

Montana Tech Library

Digital Commons @ Montana Tech

Silver Bow Creek/Butte Area Superfund Site

Montana Superfund

Summer 9-11-2023

Butte Priority Soils Operable Unit (BPSOU) Final Insufficiently Reclaimed (IR) Sites Field Sampling and Investigation Plan (FSP) Butte Remediation Evaluation System (BRES) No.174 – Buffalo Ditch

Mike McAnulty

Follow this and additional works at: https://digitalcommons.mtech.edu/superfund_silverbowbutte



Part of the [Environmental Health and Protection Commons](#), [Environmental Indicators and Impact Assessment Commons](#), and the [Environmental Monitoring Commons](#)

Atlantic Richfield Company

Mike Mc Anulty

Liability Manager

317 Anaconda Road

Butte MT 59701

Direct (406) 782-9964

Fax (406) 782-9980

September 11, 2023

Nikia Greene
Remedial Project Manager
US EPA – Montana Office
Baucus Federal Building
10 West 15th Street, Suite 3200
Helena, Montana 59626

Erin Agee
Senior Assistant Regional Counsel
US EPA Region 8 Office of Regional Counsel
CERCLA Enforcement Section
1595 Wynkoop Street
Denver, CO 80202
Mail Code: 8ORC-C

Daryl Reed
DEQ Project Officer
P.O. Box 200901
Helena, Montana 59620-0901

Jonathan Morgan, Esq.
DEQ, Legal Counsel
P.O. Box 200901
Helena, Montana 59620-0901

RE: Butte Priority Soils Operable Unit (BPSOU) Final Insufficiently Reclaimed (IR) Sites Field Sampling and Investigation Plan (FSP) Butte Remediation Evaluation System (BRES) No.174 – Buffalo Ditch

Agency Representatives:

I am writing to you on behalf of Atlantic Richfield Company to distribute the Butte Priority Soils Operable Unit (BPSOU) Final Insufficiently Reclaimed (IR) Sites – Field Sampling and Investigation Plan (FSP) Butte Remediation Evaluation System (BRES) No.174 – Buffalo Ditch.

Agency comments received August 10, 2023, are addressed below. Changes were incorporated into the FSP to address these comments as appropriate. Note, accessible hyperlinks to the Agency-approved Final 2023 QAPPs are included within the text of the FSP.

Agency Comment:

1. *Table 2: Previous sampling: Sample ID: LASH-SO1 – the Cadmium result in this sample is reported as 0 mg/kg on the Geocortex site. Please revise.*

Atlantic Richfield Response: The Cadmium result for LASH-SO1 has been revised to 0 mg/kg, as reported on the Geocortex site. Additionally, during revision, sample identification for this historical station was revised to “L-SO-1”.

Agency Comment:

2. *Figure 1: Please confirm that sample 038WA08-0 is included on the Figure 1.*

Mike Mc Anulty

Liability Manager

317 Anaconda Road

Butte MT 59701

Direct (406) 782-9964

Fax (406) 782-9980

Atlantic Richfield Response: Figure 1 has been updated to include the sample referenced. During revision, sample identification for this historical station was revised to "038-WA-08-01". Although review of available historical data includes samples collected on adjacent sites, for consistency historical sample data presented in this revised and final FSP includes only historical sample data points within the original sampling boundary or the proposed boundary adjustment.

Agency Comment:

3. *Please confirm the naming convention for samples collected under the Unreclaimed Sites QAPP as all proposed samples begin with a prefix "IR" including the samples being collected under the UR Sites QAPP. Please revise as appropriate.*

Atlantic Richfield Response: The sample naming convention provided in the FSP follows Section 3.2.2 Sample Identification in the Agency-approved BPSOU 2023 Final Insufficiently Reclaimed Areas Quality Assurance Project Plan (QAPP). As described in the FSP, sample stations located within the original site boundary will follow the Final IR QAPP. These stations are listed in the FSP as IR-174-SS01 through SS24 and will include two depth intervals. Sample stations located outside the original site boundary are listed in the FSP as IR-174-SS25 through SS27 and will include three depth intervals following the Final Unreclaimed Sites (UR) QAPP.

Figure 1 and Figure 2 illustrate the site sampling boundary and sample stations. Sample stations are color coded and the appropriate QAPP referenced in the figure legend to provide field personnel with a discernable visual reference.

If you have any questions or comments, please call me at (907) 355-3914.

Sincerely,



Mike Mc Anulty

Liability Manager

Remediation Management Services Company

An affiliate of **Atlantic Richfield Company**

Atlantic Richfield Company

Mike Mc Anulty

Liability Manager

317 Anaconda Road

Butte MT 59701

Direct (406) 782-9964

Fax (406) 782-9980

Cc: Chris Greco / Atlantic Richfield – email
Josh Bryson / Atlantic Richfield – email
Loren Burmeister / Atlantic Richfield – email
Dave Griffis / Atlantic Richfield – email
Jean Martin / Atlantic Richfield – email
Irene Montero / Atlantic Richfield – email
David A. Gratson / Environmental Standards – email
Mave Gasaway / DGS – email
Adam Cohen / DGS – email
Brianne McClafferty / Holland & Hart – email
David Shanight / CDM – email
Curt Coover / CDM – email
James Freeman / DOJ – email
Amy Steinmetz / DEQ – email
Dave Bowers / DEQ – email
Carolina Balliew / DEQ – email
Katie Garcin-Forba / DEQ – email
Jim Ford / NRDP – email
Pat Cunneen / NRDP – email
Katherine Hausrath / NRDP – email
Ted Duaime / MBMG – email
Gary Icopini / MBMG – email
Becky Summerville / MR – email
John DeJong / UP – email
Robert Bylsma / UP – email
John Gilmour / Kelley Drye – email
Leo Berry / BNSF – email
Robert Lowry / BNSF – email
Brooke Kuhl / BNSF – email
Lauren Knickrehm / BNSF – email
Doug Brannan / Kennedy Jenks – email
Matthew Mavrinac / RARUS – email
Harrison Roughton / RARUS – email
Brad Gordon / RARUS – email
Mark Neary / BSB – email
Eric Hassler / BSB – email
Julia Crain / BSB – email
Brandon Warner / BSB – email
Abigail Peltomaa / BSB – email
Eileen Joyce / BSB – email
Sean Peterson/BSB – email
Josh Vincent / WET – email



A bp affiliated company

Atlantic Richfield Company

Mike Mc Anulty

Liability Manager

317 Anaconda Road

Butte MT 59701

Direct (406) 782-9964

Fax (406) 782-9980

Scott Bradshaw / W&C – email

Emily Stoick / W&C – email

Pat Sampson / Pioneer – email

Andy Dare / Pioneer – email

Karen Helfrich / Pioneer – email

Randa Colling / Pioneer – email

Ian Magruder/ CTEC – email

CTEC of Butte – email

Scott Juskiewicz / Montana Tech – email

File: MiningSharePoint@bp.com – email

BPSOU SharePoint – upload



**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 8, MONTANA OFFICE**

FEDERAL BUILDING, 10 West 15TH Street, Suite 3200
Helena, MT 59626-0096
Phone 866-457-2690
www.epa.gov/region8

Ref: 8MO

August 10, 2023

Mr. Mike McAnulty
Liability Manager
Atlantic Richfield Company
317 Anaconda Road
Butte, Montana 59701

**Re: Approval letter for the Butte Priority Soils Operable Unit (BPSOU) Draft Final
Insufficiently Reclaimed Sites – Field Sampling Plan (FSP) BRES No. 174 – Buffalo
Ditch (dated July 25, 2023)**

Dear Mike:

The U. S. Environmental Protection Agency (EPA), in consultation with the Montana Department of Environmental Quality (DEQ), is approving the *Draft Final Insufficiently Reclaimed Sites – Field Sampling Plan (FSP) BRES No. 174 – Buffalo Ditch (dated July 25, 2023)* with the following comments. It is EPA's expectation that the following comments will be addressed prior to final distribution of this FSP. Please attach the Insufficiently Reclaimed Sites quality assurance project plan (QAPP) and the Unreclaimed Sites QAPP to this FSP and distribute once the comments have been addressed.

Comments

1. Table 2: Previous sampling: Sample ID: LASH-SO1 – the Cadmium result in this sample is reported as 0 mg/kg on the Geocortex site. Please revise.
2. Figure 1: Please confirm that sample 038WA08-0 is included on the Figure 1.
3. Please confirm the naming convention for samples collected under the Unreclaimed Sites QAPP as all proposed samples begin with a prefix "IR" including the samples being collected under the UR Sites QAPP. Please revise as appropriate.

If you have any questions or concerns, please call me at (406) 457-5019.

Sincerely,

**NIKIA
GREENE**

Digitally signed by
NIKIA GREENE

Date: 2023.08.10
11:34:58 -06'00'

Nikia Greene
Remedial Project Manager

Butte File

Chris Greco / Atlantic Richfield

Josh Bryson / Atlantic Richfield

Mike Mc Anulty / Atlantic Richfield

Loren Burmeister / Atlantic Richfield

Dave Griffis / Atlantic Richfield

Jean Martin / Atlantic Richfield

Irene Montero / Atlantic Richfield

David A. Gratson / Environmental Standards

Mave Gasaway / DGS

Adam Cohen / DGS

Brianne McClafferty / Holland & Hart

Daryl Reed / DEQ

Amy Steinmetz / DEQ

Dave Bowers / DEQ

Katie Garcin-Forba / DEQ

Carolina Balliew / DEQ

Jim Ford / NRDP

Pat Cunneen / NRDP

Katherine Hausrath / NRDP

Ted Duaime / MBMG

Gary Icopini / MBMG

Becky Summerville / MR

John DeJong / UP

Robert Bylsma / UP

John Gilmour / Kelley Drye

Leo Berry / BNSF

Robert Lowry / BNSF

Brooke Kuhl / BNSF

Lauren Knickrehm / BNSF

Doug Brannan / Kennedy Jenks

Matthew Mavrinac / RARUS

Harrison Roughton / RARUS
Brad Gordon / RARUS
Mark Neary / BSB
Eric Hassler / BSB
Julia Crain / BSB
Brandon Warner / BSB
Abigail Peltomaa / BSB
Eileen Joyce / BSB
Sean Peterson/BSB
Josh Vincent / WET
Scott Bradshaw / W&C
Emily Stoick / W&C
Pat Sampson / Pioneer
Andy Dare / Pioneer
Karen Helfrich / Pioneer
Randa Colling / Pioneer
Scott Sampson / Pioneer
Ian Magruder/ CTEC
CTEC of Butte
Scott Juskiewicz / Montana Tech
David Shanight / CDM Smith
Curt Coover / CDM Smith
Chapin Storrar / CDM Smith
Erin Agee / EPA
Will Lindsey / EPA
Aaron Urdiales / EPA
Christina Progeess / EPA
Jamie Miller / EPA
Chris Wardell / EPA
Dana Barnicoat / EPA
Charlie Partridge / EPA
Kristi Carroll / Montana Tech Library

September 11, 2023

Nikia Greene
Remedial Project Manager
US EPA – Montana Office
Baucus Federal Building
10 West 15th Street, Suite 3200
Helena, Montana 59626

Erin Agee
Senior Assistant Regional Counsel
US EPA Region 8 Office of Regional Counsel
CERCLA Enforcement Section
1595 Wynkoop Street
Denver, CO 80202
Mail Code: 8ORC-C

Daryl Reed
DEQ Project Officer
P.O. Box 200901
Helena, Montana 59620-0901

Jonathan Morgan, Esq.
DEQ, Legal Counsel
P.O. Box 200901
Helena, Montana 59620-0901

Re: Butte Priority Soils Operable Unit (BPSOU) Final Insufficiently Reclaimed Sites – Field Sampling Plan (FSP) BRES No. 174 – Buffalo South and BRES No 174 – Buffalo Ditch.

Dear Agency Representatives:

I am writing to you on behalf of Atlantic Richfield Company (Atlantic Richfield) to submit the Butte Priority Soils Operable Unit (BPSOU) Final Insufficiently Reclaimed (IR) Sites - Field Sampling and Investigation Plan (FSP) Butte Remediation Evaluation System (BRES) No. 174 – Buffalo South and BRES No. 174 – Buffalo Ditch.

As described in Appendix D, Attachment C, Section 7.0 of the 2020 BPSOU Consent Decree (CD) (available at <https://www.co.silverbow.mt.us/2161/ButtePriority-Soils-Operable-Unit-Consent-Decree>), sites listed as IR Solid Media Sites within the BPSOU were reclaimed prior to the establishment of the Butte Hill Revegetation Specifications (BHRS), Appendix A to the CD. Since additional reclamation work may be required to bring the sites into compliance with the BHRS, the sites will be evaluated to assess past actions and to identify any site-specific conditions that fail to meet the BHRS.

The site evaluation will include a review of available BRES field evaluations and site construction completion reports and on-site evaluation and sampling. The site evaluation will include sampling within the existing site boundary performed according to the Atlantic Richfield *2023 Final Insufficiently Reclaimed Sites Quality Assurance Project Plan (QAPP)* (referred to herein as IR Sites QAPP). A link to the IR Sites QAPP is provided in Attachment 1.

This FSP describes field evaluation of the IR Site BRES No. 174 – Buffalo South and BRES No. 174 – Buffalo Ditch. The sampling boundary and proposed soil sampling stations and deficiencies identified during previous BRES evaluations are shown on Figure 1 and Figure 2.

Field sampling within the existing boundary will be performed to determine whether contaminants are present, whether the existing cap and supported growth media are sufficiently protective of human health and the environment, how observed site conditions compare to the BHRS, and whether there are previously unidentified conditions contributing to site deficiencies.

The site evaluation is anticipated to be completed in 2023. A site summary and declaration will be prepared to present all available site data and describe which, if any, BHRS criteria are not met. The site will be evaluated following the Recreational Land Use Soil Action Levels for Human Health, Soil Screening Criteria, and cover soil Chemical Suitability Criteria provided in the IR Sites QAPP. Samples obtained outside of the existing reclaimed area will be evaluated following the Soil Action Levels for Human Health and Soil Screening Criteria for Waste Identification in the Atlantic Richfield 2023 *Unreclaimed (UR) Sites QAPP* (referred to herein as UR Sites QAPP). A link to the UR Sites QAPP is provided in Attachment 1.

If further remediation is recommended after the evaluation and sampling is complete, a remedial action work plan (RAWP) describing actions that will be implemented at the site will be provided for Agency review and approval.

The crosswalk list provided below references where pertinent field sample collection and documentation elements are discussed.

| Element | Reference Location | | |
|---|--------------------|------------------------|------------------------|
| | FSP | IR Sites QAPP | UR Sites QAPP |
| Title Page and Approval Authority | Approval Letter | Page i | Page i |
| Site Introduction and Appropriate Agency-Approved QAPP* Reference | Page 1, Page 2 | | |
| Data Quality Objectives | | Section 2.5 | Section 2.5 |
| Site and Sampling Objectives | Figure 1, Figure 2 | Section 3.0 | Section 3.0 |
| Proposed Schedule for Site Field Work | Page 2 | | |
| Site Figure | Figure 1, Figure 2 | | |
| Sampling Procedures and Standard Operating Procedures (SOPs) | | Section 3.2 Appendix B | Section 3.2 Appendix B |
| Sample Analysis Methods | | Section 3.3 | Section 3.3 |

Background

The Buffalo South (BRES No. 174) is 7.29 acres and combines Buffalo South (BRES No. 174), Buffalo Ditch (BRES No. 174), Silver Hill Dump (BRES No. 67), and the southwest corner of North Main

Street and Buffalo Street. As described in the BPSOU *Source Areas and Reclaimed Boundary Adjustments*¹, reclamation to BRES No. 174 Buffalo South and BRES No. 67 Silver Hill Dump was completed in 1993 and 1998, respectively. As described in the Final *Third Cycle Best Management Practices (BMPs) Storm Water Control Sites Work Plan, Revision 2*², reclamation was completed on the northeast corner of the Buffalo and Main reclamation site.

ARCO completed the Buffalo South (BRES No. 174) reclamation, which consisted of excavating waste rock at the Silver Hill Dump to the natural soil surface, in 1993. The surface was graded to a slope less than a 4 Horizontal (H):1 Vertical (V), and 350 tons per acre of lime rock were applied. Cover material from the Lewis Claim borrow site was then placed over the site to a depth of 18 inches. An 11-52-0 fertilizer mix was broadcast at a rate of 300 pounds per acre, and a double disc drill seeder was used to plant the EPA92 seed mixture at a rate of 20.5 pounds per acre. Straw was spread and crimped at a rate of 2 tons per acre.

Silver Hill Dump (BRES No. 67) construction activities occurred on October 5, 1998, and included covering the site with 12 inches of landfill soil mixed with Dillon manure in a 6:1 ratio. Two berms, one on the eastern and one on the southern boundary, were constructed and covered with Curlex erosion control fabric to minimize storm water run-on. The south berm is approximately 75 feet long, and the east berm is approximately 105 feet long. Straw mulch was spread by hand and crimped into the cover soil on August 7, 1998. The site was drill seeded and hand seeded on October 23, 1999, with 19 pounds per acre of the Primary Seed Mixture; the site was hand fertilized on October 28, 1998.

The southwest corner of Buffalo and Main streets reclamation area is located to the southwest of the Buffalo Street and Main Street intersection. ARCO completed work in this area in 2013 following the *Third Cycle Best Management Practices (BMPs) Storm Water Control Sites Work Plan*². The existing slope was steep with limited vegetation; however, no erosion issues were noted. The work included resloping the steep area to a 3H:1V slope with structural fill and 18 inches of cover soil. Resloping this area widened Buffalo Street by 8 feet, and this area was reclaimed per BRES specifications. The existing 30-inch high-density polyethylene (HDPE) outlet that discharges into the Buffalo Gulch channel was extended 15 feet, and a rock outfall was installed from the outlet to the grouted section of the channel. A reinforced, grass-lined channel was constructed down the northwestern corner of the resloped area to prevent water erosion from accruing.

Buffalo Gulch channel (BG-D-S0001) and Buffalo Gulch detention pond (BG-PND-S0001) are storm water features that were constructed on the BRES No. 174 site. The channel runs to the south from the northeast corner of the site and onto the proposed Buffalo Ditch site. No samples will be collected from the channel or detention pond since they are monitored and maintained by Butte-

¹ Atlantic Richfield Company and Butte-Silver Bow, 2022. Draft Final Source Areas and Reclaimed Boundary Adjustments. Prepared by Pioneer Technical Services, Inc. April 4, 2022.

² Atlantic Richfield Company, 2013. Final Third Cycle Best Management Practices (BMPs) Storm Water Control Sites Work Plan. Prepared by Pioneer Technical Services, Inc. April 4, 2013.

Silver Bow (BSB) under the *Operation and Maintenance Plan for the Butte-Silver Bow Superfund Storm Water System*³. A capped shaft is also located on site.

An adjusted boundary is proposed for BRES No. 174 – Buffalo South, as shown on Figure 1 and Figure 2, to accurately represent the reclaimed area and align site boundaries with completed site remediation efforts. Note that the proposed adjusted boundary has not been approved by the Agencies. As described in the BPSOU *Source Areas and Reclaimed Boundary Adjustments*¹, this was completed by using a high-resolution aerial image and visual comparisons to identify the areas of apparent remediation. To verify the proposed adjusted boundary, samples will be collected in areas that are included in the proposed boundary area, but just outside of the original boundary. The proposed site boundary for this area consolidates Buffalo South and Silver Hill Dump and was verified to include the previously reclaimed portion in the northeast corner of the site, just southwest of the intersection of Buffalo Street and North Main Street. The proposed boundary excludes a residential property from BRES No. 67 Silver Hill Dump. As shown on Figure 1 and Figure 2, the proposed boundary separates the portion south of the walking trail into a new BRES site, Buffalo Ditch; however, both sites were labeled as BRES No. 174. To eliminate confusion during the evaluation of the sites, Buffalo Ditch will be identified as BRES No. 174D. BRES No. 174, Buffalo South, will remain the same. This modification is proposed for sampling purposes only and will not change the identification of the site. No samples will be collected on BRES No. 67 Silver Hill Dump and the corner of Main Street and Buffalo Street sites during this evaluation since this area was reclaimed after 1997.

Previous Evaluation Findings

As specified in the CD, information collected during previous site investigations has been reviewed and incorporated into the proposed sampling design. Field verification was completed by Atlantic Richfield and BSB on August 4, 2017.

The Buffalo South site was evaluated in 2017 and in 2021 during the recurring 4-year cycle of field evaluations of previously reclaimed sites within the BPSOU. The results of both evaluations indicate several of the same issues throughout the site; however, the 2021 evaluation suggests the conditions are deteriorating. Undesirable species and noxious weeds make up most of the cover on the site. Spotted knapweed is dominant on the site, while cheatgrass and salsify occur frequently and leafy spurge, thistle, baby's breath, dalmatian toadflax, dandelion, and mustard occur infrequently. The central portion of site is low in vegetation and native grasses and contains many barren areas. Erosion on the site edges is contributing to sediment collection throughout the site and within the Buffalo Gulch channel. The 2017 evaluation stated a maintenance road was constructed for access to maintain the Buffalo Gulch channel.

³ Butte-Silver Bow, 2018. Interim Operation and Maintenance Plan for the Butte-Silver Bow Superfund Storm Water System within the Butte Priority Soils Operable Unit. Prepared for U.S. Environmental Protection Agency. June 11, 2018.

Previous Sampling Efforts

The Geocortex web-based database at <https://eis2.woodardcurran.com/Html5Viewer/index.html?viewer=BPButte.BPSOU> contains the records for previous soil samples collected within the BPSOU. The approximate sample stations located on BRES No. 174 – Buffalo South and BRES No 174 – Buffalo Ditch are included on Figure 1 and Figure 2, with results provided in Table 1 and Table 2 below. Sample results highlighted below exceed CD Solid Media soil screening criteria. The BPSOU soil action levels and screening criteria are listed in Table 1 and Table 2, respectively, in Section 2.5 of the IR Sites QAPP.

Table 1: Previous Sampling
Results from BPSOU Soil Sampling Located on Buffalo South

| Contaminant of Concern | Sample ID: 038-WA-08-01 | Sample ID: RVM-128 | Sample ID: RVM-129 | Sample ID: RVM-130 (89S-033) | Sample ID: RVM-130 (90S-130) |
|------------------------|-------------------------|--------------------|--------------------|------------------------------|------------------------------|
| Arsenic | 127 mg/kg | 1 mg/kg | 1 mg/kg | 46 mg/kg | 0 mg/kg |
| Cadmium | 3 mg/kg | 0 mg/kg | 0 mg/kg | 1 mg/kg | 0 mg/kg |
| Copper | 1,350 mg/kg | 22 mg/kg | 11 mg/kg | 25 mg/kg | 10 mg/kg |
| Lead | 643 mg/kg | 7 mg/kg | 2 mg/kg | 52 mg/kg | 3 mg/kg |
| Zinc | 1,420 mg/kg | 41 mg/kg | 3 mg/kg | 82 mg/kg | 3 mg/kg |
| pH | 3.9 S.U. | 7.3 S.U. | 7.4 S.U. | 7.5 S.U. | 7.8 S.U. |

mg/kg: milligrams per kilogram. S.U.: standard unit.

Table 2: Previous Sampling
Results from BPSOU Soil Sampling Located on Buffalo Ditch

| Contaminant of Concern | Sample ID: MHJ 937 | Sample ID: L-SO-1 | Sample ID: L-SO-2 |
|------------------------|--------------------|-------------------|-------------------|
| Arsenic | 106 mg/kg | 206 mg/kg | 89 mg/kg |
| Cadmium | 12 mg/kg | 0 mg/kg | 0 mg/kg |
| Copper | 533 mg/kg | 0 mg/kg | 0 mg/kg |
| Lead | 2,100 mg/kg | 2,640 mg/kg | 4,200 mg/kg |
| Zinc | 4,650 mg/kg | 0 mg/kg | 0 mg/kg |
| pH | 6.02 S.U. | - S.U. | - S.U. |

mg/kg: milligrams per kilogram. S.U.: standard unit.

Preliminary Site Evaluation

Evaluation findings for both sites can be found in the sections below.

Buffalo South

A preliminary site evaluation was conducted during development of this sampling plan to inspect current site conditions and identify focus areas for further investigation which included site photographs. Photograph 1 through Photograph 6 show current site conditions. The investigation found the site to have moderate vegetation establishment with a large area of low vegetation and barren areas. Undesirable vegetation and weeds are present throughout the whole site.



Photograph 1: Site overview facing southwest.



Photograph 2: Site overview facing east.

Sediment from Buffalo Street is migrating onto the site and is causing rills to form along the site edges. A few barren areas were also discovered. A culvert is located on the northeast portion of the

site. This culvert diverts water from BRES No. 53 and 54, north of BRES No. 174, under Buffalo Street and onto BRES No. 174 Buffalo South site.



Photograph 3: Barren area on the south side of site.



Photograph 4: East vehicle pullout area on Buffalo Street.



Photograph 5: West vehicle pullout area on Buffalo Street.

Sediment from a barren area on the south portion of the site is depositing into the paved channel that runs along the south border of the site.



Photograph 6: East side of site along North Montana Street

Two areas along Buffalo Street are used as vehicle pull outs. These two locations are not barren areas, but rather, an engineered cap with asphalt millings and appear to be in good condition. No samples will be collected here since it is capped and not included in the boundary.

The corner of Buffalo Street and North Montana Street shows heavy storm water and sediment collection and migration. Undercutting of this intersection was observed. Sediment and storm water run along the site, down North Montana Street, and into a storm water inlet north of the private property shown on Photograph 6.

Buffalo Ditch

A preliminary site evaluation was conducted during development of this sampling plan to inspect current site conditions and identify focus areas for further investigation. Photograph 7 through Photograph 9 show current site conditions. The investigation found the site to have good vegetation establishment with undesirable vegetation and weeds throughout the whole site. Buffalo Gulch channel is located on the east side of the site. No samples will be collected from the channel.



Photograph 7: Overview of Buffalo Ditch looking north.



Photograph 8: Overview of Buffalo Ditch looking southwest.

A gravel and cement-lined channel (Buffalo Gulch channel) runs along the southwest and south borders of the site. A storm water inlet is located in the cemented line portion of the channel. BSB maintenance crews completed seeding along the north portion of the site, and vegetation is well established.



Photograph 9. Dirt pile on the northwest of site.

An unknown barren dirt pile was observed during the evaluation. A sample location has been proposed for this area.

Figure 1 and Figure 2 illustrate the proposed sample stations as sited during the preliminary site evaluation. Adjusted boundary lines, previous sample locations, and other previous findings are included on Figure 1 and Figure 2.

Site Characterization Plan

Per the IR Sites QAPP, the site will be sampled at two depth intervals [(1) 0 to 6 inches and (2) 6 to 18 inches] to determine whether waste is present and/or confirm the depth of previous reclamation efforts. Opportunistic samples may be obtained in the field at the discretion of field sampling personnel or Agency oversight representative(s). The field team leader will be responsible for determining the appropriate number and depth of samples as dictated by field conditions.

Samples collected within the approved BRES boundary will be sampled following procedures in the IR Sites QAPP using a systematic procedure to determine the extent of waste present, previous reclamation, and transient material. Samples collected outside of the original BRES boundary will be collected following the protocol described in the 2023 UR Sites QAPP. Samples obtained outside of the original boundary will be obtained from three depth intervals [(3) 0 to 2 inches, (4) 2 to 6 inches, and (5) 6 to 12 inches] per the UR Sites QAPP sampling protocol.

Field and laboratory analytical results will be used to prepare the site declaration and prescribe site remedial improvements.

Existing site grading and drainages will be evaluated to determine storm water flow patterns and identify if additional storm water controls will help prevent sediment migration. Contributing sources of storm water upgradient and adjacent to the site will also be investigated.

At minimum, items identified below, but not specifically detailed in the QAPP, may be evaluated to determine adequacy and to identify if additional remedial measures are necessary. Additional items also may be identified during the remedial design process.

- Evaluate relative percent vegetative cover (as needed).
 - Coordinate and confirm plant species with biology/plant ecologist or related subject matter expert (as needed).
- Evaluate the performance of existing storm water controls to mitigate run-on/runoff.
- Evaluate location and condition of existing storm water controls.
- Identify potential remedial improvements to mitigate site erosion and vegetative areas to meet the BHRS.
- Identify necessary maintenance for successful long-term operation.
- Evaluate steep slopes for erosion of possible mining waste and potential for regrading.

The final remedial cap configuration (i.e., vegetative or engineered) will be coordinated with the landowner's end usage. A final RAWP will be provided for Agency review and approval prior to implementation.

Sampling Procedure

Sampling Procedures for BRES 174 – Buffalo South (Figure 1) and BRES 174D – Buffalo Ditch (Figure 2) are discussed in the sections below.

BRES 174 – Buffalo South

All soil sampling and characterization activities and procedures within the existing site boundary will follow the IR Sites QAPP. Samples will be obtained from the sample stations listed below. The IR Sites QAPP describes the quality assurance/quality control policies and procedures that will be used during sample collection and analyses.

| Sample Station | Two Depth Intervals (inches) |
|-----------------------|---|
| IR-174-SS01 | (1) 0-6, (2) 6-18 |
| IR-174-SS02 | (1) 0-6, (2) 6-18 |
| IR-174-SS03 | (1) 0-6, (2) 6-18 |
| IR-174-SS04 | (1) 0-6, (2) 6-18 |
| IR-174-SS05 | (1) 0-6, (2) 6-18 |
| IR-174-SS06 | (1) 0-6, (2) 6-18 |
| IR-174-SS07 | (1) 0-6, (2) 6-18 |
| IR-174-SS08 | (1) 0-6, (2) 6-18 |
| IR-174-SS09 | (1) 0-6, (2) 6-18 |
| IR-174-SS10 | (1) 0-6, (2) 6-18 |
| IR-174-SS11 | (1) 0-6, (2) 6-18 |
| IR-174-SS12 | (1) 0-6, (2) 6-18 |
| IR-174-SS13 | (1) 0-6, (2) 6-18 |
| IR-174-SS14 | (1) 0-6, (2) 6-18 |
| IR-174-SS15 | (1) 0-6, (2) 6-18 |
| IR-174-SS16 | (1) 0-6, (2) 6-18 |
| IR-174-SS17 | (1) 0-6, (2) 6-18 |
| IR-174-SS18 | (1) 0-6, (2) 6-18 |
| IR-174-SS19 | (1) 0-6, (2) 6-18 |
| IR-174-SS20 | (1) 0-6, (2) 6-18 |
| IR-174-SS21 | (1) 0-6, (2) 6-18 |
| IR-174-SS22 | (1) 0-6, (2) 6-18 |
| IR-174-SS23 | (1) 0-6, (2) 6-18 |
| IR-174-SS24 | (1) 0-6, (2) 6-18 |

All soil sampling and characterization activities and procedures outside of the existing site boundary will follow the UR Sites QAPP. Samples will be obtained from the sample stations listed below.

| Sample Station | Three Depth Intervals (inches) |
|-----------------------|---|
| IR-174-SS25 | (3) 0-2, (4) 2-6, and (5) 6-12 |
| IR-174-SS26 | (3) 0-2, (4) 2-6, and (5) 6-12 |
| IR-174-SS27 | (3) 0-2, (4) 2-6, and (5) 6-12 |

BRES 174D– Buffalo Ditch

All soil sampling and characterization activities and procedures within the existing site boundary will follow the IR Sites QAPP. Samples will be obtained from the sample stations listed below. The IR Sites QAPP describes the quality assurance/quality control policies and procedures that will be used during sample collection and analyses.

| Sample Station | Two Depth Intervals (inches) |
|----------------|---------------------------------|
| IR-174D-SS01 | (1) 0-6, (2) 6-18 |
| IR-174D-SS02 | (1) 0-6, (2) 6-18 |
| IR-174D-SS03 | (1) 0-6, (2) 6-18 |
| IR-174D-SS04 | (1) 0-6, (2) 6-18 |
| IR-174D-SS05 | (1) 0-6, (2) 6-18 |
| IR-174D-SS06 | (1) 0-6, (2) 6-18 |
| IR-174D-SS07 | (1) 0-6, (2) 6-18 |
| IR-174D-SS08 | (1) 0-6, (2) 6-18 |

No soil sampling activities are proposed outside of the existing site boundary for Buffalo Ditch.

This field work is anticipated to be completed in 2023, depending on site conditions.

Site Summary Report and Declaration

After the site evaluation and data collection activities are complete, a site evaluation summary report will be prepared and submitted to Agencies for review and approval. The report will include a summary of all available site sampling data and a site declaration specifying any deficient criteria as specified in the CD.

If you have questions or comments, please do not hesitate to call me at (907) 355-3914.

Sincerely,

Mike McNulty

Mike Mc Anulty
Liability Manager
Remediation Management Services Company
An affiliate of **Atlantic Richfield Company**

Attachments:

Figure 1 – Insufficiently Reclaimed Sites BRES No. 174 – Buffalo South Proposed Sample Stations

Figure 2 – Insufficiently Reclaimed Sites BRES No. 174 – Buffalo Ditch Proposed Sample Stations

Attachment 1 – Document Links

Attachment 2 – FSP Submittal List

Cc: Chris Greco / Atlantic Richfield – email
Josh Bryson / Atlantic Richfield – email
Mike Mc Anulty / Atlantic Richfield – email
Loren Burmeister / Atlantic Richfield – email
Dave Griffis / Atlantic Richfield – email
Jean Martin / Atlantic Richfield – email
Irene Montero / Atlantic Richfield – email
David A. Gratson / Environmental Standards – email
Mave Gasaway / DGS – email
Adam Cohen / DGS – email
Brianne McClafferty / Holland & Hart – email
David Shanight / CDM - email
Curt Coover / CDM - email
James Freeman / DOJ - email
Amy Steinmetz / DEQ - email
Dave Bowers / DEQ – email
Katie Garcin-Forba / DEQ – email
Carolina Balliew / DEQ - email
Jim Ford / NRDP - email
Pat Cunneen / NRDP - email
Katherine Hausrath / NRDP - email
Ted Duaine / MBMG - email
Gary Icopini / MBMG - email
Becky Summerville / MR - email
John DeJong / UP - email
Robert Bylsma / UP - email
John Gilmour / Kelley Drye - email
Leo Berry / BNSF - email
Robert Lowry / BNSF - email
Brooke Kuhl / BNSF – email
Lauren Knickrehm / BNSF - email
Doug Brannan / Kennedy Jenks - email
Matthew Mavrinac / RARUS - email
Harrison Roughton / RARUS - email
Brad Gordon / RARUS - email
Mark Neary / BSB - email
Eric Hassler / BSB - email
Julia Crain / BSB - email
Brandon Warner / BSB – email
Abigail Peltomaa / BSB - email
Eileen Joyce / BSB – email
Sean Peterson/BSB – email
Josh Vincent / WET - email
Scott Bradshaw / W&C – email
Emily Stoick / W&C – email
Pat Sampson / Pioneer – email

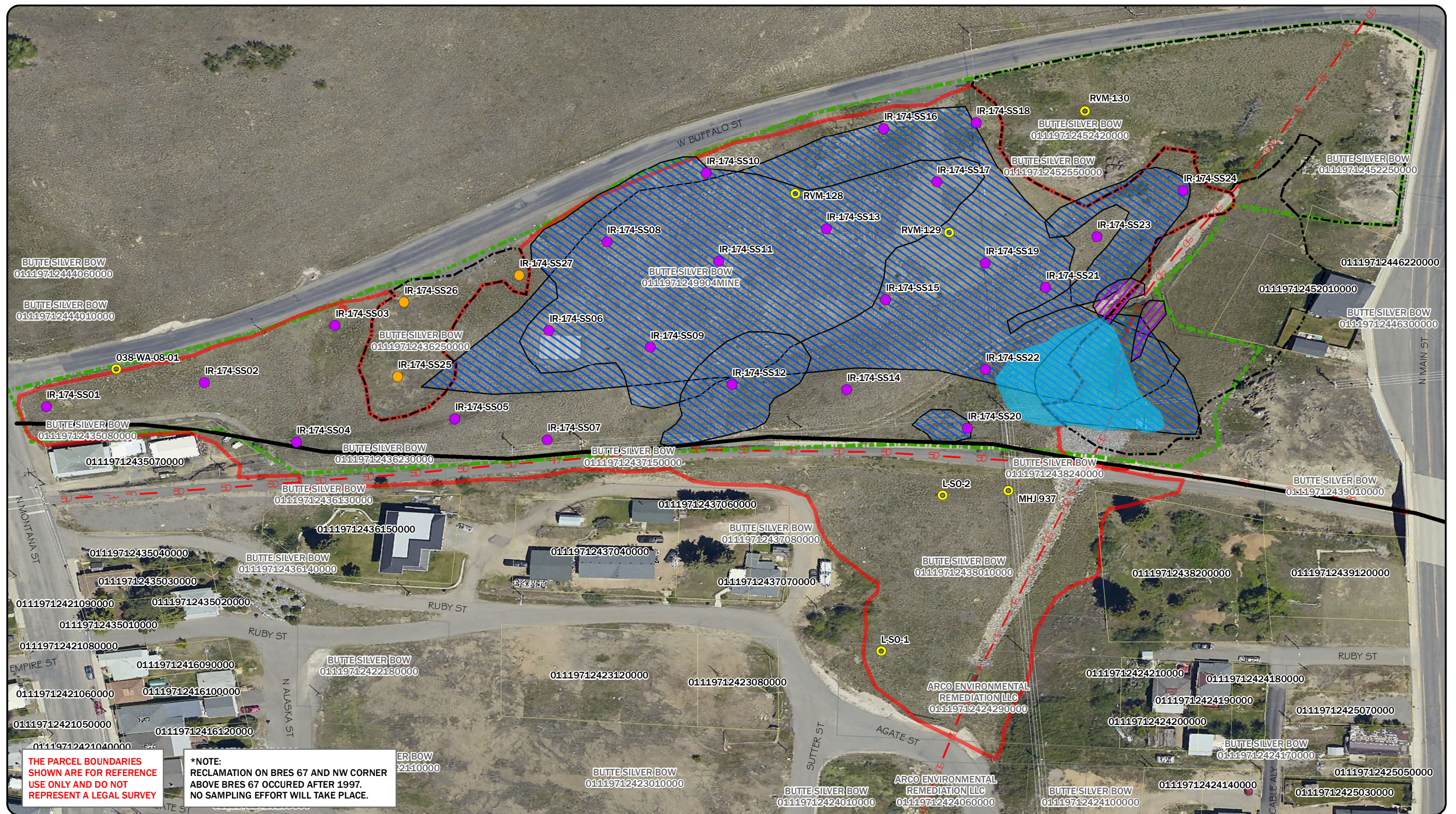
Andy Dare / Pioneer – email
Karen Helfrich / Pioneer – email
Randa Colling / Pioneer – email
Ian Magruder/ CTEC – email
CTEC of Butte – email
Scott Juskiewicz / Montana Tech – email

File: MiningSharePoint@bp.com - email
BPSOU SharePoint – upload

Figures

Figure 1 – Insufficiently Reclaimed Sites BRES No. 174 – Buffalo South Proposed Sample Stations

Figure 2 – Insufficiently Reclaimed Sites BRES No. 174 – Buffalo Ditch Proposed Sample Stations



- | | | |
|----------------------------|-------------------------------|--|
| ● HISTORIC SAMPLE STATIONS | NO SAMPLING WILL OCCUR * | ▨ BRES EVALUATION VEGETATIVE IMPROVEMENT |
| ● SAMPLE UNDER IR QAPP | PROPERTY OWNERSHIP | — STORM WATER LINE |
| ● SAMPLE UNDER UR QAPP | ACCESS PROPERTY OWNERSHIP | ▭ BRES BOUNDARY (ORIGINAL) |
| ▭ BUFFALO DETENTION BASIN | ▨ BRES EVALUATION BARREN AREA | ▭ BRES BOUNDARY (PROPOSED ADJUSTMENT) |
| — BUFFALO GULCH CHANNEL | | |

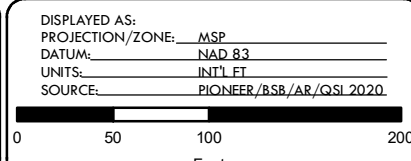
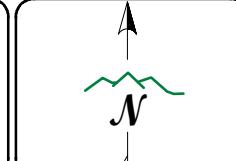
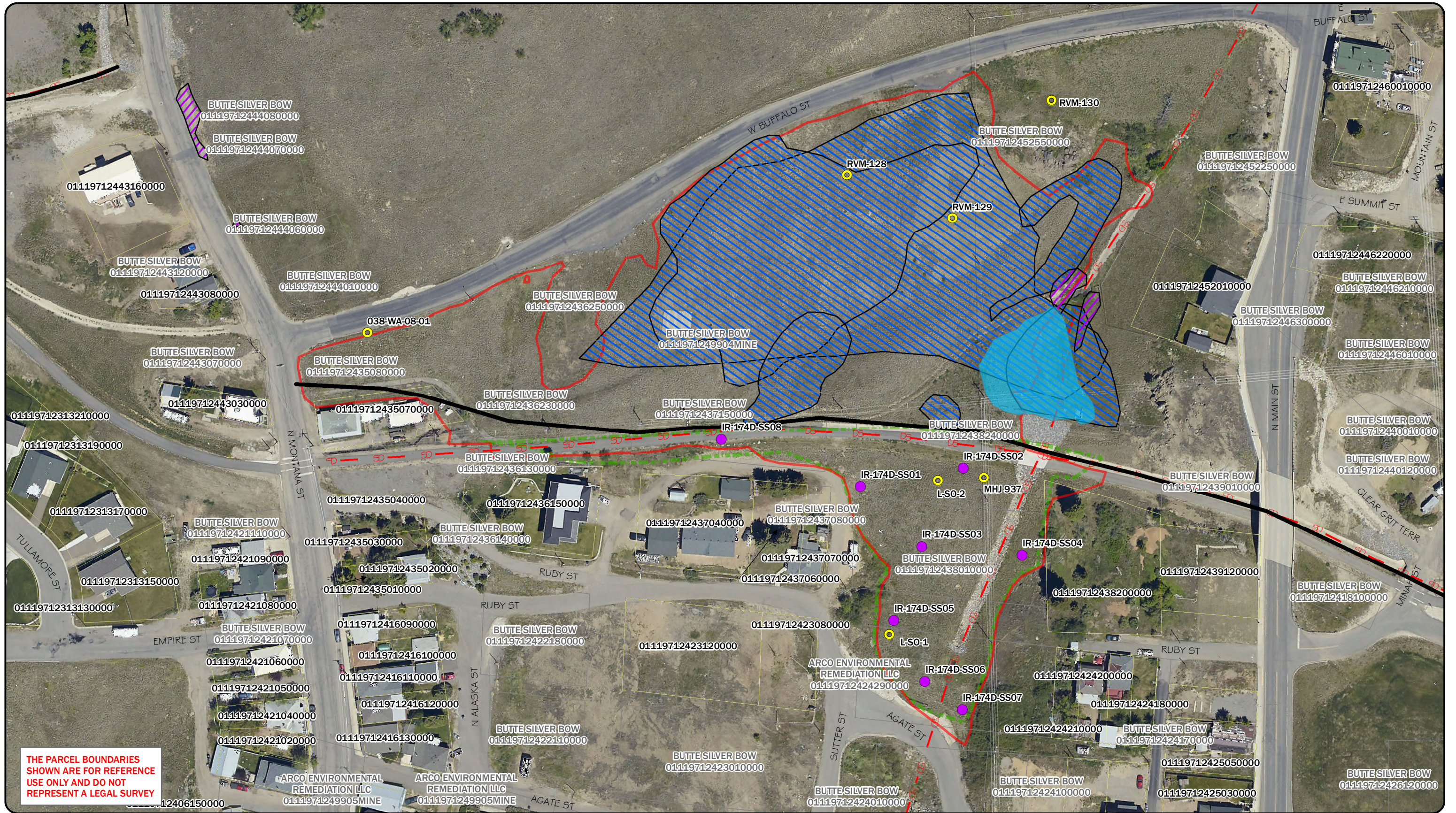


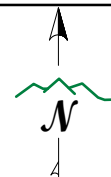
FIGURE 1

DATE: 8/16/2023

**INSUFFICIENTLY RECLAIMED
 SITE BRES No.174 BUFFALO SOUTH**



- | | | |
|----------------------------|--|---------------------------------------|
| ● HISTORIC SAMPLE STATIONS | PROPERTY OWNERSHIP | ■ BRES BOUNDARY (ORIGINAL) |
| ● SAMPLE UNDER IR QAPP | ACCESS PROPERTY OWNERSHIP | ■ BRES BOUNDARY (PROPOSED ADJUSTMENT) |
| ■ BUFFALO DETENTION BASIN | ■ BRES EVALUATION BARREN AREA | — STORM WATER LINE |
| — BUFFALO GULCH CHANNEL | ■ BRES EVALUATION VEGETATIVE IMPROVEMENT | |



DISPLAYED AS: _____
 PROJECTION/ZONE: MSP
 DATUM: NAD 83
 UNITS: INT'L FT
 SOURCE: PIONEER/BSB/AR/QSI 2020

0 50 100 200
Feet

FIGURE 2

PIONEER
TECHNICAL SERVICES, INC.

**INSUFFICIENTLY RECLAIMED
SITE BRES No.174 BUFFALO DITCH**

DATE: 8/16/2023

Attachment 1
Document Links

Document Links

Insufficiently Reclaimed Sites QAPP:

<https://pioneertechnicalservices.sharepoint.com/:f:/s/submitted/EuRW3KcNuu9CqOHRiP3ENvsBOUc-dYqdITUbZZtCVROTAA>⁴

Unreclaimed Sites QAPP:

<https://pioneertechnicalservices.sharepoint.com/:f:/s/submitted/EtZbDgcepsdEie6VxUMdW88BbKopRVYj5ZsLN0sG3RkrhA>⁵

⁴ Please note that the link provided is valid for one year from the date of this submittal.

⁵ Please note that the link provided is valid for one year from the date of this submittal.

Attachment 2
FSPs Submittal List

| Site | Submittal Date | Approval Date |
|---|----------------|---------------|
| BRES No. 104 – Colorado Dump Shaft | 9/29/2021 | 11/5/2021 |
| BRES No. 104 – Colorado Dump Shaft, Final Revised | 12/2/2021 | 12/6/2021 |
| BRES No. 154 – Clark Mill Tailings NE | 12/1/2021 | 12/6/2021 |
| BRES No. 30 – Atlantic-1 | 1/12/2022 | 2/22/2022 |
| BRES No. 16 – Curry | 1/12/2022 | 2/22/2022 |
| BRES No. 8 – Belle of Butte | 3/11/2022 | 9/26/2022 |
| BRES No. 38 – Sister Dump | 6/16/2022 | 9/26/2022 |
| BRES No. 32 – Corra 2 Dump | 6/20/2022 | 6/30/2022 |
| BRES No. 158 – Waste Rock Dump | 6/20/2022 | 7/11/2022 |
| BRES No. 50 Zelia | 6/22/2022 | 6/30/2022 |
| BRES No. 93 – Soudan Dump | 6/23/2022 | 6/30/2022 |
| BRES No. 96 Washoe Dump | 6/23/2022 | 7/11/2022 |
| BRES No. 133 – Dexter Mill | 7/14/2022 | 7/26/2022 |
| BRES No. 37 – Josephine Shaft | 7/20/2022 | 7/26/2022 |
| BRES No. 34 – Eveline Dump | 7/22/2022 | 8/2/2022 |
| BRES No. 17 – Paymaster | 7/25/2023 | 8/10/2023 |
| BRES No. 31 – Waste Dump #5 | 7/25/2023 | 8/10/2023 |
| BRES No. 48 – Old Glory West | 7/25/2023 | 8/10/2023 |
| BRES No. 66 – West Ruby Dump | 7/25/2023 | 8/10/2023 |
| BRES No. 134 – Star West Dump | 7/25/2023 | 8/10/2023 |
| BRES No. 174 – Buffalo South and Buffalo Ditch | 7/25/2023 | 8/10/2023 |
| BRES No. 84 – Mandan Park | 7/25/2023 | 8/2/2023 |