Sec 2.1, Pages 3-8; Sec 3.5, Pages 37-38; Sec 4.0, Page 45-49; Sec 5.0, Pages 50-64 SAP Secs 4.0 and 5.0	
B3. Sample Handling and Custody			
a. States maximum holding times allowed from sample collection to extraction and/or analysis for each sample type and, for in-situ or continuous monitoring, the maximum time before retrieval of information	Yes	QAPP Sec 3.3, Pages 30-34 (particularly Sec 3.2); Appendix A (Table A-1, QA/QC Sample Requirements and Sample Container, Preservation and Holding Time Requirements); Appendix C (List of SOPs) SAP Sec 3.3 and Table 2	

Quality Assurance Project Plan for Region 8 Site Assessment Task Orders, Revision 3, March 2023; with Sampling and Analysis Plan for the Highway 24 Mill Site

Element	Acceptable Yes/No/NA	Page/ Sec	Comments
b. Identifies how samples or information should be physically handled, transported, and then received and held in the laboratory or office (including temperature upon receipt)	Yes	QAPP Sec 3.3, Pages 30-34; Appendix C (List of SOPs) SAP Sec 3.3 and Table 2	
c. Indicates how sample or information handling and custody information should be documented, such as in field notebooks and forms, identifying individual responsible	Yes	QAPP Sec 2.1, Pages 3-8 (roles and responsibilities); Sec 3.3, Pages 30-34; Appendix C (List of SOPs) SAP Secs 2.7, 3.3, and Att 2 - SSDMS	
d. Discusses system for identifying samples, for example, numbering system, sample tags and labels, and attaches forms to the plan	Yes	QAPP Sec 3.3, Pages 30-34 SAP Sec 3.3 and Att 2 - SSDMS	
e. Identifies chain-of-custody procedures and includes form to track custody	Yes	QAPP Sec 3.3, Pages 30-34; Appendix A (Table A-1, QA/QC Sample Requirements and Sample Container, Preservation and Holding Time Requirements); Appendix C (List of SOPs) SAP Sec 3.3 and Att 2 - SSDMS	
B4. Analytical Methods			
a. Identifies all analytical SOPs (field, laboratory and/or office) that should be followed by number, date, and regulatory citation, indicating options or modifications to be taken, such as sub-sampling and extraction procedures	Yes	QAPP Sec 3.4, Pages 35-36, Sec. 3.5, Pages 37-48; Appendix A (Table A-1, Analytical); B (Field Equipment); and C (List of SOPs) SAP Sec 3.2, Table 2, and Att 1	
b. Identifies equipment or instrumentation needed	Yes	QAPP, Appendices A, B, and C SAP Sec 3.2, Table 2, and Att 1	
c. Specifies any specific method performance criteria	Yes	QAPP Sec 2.4, Pages 13-24 (QA/QC Objectives for Measurement); Sec 3.5, Pages 37-38; Sec 5.0, Pages 50-64 (including PARCCS criteria and Table 3) Sec 2.6.1 (Precision); App A (Tables A-1 and A-2), B (Field Equipment), and C (list of SOPs) SAP Secs 3.4 and 3.5 and Table 2 and	

Quality Assurance Project Plan for Region 8 Site Assessment Task Orders, Revision 3, March 2023; with Sampling and Analysis Plan for the Highway 24 Mill Site

Element	Acceptable Yes/No/NA	Page/ Sec	Comments
		Att 1 to SAP, site-specific analyses by matrix	
d. Identifies procedures to follow when failures occur, identifying individual responsible for corrective action and appropriate documentation	Yes	QAPP Sec 2.1, Page 7 (responsible parties); Sec 4.0 Pages 45-47 (Assessment and Oversight), Sec 5.0, pages 51-53 (Data Validation and Usability), Pages 50-64) SAP Secs 4.0 and 5.0	
e. Identifies sample disposal procedures	Yes	QAPP, Sec 2.1.10 and 2.1.11, Page 6 (roles and responsibilities) SAP Secs 3.2 (SOPs) and 3.3 (Sample Handling and Custody)	
f. Specifies laboratory turnaround times needed	Yes	QAPP, Sec 2.3, Page 11 SAP Sec 3.4	
g. Provides method validation information and SOPs for nonstandard methods	Yes	QAPP Sec 5.0, Pages 50-54 SAP Secs 3.2 and 5.0 and Table 2	
B5. Quality Control			
a. For each type of sampling, analysis, or measurement technique, identifies QC activities which should be used, for example, blanks, spikes, duplicates, etc., and at what frequency	Yes	QAPP Sec 3.5, Pages 37-38, Appendix A (Table A-1, QA/QC Sample Requirements and Sample Container, Preservation, and Holding Time Requirements) SAP Sec 3.5, Table 2	
b. Details what should be done when control limits are exceeded, and how effectiveness of control actions will be determined and documented	Yes	QAPP, Section 5.3, Pages 54-64 SAP Sections 4.0 and 5.0	
c. Identifies procedures and formulas for calculating applicable QC statistics, for example, for precision, bias, outliers and missing data	Yes	QAPP Sec 5.3, Pages 54-64 SAP Sec 5.0	

Quality Assurance Project Plan for Region 8 Site Assessment Task Orders, Revision 3, March 2023; with Sampling and Analysis Plan for the Highway 24 Mill Site

Element	Acceptable Yes/No/NA	Page/ Sec	Comments
B6. Instrument/Equipment Testing, Inspection, and Maintenance			
a. Identifies field and laboratory equipment needing periodic maintenance, and the schedule for this	Yes	QAPP Sec 3.5.1, Page 37; Sec 3.7.1, Page 40; Sec 4.1.2, Page 46; and App B (Field Equipment) SAP Sec 3.2	
b. Identifies testing criteria	Yes	QAPP Sec 3.5, Pages 34 and 35; App A (Tables A-1 and A-2; (Field Equipment) SAP Sec 3.2	
c. Notes availability and location of spare parts	Yes	QAPP Sec 3.6, Page 38-40, Sec 4.1.2., and Appendix B (Field Equipment) SAP Sec 3.2	
d. Indicates procedures in place for inspecting equipment before usage	Yes	QAPP Secs 4.1.1 and 4.1.2, Pages 45-56; Sec; Appendix B (Field Equipment) SAP Sec 3.2	
e. Identifies individual(s) responsible for testing, inspection and maintenance	Yes	QAPP, Secs 2.1.8, 2.1.9, 2.1.11, Pages 4-6; Sec 3.6, Pages 38-39 and Sec 3.7, Pages 39-41 SAP Secs 2.1 and 3.2	
f. Indicates how deficiencies found should be resolved, re-inspections performed, and effectiveness of corrective action determined and documented	Yes	QAPP Sec 4.0, Pages 45-49 SAP Secs 4.0 and 5.0	
B7. Instrument/Equipment Calibration and Frequency			
a. Identifies equipment, tools, and instruments that should be calibrated and the frequency for this calibration	Yes	QAPP Sec 2.4.3.2, Page 22; Sec 3.5.1, Page 37; Sec 3.7.1, Page 40; Sec 4.1.2, Page 46; and App B (Field Equipment) SAP Sec 3.2	
b. Describes how calibrations should be performed and documented, indicating test criteria and standards or certified equipment	Yes	QAPP Sec 2.4.3.2, Page 22; Sec 3.5.1, Page 37; Sec 3.7.1, Page 40; Sec 4.1.2, Page 46; and App B (Field Equipment)	

Quality Assurance Project Plan for Region 8 Site Assessment Task Orders, Revision 3, March 2023; with Sampling and Analysis Plan for the Highway 24 Mill Site

Element	Acceptable Yes/No/NA	Page/ Sec	Comments
		SAP Sec 3.2	
c. Identifies how deficiencies should be resolved and documented	Yes	QAPP Sec 2.4.3.2, Page 22; Sec 3.5.1, Page 37; Sec 3.7.1, Page 40; Sec 4.1.2, Page 46; and App B (Field Equipment) SAP Secs 3.2 and 5.0	
B8. Inspection/Acceptance for Supplies and Consumables			
a. Identifies critical supplies and consumables for field and laboratory, noting supply source, acceptance criteria, and procedures for tracking, storing and retrieving these materials	Yes	QAPP Sec 3.8, Page 42 SAP Sec 3.2	
b. Identifies the individual(s) responsible for this	Yes	QAPP Sec 2.1.8, 2.1.9, and 2.1.11 Pages 5-6 (roles and responsibilities); Sec 3.8, Page 42 SAP Secs 2.1 and 3.2	
B9. Use of Existing Data (Non-direct Measurements)			
a. Identifies data sources, for example, computer databases or literature files, or models that should be accessed and used	Yes	QAPP Sec 3.9, Page 42 SAP Secs 2.5 and 5.0 and Att 2 to SAP – SSDMS	
b. Describes the intended use of this information and the rationale for their selection, i.e., its relevance to project	Yes	QAPP Sec 3.9, Page 42 SAP Secs 2.5 and 5.0 and Att 2 to SAP – SSDMS	
c. Indicates the acceptance criteria for these data sources and/or models	Yes	QAPP Sec 3.9, Page 42 SAP Secs 2.5 and 5.0 and Att 2 to SAP – SSDMS	
d. Identifies key resources/support facilities needed	Yes	QAPP Sec 3.9, Page 42 SAP Secs 2.5 and 3.2 and Att 2 to SAP – SSDMS	
e. Describes how limits to validity and operating conditions should be determined, for example, internal checks of the program and Beta testing	Yes	QAPP Sec 3.9, Page 42 SAP Secs 2.5 and 3.2 and Att 2 to SAP – SSDMS	

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Element	Acceptable Yes/No/NA	Page/ Sec	Comments
B10. Data Management			
a. Describes data management scheme from field to final use and storage	Yes	QAPP Sec 2.6, Pages 24-26 (Documentation and Records); Sec 3.10, Page 43 (Data Management) SAP Sec 2.5, 3.2, and 3.6; Att 2 to SAP – SSDMS	
b. Discusses standard record-keeping and tracking practices, and the document control system or cites other written documentation such as SOPs	Yes	QAPP Sec 2.6, Pages 24-26 (Documentation and Records); Sec 3.0, 3.3.1, Page 30-34 (Sample Documentation Procedures); Sec 3.10, Page 43 (Data Management) SAP Secs 2.7 and 3.6; Att 2 to SAP – SSDMS	The contract QMP is referenced and includes additional information on document control and records management.
c. Identifies data handling equipment/procedures that should be used to process, compile, analyze, and transmit data reliably and accurately	Yes	QAPP Sec 2.6, Pages 24-26 (Documentation and Records); Sec 3.0, 3.3.1, Page 30-34 (Sample Documentation Procedures); Sec 3.10, Page 43 (Data Management) SAP Secs 3.2, 3.6, and Att 2 to SAP – SSDMS	
d. Identifies individual(s) responsible for this	Yes	QAPP Section 2.1.7, 2.1.8, and 2.1.9 Pages 5-6; QAPP Sec 2.6, Pages 24-26 (Documentation and Records); Sec 3.0, 3.3.1, Page 30-34 (Sample Documentation Procedures); Sec 3.10, Page 43 (Data Management) SAP Sec 2.1, 3.6, and Att 2 to SAP – SSDMS	
e. Describes the process for data archival and retrieval	Yes	QAPP Sec 2.6, Pages 24-26 (Documentation and Records); Sec 3.0, 3.3.1, Page 30-34 (Sample Documentation Procedures); Sec 3.10, Page 43 (Data Management) SAP Sec 2.7 and 3.6; Att 2 to SAP – SSDMS	

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Element	Acceptable Yes/No/NA	Page/ Sec	Comments
f. Describes procedures to demonstrate acceptability of hardware and software configurations	Yes	QAPP Sec 2.6, Pages 24-26 (Documentation and Records); Sec 3.0, 3.3.1, Page 30-34 (Sample Documentation Procedures); Sec 3.10, Page 43 (Data Management) SAP Sec 3.6 and Att 2 to SAP – SSDMS	
g. Attaches checklists and forms that should be used	Yes	QAPP Sec 2.6, Pages 24-26 (Documentation and Records); Sec 3.0, 3.3.1, Page 30-34 (Sample Documentation Procedures); Sec 3.10, Page 43 (Data Management) SAP Sec 3.2 and 3.6 and Att 2 to SAP– SSDMS	
C. Assessment and Oversight			
C1. Assessments and Response Actions			
a. Lists the number, frequency, and type of assessment activities that should be conducted, with the approximate dates	Yes	QAPP Sec 4.0, Pages 45-49 (discussed for each type of assessment or audit) SAP Sec 4.0	
b. Identifies individual(s) responsible for conducting assessments, indicating their authority to issue stop work orders, and any other possible participants in the assessment process	Yes	QAPP Sec 4.0, Pages 45-49 SAP Section 4.0	
c. Describes how and to whom assessment information should be reported	Yes	QAPP Sec 4.0; Pages 40-42 (Reports to Management) SAP Sec 4.0	
d. Identifies how corrective actions should be addressed and by whom, and how they should be verified and documented	Yes	QAPP Sec 4.0, Pages 45-49 (including assessment and response and reports to management) SAP Sec 4.0	

Element	Acceptable Yes/No/NA	Page/ Sec	Comments
C2. Reports to Management			
a. Identifies what project QA status reports are needed and how frequently	Yes	QAPP Secs 4.1 to 4.3, Pages 45-49 SAP Sec 2.4 (Monthly Progress Reports, which include any QA issues) and Sec 4.0	
b. Identifies who should write these reports and who should receive this information	Yes	QAPP Sec 2.1, Pages 3-6 (roles and responsibilities); Sec 4.0, Pages 45-49 SAP Secs 2.1 (project org), 2.4 (Monthly Progress Reports, which include any QA issues) and Sec 4.0	
D. Data Validation and Usability			
D1. Data Review, Verification, and Validation			
Describes criteria that should be used for accepting, rejecting, or qualifying project data	Yes	QAPP Sec 5.0, Pages 50-53 SAP Sec 5.0	
D2. Verification and Validation Methods			
a. Describes process for data verification and validation, providing SOPs and indicating what data validation software should be used, if any	Yes	QAPP Sec 5.0, Pages 50-53 (specifically, 5.2, Verification and Validation Methods, including references of EPA guidance, training of personnel, and SOPs) SAP Sec 5.0	
b. Identifies who is responsible for verifying and validating different components of the project data/information, for example, chain-of-custody forms, receipt logs, calibration information, etc.	Yes	QAPP Sec 2.1, Pages 3-8 (specifically, Sec 2.1.6, Page 4); SAP Sec 2.1, Project/Task Organization	
c. Identifies issue resolution process, and method and individual responsible for conveying these results to data users	Yes	QAPP Sec 2.1, Pages 3-8 (see Sec 2.1.6, Page 4); Sec 5.0, Pages 50-53 (including last ¶ on corrective actions and responsibilities) SAP Secs 4.0 and 5.0	

Element	Acceptable <i>Yes/No/NA</i>	Page/ Sec	Comments
d. Attaches checklists, forms, and calculations	Yes	Sec 5.0, Pages 50-53 (cites National Functional Guidelines, which include checklists, forms, and calculations used and Sec 5.3, includes data quality assessment equations for PARCCS assessment; Appendix A (Table A-2) SAP Sec 3.2, states that relevant forms will be attached or cited	
D3. Reconciliation with User Requirements			
a. Describes procedures to evaluate the uncertainty of the validated data	Yes	QAPP Sec 5.3, Pages 54-64 (Reconciliation with User Requirements) SAP Secs 4.0 and 5.0	
b. Describes how limitations on data use should be reported to the data users	Yes	QAPP Sec 5.3, Pages 54-64, Sec 5.3 (including Sec 5.3.7, Data Limitations and Actions) SAP Sec 5.0	