Winter 12-2023

Butte Priority Soils Operable Unit Uncontrolled Surface Flow Areas Draft Remedial Design Work Plan (RDWP)

Woodard & Curran

SILVER BOW CREEK/BUTTE AREA NPL SITE

Butte Priority Soils Operable Unit

Uncontrolled Surface Flow Areas Draft Remedial Design Work Plan (RDWP)

December 2023

SILVER BOW CREEK/BUTTE AREA NPL SITE

Butte Priority Soils Operable Unit
Uncontrolled Surface Flow Areas

Draft Remedial Design Work Plan (RDWP)

Prepared for:

Atlantic Richfield Company
317 Anaconda Road
Butte, Montana 59701

Prepared by:

Woodard & Curran
1800 West Koch, Suite 6
Bozeman, MT 59715

December 2023

APPROVAL PAGE

REMEDIAL DESIGN WORK PLAN FOR
BUTTE PRIORITY SOILS OPERABLE UNIT UNCONTROLLED SURFACE FLOW AREAS
SILVER BOW CREEK/BUTTE AREA NPL SITE

Approved: _____ Date: _____
Nikia Greene, Site Project Manager, EPA, Region 8

Approved: _____ Date: _____
Daryl Reed, Project Officer, Montana DEQ

Approved: _____ Date: _____
David Gratson, Quality Assurance Manager,
Environmental Standards

Approved: _____ Date: _____
Mike McAnulty, Operations Project Manager, Atlantic
Richfield Company

Plan is effective on date of last signature above.

DISTRIBUTION LIST

Silver Bow Creek/Butte Area NPL Site
Butte Priority Soils Operable Unit Uncontrolled Surface Flow Areas Remedial Design Work Plan
Butte, Silver Bow County, Montana

Key Personnel Recipients	Title	Organization	Telephone Number	E-mail Address
Nikia Greene	Remedial Project Manager	EPA	(406) 457-5019	greene.nikia@epa.gov
Erin Agee	Legal Counsel	EPA	(303) 312-6374	agee.erin@epa.gov
Daryl Reed	State Project Officer	DEQ	(406) 444-6433	dreed@mt.gov
Jonathan Morgan	Legal Counsel	DEQ	(406) 444-6589	jmorgan3@mt.gov
Mike Mcanulty	Liability Manager	Atlantic Richfield	(907) 355-3914	mmcanulty@bp.com
David Gratson	AR Quality Assurance Manager	Environmental Standards	(505) 660-8521	dgratson@envstd.com
Irene Montero	Senior Technologist	Atlantic Richfield	(713) 538-0875	irene.montero@bp.com
David Shanight	EPA Contractor	CDM Smith	(406) 441-1400	ShanightDT@cdmsmith.com
Curt Coover	EPA Contractor	CDM Smith	(406) 441-1400	CooverCA@cdmsmith.com
Scott Bradshaw	AR Contractor – Project Manager	TREC, Inc.	(406) 551-2294	sbradshaw@woodardcurran.com
Paddy Stoy	AR Contractor – Field Team Lead	TREC, Inc.	(406) 922-0424	pstoy@woodardcurran.com
Tina Donovan	AR Contractor – Quality Assurance Officer	TREC, Inc.	(406) 205-0466	tdonovan@woodardcurran.com
Nicole Santifer	AR Contractor – Health and Safety Manager	TREC, Inc.	(406) 221-7095	nsantifer@woodardcurran.com
Eric Hassler	Director, Department of Reclamation and Environmental Services	Butte-Silver Bow	(406) 497-5042	ehassler@bsb.mt.gov
Julia Crain	Assistant Director, Department of Reclamation & Environmental Services / QA Manager	Butte-Silver Bow	(406) 497-6264	jcrain@bsb.mt.gov
Abigail Peltomaa	Manager, Data Management Division/QA Officer	Butte-Silver Bow	(406) 497-5045	apeltomaa@bsb.mt.gov
Chad Anderson	Manager, Human Health/RMAP Division	Butte-Silver Bow	(406) 497-6278	canderson@bsb.mt.gov
Brandon Warner	Manager, Environmental Division	Butte-Silver Bow	(406) 497-5022	bwarner@bsb.mt.gov

Dan Janosko	GIS Data Specialist	Butte-Silver Bow	(406) 497-6261	djanosko@bsb.mt.gov

Information Only Recipients	Organization	E-mail Address
Chris Greco	Atlantic Richfield	Chris.greco@bp.com
Loren Burmeister	Atlantic Richfield	Loren.Burmeister@bp.com
Mike McAnulty	Atlantic Richfield	mcanumc@bp.com
Dave Griffis	Atlantic Richfield	Dave.Griffis@bp.com
Jean Martin	Atlantic Richfield	Jean.martin@bp.com
Mave Gasaway	Davis, Graham & Stubbs, LLP	Mave.Gasaway@dgslaw.com
Brianne McClafferty	Holland & Hart LLP	BCMclafferty@hollandhart.com
James Freeman	DOJ	james.freeman2@usdoj.gov
Amy Steinmetz	DEQ	ASteinmetz@mt.gov
Dave Bowers	DEQ	dbowers@mt.gov
Carolina Balliew	DEQ	cballiew@mt.gov
Katie Garcin-Forba	DEQ	katie.garcin-forba@mt.gov
Jim Ford	NRDP	jford@mt.gov
Pat Cunneen	NRDP	pcunneen@mt.gov
Harley Harris	NRDP	Harleyharris@mt.gov
Katherine Hausrath	NRDP	khausrath@mt.gov
NRDP Inbox	NRDP	NRDPRecords@mt.gov
Ted Duaime	MBMG	TDuaime@mtech.edu
Gary Icopini	MBMG	gicopini@mtech.edu
Becky Summerville	Inland	bsummerville@mtresourcesinc.com
John DeJong	Union Pacific	John.DeJong@up.com
Robert Bylsma	Union Pacific	rcbylsma@up.com
John Gilmour	Union Pacific	jgilmour@kellydrye.com
Leo Berry	BNSF	leo@bkbh.com

Information Only Recipients	Organization	E-mail Address
Robert Lowry	BNSF	rlowry@kelrun.com
Brooke Kuhl	BNSF	brooke.kuhl@bnsf.com
Jeremie Maehr	Kennedy/Jenks	JeremieMaehr@kennedyjenks.com
Annika Silverman	Kennedy Jenks	AnnikaSilverman@kennedyjenks.com
Matthew Mavrinac	RARUS	Matthew.Mavrinac@patriotrail.com
Harrison Roughton	RARUS	harrison.roughton@patriotrail.com
Brad Gordon	RARUS	Brad.gordon@patriotrail.com
JP Gallagher	BSB	jgallagher@bsb.mt.gov
Mark Neary	BSB	Mneary@bsb.mt.gov
Karen Maloughney	BSB	kmaloughney@bsb.mt.gov
Sean Peterson	BSB	speterson@bsb.mt.gov
Josh Vincent	WET	jvincent@waterenvtech.com
Craig Deeney	Woodard & Curran	cdeeney@woodardcurran.com
Emily Stoick	Woodard & Curran	estoick@woodardcurran.com
Brad Archibald	Pioneer Technical Services, Inc.	barchibald@pioneer-technical.com
Pat Sampson	Pioneer Technical Services, Inc.	psampson@pioneer-technical.com
Joe McElroy	Pioneer Technical Services, Inc.	jmcelroy@pioneer-technical.com
Andy Dare	Pioneer Technical Services, Inc.	adare@pioneer-technical.com
Leesla Jonart	Pioneer Technical Services, Inc.	ljonart@pioneer-technical.com
Randa Colling	Pioneer Technical Services, Inc.	rcolling@pioneer-technical.com
Karen Helfrich	Pioneer Technical Services, Inc.	khelfrich@pioneer-technical.com
Joel Thompson	Stantec	joel.thompson@stantec.com
Brent Lucyk	Stantec	Brent.Lucyk@stantec.com
Ian Magruder	CTEC	imagruder@wwcengineering.com
Peter Haun	CTEC	phaun@wwcengineering.com
CTEC of Butte	CTEC	buttectec@hotmail.com

Information Only Recipients	Organization	E-mail Address
Scott Juskiewicz	Montana Tech Library	sjuskiewicz@mtech.edu
BPSOU Share Point		upload
MiningSharePoint@bp.com		

REVISION SUMMARY

Revision No.	Author	Version	Description	Date
Rev 0	W&C, Inc.	Draft	Initial Draft	August 2023
Rev 1	W&C, Inc.	Draft	Draft Final	December 2023

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LIST OF ATTACHMENTS

LIST OF ACRONYMS AND ABBREVIATIONS

ARAR	Applicable Relevant and Appropriate Requirements
AR	Atlantic Richfield Company
ASTM	American Society for Testing and materials
BMP	Best Management Practice
BTC	Blacktail Creek
BSB	Butte-Silver Bow
BPSOU	Butte Priority Soils Operable Unit
BTL	Butte Treatment Lagoons
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COC	Contaminant of Concern
CREAT	Climate Resilience Evaluation & Awareness Tool
DEQ	Department of Environmental Quality
EPA	U.S. Environmental Protection Agency
FEWA	Functionally Effective Wetland Area
FRESOW	Further Remedial Elements Scope of Work
GIS	Geographic Information System
GPS	Global Positioning System
GSR	Green and Sustainable Remediation
HaSP	Health and Safety Plan
HSSE	Health Safety Security and Environment
ITRC	Interstate Technology & Regulatory Council
NAD	North American Datum
NAVD	North American Vertical Datum
NPL	National Priorities List
NWI	National Wetlands Inventory
O&M	Operations & Maintenance
PDIER	Pre-Design Investigation Evaluation Report
PDIWP	Pre-Design Investigation Work Plan
PSP	Project Sustainability Plan
QA	Quality Assurance
QAM	Quality Assurance Manager
QAO	Quality Assurance Officer
QAPP	Quality Assurance Project Plan
RA	Remedial Action
RAWP	Remedial Action Work Plan
RD	Remedial Design
RDWP	Remedial Design Work Plan
ROD	Record of Decision
RODA	Record of Decision Amendment
SAP	Sampling and Analysis Plan
SBC	Silver Bow Creek

SEFA	Spreadsheets for Environmental Footprint Analysis
SSHASP	Site-Specific Health and Safety Plan
SWPPP	Storm Water Pollution Prevention Plan
USFA	Uncontrolled Surface Flow Area

1.0 INTRODUCTION

This document has been prepared on behalf of Atlantic Richfield Company (AR) and presents a Remedial Design Work Plan (RDWP) for the design of the remedy selected by the United States Environmental Protection Agency (EPA) to address Uncontrolled Surface Flow Areas (USFA) in the Butte Priority Soils Operable Unit (BPSOU). See Figure 1 which provides a map of the Uncontrolled Surface Flow Areas. The objective of the RDWP is to provide the framework for developing design documents (including plans and specifications) for the EPA selected remedy. This framework will cover the Remedial Design (RD) tasks to be performed by Atlantic Richfield.

This RDWP was developed consistent with applicable EPA guidance and decision documents, including:

- *Consent Decree for the Butte Priority Soils Operable Unit, Attachment C to Appendix D Further Remedial Elements Scope of Work* (EPA, 2020)
- *Record of Decision Amendment (RODA), Butte Priority Soils Operable Unit, Silver Bow Creek/Butte Area NPL Site* (EPA, 2020)
- *Remedial Design/Remedial Action Handbook* (EPA, 1995)

1.1 UNCONTROLLED SURFACE FLOW AREAS DESCRIPTION AND BACKGROUND

The Uncontrolled Surface Flow Areas, shown in Figure 1, may be impacted by historic mining activity and therefore may be contributing to degradation of surface water quality in Silver Bow and Blacktail Creeks. The areas in Figure 1 are located within, or drain into, the BPSOU. The USFAs need further evaluation to determine the areas contributing to degradation of surface water quality. Based on site evaluations, determinations will be made as to whether best management practices (BMPs) are required to be installed. Limited surface water quality data has been collected near a few of the USFA project sites since 2018. No previous soil or geotechnical investigations have been completed within the Uncontrolled Surface Flow project areas discussed as a part of this RDWP.

1.1.1 GEOLOGY

The Butte Area lies within the Summit Valley of southwest Montana and is characterized by Quaternary alluvium surrounded by the Butte Quartz Monzonite of the Cretaceous Boulder Batholith (Geologic Map of the Upper Clark Fork Valley, Southwestern Montana, Open File Report 506, [MBMG, 2004]). Soil and/or geotechnical investigations have not been completed in the USFAs and more information will need to be gathered to inform geotechnical characteristics and support BMP selection for the USFAs.

1.1.2 STORM WATER HYDROLOGY

Limited stormwater data has been collected from 2018 through 2022 on numerous USFA drainages. The BMPs to be installed for each USFA drainage will be sized to collect the 6-month, 24-hour type 1 storm event volume, based on the Rational Method.

1.1.3 PROPERTY BOUNDARIES

Many USFAs lie on private land. Property surveys will need to be conducted to define areas and practicability for BMP implementation in the USFAs.

2.0 PROJECT ORGANIZATION

An example organizational chart showing the overall organization of the project team is provided in Figure 2. Responsibilities of key individuals comprising a project team are described below.

2.1 KEY ORGANIZATIONS

2.1.1 ENVIRONMENTAL PROTECTION AGENCY

The EPA is the lead agency for the RD efforts detailed in this RDWP. Pre-design, 30% design, 60% design, pre-final, and final design documents will be submitted to the EPA for comment, review, and approval. The EPA will compile any comments from MDEQ and BSB and provide to AR.

2.1.2 MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY

The MDEQ is the state agency for the RD efforts detailed in this RDWP. Pre-design, 30% design, 60% design, pre-final, and final design documents will be submitted to the MDEQ for comment and review. The MDEQ will provide any questions or comments to the EPA.

2.1.3 ATLANTIC RICHFIELD COMPANY

AR will manage the RD project and consultant RD activities detailed in this RDWP. The Pre-design, 30% design, 60% design, pre-final, and final design documents will be submitted through AR to the EPA and DEQ for comment and review. AR will coordinate any response to comments through their consultant(s) to the EPA and MDEQ.

2.1.4 BUTTE-SILVER BOW

The RD efforts detailed in this RDWP will be developed in collaboration with BSB County. Pre-design, 30% design, 60% design, pre-final, and final design documents will be submitted to BSB for comment and review. BSB will provide any questions or comments to AR for consideration prior to submittal to EPA and DEQ.

2.1.5 WOODARD & CURRAN, INC.

Woodard & Curran is the AR consultant responsible for the engineering and design of the RD activities detailed in this RDWP. Woodard & Curran will be responsible for ensuring that the project pre-design and design activities are completed according to project requirements. Woodard

& Curran is also responsible for managing sub-contractors for such professional services pertaining to the pre-design and remedial design activities including, but not limited to, laboratories, survey and boundary work, geotechnical investigation, and landscape architectural design.

2.2 KEY PERSONNEL

2.2.1 EPA PROJECT MANAGER

Nikia Greene is the EPA's project manager for this work. Mr. Greene is based in the EPA Region 8 office in Helena, Montana. He will be the primary contact for EPA and ensure that RDs and RAs comply with the Consent Decree Plan and the Agency Remedial Elements Scope of Work. Mr. Greene will be responsible for review and approval of this RDWP and the Preliminary (30%), Intermediate (60%), Pre-Final (95%), and Final (100%) RDs and RAWP. During construction Mr. Greene will be responsible for providing construction oversight on behalf of EPA.

2.2.2 DEQ PROJECT MANAGER

Daryl Reed is the DEQ project manager for this work. Mr. Reed is based in the DEQ Remediation Division office located in Helena, Montana. He will be the primary contact for DEQ and ensure that RDs and RAs comply with the Consent Decree Plan and the Agency Remedial Elements Scope of Work. Mr. Reed will be responsible for review and approval of this RDWP and the Preliminary (30%), Intermediate (60%), Pre-Final (95%), and Final (100%) RDs and RAWP on behalf of DEQ.

2.2.3 ATLANTIC RICHFIELD LIABILITY MANAGER

The Atlantic Richfield liability manager is Mike McAnulty, who is responsible for overall programmatic planning for technical and administrative components of RD and RA work completed by Atlantic Richfield. Mr. McAnulty will be the primary technical point of contact for the EPA, DEQ, BSB, and the project contractor. He will take the lead in negotiating with the EPA, DEQ, BSB, and contractor.

2.2.4 ATLANTIC RICHFIELD QUALITY ASSURANCE MANAGER

The Atlantic Richfield Quality Assurance Manager (QAM) for the project is David Gratson. He will interface with the Atlantic Richfield Liability Manager on company policies regarding quality and will have the authority and responsibility to approve QA documents specific to the USFAs.

2.2.5 WOODARD & CURRAN, INC. PROJECT MANAGER

Atlantic Richfield will contract directly with Woodard & Curran who will serve as the Atlantic Richfield Representative for the USFA projects. Woodard & Curran's project manager for Atlantic Richfield is Scott Bradshaw, P.E. Mr. Bradshaw will be the primary contact for Atlantic Richfield. Responsible for developing this RDWP, he will also be responsible for the Preliminary (30%), Intermediate (60%), Pre-Final (95%), and Final (100%) RDs and RAWP, and bid documents. He will also provide construction oversight and management during construction activities for the USFA projects. Mr. Bradshaw will be responsible for ensuring the USFA PDI Work Plan is

implemented and coordinate all project-specific assignments and provide overall project direction to the Woodard & Curran team.

2.2.6 WOODARD & CURRAN, INC. FIELD TEAM LEAD

The Field Team Leader for the boundary surveys, geotechnical investigations, and other necessary field work will be a Woodard & Curran employee with the appropriate qualifications. The Field Team Leader will ensure that all members of the field team review and follow the USFA SAPs, QAPPs, and their attachments when implementing field activities. The Field Team Leader will also be responsible for maintaining the SAP and QAPP. The Field Team Leader will conduct daily safety meetings, assist in field activities, and document activities in the logbook. The Field Team Leader will be responsible for equipment coordination, problem solving, and decision making in the field and manage technical aspects of the project status by observing site activities to ensure compliance with the Site-Specific Health and Safety Plan (SSHASP). Finally, the Field Team Leader will identify potential integrity management issues, as appropriate, and prepare required project documentation.

2.2.7 WOODARD & CURRAN, INC. QUALITY ASSURANCE OFFICER

The Quality Assurance Officer (QAO), Tina Donovan, from Woodard & Curran is responsible for reviewing field and laboratory data and evaluating data quality. She will also conduct on-site reviews and prepare site review reports for the QAM.

2.2.8 WOODARD & CURRAN, INC. PROJECT SAFETY AND HEALTH MANAGER

The Woodard & Curran Project Safety and Health Manager, Nicole Santifer, will conduct the initial safety meeting prior to starting any field/construction work. The Safety and Health Manager will ensure that work crews comply with all site health and safety requirements and will revise the SSHASP, if necessary.

3.0 REMEDIAL DESIGN OVERVIEW

This section provides an overview of the remedial design (RD) and outlines the various design components and submittals.

3.1 REMEDIAL DESIGN OBJECTIVES

The objective of the (RD) for the USFA remedial projects is to develop plans and specifications for implementing the EPA remedy laid out in the *Further Remedial Elements Scope of Work (EPA, 2020)*, and while doing so, to ensure that the remedy is implemented in a safe and efficient manner. Specific activities to accomplish the RD objectives are to:

- Collect and analyze geotechnical data necessary to support the RD and characterize the USFAs.
- Develop engineering and design specifications for the various USFA drainages.
- Determine the practicality and feasibility of implementing BMPs for each USFA drainage.

- Select BMPs for handling and processing effective storm water runoff volume.
- Develop engineering and design information to support the size and location of the stormwater BMPs.
- Develop design documents for the construction of the BMPs with the goal of achieving the performance standards established by the EPA.
- Develop project deliverables to allow timely execution of BMPs and end land use feature construction.

3.2 REMEDIAL ACTION SUMMARY

The RODA (EPA, 2019) lays out guidelines for selected remedies for surface water and solid media within BPSOU. The goals of the remedies are to protect human health, environmental health, and reduce COC concentrations to water quality standards in Blacktail Creek (BTC) and Silver Bow Creek (SBC). The ROD/RODA states the selected remedy for surface water consists of the following components:

1. The Surface Water Management Program, which utilizes BMPs to address contaminated storm water runoff and improve storm water quality.
2. Excavation and removal of contaminated sediments from uncontrolled surface flow areas along Blacktail Creek and Silver Bow Creek. Excavation of sediments will occur from just above the confluence of Blacktail Creek and Metro Storm Drain to the beginning of the reconstructed Silver Bow Creek floodplain at Butte Treatment Lagoons (BTL). Following removal of sediments, further evaluation of surface water quality in this area will be conducted.

   2020 selected remedy: While the removal of contaminated sediments, stream banks, and nearby floodplain wastes was included in all the alternatives considered for the selected remedy in the 2006/2011 BPSOU Record of Decision, and is an established remedial component, the scope of the removals required under this amendment is more extensive than envisioned in the original remedy. The expanded scope is based on extensive data collected in these areas and these wastes' impact to surface water and sediment quality and in part on significant public input on additional waste removals.
3. Capturing and treating storm water runoff up to a specified maximum storm event if BMPs implemented under the Surface Water Management Program do not achieve the goal of meeting surface water standards in Silver Bow Creek and Blacktail Creek during storm water events.
4. Hydraulic control, capture, and treatment of contaminated groundwater to prevent its discharge to Blacktail and Silver Bow Creek surface water.

The *Further Remedial Elements Scope of Work (EPA, 2020)* specifically details that the remedial actions (RAs) for the USFAs project area include:

1. Site Evaluation – Evaluate areas contributing to degradation of surface water quality and determine appropriate BMP
2. Remedial Action Work Plans – RAWPs describing the BMPs to be implemented
3. Remedial Action – Construct and install stormwater BMPs appropriate for reducing contaminant loading to the creeks

This RDWP document describes the approach and plan for design and implementation of these activities. Details regarding the design requirements for the remedial activities as set forth in the *Further Remedial Elements Scope of Work (EPA, 2020)* will be discussed in the Design Report for the USFAs. The accompanying reports and plans will discuss details of how the design requirements are achieved, including documentation of design calculations and models. The Construction Documents will detail how all the requirements detailed in the Design Criteria Report and Accompanying Reports and Plans will be constructed. The RD will include, at a minimum, the following elements (as detailed in the *FRESOW (EPA, 2020))*:

1. **Site Evaluations***:* While the FRESOW dictates that site evaluations be conducted to determine if individual sub-watershed areas contribute to the degradation of surface water quality, due to the short duration of flows and low flow volumes observed with most of the USFA sites, collecting samples to determine contributions to surface water degradation was deemed ineffective. Therefore, all drainages were assumed to potentially contribute to degradation of surface water and appropriate BMP's will be selected.
2. **Remedial Action Work Plans:** After the necessary evaluation and sampling are completed, and a summary report is produced and approved, EPA, in consultation with MDEQ, will determine which sites require BMPs (EPA, 2020). If BMPs are required, a RAWP will be generated for review and approval by the EPA, in consultation with MDEQ. The RAWP shall define appropriate BMPs to reduce and/or prevent contaminant loading to the creeks. BMP sizing will not exceed the 6-month, 24-hour Type 1 storm volume, determined with a hydrologic model approved by the EPA in consultation with MDEQ (EPA, 2020).
3. **Remedial Action:** Remedial action activities will be performed in accordance with the RAWP. An operations and maintenance plan will be developed as part of the RAWP (EPA, 2020). Following the remedial action, BMPs will be integrated into a stormwater O&M program. A construction completion report for the BMPs shall be submitted for review and approval by the EPA, in consultation with MDEQ (EPA, 2020).
4. **Geotechnical Conditions:** EPA, in consultation with MDEQ, may require geotechnical investigation to adequately characterize subsurface conditions in areas of the sedimentation bay, vegetated swale, diversion structures, discharge structures, or other structural features. SDs may also propose such investigation in design documents.

5. **Other:** EPA, in consultation with MDEQ, may identify additional data gaps during the design phase and require SDs to address during design. SDs may also propose such data gaps.

3.3 MANAGEMENT STRATEGY

This section describes the approach taken by AR during the RD process, including the management strategy and approach to contracting.

Design documents are being developed with input from EPA, MDEQ, and BSB; therefore, only a high-level overview is provided in this RDWP. The RD will include plans for evaluation, determination, and construction of BMPs in the USFAs.

All RDs for the USFAs will be submitted for EPA review and approval, in consultation with MDEQ. Once final designs and the Remedial Action Work Plan (RAWP) are approved, the projects will be opened for bid as independent or as multiple bid package(s). The contractor will be responsible for determining how to best sequence construction activities and resources, unless otherwise directed in the plans and specifications.

The general contracting strategy for the RD is for Atlantic Richfield to manage the USFA project design using one design engineer and one contractor for the RD and implementation of the RA.

4.0 DESIGN SUPPORT ACTIVITIES

4.1 PRE-DESIGN INVESTIGATION ACTIVITIES

This section describes the pre-design activities to be conducted during the RD process. These pre-design activities will provide information necessary to develop the engineering design. The pre-design investigation will address data gaps from previous studies, utility locates, topographic surveys, and further geotechnical investigation for construction design parameters and waste characterization. The results from these activities will be incorporated into the final design.

Engineering data collection will be conducted under the *Pre-Design Investigation Work Plan* (PDIWP) (Atlantic Richfield, 2023), which includes the Uncontrolled Surface Flow Area *Soils Characterization QAPP*. All data collected will follow the requirements of the Woodard & Curran Site Specific Health and Safety Plan (TREC, 2019), which details an Emergency Response Plan.

Once collected and validated, data will be analyzed to answer the following questions:

1. Are there existing wetlands? How do proposed stormwater BMP locations interact with existing wetlands?
2. Where are the existing utilities and how must they be protected during design and construction?
3. What are the existing property boundaries and associated ownerships?
4. Where are the feasible, most effective locations for BMPs in each USFA drainage?

5. Does the required BMP volume fit within the location?
6. Do the proposed BMP locations lie above known contaminated soils?
7. Are the existing soils in the USFAs suitable for backfill material?
8. Do site groundwater levels allow for sufficient BMP volumes?
9. Are site soils and conditions amenable to infiltration if it is required to meet BMP volume requirements?
10. Can low impact development practices be utilized along existing properties?

The following sections summarize each of the pre-design characterization activities. The PDIWP explains in further detail on how the pre-design characterization activities will be conducted.

4.1.1 WETLAND DELINEATION

Based on the National Wetlands Inventory (NWI), wetlands exist throughout the Uncontrolled Surface Flow Areas. A wetland delineation may be performed along the sites to confirm the NWI and provide higher site-resolution to them if proposed BMPs are expected to impact wetland areas. Functionally Effective Wetland Area (FEWA) forms will be completed to establish a pre-construction score to compare to post-construction conditions and fulfill the "No Net Loss" Superfund goal for wetlands.

4.1.2 UTILITY LOCATES

Utility locates and potholing will be completed before commencement of geotechnical investigations and will be done in accordance with Atlantic Richfield's (AR) Overhead Utility and Ground Disturbance Defined Practices and all other applicable HSSE requirements. All utilities found on site will be mapped and protected from damage of any kind resulting from work activities.

4.1.3 BOUNDARY AND TOPOGRAPHIC SURVEY

Survey data collection will include but is not limited to:

- Topographic survey;
- Survey of utility locations and features;
- Channel cross-sections and longitudinal survey; and
- Boring locations.

Topographic survey will be completed using a resource grade GPS unit. Property boundaries and existing easements will be determined with ground survey technology and by desktop records research. Survey data will be collected with the following datum: Horizontal – Montana State Plane NAD 83, Vertical – NAVD 88. A licensed professional surveyor and NGS benchmarks will be used as for property boundary definition. At a minimum, a licensed professional engineer will oversee the topographic ground survey data collection.

4.1.4 GEOTECHNICAL CHARACTERIZATION

A geotechnical investigation will be performed to determine subsurface characteristics. Approximately 10 tests pits will be collected, or another acceptable soil sampling method, near the anticipated BMP locations of the USFAs. Details of this soil characterization plan are located in the Uncontrolled Surface Flow Area *Soils Characterization QAPP* (Atlantic Richfield, 2023). The data will be input to the PDIER to aid in the design of the RAs.

Soil sampling will be completed to determine the following:

- Location and depth of soil layers;
- Presence and type (i.e., mining-related or municipal) of waste or contaminated materials;
- Backfill material suitability;
- Soil Infiltration Rates
- Groundwater elevations
- Other features that may affect the project; and
- Visual examination, classification or laboratory testing, as necessary, to aid in design of BMPs.

4.1.5 STORMWATER CHARACTERIZATION

Stormwater monitoring was conducted along the various USFAs using ISCO automatic samplers, D-Tec samplers, and area-velocity meters. Previously collected stormwater data is located in the BPSOU Surface Water Data Summary Reports (2018-2022) and will be utilized to inform the following:

- COC concentrations
- Stormwater flow
- COC loading
- Data to be used to help determine and verify BMP sizing

4.2 SUPPORT DOCUMENTS

This RDWP provides the overview of the RD work and is supported by the following documents:

- *Uncontrolled Surface Flow Area Pre-Design Investigation Work Plan* (Atlantic Richfield, 2023)
- *Uncontrolled Surface Flow Area Soils Characterization QAPP* (Atlantic Richfield 2023)

4.3 ACCOMPANYING REPORTS AND PLANS

The following sections summarize each of the accompanying design reports and plans. These reports and plans will supplement the construction documents: construction plans, specifications, and compensation schedule. Applicable elements from the accompanying reports and plans will be detailed in the construction plans, specifications, and SWPPP to provide the contractor a

consolidated set of construction documents for executing the various elements outlined in the accompanying reports and plans.

4.3.1 PRE-DESIGN INVESTIGATION EVALUATION REPORT

The Pre-Design Investigation Evaluation Report (PDIER) describes the data collected during due diligence actions performed prior to final design of the BMPs in the USFAs. The PDIER will include a summary of the investigations performed, investigation results, interpretations of validated data, photographs documenting the work conducted, and recommendations for the remedial design. Results found from the PDIWP activities described above will be used in conjunction with the Uncontrolled Surface Flow Areas BMP Implementation Flow Chart seen in Figure 3, to aid in BMP evaluation and selection. A draft report will be submitted with the 60% submittal. Details of how the requirements outlined in this plan are to be executed will be provided in the construction plans and specifications.

4.3.2 DESIGN REPORT

A design criteria and design basis report (Design Report) will be submitted at each phase of design and will describe the technical parameters upon which the RD will be based. It will also include a description of how those criteria are incorporated into the design at that phase. The Design Report will include the following:

- Project Description;
- Design requirements and provisions for design elements:
    - Waste identification/removal criteria;
    - Backfill suitability criteria;
    - Regrading, revegetation, and capping requirements;
    - Stormwater BMP sizing and installation criteria.
- O&M provisions and Institutional Control considerations;
- Permit requirements[1] – a list of required permits and applicable provisions and requirements will be detailed in the Design Report;
- Hydraulic Control Criteria;
- Applicable or Relevant and Appropriate Requirements (ARARs);
- Applicable local, county, state, and federal level design standards;

[1] According to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121.e.1, Applicable or Relevant and Appropriate Requirements (ARARs) associated with administrative requirements, such as permitting, are not applicable to CERCLA on-site activities. The CERCLA permitting exemption will be generally applied to the remedial activities described in this document. However, this does not remove the requirement to meet (or waive) the substantive provisions of permitting regulations and does not provide exemption for any required permits by private entities. The Design Criteria Report will detail the substantive provisions of the applicable permits.

- A description of design assumptions and design constraints;
- Anticipated waste volumes and import fill requirements;
- Grading Plan to achieve basin volume requirements;
- A description of the transport the contaminated soil generated during excavation to a repository/disposal facility and will detail how the proposed repository/disposal facility is suitable to accept such materials;
- Hydrologic and Hydraulic Modeling Results;
- End Land Use Design Requirements and Calculations;
- A description of wetland and upland revegetation areas and requirements and areas to receive revegetation details.
- A description of how the RA will be implemented in a manner that minimizes environmental impacts in accordance with EPA's Principles for Greener Cleanups (Aug. 2009)
- A description of monitoring and control measures to protect human health and the environment, such as air monitoring and dust suppression, during the RA; and
- A description of property boundaries, easements, leases, or access agreements that will be assessed for the adequacy of providing construction and permanent maintenance access to the Uncontrolled Surface Flow Areas.

4.4 ACCOMPANYING DESIGN ASSISTANCE MODELS

The following sections describe the modeling programs used to assist the design of the RA activities.

4.4.1 HYDRAFLOW EXPRESS

The Hydraflow Express Extension for Autodesk AutoCAD Civil 3D will be used to model hydraulic conditions (such as back up elevations) and adequately size the associated hydraulic controls.

4.4.2 RATIONAL METHOD

The Rational method will be used to determine peak discharge and design storm volume values for each individual drainage comprising the USFAs. Based on empirical hydrologic modeling and the 6-month storm rainfall intensity, the design peak flow value for each drainage will be determined. Iterations of the Rational method design calculation will be conducted for each individual USFA drainage using it's associated characteristics (runoff coefficient, drainage area).

5.0 GREEN REMEDIATION PRINCIPLES

In accordance with the SOW, Green and Sustainable Remediation (GSR) concepts and climate change resilience will be considered and incorporated throughout the remedial design process. GSR is broadly defined by the Interstate Technology & Regulatory Council (ITRC) GSR Team as

a remedy or combination of remedies whose net benefit to human health and the environment is maximized through the judicious use of resources and the selection of remedies that consider how the community, global society, and the environment would benefit, or be adversely affected by, RI and corrective actions (ITRC, 2011). GSR is more broadly considered as an environmentally beneficial approach that incorporates efforts to reduce negative effects during Site characterization and remediation. Similarly, Green Remediation is defined by EPA as "the practice of considering all environmental effects of remedy implementation and incorporating options to minimize the environmental footprints of cleanup actions". Climate change resilience in the context of site cleanup looks to mitigate potential vulnerabilities of remedial systems due to the impacts of climate change and extreme weather events.

An approach for incorporating GSR concepts and climate change resilience into the Uncontrolled Surface Flow Areas Project was developed based on guidance from the following resources:

Superfund Green Remediation – https://www.epa.gov/superfund/superfund-green-remediation

American Society for Testing and Materials (ASTM) E2893-16e1 Standard Guide for Greener Cleanups

Principles of Ecological Land Reuse – https://clu-in.org/ecotools/principles.cfm

Superfund Climate Resilience – https://www.epa.gov/superfund/superfund-climate-resilience

Woodard & Curran Project Sustainability Plan Short Form, Attachments A & G

5.1 Incorporating GSR Concepts

The general approach for incorporating GSR at various phases of remedy implementation will consist of 1) identifying BMPs for implementation from the ASTM standard and Principles for Ecological Land Reuse based on ability to implement and environmental impact, and 2) documenting and assessing the impact of selected BMPs in accordance with the internal Project Sustainability Plan (PSP). It is anticipated that this process will be conducted at each phase of remedy implementation, including pre-design investigation activities, construction and installation of stormwater BMPs, and project-wide monitoring efforts. Additional details on each step of this process are provided below.

5.1.1 Selection and Implementation of Greener Cleanup BMPs

Greener cleanup BMPs will be selected for implementation that target the core elements of the environmental footprint most impacted by site remedial design and implementation activities. BMPs will be selected in accordance with ASTM E2893-16e1, which provides a process for identifying, prioritizing, selecting, implementing, documenting, and reporting BMP activities to reduce the environmental footprint of a cleanup. BMPs will target the five core elements of the environmental footprint by aiming to:

1) minimize total energy use and maximize use of renewable energy,

2) minimize air pollutant and greenhouse gas emissions,

3) minimize water use and impacts to water resources,

4) reduce, reuse, and recycle materials and waste, and

5) protect land and ecosystems.

In accordance with the ASTM standard, BMPs will be prioritized and selected for implementation based on the relative ability of each BMP to reduce the environmental footprint of site activities, along with factors such as ease of implementation, effectiveness, reliability, short-term risks, community concerns, cost, and potential for environmental trade-offs.

The ASTM standard provides 161 suggested BMPs for consideration specific to various remedial technologies and environmental footprint core elements. Additionally, the Principles of Ecological Land Reuse published by EPA will also be considered as potential BMPs to implement specific to the land and ecosystems core element of the environmental footprint. Additional BMPs may also be considered based on EPA's series of BMP fact sheets, which include recommended BMPs for activities such as site investigation and environmental monitoring, materials and waste management, and surface restoration.

5.1.2 Project Sustainability Plan

An internal PSP will be completed to document the level of GSR evaluation to be conducted (i.e., qualitative vs. semi-quantitative), which sustainability metrics will be evaluated (e.g., Greener Cleanup BMPs, SEFA analyses), how these metrics will be recorded and documented during the project, and how the results will be reported. The PSP will be maintained as an internal reference throughout the remedial design process to ensure incorporation of GSR concepts at various phases of design and implementation.

5.2 Incorporating Climate Change Resilience

Potential vulnerabilities of the chosen remedy to climate change and extreme weather events will also be evaluated throughout the remedial design and implementation process. EPA recommends periodic screening of remedy vulnerabilities so that remedies may be made more resilient and adapted to future changing climates, as described on EPA's "Superfund Climate Resilience" website.

An initial vulnerability assessment will be conducted to evaluate the remedy's exposure and sensitivity to climate or weather hazards of concern. Publicly available online resources, such as EPA's Climate Change Indicators in the Unites States website and EPA's Climate Resilience Evaluation & Awareness Tool (CREAT), will be used to identify climate hazards of concern for the remedy. Based on this vulnerability assessment, resilience measures may be considered if

necessary to address identified climate hazards. Following initial remediation activities, vulnerability assessments will be conducted periodically as part of long-term monitoring to ensure remedy resilience over time.

6.0 REMEDIAL DESIGN DELIVERABLES

This section describes the RD design deliverables to the agencies for review.

The RD will be accomplished in five main stages:

1. Pre-Design Document Submittals;
2. Preliminary Design (30%);
3. Intermediate Design (60%);
4. Pre-final Design (95%); and
5. Final Design (100%).

Pre-Design Document Submittals will include:

- Remedial Design Work Plan (RDWP); and
- Pre-Design Investigation Work Plan (PDIWP) and its attachments, including a Wetland Functional Effective Wetland Area (FEWA) Assessment.

Section 4.1 describes the specific elements for each of the pre-design document submittals.

Design Submittals will include the following: Note, some plans or assessments may be attachments or substantially discussed as part of a larger plan or report.

- Design Report, including Pre-Design Investigation Evaluation Report;
- Construction Drawings; and
- Updated RD and RA schedule.

The 30% submittal will include an updated RD and RA schedule, Preliminary Construction Drawings, Design Report, Pre-Design Investigation Evaluation Report, and a description of how the remedial action will be implemented to minimize environmental impacts in accordance with the EPA's Principles for Greener Cleanups (Aug. 2019) at a minimum. The 60% and 95% submittals will include progress made on each of the submittal elements and response to agency comments regarding the previous submittal. The 100% final design submittal will include, final submittals of all deliverables addressing agency questions and comments and construction drawings and specifications certified by a registered professional engineer.

7.0 SCHEDULE

The RD will be submitted to the EPA for 30%, 60%, and 95% review. The final deliverable for design to the EPA will be the 100% design with all Agency comments addressed. Coordination

with other project consultants is necessary throughout the design process to ensure a cohesive end-product. The tentative proposed schedule for RD is as follows:

December 2024:	Pre-Design Documents
Spring and Summer 2024:	Field Investigations
Fall 2024:	PDIER Submittal
Fourth Quarter 2024:	30% Preliminary Design Submittals and Pre-Design Document Updates
Spring 2025:	60% Intermediate Design Submittal
Winter 2025:	95% Pre-Final Design and 100% Final Design Submittals

This schedule is contingent upon the completion of the tasks outlined in the Pre-Design Investigation Work Plan, and agency and BSB review and approval of the pre-design, 30% design, 60% design, pre-final, and final design documents in a timely manner.

Remedial action includes the implementation of BMPs in the USFAs. The tentative proposed schedule for remedial action is as follows:

Spring 2026:	Project letting and bidding to select a contractor
Spring 2026:	Begin Construction of BMPs
Fall 2028:	Complete construction of BMPs and site revegetation and plantings (late June/ early July) throughout project sites
Fall 2029:	Complete operational and functional assessment

A detailed Remedial Design and Remedial Action Gantt chart schedule will be submitted and updated monthly throughout the project development.

8.0 CONSTRUCTION DOCUMENTSS

The construction documents provided to the contractor will include construction plans and specifications. Common specifications will be developed in conjunction with all Corridor RDRA projects; those specific to USFAs will be developed separately.

8.1 PROJECT CONSTRUCTION PLANS

Design drawings will be created for the USFAs. The drawings to be submitted throughout the design phases may include, but are not limited to:

- Cover Sheet;
- General Notes;

- Existing Conditions and construction survey control;
- Statement of Estimated Quantities;
- Demolition Plan and Utility Protection Plan;
- Site Plan;
- Maintenance Access Roads Plan and Profiles;
- Grading Plans:
    - Phasing Plans, including waste material removal;
    - Retaining wall plans;
    - Cross Sections;
    - Profiles.
- Erosion Control Plans;
- Material Transportation Plan:
    - Waste, Fill, and Cut Haul Routes;
    - Traffic Control Plans.
- Storm Drain Plan and Profiles;
- Planting Plans;
- Irrigation Plans;
- Details.

8.2 PROJECT SPECIFICATIONS

Project specifications will be created for the entire BPSOU Corridor remedial projects. If specific and unique specifications are required for USFAs, they will be developed separately but in agreement with the general specifications. The specifications will supplement the construction drawings and include elements of the Accompanying Reports and Plans to provide technical requirements to the contractor(s) for implementation. The specifications to be submitted throughout the design phases may include, but are not limited to:

- Earthwork specifications;
- Pipe specifications;
- Bedding specifications;
- Planting specifications;
- Irrigation specifications;
- Erosion control specifications;
- Photographic documentation specification of the Remedial Actions.

9.0 REFERENCES

Atlantic Richfield, 2019. BPSOU 2018 Surface Water Monitoring Data Summary Report (DSR). Atlantic Richfield Company, 2019.

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Atlantic Richfield, 2023b. Silver Bow Creek/Butte Area NPL Site. Butte Priority Soils Operable Unit. Draft Uncontrolled Surface Flow Area Soils Characterization Quality Assurance Project Plan (QAPP). December 2023.

EPA, 1995. Remedial Design/Remedial Action Handbook. U.S. Environmental Protection Agency, June 1995.

EPA, 2006. *Record of Decision, Butte Priority Soils Operable Unit, Silver Bow Creek/Butte Area NPL Site*. U.S. Environmental Protection Agency, September 2006.

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EPA, 2020b. Record of Decision Amendment, Butte Priority Soils Operable Unit, Silver Bow Creek/Butte Area NPL Site. U.S. Environmental Protection Agency, February 2020.

MBMG, 2004. Geologic Map of the Upper Clark Fork Valley, Southwestern Montana, Open File Report 506. Mapped and compiled by Richard B. Berg and Phyllis A. Hargrave for the Montana Bureau of Mines and Geology, 2004

W&C, 2022. BPSOU Site Specific Health and Safety Plan. Woodard & Curran, Inc. October 2022.

Figures

DRAINAGE M

MONTANA STREET

CENTENNIAL AVENUE

DRAINAGE N

KAW AVENUE

GEORGE STREET

BUTTE REDUCTION WORKS SMELTER AREA MINE WASTE REMEDIATION AND CONTAMINATED HYDRAULIC CONTROL

DRAINAGE I

DRAINAGE J

DRAINAGE K

DRAINAGE L

DRAINAGE A

INTERSTATE 90
MDT R.O.W.

DRAINAGE B

DRAINAGE G

DRAINAGE H

MONTANA POLE NPL SITE

DRAINAGE C

GREENWOOD AVE W

DRAINAGE F

DRAINAGE E

DRAINAGE D

N

400' 0 400' 800'

BAR SCALE
1" = 400'

LEGEND

- DRAINAGE BASIN
- BPSOU BOUNDARY
- ARCO OWNED PROPERTY
- BSB OWNED PROPERTY
- MDT R.O.W.
- MONTANA POLE NPL SITE
- EXISTING SURFACE WATER FEATURE
- EXISTING CULVERT
- NORTHWESTERN ENERGY OWNED PROPERTY

NOTES:

1. UNCAPTURED DRAINAGE AREAS WILL BE EVALUATED TO DETERMINE THE NECESSITY OF BMPs.

FIGURE

REV	DESCRIPTION	DATE
DESIGNED BY: SB	CHECKED BY: SB	BPSOU-UNCAPTURED BASINS*.dwg
DRAWN BY: CS		

BPSOU UNCAPTURED
SURFACE FLOW AREAS

ATLANTIC RICHFIELD
BUTTE, MT

BUTTE PRIORITY SOILS OU
UNCONTROLLED SURFACE
FLOW AREA BMPs

JOB NO.:0231351
DATE:10/9/2019
SCALE: 1"=400'
SHEET: 1 OF 1

USFA-1

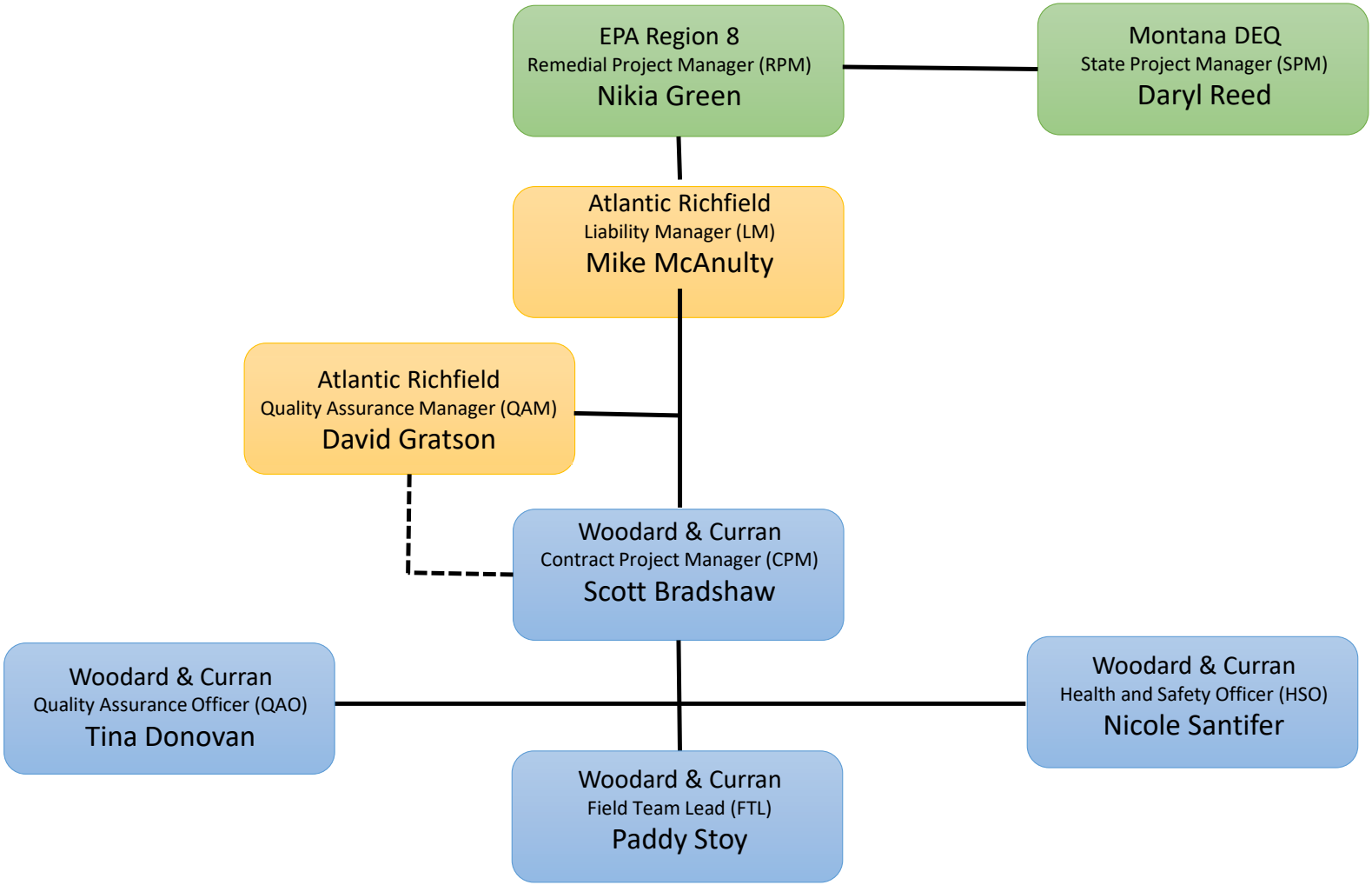
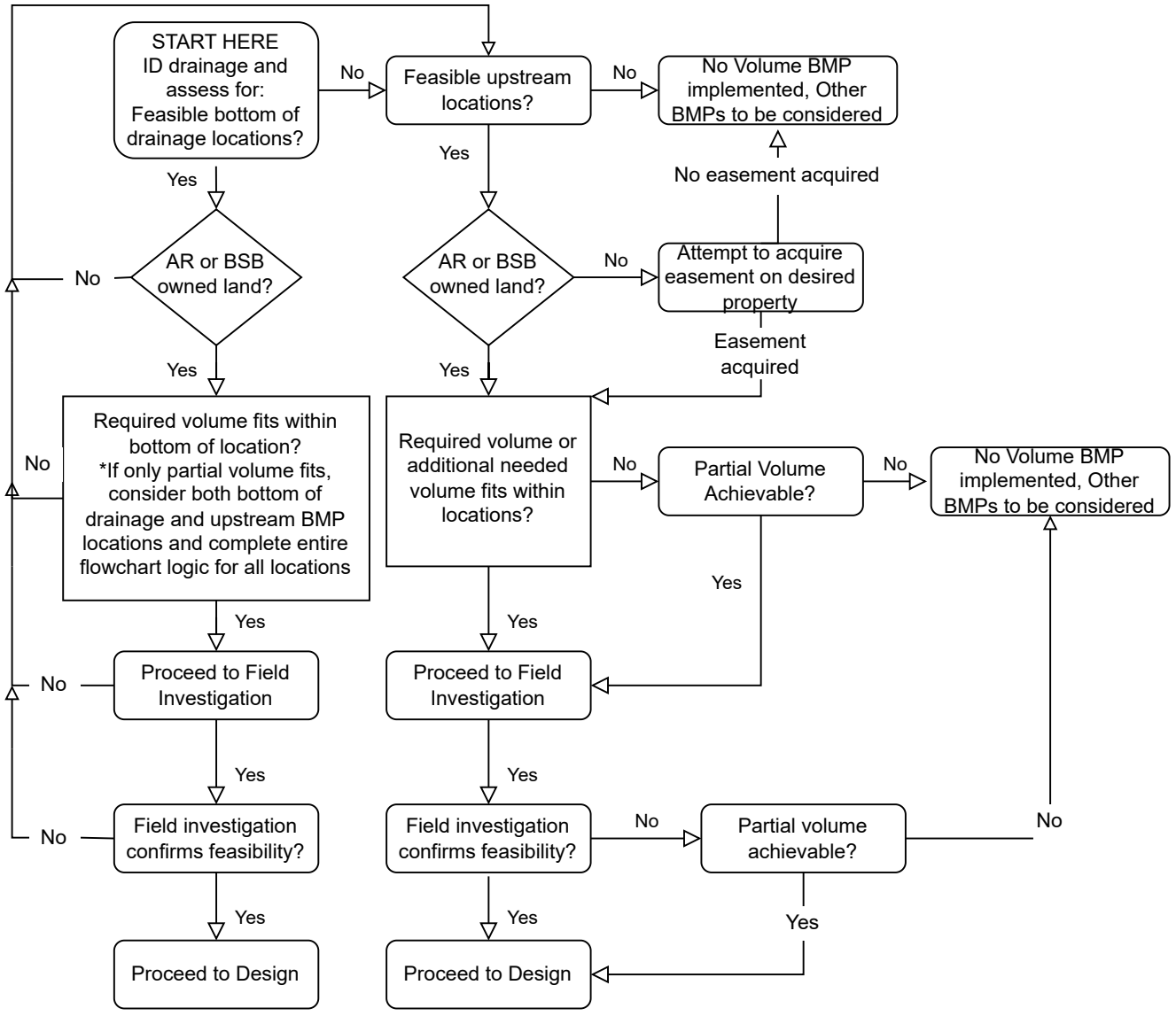


Figure 2: BPSOU USFAs Design Team Organization

Uncontrolled Surface Flow Areas BMP Implementation Flow Chart



Feasibility determined by the following factors:

- Property Ownership
  - BSB or AR owned land prioritized
  - MDT right of ways a possibility
  - Easements will be attempted to be acquired on desired private property
- Feasibility of volume-based or non volume-based BMP Placement
  - Volume-Based BMPs
    - Sufficient available area for required BMP volume
    - Consideration for if volume can be achieved at one location or multiple locations
    - Groundwater levels allow for sufficient BMP volumes
    - Site soils and conditions are amenable to infiltration if it is required to meet volume requirements
    - Access to BMP during construction or after for OM&M (ties to property ownership/easements)
  - Non volume-based BMPs
    - BMP locations do not lie over known contaminated soils
    - Access to BMP during construction or after for OM&M (ties to property ownership/easements)
- Existing Infrastructure
  - Buried of overhead utilities and known upcoming changes to those locations
  - Roadways and/or presence/absence of curb and gutter sufficient to drain to potential BMP locations
- No identified negative impacts to Insufficiently or Unreclaimed Sites