

Explanation of Significant Differences Joslyn Street Tailings Facility

Helena, Montana



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Waste Management and Remediation Division

Helena, Montana

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Acronyms and Abbreviations

ARM	Administrative Rules of Montana
BNSF	BNSF Railway Company
CALA	Controlled Allocation of Liability Act
CECRA	Comprehensive Environmental Cleanup and Responsibility Act
DEQ	Montana Department of Environmental Quality
EPA	U.S. Environmental Protection Agency
ERCLs	Environmental requirements, criteria, and limitations
ESD	Explanation of Significant Differences
EA	Exposure Area
IC	Institutional Control
JST	Joslyn Street Tailings Facility
MCA	Montana Code Annotated
µg/L	Micrograms per liter (parts per billion)
mg/kg	Milligram per kilogram (parts per million)
MNA	Monitored natural attenuation
MW	Monitoring well
O&M	Operation and Maintenance
SSCL	Site-specific cleanup level
SSL	Soil Screening Level
SPLP	Synthetic Precipitation Leaching Procedure
UCL	Upper confidence limit
VCRA	Voluntary Cleanup and Redevelopment Act

1.0 INTRODUCTION TO THE SITE AND STATEMENT OF PURPOSE

1.1 SITE NAME AND LOCATION

The Joslyn Street Tailings Facility (JST Facility) is a Comprehensive Environmental Cleanup and Responsibility Act (CECRA – State Superfund) Facility in the City of Helena (City) and extends beyond the City limits into Lewis and Clark County, Montana (Figure 1). The JST Facility is approximately 131 acres in size and is located in the NE1/4 of Section 23, Township 10 North, Range 4 West, Montana Principal Meridian of Lewis and Clark County. The elevation is approximately 3,900 feet above mean sea level with a relatively flat grade. The JST Facility is generally located south of Crystal Springs Road, west of Joslyn Street, primarily north of the Centennial Trail, east of Tenmile Creek, and primarily southwest of the Lewis and Clark County Fairgrounds with the exception of a narrow strip of the Fairgrounds that is within the JST Facility. As defined in § 75-10-701(4), Montana Code Annotated (MCA), the JST Facility boundaries are based on wherever a hazardous or deleterious substance has come to be located, which includes residential areas, recreational areas, a few commercial facilities, and an active rail line. The Montana Department of Environmental Quality (DEQ) issued the Record of Decision (ROD) for the JST Facility on November 12, 2019 (DEQ 2019).

1.2 STATUS OF ROD IMPLEMENTATION

In 1995, DEQ issued notice letters to Burlington Northern Santa Fe (BNSF) and Walter Crane informing them of potential liability for the JST Facility under CECRA. In 1994 and 1995, BNSF performed investigations to support its preparation of a voluntary cleanup plan under the Voluntary Cleanup and Redevelopment Act (VCRA) (§§ 75-10-730 through 738, MCA). In 1996-1997, following a 30-day public comment period, BNSF conducted a voluntary cleanup at the JST Facility that consolidated and stabilized visual mine waste tailings into an on-site repository to prevent direct contact with contaminated tailings and leaching to groundwater. As part of the DEQ-approved plan, BNSF conducts annual monitoring of vegetation and visual inspection of the integrity of the repository. In addition, BNSF conducts groundwater quality monitoring downgradient of the repository twice per year. In 1995, the Montana legislature enacted a mixed funding pilot program. The JST Facility was eligible for the mixed funding and in 1997, BNSF was reimbursed \$300,000 for its voluntary cleanup. Based upon BNSF's voluntary cleanup, DEQ re-ranked the JST Facility on the CECRA Priority List as being in operation and maintenance (O&M).

In 2002, the Helena School District was exploring irrigation options for Capital High School and discovered additional arsenic and lead contamination near the large diameter well located on BNSF property at the JST Facility (See Figure 2). Based upon this new information, DEQ re-ranked the JST Facility as a high priority on the CECRA Priority List and required BNSF and Walter Crane to perform additional investigation to identify the magnitude and extent of soil and groundwater contamination. BNSF performed a supplemental investigation, which re-evaluated areas covered by the voluntary cleanup, and also evaluated areas beyond the tailings footprint addressed under the voluntary cleanup.

In January 2006, BNSF petitioned for allocation under the Controlled Allocation of Liability Act (CALA) as provided for in § 75-10-745, MCA. As required by CALA, DEQ conducted a good faith

investigation to identify potentially liable persons and in 2009 issued notice letters to seven parties (Judy Reynolds, Lee Reynolds, BNSF, Walter Crane, Crystal Crane, Montana Rail Link, Inc., and Lewis and Clark County) informing them of potential liability for the JST Facility under CECRA. As part of the CALA process, BNSF was designated as the lead person responsible for conducting all DEQ-required remedial actions. The CALA allocation process occurred concurrently with ongoing required remedial actions, including those required by DEQ in 2005.

In 2012, BNSF and Montana Rail Link, Inc. signed a CALA Stipulated Agreement and in 2013 Lewis and Clark County, which was assigned a zero share of liability, also elected to sign. This agreement provides that BNSF will conduct all required remedial actions and allows BNSF to request reimbursement of a portion of the eligible remedial action costs from the orphan share fund upon completion of certain remedial activities. The agreement also contained the other provisions required by § 75-10-750, MCA.

The following is a summary of DEQ's selected remedy for the JST Facility, as identified in the ROD (DEQ 2019). See Section 2.3 of this Explanation of Significant Difference (ESD) for a more detailed discussion of the selected remedy for soil and groundwater.

Soil

Excavation and off-site disposal with treatment as needed: The selected remedy for soil involves removal of arsenic and lead contaminated soils and transporting them off-site to a permitted landfill. Dependent on the exposure area (EA), analytical results are compared to site specific cleanup levels (SSCLs) on a point-by-point basis, or a 95% upper confidence limit (UCL) to determine if soils meet the cleanup criteria outlined in the ROD. In EAs 1, 4, and 11, compliance will be evaluated on a point-by-point comparison of the validated confirmation sampling results to the site SSCLs (Arcadis, 2020a). In EAs 3, 5, 6, and 10, a 95% or greater UCL will be calculated to evaluate compliance with the direct contact SSCLs on an EA basis (Arcadis, 2020a). Leaching is evaluated on a point-by-point basis across all EAs. See Figure 2 for these EA locations.

Groundwater

Monitored natural attenuation after source removal: Monitoring is necessary to evaluate the effectiveness of the remedy and to ensure that contaminant concentrations in groundwater decrease following soil excavation and disposal.

Site-Wide Elements

Site-wide elements include engineering controls, institutional controls (ICs), long-term monitoring, along with backfill and regrading of excavated areas.

Current Status

BNSF began implementing the remedy in Fall 2020. EA5 has been reseeded as per the approved Revegetation and Weed Control Plan (Arcadis, 2020b). BNSF's revegetation requirements include plant species (weed free seed mix) specified by Lewis and Clark County, vegetative cover equal to 85% of the vegetative cover of surrounding lands within three years, and completion of the Five-Year Noxious Weed Management Plan with Lewis and Clark County (Arcadis, 2020a & 2020b).

BNSF performed additional sampling of wetland soils to better determine the extent of arsenic and lead contamination in 2022. On August 21, 2024, DEQ received the Wetlands Excavation Remediation Action Work Plan Addendum (Wetland WP). DEQ approved the Wetland WP on August 21, 2024. This Wetland WP identifies three areas for performing excavation activities in the wetlands located in EAs 10 and 11 (see Figure 2). The excavation activities to remove arsenic and lead contaminated soils in the wetlands was completed in 2025. DEQ has approved the results demonstrating the completeness of the activities in EA 11. DEQ has not approved the results demonstrating the completeness of EA 10 at this time.

BNSF collected additional sampling data along the active rail line (EA 6) and on-site repository (EAs 6 and 10) due to constraints on the ability to excavate in these areas without affecting the integrity of the engineered repository or active rail (see Figure 2 for exposure area locations). BNSF presented their data and proposal for remedial alternatives to address these constraint areas in the September 17, 2024 Construction Constraint Sampling Summary (CSS Summary). See Figures 3 and 4 for these specific constraint areas. On September 24, 2024, DEQ provided its approval of the CSS Summary. This ESD addresses the construction constraint areas documented in the CSS Summary.

1.3 EVALUATING CHANGES TO THE ROD

DEQ typically follows the procedures outlined in the U.S. Environmental Protection Agency's (EPA) Guide to Preparing Superfund Proposed Plans, Records of Decisions, and Other Remedy Selection Decision Documents (Guide) (EPA 1999) if DEQ determines that a change to the ROD is necessary or appropriate. The Guide provides various options for documenting changes to the ROD, depending on the nature of the modification. Specifically, options include preparing a memorandum to the file, an explanation of significant difference (ESD), or a ROD amendment.

Section 7.0 of the Guide discusses how to evaluate and categorize post-ROD information. The Guide directs the lead agency (in this case, DEQ) to evaluate:

- (1) Scope – whether the change alters the scope of the remedy;
- (2) Performance – whether the change alters the performance; and
- (3) Cost – whether there are significant changes to cost estimates in the ROD.

Once this evaluation is complete, DEQ determines whether the change is non-significant or minor, significant, or fundamental.

Non-significant or minor changes usually arise during design and construction, when modifications are made to the functional specifications of the remedy to address issues such as performance optimization or new technical issues. This type of change does not have a significant impact on the scope, performance, or cost of the remedy. Examples provided in the Guide include a small increase in the volume of soil requiring treatment; a change in the location of an onsite landfill; or changes to the groundwater monitoring schedule.

Significant changes generally involve a change to a component of a remedy that does not fundamentally alter the overall cleanup approach. Examples provided in the Guide include a large increase in volume; changing from an onsite landfill to an offsite landfill; a contingency remedy; changes in legal requirements that impact SSCLs or make the remedy no longer protective; a revision to land use; a change in secondary treatment; or requiring additional institutional controls.

Fundamental changes involve an appreciable change in the scope, performance, or cost of the ROD remedy and could come from a number of changes that together result in a fundamental change. Examples provided in the Guide include changes in the primary treatment method including those that result in a significant cost increase or decrease; a change from containment to treatment with a cost increase; invoking a technical impracticability waiver; or a volume decrease that changes the primary treatment method.

1.4 CHANGES TO THE ROD

DEQ has identified a revision to the ROD which is being addressed in this document. As documented in the CCS Summary (Arcadis, 2024), the excavation and off-site disposal element of the remedy cannot be fully executed at specific locations within EAs 6 and 10 due to construction constraints. These construction constraints are the active BNSF rail line and the existing JST repository. For locations where construction constraints prevent excavation, a low-permeability cap with institutional controls is proposed. This remedy modification addresses both direct contact and leaching exceedances. It will use a combination of soil and groundwater alternatives in Section 9.1 of the ROD, including Soil Alternative 2 (Low Permeability Cap and Groundwater) and Alternative 5 (Monitored Natural Attenuation). In addition, this proposal will include the site-wide elements, including long-term monitoring and ICs, to limit disturbance to the low permeability cap and ensure the soils maintain an appropriate depth to preclude direct contact, and to preserve the remedy and ensure compliance with the Environmental Requirements, Criteria, and Limitations (ERCLs). (Arcadis, 2024).

1.5 DOCUMENTING POST-ROD CHANGES

As discussed in Section 1.3, DEQ evaluated whether the changes identified in Section 1.4 are non-significant or minor, significant, or fundamental. DEQ has determined that the changes are significant in that they generally involve a change to a component of a remedy; however, these changes do not fundamentally alter the overall cleanup approach. All changes discussed in Section 1.4 fall within the Guide examples of significant changes, such as leaving soils in place at construction constraint locations that exceed leaching to groundwater.

The Guide indicates that significant changes can be documented through an ESD. This document will provide additional information concerning remedy changes and the basis for such.

1.6 AFFIRMATION OF STATUTORY DETERMINATIONS

After reviewing the identified changes to the selected remedy, DEQ has determined that the modification to the selected remedy is protective of public health, safety, and welfare and the

environment; complies with applicable or relevant state and federal environmental requirements, criteria, and limitations (ERCLs); mitigates risk; is effective in the short- and long-term; is practicable and implementable; uses treatment and resource recovery technologies if practicable, giving due consideration to engineering controls; and is cost-effective.

2.0 SUMMARY OF SITE HISTORY, CONTAMINATION, AND SELECTED REMEDY

2.1 SITE HISTORY

2.1.1 Montana Lead, Inc.

The JST Facility was operated as a metal ore mill from approximately 1935-1938 by Montana Lead, Inc., which was formed in 1927 by Philip Barbour and associates. The Green Meadow Mill processed lead ore from the Rimini, Montana area, which left mill tailings as a waste product. Mill operators disposed of tailings onto the ground surface of property leased from the Northern Pacific Railway (predecessor to BNSF Railway Company), which has resulted in metals contamination of the soil and groundwater. No known milling operations occurred at the JST Facility after Montana Lead's bankruptcy in the late 1930s and no evidence exists to indicate the tailings piles were modified to any great extent prior to interim remedial actions occurring at the JST Facility. A detailed discussion of the history, regulatory events, investigations, and interim actions related to the JST Facility can be found in the ROD.

2.2 JOSLYN STREET TAILINGS SITE CONTAMINATION

Details of the JST Facility contamination prior to implementation of the selected remedy are found in the ROD (DEQ 2019) and are summarized in the following sections.

2.2.1 Groundwater

As described in the ROD, groundwater at the JST Facility is contaminated with arsenic at levels that exceed the Montana DEQ Circular 7 (DEQ-7) groundwater standard of 10 micrograms per liter ($\mu\text{g/L}$). The highest arsenic concentrations detected historically in groundwater (191 micrograms per liter ($\mu\text{g/L}$)) have occurred in the central portion of the JST Facility extending from monitoring well MW2 toward the east onto the Ryan Park ballfields (Figure 6). There are also naturally occurring exceedances of the DEQ-7 standard for arsenic in the areas of monitoring wells MW4 and MW8 due to reducing conditions that were investigated and documented by DEQ and discussed in the ROD. The investigation revealed that hydric soils were present and that wetland vegetation occurred in the areas of MW4 and MW8, which indicates that reducing conditions are present in those locations. Reducing conditions can mobilize some metals in soil, particularly arsenic, that move into groundwater, resulting in elevated arsenic concentrations.

2.2.2 Soil

As described in the ROD, surface and subsurface soils at the JST Facility are contaminated with arsenic and lead. The maximum detected concentrations of lead and arsenic in soil are 7,970 milligrams per kilogram (mg/kg) and 28,878 mg/kg , respectively. The majority of SSCL exceedances for both arsenic and lead occur across the JST Facility, primarily in surface (vs subsurface) soil.

2.2.3 Wetland Soil

As described in the ROD, historic sampling within the wetland at the northern portion of the JST Facility indicated exceedances of soil SSCLs for both arsenic and lead. Additional sampling during the implementation of the remedy has indicated that soils within the wetland that exceed SSCLs for arsenic and lead extend beyond the original sampling locations. Excavation of soils within and near the wetlands occurred in 2025, under a DEQ approved work plan (Arcadis, 2024), to address specific areas that exceed arsenic and lead SSCLs.

2.2.4 Surface Water

As described in the ROD, contamination has not caused any known impacts to surface water, which only occurs seasonally in the area of the historic rail bed and within a mapped wetland at the northern portion of the JST Facility. There is often year-round water in Crystal Spring in the northwest corner of the wetland area, but this is outside the area of any known soil or sediment contamination and flows away from the Facility.

2.3 SELECTED REMEDY

Details of the DEQ's selected remedy for the JST Facility are found in the ROD (DEQ 2019) and are summarized in the following sections.

2.3.1 Soil

Excavation and off-site disposal with treatment as needed is the selected remedy for contaminated soils at the JST Facility and requires removal of soils exceeding the SSCLs for respective uses across the JST Facility. Excavation and off-site disposal will involve removal of contaminated soils that exceed SSCLs, treatment of the soils if necessary to levels that are acceptable by the off-site landfill, and disposal of material at an off-site landfill, followed by backfill with DEQ approved clean soil and/or regrading.

2.3.2 Groundwater

The selected remedy for groundwater is monitored natural attenuation (MNA) after source removal. Monitoring is necessary to evaluate the effectiveness of the remedy and to ensure that contaminant concentrations in groundwater decrease following soil excavation and off-site disposal.

2.3.3 Site-Wide Elements

Engineering controls: Engineering controls such as fencing and locked gates are being used and will continue to be used during soil remediation activities. The selected remedy requires that the existing fence and signage surrounding the existing on-site repository remains in place for the life of the repository.

Institutional Controls (ICs): The selected remedy requires BNSF to implement ICs to limit future use of its property within the JST Facility to commercial/industrial use and to prevent

unauthorized use of groundwater where it exceeds SSCLs or DEQ-7 standards. It also requires BNSF to maintain the existing IC that limits disturbance of the on-site repository and provides for long-term operation and maintenance of the repository. The selected remedy requires Lewis and Clark County to implement ICs to limit future use of a narrow section of property on the Fairgrounds to restrict recreational use; this section of property will be surveyed prior to Lewis and Clark executing the IC. The selected remedy also requires Lewis and Clark County to implement ICs that will prevent unauthorized use of groundwater where it exceeds SSCLs in the area of Ryan Park. BNSF will be required to monitor and enforce all ICs within the JST Facility. The owner of EA5 will be required to implement ICs to limit future use of their property to commercial/industrial and unauthorized use of groundwater where it exceeds DEQ-7 standards.

Long-term monitoring: Monitoring is necessary to evaluate the effectiveness of the remedy and to ensure that off-site groundwater does not become contaminated. This includes continued long-term monitoring of the on-site repository that was established as part of BNSF's voluntary cleanup.

Backfill, grading, vegetation, and well abandonment: Some additional backfill, grading, and replacement of vegetation will be necessary to aid in erosion control. In addition, regrading of the JST Facility ground surface will reduce or eliminate surface water ponding. Some monitoring wells may also be abandoned or replaced.

3.0 BASIS FOR THE ESD AND DESCRIPTIONS OF SIGNIFICANT DIFFERENCES

3.1 EXCAVATION AND OFF-SITE DISPOSAL OF CONTAMINATED SOIL

DEQ's selected remedy for soil exceeding SSCLs included excavation and off-site disposal at a licensed and permitted landfill. During implementation of the ROD, contaminated soil was excavated and sampled to ensure the soil met the requirements of the landfill. Upon receipt and validation of sample results that indicated that the soil was acceptable for disposal, the soil was transported and disposed of at an off-site landfill. Confirmation samples were collected from the bottom and sidewalls of excavations to ensure that the remaining soil does not exceed the SSCLs. Upon receipt and validation of confirmation sample results that indicate SSCLs¹ have been met, and after receiving approval from DEQ, excavations can be regraded/backfilled with soil that has been sampled and determined by DEQ to be acceptable for use at the JST Facility.

3.1.1 Construction Constraints Soil Sampling Activities

Facility remedial action excavation activities were conducted by BNSF in 2020/2021 at several Facility grids. Excavation and sampling locations for samples collected in 2020/2021 and in April 2022 are shown on Figure 3 and Figure 4, respectively. The 2020/2021 soil samples were collected from the north sidewall of grids 93, 111, 122, 123, 128, 129, 130, 139, and the south sidewall of grid 154. At these sample locations, two conditions were met: (1), construction constraints² were encountered at the time of excavation; and (2), the sample results were above the surface soil SSCL but below their applicable subsurface/leaching SSCL with the exception of the north sidewall of grids 93, and 111, as well as 122 [subsurface], which also exceeded the applicable subsurface/leaching SSCL (Table 1). The 2022 soil samples were collected from the north sidewall of grids 109, 115, 119, 123, 128 and 209, and the south sidewall of grid 109 where construction constraints were encountered at the time of excavation and where 2020/2021 sidewall samples were above the subsurface/leaching SSCL. Analytical results for the 2022 soil samples are presented in Table 2. (Arcadis, 2024).

As prescribed in the Construction Constraint Sampling Plan (Arcadis, 2022), arsenic samples were collected from sidewalls where 2020/2021 analytical data indicated the soil was above the subsurface/leaching SSCL. Lead samples collected in 2022 were collected from locations outside the active mainline track structure where lead concentrations were above the subsurface/leaching SSCL during the 2020/2021 sampling efforts.

Appendix G of the Feasibility Study Report (Arcadis 2019) presented a time of travel evaluation for lead concentrations in soil to groundwater. That evaluation determined that a travel time for lead ranged from approximately 100,000 to 2,000,000 years, with a travel time of greater than 600,000 years under average conditions. Based on the travel time calculations, adequate time has elapsed for water to infiltrate from the ground surface to groundwater since tailings were initially stored at the Facility. However, based on the travel time evaluation, lead present in surface soil is

¹ For EAs 3, 5, 6, and 10, a 95% or greater upper confidence limit (UCL) will be calculated to evaluate compliance with the direct contact SSCLs on an exposure area basis (Arcadis, 2020a).

² The north sidewall of grid 109 and south sidewall of grid 154 are bounded by the Facility's onsite repository. All other sidewalls referenced in this Sampling Summary are constrained by the active mainline track structure.

strongly sorbed to soils and aqueous lead is not expected to be transported from the surface through the vadose zone to groundwater on relevant timescales. This is consistent with the groundwater monitoring data at the Facility, which show that lead is generally not detected above laboratory reporting limits (Arcadis 2019). Based upon these time of travel calculations presented in Appendix G of the Feasibility Study Report (Arcadis 2019) and discussion presented in Section 4.3.2 of the same report, the Record of Decision indicated lead impacted soils underneath the active rail line ballast at the Facility are not expected to result in exceedances of the SSCL for groundwater (DEQ 2019b). As a result, lead samples were not collected from beneath the active mainline track structure ballast in 2022. (Arcadis, 2024).

3.1.2 Construction Constraints Results Discussion

Arsenic and lead analytical results were compared to surface and subsurface/leaching in accordance with the Remedial Action Work Plan (RAWP) (Arcadis 2020a). Although the subsurface and leaching SSCLs are distinct criterion in EAs 6 and 10 (which encompass the results discussed herein), the values of both criterion are identical and referred to herein as subsurface/leaching. The subsurface/leaching criteria for arsenic and lead are 385 mg/kg and 617 mg/kg, respectively. In addition to comparison with the SSCLs defined in the Record of Decision (ROD; DEQ 2019), arsenic (As) results (both total and by the synthetic precipitation leaching procedure (SPLP)) were compared to historical results for the Joslyn Tailings Facility, including those presented in the December 15, 2014, memorandum on Updated Site-Specific Soil Screening Level (SSL) Calculations (Arcadis, 2014). SPLP results were compared to the DEQ-7 arsenic groundwater standard (DEQ 2019a). Results indicate there is a potential for leaching from sidewalls along the constrained area with concentrations above the leaching to groundwater criteria. Additional leaching analyses were not performed on the SPLP analytical data from the 2022 sampling event as the leachability potential was similar to results reported in the 2014 memorandum and further analyses were thus unwarranted. (Arcadis, 2024).

Discussion of the sidewall sample data with exceedances of applicable SSCLs and the modified remedial alternative is presented below.

3.1.2.1 2020/2021 Data Discussion

Ten sidewall samples from nine grids (grids 93, 111, 122, 123, 128, 129, 130, 139, and 154) located along the repository and active mainline track structure had arsenic concentrations that exceed the surface SSCL but are below the subsurface/leaching SSCLs. Lead concentrations for these sidewalls were below the subsurface/leaching SSCL except for the north sidewall of grids 93 and 111 and the subsurface sample from the north sidewall of grid 122 (denoted with a -D in the sample ID). Analytical data for these sidewalls is presented in Table 1 and depicted by a pink line on Figure 3. (Arcadis, 2024).

The ten sidewall samples shown in Table 1 are above the surface SSCL for arsenic and/or lead. Arsenic and lead concentrations are below their applicable subsurface/leaching criteria for all but three samples (G93-NSW-20201106, G111-NSW-20210827, and G122-NSW-20201113-D), which have adjusted lead concentrations exceeding the subsurface/leaching criteria. As discussed in the 2019 Feasibility Study Report (Arcadis 2019), and in the previous Section 3.1.1, based on lead

transport analysis it is not expected for lead to be transported from impacted soils to groundwater under current conditions (beneath the ballast) in the active rail line area at the Facility. Therefore, although these three samples have lead concentrations above the subsurface/leaching SSCL, transporting of lead is not expected and a remedy addressing the surface SSCLs is appropriate. (Arcadis, 2024). Please see Figure 3 and 4 for locations where arsenic and lead concentrations exceed SSCLs (Figure 5 summarizes these location).

3.1.2.2 2022 Data Discussion

The results from the April 28, 2022 sampling event are consistent with historical results with some minor variations described herein. Analytical data for the 2022 sidewall samples are presented in Table 2 and depicted on Figure 4. (Arcadis, 2024).

One sidewall sample (the duplicate from grid 109, S-A(20220428), collected from a depth of 0 to 2 feet) denoted by [] brackets on Figure 4 has a total arsenic concentration above the surface and subsurface/leaching SSCLs. However, this location abuts the on-site soil repository and additional excavation of materials to the north cannot be completed without compromising the integrity of the clay liner cover system of the repository. Therefore, the excavation in grid 109 was terminated in a vertical cut at the repository fence. (Arcadis, 2024).

Three sidewall samples (G109-SSW-20220428, G115-NSW-20220428, and G119-NSW-20220428) collected within surface soil from 0 to 2 feet along the active mainline track structure have total arsenic concentrations above the surface soil and subsurface/leaching SSCLs. These locations are bounded by the active mainline track structure and the sidewalls have been excavated to their practical extents while maintaining the stability of the track structure. (Arcadis, 2024)

Arsenic did not exceed the applicable SSCLs in four deep sidewall samples (G109-NSW-20220428-D, G109-SSW-20220428-D, G123-NSW-20220428-D, and G128-NSW-20220428-D). (Arcadis, 2024).

The surface soil portions of the associated sidewalls, however, have arsenic concentrations above their respective subsurface/leaching SSCLs. (Arcadis, 2024).

Arsenic exceeded the surface SSCL in one sidewall sample (G209-NSW-20220428) but the concentration was below the subsurface/leaching SSCL. (Arcadis, 2024).

Please see Figure 3 and 4 for locations where arsenic and lead concentrations exceed SSCLs (Figure 5 summarizes these location).

3.1.3 Modified Remedial Alternative

The selected remedy set forth in the Record of Decision (ROD; DEQ 2019b) was a combination of multiple alternatives, which include excavation and off-site disposal, monitored natural attenuation (MNA), and site-wide elements (engineering controls, institutional controls [ICs], long term monitoring and backfill grading, vegetation and well abandonment). Implementation of ROD excavation and disposal activities is nearly complete and MNA and site-wide elements at the

Facility continue to be implemented; additional excavation and disposal activities were completed in EAs 10 and 11 (Wetland areas) in 2024. However, the excavation and off-site disposal element of the remedy cannot be fully executed at the locations discussed in this memo due to construction constraints. (Arcadis, 2024).

A modified remedial alternative, using a combination of soil and groundwater alternatives in Section 9.1 of the ROD including Soil Alternative 2 – Low Permeability Cap and Groundwater Alternative 5 – Monitored Natural Attenuation, is presented below for the locations that preclude additional excavation due to construction constraints. This modified alternative addresses concentrations that may exceed direct contact and/or leaching to groundwater SSCLs. In addition, this modified alternative will include the site-wide elements, including long-term monitoring and ICs, to preserve the remedy and ensure compliance with the ERCLs. (Arcadis, 2024).

3.1.3.1 Modified Alternative: Low-Permeability Cap with Institutional Controls

Nine grids associated with the 2020/2021 sampling effort (grids 93, 111, 122, 123, 128, 129, 130, 139, and 154), and one grid sampled in April 2022 (grid 209) had sidewall metals concentrations above surface SSCLs but below the subsurface/leaching SSCLs for arsenic and lead with the exception of three sidewalls (G93-NSW, G111-NSW, and the deep sample at G122-NSW) which were above the subsurface/leaching SSCL for lead. As discussed in Sections 3.1.1, transport of lead is not expected from soils beneath the ballast, therefore a remedy addressing the surface SSCLs is appropriate. (Arcadis, 2024).

Four of the six sidewalls sampled in April 2022 exceeded the subsurface leaching SSCL for arsenic: two sidewall locations in grid 109, one sidewall location in grid 115, and one sidewall location in grid 119. Additionally, SPLP results in these sidewalls indicate there is a potential for leaching, with concentrations above the groundwater criteria. (Arcadis, 2024).

Because these sidewalls represent the practical limits of excavation due to abutting construction constraints (onsite soil repository or the active mainline track structure), additional excavation and material removal poses significant challenges as it would require breaching the existing fully encapsulated geosynthetic clay lined repository and removal of portions of the active rail line. (Arcadis, 2024).

The rail line operating through Helena, Montana is part of the BNSF mainline. Operations on this line are integral to interstate commerce and international trade and include the transporting of agricultural products, raw materials, and manufactured goods from around the U.S. and the world. Any regulatory or other action that disrupts BNSF operations can have a significant impact throughout the interstate rail network and the economy. In addition, this particular rail line is also identified as part of the Department of Defense's Strategic Rail Corridor Network (Stracnet). See Office of the Special Assistant for Transportation Engineering Railroads for National Defense (Arcadis, 2024).

For areas that abut the track structure, the geotextile, clay liner, and backfill system will be used. This system will identify the extent of excavation and maintain the structural integrity of the rail

infrastructure where additional excavation poses significant challenges. Geotextile and clay liner will be placed over the impacted sidewall, starting at the excavation extents as defined in the ROD and terminating approximately 10 feet north (grids 93, 109, 111, 122, 123, 128, 129, 130, 139, and 209) or 10 feet south (grids 115 and 119) of the sidewall face such that it extends over the clean backfill placed in grids 93, 109, 111, 115, 119, 122, 123, 128, 129, 130, 139, and 209 while overlapping the sidewall and allowing for contouring to direct precipitation away from the impacted sidewall and match with existing surrounding surfaces. This approach will mitigate potential exposure of sidewall materials through direct contact at the surface while restricting infiltration. Once the liners are installed, the above-described cover system will be installed over the clay liner and sloped to match surrounding topography. Utilities, including the Sprint telecommunications line, will not be impacted.

Breaching the existing repository liner to remove these soils may compromise the competency of the existing repository, and damage to the existing repository could result in increased cost over time due to repairs that would be required to maintain the integrity of the liner system. In addition, if the liner is breached, there is a potential that water could infiltrate the repository and result in metals impacts to groundwater that would require additional monitoring or remediation after the breach is repaired. (Arcadis, 2024)

In lieu of continuing the excavation and compromising the soil repository liner system, the repository fence would be temporarily removed along the north sidewall of grid 109 and south sidewall of grid 154 and a geotextile and clay liner (comparable to the liner used for construction of the repository and in accordance with ARM 17.50.1403) will be placed over the impacted sidewall. The liners will mitigate potential exposure of sidewall materials through direct contact at the surface while restricting infiltration and thereby limiting the leachability potential indicated by the SPLP sample results discussed above. A geotextile material will be placed at the base of any excavation, prior to placement of the clay liner, to identify the extents of the excavation and area of contamination. The clay liner will be placed on top of the geotextile material in such a way that it will overlap with the existing repository liner and terminate approximately 10 feet from the sidewall faces away from the repository, such that it extends over clean backfill placed in grids where exceedances occurred while overlapping the sidewalls. Actual termination location on the south side of the repository will be determined in the field based on the location of a Sprint telecommunications line, which is near the north sidewall of grid 109. Once the geotextile and clay liners are installed, a cover system will be installed over the liners. The cover system will consist of placement of clean backfill to a minimum cover depth of 2 feet over the excavation sidewalls, including a minimum of 6 inches of growth media to be seeded as prescribed in the RAWP (Arcadis 2020a). The cover system will be sloped to match surrounding topography and the repository fence will be reinstalled at its original location prior to revegetation efforts. The Sprint telecommunications line will not be impacted; the utility is installed parallel to the railroad tracks and near the south side of the repository, and the liner system will be terminated prior to crossing the utility. Although the utility is close to the north sidewall of grid 109, it is installed south of the sidewall (Figure 4) and in an area that was previously excavated to meet SSCLs. (Arcadis, 2024). Monitoring for leaching will be accomplished through the existing groundwater monitoring program. Monitoring wells MW-2A and MW-9 are located directly downgradient of the sidewalls

where this modified remedy will be implemented, with additional monitoring wells, MW-7 and MW-13, located further downgradient.

To ensure the integrity of the low permeability cap and overlying cover system, additional ICs (through a restrictive covenant) will be implemented at the affected sidewalls to ensure no excavation or disturbance of the cover system similar to the IC imposed on the repository. Existing groundwater use restriction ICs for the BNSF owned properties will remain in place. Annual inspection of the overlying cover system will be conducted concurrently with the inspection of the repository. Similar to the maintenance requirements of the repository, any required maintenance and repairs will be completed within 60-days of the inspection. Railroad operations and maintenance (including but not limited to maintenance of signals, track, ballast, ties; control of weeds and drainage; access roadways; fire guards; material storage; and emergency response activities) occur primarily in the railroad grade outside of the repository. Emergency response activities (such as response to spills and derailments) may impact the low permeability cap and overlying cover system, although if such activities are warranted, BNSF shall advise DEQ before conducting such activities. BNSF manages planned maintenance activities with an internal process for ensuring restricted activities are properly identified and completed in compliance of such restrictions. If any disruption to the IC area and cover system is needed, DEQ will be notified, and repairs completed within 60-days by BNSF. (Arcadis, 2024).

3.1.4 Comparison of Modified Remedy Elements to Cleanup Criteria

The modified remedy for the grid locations with construction constraints is the above-presented modified alternative (a low permeability cap) at locations presented on Figure 3 and Figure 4 (and summarized on Figure 5). A side-by-side comparison of the ROD remedy and the ESD modified alternative is shown in Table 4. Cost estimates for the ROD remedy and the ESD modified remedy are shown in Tables 4a and 4b. Additional details of the ESD modification are included in this section.

3.1.4.1 Protectiveness

The low permeability cap, including the overlying cover system, will achieve protectiveness by precluding direct contact to surface soils with metals concentrations above the surface SSCL. The locations covered by this modification will no longer present surface soil direct contact concerns and therefore be protective. Implementation of the site-wide elements discussed in the ROD, including institutional controls, will ensure continued protectiveness for this alternative. (Arcadis, 2024).

The low permeability cap, including the overlying cover system, achieves protectiveness by precluding direct contact to subsurface soils with metals concentrations above the subsurface/leaching SSCL. The low permeability cap and cover system will restrict groundwater infiltration and, by extension, the leaching of metals from the soil through infiltration. The low permeability cap and cover system will function similarly to the onsite repository in restricting both infiltration and direct contact to subsurface soils and, therefore, is protective. The sidewalls that abut the onsite repository will be further protected by the existing repository fencing and signage following implementation of the modification. Implementation of the site-wide elements

discussed in the ROD, including institutional controls, will ensure continued protectiveness for this modification. (Arcadis, 2024).

3.1.4.2 Compliance with Environmental Requirements

The low permeability cap, including the overlying cover system, achieves compliance with environmental requirements by meeting SSCLs. Implementation of the site-wide elements discussed in the ROD will ensure continued compliance with environmental requirements for this modification. (Arcadis, 2024).

The low permeability cap, including the overlying cover system, achieves compliance with environmental requirements as detailed in Table 3. The ERCL table from the RAWP is included as Table 3 and text revisions associated with discussion of this alternative are included. This modification is anticipated to comply with the ERCLs and not change the previously modeled monitored naturally attenuation remedy (Arcadis, 2019) selected in the ROD for groundwater, which indicated that the groundwater SSCL for arsenic will be met within approximately 15 years when combined with source removal (DEQ 2019b). (Arcadis, 2024).

3.1.4.3 Mitigation to Risk

The low permeability cap, including the overlying cover system, achieve mitigation to risk by eliminating the potential for direct exposure to the impacted soils. In addition, the low permeability cap, including the overlying cover system, mitigates risk by restricting infiltration of water. As discussed in the ROD, a low permeability cap does leave the potential for high groundwater to contact impacted soils; however, this modified remedy element is for select areas where additional removal poses significant challenges as discussed above in Section 3.1.3.1. Risk is further reduced by site-wide elements including the existing groundwater use restrictions and monitored natural attenuation with long-term groundwater monitoring program. The modification to the ROD mitigates risk to public health, safety, and welfare and to the environment. (Arcadis, 2024).

3.1.4.4 Effectiveness and Reliability

The low permeability cap, including the overlying cover system, achieves effectiveness and reliability through the site-wide elements discussed in the ROD. These elements include institutional controls to limit disturbance to the remedy; backfill, grading and revegetation to limit erosions to the remedy; and long-term monitoring to evaluate effectiveness of the remedy. (Arcadis 2024).

The low permeability cap, including the overlying cover system, achieves effectiveness and reliability through the site-wide elements discussed above as well as long-term maintenance to ensure cracks and other potential cap degradation is properly repaired. The remedy modification is less reliable than the other soil alternatives (excavation and off-site disposal) because it requires the greatest operation and maintenance, and the potential remains for high groundwater to come into contact with contaminated soil, however, this metric is met through long term monitoring and MNA. (Arcadis, 2024).

3.1.4.5 Technically Practicable and Implementable

The low permeability cap, including the overlying cover system, is technically practicable and implementable since this remedy will meet SSCLs through backfill and regrading, which is or has been completed across the site at other areas. It is also technically practicable and implementable since this remedy is similar to the onsite repository, and the repository was successfully implemented and has been in place for over 20 years. (Arcadis, 2024).

3.1.4.6 Treatment or Resource Recovery Technologies

The low permeability cap, including the overlying cover system, do not require treatment or resource recovery technology. (Arcadis, 2024).

3.1.4.7 Cost Effectiveness

The low permeability cap, including the overlying cover system, is cost effective in comparison to the cost, risk, and significant challenges included with removing mainline tracks or opening up the existing repository.

To complete removal as detailed in ROD Alternative 4 for locations that abut the mainline tracks, an approximately 400-foot section of paired tracks would need to be temporarily rerouted approximately 100 feet to the south. The cost for temporarily moving the mainline tracks would be multiple orders of magnitude higher than the Modifications of this ESD. To complete removal as detailed in ROD Alternative 4 for the locations that abut the repository, approximately 120 linear feet of the repository perimeter (approximately 13% of the total perimeter) could be potentially compromised due to excavation activities. The estimated cost for repairs to the repository (including materials and labor) would be \$320,000, based on inflation since the repository construction. Further monitoring would also be required, which would include additional monitoring wells and groundwater sampling, with an estimated cost of \$10,500. Damage to the repository could result in at least \$430,000 in additional costs over the next 30 years. In comparison, the estimated total cost to implement low permeability cap, including the overlying cover system, is estimated to be \$180,000. Factoring in long term operation and maintenance cost over 30 years, including weed management activities, the total present value of the cap and cover system is estimated to be \$210,000. The cost to implement this remedy is substantially lower than removal of the construction constraints. See Tables 4a and 4b for more details regarding cost estimates. (Arcadis, 2024; Arcadis, 2026).

Based on the comparison above, implementation of the modified remedy meets Comprehensive Environmental Cleanup and Responsibility Act (CECRA) criteria found in § 75-10-721(2). Long-term operation and maintenance will be required to ensure the long-term effectiveness of this remedy. In addition, use of the property will be restricted by institutional controls as discussed above, in order to protect the integrity of the remedy. (Arcadis, 2024).

The above referenced modification is generally consistent with alternatives contemplated in the FS, will meet the remedial action objectives in the ROD and are protective of human health and the environment. The modification addresses soil with a low permeability cap, including the

overlying cover system, and will result in surface conditions that meet SSCLs and preclude direct contact with soil exceeding SSCLs. In addition, the sidewalls will meet both surface and subsurface SSCLs. The modification protects groundwater using a cap system that will restrict infiltration of water. Institutional controls and long-term monitoring will verify the remedy remains in place and functions as intended. (Arcadis, 2024).

3.1.5 Summary

The low-permeability cap, including the overlying cover system, with institutional controls, uses a combination of soil and groundwater alternatives in Section 9.1 of the ROD: Soil Alternative 2 – Low Permeability Cap and Groundwater Alternative 5 – Monitored Natural Attenuation. This modified alternative addresses concentrations that may exceed direct contact and/or leaching to groundwater SSCLs. In addition, this modified alternative will include the site-wide elements, including long-term monitoring and ICs, to preserve the remedy and ensure compliance with the ERCLs. (Arcadis, 2024). The grids where this modified alternative will be applied are shown on Figures 3, 4, and 5.

4.0 PUBLIC NOTIFICATION

DEQ has determined that these changes to the ROD are significant but not fundamental. There are no changes in the scope of the remedy and the remedial components (excavation and offsite removal versus cover system and low permeability cap) were already screened and evaluated in the ROD. Therefore, EPA's Guide indicates that public comment on this ESD is not necessary (EPA 1999). In addition, public comment is not required by CECRA.

However, public notification will be made available via publication of the availability of the ESD in a major local newspaper of general circulation and will also be made available to the public by placing it in the Administrative Record file. The administrative record that contains all of the documents related to the selection of the final remedy for the JST Facility (see Section 14.0 of the ROD), including those noted in Section 5 of this ESD, is located at:

Montana Department of Environmental Quality
Waste Management and Remediation Division
Superfund, AML, and Construction Bureau
1225 Cedar Street
PO Box 200901
Helena, Montana 59620-0901
Telephone: (406) 444-6444

5.0 ADMINISTRATIVE RECORD REFERENCES

DEQ cited, relied upon, or considered the following documents in developing this ESD. The following documents do not include legal citations such as those found in the MCA, ARM, United States Code, and Code of Federal Regulations (CFR). In addition, references identified in the ROD (DEQ 2019) are incorporated herein as part of this ESD administrative record.

Arcadis. 2014. Joslyn Tailings Facility - Updated Site-Specific Soil Screening Level (SSL) Calculations. December 14.

Arcadis. 2019. Feasibility Study Report. Joslyn Street Tailings Facility. Helena, Montana. November 22.

Arcadis, 2020a. Remedial Action Work Plan. Burlington Northern Joslyn Street Tailings Facility. September 18.

Arcadis, 2020b. Revegetation and Weed Control Plan. Burlington Northern Joslyn Street Tailings Facility. December 4.

Arcadis. 2022. Construction Constraint Sampling Plan. Burlington Northern Joslyn Street Tailings Facility. April 12.

ARCADIS. 2024. Wetlands Excavation Remedial Action Work Plan Addendum, Joslyn Street Tailings Facility, Helena, Montana. July 12.

ARCADIS. 2024. Construction Constraints Sampling Summary. September 17.

ARCADIS. 2026. Email to DEQ re JST Facility – Cost Estimate. May 15.

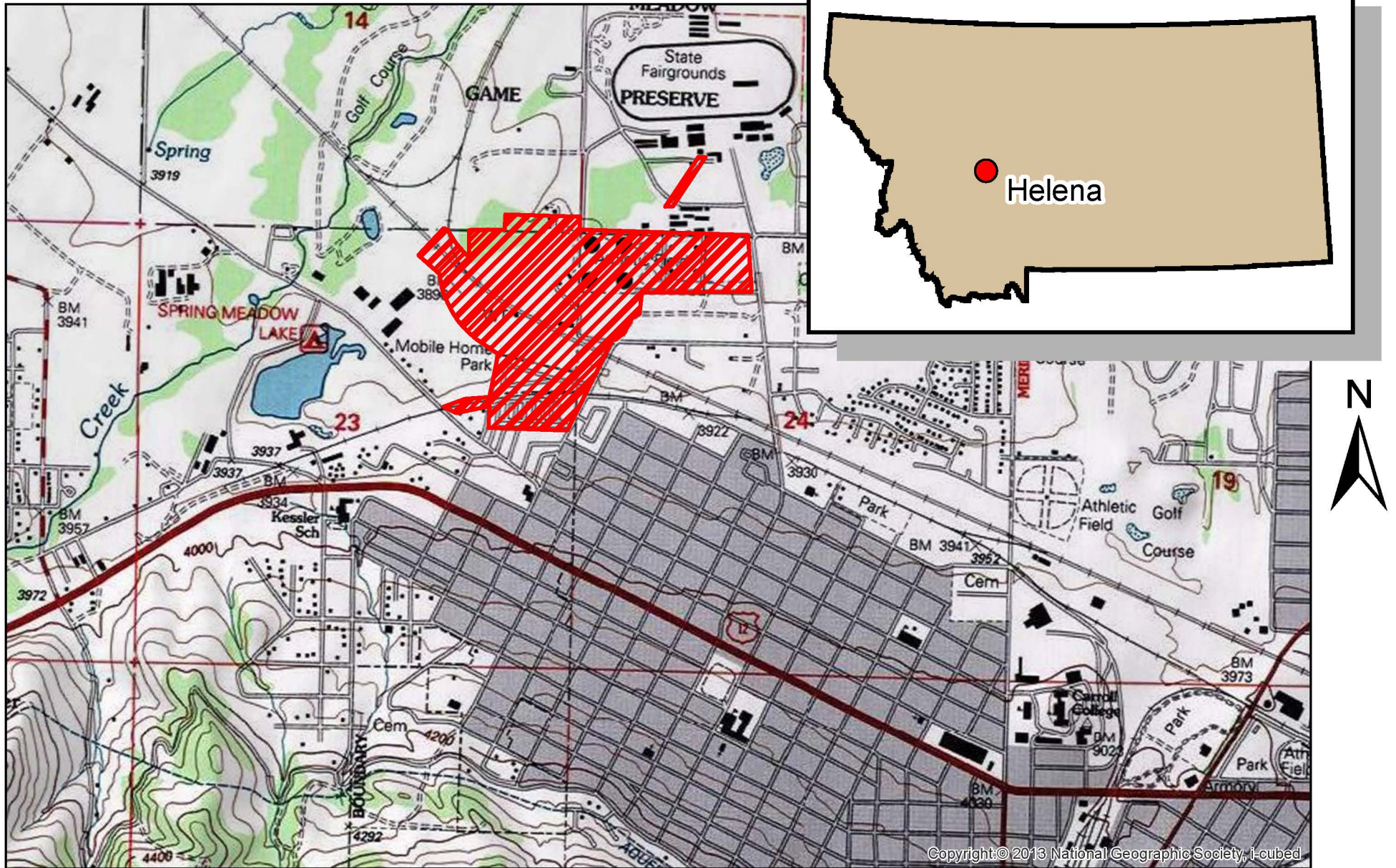
DEQ. 2019. Record of Decision, Joslyn Street Tailings Facility, Helena, Montana. November 12.

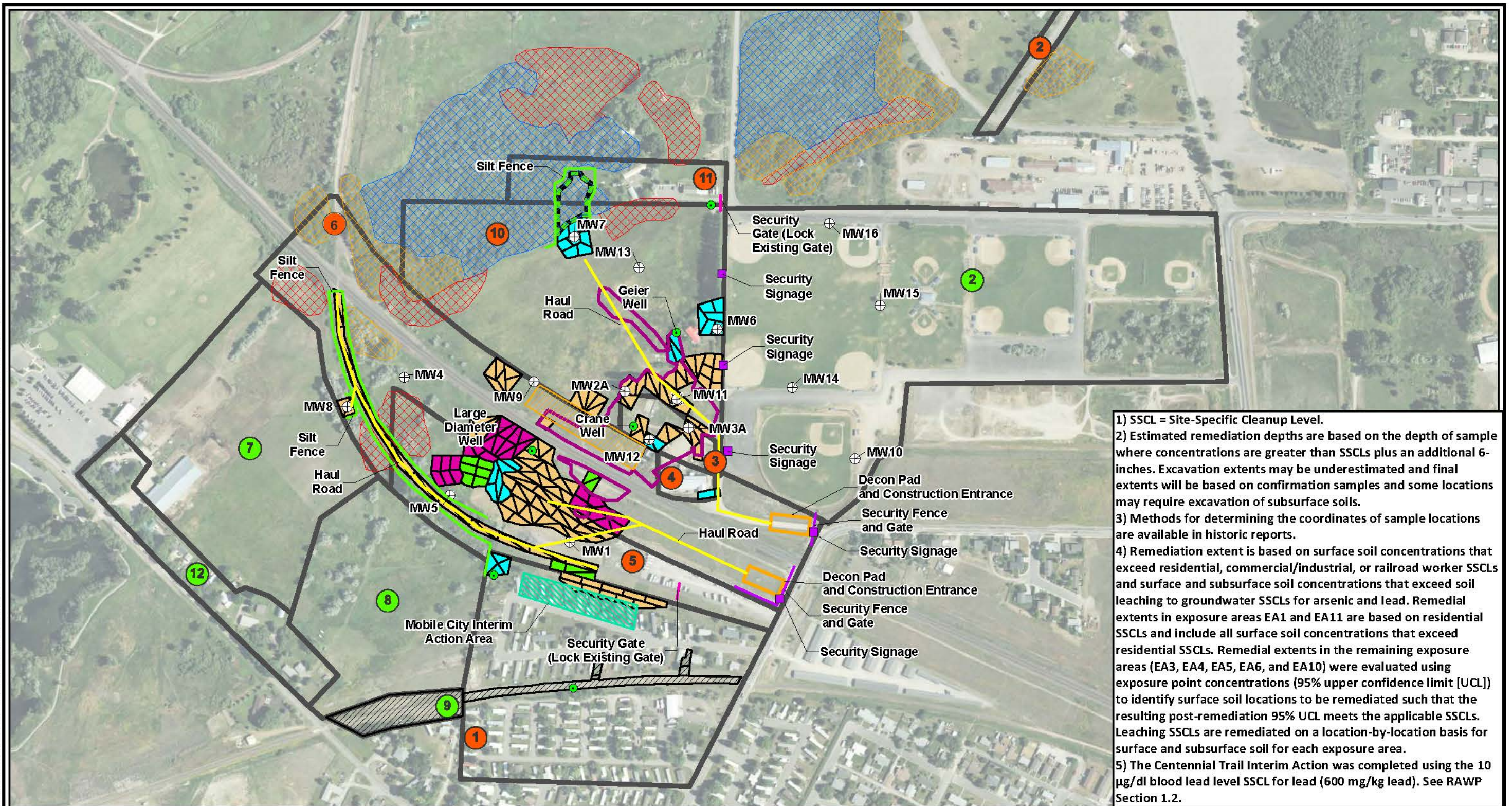
DEQ. 2019a. Circular DEQ-7 Montana Numeric Water Quality Standards. Montana Dept. of Environmental Quality, Water Quality Division, Water Quality Planning Bureau, Water Quality Standards and Modeling Section. June.

EPA. 1999. A Guide to Preparing Superfund Proposed Plans, Records of Decision, and Other Remedy Selection Decision Documents. EPA-540-R-98-031. July.

FIGURES

Joslyn Street Tailings Facility Facility Location





- 1) SSCL = Site-Specific Cleanup Level.
- 2) Estimated remediation depths are based on the depth of sample where concentrations are greater than SSCLs plus an additional 6-inches. Excavation extents may be underestimated and final extents will be based on confirmation samples and some locations may require excavation of subsurface soils.
- 3) Methods for determining the coordinates of sample locations are available in historic reports.
- 4) Remediation extent is based on surface soil concentrations that exceed residential, commercial/industrial, or railroad worker SSCLs and surface and subsurface soil concentrations that exceed soil leaching to groundwater SSCLs for arsenic and lead. Remedial extents in exposure areas EA1 and EA11 are based on residential SSCLs and include all surface soil concentrations that exceed residential SSCLs. Remedial extents in the remaining exposure areas (EA3, EA4, EA5, EA6, and EA10) were evaluated using exposure point concentrations (95% upper confidence limit [UCL]) to identify surface soil locations to be remediated such that the resulting post-remediation 95% UCL meets the applicable SSCLs. Leaching SSCLs are remediated on a location-by-location basis for surface and subsurface soil for each exposure area.
- 5) The Centennial Trail Interim Action was completed using the 10 µg/dl blood lead level SSCL for lead (600 mg/kg lead). See RAWP Section 1.2.

LEGEND

Security Signage	Security Gate (Lock Existing Gate)	Exposure Area	Estimates Soil Remediation Depth <table><tr><td></td><td>6 Inches</td></tr><tr><td></td><td>12 Inches</td></tr><tr><td></td><td>18 Inches</td></tr><tr><td></td><td>24 Inches</td></tr></table>		6 Inches		12 Inches		18 Inches		24 Inches
	6 Inches										
	12 Inches										
	18 Inches										
	24 Inches										
Monitoring Well	Silt Fence	Mobile City Interim Action Area									
Abandoned Monitoring Well Location	Decon Pad and Construction Entrance	Wetland Investigation Area									
Water Supply Well	Centennial Trail Interim Action Area	Palustrine Emergent Vegetation Temporarily Flooded									
Haul Road	Repository	Palustrine Forested Temporarily Flooded									
Security Fence and Gate	Former Tailings Boundary	Palustrine Scrub-Shrub Temporarily Flooded									

T10N - R4W
Section 23
46.61402, -112.0633 (MW-11)
July 2017

SOURCE: WORLD IMAGERY, SERVICED BY
ESRI/ARC GIS ONLINE, ACCESSED ON
8/5/2020

No Unacceptable Soil Risks Identified

Soil Risks to be Addressed by Remedial Action

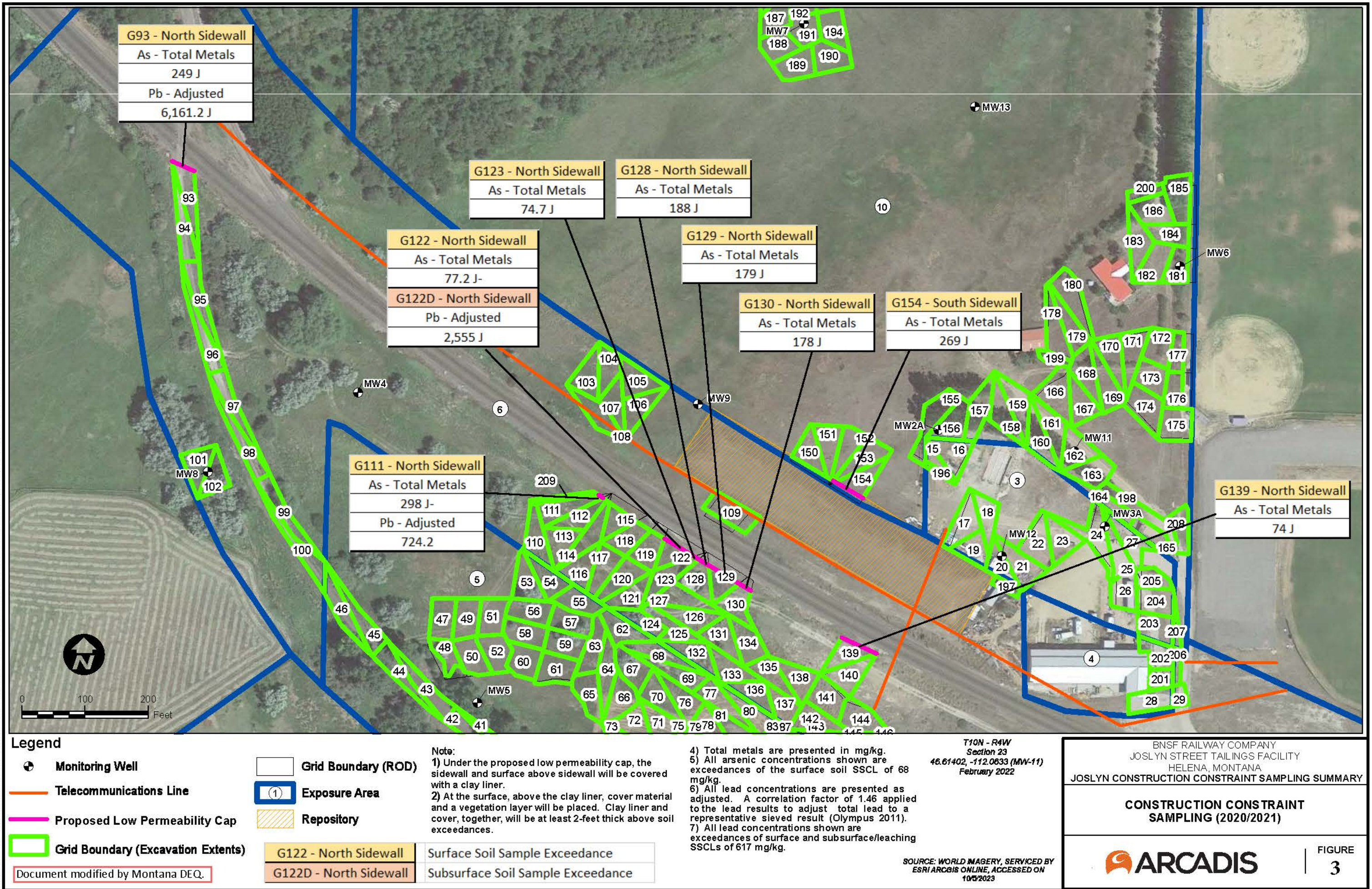
BNSF RAILWAY COMPANY
JOSLYN STREET TAILINGS FACILITY
HELENA, MONTANA
REMEDIAL ACTION WORK PLAN

SITE MAP AND KEY FEATURES

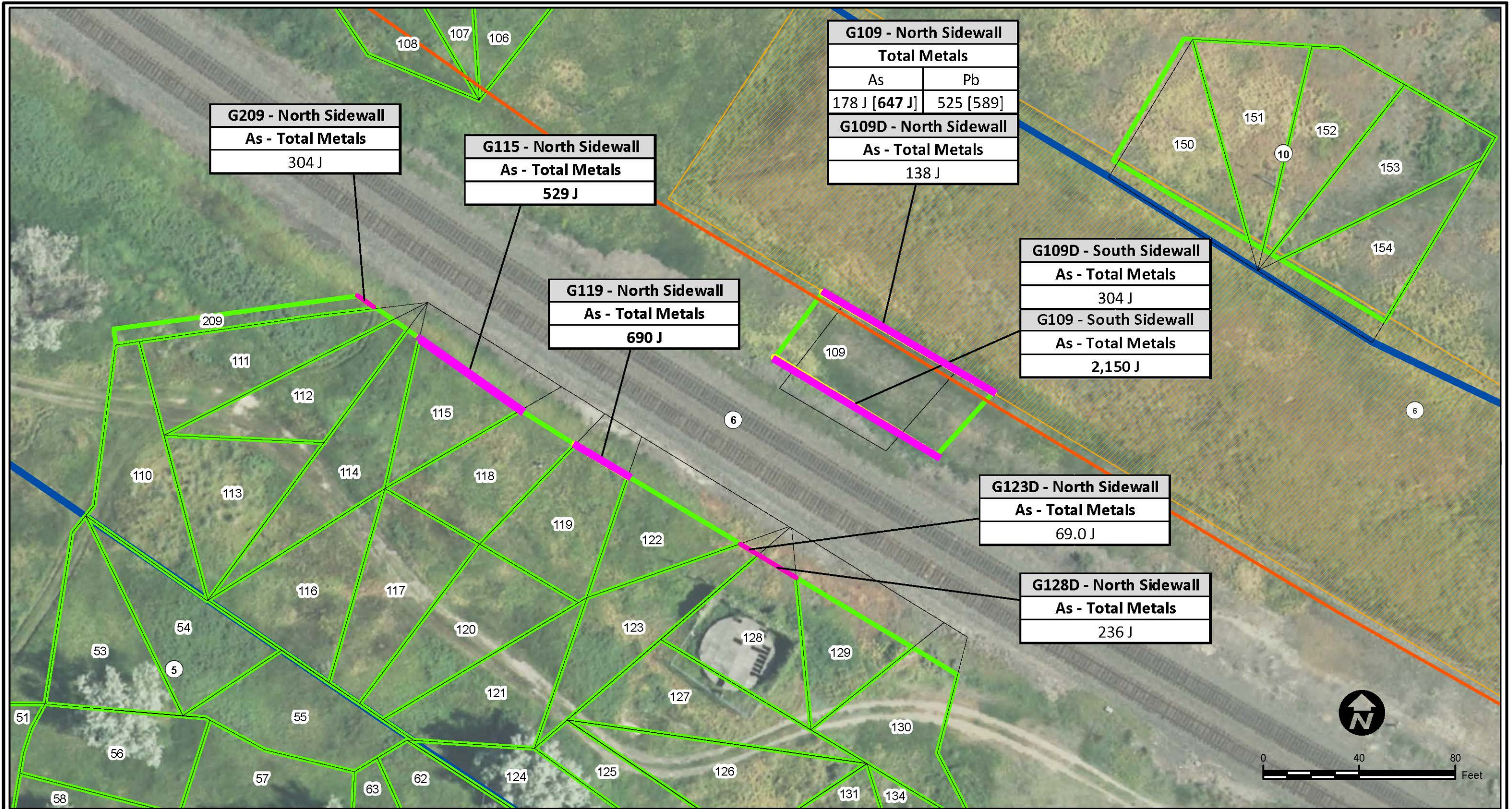
ARCADIS Design & Consultancy for natural and built assets

FIGURE
2

PATH: T:\ENVB\BFG\BARCHMAP\2022\CONSTRAINTS\CONSTRAINTSAMPLING_2020-2021.MXD LAST SAVED BY: DHOLMES LAST SAVED ON: 10/5/2023



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Legend

- Monitoring Well
- Telecommunications Line
- Proposed Low Permeability Cap
- Exposure Area
- Grid Boundary (Excavation Extents)
- Grid Boundary (ROD)
- Repository

Figure modified by Montana DEQ

Notes:

- 1) Total metals are presented in mg/kg.
- 2) Results shown in [] are duplicate results.
- 3) Grid number with D in name (i.e. G123D) denotes a subsurface sample.
- 4) Under the proposed low permeability cap, the sidewall will be covered with a clay liner and backfilled with 2-feet of cover material.
- 5) BOLD analytical result indicates concentration above subsurface/leaching SSCL.
- 6) Under the proposed low permeability cap, the sidewall and surface above sidewall will be covered with a clay liner.
- 7) At the surface, above the clay liner, cover material and a vegetation layer will be placed. Clay liner and cover, together, will be at least 2-feet above soil exceedances.

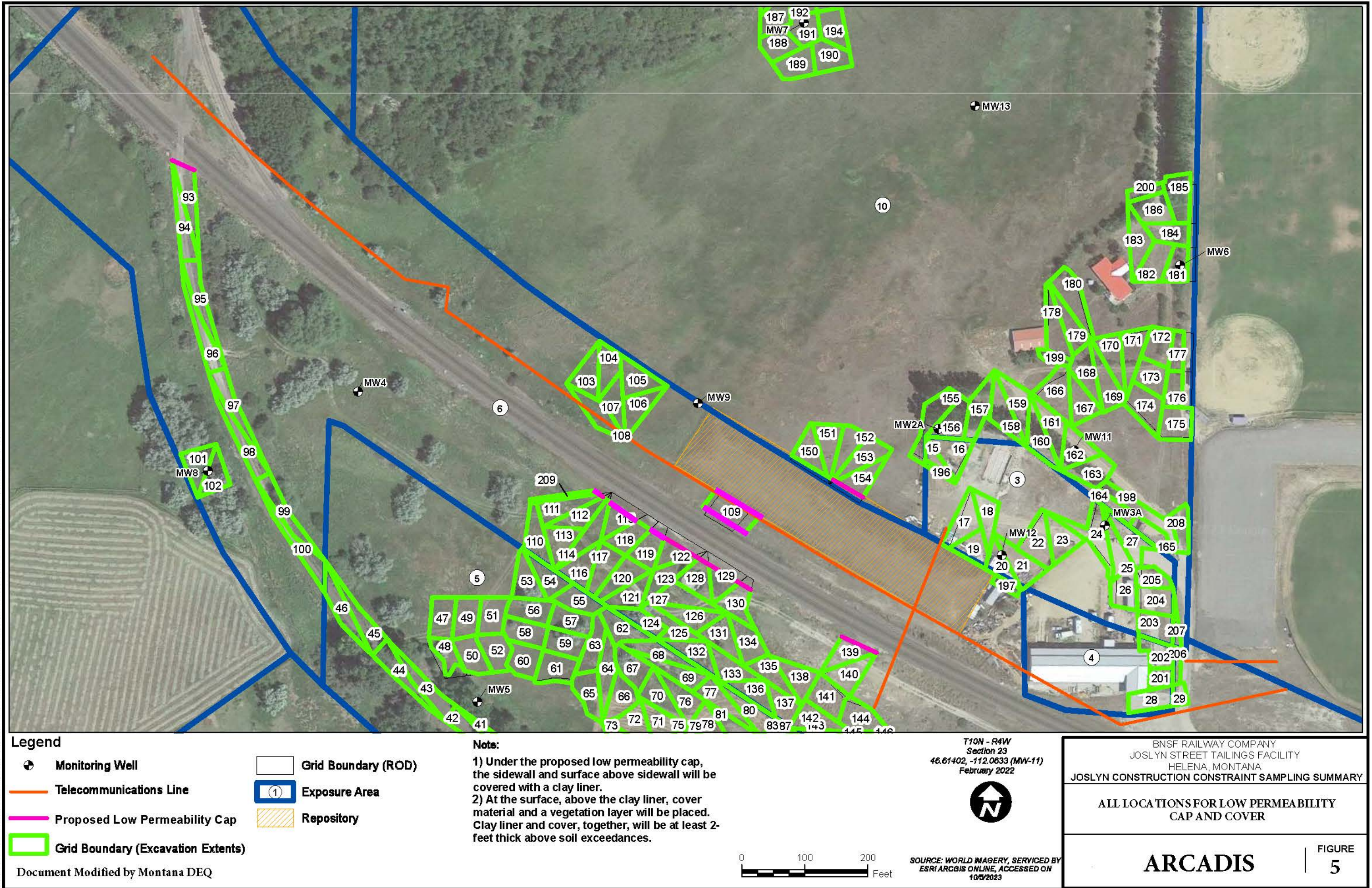
SOURCE: WORLD IMAGERY, SERVICED BY
ESRI ARCGIS ONLINE, ACCESSED ON
10/5/2023

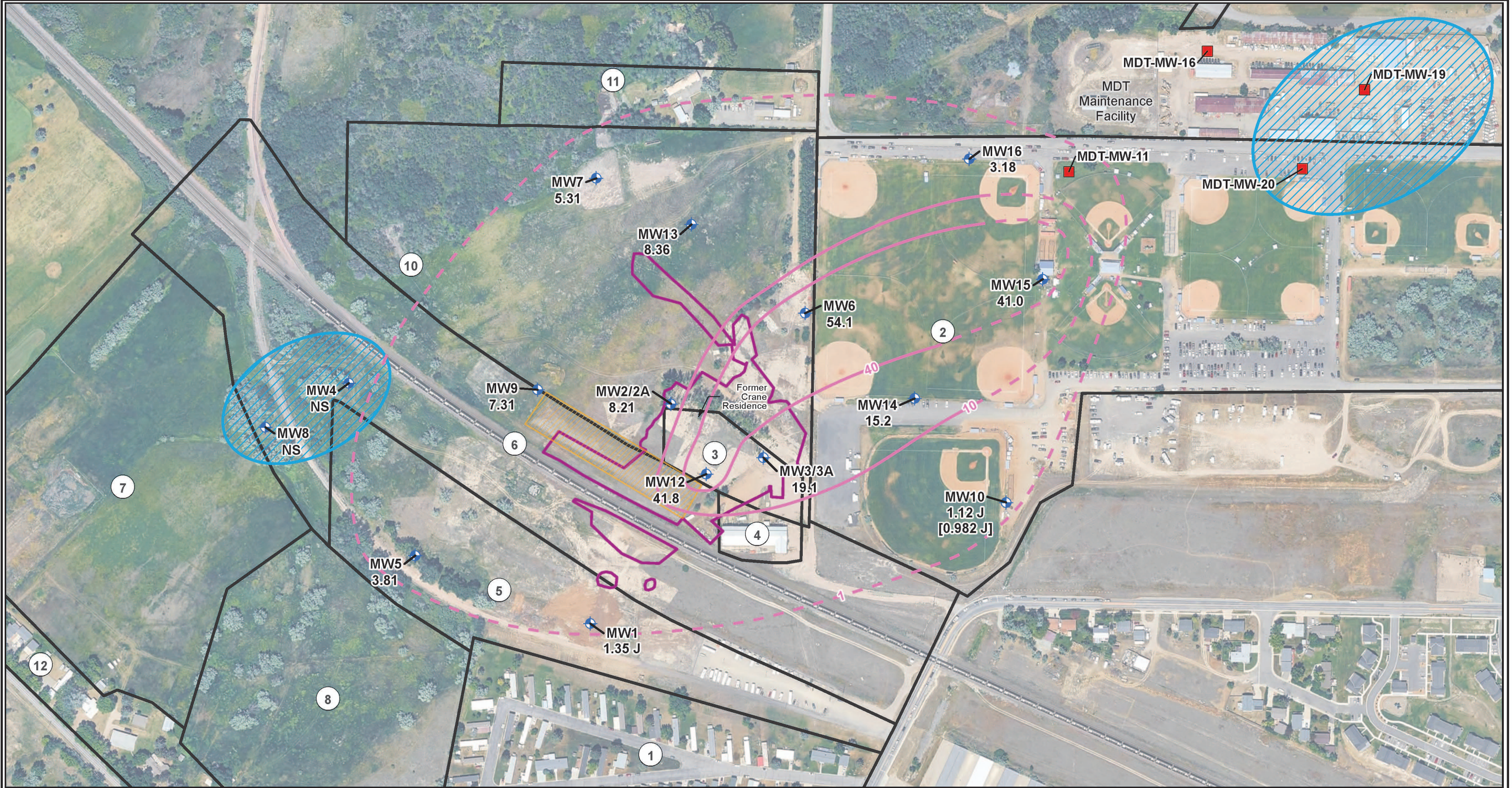
T10N - R4W
Section 23
46.61402, -112.0633 (MW-11)
February 2022

BNSF RAILWAY COMPANY
JOSLYN STREET TAILINGS FACILITY
HELENA, MONTANA
JOSLYN CONSTRUCTION CONSTRAINT SAMPLING SUMMARY

**CONSTRUCTION CONSTRAINT
SAMPLING (2022)**

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TABLES

Table 1
2020/2021 Sample Results for Sidewalls
BNSF Joslyn Tailings Facility
Helena, MT



							Analyte Method Matrix Units Applicable SSCL	Arsenic SW6010D Soil mg/kg 385	Lead SW6010D Soil mg/kg N/A	Adjusted Lead ^{1,2} SW6010D Soil mg/kg 617	
Sample ID	Grid Number	Sidewall	Sampling Horizon	EA Number	SDG Number	Date SDG Submitted to DEQ	Sample Date	Arsenic Result	Lead Result	Adjusted Lead Result	Excavation Constraint
G93-NSW-20201106	93	North	0.0 - 1.5 ft	6	L1289166	12/23/2020	11/06/20	249 J	4,220 J	6,161.2 J	Rail Line
G111-NSW-20210827	111	North	0.0 - 1.0 ft	6	L1396333	10/15/2021	08/21/21	298 J-	496.0	724.2	Rail Line
G122-NSW-20201113	122	North	0.0 - 2.0 ft	6	L1286304	11/25/2020	11/13/20	77.2 J	289 J	421.9 J	Rail Line
G123-NSW-20201116	123	North	0.0 - 2.0 ft	6	L1286441	12/23/2020	11/16/20	74.7 J	208 J	303.7 J	Rail Line
G128-NSW-20201214	128	North	0.0 - 2.0 ft	6	L1296611	1/13/2021	12/14/20	188 J	264 J	385.4 J	Rail Line
G129-NSW-20201113	129	North	0.0 - 2.0 ft	6	L1289166	12/23/2020	11/13/20	179 J	116 J	169.4 J	Rail Line
G130-NSW-20201113	130	North	0.0 - 1.5 ft	6	L1289166	12/23/2020	11/13/20	178 J	64.4 J	94.0 J	Rail Line
G139-NSW-20201019	139	North	0.0 - 1.0 ft	6	L1289166	12/23/2020	10/19/20	74 J	64.2 J	93.7 J	Rail Line
G122-NSW-20201113-D	122	North	2.0 - 2.5 ft	6	L1286304	11/25/2020	11/13/20	175 J	1,750 J	2,555 J	Rail Line
G154-SSW-20201021	154	South	0.0 - 1.0 ft	10	L1289166	12/23/2020	10/21/20	269 J	181 J	264.3 J	Repository

Notes:
Bold = Concentration above surface SSCL
Shaded = concentration above the subsurface/leaching SSCL
[] = denotes duplicate sample
µg/L = micrograms per Liter
D = Denotes deep sample (collected between 2 feet below original grade and terminus of excavation)
DEQ = Montana Department of Environmental Quality
ft = feet
ID = identifier/identification
mg/kg = milligrams per kilogram
SDG = Sample Delivery Group
SSCL = Site Specific Cleanup Level

		EA6 and EA10 SSCLs	
	Sample Location	Arsenic	Lead
	Surface	68	617
	Subsurface/Leaching	385	617
	Active Rail Line	414	1292

Footnotes:
¹ = A correction factor of 1.46 applied to the lead results to adjust total lead to a representative sieved result (Olympus 2011).
² = Lead is not expected to be transported from impacted soils within the active rail line to groundwater under the current conditions at the Facility (Arcadis 2019; DEQ 2019b).
* = Samples sieved with a #60 (<250 micron [µm]) sieve prior to analysis.

Data Qualifier:
J = The analyte was positively identified; however, the associated numerical value is an estimated concentration only.

Sources:
Arcadis. 2024. Construction Constraint Sampling Summary. Joslyn Street Tailings Facility. September 17.
Arcadis. 2019. Feasibility Study Report. Joslyn Street Tailings Facility. Helena, Montana. November 22.
DEQ. 2019b. Record of Decision, Joslyn Street Tailings Facility, Helena, Montana. November 12.
Olympus. 2011. Supplemental Investigation Report, Joslyn Tailings Facility, Lewis and Clark County, Montana. Prepared for Montana Department of Environmental Quality on behalf of BNSF Railway Company. September.

Table 2
2022 Soil and SPLP Analytical Sample Results
BNSF Joslyn Tailings Facility
Helena, MT

						Analyte Method Matrix Units	Total Arsenic SW6010D Soil mg/kg	SPLP Arsenic 1312/SW6010D Water µg/L	Total Lead* SW6010D Soil mg/kg	SPLP Lead 1312/SW6010D Water µg/L	
						Applicable SSCL	385	10 ^a	617	15 ^a	
Sample ID	Grid Number	Sidewall	Sampling Horizon	EA Number	SDG Number	Sample Date	Total Arsenic Result	SPLP Arsenic Result	Total Lead Result	SPLP Lead Result	Excavation Constraint
G109-NSW-20220428 [S-A(20220428)]	109	North	0.0 - 2.0 ft	6	L1488309	04/28/22	178 J [647 J]	337 J [770]	525 [589]	69.9 [309]	Repository
G109-NSW-20220428-D	109	North	2.0 - 2.5 ft	6	L1488309	04/28/22	138 J	247 J	--	--	Repository
G109-SSW-20220428	109	South	0.0 - 2.0 ft	6	L1488309	04/28/22	2,150 J	427 J	--	--	Rail Line
G109-SSW-20220428-D	109	South	2.0 - 2.5 ft	6	L1488309	04/28/22	304 J	119 J	--	--	Rail Line
G115-NSW-20220428	115	South	0.0 - 1.5 ft	6	L1488309	04/28/22	529 J	432 J	--	--	Rail Line
G119-NSW-20220428	119	South	0.0 - 1.0 ft	6	L1488309	04/28/22	690 J	751 J	--	--	Rail Line
G123-NSW-20220428-D	123	South	2.0 - 2.5 ft	6	L1488309	04/28/22	69 J	79.8 J	--	--	Rail Line
G128-NSW-20220428-D	128	South	2.0 - 2.5 ft	6	L1488309	04/28/22	236 J	240 J	--	--	Rail Line
G209-NSW-20220428	209	South	0.0 - 1.0 ft	6	L1488309	04/28/22	304 J	261 J	--	--	Rail Line

Notes:
Bold = Concentration above surface SSCL
Shaded = concentration above the subsurface/leaching SSCL
Underlined = Concentration above the Montana DEQ Circular-7 MCL
[] = denotes duplicate sample
µg/L = micrograms per Liter
D = Denotes deep sample (collected between 2 feet below original grade and terminus of excavation)
ft = feet
ID = identifier/identification
mg/kg = milligrams per kilogram
SDG = Sample Delivery Group
SSCL = Site Specific Cleanup Level
-- = not analyzed

Footnote:
a = Screening level from Montana DEQ Circular-7 (DEQ 2019a)
* = Samples sieved with a #60 (<250 micron [µm]) sieve prior to analysis.

Data Qualifier:
J = The analyte was positively identified; however, the associated numerical value is an estimated concentration only.

Sources:
DEQ. 2019a. Circular DEQ-7 Montana Numeric Water Quality Standards. Montana Dept. of Environmental Quality, Water Quality Division, Water Quality Planning Bureau, Water Quality Standards and Modeling Section. June. Available online at:
<https://deq.mt.gov/Water/Programs/standards>

		EA6 and EA10 SSCLs	
	Sample Location	Arsenic	Lead
	Surface	68	617
	Subsurface/Leaching	385	617
	Active Rail Line	414	1292

Table 3
Environmental Requirements, Criteria and Limitations
BNSF Joslyn Tailings Facility
Helena, MT

Environmental Requirements, Criteria, and Limitations		
Joslyn Street Tailings Facility Remedial Action Work Plan / Construction Constraint Sampling Summary		
State or Federal ERCL Citation	Description	Preliminary Identification of Compliance
CONTAMINANT-SPECIFIC REQUIREMENTS		
Groundwater		
42 USC §§ 300(f) et seq., 40 CFR Part 141	Maximum Contaminant Levels and Maximum Contaminant Level Goals (Relevant) The federal Safe Drinking Water Act, 42 USC§§ 300(f) et seq., and the National Primary Drinking Water Regulations (40 CFR Part 141) (Relevant) establish maximum contaminant levels (MCLs) for contaminants in drinking water distributed in public water systems. -The MCLs are identified because the groundwater in the area of the JST Facility is an actual or potential source of drinking water. Compliance with all MCLs is required and remedial actions must meet the MCLs for all contaminants at the JST Facility, including any breakdown products generated during remedial actions. For the primary contaminants of concern, the MCLs are listed below, with all levels provided in µg/L. Arsenic: 10, Lead: 15.	Wastes generated during implementation of the remedy will be stored and treated or disposed of in such a manner as to not impact groundwater quality. If groundwater is collected during excavation or sampling activities, it will be disposed of in accordance with DEQ's FAQ guidance. Contaminated soils and other contaminated media will be treated, recycled, or disposed of in accordance with solid and hazardous waste ERCLs in a manner that does not degrade the aquifer. Treated soil will be disposed of offsite at an appropriate and DEQ-approved disposal facility.
40 CFR Part 143.3	Secondary Maximum Contaminant Levels (Relevant) Because groundwater in the vicinity of the site is an actual or potential source of drinking water, the Secondary Maximum Contaminant Levels (SMCLs) specified in 40 CFR Part 143.3 are relevant requirements to be attained by the remedy for the JST Facility. This regulation contains levels for iron, manganese, color, odor, and corrosivity that are relevant to the remedial actions.	For locations where the cover and cap system detailed in the Joslyn Street Tailings Facility Construction Constraint Sampling Summary is implemented, ground water will be closely monitored, through the existing groundwater monitoring program pursuant to the schedule defined in the ROD, to ensure that contaminant concentrations are decreasing through sorption and dilution.
Montana Water Quality Act § 75-5-605, MCA § 75-5-303, MCA ARM 17.30.1006	The Montana Water Quality Act, § 75-5-605, MCA (Applicable) provides that it is unlawful to cause pollution of any state waters or cause to be placed any wastes where they will cause pollution of any state waters. Section 75-5-303 (Applicable), MCA requires that existing uses of state waters and the level of water quality necessary to protect the uses must be maintained and protected. Montana Groundwater Pollution Control System ARM 17.30.1006 (Applicable) classifies groundwater into Classes I through IV based upon its natural specific conductance and establishes the groundwater quality standards applicable with respect to each groundwater classification. Class I is the highest quality class; class IV is the lowest. Class I groundwater has a specific conductance of less than or equal to 1,000 microSiemens per centimeter (µmhos/cm) at 25 degrees Celsius. The specific conductance of groundwater at the JST Facility ranged from 430 µmhos/cm to 920 µmhos/cm. The lowest measured specific conductance generally dictates its classification and, based on its specific conductance, groundwater at the JST Facility is classified as Class I Groundwater.	To protect state waters from degradation/pollution, wastes generated during remedial activities will be stored and treated or disposed of in such a manner as to not impact groundwater quality. Soil excavated from contaminant of concern (COC) impacted soil areas will be stockpiled on contaminated areas. If a stockpile is not located on contaminated area or the soils fail a TCLP analysis the stockpile will be placed on a liner with berms to prevent contamination of surrounding surficial soil or contamination of the groundwater. If groundwater is collected during excavation or sampling activities, it will be disposed of in accordance with DEQ's FAQ guidance. Contaminated soils and other contaminated media will be treated, recycled or disposed of in accordance with solid and hazardous waste ERCLs in a manner that does not degrade the aquifer. .
Circular DEQ-7, Montana Numeric Water Quality Standards, June 2019	Numeric Water Quality Standards (Applicable) Concentrations of substances in groundwater within Class I may not exceed the human health standards for groundwater. Compliance with all DEQ-7 standards is required and remedial actions must meet the DEQ-7 standards for all contaminants at the JST Facility, including any breakdown products generated during remedial actions. Concentration thresholds for JST Facility contaminants for human intake are based on federal MCLs. Arsenic: 10 µg/L, Lead : 15 µg/L	Following excavation of the contaminated soils, ground water will be closely monitored to ensure that contaminant concentrations are decreasing through sorption and dilution. Compliance where the cover and cap system detailed in the Joslyn Street Tailings Facility Construction Constraint Sampling Summary is implemented will be confirmed using existing groundwater monitoring and the criteria detailed above. Institutional controls and Engineering controls as described in the RAWP and required in the ROD will be placed to address any potential exposure concerns until DEQ-7 standards are met.
ARM 17.30.1011	ARM 17.30.1011 (Applicable) provides that any groundwater whose existing quality is higher than the standard for its classification must be maintained at that high quality in accordance with § 75-5-303, MCA, and ARM Title 17, chapter 30, subchapter 7.	To protect state waters from degradation/pollution, wastes generated during remedial activities will be stored and treated or disposed of in such a manner as to not impact groundwater quality. Soil excavated from contaminant of concern (COC) impacted soil areas will be stockpiled on contaminated areas. If a stockpile is not located on contaminated area or the soils fail a TCLP analysis the stockpile will be placed on a liner with berms to prevent contamination of surrounding surficial soil or contamination of the groundwater. If groundwater is collected during excavation or sampling activities, it will be disposed of in accordance with DEQ's FAQ guidance. Contaminated soils and other contaminated media will be treated, recycled or disposed of in accordance with solid and hazardous waste ERCLs in a manner that does not degrade the aquifer. Following excavation of the contaminated soils, ground water will be closely monitored to ensure that contaminant concentrations are decreasing through monitored natural attenuation. will evaluate the effect of source removal decrease contaminant concentrations in groundwater through sorption and dilution. Compliance where the cover and cap system is implemented will be confirmed using existing groundwater monitoring and the criteria detailed above. Institutional controls and Engineering controls as described in the RAWP and required in the ROD will be placed to address any additional potential exposure concerns until DEQ-7 standards are met.
Surface Water		
ARM 17.30.610, ARM 17.30.622	Generally, no year-round surface water features are present at the JST Facility. There are several areas that collect some surface water during periods of precipitation or during spring runoff. Wetlands occur in the northwest portion of the JST Facility. The JST Facility falls within the Ten mile Drainage. ARM 17.30.610 (Applicable) provides that surface waters within the boundaries of the JST Facility would be classified as A-1. ARM 17.30.622 (Applicable) Provides the classification standards and beneficial uses for the A-1 classification and provides that the waters are to be maintained suitable for drinking, culinary and food processing purposes after conventional treatment for removal of naturally present impurities. The section also provides the specific water quality standards for water classified as A-1 that must be met.	To prevent state waters from degradation, wastes generated during remedy implementation activities will be stored and treated or disposed of in such a manner as to not impact surface water quality. Contaminated soil and other contaminated media will be treated, recycled or disposed of in accordance with all solid and hazardous waste ERCLs in a manner that does not impact water quality. If impacts to surface waters cannot be avoided, a permit will be obtained and activities will be conducted in accordance with BMPs described in Nationwide Permit 38. Compliance with this criteria will be met at the cover and cap locations through annual inspections as detailed in the Construction Constraint Sampling Summary. Inspection will ensure the cover system remains protective of material left in place due to construction constraints.
ARM 17.30.637	ARM 17.637 (Applicable) requires state surface waters to be free from substances attributable to municipal, industrial, agricultural practices, or other discharges, and states that pollution resulting from storm drainage and non-point sources must be eliminated or minimized.	A Storm Water Pollution Prevention Plan has been prepared for characterization and remedial activities to be conducted at the JST Facility. Excavated areas will be recontoured to minimize potential storm drainage to state surface waters. Implementation of the cover and cap system detailed in the Joslyn Street Tailings Facility Construction Constraint Sampling Summary will protect from transportation of impacted material from storm drainage. Therefore, no further actions are needed to comply with this requirement.
ARM 17.30.705	ARM 17.30.705 (Applicable) provides that for any surface water, existing and anticipated uses and the water quality necessary to protect these uses must be maintained and protected unless degradation is allowed under the non-degradation rules at ARM 17.30.708.	If impacts to surface waters within the boundaries of the Joslyn Tailings Facility cannot be avoided, a permit will be obtained and activities will be conducted in accordance with BMPs described in Nationwide Permit 38. Compliance with this criteria will be met at the cover and cap locations through annual inspections as detailed in the Construction Constraint Sampling Summary. Inspection will ensure the cover system remains protective of material left in place due to construction constraints.
Air Quality		
42 USC§§ 7401 et seq.	The Clean Air Act, 42 USC§§ 7401 et seq., (Applicable) provides limitations on air emissions resulting from cleanup activities or emissions resulting from wind erosion of exposed hazardous substances.	BNSF has determined that an air permit is not required. Air emissions from construction activities will be mitigated through dust suppression practices, and air monitoring within the construction area during work activities as outlined in Sections 4.4.8, 4.4.11.3.1, and 4.4.11.3.3 of the remedial action work plan. BMPs implemented will include but are not limited to minimizing the area of exposed soil; application of water to suppress dust in the excavations, haul roads, and stock pile areas; limiting the speed of haul trucks to 10 miles per hour in the work area; potentially suspending work in periods of sustained high wind; and conducting and evaluating air quality monitoring around the excavation area and implementing adjustments as necessary until appropriate emission levels are achieved. Remedial actions will be halted if air monitoring indicates dust levels are approaching air quality limitations and will not resume until adequate dust control measures are in place. Activities to be conducted under this work plan are not expected to result in exceedances of ambient air quality standards for sulfur dioxide, nitrogen dioxide, carbon monoxide, ozone, or hydrogen sulfide. If emissions of lead or arsenic exceed the levels described within the remedial action work plan, work will be stopped an additional engineering controls will be implemented. Implementation of the cover and cap system detailed in the Joslyn Street Tailings Facility Construction Constraint Sampling Summary will be completed following the mitigation techniques detailed above. Therefore, no further actions are needed to comply with this requirement.
75-2-101, et seq., MCA	Sections 75-2-101, et seq., MCA (Applicable) provides that state emission standards are enforceable under the Clean Air Act of Montana.	
ARM 17.8.204	ARM 17.8.204 (Applicable) establishes monitoring, data collection and analytical requirements to ensure compliance with ambient air quality standards.	
ARM 17.8.220	ARM 17.8.220 (Applicable) provides that settled particulate matter shall not exceed a 3-day average of 10 grams per square meter.	
ARM 17.8.223	ARM 17.8.223 (Applicable) provides that PM-10 concentrations in ambient air shall not exceed a 24-hour average of 150 micrograms per cubic meter of air and an annual average of 50 micrograms per cubic meter of air.	
ARM 17.8.210, 17.8.211, 17.8.212, 17.8.213, 17.8.214, and 17.8.222 (Applicable)	Ambient air standards are also promulgated for sulfur dioxide, nitrogen dioxide, carbon monoxide, ozone, hydrogen sulfide, and lead. If emissions of these compounds were to occur at the JST Facility in connection with any remedial action, these standards would also be applicable.	

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Joslyn Street Tailings Facility Remedial Action Work Plan / Construction Constraint Sampling Summary		
State or Federal ERCL Citation	Description	Preliminary Identification of Compliance
LOCATION-SPECIFIC REQUIREMENTS		
The Endangered Species Act		
16 USC §§ 1531 et seq., 50 CFR Part 402, 40 CFR 6.302(h), and 40 CFR 257.3-2	This statute and implementing regulations (16 USC §§ 1531 et seq., 50 CFR Part 402, 40 CFR 6.302(h), and 40 CFR 257.3-2)(Relevant) require that any federal activity or federally authorized activity may not jeopardize the continued existence of any threatened or endangered species or destroy or adversely modify a critical habitat. Compliance with this requirement involves consultation with the U.S. Fish and Wildlife Service (USFWS) and a determination of whether there are listed or proposed species or critical habitats present at the facility, and, if so, whether any proposed activities will impact such wildlife or habitat. No endangered or threatened species or critical habitat have been identified at the JST Facility and no federal actions or activities are anticipated.	While activities proposed in this work plan will result in significant disturbance, no endangered or threatened species or critical habitats have been identified at this site. Therefore, the work will not impact threatened or endangered species or critical habitats. However, if threatened or endangered species or critical habitats are encountered during remedial actions, compliance with these ERCLs is required and consultation with USFWS will occur. Implementation of the cover and cap system detailed in the Joslyn Street Tailings Facility Construction Constraint Sampling Summary will not impact threatened or endangered species or critical habitats. Therefore, no further actions are needed to comply with this requirement.
Montana Nongame and Endangered Species Conservation Act		
§§ 87-5-101 et seq., MCA §87-5-201, MCA ARM 12.5.201	§§ 87-5-101 et seq., MCA (Applicable) Endangered species should be protected in order to maintain and to the extent possible enhance their numbers. This regulatory citation lists endangered species, prohibited acts and penalties. See also, § 87-5-201, MCA, (Applicable) concerning protection of wild birds, nests and eggs. ARM 12.5.201 (Applicable), certain activities are prohibited with respect to specified endangered species.	While activities proposed in this work plan will result in significant disturbance, no endangered or threatened species or critical habitats have been identified at this site. Therefore, the work will not impact threatened or endangered species or critical habitats. However, if threatened or endangered species or critical habitats are encountered during remedial actions, compliance with these ERCLs will occur. Implementation of the cover and cap system detailed in the Joslyn Street Tailings Facility Construction Constraint Sampling Summary will not impact threatened or endangered species or critical habitats. Therefore, no further actions are needed to comply with this requirement.
Migratory Bird Treaty Act		
16 USC §§ 703 et seq.	6 USC §§ 703 et seq., (Relevant) establishes a federal responsibility for the protection of the international migratory bird resource and requires continued consultation with the USFWS during remedial design and remedial construction to ensure that the cleanup does not unnecessarily impact migratory birds.	There are no known migratory birds that would be affected by remedial activities at the JST Facility. However, if international migratory bird resources are subsequently encountered during remedial actions, consultation with the USFWS will occur. The work is not expected to impact migratory birds. Implementation of the cover and cap system will not impact migratory birds. Therefore, no further actions are needed to comply with this requirement.
Bald Eagle Protection Act		
16 USC §§ 668 et seq.	16 USC §§ 668 et seq., (Relevant) establishes a federal responsibility for protection of bald and golden eagles and requires continued consultation with the USFWS during remedial design and remedial construction to ensure that any cleanup does not unnecessarily adversely affect the bald and golden eagle.	As determined in the ROD, bald and golden eagles have not been identified at the JST Facility. However, if bald or golden eagles are subsequently encountered during remedial actions, consultation with the USFWS will occur. The work is not expected to impact bald or golden eagles. Implementation of the cover and cap system detailed in the Joslyn Street Tailings Facility Construction Constraint Sampling Summary will not impact bald or golden eagles. Therefore, no further actions are needed to comply with this requirement.
Historic Sites, Buildings, Objects and Antiquities Act		
16 USC §§ 461 et seq.	16 USC §§ 461 et seq., (Relevant) provides that, in conducting an environmental review of a proposed action, the responsible official shall consider the existence and location of natural landmarks using information provided by the National Park Service pursuant to 36 CFR 62.6(d) to avoid undesirable impacts upon such landmarks.	To date, no natural landmarks have been identified at the Facility. The work is not expected to impact natural landmarks. Therefore, no further actions are needed to comply with this requirement. Implementation of the cover and cap system detailed in the Joslyn Street Tailings Facility Construction Constraint Sampling Summary will not impact Historic Sites, Buildings, Objects or Antiquities. Therefore, no further actions are needed to comply with this requirement.
Resource Conservation and Recovery Act		
40 CFR § 264.18	40 CFR § 264.18 (Relevant) provides location standards for facilities where treatment of hazardous waste will occur. Portions of those treatment areas must not be located within 200 feet of a fault which has had displacement in Holocene time and treatment areas in or near a 100-year floodplain must be designed, constructed, operated, and maintained to avoid washout.	Based on FEMA and USGS mapping, the JST Facility is not located in a 100-year floodplain or near a Quaternary fault. Therefore, no further actions are needed to comply with this requirement. Implementation of the cover and cap system detailed in the Joslyn Street Tailings Facility Construction Constraint Sampling Summary will not occur within 200 feet of a fault. Therefore, no further actions are needed to comply with this requirement.
Wetlands, Flood Plains, and Streambed Preservation		
Executive Order No. 11,990	Executive Order No. 11,990 (Relevant) provides for the avoidance of adverse impacts associated with the destruction or loss of wetlands and avoids support of new construction in wetlands if a practicable alternative exists.	Wetlands exist at the Facility and adverse impacts will be avoided to the extent practicable. Prior to excavation, soil samples will be collected in the wetlands area per Section 4.4.10 of the remedial action work plan, and a wetlands delineation will be performed, if necessary. If excavation is required within the wetland, then a federal permit will be obtained prior to excavating in the wetland. Implementation of the cover and cap system detailed in the Joslyn Street Tailings Facility Construction Constraint Sampling Summary will not occur within wetlands. Therefore, no further actions are needed to comply with this requirement.
Montana Solid Waste Management Act		
§§ 75-10-201, et seq., MCA; ARM 17.50.501 et seq.	§§ 75-10-201, et seq., MCA, and ARM 17.50.501 et seq., (Applicable) specify requirements that apply to the location of any solid waste management facility, which includes the existing repository at the JST Facility.	A temporary lined and bermed storage area will be constructed to manage contaminated waste while it is awaiting transport. Excavated soils and IDW groundwater will be transported and disposed offsite at a licensed disposal facility (Lewis and Clark County Landfill) that meets the solid waste requirements. Other non-hazardous waste associated with the selected remedy will be characterized and disposed as municipal waste unless otherwise indicated. The existing repository was constructed to comply with these requirements. The proposed cap and cover system detailed in the Joslyn Street Tailings Facility Construction Constraint Sampling Summary will comply with these requirements.
ARM 17.50.523	ARM 17.50.523 (Applicable) requires that waste be transported in such a manner as to prevent its discharge, dumping, spilling or leaking from the transport vehicle	All offsite disposal will occur in covered vehicles to prevent spilling, dumping, or leaking from the transport vehicle. Other solid waste (i.e., plastic wrapping, cardboard, etc.) will be contained in a plastic bag (if necessary), double-bagged (if necessary), and placed in a waste disposal dumpster for collection and appropriate disposal as solid waste. Implementation of the cover and cap system detailed in the Joslyn Street Tailings Facility Construction Constraint Sampling Summary would not require transportation of waste. Therefore, no further actions are needed to comply with this requirement.
ARM 17.50.525	ARM 17.50.525 (Applicable) states that DEQ may inspect at reasonable hours.	DEQ has authority pursuant to Sections 75-10-705 and 75-10-707, MCA, to conduct inspections of the existing depository and remedial activities at reasonable hours upon presentation of state credentials. Implementation of the cover and cap system detailed in the Joslyn Street Tailings Facility Construction Constraint Sampling Summary would not preclude DEQ inspection. Therefore, no further actions are needed to comply with this requirement.
ARM 17.50.1004	ARM 17.50.1004 (Applicable) addresses Class II landfills in floodplains.	Based on FEMA mapping, the JST Facility is not located in a 100-year floodplain. Existing repository design and operation complies with state standards. Therefore, no further actions are needed to comply with this requirement. Implementation of the cover and cap system detailed in the Joslyn Street Tailings Facility Construction Constraint Sampling Summary would not occur within a 100-year floodplain. Therefore, no further actions are needed to comply with this requirement.
ARM 17.50.1005	ARM 17.50.1005 (Applicable) prohibits placement of a Class II landfill in a wetland unless special conditions are met.	Wetlands exist at the Facility and adverse impacts have been and will continue to be avoided. Existing repository design and operation complies with state standards. No new landfills or lateral expansions of existing landfills will be created as part of the selected remedy. Therefore, no further actions are needed to comply with this requirement. Implementation of the cover and cap system detailed in the Joslyn Street Tailings Facility Construction Constraint Sampling Summary will not occur in a wetland area. Therefore, no further actions are needed to comply with this requirement.
ARM 17.50.1006	ARM 17.50.1006 (Applicable) prohibits placement of a Class II landfill within 200 feet of a fault which has had displacement in Holocene time unless special conditions are met.	Based on USGS mapping, the Facility is not located near a Quaternary fault. Existing repository design and operation complies with state standards. No new landfills or lateral expansions of existing landfills will be created as part of the selected remedy. Therefore, no further actions are needed to comply with this requirement. Implementation of the cover and cap system detailed in the Joslyn Street Tailings Facility Construction Constraint Sampling Summary will not occur near a Quaternary fault. Therefore, no further actions are needed to comply with this requirement.
ARM 17.50.1007	ARM 17.50.1007 (Applicable) prohibits placement of a Class II landfill in a seismic impact zone (as defined in ARM 17.50.1002(35)) unless special conditions are met.	No new landfills or lateral expansions of existing landfills will be created as part of the selected remedy. Existing repository design and operation complies with state standards. Therefore, no further actions are needed to comply with this requirement. Review of the Seismic-Hazard Map for the State of Montana produced by the USGS (Attachment 4 of the Joslyn Street Tailings Facility Construction Constraint Sampling Summary) shows the JST is located in the 0.1g zone. Therefore, no further actions are needed to comply with this requirement.

Table 3
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BNSF Joslyn Tailings Facility
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State or Federal ERCL Citation	Description	Preliminary Identification of Compliance
ARM 17.50.1008	ARM 17.50.1008 (Applicable) prohibits placement of a Class II landfill in an unstable area, which are defined in ARM 17.50.1002(40) as including locations that are susceptible to events or forces that are capable of impairing the integrity of the landfill structural components responsible for preventing releases from the landfill.	No new landfills or lateral expansions of existing landfills will be created as part of the selected remedy. Existing repository design and operation complies with state standards. Therefore, no further actions are needed to comply with these requirements. The JST is not located in an area susceptible to natural or artificially-caused events or forces capable of impairing the integrity of some or all of the landfill structural components responsible for preventing releases from a landfill as evidenced by the presence of the existing onsite repository. Therefore, no further actions are needed to comply with this requirement.
ARM 17.50.1009	ARM 17.50.1009 (Applicable) provides that a solid waste management facility must be located where a sufficient acreage of suitable land is available for solid waste management, including adequate separation of wastes from underlying groundwater and adjacent surface water. The facility may not cause or contribute to the taking of any endangered or threatened species of plants, fish, or wildlife or result in the destruction or adverse modification of critical habitat for those species. Also, the facility must manage solid waste, gas, and leachate.	
ARM 17.50.1109	ARM 17.50.1109 (Applicable) further requires that Class II landfills be designed, constructed, and maintained with a run-on and run-off control system to address 25-year storm events.	
ARM 17.50.1110	ARM 17.50.1110 (Applicable) prohibits a Class II landfill from causing a discharge of a pollutant into state waters, including wetlands.	Wetlands exist at the Facility and adverse impacts will be avoided. The existing repository is located in an area that complies with all of the requirements and does not cause or contribute to the taking of any endangered or threatened species of plants, fish or wildlife, nor does it result in the destruction or adverse modification of critical habitat for those species. Solid waste will be managed by temporarily stockpiling contaminated soils on contaminated areas yet to be excavated. If a stockpile is not located on contaminated area or the soils fail a TCLP analysis the stockpile will be placed on a liner with berms to prevent contamination of surrounding surficial soil or contamination of the groundwater. Contaminated soils will be transported as described above, transported and disposed offsite at a licensed disposal facility (Lewis and Clark County Landfill) that meets the solid waste requirements. Existing repository design and operation complies with state standards. Implementation of the cover and cap system detailed in the Joslyn Street Tailings Facility Construction Constraint Sampling Summary will not occur in a wetland area and the design of the remedy will not cause a discharge of pollutants to state waters. Therefore, no further actions are needed to comply with this requirement.
ARM 17.50.1116	ARM 17.50.1116 (Applicable) requires that a solid waste management facility be designed, constructed, and operated in a manner to prevent harm to human health and the environment.	No new landfills or lateral expansions of existing landfills will be created as part of the selected remedy. The existing repository design and operation complies with state standards. Therefore, no further actions are needed to comply with these requirements. Implementation of the cover and cap system detailed in the Joslyn Street Tailings Facility Construction Constraint Sampling Summary will be done in a manner that prevents harm to human health and the environment. The substantive design of the remedy will reduce potential impacts from the soil which this remedy applies.
ARM 17.50.1204(1)(b)	ARM 17.50.1204(1)(b) (Applicable) requires that a Class II landfill or a lateral expansion of an existing Class II landfill unit be constructed utilizing a composite liner and leachate collection and removal system that is designed and constructed to maintain less than a 30-centimeter depth of leachate over the liner.	
ARM 17.50.1205(3)	ARM 17.50.1205(3) (Applicable) requires that the leachate system provide for accurate monitoring of the leachate level and provide a minimum slope at the base of the overlying leachate collection layer equal to at least two percent.	
ARM 17.50.1303	ARM 17.50.1303 (Applicable) identifies requirements for groundwater monitoring.	No new landfills or lateral expansions of existing landfills will be created as part of the selected remedy. Groundwater monitoring will continue pursuant to the schedule described in the ROD. Long-term groundwater monitoring pursuant to the schedule described in the ROD will be used to assess the effectiveness of the proposed remedy in the Joslyn Street Facility Construction Constraint Sampling Summary.
ARM 17.50.1312	ARM 17.50.1312 (Applicable) identifies requirements for monitoring well abandonment.	Any abandonment of monitoring wells will be conducted in accordance with these requirements and will further comply with the Board of Water Well Contractors requirements described in ARM 36.21.670 - 36.21.678 and 36.21.810. BNSF will seek DEQ approval prior to any well abandonment. Implementation of the cover and cap system detailed in the Joslyn Street Tailings Facility Construction Constraint Sampling Summary would not require abandonment of monitoring wells. Therefore, no further actions are needed to comply with this requirement.
ARM 17.50.1403	ARM 17.50.1403 (Applicable) sets forth the closure requirements for Class II landfills. This includes the requirement that the cap be a minimum of 24 inches thick and other criteria, as follows: 1. install a cover that is designed to minimize infiltration and erosion; 2. design and construct the final cover system to minimize infiltration through the closed unit by the use of an infiltration layer that contains a minimum 18 inches of earthen material and has a permeability less than or equal to the permeability of any bottom liner, barrier layer, or natural subsoils or a permeability no greater than 1 X 10 ⁻⁵ cm/sec, whichever is less; and 3. minimize erosion of the final cover by the use of a seed bed layer that contains a minimum of six inches of earthen material that is capable of sustaining native plants.	No new landfills or lateral expansions of existing landfills will be created as part of the selected remedy. Existing repository design and operation complies with state standards. Therefore, no further actions are needed to comply with these requirements. Implementation of the cover and cap system detailed in the Joslyn Street Tailings Facility Construction Constraint Sampling Summary meets the requirements of this criteria.
ARM 17.50.1404	ARM 17.50.1404 (Applicable) sets forth post closure care requirements for Class II landfills. Post closure care requires maintenance of the integrity and effectiveness of any final cover, including making repairs to the cover as necessary to correct the effects of settlement, subsidence, erosion, or other events, and preventing run-on and run-off from eroding or otherwise damaging the cover and comply with the groundwater monitoring requirements found at ARM Title 17, chapter 50, subchapter 13.	No new landfills or lateral expansions of existing landfills will be created as part of the selected remedy. Existing repository design and operation complies with state standards. Long-term groundwater monitoring and maintenance of the existing repository will continue per Section 4.5.1 of the remedial action work plan and the 1997 Site Construction Report for the VCRA. Reports of the inspection and monitoring will be sent to DEQ. Requirements for the on-site repository will be applied to locations where the cover and cap system detailed in the Joslyn Street Tailings Facility Construction Constraint Sampling Summary is implemented.
§ 75-10-212, MCA	Section 75-10-212, MCA (Applicable) prohibits dumping or leaving any debris or refuse upon or within 200 yards of any highway, road, street, or alley of the State or other public property, or on privately owned property where hunting, fishing, or other recreation is permitted. However, the restriction relating to privately owned property does not apply to the owner, his agents, or those disposing of debris or refuse with the owner's consent.	All offsite disposal will occur in covered vehicles to prevent spilling, dumping, or leaking from the transport vehicle. Other solid waste (i.e., plastic wrapping, cardboard, etc.) will be contained in a plastic bag (if necessary), double-bagged (if necessary), and placed in a waste disposal dumpster for collection and appropriate disposal as solid waste. Implementation of the cover and cap system detailed in the Joslyn Street Tailings Facility Construction Constraint Sampling Summary would not require transportation of waste. Therefore, no further actions are needed to comply with this requirement.

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Helena, MT

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Joslyn Street Tailings Facility Remedial Action Work Plan / Construction Constraint Sampling Summary		
State or Federal ERCL Citation	Description	Preliminary Identification of Compliance
ACTION-SPECIFIC REQUIREMENTS		
Air Quality		
ARM 17.8.304 and 17.8.308	ARM 17.8.304 and 17.8.308 (Applicable) provide that no person shall cause or authorize the production, handling, transportation or storage of any material; or cause or authorize the use of any street, road, or parking lot; or operate a construction site or demolition project, unless reasonable precautions to control emissions of airborne particulate matter are taken. Emissions of airborne particulate matter must be controlled so that they do not exhibit an opacity of 20% or greater averaged over six consecutive minutes.	Dust control measures such as wetting, covering stockpiles and truck loads, use of designated driveways as part of a journey management plan, and procedures for air monitoring to verify compliance with ambient air standards may be necessary to meet air quality requirements. Excavation or backfill actions will be halted if air monitoring indicates dust concentrations are approaching air quality limitations and will not resume until adequate dust control measures are in place. See Sections 4.4.8, 4.4.11.3.1, and 4.4.11.3.3 of the remedial action work plan.
ARM 17.24.761	ARM 17.24.761 (Relevant) specifies a range of measures for controlling fugitive dust emissions during mining and reclamation activities and requires that a fugitive dust control program be implemented.	Implementation of the cover and cap system detailed in the Joslyn Street Tailings Facility Construction Constraint Sampling Summary will be completed following the mitigation techniques detailed above. Therefore, no further actions are needed to comply with this requirement.
Groundwater Act		
§ 85-2-505, MCA	§ 85-2-505, MCA (Applicable) precludes the wasting of groundwater. Any well producing waters that contaminate other waters must be plugged or capped, and wells must be constructed and maintained so as to prevent waste, contamination, or pollution of groundwater.	New wells may be installed as part of the long-term groundwater monitoring program. Wells will be properly constructed to prevent further contamination or pollution of groundwater. Drilling subcontracts will require that drillers complete and file a well log report with the Montana Bureau of Mines and Geology. Compliance water quality monitoring will be conducted using methods approved by DEQ. Implementation of the cover and cap system detailed in the Joslyn Street Tailings Facility Construction Constraint Sampling Summary would not require installation of monitoring wells. Therefore, no further actions are needed to comply with this requirement.
§ 85-2-516, MCA and ARM 36.21.809	§ 85-2-516, MCA and ARM 36.21.809 (Applicable) states that within 60 days after any well is completed a well log report must be filed by the driller with the Montana Bureau of Mines and Geology.	
ARM 17.30.641	ARM 17.30.641 (Applicable) provides standards for sampling and analysis of water to determine quality.	
ARM 17.30.646	ARM 17.30.646 (Applicable) requires that bioassay tolerance concentrations be determined in a specified manner.	Bioassays will not be required as part of the tasks detailed in the ROD. Implementation of the cover and cap system detailed in the Joslyn Street Tailings Facility Construction Constraint Sampling Summary would not require bioassays. Therefore, no further actions are needed to comply with this requirement.
ARM 36.21.670-678 and 810	ARM 36.21.670-678 and 810 (Applicable) specifies certain requirements that must be fulfilled when abandoning monitoring wells. This includes filing a well log report with the Montana Bureau of Mines and Geology.	Well abandonment activities at the JST Facility will be performed in accordance with ARM 36.21.670 - 36.21.678 and 36.21.810. Well logs will be filed as part of the scope of any well drilling or abandonment activities. BNSF will seek DEQ approval prior to any well abandonment. Implementation of the cover and cap system detailed in the Joslyn Street Tailings Facility Construction Constraint Sampling Summary would not require abandonment of monitoring wells. Therefore, no further actions are needed to comply with this requirement.
Storm Water Runoff		
ARM 17.30.1341 to 1344	ARM 17.30.1341 to 1344 (Applicable) requires a Storm Water Discharge General Permit for storm water point sources. Generally, the permit requires the permittee to implement Best Management Practices (BMP) and to take all reasonable steps to minimize or prevent any discharge which has a reasonable likelihood of adversely affecting human health or the environment. However, if there is evidence indicating potential or realized impacts on water quality due to any storm water discharge associated with the activity, additional protections may be required.	A Storm Water Pollution Prevention Plan (SWPPP) has been prepared because the disturbed acreage is greater than 1 acre, and is included as an Appendix to this work plan. DEQ has exempted BNSF from the requirement for the procedural portions of a MPDES General Permit. The SWPPP includes BMPs to minimize the potential for storm water pollution, and further addresses the requirements contained in the storm water management regulations. BMPs that will be placed or followed include the following: contaminated soils will be stockpiled on contaminated areas and bermed to prevent runoff. If a stockpile is not located on contaminated area or the soils fail a TCLP analysis the stockpile will be placed on a liner with berms to control runoff/runoff until hauled to the disposal facility to minimize the potential for any additional degradation of state waters; straw bales, fiber rolls, silt fences, gravel bags, filters, sediment traps/basins, and/or other materials will be used to control runoff and erosion from excavations and other active work areas; decontamination pads will be constructed and used to prevent the tracking of impacted soil from the Facility; impacted soil will be loaded into trucks and the loads will be covered by tarps during transit; water will be applied to control dust during excavation and loading; and loads will be transported using the routes shown in Figures 4a and 4b. Equipment and maintenance and refueling will be performed offsite when possible. Following backfill and regrading, the excavation area will be revegetated per the revegetation/weed management plan, approved by the Lewis and Clark County Weed District. Implementation of the cover and cap system detailed in the Joslyn Street Tailings Facility Construction Constraint Sampling Summary will be completed in compliance with the above requirements. Therefore, no further actions are needed to comply with this requirement.
Resource Conservation and Recovery Act		
40 CFR 261.4(b)(7)	40 CFR 261.4(b)(7), (Applicable), indicates that solid waste from the extraction, beneficiation, and processing of ores and minerals is covered by the Bevill exclusion and is therefore excluded from hazardous waste regulation. The tailings at the JST Facility meet the Bevill exclusion criteria because they are remnants of the milling operations, meet the definition of beneficiation, and are in the same form that they were when milled (i.e., were not mixed with other wastes). However, although mining waste is excluded from RCRA hazardous waste regulations under Title 40 of the Code of Federal Regulations Part 261.4(b)(7), disposal facilities typically will not accept the waste if Toxicity Characteristic Leaching Procedure (TCLP) concentrations exceed hazardous waste levels. There are levels of lead at the JST Facility that have the potential to be considered hazardous waste.	The lead-contaminated soil will be further characterized during remedial design. If the soil sample, when subject to TCLP, produces a result in excess of the regulatory limit for lead (5 mg/L), then the soil represented by the same is a characteristic hazardous waste and will be treated on-site with cement kiln dust to remove the hazardous characteristic to below 5 mg/L lead as outlined in Section 4.4.5 prior to transport and disposal to the off-site landfill consistent with solid waste requirements. Implementation of the cover and cap system detailed in the Joslyn Street Tailings Facility Construction Constraint Sampling Summary will not require disposal of waste. Therefore, no further actions are needed to comply with this requirement.
Reclamation Requirements		
§ 75-10-1404, MCA	Section 75-10-1404, MCA (Applicable) requires that mine waste repositories be capped with a minimum of 24 inches of cover material, including a minimum of six inches of topsoil, and revegetated using plant species native to the area. Revegetated areas must achieve a vegetative cover equal to 85% of the vegetation cover of adjacent lands (that were not previously disturbed) within three years of the initial seeding.	The existing waste repository will not be disturbed as part of the remedial activities. Vegetative cover associated with the onsite repository will continue to be inspected annually. Clean fill will be placed in the excavated areas or regraded in some instances, and six inches of topsoil will be placed in all exposure areas where excavation has taken place. The areas will be revegetated under a plan approved by the Lewis and Clark County Weed District. Revegetation will be monitored until 85% of the vegetation cover of adjacent lands is achieved. Implementation of the cover and cap system detailed in the Joslyn Street Tailings Facility Construction Constraint Sampling Summary will not reduce the cover thickness on the repository or result in inadequate vegetative cover. Therefore, no further actions are needed to comply with this requirement.
§§ 82-4-101 et seq., MCA, and § 82-4-301 et seq., MCA	Sections 82-4-101 et seq., MCA, and 82-4-301 et seq., MCA (Relevant) provide that while no mining itself occurred at the JST Facility, milling occurred and these requirements are relevant for the management and reclamation of areas disturbed by excavation, grading or similar actions.	A SWPPP and Air Monitoring Requirements (Exhibit 1 of the work plan) have been prepared as part of this work plan. Air monitoring will be conducted during field activities to assure that ambient air quality standards are not exceeded. The SWPPP includes BMPs to minimize the potential for storm water pollution, and further addresses the requirements contained in the storm water management regulations. BMPs that will be placed or followed include the following: contaminated soils will be stockpiled on contaminated areas and bermed to prevent runoff. If a stockpile is not located on contaminated area or the soils fail a TCLP analysis the stockpile will be placed on a liner with berms to control runoff/runoff until hauled to the disposal facility to minimize the potential for any additional degradation of state waters; straw bales, fiber rolls, silt fences, gravel bags, filters, sediment traps/basins, and/or other materials will be used to control runoff and erosion from excavations and other active work areas; decontamination pads will be constructed and used to prevent the tracking of impacted soil from the Facility; impacted soil will be loaded into trucks and the loads will be covered by tarps during transit; water will be applied to control dust during excavation and loading; and loads will be transported using the routes shown in Figures 4a and 4b. Equipment and maintenance and refueling will be performed offsite when possible. Following backfill and regrading, the excavation area will be revegetated per the revegetation/weed management plan, approved by the Lewis and Clark County Weed District. Implementation of the cover and cap system detailed in the Joslyn Street Tailings Facility Construction Constraint Sampling Summary will be completed following the same SWPPP and air monitoring requirement detailed above. Therefore, no further actions are needed to comply with this requirement.
ARM 17.24.631	ARM 17.24.631 (Relevant) provides that disturbances to the prevailing hydrologic balance will be minimized. Changes in water quality and quantity, in the depth to groundwater and in the location of surface water drainage channels will be minimized, to the extent consistent with the selected remedial action. Other pollution minimization devices must be used if appropriate, including stabilizing disturbed areas through land shaping, diverting runoff, planting quickly germinating and growing stands of temporary vegetation, regulating channel velocity of water, lining drainage channels with rock or vegetation, mulching, and control of acid-forming, and toxic waste materials.	
ARM 17.24.633	ARM 17.24.633 (Relevant) provides that all surface drainage from a disturbed area must be treated by the best technology currently available. This includes the requirement that sediment control be maintained until the disturbed area has been restored and revegetation requirements have been met.	
ARM 17.24.635 through 17.24.637	ARM 17.24.635 through 17.24.637 (Relevant) provides requirements for temporary and permanent diversions.	
ARM 17.24.638	ARM 17.24.638 (Relevant) provides that sediment control measures must be implemented during operations.	A SWPPP and Air Monitoring Requirements (Exhibit 1 of the work plan) have been prepared as part of this work plan. Air monitoring will be conducted during field activities to assure that ambient air quality standards are not exceeded. The SWPPP includes BMPs to minimize the potential for storm water pollution, and further addresses the requirements contained in the storm water management regulations. BMPs that will be placed or followed include the following: contaminated soils will be stockpiled on contaminated areas and bermed to prevent runoff. If a stockpile is not located on contaminated area or the soils fail a TCLP analysis the stockpile will be placed on a liner with berms to control runoff/runoff until hauled to the disposal facility to minimize the potential for any additional degradation of state waters; straw bales, fiber rolls, silt fences, gravel bags, filters, sediment traps/basins, and/or other materials will be used to control runoff and erosion from excavations and other active work areas; decontamination pads will be constructed and used to prevent the tracking of impacted soil from the Facility; impacted soil will be loaded into trucks and the loads will be covered by tarps during transit; water will be applied to control dust during excavation and loading; and loads will be transported using the routes shown in Figures 4a and 4b. Equipment and maintenance and refueling will be performed offsite when possible. Following backfill and regrading, the excavation area will be revegetated per the revegetation/weed management plan, approved by the Lewis and Clark County Weed District. Implementation of the cover and cap system detailed in the Joslyn Street Tailings Facility Construction Constraint Sampling Summary will be completed following the same SWPPP and air monitoring requirement detailed above. Therefore, no further actions are needed to comply with this requirement.
ARM 17.24.640	ARM 17.24.640 (Relevant) provides that discharges from diversions must be controlled to reduce erosion and to minimize disturbance of the hydrologic balance.	
ARM 17.24.641	ARM 17.24.641 (Relevant) provides that practices to prevent drainage from toxic forming spoil material into ground and surface water will be employed.	
ARM 17.24.643 through 17.24.646	ARM 17.24.643 through 17.24.646 (Relevant) provide requirements for groundwater protection, groundwater recharge protection, and groundwater and surface water monitoring.	
ARM 17.24.701	ARM 17.24.701 (Relevant) provides that undisturbed soils must be protected to the extent possible from contamination and soil salvage operations must be conducted in a manner that minimizes erosion, contamination, degradation, compaction, and deterioration of the biological properties of the soil.	

Table 3
Environmental Requirements, Criteria and Limitations
BNSF Joslyn Tailings Facility
Helena, MT

Environmental Requirements, Criteria, and Limitations		
Joslyn Street Tailings Facility Remedial Action Work Plan / Construction Constraint Sampling Summary		
State or Federal ERCL Citation	Description	Preliminary Identification of Compliance
ARM 17.24.702	ARM 17.24.702 (Relevant) provides that salvaged and stockpiled soil must be protected from wind or water erosion. Active stockpiles must be used within one year or revegetated. Redistributed soil must be reconditioned by subsoling on the contour, whenever possible.	Revegetation will be accomplished in cooperation with the Lewis and Clark County Weed District. A revegetation/weed management plan, approved by the Lewis and Clark County Weed District has been included as an Appendix to this work plan. Implementation of the cover and cap system detailed in the Joslyn Street Tailings Facility Construction Constraint Sampling Summary will be completed following the same revegetation requirement detailed above. Therefore, no further actions are needed to comply with this requirement.
ARM 17.24.703	ARM 17.24.703 (Relevant) provides that, when using materials other than, or along with, soil for final surfacing in reclamation, the operator must demonstrate that the material (1) is at least as capable as the soil of supporting the approved vegetation and subsequent land use; and (2) the medium must be the best available in the area to support vegetation. Such substitutes must be used in a manner consistent with the requirements for redistribution of soil in ARM 17.24.701 and 702.	
ARM 17.24.711	ARM 17.24.711 (Relevant) provides that, when reclaiming, a diverse, effective and permanent vegetative cover of the same seasonal variety and utility as the vegetation native to the area of land to be affected must be established.	Revegetation will be accomplished in cooperation with the Lewis and Clark County Weed District. A revegetation/weed management plan, approved by the Lewis and Clark County Weed District has been included as an Appendix to this work plan. Implementation of the cover and cap system detailed in the Joslyn Street Tailings Facility Construction Constraint Sampling Summary will be completed following the same revegetation requirement detailed above. Therefore, no further actions are needed to comply with this requirement.
ARM 17.24.713	ARM 17.24.713 (Applicable) provides that seeding and planting of disturbed areas must be conducted during the first appropriate period for favorable planting after final seeded.	
ARM 17.24.714	ARM 17.24.714 (Applicable) provides that mulch or cover crop or both must be used until adequate permanent cover can be established.	
ARM 17.24.716	ARM 17.24.716(Applicable) provides that revegetation may be done through drill or broadcast seeding, by seeding transplants, or by establishing sod plugs, and all revegetation must be done on the contour whenever possible. Seed mix must be free of weedy or other undesirable species and done in a manner to prevent establishment of noxious weeds.	Revegetation will be accomplished in cooperation with the Lewis and Clark County Weed District. A revegetation/weed management plan, approved by the Lewis and Clark County Weed District has been included as an Appendix to this work plan. Implementation of the cover and cap system detailed in the Joslyn Street Tailings Facility Construction Constraint Sampling Summary will be completed following the same revegetation requirement detailed above. Therefore, no further actions are needed to comply with this requirement.
ARM 17.24.717	ARM 17.24.717 (Applicable) provides that tree or shrub species must be adopted for local site conditions and climate and be planted in combination with herbaceous species.	
ARM 17.24.718	ARM 17.24.718 (Applicable) provides that soil amendment must be used if necessary to establish a permanent vegetative cover. Grazing, haying or chemical applications may not be conducted if they interfere with establishment of revegetation.	
ARM 17.24.721	ARM 17.24.721 (Applicable) provides that reclamation must ensure that rills or gullies are stabilized and the area reseeded and replanted if the rills and gullies are disrupting the reestablishment of the vegetative cover or causing or contributing to a violation of water quality standards for a receiving stream.	Revegetation will be accomplished in cooperation with the Lewis and Clark County Weed District. A revegetation/weed management plan, approved by the Lewis and Clark County Weed District has been included as an Appendix to this work plan. Implementation of the cover and cap system detailed in the Joslyn Street Tailings Facility Construction Constraint Sampling Summary will be completed following the same revegetation requirement detailed above. Therefore, no further actions are needed to comply with this requirement.
ARM 17.24.723	ARM 17.24.723 (Applicable) provides that periodic monitoring of vegetation, soils, water, and wildlife is required.	
ARM 17.24.724	ARM 17.24.724 (Applicable) provides that the success of revegetation is measured against unmined reference areas on lands exhibiting good ecological integrity.	
ARM 17.24.726	ARM 17.24.726 (Applicable) provides the required methods for measuring vegetative success.	Revegetation will be accomplished in cooperation with the Lewis and Clark County Weed District. A revegetation/weed management plan, approved by the Lewis and Clark County Weed District has been included as an Appendix to this work plan. Implementation of the cover and cap system detailed in the Joslyn Street Tailings Facility Construction Constraint Sampling Summary will be completed following the same revegetation requirement detailed above. Therefore, no further actions are needed to comply with this requirement.
ARM 17.24.731	ARM 17.24.731 (Applicable) provides that, if toxicity to plants or animals is suspected, comparative chemical analyses may be required.	
Noxious Weeds		
§§ 7-22-2101 et seq., MCA	Sections 7-22-2101 et seq., MCA (Applicable) establishes and authorizes weed control at the local level. Section 7-22-2101(6)(a), MCA defines "noxious weeds." Designated noxious weeds are listed in ARM 4.5.201 (Applicable) and ARMs 4.5.206 through 4.5.209 (Applicable) and must be managed consistent with weed management criteria developed under § 7-22-2109(2)(b), MCA, and in compliance with § 7-22-2152, MCA. In addition, ARM 4.5.210 (Applicable) identifies regulated plants that may not be used for revegetation.	Revegetation will be accomplished in accordance with the Lewis and Clark County Weed District. A revegetation/weed management plan, approved by the Lewis and Clark County Weed District has been included as an Appendix to this work plan. Implementation of the cover and cap system detailed in the Joslyn Street Tailings Facility Construction Constraint Sampling Summary will be completed following the same revegetation requirement detailed above. Therefore, no further actions are needed to comply with this requirement.
ARM 4.5.201		
ARM 4.5.206 - 4.5.209		
ARM 4.5.210		

Table 3
Environmental Requirements, Criteria and Limitations
BNSF Joslyn Tailings Facility
Helena, MT

Environmental Requirements, Criteria, and Limitations		
Joslyn Street Tailings Facility Remedial Action Work Plan / Construction Constraint Sampling Summary		
State or Federal ERCL Citation	Description	Preliminary Identification of Compliance
OTHER LAWS (NON-EXCLUSIVE LIST)		
Occupational Safety and Health Regulations		
29 CFR 1910	29 CFR 1910 (Applicable). The OSHA regulations found at 29 CRF 1910 are applicable to worker protection during conduct of all remedial activities.	A site-specific Health and Safety Plan was prepared (see Appendix B of the remedial action work plan) and will be implemented for remedial activities performed at the JST Facility. The Health and Safety Plan includes information on site hazards, job procedures, emergency response, personnel training requirements, site control, air monitoring, and personnel protection equipment. The Health and Safety Plan will be updated, as needed, for to capture activities associated with implementation of the cover and cap system detailed in the Joslyn Street Tailings Facility Construction Constraint Sampling Summary. Therefore, no further actions are needed to comply with this requirement.
Public Water Supply Regulations		
ARM 17.38.101	ARM 17.38.101 (Relevant). If remedial action at the JST Facility requires any reconstruction or modification of any public water supply line or sewer line, the construction standards specified in ARM 17.38.101 must be observed.	Modification of public water supply lines or sewer piping lines is not expected to be conducted under this work plan. Precautions will be taken to avoid buried utilities during intrusive field activities. In the event that water or sewer piping is encountered during construction, then the appropriate construction standards will be followed. Implementation of the cover and cap system detailed in the Joslyn Street Tailings Facility Construction Constraint Sampling Summary will not require modification of public water supply or sewer piping lines. Therefore, no further actions are needed to comply with this requirement.
Water Rights		
§ 85-2-101, MCA	Section 85-2-101, MCA (Applicable) declares that all waters within the state are the state's property, and may be appropriated for beneficial uses. The wise use of water resources is encouraged for the maximum benefit to the people and with minimum degradation of natural aquatic ecosystems.	Activities to be conducted under this work plan do not involve the use of state waters that would require a beneficial use analysis or appropriation. Implementation of the cover and cap system detailed in the Joslyn Street Tailings Facility Construction Constraint Sampling Summary will not require the use of state waters. Therefore, no further actions are needed to comply with this requirement.
Parts 3 and 4 of Title 85, Chapter 2, MCA	Parts 3 and 4 of Title 85, Chapter 2, MCA (Applicable) set out requirements for obtaining water rights and appropriating and utilizing water. All requirements of these parts are laws which must be complied with in any action using or affecting waters of the state.	
Montana Safety Act		
§ 50-71-201, MCA	Section 50-71-201, MCA (Applicable) provides that every employer must provide and maintain a safe place of employment, provide and require use of safety devices and safeguards, and ensure that operations and processes are reasonably adequate to render the place of employment safe. The employer must also do every other thing reasonably necessary to protect the life, health, and safety of its employees.	A site-specific Health and Safety Plan was prepared (see Appendix B of the remedial action work plan) and will be implemented for remedial activities performed at the JST Facility. The Health and Safety Plan includes information on site hazards, job procedures, emergency response, personnel training requirements, site control, air monitoring, and personnel protection equipment. The Health and Safety Plan will be updated, as needed, for to capture activities associated with implementation of the cover and cap system detailed in the Joslyn Street Tailings Facility Construction Constraint Sampling Summary. Therefore, no further actions are needed to comply with this requirement.

Table 3
Environmental Requirements, Criteria and Limitations
BNSF Joslyn Tailings Facility
Helena, MT

Notes:

This evaluation was originally completed for the 2020 Remedial Action Work Plan. Revisions/updates made for the 2023 Construction Constraint Sampling Summary. This version (Table 3) comes from the September 17, 2024, Construction Constraint Sampling Summary, submitted by Arcadis on behalf of BNSF.

Acronyms and Abbreviations:

§ = section
µg/L = microgram per liter
µg/m³ = microgram per cubic meter
µmhos/cm = microsiemens per centimeter
°F = degree Fahrenheit
ARM = Administrative Rules of Montana
AS = action-specific
BMP = best management practice
CFR = Code of Federal Regulations
c.f.u. = colony forming unit
c.u. = color unit
CS = contaminant-specific
DEQ = Department of Environmental Quality
ERCL = environmental requirements, criteria, and limitations
FEMA = Federal Emergency Management Agency
g/m² = gram per square meter
IDW = investigation-derived waste
JST = Joslyn Street Tailings
LS = location-specific
mg/L = milligram per liter
MCA = Montana Code Annotated
MCL = maximum contaminant level
MCLG = maximum contaminant level goal
MFWP = Montana Department of Fish, Wildlife, and Parks
N/A = not applicable
PM = particulate matter
PM-10 = particulate matter, diameter 10 micrometers or less
RCRA = Resource Conservation and Recovery Act
TON = threshold odor number
TCLP = toxicity characteristic leaching procedure
USFWS = United States Fish and Wildlife Service
USGS = United States Geological Survey
WQS = water quality standard

Table 4
Comparison of Alternatives
BNSF Joslyn Street Tailings Facility
Helena, MT

Alternatives	Protectiveness	Compliance with Environmental	Mitigation to Risk	Effectiveness and Reliability	Technically Practicable and Implementable	Treatment and Resource Technologies	Cost Effectiveness
ROD Alternative 4 Excavation and off-site disposal	•Protective when combined with ROD Alternative 5 (MNA).	•Anticipated to comply with ERCLs within 15 years.	•Mitigates risk by removal and disposal of contaminated soils	•Effective and reliable in short and long term by removal and disposal of contaminated soils	•Practicable and implementable.	•No treatment and resource technologies implemented.	•Cost to temporarily reroute mainline tracks would be multiple orders of magnitude higher than the Proposed Alternatives. •An estimated \$430,000 for repository modification, repairs, and long-term monitoring. •Would require removal of mainline tracks and damage to the repository resulting in repair and additional monitoring costs.
ESD Proposed Alternative Low Permeability Cap, including overlying cover system	•For leaching exceeances, protective when combined with Alternative 5 (MNA). •For soils currently exceeding direct contact SSCL, soils left in place will meet applicable SSCL post-remedy with the cover system. •Perpetual maintenance required. •IC to prevent disturbance required.	•Anticipated to comply with ERCLs within 15 years.	•Mitigates direct exposure risk, including in areas currently exceeding SSCLs, by meeting SSCLs after placement of cover soil. •Mitigates leachate generation by water infiltration risk with impermeable clay liner. •Requires long-term OMM. •IC required to prevent disturbance.	•Effective and reliable in the short and long term by meeting SSCLs after placement of cover soil. •Effective and reliable in short term by precluding water infiltration and direct exposure. •Effective and reliable in the long term with maintenance. •IC to prevent disturbance required. •Potential groundwater exposure during high groundwater events.	•Practicable and implementable. •Long-term maintenance required.	•No treatment and resource technologies implemented.	•Estimated \$180,000 to implement; estimated \$210,000 including long-term monitoring costs. •Substantially lower cost than ROD Alternative 4 •Cost effective, would require minimal long term maintenance. •No removal of tracks or damage to repository

Notes: Modified by DEQ, previous version from Table 4, September 17, 2024 Construction Constriant Sampling Summary, by Arcadis, on behalf of BNSF.

Table 4a
Construction Constraint Alternative
Cost Estimate
Joslyn Street Tailings Facility
Lewis and Clark County, Montana

Proposed ESD Alternative - Low Permeability CAP and Cover System

Capital Costs					
Description	Quantity	Unit	Unit Cost	Total Cost	Notes/Source
Work Plan, Agency Correspondence, and Design	1	LS	\$15,000	\$15,000	Prepare work plan to implement modified remedy.
Repository Modification					
General Fill - Placed	750	TON	\$33.48	\$25,110	Quote, per ton, from supplier and contractor
Topsoil - Placed	370	TON	\$46.62	\$17,249	Quote, per ton, from supplier and contractor
Geosynthetic Clay Liner - Placed	1	LS	\$57,500	\$57,500	Quote from supplier and contractor based on 300 linear feet. Quote multiplied for 750 linear feet of Bentomat DN.
Geosynthetic Fabric - Placed	1	LS	\$10,000	\$10,000	Estimated 10,000 square feet woven geotextile; \$0.65 per square foot, \$0.35 per square foot for installation. (bpmgeosynthetics.com)
Restoration					
Fence Removal/Replacement	1	LS	\$10,000	\$10,000	Quote from contractor
Revegetation	1	LS	\$0	\$0	Revegetation included under site-wide Remedial Action costs
Reporting and Oversight					
Construction Oversight	10	DAY	\$1,500	\$15,000	Engineer's estimate of labor, equipment, and expenses.
Construction Completion Report	1	LS	\$0	\$0	Reporting included under site-wide Construction Completion Report.
Subtotal Capital Cost				\$149,859	
Contingency				20%	\$29,972
TOTAL CAPITAL COSTS (ROUNDED UP)				\$180,000	

Capital Cost Notes:

LS = lump sum

YR = YEAR

1. The level of accuracy of these estimated costs is "Order of Magnitude," as defined by the American Association of Cost Engineers. The accuracy of an Order of Magnitude estimate is plus 50 percent and minus 30 percent. Cost estimates at this level may be used to compare alternatives, but should not be used to plan, finance, or develop projects. Changes in the cost elements are likely to occur during the engineering design of the remedial alternative. The cost estimate was prepared in general accordance with regulatory guidance for cost estimating (USEPA 2000). Unit costs were selected based on previous remediation and project experience and based on budgetary quotes for some materials and services.

2. Mobilization/demobilization and material confirmation sampling included in costs.

3. Material costs include transport/shipment and installation costs.

Source: Arcadis May 15, 2026 email to DEQ re JST Facility - Cost Estimate

Table 4a
Construction Constraint Alternative
Cost Estimate
Joslyn Street Tailings Facility
Lewis and Clark County, Montana

Proposed ESD Alternative - Low Permeability CAP and Cover System

Groundwater remedy and monitoring costs included in the groundwater alternative costs.

Operation, Maintenance, and Monitoring (OMM) Costs			
Annual Costs			
Description	Quantity	Unit Cost	Total
Years 1-5			
Post-Remedial Cap Operations and Maintenance (labor, expenses, materials) assumed every 5 years	1	\$2,000	\$2,000
Management and Reporting	1	\$1,500	\$1,500
TOTAL ANNUAL OMM COSTS (Years 1-5)			\$3,500
Periodic OMM Costs			
Noxious Weed Management (annual years 1-5, every 5 years starting in year 10)	1	\$2,000	\$2,000
TOTAL PERIODIC OMM COSTS (Years 10, 15, 20, 25, 30)			\$2,000

Table 4b
Construction Constraint Alternative
Cost Estimate
Joslyn Street Tailings Facility
Lewis and Clark County, Montana

Proposed ROD Alternative 4 - Repository Repair and Monitoring

Capital Costs					
Description	Quantity	Unit	Unit Cost	Total Cost	Notes/Source
Work Plan, Agency Correspondence, and Design	1	LS	\$25,000	\$25,000	Prepare work plan to modify and repair repository.
Repository Modification					
Mobilization/Demobilization	1	LS	\$16,000	\$16,000	Quote from supplier and contractor
Surface Preparation	1,900	SY	\$20	\$38,000	Quote from supplier and contractor. Assumes approximately 1/3 of the footprint of the repository would need soil stripped and GCL pulled to access sidewalls.
Management of Repository Material	600	CY	\$65	\$39,000	Quote from supplier and contractor. Includes transportation of soils to landfill. Assuming 600 SY of repository will be disturbed at an average excavated face height of 3 feet.
Cover (top and sides) GCL	600	SY	\$50	\$30,000	Quote from supplier and contractor
Soil Stabilization	900	TON	\$40	\$36,000	Quote from supplier and contractor. Assuming soil stabilization required due to TCLP exceedances.
Disposal of Repository Material	900	TON	\$15	\$13,500	Quote from supplier and contractor.
Restoration					
Fence Removal/Replacement	1	LS	\$10,000	\$10,000	Scaled quote from contractor
Revegetation	1	LS	\$5,000	\$5,000	Engineer's estimate.
Reporting and Oversight					
Construction Oversight	15	DAY	\$1,500	\$22,500	Engineer's estimate of labor, equipment, and expenses.
Construction Completion Report	1	LS	\$25,000	\$25,000	Engineer's estimate. Includes revisions to deed restrictions.
Subtotal Capital Cost				\$260,000	
Contingency				20%	\$52,000
TOTAL CAPITAL COSTS (ROUNDED UP)				\$320,000	

Capital Cost Notes:

LS = lump sum

YR = YEAR

1. The level of accuracy of these estimated costs is "Order of Magnitude," as defined by the American Association of Cost Engineers. The accuracy of an Order of Magnitude estimate is plus 50 percent and minus 30 percent. Cost estimates at this level may be used to compare alternatives, but should not be used to plan, finance, or develop projects. Changes in the cost elements are likely to occur during the engineering design of the remedial alternative. The cost estimate was prepared in general accordance with regulatory guidance for cost estimating (USEPA 2000). Unit costs were selected based on previous remediation and project experience and based on budgetary quotes for some materials and services.

2. Mobilization/demobilization and material confirmation sampling included in costs.

3. Material costs include transport/shipment and installation costs.

4. Costs include preparatory work to access soils for additional excavation.

Source: Arcadis May 15, 2026 email to DEQ re JST Facility - Cost Estimate

Table 4b
Construction Constraint Alternative
Cost Estimate
Joslyn Street Tailings Facility
Lewis and Clark County, Montana

Proposed ROD Alternative 4 - Repository Repair and Monitoring

Groundwater remedy and monitoring costs included in the groundwater alternative costs.

Operation, Maintenance, and Monitoring (OMM) Costs			
Annual Costs			
Description	Quantity	Unit Cost	Total
Years 1-5			
Post-Remedial Repository Operations and Maintenance (labor, expenses, materials)	1	\$1,500	\$1,500
Additional Groundwater Monitoring due to Repository Repairs (assume 5 years for subset of monitoring wells around repository)	1	\$8,000	\$8,000
Management and Reporting	1	\$1,000	\$1,000
TOTAL ANNUAL OMM COSTS (Years 1-5)			\$10,500
Years 6-30			
Post-Remedial Repository Operations and Maintenance (labor, expenses, materials)	1	\$1,500	\$1,500
Management and Reporting	1	\$1,000	\$1,000
TOTAL ANNUAL OMM COSTS (Years 6-30)			\$2,500
Periodic OMM Costs			
Noxious Weed Management (annual years 1-5, every 5 years starting in year 10)	1	\$2,000	\$2,000
TOTAL PERIODIC OMM COSTS (Years 10, 15, 20, 25, 30)			\$2,000

