2026 Big Mountain Viper Reclamation Plan
Weld County, Colorado

MAY 2026

PREPARED FOR

Taproot Rockies Midstream, LLC

PREPARED BY

SWCA Environmental Consultants

2026 BIG MOUNTAIN VIPER RECLAMATION PLAN
WELD COUNTY, COLORADO

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1 INTRODUCTION

SWCA Environmental Consultants (SWCA), on behalf of Taproot Rockies Midstream, LLC (Taproot Midstream), has prepared and is submitting this reclamation plan (Plan) to the Colorado Energy and Carbon Management Commission (ECMC) in accordance with ECMC Rule 915b (2025). An unplanned release occurred in September 2022 at the Taproot Midstream Big Mountain Viper (BMV) Installation (Project) site in Weld County, Colorado, that resulted in elevated soil boron, pH, salinity, and sodicity. Soil salts, particularly sodium, are considered limiting to successful reclamation processes following oil and gas operations because they may deteriorate soil structure and interrupt normal soil-plant-water relationships. In such cases, under ECMC Rule 915b, operators are required to "provide a detailed Reclamation plan that includes, but is not limited to, soil analysis from adjacent undisturbed lands, revegetation techniques, site stabilization, and details of seeded species" (ECMC 2025).

The purpose of this Plan is to describe the site-specific conditions and reclamation/remediation practices for the Project in accordance with ECMC Rule 915b (2025). Ecological conditions at the Project site and within the surrounding area were initially assessed on September 5, 2022 (see Section 3, Ecological Conditions) during preliminary excavation activities to evaluate potential impacts to soil resources from the unintended release and to inform development of this Plan. Preliminary confirmation sampling was completed on September 8 and September 12 to evaluate the efficacy of preliminary excavation activities. Soil laboratory results indicated residual impacts and additional excavation of impacted materials and confirmation sampling was completed November 10 through 11, 2022. Due to residual elevated boron, additional follow-up sampling occurred on August 29, 2024; April 10, 2025; and February 13, 2026, to evaluate the success of additional excavation activities. This reclamation plan presents data and recommendations for reclamation across the location based on the initial (2022) and new datasets (2024-2026).

Specifications regarding ecological conditions at the Project site and surrounding area, reclamation and remediation procedures and best management practices (BMPs), monitoring, and reporting are discussed in the sections below. This document may be revised based on site conditions documented during remediation activities or as new information becomes available through similar remediation and/or monitoring efforts (see Section 5.1.1, Adaptive Management).

2 PROJECT OVERVIEW

The Project site is located approximately 8.5 miles northwest of Raymer, Colorado, in Weld County (NW SW¼-¼ Section 16, Township 8 North, Range 59 West) and consists of a produced water transfer system (PWTS) with other ancillary facilities/infrastructure. A PWTS moves water produced from oil and gas activities between different oil and gas locations and is a network of interconnected off-location water flowlines proceeding from multiple well sites or production facilities (CO ECMC 2022). On September 5, 2022, a release was discovered and reported at the Project site due to a failure of the PWTS. The release occurred on the Big Mountain Viper 8-59 well pad facility where vegetation is purposefully prevented to avoid fire hazards on the facility (Appendix B). The release was contained in the PWTS apart from a small area to the south and southwest of the facility that included a spill containment/retention pond (Figure 1). Following discovery of the release, contaminated fill and soil were visually delineated within the PWTS, excavated to various depths based on the observed depth of seepage, removed from the site, and disposed of at an approved facility. An Initial Spill/Release Report (Form 19) was submitted by Taproot Midstream to ECMC on September 5, 2022 (Appendix A). Approximately 0.18 acre within the Project footprint requires interim revegetation resulting from the release (Table 1).

Table 1. Acres of Disturbance as Constructed

Disturbance Type	Area of Disturbance (acres)	Area to be Reclaimed (acres)
PWTS	*0.58*	*0.18*
Access Roads	*0*	*0*
Ancillary Facilities	*0*	*0*
Totals	**0.58**	**0.18**

3 ECOLOGICAL CONDITIONS

Identification of ecological characterizations of the land is important for reclamation planning as developing ecological site-specific reclamation techniques will increase the likelihood that revegetation is successful (see Section 4.2, Revegetation) and that reclamation success standards are met (see Section 5.1, Monitoring). Major Land Resource Areas (MLRAs) are geographically associated land resource units developed by the United States Department of Agriculture-Natural Resources Conservation Service (USDA-NRCS) to provide regionally specific information on geology, climate, water, soils, and biological resources (USDA-NRCS 2025; Stringham et al. 2016). MLRAs are effective planning tools on a regional scale while ecological site descriptions (ESDs), which are refined geographical units within MLRAs, can be used to describe the physiographic setting, soils, vegetation, hydrology, and ecology at a site-specific scale. The Project falls within the Central High Plains, Southern Part MLRA and the Loamy Plains ecological site (R067BY002CO) which is largely associated with mixed-grass prairie (short- and midgrass species) and a minor component of forbs and shrubs (NRCS 2026). The Loamy Plains ecological site occurs on gently rolling plains and average annual precipitation ranges from 13 inches to over 18 inches depending on location. Livestock grazing is common across the ecological site (NRCS 2026).

3.1 Plant Communities

Pre-disturbance vegetative conditions at the Project site were assessed using publicly available datasets to better understand baseline conditions that inform reclamation actions and success standards for reclamation. These datasets include the NRCS's ESDs (discussed above) and the Rangeland Analysis Platform (RAP). The RAP integrates data from NRCS's National Resources Inventory and the Bureau of Land Management's (BLM's) Assessment, Inventory, and Monitoring and Landscape Monitoring Framework datasets. These quantitative vegetative assessments are modeled with the historical Landsat satellite records, gridded meteorology, and abiotic land surface data to provide estimates of the percent vegetation cover of annual grasses and forbs, perennial grasses and forbs, woody stems (e.g., shrubs and trees), litter, and bare ground (NRCS and BLM 2021). RAP data were used to inform vegetation and abiotic characteristics for reclamation planning and were referenced to further assess the distribution and estimated cover of vegetation and cover types across the Project site.

The Project site falls within the Loamy Plains ecological site as described above. This ecological site is correlated with mixed-grass prairie and plant community composition and is generally about 70% to 85% grasses and grass-like plants, 5% to 15% forbs, and 10% to 15% woody plants (NRCS 2026). Common plant species in the Loamy Plains ecological site includes western wheatgrass (*Pascopyrum smithii*), green needlegrass (*Nassella viridula*), Indian ricegrass (*Achnatherum hymenoides*), squirreltail (*Elymus elymoides*), needle and thread (*Hesperostipa comata*), blue grama (*Bouteloua gracilis*), buffalograss (*Bouteloua dactyloides*), fourwing saltbush (*Atriplex canescens*), winterfat (*Krascheninnikovia lanata*), rubber rabbitbrush (*Ericameria nauseosa* ssp. *nauseosa*), plains pricklypear (*Opuntia polyacantha*),

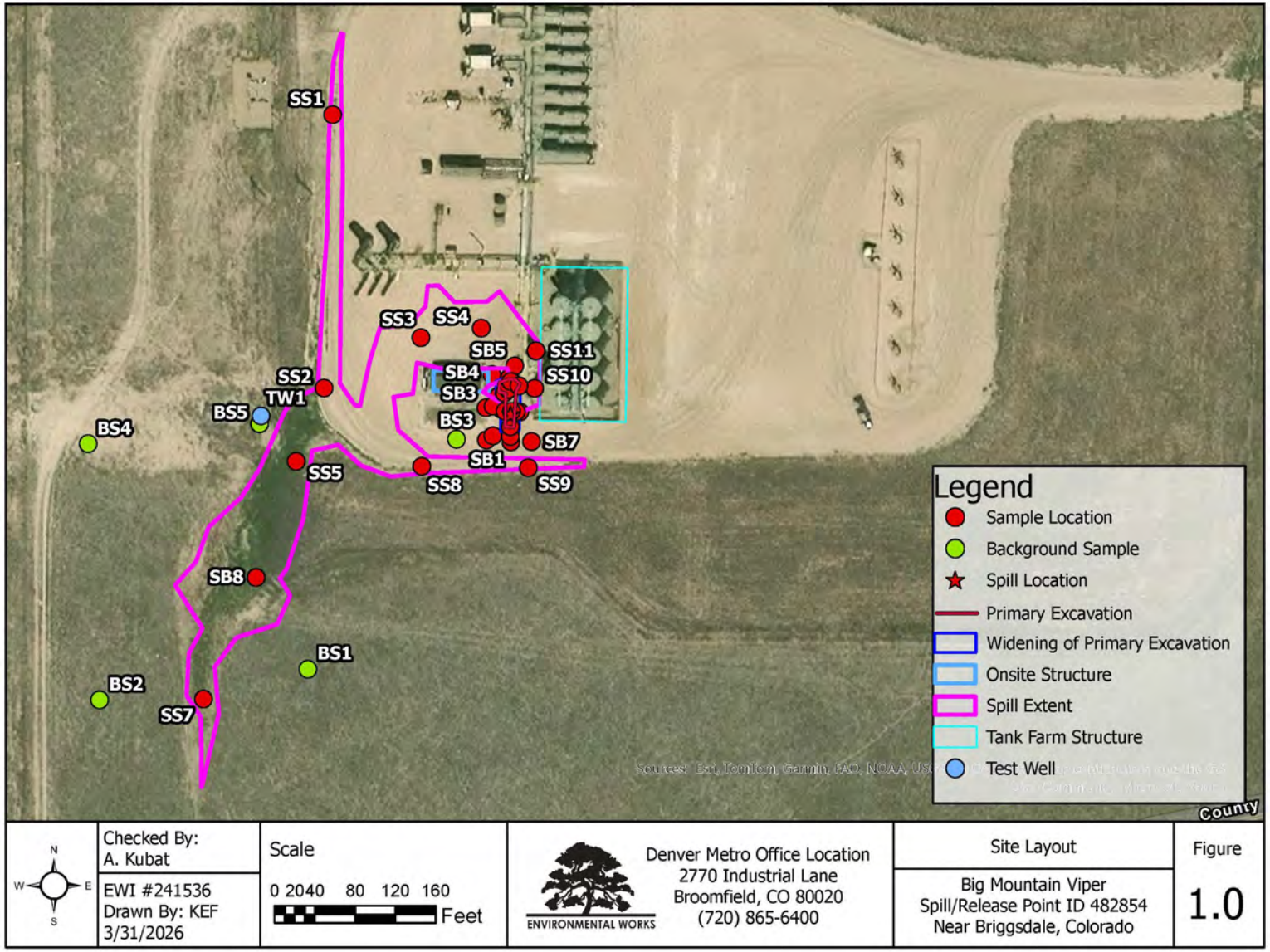

Figure 1. Site layout for the BMV release with release extent and sample locations.

soapweed yucca (*Yucca glauca*), scarlet globemallow (*Sphaeralcea coccinea*), and various other forbs along with invasive species such as cheatgrass (*Bromus tectorum*).

Surrounding the Project site, RAP estimates a 10-year average of foliar and surface cover consisting of approximately 3.5% annual grasses and forbs (i.e., cheatgrass and other invasive species), 67.9% perennial grasses and forbs (i.e., native mixed-grass species and forbs), 3.1% woody stems, 8.2% litter, and 11.9% bare ground (NRCS and BLM 2021).[1] RAP further estimates that the 10-year average biomass for the Project site is approximately 47.7 pounds per acre of annual grasses and forbs and approximately 938.1 pounds per acre of perennial grasses and forbs for a total of approximately 985.8 pounds per acre of herbaceous vegetation. Understanding the average cover, density, and biomass of existing vegetation in the surrounding landscape informs revegetation efforts (see Section 4.2, Revegetation).

A qualified SWCA biologist conducted a quantitative vegetation assessment at the Project site and within immediately adjacent reference sites to verify site conditions on December 2, 2021, following a previous release that occurred and was reported on 07/26/2021 (Appendix C, Table C1). The quantitative vegetation assessment used the Daubenmire method which consists of systematically placing a quadrat frame on the ground and recording canopy cover as well as composition by canopy cover (Coulloudon et al. 1999). Three locations were selected within the Project site (IMPACT-01, IMPACT-02, and IMPACT-03) and three locations were selected immediately adjacent to the Project site as reference sites (ADJACENT-01, ADJACENT-02, and ADJACENT-03) based on representative characteristics of the surrounding area for Daubenmire frame assessments.

No evidence of use by livestock was observed at the Project site or reference sites. Due to the installation of the PWTS and other related operational oil and gas production infrastructure, vegetation is not present at the release location or in the immediate vicinity. The release occurred on the BMV 8-59 facility pad and vegetation is purposefully prevented to avoid fire hazards on the facility (Appendix B).

At the reference sites immediately adjacent to the Project site (active facility), native vegetation consistent with shortgrass prairie is present including blue grama, winterfat, broom snakeweed (*Gutierrezia sarothrae*), western wheatgrass, sand dropseed (*Sporobolus cryptandrus*), buffalograss, plains pricklypear, and scarlet globemallow. Results of the quantitative vegetation assessment are provided in Appendix C.

3.2 Soils

Soils in the Project site are typical of the Loamy Plains ecological site and are well-drained, shallow to moderately deep ustic loams derived from loess, alluvium, and/or eolian deposits with textures ranging from sandy to clayey (NRCS 2026). They typically have a moderate to moderately slow permeability class and water capacity is high. As the fineness of soil texture increases, there is generally more available moisture storage from sands to loams to silt loams to clays. Soil structure defines the process in which soil particles are aggregated and support vegetation and healthy aeration (NRCS 2026). Surface soil structure for the Loamy Plains ecological site is granular to subangular blocky, and structure below the surface is prismatic or subangular blocky. These soils are typically high in fertility but may be susceptible to erosion by wind and water. The potential for water erosion accelerates with increasing slope.

The Olney fine sandy loam component makes up 85% of the map unit (NRCS 2019). Slopes are 0 to 6 percent. This component is found on dissected plains. The parent material consists of calcareous loamy alluvium. Depth to a root-restrictive layer is greater than 60 inches. The natural drainage class is well

[1] Cover estimates for percent foliar and surface cover do not sum to 100% based on annual variability across the 10-year averages.

drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is low. This soil is not flooded, and it is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1.0%. Non-irrigated land capability classification is 4c. Class 4 soils have very severe limitations that restrict the choice of plants or that require very careful management, or both. Subclass c soils have climate that is very cold or very dry as a chief limitation. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 5.0%. There are no saline horizons within 30 inches of the soil surface.

A typical pedon for the Olney soil series is described in Table 2 (NRCS 2012). These well-drained soils typically have low runoff potential and moderate susceptibility to wind and water erosion, especially if unprotected (i.e., no vegetation cover) and/or on steeper slopes (NRCS 2019). Olney soils are generally a fair source of reclamation material and topsoil but may be limited by the low organic matter content and cation exchange capacity. The soil susceptibility to compaction is moderate which indicates that the potential for compaction is significant. The growth rate of seedlings may be reduced following compaction. After the initial compaction (i.e., the first pass of equipment), soils with a moderate rating are able to support standard equipment with only minimal increases in soil density. These soils are intermediate between moisture insensitive and moisture sensitive.

Table 2. Typical Pedon and Horizon Descriptions of the Olney Soil Series

Horizon	Depth (inches)	Description*
A	0–5	Pale brown (10YR 6/3) loamy sand, brown (10YR 4/3) moist; weak fine granular structure; soft, very friable; neutral (pH 7.2); clear smooth boundary; 4 to 6 inches thick.
Bt1	5–8	Brown (10YR 5/3) sandy loam, brown (10YR 4/3) moist; weak medium subangular blocky structure parting to weak fine granular; slightly hard, very friable; few faint clay films on faces of peds; neutral (pH 7.2); clear smooth boundary; 2 to 6 inches thick.
Bt2	8–16	Brown (10YR 5/3) sandy clay loam, brown (10YR 4/3) moist; moderate medium prismatic structure parting to moderate medium subangular blocky; hard, friable, common faint clay films on faces of peds; slightly alkaline (pH 7.4); clear smooth boundary; 8 to 24 inches thick.
Btk	16–22	Pale brown (10YR 6/3) sandy loam, brown (10YR 5/3) moist, weak coarse prismatic structure parting to weak medium and coarse subangular blocky; hard, friable; few faint clay films on faces of peds; 3% gravel; common fine distinct threads of carbonate masses and carbonate coatings on the sand and pebble fragments in matrix; strongly effervescent; moderately alkaline (pH 8.0); gradual wavy boundary; 2 to 10 inches thick.
Bk1	22–24	Very pale brown (10YR 7/3) sandy loam, brown (10YR 5/3) moist; massive; slightly hard, very friable; common fine distinct threads of carbonate masses in matrix; strongly effervescent; moderately alkaline (pH 8.2); gradual irregular boundary; 10 to 16 inches thick.
Bk2	24–80	Pale brown (10YR 6/3) sandy loam, brown (10YR 5/3) moist; massive; slightly hard, very friable; few fine distinct carbonate masses in matrix; strongly effervescent; moderately alkaline (pH 8.2); several feet thick.

*Source: NRCS (2012).

3.2.1 Affected Soils Analysis

A qualified geologist from Environmental Works, Inc. (EWI), collected soil samples at the Project site and within immediately adjacent, non-impacted areas to assess the overall impact of the unplanned release on the BMV facility pad and adjacent soils to assist in development of this reclamation plan in September and November 2022, August 2024, April 2025, and February 2026 (Figures 1 and 2). EWI initially collected 21 discrete samples at depths ranging from 0 to 6 inches (surface samples) up to 9.5 feet below ground surface (bgs) across the impacted area at the unintended release location to evaluate the nature and extent of impact (Figure 1). Samples included two background samples (BS1, BS2) outside of the area of impact for comparison of site conditions prior to the unintended release. Some excavation of impacted materials had already been conducted across the area of impact. Sample analytical results were

used to confirm potential impacts to the facility and adjacent soils, as well as to establish potential remediation efforts (i.e., excavation and import, soil amendments) for the location.

Initial analytics indicated elevated salinity, sodicity, and boron levels in unexcavated materials; therefore, additional excavation and confirmation sampling was conducted. On November 10 and 11, 2022, EWI collected an additional 12 discrete samples at depths ranging from 1 foot to 10 feet bgs across the impacted area to further evaluate the nature and extent of impact and to verify that additional excavation efforts were successful. Follow-up confirmation sampling included an additional background sample (BS3) outside of the area of impact for background comparison of site conditions prior to the unintended release.

Due to residual elevated boron levels, additional excavation and sampling was conducted from 2024 to 2026. To further evaluate the success of the excavation efforts, 15 discrete samples were taken from the impacted area on August 29, 2024, 3 discrete samples were taken from the impacted area on April 10, 2025, and 3 discrete samples were taken from the impacted area on February 13, 2026. Six background samples were collected on April 10, 2025 (BS4, BS4, BS4, BS5, BS5, BS5). Sampling depths ranged from 2 feet to 10 feet bgs.

Ultimately, confirmation samples were collected at 60 locations following excavations along the observed area of impact and submitted to Pace Analytical Laboratories (Mount Juliet, Tennessee) for analysis (Figures 1 and 2). Fifteen discrete surface samples (SS) were collected from areas of shallow excavations within the impacted area at depths ranging from 0 to 6 inches and 1 to 2 feet bgs. Thirteen discrete sidewall samples (SW) were collected from the sidewall of the deep excavation at depths ranging from 6 to 8 feet and four discrete floor samples (FS) were collected from the floor of the deep excavation ranging in depth from 7.5 to 10 feet at the release location. Nineteen discrete step back samples (SB) were collected within the impacted area at depths ranging from 2 to 7 feet bgs. Nine background samples (BS) were collected outside of the area of impact at depths ranging from 0 inches to 10 feet. Finally, one backfill sample was collected from the soil substitute that was imported to the site.

All samples were analyzed for metals, volatile organic compounds (VOCs), semi-VOCs, total petroleum hydrocarbons (TPH), and Soil Suitability for Reclamation parameters [i.e., saturated paste pH, electrical conductivity (EC), sodium adsorption ratio (SAR), and boron]. All samples were collected using standard regulatory protocol for hydrocarbons and equipment de-contamination procedures. Sampling equipment was properly decontaminated between individual samples. Discrete samples were collected in sterilized glass jars acquired from the laboratory and maintained on ice until submitted for analysis. Analytical results for all collected samples are provided in Appendix D.

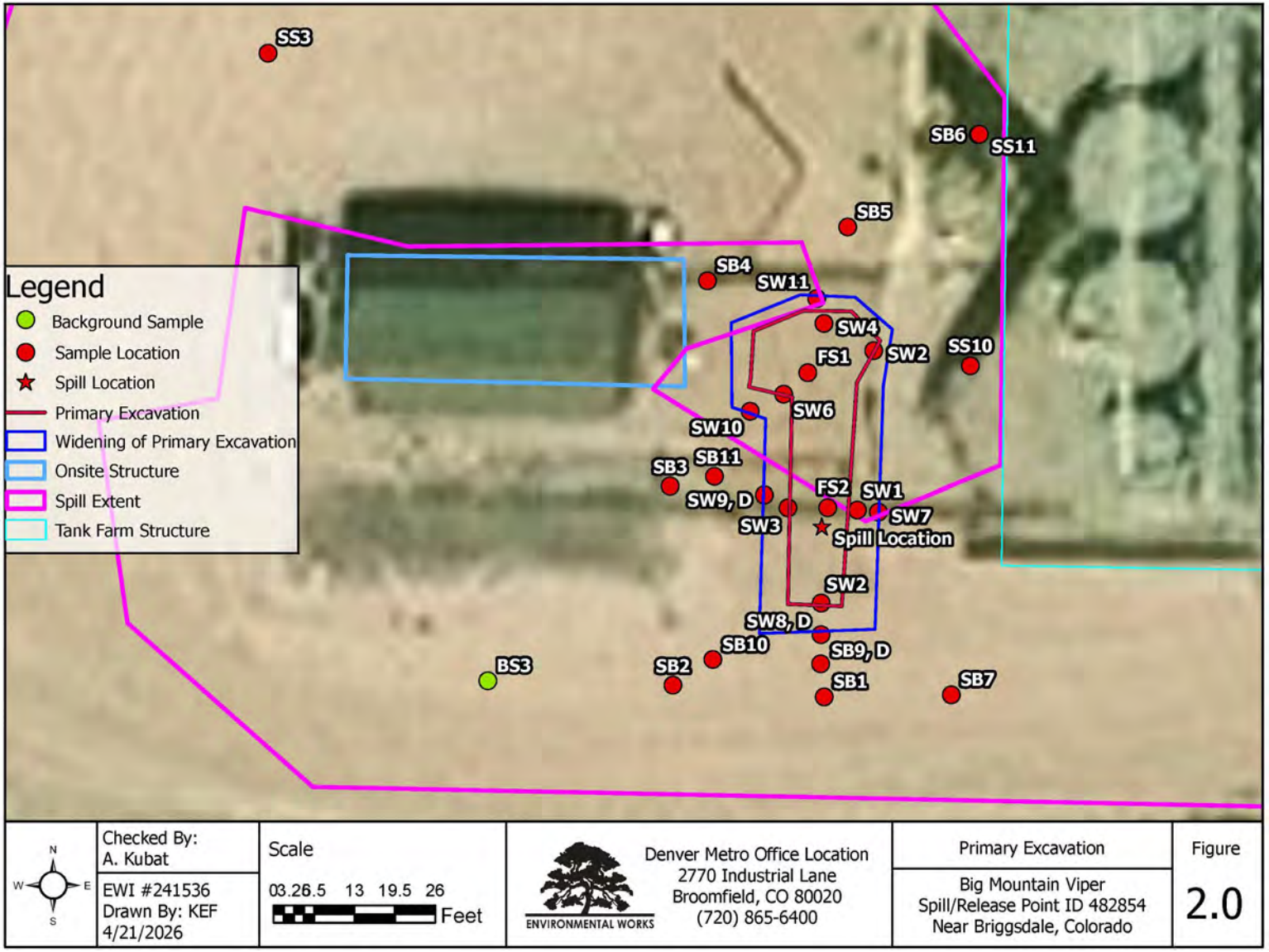

Figure 2. Excavation area for the BMV release with sample locations.

3.2.2 Analytical Results

Initial laboratory analytical results (September 8 and 12, 2022) indicated that soil EC, SAR, and boron were elevated across the impacted Project area as 11 of 19 collected samples were greater than Table 915-1 Soil Suitability for Reclamation maximum levels for at least one of these parameters (Appendix D). Initial laboratory analytical results indicated potential saline/sodic soil conditions in samples that were collected within the area of impact from the produced water release. Sodic soils, resulting from excess sodium in the soil, impact soil structure through soil dispersion making the soil surface hard. Soil dispersion and poor soil structure may impair seed germination and seedling development. Soil pH was not elevated above Table 915-1 levels in any of the initial soil samples.

Sampling was conducted following additional excavation remediation efforts (November 10 and 11, 2022) to confirm that most of the impacted materials were successfully removed. Four sidewall samples (6 to 7.5 feet bgs) and 2 surface samples (1 to 2 feet bgs) indicated residual elevated soil EC, SAR, and/or boron. Additional samples were collected from the impacted area in August 2024, April 2025, and February 2026. The results of the 2024 to 2026 sampling efforts indicate that all impacted samples contain acceptable boron levels within Table 915-1 levels, with 3 samples having elevated SAR levels (SB9 [2025; 7 feet bgs], SB9 [2026; 7 feet bgs], and SW9 [2026; 6 feet bgs]), 1 sample having elevated EC (SB9 [2026; 7 feet bgs]), and 9 samples having elevated pH levels (SB1 [2024; 4 feet bgs], SB1 [2024; 7 feet bgs], SB2 [2024; 6 feet bgs], SB3 [2024; 4 feet bgs], SB5 [2024; 4 feet bgs], SB6 [2024; 2 feet bgs], SB7 [2024; 4 feet bgs], SB8 [2024; 2 feet bgs], and SB8 [2024; 4 feet bgs]). Elevated SAR, EC, and pH values are deep within the soil profile and/or only slightly elevated above Table 915-1 allowances; therefore, they are therefore not anticipated to cause harm to the environment and/or human health and should not limit plant establishment.

3.2.2.1 SOIL PH

Soil pH is a measure of the acidity or alkaline condition, determined by measuring the hydrogen ion activity in the soil (Thorup 1984). Soil pH is considered one of the most important measurements in the soil and is often called the “master variable” (McBride 1994). Soil pH affects nutrient availability, ion exchange, dissolution/precipitation of minerals, reduction and oxidation (redox) reactions, adsorption, and other important factors in the soil system, which can greatly influence plant growth and development (McBride 1994; Thorup 1984). Soil pH between 6.4 and 8.2 is generally optimal for plant growth of agronomic crops and native grass species (Thorup 1984; Tisdale et al. 1993). As the pH increases or decreases from this ideal range, the availability of plant nutrients may limit plant growth. Additionally, ECMC Table 915-1 Soil Suitability for Reclamation parameters establishes soil pH suitability levels from 6.0 to 8.3 (CO ECMC 2025).

Soil pH in all samples collected from the impacted area from 2022 to 2026 ranged from 7.7 to 8.7 (average pH of 8.0), which is comparable to the background samples collected outside of the impacted area (8.1 to 8.4). Six samples [SB3 (2024; 4 feet bgs), SB5 (2024; 4 feet bgs), SB7 (2024; 4 feet bgs), SB8 (2024; 2 feet bgs), SB8 (2024; 4 feet bgs), and SS10 (2022; 2 feet bgs)] have soil pH above 8.3, the Soil Suitability for Reclamation maximum level. Elevated soil pH can be indicative of potential sodium hydrolysis and sodic soil conditions; however, pH in the background samples appears to be naturally elevated and soil EC and SAR in the impacted samples with elevated pH are within Table 915-1 levels (Appendix D). Slightly elevated soil pH will not cause harm to the environment and/or human health and should not limit plant establishment.

3.2.2.2 SOIL SALINITY

EC is an estimate of soil salinity (Hanson et al. 1999) and is measured by the specific conductance of the saturated paste extract. EC is measured to determine the total estimated salinity of a soil. A saline soil is any soil that has an EC greater than 4.0 millimhos per centimeter (mmhos/cm) (Ayers and Westcot 1985; Weil 2017). At elevated levels, soil salinity can negatively impact vegetative growth due to osmotic stress (Hanson et al. 1999). This osmotic stress makes it difficult for plants to extract water from the soil (Bohn et al. 1985). Additionally, ECMC Table 915-1 Soil Suitability for Reclamation parameters establishes soil EC suitability levels below 4.0 mmhos/cm (CO ECMC 2025).

EC of initial samples collected from the impacted area ranged from 0.424 to 10.5 mmhos/cm (average EC of 4.24 mmhos/cm), which is higher than background samples collected outside of the impacted area (range of 0.26 to 1.81 mmhos/cm). EC in November 2022 samples collected from the impacted area following additional excavation ranged from 0.806 to 7.04 mmhos/cm (average EC of 3.38 mmhos/cm), which is lower than initial results but remains higher than background samples collected outside the impacted area. From 2024 to 2026, the EC in samples collected from the impacted area ranged from 0.431 to 5.39 mmhos/cm (average EC of 2.08 mmhos/cm), which is lower than all 2022 results but still slightly higher than the background samples (Appendix D).

Nine of the initial 19 samples (FS2, SW1, SW3, SW5, SW6, SS6, SS7, SS10, and SS11) collected from the impacted area displayed EC that was higher than the Table 915-1 Soil Suitability for Reclamation maximum level (4.0 mmhos/cm). Follow-up sampling efforts in 2022, 2024, 2025, and 2026 verified that additional excavation efforts were mostly successful at remediating soil salinity across the location. From 2024 to 2026, only one sample collected from the impacted area displayed EC that remains higher than the maximum allowable level [SB9 (2026; 7 feet bgs)]. The remaining samples verified that soil EC was lower than the 2022 soil samples and below Table 915-1 allowances (Appendix D).

3.2.2.3 SOIL SODICITY

Sodic soils are non-saline soils containing sufficient exchangeable sodium to adversely affect crop production and soil structure (Soil Science Society of America 2010). Elevated exchangeable sodium concentrations in the soil can negatively impact soil structure causing the soil to disperse, resulting in hard surface crusts, reduced infiltration rates, and reduced oxygen diffusion rates. The definition and standard for describing sodic soils based on soil chemistry are those soils that have a SAR greater than 13, an EC less than 4.0 mmhos/cm, and pH between 8.5 and 10. However, the ECMC Table 915-1 Soil Suitability for Reclamation maximum level for SAR is 6.0 (CO ECMC 2025).

SAR in initial samples collected from the impacted area ranged from 1.47 to 34.8 (average SAR of 7.92) with 13 impacted sample locations having SAR greater than the background samples (range of 0.08 to 5.35). SAR in November 2022 samples collected from the impacted area following additional excavation ranged from 1.74 to 17.8 (average SAR of 7.58) which is lower than initial results but remains higher than background samples collected outside the impacted area. From 2024 to 2026, SAR in samples collected from the impacted area ranged from 1.96 to 7.51 (average SAR of 4.94), which is lower than the 2022 results and comparable to the background samples (Appendix D).

Eleven of the initial 19 samples (FS1, FS2, SW1, SW3, SW4, SW5, SW6, SS6, SS7, SS10, and SS11) collected from the impacted area displayed SAR that was higher than the Table 915-1 Soil Suitability for Reclamation maximum level of 6.0. Sampling in November 2022 verified that additional excavation efforts were mostly successful at remediating soil sodicity across the location.

Five samples of 11 of the November 2022 samples (SW8, SW9, SW10, SW11, and SS11) collected from the impacted area displayed SAR that remains higher than the maximum allowable level. The remaining

samples verified that soil SAR was lower than initial soil samples and below Table 915-1 allowances. From 2024 to 2026, only three samples had SAR values greater than the Table 915-1 limit [SB9 (2025; 7 feet bgs), SB9 (2026; 7 feet bgs), and SW9 (2026; 6 feet bgs)]. Samples SB9 (2025; 7 feet bgs) and SW9 (2026; 6 feet bgs) were only slightly elevated above Table 915-1 allowances (Appendix D). Elevated SAR samples were collected from 6.0 to 7.0 feet bgs which is well below the plant root zone and will not impair vegetation. Furthermore, these samples were collected from the facility where vegetation is actively prevented. Slightly elevated SAR will not impair vegetation, nor cause harm to the environment and/or human health.

3.2.2.4 ADDITIONAL ANALYTES (BORON, METALS, VOCS, AND TPH)

Boron levels in recent samples collected from the impacted area are below the Table 915-1 Soil Suitability for Reclamation maximum level for boron of 2 milligrams per liter. Soil sample analytical results indicate that metal levels are within Table 915-1 Cleanup Concentrations in all samples collected (CO ECMC 2025:900-45 through 900-46). Arsenic is consistently elevated above Residential Soil Screening Levels (RSSLs), but comparable to background levels indicating that arsenic is naturally elevated in soils at the location. Soil sample analytical results further indicate that VOCs and semi-VOCs are all below RSSL cleanup concentrations. TPH levels are non-detectable (ND) or within Table 915-1 Cleanup Concentrations for samples within the impacted area.

3.2.3 Justifications

Produced water releases from oil and gas infrastructure may have potential impacts on existing plant communities as produced water can penetrate the soil profile resulting in degraded soil quality due to various pollutants (Pichtel 2016). The depth of contamination varies depending on the amount of produced water released, the chemical makeup of the produced water, and the soil properties (Pichtel 2016). Native vegetation and the wildlife and livestock that browse and graze these plants may experience the harmful impacts of soil contamination from produced water releases (Bamberger and Oswald 2012; Pichtel 2016).

Soil analytics indicate EC and SAR levels are below ECMC Table 915-1 Soil Suitability for Reclamation maximum levels in all confirmation samples collected above the 6 to 7-foot soil depth. Slightly elevated soil EC and SAR below the functional root zone is not expected to impair vegetation establishment (see Section 3.2.3.1).

3.2.3.1 ROOT DEPTH ANALYSIS

Direct and indirect processes may influence seed germination and native plant reestablishment in soils potentially impacted from produced water releases ranging from soil chemical and physical effects to biological effects (Green et al. 2020). The effects of produced water on seed germination and plant growth can persist for decades, if not remediated, and impacted soil often requires that remediation take place and vegetation be restored in some capacity. In-situ (e.g., amendments, natural attenuation, leaching, etc.) and ex-situ (e.g., excavation and disposal, washing and scrubbing, etc.) remediation strategies can be employed to ameliorate the negative or deleterious impacts to vegetation, essentially potential impacts in the active root zone (Green et al. 2020). Through excavation and disposal alone, the immediate removal of impacted topsoil and subsoil immediately below topsoil layers (i.e., to the extent of produced water contamination) can remove the harmful contaminants and provide a suitable growth medium soon after topsoil replacement.

Understanding the approximate rooting depth of the native plant species that occur at these locations helps inform remediation actions and BMPs for reclamation work, especially regarding excavation and

reseeding efforts. Plant species surrounding the Project site are typical of short- to mid-grass prairies of Northern Colorado, where approximately 60-70% of the vegetation biomass is composed of perennial grasses. There is variation in the root characteristics and rooting depths for the plant species that will be used for revegetation. For this Plan the functional root zone of a plant is the portion of the root mass where most of the root functions occur including water and nutrient uptake. For the perennial grasses the functional root zone is most likely to occur within the top 24 to 30 inches of the root zone (Table 3). For the seed mix species, it is reasonable to estimate that most of the reseeded vegetation root structure and water/nutrient uptake (approximately 90%) is likely to occur within the top 24 to 30 inches of the soil surface. Although roots may extend to greater depths, the magnitude of impacts from potential contaminants are likely negligible because of the reduced function of roots at these depths.

Revegetation seed mixes are designed based on native species composition that is typical of the reclamation site. The following species are included in SWCA's reclamation seed mix and are representative of native plant communities in Northern Colorado's shortgrass prairies: blue grama, thickspike wheatgrass (*Elymus lanceolatus*), western wheatgrass, alkali sacaton (*Sporobolus airoides*), and squirreltail (Table 4). Given that the functional root zone of selected revegetation species is within the top 36 inches (Table 3), elevated soil EC and SAR below 36 inches is not expected to impair vegetation establishment.

3.2.3.2 GROUNDWATER

The average groundwater depth across the Project site is greater than 20 feet bgs, based on local topography and nearby well data. All hazardous analytes were within Table 915-1 cleanup concentrations and/or below RSSLs. Furthermore, all visually impacted soils have been excavated and removed from the Project site and confirmation sampling conducted; therefore, these analytes are not a concern at the time of analysis and will not cause harm to the environment and/or human health or should not limit plant establishment at the time of reclamation (see Appendix D).

Table 3. Root Characteristics and Approximate Functional Rooting Depths for Seed Mix Species

Common Name	Scientific Name	Root Growth Habit	General Root Orientation	Approximate Functional Root Zone (inches)	Approximate Root Mass in Functional Root Zone (%)	Other Notes	References
Blue Grama	*Bouteloua gracilis*	Fibrous root system, can produce tillers but not rhizomes or solons	Vertical/Horizontal	0-18	~85%	Roots can extend horizontally 1 foot from center of the roots depending on the soil type/composition	Anderson 2003 Smith et al 2004 Lee & Lauenroth 1994
Thickspike Wheatgrass	*Elymus lanceolatus*	Extensive creeping rhizome system	Horizontal/Vertical	0-15	~100	Most of the root mass is confined to the upper 8 inches of soil	Scher 2002
Western Wheatgrass	*Pascopyrum smithii*	Deep rooting with shallow rhizomatous roots	Horizontal/Vertical	0-30	~90%	Deep roots and rhizomes are profusely branched	Tirmenstein 1999 Weaver 1942
Alkali Sacaton	*Sporobolus airoides*	Extensive fibrous root system	Vertical/Horizontal	0-16	NA	Capable of thriving on saline and sodic soils	USDA, NRCS 2022
Squirreltail	*Elymus elymoides*	Deep rooting with branching lateral roots extending 16 inches	Vertical/Horizontal	0-40	100%	Depths greater than 40 inches are possible, bedrock limited root depth in cited study	Reynolds & Fraley 1999

4 RECLAMATION AND REMEDIATION PROCEDURES AND BEST MANAGEMENT PRACTICES

Based on the most recent results of the environmental site investigation of the Project location, the following site-specific soil reclamation and remediation options have been established for the impacted area of the BMV facility.

4.1 Excavation and Import

Medium excavation and import of suitable topsoil and/or fill resources has been implemented. Impacted resources have been excavated to the depth of impact and have been replaced with suitable soil or fill resources, depending on the location on the BMV facility. Where topsoil replacement was required, topsoil resources of similar physicochemical properties (i.e., soil pH, soil EC/SAR, organic matter content, soil texture) were imported. Confirmation sampling was conducted following all excavation efforts to verify that impacted soil resources were properly removed (Appendix D).

4.2 Revegetation

Most of the unintended release occurred on the Big Mountain Viper 8-59 well pad and facility where vegetation is purposefully prevented to avoid fire hazards around equipment. Revegetation is only required on a small area southwest of the facility. Revegetation measures and BMPs will include the following measures.

4.2.1 Seedbed Preparation

Seedbed preparation maximizes seeding efficiency and improves reclamation success. Seedbed preparation includes topsoil replacement and surface roughening techniques such as scarifying and/or discing. As needed, soil conditioning (i.e., soil amendments), decompaction, and topsoil protection measures must be implemented to successfully reestablish vegetation and to protect the seedbed and soil resources until revegetation and stabilization are effective. A good seedbed is uniformly firm with various micro-habitats and/or light mulch on the surface to prevent erosion and protect seed.

Topsoil Placement

1. Evaluate the compaction of subsoil prior to the respread of topsoil and deep rip accordingly, depending on ecological site and type of equipment used for topsoil replacement. Ripping should occur to a minimum depth of 18 inches using a parabolic ripper or equivalent equipment to reduce soil compaction and improve drainage. The shanks on the back of a grader or dozer should NOT be used to reduce soil compaction.
2. Apply topsoil evenly across prepared subsoil surface.
3. Disk applied topsoil to a depth of 4.0 to 6.0 inches. Disking should be conducted using a disk and harrow, field cultivator, vibra-shank, or other alternative suitable to site conditions. Identify with the appropriate signage when leaving topsoil in place for more than 1 month prior to seeding.

Additional erosion-control BMPs will be added to minimize erosion and control sediment transport, as needed (see Section 4.3).

Prior to Seeding (i.e., no more than 2 to 4 weeks prior to seeding)

1. Perform primary disking/tillage of topsoil to break up clods.
2. Continue to till and aerate until clods are reduced to less than 4 inches and the overall density of cloddiness is reduced to less than 50% of the segment extent. Tillage must be no deeper than the depth of the replaced topsoil.
3. Till across slope or perpendicular to the aspect of the slope to reduce erosive forces and avoid channelization from sheet flow and/or wind whenever possible.
4. Once imported topsoil is applied and prepared for seeding, adequately identify with signage to prevent equipment from unnecessarily driving on and/or compacting applied topsoil.
5. Prior to or during seeding, perform a final tillage to break up any remaining clods and produce a firm seed bed.
6. Suspend site preparation when soils are too wet to support equipment without significant rutting or soil mixing.

4.2.2 Seeding

Appropriate revegetation practices provide the species composition, diversity, structure, and total ground cover to promote the reestablishment of the desired plant community. The reclamation contractor is encouraged to provide suggestions for deviations from this Plan to Taproot Midstream based on their experience in implementing these techniques in similar areas. A site-specific, semi salt-tolerant seed mix will be used to reclaim and stabilize disturbed soils in the Project site (Table 4).

Seeding is more successful implemented during fall prior to late fall/early winter freeze and precipitation events. When possible, seeding will occur prior to anticipated precipitation events to increase the likelihood of germination and vegetation establishment.

Seeding Schedule

1. Seeding should occur within ideal seeding windows for greatest success. In Colorado, this is after October 1 for late fall, dormant seeding (preferred) and from spring thaw to June 1, for spring seeding. If reclamation is completed outside of the ideal seeding season, a cover crop should be seeded to provide quick vegetation establishment and more immediate ground cover and protection. The actual end date will be based on the current weather patterns and ground conditions. No seeding is allowed outside of the recommended window without prior approval from Taproot Midstream.
2. Seeding within the recommended window should be conducted in consideration of the current and anticipated weather conditions. Soil temperatures of around 40 degrees Fahrenheit are ideal.

The appropriate seeding technique and equipment must be used in consideration of site conditions and terrain. Drill seeding is the primary seeding method for the Project site and will be implemented across the site. Drill seeding is preferred as it improves seed-to-soil contact. Drill seeding should not be used on steep slopes (steeper than 3:1 slopes) and may be limited in shallow ecological sites with restrictive layers near the surface (i.e., bedrock/ unconsolidated rock) and certain textures. Weather and site conditions must be suitable for the selected seeding method to ensure an adequate seeding rate and to minimize soil clodding or mixing. The reclamation contractor is expected to use its expertise in recommending modifications to the proposed seed applications and methods.

Drill Seeding

1. Inspect and calibrate drill seeders regularly. Generally, inspections should be conducted before each site visit and calibrations should be conducted for each seed mixture once per season, following significant maintenance, and/or when the application rate is significantly adjusted.
    a. Drill seeding should occur using a drill equipped with an agitator and depth bands to mix seed and ensure proper seeding depths.
    b. Seed tubes, packer wheels, and depth bands must be in proper, functioning condition.
    c. Proper seeding depths must be established and calibrated prior to seeding; 0.25 to 0.50 inch for grasses and large-seeded forbs and less than 0.125 inch for small-seeded shrubs and forbs, when practicable.
2. Adequately mix seed hopper each time seed is added.
3. Prior to seeding, disc topsoil surface with scarifier and/or disc, or cultipacker, or harrow as needed to loosen seedbed and aerate surface (see Section 4.2.1).
4. Maintain an appropriate speed during drill seeding to ensure appropriate seed spacing and seed depth. The speed must be appropriate to site conditions, typically less than 5 miles per hour for level conditions.
5. Apply certified noxious weed-free mulch and/or other erosion-control devices/BMPs as specified following seeding (see Section 4.3).

4.2.2.1 SEED MIX

The reclamation seed mix was designed to achieve species composition and diversity for the desired plant community, ecological setting, and current soil properties based on pre-disturbance vegetation characteristics described in Section 3.1, Plant Communities. Species for the reclamation seed mix were selected for their likelihood of occurring in the Project site, wildlife and forage value, erosion control capabilities, and commercial availability. Table 4 provides a list of selected species by pure live seed (PLS) per square foot and pounds per acre. Final selection of seed mixes will be dependent on seed availability.

Seed Mix

1. The reclamation contractor must purchase “Certified Seed” (blue tagged) or “Source Identified” (yellow tagged) seeds from a reputable seller. Certified Seed is certified by the State Department of Agriculture to contain 0% weed seed and no more than six seeds per pound of “restricted” weed seeds.
2. The reclamation contractor must follow proper seed handling guidelines, including storage temperature and humidity.
3. To increase the likelihood of successful reclamation, locally adapted native plant materials should be selected when possible.
4. Seeding rates are specified in Table 4 and are specific to drill seeding applications ***(i.e., seed rates would double for broadcast or hydroseeding applications***). The seed mix should provide approximately 60 PLS per square foot and should contain a mycorrhizal inoculum at the rate of 5.0 pounds per acre. The reclamation contractor must procure and apply seed at the specified rate for the seeding method selected.
5. Seed mix should include a sterile cover crop to provide quick vegetation establishment and more immediate ground cover and protection [e.g., oats (*Avena sativa*) or sterile triticale (*Triticum*

aestivum x Secale cereal) at 30 lbs per acre]. Cover crops should only include species that are non-invasive, non-persistent, and non-competitive.

6. Contractor must retain all seed tags (labels) and provide the original seed tags along with documentation of the application location in a timely manner to Taproot Midstream.

Table 4. Recommended Seed Mix for Revegetation Activities at the Big Mountain Viper Project, Weld County, Colorado

Common Name	Scientific Name	Pure Live Seed (pounds per acre)	Pure Live Seed per square foot	Composition (%)
Blue Grama	*Bouteloua gracilis*	0.79	15	25%
Thickspike Wheatgrass	*Elymus lanceolatus*	3.4	12	20%
Western Wheatgrass	*Pascopyrum smithii*	3.6	9.0	15%
Alkali Sacaton	*Sporobolus airoides*	0.22	9.0	15%
Squirreltail	*Elymus elymoides*	2.0	9.0	15%
Scarlett Globemallow	*Sphaeralcea coccinea*	0.26	3.0	5%
Purple prairie clover	*Dalea purpureum*	0.62	3.0	5%
Total*		**10.9**	**60**	**100%**

Note: Seeding rate is 10.9 Pure Live Seed pounds per acre.
* Totals may not be exact due to rounding.

4.3 Site Stabilization

Site stabilization applications and erosion-control devices will be installed, as needed, following reclamation activities and in accordance with the Project's stormwater management plan (SWMP). The SWMP will provide available actions, erosion control devices, and installation measures to meet the standards and requirements of the Project's stormwater discharge permit. The remediation and reclamation actions identified in this Plan were designed to promote further site stabilization through amelioration of saline-sodic soil conditions and to facilitate the establishment of desirable vegetation that provides additional protections against site erosion.

Following reclamation actions, apply and crimp straw mulch into surface soils to reduce potential water and wind erosion. Recommended straw mulch application rates are between 1.5 to 2 tons per acre. This will provide ground coverage of approximately 80% to 90% of the ground surface prior to crimping. Once applied the straw mulch should be crimped into the soil. Upon successful crimping, the straw mulch should be standing vertically with approximately 40% to 60% of the ground surface covered. Straw mulch should be at least 6 inches in length. Straw mulch should be crimped sufficiently to cause vertical cover that will not be dislodged by light breezes.

4.4 Noxious Weed Management

The primary goal of noxious weed management is to prevent and manage the establishment and spread of state- and/or county-listed noxious weeds because of Project disturbance and/or activities. The invasion and establishment of these plant species are a threat to the overall health of ecosystems; detrimental effects may include diminished habitat and quality of forage for wildlife and livestock, diminished native plant communities, and increased fuel load for wildfires. Noxious weed management of state-listed and

county-listed species will occur within the Project site and focus on areas where reclamation and remediation activities occur. Any state- and/or county-listed noxious weeds that occur outside of the Project site as the result of Project activities will be monitored and/or controlled by Taproot Midstream in coordination with the surface owner.

Areas most susceptible to noxious and invasive weed infestations or occurrences include recently disturbed soils, roadsides, pipeline rights-of-way, and drainages. Noxious weed management will be a cooperative effort between the surface owners.

Herbicide Application

1. All herbicide applications will be completed or supervised by a state-licensed pesticide applicator.
2. All herbicide label requirements must be followed. Deviations are not allowed.
3. All herbicide application on the Project site will be made with the appropriate spraying equipment (as determined by weed species, selected herbicide, terrain, infestation level, etc.).
4. Do not conduct treatments during precipitation events or when precipitation is expected within 24 hours.
5. Apply herbicides in favorable weather conditions to minimize drift. Herbicide applications will only be conducted when average wind speeds are below 10 miles per hour.
6. Complete herbicide treatment records during herbicide application for each treated area and submit to Taproot Midstream within 24 hours of application.

No state- and/or county-listed noxious weed species were observed during site inspections in 2021.

4.5 Fencing Installation

Fencing options will be determined in coordination with the surface owner and current land use management. If no grazing activities are planned during site reclamation, fencing will not be installed. If, during the first two growing seasons, grazing is planned, fencing will be installed per the preference and/or recommendation of the surface owner and may include wildlife friendly three-wire fencing or temporary hotwire fencing to discourage grazing impacts to reclamation and revegetation efforts.

5 MONITORING AND REPORTING

5.1 Monitoring

The purpose of monitoring is to obtain information for use in evaluating responses to reclamation and remediation activities. Establishing a strong monitoring program that can be easily followed and repeated will greatly assist in future efforts to make appropriate management decisions. As described in ECMC's Reclamation Regulations 1000 Series, Rule 1004.d "final reclamation of all disturbed areas shall be considered complete when all activities disturbing the ground have been completed, and all disturbed areas have been either built upon, compacted, covered, paved, or otherwise stabilized in such a way as to minimize erosion, or a uniform vegetative cover has been established that reflects pre-disturbance or reference area forbs, shrubs, and grasses with total percent plant cover of at least eighty percent (80%) of pre-disturbance or reference area levels, excluding noxious weeds, or equivalent permanent, physical erosion reduction methods have been employed" (CO ECMC 2021:1000-8). As such, annual monitoring

will occur for a minimum of two growing seasons and until at least 80% of reference area levels have been met or exceeded and will document plant vegetation establishment as well as composition and percent foliar and surface cover within reclaimed areas to evaluate the overall success of reclamation and remediation activities and inform further prevention and management techniques.

5.1.1 Adaptive Management

In an adaptive management strategy, the outcome of management efforts may vary; these outcomes may require that changes in methods for reclamation be made. Adaptive management greatly increases the potential for reclamation success by providing early detection of problems and the opportunity to implement remedial actions to address these problems. No single management technique is applicable or effective for all situations, and multiple management actions may be required for effective management. Effective monitoring is an essential element of adaptive management because it provides reliable feedback on the effects of reclamation actions. If it has been determined that adaptive measures are necessary, monitoring data will provide information on target areas and species, such as noxious weeds, that may require varied or more intensive treatments.

5.2 Reporting

Reclamation results will be described in annual reports for a minimum of two growing seasons and until at least 80% of reference area levels have been met or exceeded. Annual reports will include documentation of overall areas reclaimed, conditions associated with the Project site and reclaimed areas, and additional strategies to meet success criteria described above if necessary. The results of annual monitoring and reporting will determine if these areas require remedial action and additional treatment (see Section 5.1.1, Adaptive Management).

6 CONCLUSION

SWCA was retained by Taproot Midstream to investigate site conditions following a produced water release during fall of 2022 at the BMV PWTS, approximately 8.5 miles northwest of Raymer, Colorado. The release occurred on the BMV 8-59 well pad facility where vegetation is purposefully prevented to avoid fire hazards on the facility (Appendix B). The release was contained in the PWTS apart from a small area to the south and southwest of the facility that included a spill containment. Soils at the Project site were sampled on September 8 and 12, 2022, immediately following discovery of the release and initial excavation. Soils were sampled again on November 10 and 11, 2022; August 29, 2024; April 10, 2025; and February 13, 2026 (follow-up confirmation sampling). Discrete soil samples collected from various impact areas and soil depths across the location indicate that excavation has been successful and all material containing elevated EC and SAR that could potentially impact revegetation efforts has been successfully removed from the Project site and replaced with appropriate resources.

Using field observations and collected analytical data, SWCA developed this Plan to propose various options for revegetation (e.g., seedbed preparation, seeding, noxious weed control, monitoring, adaptive management) following appropriate remediation actions. Site preparation and seeding should occur in late fall/early winter or early spring with a suitable seed mix that will achieve species composition and diversity for the desired plant community, ecological setting, and current soil properties based on pre-disturbance vegetation characteristics. Fall seeding ensures suitable soil conditions for drill-seeding efforts and takes advantage of spring snowmelt and increased soil moisture for germination. A seed mix recommendation is available in Table 4. SWCA further recommends that follow-up monitoring occur for a minimum of two growing seasons to verify remediation effectiveness and desirable revegetation.

7 LITERATURE CITED

Anderson MD. 2003. *Bouteloua gracilis*. In: In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: https://www.fs.fed.us /database/feis/plants/graminoid/bougra/all.html. Accessed May 2026.

Ayers, R.S., and D.W. Westcot. 1985. Water quality for agriculture. FAO Irrigation and Drainage Paper 29. Rome: Food and Agriculture Organization of the United Nations.

Bamberger M. and Oswald RE., 2012. Impacts of gas drilling on human and animal health. New solutions: a journal of environmental and occupational health policy, 22(1), pp.51-77.

Bohn, H.L., B.L. McNeal, and G.A. O'Connor. 1985. *Soil Chemistry*. New York: John Wiley and Sons.

Colorado Energy & Carbon Management Commission (CO ECMC). 2025. *900 Series Rules and Regulations*. Available at: https://ecmc.colorado.gov/sites/g/files/lrnvjt1211/files/documents/900%20Series%20-%20Environmental%20Impact%20Prevention_Effective%20April%2030%2C%202025.pdf. Accessed May 2026.

———. 2022. *Rules and Regulations*. Available at: https://ecmc.state.co.us/documents/reg/Rules/LATEST/100%20Series%20-%20Definitions.pdf. Accessed May 2026.

———. 2021. *1000 Series Rules and Regulations*. https://ecmc.colorado.gov/sites/g/files/lrnvjt1211/files/documents/1000%20Series%20%20Reclamation%20Regulations_Effective%20January%2015%2C%202021.pdf. Available at: Accessed May 2026.

Coulloudon, B., K. Eshelman, J. Gianola, N. Habich, L. Hughes, C. Johnson, M. Pellant, P. Podborny, A. Rasmussen, B. Robles, P. Shaver, J. Spehar, and J. Willoughby. 1999. *Sampling Vegetation Attributes*. Technical Reference 1734-4. Denver, Colorado: Bureau of Land Management. BLM/RS/ST-96/002+1730. Accessed May 2026.

Green, A., T.M. DeSutter, M.A. Meehan, A.L.M. Daigh, and P.L. O'Brien. 2020. Produced water's impact on soil properties: Remediation challenges and opportunities. Agrosystems, Geosciences, & Environment 3(1): 1–17. Accessed May 2026.

Hanson, B., S.R. Grattan, and A. Fulton. 1999. *Agricultural Salinity and Drainage*. Division of Natural Resources Publication 3375. University of California Irrigation Program. Davis: University of California.

Lee CA. and Lauenroth, W.K., 1994. Spatial distributions of grass and shrub root systems in the shortgrass steppe. American Midland Naturalist, pp.117-123. Available at: https://www.jstor.org/stable/2426206?read-now=1&refreqid=excelsior%3A0e3c5e47ccc21a6db88339dfd74dae1c&seq=3#page_scan_tab_contents. Accessed May 2026.

McBride, M.B. 1994. *Environmental Chemistry of Soils*. New York: Oxford University Press.

Natural Resources Conservation Service (NRCS). 2012. Official Soil Series Descriptions: Olney Soil Series. Available at: https://soilseries.sc.egov.usda.gov/OSD_Docs/O/OLNEY.html. Accessed May 2026.

———. 2026. Ecological Site Descriptions catalog: MLRA 067B/Ecological Site R067BY002CO. Available at: https://edit.sc.egov.usda.gov/catalogs/esd/067B/R067BY002CO. Accessed May 2026.

———. 2019. Web Soil Survey. Available at: https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx. Accessed May 2026.

Natural Resources Conservation Service (NRCS) and Bureau of Land Management (BLM). 2021. Rangeland Analysis Platform. U.S. Department of Agriculture, Natural Resources Conservation Service. U.S. Department of the Interior, Bureau of Land Management. University of Montana. Available at: https://rangelands.app/. Accessed May 2026.

Pichtel J, 2016. Oil and gas production wastewater: Soil contamination and pollution prevention. Applied and Environmental Soil Science, 2016. Accessed May 2026.

Reynolds TD. and Fraley Jr, L. 1989. Root profiles of some native and exotic plant species in southeastern Idaho. Environmental and Experimental Botany, 29(2), pp.241-248.

Scher, Janette S. 2002. Elymus lanceolatus. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available at: https://www.fs.fed.us /database/feis/plants/graminoid/elelan/all.html. Accessed May 2026.

Smith SE, Haferkamp MR, and Voigt PW. 2004. Gramas. In Warm-Season (C4) Grasses, Agronomy Monograph no. 45. American Society of Agronomy, Crop Science Society of America, Soil Science Society of America, Madison, WI. Available at: https://cals.arizona.edu/research/azalfalf/pdf_pubs/gramas.pdf. Accessed May 2026.

Soil Science Society of America. 2010. Glossary of Soil Science Terms. Madison, Wisconsin. Available at: https://www.soils.org/publications/soils-glossary. Accessed May 2026.

Stringham, T.K., P. Novak-Echenique, D.K. Snyder, S. Peterson, and K.A. Snyder. 2016. Disturbance response grouping of ecological sites increase utility of ecological sites and state-and-transition models for landscape scale planning in the Great Basin. *Rangelands* 38(6):371–378.

Thorup, R.M. 1984. *Ortho Agronomy Handbook: A Practical Guide to Soil Fertility and Fertilizer Use*. San Francisco, California: Chevron Chemical Company.

Tirmenstein D. 1999. *Pascopyrum smithii*. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available at: https://www.fs.fed.us /database/feis/. Accessed May 2026.

Tisdale, S.L., W.L. Nelson, J.D. Beaton, and J.L. Havlin. 1993. *Soil Fertility and Fertilizers*. 5th edition. New York: Macmillan Publishing Company.

United States Department of Agriculture, Natural Resources Conservation Service (USDA-NRCS). 2025. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture, Agriculture Handbook 296. Available at: https://www.nrcs.usda.gov/sites/default/files/2025-07/AgHandbook296-508-lowres.pdf. Accessed May 2026.

Weaver JE. 1942. Competition of western wheatgrass with relict vegetation of prairie. American Journal of Botany, pp.366-372. Available at: https://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1433&context=agronomyfacpub. Accessed May 2026.

Weil, Raymond & Brady, Nyle. 2017. *The Nature and Properties of Soils, 15th edition*. Pearson Education.

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APPENDIX A

Initial Spill/Release Report (Form 19)

FORM 19 Rev 03/21

State of Colorado
Oil and Gas Conservation Commission

1120 Lincoln Street, Suite 801, Denver, Colorado 80203
Phone: (303) 894-2100 Fax: (303) 894-2109

Document Number: 403155830
Date Received: 09/05/2022

Spill report taken by: ALLISON, RICK

Spill/Release Point ID: 482854

SPILL/RELEASE REPORT (INITIAL)

This form is to be submitted by the party responsible for the oil and gas spill or release. Refer to COGCC Rule 912.b. for reporting requirements of spills or releases of E&P Waste, produced Fluids, or unauthorized Releases of natural gas. Submit a Site Investigation and Remediation Workplan (Form 27) if Rule 913.c. applies.

OPERATOR INFORMATON

Name of Operator: TAPROOT ROCKIES MIDSTREAM LLC Operator No: 10718

Address: 555 17TH STREET SUITE 800

City: DENVER State: CO Zip: 80202

Contact Person: David Brazeal David Brazeal

Phone Numbers

Phone: ( )

Mobile: (701) 509-2063

Email: dbrazeal@taprootep.com

INITIAL SPILL/RELEASE REPORT

Initial Spill/Release Report Doc# 403155830

Initial Report Date: 09/05/2022 Date of Discovery: 09/05/2022 Spill Type: Recent Spill

Spill/Release Point Location:

QTRQTR NWSW SEC 16 TWP 8N RNG 59W MERIDIAN 6

Latitude: 40.661199 Longitude: -103.989859

Municipality (if within municipal boundaries): County: WELD

Enter Lat./long measurement of the actual Spill/Release Point. Lat./Long. Data shall meet standards of Rule 216.

Reference Location:

Facility Type: PRODUCED WATER TRANSFER SYSTEM

[X] Facility/Location ID No 467382

Spill/Release Point Name: Big Mountain Viper Pipeline

[ ] Well API No. (Only if the reference facility is well) 05- -

[ ] No Existing Facility or Location ID No.

Estimated Total Spill Volume: use same ranges as others for values

Estimated Oil Spill Volume(bbl): 0

Estimated Condensate Spill Volume(bbl): 0

Estimated Flow Back Fluid Spill Volume(bbl): 0

Estimated Produced Water Spill Volume(bbl): >=100

Estimated Other E&P Waste Spill Volume(bbl): 0

Estimated Drilling Fluid Spill Volume(bbl): 0

Specify:

Has the subject Spill/Release been controlled at the time of reporting? Yes

Land Use:

Current Land Use: OTHER Other(Specify): Bison/Civitas N Loc ID 472549

Weather Condition: Mild

Surface Owner: OTHER (SPECIFY) Other(Specify): Bison/Civitas N, and STATE

Describe what is known about the spill/release event (what happened -- including how it was stopped, contained, and recovered):

The Spill was discovered by a Civitas Operator around 12:00 AM on 9/5/22. The Operator notified Taproot. The pipeline segment was shutdown and isolated. A spill response and clean-up crew from Environmental Works, Inc. was dispatched and clean-up activities were ongoing today. It appears that a short section of 4" Shawcor Flexpipe failed under normal operating pressure. The failed piping will be removed and the investigation will continue into tomorrow.

List of Agencies and Other Parties Notified Pursuant to Rule 912.b.(7)-(11):

Data not required

REPORT CRITERIA

Rule 912.b.(1) Report to the Director (select all criteria that apply):

No — Rule 912.b.(1).A: A Spill or Release of any size that impacts or threatens to impact any Waters of the State, Public Water System, residence or occupied structure, livestock, wildlife, or publicly-maintained road.

Waters of the State: _____ Public Water System: _____

Residence or Occupied Structure: _____ Livestock: _____

Wildlife: _____ Publicly-Maintained Road: _____

Yes — Rule 912.b.(1).B: A Spill or Release in which 1 barrel or more of E&P Waste or produced fluids is spilled or released outside of berms or other secondary containment.

Yes — Rule 912.b.(1).C: A Spill or Release of 5 barrels or more of E&P Waste or produced Fluids regardless of whether the Spill or Release is completely contained within berms or other secondary containment.

No — Rule 912.b.(1).D: Within 6 hours of discovery, a Grade 1 Gas Leak. For a Grade 1 Gas Leak from a Flowline, the Operator also must submit the Form 19 – Initial, document number on a Form 44, Flowline Report, for the Grade 1 Gas Leak

Enter the approximate time of discovery _____ (HH:MM)

Enter the Document Number of the Grade 1 Gas Leak Report, Form 44 _____

Was there a reportable accident associated with either a Grade 1 Gas Leak or an E&P waste spill or release? _____

Enter the Document Number of the Initial Accident Report, Form 22 _____

Was there damage during excavation? _____

Was CO 811 notified prior to excavation? _____

Yes — Rule 912.b.(1).E: The discovery of 10 cubic yards or more of impacted material resulting from a current or historic Spill or Release. Discovery and reporting will not be contingent upon confirmation samples demonstrating exceedance of Table 915-1 standards.

Estimated Volume of Impacted Solids (cu. yd.): 200

No — Rule 912.b.(1).F: The discovery of impacted Waters of the State, including Groundwater. Discovery and reporting will not be contingent upon confirmation samples demonstrating exceedance of Table 915-1 standards. The presence of free product or hydrocarbon sheen on Groundwater or surface water is reportable. The presence of contaminated soil in contact with Groundwater or surface water is reportable. Check all that apply:

- ☐ The presence of free product or hydrocarbon sheen Surface Water
- ☐ The presence of free product or hydrocarbon sheen on Groundwater
- ☐ The presence of contaminated soil in contact with Groundwater
- ☐ The presence of contaminated soil in contact with Surface water

No — Rule 912.b.(1).G: A suspected or actual Spill or Release of any volume where the volume cannot be immediately determined, including a spill or release of any volume that daylights from the subsurface.

No — Rule 912.b.(1).H: Spill or Release resulting in vaporized hydrocarbon mists that leave the Oil and Gas Location or Off-Location Flowline right of way from an Oil and Gas Location and impacts or threatens to impact off-location property.

☐ Areas offsite of Oil & Gas Location ☐ Off-Location Flowline right of way

No — Rule 912.b.(1).I: A Release of natural gas that results in an accumulation of soil gas or gas seeps.

No Rule 912.b.(1).J: A Release that results in natural gas in Groundwater.

OPERATOR COMMENTS:

I hereby certify all statements made in this form are to the best of my knowledge true, correct, and complete.

Signed: _____ Print Name: Dale Hunt

Title: VP of Engineering Date: 09/05/2022 Email: dhunt@taprootep.com

Condition of Approval

COA Type	Description

0 COA

Attachment List

Att Doc Num	Name
403155830	SPILL/RELEASE REPORT(INITIAL)
403155951	FORM 19 SUBMITTED

Total Attach: 2 Files

General Comments

User Group	Comment	Comment Date
		Stamp Upon Approval

Total: 0 comment(s)

APPENDIX B

Assessment Photos

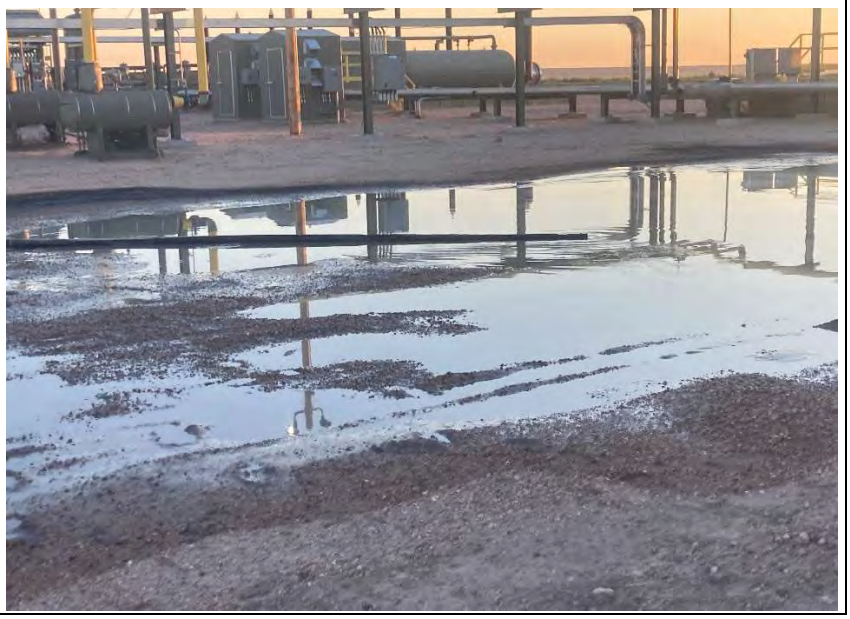
Photo: 1 **Description:** Initial site conditions on 9/5 looking east.	

Photo: 2 **Description:** Initial site conditions looking southwest.	

Photo: 3 **Description:** Initial site conditions looking south.	

Photo: 4 **Description:** Release location.	

Photo: 5 **Description:** The outlined impacted area of the adjacent property to the southwest.	

Photo: 6 **Description:** Liquid Vac Truck Operator working to remove free liquids.	

Photo: 7 **Description:** Hydro excavator working in the primary excavation area to locate the pipeline failure.	

Photo: 8 **Description:** Locating the failure in the pipeline.	

Photo: 9 **Description:** The failure in the pipeline. Deformed shawcore 4" pipe.	

Photo: 10 **Description:** Surface scraping of impacted area.	

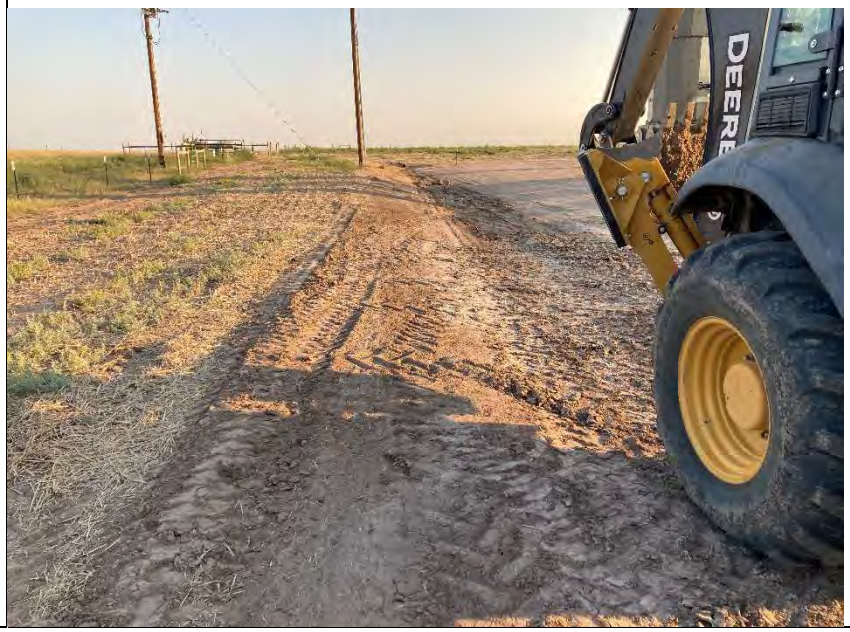
Photo: 11 **Description:** Surface scrapping of impacted area to remove visible wet soil.	

Photo: 12 **Description:** Loading impacted soil for disposal.	

Photo: 13 **Description:** Primary excavation area after exposing failed pipeline. View looking north.	

Photo: 14 **Description:** Secondary excavation area after surface scrape looking west.	

Photo: 15 **Description:** Secondary excavation area after surface scrape, looking east.	

Photo: 16 **Description:** Secondary excavation area after surface scrape looking north.	

Photo: 17 **Description:** Adjacent property after surface scrape.	
Photo: 18 **Description:** Replaced line with stainless steel pipe. View looking north.	

Photo: 19 **Description:** Area of surface impacts to the east of the primary excavation. Hand digging and hydroexcavation performed until no observed impacts. View looking north.	

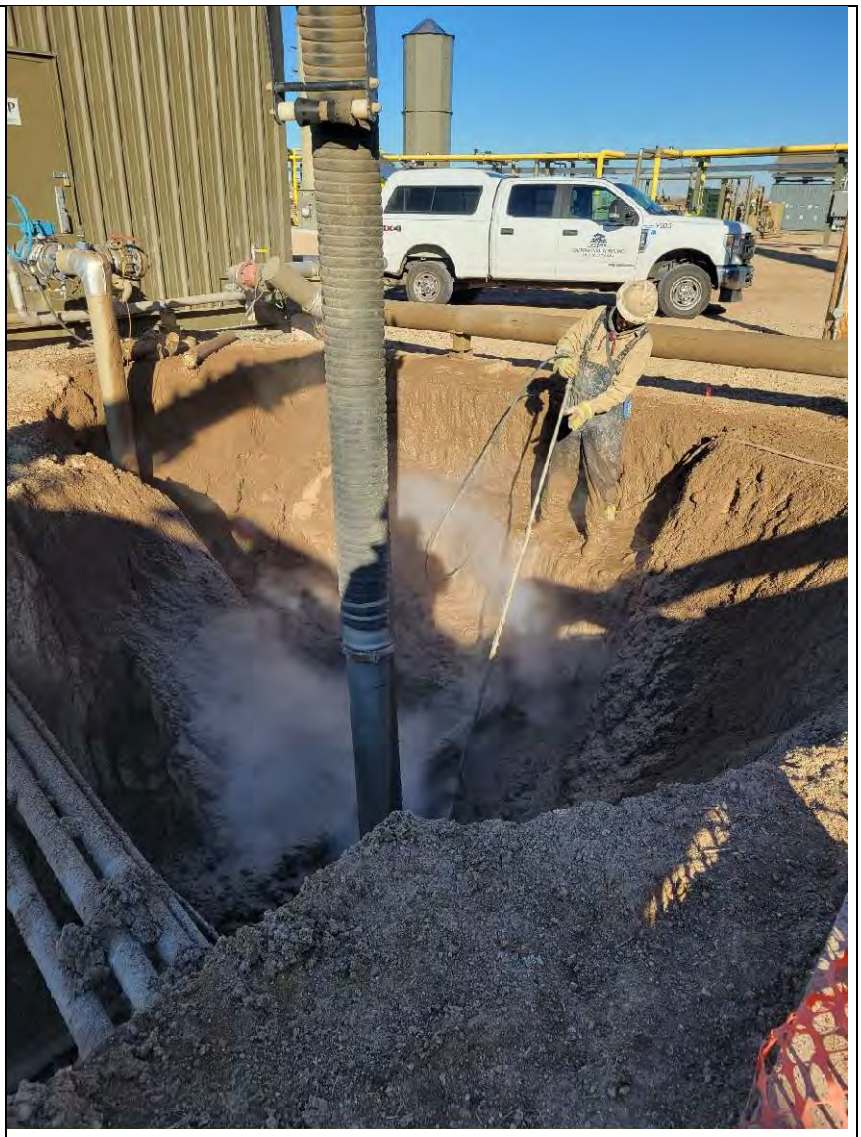
Photo: 20 **Description:** Widening of primary excavation completed on 11/10 and 11/11. Secondary sidewall samples collected.	

Photo: 21 **Description:** Widening of primary excavation completed on 11/10 and 11/11. Existing infrastructure hindering further excavation.	

APPENDIX C

Vegetation Assessment Results

Table C1. Results of the December 2, 2021, Vegetation Site Assessment for the Big Mountain Viper Project, Weld County, Colorado*

Site†	Latitude (degrees)	Longitude (degrees)	Surface Cover													
			Burning bush (*Bassia scoparia*)		Blue grama (*Bouteloua gracilis*)		Winterfat (*Krascheninnikovia lanata*)		Litter (Native Vegetation)		Litter (Hay Mulch)		Bare Ground		Total	
			Cover (%)	Density (Count)	Cover (%)	Density (Count)	Cover (%)	Density (Count)	Cover (%)	Density (Count)	Cover (%)	Density (Count)	Cover (%)	Density (Count)	Cover (%)	Density (Count)
IMPACT-01	40.66088	-103.98993	-	-	-	-	-	-	-	NA	30.0	NA	70.0	NA	**100.0**	**-**
IMPACT-02	40.66089	-103.98992	-	-	-	-	-	-	-	NA	10.0	NA	90.0	NA	**100.0**	**-**
IMPACT-03	40.66084	-103.99004	-	-	-	-	-	-	-	NA	30.0	NA	70.0	NA	**100.0**	**-**
Average			**-**	**-**	**-**	**-**	**-**	**-**	**-**	**NA**	**23.3**	**NA**	**76.7**	**NA**	**100.0**	**-**
ADJACENT-01	40.66067	-103.98971	-	-	75.0	15.0	5.0	1.0	10.0	NA	-	NA	10.0	NA	**100.0**	**16.0**
ADJACENT-02	40.66071	-103.98986	1.0	1.0	50.0	10.0	-	-	5.0	NA	-	NA	44.0	NA	**100.0**	**11.0**
ADJACENT-03	40.66071	-103.98983	-	-	45.0	14.0	30.0	1.0	5.0	NA	-	NA	20.0	NA	**100.0**	**15.0**
Average			**1.0**	**1.0**	**56.7**	**13.0**	**11.7**	**0.7**	**6.7**	**NA**	**-**	**NA**	**24.7**	**NA**	100.0	**14.0**

Note: Density for each species represents the count of individuals of said species rooted inside the Daubenmire frame. Cover percent is a general estimate of the surface cover each species is occupying within the Daubenmire frame.

* Results were collected following a previous release that occurred and was reported on 07/26/2021.

† The IMPACT-01, IMPACT-02, and IMPACT-03 sites are representative of ecological conditions within the Project site and the ADJACENT-01, ADJACENT-02, and ADJACENT-03 sites are reference sites and are representative of ecological conditions immediately adjacent to the Project site.

NA = Not Available; plant density was not recorded for litter or bare ground surface cover categories.

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APPENDIX D

Sampling Analytical Results

Table D1. Summary of Sample Analytical Results

Station Name				**BS1***	**BS2***	**BS3**	**FS1***	**FS1**	**FS2***	**FS2**	**SW1***	**SW2***	**SW3***	**SW4***
Sample Date	**CAS Number**	**Units**	**RSSL[↑]**	9/8/22	9/8/22	11/10/22	9/12/22	11/11/22	9/12/22	11/10/22	9/12/22	9/12/22	9/12/22	9/12/22
Sample Depth				0 - 0.5 ft	0 - 0.5 ft	6 - 6.5 ft	9 - 9.5 ft	10 ft	7.5 - 8 ft	9 ft	6 - 6.5 ft	6 - 6.5 ft	6 - 6.5 ft	7.5 - 8 ft
Metals														
Arsenic	7440-38-2	mg/kg	0.68	8.41	6.45	3.03	6.15	1.56	8.69	3.17	3.60	2.80	4.17	1.99
Barium	7440-39-3	mg/kg	15,000	463	596	90.9	227	82.1	63.2	46.4	211	223	264	137
Cadmium	7440-43-9	mg/kg	71	0.356	0.392	0.334	0.293	0.395	0.611	0.182	0.249	0.599	0.289	0.211
Chromium	7440-47-3	mg/kg	0.3	<0.511	<0.50	<0.244	<0.50	<0.244	<0.506	<0.252	<0.51	<0.515	<0.502	<0.513
Copper	7440-50-8	mg/kg	3,100	16.7	17.5	9.96	10.7	9.16	11.3	10.3	<9.51	<9.39	10.9	10.9
Lead	7439-92-1	mg/kg	400	17.3	20.2	11.7	11.7	12.0	11.3	14.7	17.8	12.2	12.6	12
Nickel	7440-02-0	mg/kg	1,500	14.7	15.7	<9.67	10.3	<9.05	<8.90	<9.51	<9.51	<9.39	10.3	13.1
Selenium	7782-49-2	mg/kg	390	0.301	0.234	0.195	0.264	0.095	0.544	0.186	0.235	0.181	0.146	0.136
Silver	7440-22-4	mg/kg	390	<0.0940	<0.0940	<0.0967	<0.0917	<0.0905	<0.0890	<0.0951	<0.0951	<0.0939	<0.0801	<0.0867
Zinc	7440-66-6	mg/kg	23,000	<94.0	<94.0	<96.7	<91.7	<90.5	<89.0	<95.1	<95.1	<93.9	<80.1	<86.7
Volatile Organic Compounds (VOCs)														
Benzene	71-43-2	mg/kg	1.2	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	NS	<0.002	<0.002	<0.002	<0.002
Ethylbenzene	100-41-4	mg/kg	5.8	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	NS	<0.002	<0.002	<0.002	<0.002
Toluene	108-88-3	mg/kg	490	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	NS	<0.002	<0.002	<0.002	<0.002
Xylenes, Total	1330-20-7	mg/kg	58	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	NS	<0.002	<0.002	<0.002	<0.002
1,2,4-Trimethylbenzene	95-63-6	mg/kg	30	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	NS	<0.002	<0.002	0.0187	<0.002
1,3,5-Trimethylbenzene	108-67-8	mg/kg	27	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	NS	<0.002	<0.002	0.00434	<0.002
Semi-VOCs														
1-Methylnaphthalene	90-12-0	mg/kg	18	<0.00067	<0.00335	0.00141	0.271	<0.00109	0.000652	NS	0.000631	<0.00067	1.56	0.000563
2-Methylnaphthalene	91-57-6	mg/kg	24	<0.00067	<0.00335	0.00234	0.149	<0.00194	<0.00067	NS	0.000707	<0.00067	0.455	<0.00067
Acenaphthene	83-32-9	mg/kg	360	<0.00067	<0.00335	<0.000304	0.0126	<0.000304	<0.00067	NS	<0.00067	<0.00067	0.0454	<0.00067
Anthracene	120-12-7	mg/kg	1,800	<0.00067	<0.00335	<0.000334	0.0049	<0.000334	<0.00067	NS	<0.00067	<0.00067	0.0191	<0.00067
Benzo(A)Anthracene	56-55-3	mg/kg	1.1	<0.00067	<0.00335	<0.000493	0.00258	<0.000493	<0.00067	NS	<0.00067	<0.00067	0.0073	<0.00067
Benzo(A)Pyrene	50-32-8	mg/kg	0.11	<0.00067	<0.00335	<0.000468	<0.00067	<0.000468	<0.00067	NS	<0.00067	<0.00067	<0.00067	<0.00067
Benzo(B)Fluoranthene	205-99-2	mg/kg	1.1	<0.00067	<0.00335	<0.000585	<0.00067	<0.000585	<0.00067	NS	<0.00067	<0.00067	0.0081	<0.00067
Benzo(K)Fluoranthene	207-08-9	mg/kg	11	<0.00067	<0.00335	<0.000437	<0.00067	<0.000437	<0.00067	NS	<0.00067	<0.00067	<0.00067	<0.00067
Chrysene	218-01-9	mg/kg	110	<0.00067	<0.00335	<0.000624	0.0158	<0.000624	<0.00067	NS	<0.00067	<0.00067	0.0873	<0.00067
Dibenz(A,H)Anthracene	53-70-3	mg/kg	0.11	<0.00067	<0.00335	<0.000614	<0.00067	<0.000614	<0.00067	NS	<0.00067	<0.00067	<0.00067	<0.00067
Fluoranthene	206-44-0	mg/kg	240	<0.00067	<0.00335	<0.000394	<0.00067	<0.000394	<0.00067	NS	<0.00067	<0.00067	<0.00067	<0.00067
Fluorene	86-73-7	mg/kg	240	<0.00067	<0.00335	0.00152	0.0478	<0.000286	<0.00067	NS	<0.00067	<0.00067	0.217	<0.00067
Indeno(1,2,3-Cd)Pyrene	193-39-5	mg/kg	1.1	<0.00067	<0.00335	<0.000627	<0.00067	<0.000627	<0.00067	NS	<0.00067	<0.00067	<0.00067	<0.00067

Station Name				**BS1***	**BS2***	**BS3**	**FS1***	**FS1**	**FS2***	**FS2**	**SW1***	**SW2***	**SW3***	**SW4***
Sample Date	**CAS Number**	**Units**	**RSSL**[↑]	9/8/22	9/8/22	11/10/22	9/12/22	11/11/22	9/12/22	11/10/22	9/12/22	9/12/22	9/12/22	9/12/22
Sample Depth				0 - 0.5 ft	0 - 0.5 ft	6 - 6.5 ft	9 - 9.5 ft	10 ft	7.5 - 8 ft	9 ft	6 - 6.5 ft	6 - 6.5 ft	6 - 6.5 ft	7.5 - 8 ft
Naphthalene	91-20-3	mg/kg	2	<0.00067	<0.00335	<0.00145	0.0143	<0.00145	<0.00067	NS	<0.00067	<0.00067	0.0703	<0.00067
Pyrene	129-00-0	mg/kg	180	<0.00067	<0.00335	<0.000643	0.00735	<0.000643	<0.00067	NS	<0.00067	<0.00067	0.0506	<0.00067
Total Petroleum Hydrocarbons (TPH)														
TPH (Low Fraction)	8006-61-9	mg/kg	500	0	<0.2		<0.2	<0.2	<0.2	NS	<0.2	<0.2	0.382	<0.2
C10-C28 Diesel Range	NA	mg/kg	500	<25	<25	<25	205	<25	<25	NS	<25	<25	39.9	<25
C28-C40 Residual Range Organics	NA	mg/kg	500	<100	<100	<100	<100	<100	<100	NS	<100	<100	<100	<100
Soil Suitability for Reclamation														
Boron	7440-42-8	mg/l	2	0.453	0.487	1.37	0.708	0.241	1.29	0.618	2.04	0.94	1.37	0.529
pH	NA	s.u.	6 - 8.3	8.2	8.2	8.2	7.9	8.0	7.9	8.0	8.0	7.9	7.9	8.0
Sodium Adsorption Ratio	NA	unitless	6	0.0793	0.0957	5.35	6.48	5.74	9.69	5.21	9.78	5.73	17.9	6.43
Specific Conductance	NA	mmhos/cm	4	0.264	0.27	1.75	3.97	2.12	6.21	2.12	4.39	3.26	8.34	2.84

Notes:
RSSL = Residential soil screening levels; NA = Not applicable; NS = Not sampled; '–' = No standard established; mg/kg = milligrams per kilogram; mg/l = milligrams per liter; s.u. = standard units; mmhos/cm = millimhos per centimeter.
'BS' indicates a background sample; 'FS' indicates a sample collected from the floor of an excavation; 'SW' indicates a sample collected from the sidewall of an excavation; 'SS' indicates a surface sample collected from the area of shallow excavation with limited impact from produced water.
Shaded cells indicate an exceedance of the protection of residential soil screening levels (RSSLs).
[↑] Where RSSLs are not present, Table 915-1 cleanup concentrations are used.
* Indicates samples collected during the initial release response.

Table D1. Summary of Sample Analytical Results

Station Name	CAS Number	Units	RSSL[↑]	SW5*	SW6*	SW7	SW8	SW9	SW10	SW11	SS1*	SS2*	SS3*	SS4*
Sample Date				9/12/22	9/12/22	11/10/22	11/10/22	11/10/22	11/10/22	11/11/22	9/8/22	9/8/22	9/8/22	9/8/22
Sample Depth				6 - 6.5 ft	6 - 6.5 ft	6 ft	7.5 ft	6 ft	6 ft	6 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft
Metals														
Arsenic	7440-38-2	mg/kg	0.68	2.33	2.24	3.13	4.36	3.26	1.89	3.75	1.91	2.51	2.89	2.69
Barium	7440-39-3	mg/kg	15,000	102	110	386	237	160	117	229	72.7	161	61.8	81.5
Cadmium	7440-43-9	mg/kg	71	0.216	0.461	0.21	0.22	0.216	0.583	0.258	<0.0878	0.0985	<0.0869	0.129
Chromium	7440-47-3	mg/kg	0.3	<0.503	<0.51	<0.244	<0.467	<0.244	<0.249	<0.492	<0.50	<0.50	<0.50	<0.50
Copper	7440-50-8	mg/kg	3,100	9.47	9.34	10.5	11.8	11	<9.50	11.1	<8.78	<8.64	<8.69	<9.31
Lead	7439-92-1	mg/kg	400	12.7	13	12.9	12.8	12.8	13.1	13.7	<8.78	<8.64	<8.69	<9.31
Nickel	7440-02-0	mg/kg	1,500	<8.83	<8.66	9.64	10.6	,<9.35	<9.50	10.0	<8.78	<8.64	<8.69	<9.31
Selenium	7782-49-2	mg/kg	390	0.173	0.221	0.311	0.26	0.196	0.106	0.217	<0.0878	<0.0864	<0.0869	0.16
Silver	7440-22-4	mg/kg	390	<0.0883	<0.0866	<0.0945	<0.0862	<0.0935	<0.095	<0.0962	<0.0878	<0.0864	<0.0869	<0.0931
Zinc	7440-66-6	mg/kg	23,000	<88.3	<86.6	<94.5	<86.2	<93.5		<96.2	<87.8	<86.4	<86.9	<93.1
Volatile Organic Compounds (VOCs)														
Benzene	71-43-2	mg/kg	1.2	<0.002	<0.002	<0.002	NS	NS	NS	NS	<0.002	<0.002	<0.002	<0.002
Ethylbenzene	100-41-4	mg/kg	5.8	<0.002	<0.002	<0.002	NS	NS	NS	NS	<0.002	<0.002	<0.002	<0.002
Toluene	108-88-3	mg/kg	490	<0.002	<0.002	<0.002	NS	NS	NS	NS	<0.002	<0.002	<0.002	<0.002
Xylenes, Total	1330-20-7	mg/kg	58	<0.002	<0.002	<0.002	NS	NS	NS	NS	<0.002	<0.002	<0.002	<0.002
1,2,4-Trimethylbenzene	95-63-6	mg/kg	30	<0.002	<0.002	<0.002	NS	NS	NS	NS	<0.002	<0.002	<0.002	<0.002
1,3,5-Trimethylbenzene	108-67-8	mg/kg	27	<0.002	<0.002	<0.002	NS	NS	NS	NS	<0.002	<0.002	<0.002	<0.002
Semi-VOCs														
1-Methylnaphthalene	90-12-0	mg/kg	18	<0.00067	<0.00067	<0.00109	NS	NS	NS	NS	<0.00067	0.00161	<0.00067	0.000858
2-Methylnaphthalene	91-57-6	mg/kg	24	<0.00067	<0.00067	<0.00194	NS	NS	NS	NS	<0.00067	0.00108	<0.00067	0.000671
Acenaphthene	83-32-9	mg/kg	360	<0.00067	<0.00067	<0.000304	NS	NS	NS	NS	<0.00067	<0.00067	<0.00067	<0.00067
Anthracene	120-12-7	mg/kg	1,800	<0.00067	<0.00067	<0.000334	NS	NS	NS	NS	<0.00067	<0.00067	<0.00067	<0.00067
Benzo(A)Anthracene	56-55-3	mg/kg	1.1	<0.00067	<0.00067	<0.000493	NS	NS	NS	NS	<0.00067	<0.00067	<0.00067	<0.00067
Benzo(A)Pyrene	50-32-8	mg/kg	0.11	<0.00067	<0.00067	<0.000468	NS	NS	NS	NS	<0.00067	<0.00067	<0.00067	<0.00067
Benzo(B)Fluoranthene	205-99-2	mg/kg	1.1	<0.00067	<0.00067	<0.000585	NS	NS	NS	NS	<0.00067	<0.00067	<0.00067	<0.00067
Benzo(K)Fluoranthene	207-08-9	mg/kg	11	<0.00067	<0.00067	<0.000437	NS	NS	NS	NS	<0.00067	<0.00067	<0.00067	<0.00067
Chrysene	218-01-9	mg/kg	110	<0.00067	<0.00067	<0.000624	NS	NS	NS	NS	<0.00067	<0.00067	<0.00067	<0.00067
Dibenz(A,H)Anthracene	53-70-3	mg/kg	0.11	<0.00067	<0.00067	<0.000614	NS	NS	NS	NS	<0.00067	<0.00067	<0.00067	<0.00067
Fluoranthene	206-44-0	mg/kg	240	<0.00067	<0.00067	<0.000394	NS	NS	NS	NS	<0.00067	<0.00067	<0.00067	<0.00067
Fluorene	86-73-7	mg/kg	240	<0.00067	<0.00067	<0.000286	NS	NS	NS	NS	<0.00067	0.000413	<0.00067	<0.00067
Indeno(1,2,3-Cd)Pyrene	193-39-5	mg/kg	1.1	<0.00067	<0.00067	<0.000627	NS	NS	NS	NS	<0.00067	<0.00067	<0.00067	<0.00067

Station Name				**SW5***	**SW6***	**SW7**	**SW8**	**SW9**	**SW10**	**SW11**	**SS1***	**SS2***	**SS3***	**SS4***
Sample Date	**CAS Number**	**Units**	**RSSL**[↑]	9/12/22	9/12/22	11/10/22	11/10/22	11/10/22	11/10/22	11/11/22	9/8/22	9/8/22	9/8/22	9/8/22
Sample Depth				6 - 6.5 ft	6 - 6.5 ft	6 ft	7.5 ft	6 ft	6 ft	6 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft
Naphthalene	91-20-3	mg/kg	2	<0.00067	<0.00067	<0.00145	NS	NS	NS	NS	<0.00067	<0.00067	<0.00067	<0.00067
Pyrene	129-00-0	mg/kg	180	<0.00067	<0.00067	<0.000643	NS	NS	NS	NS	<0.00067	<0.00067	<0.00067	<0.00067
Total Petroleum Hydrocarbons (TPH)														
TPH (Low Fraction)	8006-61-9	mg/kg	500	<0.2	<0.2	<0.2	NS	NS	NS	NS	<0.2	<0.2	<0.2	<0.2
C10-C28 Diesel Range	NA	mg/kg	500	<25	<25	<25	NS	NS	NS	NS	<25	<25	<25	<25
C28-C40 Residual Range Organics	NA	mg/kg	500	<100	<100	<100	NS	NS	NS	NS	<100	<100	<100	<100
Soil Suitability for Reclamation														
Boron	7440-42-8	mg/l	2	2.43	1.14	0.909	4.09	5.40	0.812	1.96	0.482	0.617	0.502	0.660
pH	NA	s.u.	6 - 8.3	7.9	7.9	8.0	7.9	7.9	8.0	7.7	8.3	8.1	8.0	8.0
Sodium Adsorption Ratio	NA	unitless	6	10.7	6.54	5.65	15.8	17.8	8.65	8.03	3.22	1.90	1.78	3.28
Specific Conductance	NA	mmhos/cm	4	6.98	5.83	1.98	7.04	6.99	3.55	2.21	0.424	0.779	0.942	1.15

Notes:
RSSL = Residential soil screening levels; NA = Not applicable; NS = Not sampled; '–' = No standard established; mg/kg = milligrams per kilogram; mg/l = milligrams per liter; s.u. = standard units; mmhos/cm = millimhos per centimeter.
'BS' indicates a background sample; 'FS' indicates a sample collected from the floor of an excavation; 'SW' indicates a sample collected from the sidewall of an excavation; 'SS' indicates a surface sample collected from the area of shallow excavation with limited impact from produced water.
Shaded cells indicate an exceedance of the protection of residential soil screening levels (RSSLs).
[↑] Where RSSLs are not present, Table 915-1 cleanup concentrations are used.
* Indicates samples collected during the initial release response.

Table D1. Summary of Sample Analytical Results

Station Name	CAS Number	Units	RSSL[↑]	SS5*	SS6*	SS6	SS7*	SS7	SS8*	SS9*	SS10*	SS10	SS11*	SS11
Sample Date				9/8/22	9/8/22	11/10/22	9/8/22	11/10/22	9/8/22	9/8/22	9/12/22	11/10/22	9/12/22	11/10/22
Sample Depth				0 - 0.5 ft	0 - 0.5 ft	1 ft	0 - 0.5 ft	1 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	2 ft	0 - 0.5 ft	2 ft
Metals														
Arsenic	7440-38-2	mg/kg	0.68	5.86	4.98	4.45	4.71	4.72	5.52	2.35	4.98	6.14	5.08	5.74
Barium	7440-39-3	mg/kg	15,000	529	551	522	377	334	528	48.1	343	512	366	510
Cadmium	7440-43-9	mg/kg	71	0.328	0.29	0.283	0.268	0.306	0.269	0.0938	0.399	0.251	0.276	0.252
Chromium	7440-47-3	mg/kg	0.3	<0.50	<0.50	<1.22	<0.514	<1.26	<0.50	<0.52	<2.51	<0.246	<2.54	<0.488
Copper	7440-50-8	mg/kg	3,100	13.9	13.7	13.8	12.6	14.1	11.3	<9.29	13.5	12.8	13.3	12.2
Lead	7439-92-1	mg/kg	400	22.4	13.1	28.9	11.1	13.4	10.6	<9.29	12.4	18.4	15.4	13.1
Nickel	7440-02-0	mg/kg	1,500	11	10.5	11.4	11	11.8	9.58	<9.29	11.1	11.6	11.7	10.9
Selenium	7782-49-2	mg/kg	390	0.3	0.243	0.274	0.23	0.335	0.252	<0.0929	0.207	0.298	0.32	0.296
Silver	7440-22-4	mg/kg	390	<0.0961	<0.0763	<0.0947	<0.0897	<0.0921	<0.0926	<0.0929	0.156	<0.0964	<0.0898	<0.0974
Zinc	7440-66-6	mg/kg	23,000	<96.1	<76.3	<94.7	<89.7	<92.1	<92.6	<92.9	<93.9	<96.4	<89.8	<97.4
Volatile Organic Compounds (VOCs)														
Benzene	71-43-2	mg/kg	1.2	<0.002	<0.002	NS	<0.002	NS	<0.002	<0.002	<0.002	NS	<0.002	NS
Ethylbenzene	100-41-4	mg/kg	5.8	<0.002	<0.002	NS	<0.002	NS	<0.002	<0.002	<0.002	NS	<0.002	NS
Toluene	108-88-3	mg/kg	490	<0.002	0.00232	NS	<0.002	NS	<0.002	<0.002	<0.002	NS	<0.002	NS
Xylenes, Total	1330-20-7	mg/kg	58	<0.002	<0.002	NS	<0.002	NS	<0.002	<0.002	<0.002	NS	<0.002	NS
1,2,4-Trimethylbenzene	95-63-6	mg/kg	30	<0.002	<0.002	NS	<0.002	NS	<0.002	<0.002	<0.002	NS	<0.002	NS
1,3,5-Trimethylbenzene	108-67-8	mg/kg	27	<0.002	<0.002	NS	<0.002	NS	<0.002	<0.002	<0.002	NS	<0.002	NS
Semi-VOCs														
1-Methylnaphthalene	90-12-0	mg/kg	18	<0.00067	<0.00067	NS	<0.00067	NS	<0.00067	<0.00067	0.00131	NS	<0.00067	NS
2-Methylnaphthalene	91-57-6	mg/kg	24	<0.00067	<0.00067	NS	<0.00067	NS	<0.00067	<0.00067	<0.00067	NS	<0.00067	NS
Acenaphthene	83-32-9	mg/kg	360	<0.00067	<0.00067	NS	<0.00067	NS	<0.00067	<0.00067	<0.00067	NS	<0.00067	NS
Anthracene	120-12-7	mg/kg	1,800	<0.00067	<0.00067	NS	<0.00067	NS	<0.00067	<0.00067	<0.00067	NS	<0.00067	NS
Benzo(A)Anthracene	56-55-3	mg/kg	1.1	<0.00067	<0.00067	NS	<0.00067	NS	<0.00067	<0.00067	<0.00067	NS	<0.00067	NS
Benzo(A)Pyrene	50-32-8	mg/kg	0.11	<0.00067	<0.00067	NS	<0.00067	NS	<0.00067	<0.00067	<0.00067	NS	<0.00067	NS
Benzo(B)Fluoranthene	205-99-2	mg/kg	1.1	<0.00067	<0.00067	NS	<0.00067	NS	<0.00067	<0.00067	<0.00067	NS	<0.00067	NS
Benzo(K)Fluoranthene	207-08-9	mg/kg	11	<0.00067	<0.00067	NS	<0.00067	NS	<0.00067	<0.00067	<0.00067	NS	<0.00067	NS
Chrysene	218-01-9	mg/kg	110	<0.00067	<0.00067	NS	<0.00067	NS	<0.00067	<0.00067	<0.00067	NS	<0.00067	NS
Dibenz(A,H)Anthracene	53-70-3	mg/kg	0.11	<0.00067	<0.00067	NS	<0.00067	NS	<0.00067	<0.00067	<0.00067	NS	<0.00067	NS
Fluoranthene	206-44-0	mg/kg	240	<0.00067	<0.00067	NS	<0.00067	NS	<0.00067	<0.00067	<0.00067	NS	<0.00067	NS
Fluorene	86-73-7	mg/kg	240	<0.00067	<0.00067	NS	<0.00067	NS	<0.00067	<0.00067	<0.00067	NS	<0.00067	NS

Station Name				**SS5***	**SS6***	**SS6**	**SS7***	**SS7**	**SS8***	**SS9***	**SS10***	**SS10**	**SS11***	**SS11**
Sample Date	**CAS Number**	**Units**	**RSSL**[↑]	9/8/22	9/8/22	11/10/22	9/8/22	11/10/22	9/8/22	9/8/22	9/12/22	11/10/22	9/12/22	11/10/22
Sample Depth				0 - 0.5 ft	0 - 0.5 ft	1 ft	0 - 0.5 ft	1 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	2 ft	0 - 0.5 ft	2 ft
Indeno(1,2,3-Cd)Pyrene	193-39-5	mg/kg	1.1	<0.00067	<0.00067	NS	<0.00067	NS	<0.00067	<0.00067	<0.00067	NS	<0.00067	NS
Naphthalene	91-20-3	mg/kg	2	<0.00067	<0.00067	NS	<0.00067	NS	<0.00067	<0.00067	<0.00067	NS	<0.00067	NS
Pyrene	129-00-0	mg/kg	180	<0.00067	<0.00067	NS	<0.00067	NS	<0.00067	<0.00067	<0.00067	NS	<0.00067	NS
Total Petroleum Hydrocarbons (TPH)														
TPH (Low Fraction)	8006-61-9	mg/kg	500	<0.2	<0.2	NS	<0.2	NS	<0.2	<0.2	<0.2	NS	<0.2	NS
C10-C28 Diesel Range	NA	mg/kg	500	<25	<25	NS	<25	NS	<25	<25	<25	NS	<25	NS
C28-C40 Residual Range Organics	NA	mg/kg	500	<100	<100	NS	<100	NS	<100	<100	<100	NS	<100	NS
Soil Suitability for Reclamation														
Boron	7440-42-8	mg/l	2	0.670	1.25	0.558	1.54	0.573	1.30	0.610	0.989	0.701	11.4	0.987
pH	NA	s.u.	6 - 8.3	7.8	8.0	7.7	7.8	7.8	8.1	8.1	7.7	8.4	8.1	8.2
Sodium Adsorption Ratio	NA	unitless	6	1.51	9.73	2.31	7.47	1.74	5.44	1.47	6.66	5.76	34.8	6.67
Specific Conductance	NA	mmhos/cm	4	2.09	5.73	4.60	6.12	3.78	2.01	0.647	8.28	0.806	10.5	1.98

Notes:
RSSL = Residential soil screening levels; NA = Not applicable; NS = Not sampled; '–' = No standard established; mg/kg = milligrams per kilogram; mg/l = milligrams per liter; s.u. = standard units; mmhos/cm = millimhos per centimeter.
'BS' indicates a background sample; 'FS' indicates a sample collected from the floor of an excavation; 'SW' indicates a sample collected from the sidewall of an excavation; 'SS' indicates a surface sample collected from the area of shallow excavation with limited impact from produced water.
Shaded cells indicate an exceedance of the protection of residential soil screening levels (RSSLs).
[↑] Where RSSLs are not present, Table 915-1 cleanup concentrations are used.
* Indicates samples collected during the initial release response.

Table D1. Summary of Sample Analytical Results

Station Name	CAS Number	Units	RSSL[↑]	SB1	SB1	SB2	SB2	SB3	SB3	SB4	SB4	SB5	SB5	SB6
Sample Date				8/29/2024	8/29/2024	8/29/2024	8/29/2024	8/29/2024	8/29/2024	8/29/2024	8/29/2024	8/29/2024	8/29/2024	8/29/2024
Sample Depth				4 - 4 ft	7 - 7 ft	4 - 4 ft	6 - 6 ft	4 - 4 ft	7 - 7 ft	4 - 4 ft	7 - 7 ft	4 - 4 ft	5 - 5 ft	2 - 2 ft
Metals														
Arsenic	7440-38-2	mg/kg	0.68	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Barium	7440-39-3	mg/kg	15,000	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Cadmium	7440-43-9	mg/kg	71	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Chromium	7440-47-3	mg/kg	0.3	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Copper	7440-50-8	mg/kg	3,100	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Lead	7439-92-1	mg/kg	400	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Nickel	7440-02-0	mg/kg	1,500	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Selenium	7782-49-2	mg/kg	390	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Silver	7440-22-4	mg/kg	390	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Zinc	7440-66-6	mg/kg	23,000	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Volatile Organic Compounds (VOCs)														
Benzene	71-43-2	mg/kg	1.2	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Ethylbenzene	100-41-4	mg/kg	5.8	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Toluene	108-88-3	mg/kg	490	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Xylenes, Total	1330-20-7	mg/kg	58	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
1,2,4-Trimethylbenzene	95-63-6	mg/kg	30	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
1,3,5-Trimethylbenzene	108-67-8	mg/kg	27	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Semi-VOCs														
1-Methylnaphthalene	90-12-0	mg/kg	18	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
2-Methylnaphthalene	91-57-6	mg/kg	24	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Acenaphthene	83-32-9	mg/kg	360	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Anthracene	120-12-7	mg/kg	1,800	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Benzo(A)Anthracene	56-55-3	mg/kg	1.1	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Benzo(A)Pyrene	50-32-8	mg/kg	0.11	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Benzo(B)Fluoranthene	205-99-2	mg/kg	1.1	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Benzo(K)Fluoranthene	207-08-9	mg/kg	11	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Chrysene	218-01-9	mg/kg	110	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Dibenz(A,H)Anthracene	53-70-3	mg/kg	0.11	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Fluoranthene	206-44-0	mg/kg	240	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Fluorene	86-73-7	mg/kg	240	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Indeno(1,2,3-Cd)Pyrene	193-39-5	mg/kg	1.1	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

Station Name				**SB1**	**SB1**	**SB2**	**SB2**	**SB3**	**SB3**	**SB4**	**SB4**	**SB5**	**SB5**	**SB6**
Sample Date	**CAS Number**	**Units**	**RSSL**[↑]	8/29/2024	8/29/2024	8/29/2024	8/29/2024	8/29/2024	8/29/2024	8/29/2024	8/29/2024	8/29/2024	8/29/2024	8/29/2024
Sample Depth				4 - 4 ft	7 - 7 ft	4 - 4 ft	6 - 6 ft	4 - 4 ft	7 - 7 ft	4 - 4 ft	7 - 7 ft	4 - 4 ft	5 - 5 ft	2 - 2 ft
Naphthalene	91-20-3	mg/kg	2	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Pyrene	129-00-0	mg/kg	180	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Total Petroleum Hydrocarbons (TPH)														
TPH (Low Fraction)	8006-61-9	mg/kg	500	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
C10-C28 Diesel Range	NA	mg/kg	500	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
C28-C40 Residual Range Organics	NA	mg/kg	500	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Soil Suitability for Reclamation														
Boron	7440-42-8	mg/l	2	0.333	0.338	1.47	0.648	1.16	0.456	1.40	0.687	1.65	1.20	0.629
pH	NA	s.u.	6 - 8.3	8.3	8.3	8.3	8.3	8.4	8.2	8.3	8.2	8.4	8.1	8.3
Sodium Adsorption Ratio	NA	unitless	6	2.32	5.19	5.27	5.12	4.90	4.88	4.93	4.74	5.15	4.45	5.47
Specific Conductance	NA	mmhos/cm	4	0.96	1.40	2.09	1.77	0.83	1.99	1.76	2.22	2.40	3.21	2.29

Notes:
RSSL = Residential soil screening levels; NA = Not applicable; NS = Not sampled; '–' = No standard established; mg/kg = milligrams per kilogram; mg/l = milligrams per liter; s.u. = standard units; mmhos/cm = millimhos per centimeter.
'BS' indicates a background sample; 'FS' indicates a sample collected from the floor of an excavation; 'SW' indicates a sample collected from the sidewall of an excavation; 'SS' indicates a surface sample collected from the area of shallow excavation with limited impact from produced water.
Shaded cells indicate an exceedance of the protection of residential soil screening levels (RSSLs).
[↑] Where RSSLs are not present, Table 915-1 cleanup concentrations are used.
* Indicates samples collected during the initial release response.

Table D1. Summary of Sample Analytical Results

Station Name				SB6	SB7	SB8	SB8	BS4	BS4	BS4	BS5	BS5	BS5	SB9
Sample Date	**CAS Number**	**Units**	**RSSL[↑]**	8/29/2024	8/29/2024	8/29/2024	8/29/2024	4/10/2025	4/10/2025	4/10/2025	4/10/2025	4/10/2025	4/10/2025	4/10/2025
Sample Depth				4 - 4 ft	4 - 4 ft	2 - 2 ft	4 - 4 ft	2 - 2 ft	6 - 6 ft	10 - 10 ft	2 - 2 ft	6 - 6 ft	10 - 10 ft	7 - 7 ft
Metals														
Arsenic	7440-38-2	mg/kg	0.68	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Barium	7440-39-3	mg/kg	15,000	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Cadmium	7440-43-9	mg/kg	71	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Chromium	7440-47-3	mg/kg	0.3	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Copper	7440-50-8	mg/kg	3,100	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Lead	7439-92-1	mg/kg	400	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Nickel	7440-02-0	mg/kg	1,500	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Selenium	7782-49-2	mg/kg	390	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Silver	7440-22-4	mg/kg	390	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Zinc	7440-66-6	mg/kg	23,000	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Volatile Organic Compounds (VOCs)														
Benzene	71-43-2	mg/kg	1.2	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Ethylbenzene	100-41-4	mg/kg	5.8	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Toluene	108-88-3	mg/kg	490	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Xylenes, Total	1330-20-7	mg/kg	58	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
1,2,4-Trimethylbenzene	95-63-6	mg/kg	30	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
1,3,5-Trimethylbenzene	108-67-8	mg/kg	27	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Semi-VOCs														
1-Methylnaphthalene	90-12-0	mg/kg	18	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
2-Methylnaphthalene	91-57-6	mg/kg	24	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Acenaphthene	83-32-9	mg/kg	360	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Anthracene	120-12-7	mg/kg	1,800	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Benzo(A)Anthracene	56-55-3	mg/kg	1.1	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Benzo(A)Pyrene	50-32-8	mg/kg	0.11	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Benzo(B)Fluoranthene	205-99-2	mg/kg	1.1	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Benzo(K)Fluoranthene	207-08-9	mg/kg	11	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Chrysene	218-01-9	mg/kg	110	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Dibenz(A,H)Anthracene	53-70-3	mg/kg	0.11	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Fluoranthene	206-44-0	mg/kg	240	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Fluorene	86-73-7	mg/kg	240	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Indeno(1,2,3-Cd)Pyrene	193-39-5	mg/kg	1.1	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

Station Name				**SB6**	**SB7**	**SB8**	**SB8**	**BS4**	**BS4**	**BS4**	**BS5**	**BS5**	**BS5**	**SB9**
Sample Date	**CAS Number**	**Units**	**RSSL**[↑]	8/29/2024	8/29/2024	8/29/2024	8/29/2024	4/10/2025	4/10/2025	4/10/2025	4/10/2025	4/10/2025	4/10/2025	4/10/2025
Sample Depth				4 - 4 ft	4 - 4 ft	2 - 2 ft	4 - 4 ft	2 - 2 ft	6 - 6 ft	10 - 10 ft	2 - 2 ft	6 - 6 ft	10 - 10 ft	7 - 7 ft
Naphthalene	91-20-3	mg/kg	2	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Pyrene	129-00-0	mg/kg	180	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Total Petroleum Hydrocarbons (TPH)														
TPH (Low Fraction)	8006-61-9	mg/kg	500	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
C10-C28 Diesel Range	NA	mg/kg	500	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
C28-C40 Residual Range Organics	NA	mg/kg	500	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Soil Suitability for Reclamation														
Boron	7440-42-8	mg/l	2	1.58	0.984	0.491	1.46	0.736	1.23	1.16	0.642	0.932	1.12	0.443
pH	NA	s.u.	6 - 8.3	8.2	8.6	8.7	8.5	8.3	8.2	8.2	8.4	8.2	8.1	8.0
Sodium Adsorption Ratio	NA	unitless	6	5.87	5.53	1.96	3.08	2.81	3.33	3.54	2.15	3.68	4.03	6.09
Specific Conductance	NA	mmhos/cm	4	3.59	1.15	0.43	0.59	0.54	1.12	1.18	0.37	1.37	1.81	3.66

Notes:
RSSL = Residential soil screening levels; NA = Not applicable; NS = Not sampled; '–' = No standard established; mg/kg = milligrams per kilogram; mg/l = milligrams per liter; s.u. = standard units; mmhos/cm = millimhos per centimeter.
'BS' indicates a background sample; 'FS' indicates a sample collected from the floor of an excavation; 'SW' indicates a sample collected from the sidewall of an excavation; 'SS' indicates a surface sample collected from the area of shallow excavation with limited impact from produced water.
Shaded cells indicate an exceedance of the protection of residential soil screening levels (RSSLs).
[↑] Where RSSLs are not present, Table 915-1 cleanup concentrations are used.
* Indicates samples collected during the initial release response.

Table D1. Summary of Sample Analytical Results

Station Name	CAS Number	Units	RSSL[↑]	SB10	SB11	SB9	SW8	SW9	Backfill
Sample Date				4/10/2025	4/10/2025	2/13/2026	2/13/2026	2/13/2026	11/10/2022
Sample Depth				7 - 7 ft	7 - 7 ft	7 - 7 ft	7.5 - 7.5 ft	6 - 6 ft	NA
Metals									
Arsenic	7440-38-2	mg/kg	0.68	NS	NS	NS	NS	NS	6.18
Barium	7440-39-3	mg/kg	15,000	NS	NS	NS	NS	NS	573
Cadmium	7440-43-9	mg/kg	71	NS	NS	NS	NS	NS	0.272
Chromium	7440-47-3	mg/kg	0.3	NS	NS	NS	NS	NS	<0.488
Copper	7440-50-8	mg/kg	3,100	NS	NS	NS	NS	NS	14.1
Lead	7439-92-1	mg/kg	400	NS	NS	NS	NS	NS	16.6
Nickel	7440-02-0	mg/kg	1,500	NS	NS	NS	NS	NS	12.5
Selenium	7782-49-2	mg/kg	390	NS	NS	NS	NS	NS	0.294
Silver	7440-22-4	mg/kg	390	NS	NS	NS	NS	NS	<0.0941
Zinc	7440-66-6	mg/kg	23,000	NS	NS	NS	NS	NS	<94.1
Volatile Organic Compounds (VOCs)									
Benzene	71-43-2	mg/kg	1.2	NS	NS	NS	NS	NS	<0.002
Ethylbenzene	100-41-4	mg/kg	5.8	NS	NS	NS	NS	NS	<0.002
Toluene	108-88-3	mg/kg	490	NS	NS	NS	NS	NS	<0.002
Xylenes, Total	1330-20-7	mg/kg	58	NS	NS	NS	NS	NS	<0.002
1,2,4-Trimethylbenzene	95-63-6	mg/kg	30	NS	NS	NS	NS	NS	<0.002
1,3,5-Trimethylbenzene	108-67-8	mg/kg	27	NS	NS	NS	NS	NS	<0.002
Semi-VOCs									
1-Methylnaphthalene	90-12-0	mg/kg	18	NS	NS	NS	NS	NS	<0.00109
2-Methylnaphthalene	91-57-6	mg/kg	24	NS	NS	NS	NS	NS	<0.00194
Acenaphthene	83-32-9	mg/kg	360	NS	NS	NS	NS	NS	<0.000304
Anthracene	120-12-7	mg/kg	1,800	NS	NS	NS	NS	NS	<0.000334
Benzo(A)Anthracene	56-55-3	mg/kg	1.1	NS	NS	NS	NS	NS	<0.000493
Benzo(A)Pyrene	50-32-8	mg/kg	0.11	NS	NS	NS	NS	NS	<0.000468
Benzo(B)Fluoranthene	205-99-2	mg/kg	1.1	NS	NS	NS	NS	NS	<0.000585
Benzo(K)Fluoranthene	207-08-9	mg/kg	11	NS	NS	NS	NS	NS	<0.000437
Chrysene	218-01-9	mg/kg	110	NS	NS	NS	NS	NS	<0.000624
Dibenz(A,H)Anthracene	53-70-3	mg/kg	0.11	NS	NS	NS	NS	NS	<0.000614
Fluoranthene	206-44-0	mg/kg	240	NS	NS	NS	NS	NS	<0.000394
Fluorene	86-73-7	mg/kg	240	NS	NS	NS	NS	NS	<0.000286
Indeno(1,2,3-Cd)Pyrene	193-39-5	mg/kg	1.1	NS	NS	NS	NS	NS	<0.000627

Station Name				**SB10**	**SB11**	**SB9**	**SW8**	**SW9**	**Backfill**
Sample Date	**CAS Number**	**Units**	**RSSL**[↑]	4/10/2025	4/10/2025	2/13/2026	2/13/2026	2/13/2026	11/10/2022
Sample Depth				7 - 7 ft	7 - 7 ft	7 - 7 ft	7.5 - 7.5 ft	6 - 6 ft	NA
Naphthalene	91-20-3	mg/kg	2	NS	NS	NS	NS	NS	<0.00145
Pyrene	129-00-0	mg/kg	180	NS	NS	NS	NS	NS	<0.000643
Total Petroleum Hydrocarbons (TPH)									
TPH (Low Fraction)	8006-61-9	mg/kg	500	NS	NS	NS	NS	NS	<0.2
C10-C28 Diesel Range	NA	mg/kg	500	NS	NS	NS	NS	NS	<25
C28-C40 Residual Range Organics	NA	mg/kg	500	NS	NS	NS	NS	NS	<100
Soil Suitability for Reclamation									
Boron	7440-42-8	mg/l	2	0.421	0.607	0.997	0.679	1.09	0.856
pH	NA	s.u.	6 - 8.3	8.1	8.0	7.9	8.3	8.1	8.2
Sodium Adsorption Ratio	NA	unitless	6	5.57	5.71	7.51	3.75	6.29	3.69
Specific Conductance	NA	mmhos/cm	4	1.98	2.94	5.39	0.79	2.22	1.23

Notes:
RSSL = Residential soil screening levels; NA = Not applicable; NS = Not sampled; '–' = No standard established; mg/kg = milligrams per kilogram; mg/l = milligrams per liter; s.u. = standard units; mmhos/cm = millimhos per centimeter.
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