

ADT Environmental & Mineral Consultants, LLC
26849 Road M
Cortez, CO 81321
(801) 918-0799
aly@adtenviro.com



DATE: 19 January 2024

ATTENTION:

Kim Coburn

Utah Department of Natural Resources
Minerals Branch of the Division of Oil, Gas and Mining – M0210041
PO Box 145801
Salt Lake City, Utah 84114-5801

DELIVERY METHOD:

Electronic Mail & USPS

Edward Ginouves

Bureau of Land Management
Cedar City Field Office
176 East D.L. Sargent Drive
Cedar City, UT 84721

SUBJECT: M0210041 – Amended Notice of Intent for Large Mining Operations & Plan of Operations

Dear Mr. Ginouves and Ms. Coburn,

Please find enclosed the amended Notice of Intent for Large Mining Operations and Plan of Operations for actions occurring on federal lands.

Also enclosed are the shapefiles that were used to generate the updated maps.

If you have any questions on this submittal, or the shapefiles, please feel free to call or e-mail to discuss further.

Best Regards,

Alysén D. Tarrant, Permits Specialist

ADT Environmental & Mineral Consultants, LLC

Application for Mineral Mine Plan Revision or Amendment

Operator: Progressive Contracting, Inc.

Mine Name: Dry Creek

File Number: M/ 021 /0041

Provide a detailed listing of all changes to the mining and reclamation plan that will be required as a result of this change. Individually list all maps and drawings that are to be added, replaced, or removed from the plan. Include changes of the table of contents, section of the plan, pages, or other information as needed to specifically locate, identify and revise or amend the existing Mining and Reclamation Plan. **Include page, section and drawing numbers as part of the description.**

DETAILED SCHEDULE OF CHANGES TO THE MINING AND RECLAMATION PLAN

			DESCRIPTION OF MAP, TEXT, OR MATERIALS TO BE CHANGED
☐ ADD	☒ REPLACE	☐ REMOVE	Replace ALL NOI Documents
☐ ADD	☐ REPLACE	☐ REMOVE	
☐ ADD	☐ REPLACE	☐ REMOVE	
☐ ADD	☐ REPLACE	☐ REMOVE	
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☐ ADD	☐ REPLACE	☐ REMOVE	

I hereby certify that I am a responsible official of the applicant and that the information contained in this application is true and correct to the best of my information and belief in all respects with the laws of Utah in reference to commitments and obligations, herein.

Russell Limb

Print Name

Sign Name, Position

Date

Return to:

State of Utah
Department of Natural Resources
Division of Oil, Gas and Mining
1594 West North Temple, Suite 1210
Box 145801
Salt Lake City, Utah 84114-5801
Phone: (801) 538-5291 Fax: (801) 359-3940

O:\FORMS\MR-REV-att.doc

FOR DOGM USE ONLY:

File #: M/ /

Approved: _____

Bond Adjustment: from (\$) _____
to \$ _____

P.C.I.
PROGRESSIVE CONTRACTING INC.

NOTICE OF INTENT TO COMMENCE LARGE MINING OPERATIONS &
PROPOSED PLAN OF OPERATIONS

DRY CREEK MINE

M/021/0041

UTU-XXXX

JANUARY 2024

Prepared For:

Bureau of Land Management (BLM)
176 East D.L. Sargent Drive
Cedar City, UT 84721

Utah Division of Oil Gas and Mining (DOGM)
PO Box 145801
1594 W North Temple #1210
Salt Lake City, UT 84116

Prepared By:

ADT Environmental & Mineral Consultants, LLC
26849 Road M
Cortez, CO 81321
aly@adtenviro.com
(801) 918-0799



3809.401 Plan of Operations Checklist

Operator Information Requirements - 3809.401(b)(1)

- ☐ Name, address, phone, taxpayer identification number – *See Section R647-4-104*
- ☐ BLM serial number of involved unpatented claims – *See Appendix A*
- ☐ Point of contact for corporations – *See Section R647-4-104*
- ☐ 30-day notification required for any change in operator – *See General Information*

Description of Operations Elements - 3809.401(b)(2)

- ☐ Maps showing all activity and facility locations – *See Appendix C*
- ☐ Preliminary designs and operating plans – *See Appendix C*
- ☐ Water management plans – *See R647-4-106.8 & R647-4-109.1*
- ☐ Rock characterization and handling plans – *See R647-4-106.9 & R647-4-109.5*
- ☐ Quality assurance plans – *See R647-4-109.5*
- ☐ Spill contingency plans – *See R647-4-109.5*
- ☐ Schedule of operations from start through closure – *See R647-4-102*
- ☐ Plans for access, power, water, or support services – *See R647-4-106.2*

Reclamation Plan Requirements - 3809.401(b)(3)

- ☐ Drill-hole plugging plans – *See R647-4-108*
- ☐ Regrading and reshaping plans – *See R647-4-110.2*
- ☐ Mine reclamation, with pit backfilling information – *See R647-4-110*
- ☐ Riparian mitigation plans – *Not applicable*
- ☐ Plans for wildlife habitat rehabilitation – *See R647-4-110.5*
- ☐ Topsoil handling plans – *See R647-4-110.5*
- ☐ Revegetation plans – *See R647-4-110.5*
- ☐ Plans to isolate and control toxic or deleterious material – *See R647-4-110.4*
- ☐ Plans to remove/stabilize buildings, structures, and facilities – *See R647-4-110.3*
- ☐ Provisions for post-closure management – *See R647-4-110.3*

Monitoring Plan Requirements - 3809.401(b)(4)

- ☐ Description of resources subject to monitoring plans – *See R647-4-109.5*
- ☐ Type and location of monitoring devices – *See R647-4-109.5*

- ❑ Sampling parameters and frequency – *See R647-4-109.5*
- ❑ Analytical methods – *See R647-4-109.5*
- ❑ Reporting procedures – *See R647-4-109.5*
- ❑ Procedures for responding to adverse monitoring results – *See R647-4-109.5*
- ❑ Reliance on other Federal or State monitoring plans – *See R647-4-109.5*

Interim Management Plan - 3809.401(b)(5)

- ❑ Measures to stabilize excavations and workings – *See R647-4-110*
- ❑ Measures to isolate or control toxic or deleterious materials – *See R647-4-110*
- ❑ Plan for storage or removal of: equipment, supplies, structures – *See R647-4-110*
- ❑ Measures to maintain the area in a safe and clean condition – *See R647-4-110*
- ❑ Plans for monitoring site conditions during non-operation – *See R647-4-110*
- ❑ Schedule of anticipated non-operation – *See R647-4-110*
- ❑ Provisions to notify BLM of changes in non-operation period – *See R647-4-110*

Table of Contents

3809.401 Plan of Operations Checklist	2
Operator Information Requirements - 3809.401(b)(1)	2
Description of Operations Elements - 3809.401(b)(2)	2
Reclamation Plan Requirements - 3809.401(b)(3)	2
Monitoring Plan Requirements - 3809.401(b)(4)	2
Interim Management Plan - 3809.401(b)(5)	3
R647-4-101 Filing Requirements and Review Procedures	8
R647-4-102 Duration of the Notice of Intention	8
R647-4-103 Notice of Intention to Commence Large Mining Operations	8
R647-4-104 Operator(s), Surface and Mineral Owner(s)	9
104.1 Operator Information	9
Company Information	9
Mine Information	9
Registered Utah Agent	9
Delegation of Authority	9
104.2 Surface & Mineral Landowners	9
Surface Landowners:	9
Mineral Owners:	10
104.3 Claim & Permit Information	10
105.1 - Topographic base map, boundaries, pre-act disturbance	11
105.2 - Surface facilities map	11
105.3 – Drawings or Cross Sections (slopes, roads, pads, etc,)	11
105.4 – Photographs	11
R647-4-106 Operation Plan	12
106.1 - Minerals mined	12
106.2 - Type of operations conducted, mining method, processing etc.	12
Mining Operation	12
Crushing	12
Loadout Area	13
Mining Equipment	13
Fuels and Oils	14
Waste Rock Management Plan	14
Use and Occupancy	14

Concurrent Reclamation.....	14
106.3 - Estimated acreages disturbed, reclaimed, annually	14
106.4 - Nature of materials mined, waste and estimated tonnages	14
Estimated Annual Mined Tonnage	15
Growth Media	15
Rock Type	15
Depth of Mining	15
106.5 - Existing soil types, location, amount	15
106.6 - Plan for protecting & re-depositing soils	16
106.7 - Existing vegetation - species and amount	16
106.8 - Depth to groundwater, extent of overburden, geology	17
Description of Hydrogeologic Setting.....	17
Water Storage/Treatment Ponds	18
Ephemeral Stream Channels	18
106.9 - Location & size of mineralized material, waste, tailings, ponds	18
Material Storage.....	18
Waste Storage	18
Water Storage/Treatment Ponds	18
106.10 - Amounts of Material extracted or moved	18
R647-4-108 - Hole Plugging Requirements	18
R647-4-109 - Impact Assessment	20
109.1 - Impacts to surface & groundwater systems	20
Surface Water Protection.....	20
Groundwater Protection	21
Water Rights Use and Water Quantity Protection	21
Actions to Mitigate Impacts to Surface and Ground Water	21
Surface Water	21
Ground Water	21
109.2 - Impacts to threatened & endangered wildlife/habitat	21
109.3 - Impacts on existing soils resources	23
109.4 - Slope stability, erosion control, air quality, safety	23
Pits.....	23
Waste dumps	23
Erosion.....	24

Storm water erosion.....	24
Wind based erosion.....	24
Emissions.....	24
Tail Pipe Emissions.....	24
Fugitive Dust.....	24
Public Health and Safety.....	24
109.5 - Actions to mitigate any impacts	24
R647-4-110 - Reclamation Plan	25
110.1 Current Land Use and Post – Mining Land Use	25
110.2 Reclamation of Roads, Highwalls, Slopes, Leach Pads, Dumps, Etc.	25
Roads, and other Ancillary Facilities	25
Highwalls	25
Crushing Area & Ancillary Structures.....	25
Waste Dumps & Crushed Stone Stockpiles	25
Mine Areas	25
Site-Wide	25
Drainages & Sumps	26
Seeding.....	26
110.3 Surface Facilities to be Left	26
Post-Closure Management of Fences, Berms, Signs and Treatment Systems.....	26
110.4 Treatment, Location, and Disposition of Deleterious Materials	26
Fuels & Oils.....	26
110.5 Re-vegetation Planting Program and Topsoil Re-distribution	26
Top Soil Material Replacement	26
Seed Bed Preparation.....	27
Seed Mixture	27
Method.....	27
Fertilization.....	27
Timing of Seeding	27
110.6 Commitment statement	27
R647-4-111 Reclamation Practices	27
R647-4-112 Variance	27
R647-4-113 Surety	27
R647-4-114 Failure to Reclaim	27

Acronyms & Abbreviations	28
References	29

Appendices

Appendix A	Associated Permits
Appendix B	Photographs of the existing vegetation and surface condition of the affected land
Appendix C	Maps and Figures
Appendix D	List of Fixed Equipment & Facilities
Appendix E	Geologic Information
Appendix F	Soil, Vegetation & Wildlife Information
Appendix G	Water Resource Information
Appendix H	SWPPP
Appendix I	Reclamation Cost Estimate

Maps

Map 1	General Site Topography
Map 2	Surface Geology
Map 3	Existing Facilities
Map 4	Proposed Development
Map 5	Existing Surface Water Resources
Map 6	Soil Resources
Map 7	Reclamation

Figures

Figure 1	General Project Location
Figure 2	General Site Area
Figure 3	Site Claim & Ownership

R647-4-101 Filing Requirements and Review Procedures

Progressive Contracting, Inc. (Company) intends to operate an open-pit gypsum mine (Dry Creek Mine) approximately 1.5 miles east of Cedar City, Utah, in Iron County. The Company will produce gypsum products, landscape rocks, and aggregate.

The Company has reviewed and understands section 101 of R-646-4.

R647-4-102 Duration of the Notice of Intention

The Company understands that this NOI including any subsequently approved amendments or revisions remains in effect for the life of the mine. The Company considers the life of the mine to be the end of mining and processing activities. The estimated life of the mine is 10 years.

R647-4-103 Notice of Intention to Commence Large Mining Operations

The Company has prepared this Notice of Intent (NOI) in accordance with R647-4-103 of the Utah Administrative Code. The NOI addresses the following requirements:

- R647-4-104 Operator(s), Surface and Mineral Owner(s)
- R647-4-105 Maps, Drawings and Photographs
- R647-4-106 Operation Plan
- R647-4-108 Hole Plugging Requirements
- R647-4-109 Impact Assessment
- R647-4-110 Reclamation Plan
- R647-4-112 Variance

R647-4-104 Operator(s), Surface and Mineral Owner(s)

104.1 Operator Information

Company Information

Progressive Contracting, Inc.
PO Box 1930
St George, UT 84770

Mine Information

Dry Creek Mine
UT-14
Cedar City, UT 84720
Contact: John Wilson
435-680-6101
johnwilson@progressivecontracting.com

Registered Utah Agent

Russell Limb
230 East Tabernacle
St George, UT 84770
435-628-6662
pci@infowest.com
Entity #: 1018101-0142

Delegation of Authority

Russell Limb
230 East Tabernacle
St George, UT 84770
435-628-6662
pci@infowest.com

104.2 Surface & Mineral Landowners

Surface Landowners:

- 8Mile LLC
1001W Cedar Knowlles S
Cedar City, UT 84720
- Russell Limb
PO Box 1930
St George, UT 84770
- Bureau of Land Management (BLM)
Cedar City Field Office
176 East D.L. Sargent Drive
Cedar City, UT 84721

Mineral Owners:

- 8Mile LLC
1002W Cedar Knowlls S
Cedar City, UT 84720
- Russell Limb
PO Box 1930
St George, UT 84770
- Bureau of Land Management (BLM)
Cedar City Field Office
176 East D.L. Sargent Drive
Cedar City, UT 84721

104.3 Claim & Permit Information

Federal mining claim number(s), lease number(s), or permit number(s) & State mining claim number(s), lease number(s), or permit number(s):

- Large Mine Permit with Utah Division of Oil, Gas & Mining (UDOGM): **M/021/0041**
- Temporary Relocation Permit under General Approval Order with Utah Division of Air Quality (UDAQ): **DAQE-AN0110970004-09**
- Storm Water Pollution Prevention Plan (SWPPP): **UTRI00230**
- BLM unpatented placer claims (**See Appendix A**)

R647-4-105 Maps, Drawings & Photographs

105.1 - Topographic base map, boundaries, pre-act disturbance

Refer to Map 1 in Appendix C

105.2 - Surface facilities map

Refer to Map 2 in Appendix C

105.3 – Drawings or Cross Sections (slopes, roads, pads, etc,)

Refer to Map 3 in Appendix C

105.4 – Photographs

Refer to Appendix B

R647-4-106 Operation Plan

The operator shall provide a narrative description referencing maps or drawings as necessary, of the proposed operations including:

106.1 - Minerals mined

Dry Creek is a gypsum mine, producing various gypsum products as well as aggregates and landscape rock.

106.2 - Type of operations conducted, mining method, processing etc.

The Company has been operating an open pit gypsum quarry near the mouth of Cedar Canyon along UT-14, in Cedar City, Utah since the early 2000s (Map 1). In 2007 the Company received their Small Mining Operations Permit (SMO) from UDOGM. The Dry Creek Mine continued to be mined under the SMO and various amendments until 2023, when the Company applied for and was granted a Large Mining Operations Permit (LMO) with UDOGM.

The Company is continuing to expand its operations from private land onto adjacent lands administered by the Cedar City Field Office (CCFO) of the BLM. The Plan Boundary, herein referred to as the Area of Interest (AOI) can be seen on the maps located in **Appendix C**.

Under this expanded plan, the following actions will be performed:

Mining Operation

The Company will remove rock from the active mine area by drilling and blasting (Map 3). The blasted rock will be loaded into haul trucks using loaders and/or excavators. Once the rock is loaded onto the haul trucks, it will be hauled to one of three designated locations.

Crushing

The rock will be hauled to one of three locations:

Crushed Aggregate Product

Crushed aggregate product will consist of material mined that does not meet specification for gypsum product. The aggregate rock will consist of the sedimentary rock interbedded within the gypsum seam (Map 2). The aggregate crushing area will also consist of larger landscape boulders that will not be crushed, but sold intact.

The aggregate crushing spread consists of:

- One (1) Closed circuit Jaw Crusher (<100 tons per hour (tph))
- One (1) Cone Crusher (<100 tph)
- One (1) Screen (<100 tph)
- Associated conveyors
- Two (2) stackers, producing two aggregate material types
- One (1) 225 kW Diesel-powered generator

Operational hours for the Crushed Aggregate Product is estimated to be 20 hours per week.

Crushed Agricultural (Ag) Gypsum

Crushed 'Ag' gypsum product will consist of crushed gypsum that will be sold for agricultural purposes. This product is a secondary product to the gypsum mine, and is operated seasonally.

The crushed 'Ag' gypsum crushing spread consists of:

- One (1) Closed circuit Impact Crusher (<100 tons per hour (tph))
- One (1) Screen (<100 tph)
- Associated conveyors
- Three (3) stackers, producing three 'Ag' gypsum material types
- One (1) 189 kW Diesel-powered generator

Operational hours for the crushed 'Ag' gypsum is seasonal, with a rolling 12-month average of 20 hours per week.

Crushed Primary Gypsum Product

The primary gypsum product is the main operation that will occur at the site. The primary gypsum product is board rock and white rock. The primary plant consists of:

- One (1) Closed circuit Impact Crusher (300 tph)
- One (1) Screen (300 tph)
- Associated conveyors
- Three (3) stackers, producing board rock and white rock stockpiles
- One (1) 165 kW Diesel-powered generator

The Board Rock product (Impact Crusher) operates 40 hours per week.

The White Rock product (screen) operates 15 hours per week.

Loadout Area

Although most of the product is directly loaded onto highway rated trucks for final sale, the white rock material is loaded separately in a loadout area. The loadout area consists of:

- Various conveyors
- One (1) stacker
- One (1) 25 kW Diesel-powered generator

The loadout area is operated seasonally, and equates to approximately 5 hours per week.

Mining Equipment

Mining equipment used at the site includes:

Table 2: Mining Equipment

Type of Equipment	Use
40 ton haul trucks	Mining and general construction
50 ton haul trucks	Mining
Excavators	Mining and general site maintenance
Loaders & backhoes	Mining and general site maintenance
Dozers	Mining and general site maintenance
Fork Lifts	General site maintenance

Type of Equipment	Use
Skid steers	General site maintenance
Fuel trucks, lube trucks, maintenance vehicles	General site maintenance
Light vehicles	General site maintenance & supervision

A detailed list of all facilities, tanks, and related fixed equipment can be found in **Appendix D** and Map 3.

Fuels and Oils

As the processing at site will consist only of crushing, screening, and washing using water, no deleterious materials are expected to be used. Fuels such as diesel and petroleum, and related oils, will be stored onsite for use in the mining equipment. Fuels and oils will be located at the crushing site, in designated areas.

Waste Rock Management Plan

The Company does not anticipate encountering any rock deemed inappropriate for industrial use as either crushed aggregate or gypsum product.

Use and Occupancy

The Company's occupancy of private and federal land is incident to mining and crushing.

The Company's operations do not limit access to adjacent public lands. Existing roads provide access to adjacent public lands (Map 1).

Section 110.3 addresses the reclamation of surface facilities.

Concurrent Reclamation

The Company will conduct concurrent reclamation as stipulated by R647-107.6. Reclamation is discussed in detail in Section 110.

106.3 - Estimated acreages disturbed, reclaimed, annually

The current disturbance, as of November 2023, is 47.2 acres. The proposed disturbance for this Notice is 75.5 acres. Table 3 details the current and proposed disturbance limits. The Company commits to completing partial reclamation concurrent with operations, as stipulated by R647-107.6.

Table 3: Existing and Anticipated Disturbance

Disturbance (Acres)	Private	Public	Total
Current Disturbance	46.1	1.0	47.1
Proposed Disturbance	56.7	18.8	75.5
Difference	10.6	17.7	28.4

106.4 - Nature of materials mined, waste and estimated tonnages

The Dry Creek mine produces multiple types of product, including landscape rock, aggregate, and gypsum products. All rock types mined at Dry Creek are sedimentary hosted.

Estimated Annual Mined Tonnage

Estimated waste mined annually: 0 tons per year

Estimated landscape rock mined annually: 0 – 10,000 tons per year

Estimated aggregate rock mined annually: 0 – 150,000 tons

Estimated ‘Ag’ gypsum rock mined annually: 0 – 150,000 tons

Estimated Board Rock mined annually: 0 – 700,000 tons

Estimated White Rock mined annually: 0 – 250,000 tons

Growth Media

Estimated growth media available for life-of-mine: Very little growth media exists within the AOI due to the steepness of the slopes and rock type. What little growth media is encountered is stockpiled in designated stockpiles as seen on Maps 3-7. Based on previous experience within the operation, suitable stockpiled material is salvaged to a depth of 6 inches. Therefore, with a total disturbance of 75.5 acres, approximately 61,226 cubic yards of growth media may be available for use in reclamation.

Rock Type

Aggregate & Landscape Rock

The primary rock type for the aggregate and landscape rock consists of Jurassic Navajo Sandstone (UGS.gov, n.d.). This rock type is inert in that it does not produce deleterious runoff.

Gypsum Products

The gypsum products are mined from the Jurassic Carmel Formation. Specifically, the gypsum is found in the Crystal Creek Member of the Carmel Formation (UGS.gov, n.d.). This member is associated with bedded siltstone, sandstone, and mudstone. All rock types are inert in that they do not produce deleterious runoff.

Depth of Mining

Mining will occur on the steep hilly slopes north of UT-14. The mining will continue to terrace the steep hilly slopes until the gypsum and desired landscape/aggregate rock has been mined out, or an elevation at or near that of the existing highway has been reached.

The final depth of mining will be well above any existing water table.

106.5 - Existing soil types, location, amount

According to the United States Department of Agriculture Natural Resources Conservation Service, the soils within the AOI are classified as (NRCS, 2024):

- 314** Badland-Moondog-Rock outcrop complex, 30 to 70 percent slopes
 0-3 inch depth soil profile: very stony silty clay loam
 Depth to bedrock: 22 inches
 Comprises 85% of AOI

- 426** Moondog-Lorhunt-Rock outcrop complex, 30 to 70 percent slopes
 0-3 inch depth soil profile: very stony silty clay loam

Depth to bedrock: 22-32 inches
Comprises 15% of AOI

Based on the soil profile for the AOI, the average salvageable soil depth should be maintained at 6 inches, including upper organic growth. See **Appendix F** and Map 6 for more detailed soil information.

Based on an average salvage depth of 6 inches, the amount of soil expected to be stockpiled for use in reclamation activities is 61,226 cubic yards.

106.6 - Plan for protecting & re-depositing soils

The Company plans to protect existing soils by clearing and stockpiling the soil before mining activities start. The soils will be salvaged and stockpiled in designated topsoil stockpile areas. The stockpile areas will be located near the cleared sites to reduce haul length. The stockpile areas will be located outside of known drainages (see Map 5) and away from roadways. Upon completion of the topsoil stockpiling, the stockpile will be bermed to reduce sediment runoff.

Upon completion of mining activities, soil will be redeposited as described in more detail in Section 110 below.

106.7 - Existing vegetation - species and amount

The AOI is located within a mixture of Sagebrush Basins and Slopes of the Central Basin and Range region (Woods, A. et al., 2000). The elevation of the Operation ranges from 6090 to 6570 ft above mean sea level (amsl).

Utah Ecoregions Map Definitions (taken directly from 'Ecoregions of Utah'):

***13c: Sagebrush Basins and Slopes** ecoregion is semiarid. The potential natural vegetation is Great Basin sagebrush. It is dominated by Wyoming big sagebrush but perennial bunchgrasses occur and become increasingly common northward as available moisture increases. However, cool season grasses are less abundant than in Ecoregions 80a and 80i, which are wetter, cooler, and have a potential natural vegetation of sagebrush steppe. The major land use is grazing, but feedlots, dairy operations, and irrigated cropland are found locally. Ecoregion 13c includes valleys, alluvial fans, and mountain flanks that are not as saline nor as arid as Ecoregions 13a or 13b. It is less rocky, rugged, and wooded than Ecoregion 13d and not as level as Ecoregions 13a and 13b.*

Ecosystem Dynamics Interpretive Tool (EDIT) – New Mexico State University

New Mexico State University hosts an online information system “for the development and sharing of ecological site descriptions, ecosystem state and transition models, and land management knowledge.” This site hosts a plethora of useful information pertaining to the Ecoregion in which the AOI is located.

According to the EDIT, the AOI is within the site: R028AY338UT (upland stony loam(Pinyon-Utah Juniper)). The full descriptive information can be found in **Appendix F** of this Document, however the takeaway from the descriptive is that the AOI has the following native ground cover (excluding trees) by percentage:

R028AY338UT – Upland Stony Loam (Pinyon-Utah Juniper):

Shrub/vine/liana foliar cover	15-30%
Grass/grasslike foliar cover	10-25%
Forb foliar cover	2-3%

Overall, therefore, the Company could expect the native ground to be covered with between 27-58% of plants (excluding trees). This is an important metric for discussing the reclamation standards, which are discussed in Section 110 below.

Vegetation & Wildlife Information

Vegetation and wildlife information has been gathered from the US Fish & Wildlife Service Information, Planning and Consultation System, as well as from the Utah Division of Wildlife Resources. The reports for the AOI are located in **Appendix F**. According to the IPaC, there are no current critical habitats within the AOI.

106.8 - Depth to groundwater, extent of overburden, geology

The geologic setting of the project is consistent with Southwestern Utah. As stated in Section 106.4, the AOI consists of Navajo Sandstone and Crystal Creek member of the Carmel Formation.

Description of Hydrogeologic Setting

The AOI is located within the Salt Creek Canyon – Coal Creek subbasin of the Escalante Desert Basin (Map 5).

According to the United States Geological Survey National Water Dashboard, the AOI is upgradient and disconnected from the Basin and Range basin-fill aquifer that underlies Cedar City, Utah (USGS.gov, 2024).

Ground Water Resources

Groundwater resources and depth to ground water within the AOI have been determined by utilizing surrounding water well information found at the Utah Division of Water Rights online map (Utah Water Rights, 2024). According to the Water Rights map, there are three underground points of diversion within one half of a mile of the AOI:

73-2416 (2) Owner: City Corporation
 Depth to Groundwater: 1,000 to 1,500 feet
 Annual usage: 3619.8999 acre feet per year

73-2206 Owner: Milan Emil Roundy
 Depth to Groundwater: 147 feet
 Annual usage: 1.8 acre feet per year

73-3511 Owner: Mitchell O. and Jana J. Dettamanti
 Depth to Groundwater: 147 feet
 Annual usage: 0.45 acre feet per year

The mine plan intends to mine the steep hilly slopes to form terraces. No pits are planned to be mined and/or excavated below the elevation of the pavement of UT-14. Therefore, there are no risks to groundwater as a result of this proposed plan.

Surface Water Resources

There are no perennial streams that run through the Operation. According to the EPA WATERS GGeoViewer, there are two major feeder ephemeral streams that converge and directed to the Coal Creek by use of a culvert. Detailed information on the surface water resources can be found in **Appendix G**.

According to the Western Regional Climate Center (WRCC) there is a weather station located in Cedar City, Utah, which is approximately two miles west of the AOI. The Cedar City 5E weather station provides average precipitation for the area based on a climate summary from 1983 to 2016. Based on the climate summary, the AOI would receive an annual total precipitation of 16.3 inches (WRCC, 2024).

Water Storage/Treatment Ponds

The Company does not have water storage or treatment ponds.

Ephemeral Stream Channels

The only ephemeral stream channels within the AOI flows to Coal Creek via culvert. See **Appendix G** for detailed information.

106.9 - Location & size of mineralized material, waste, tailings, ponds

Material Storage

For this Operation, the ‘mineralized’ material in this case is aggregate, landscape rock, and gypsum products. According to the November 2023 Drone Survey there are approximately 10-30 million tons of mineable product within the proposed disturbance area (Table 3).

The operation may have up to ten (10) individual stockpiles of various product types. Each stockpile has the capacity of approximately 15,000 tons of material.

The operation may have up to three (3) individual stockpiles of pre-crushed stone. Each pre-crushed stone stockpile has the capacity of approximately 50,000 tons of material.

Waste Storage

The Company does not anticipate any waste storage facility associated with this site.

Water Storage/Treatment Ponds

The Company does not anticipate any water storage ponds associated with this site.

106.10 - Amounts of Material extracted or moved

The types of material to be extracted and/or moved include:

- Aggregate and landscape rock
- Various gypsum products
- Growth media (soil)

Section 106.4 details the amounts and types of material to be moved annually.

R647-4-108 - Hole Plugging Requirements

No drill holes other than blast holes are planned for this operation. If, in the future, the Company determines that exploration drilling is necessary, the Company will plug the holes as soon as practical and shall not leave them unplugged for more than 30 days without approval of the Division.

The Company's surface plugging of drill holes, if applicable, shall be accomplished by setting a nonmetallic perma-plug at a minimum of 5' below the surface, or returning the cuttings to the hole and tamping the returned cuttings to within 5' of ground level. The hole above the perma-plug or tamped cuttings will be filled with a cement plug. If the cemented casing is to be left in place a concrete surface plug is not required, provided that a permanent cap is secured on top of the casing.

Drill holes that encounter water, oil, gas or other potential migratory substances and are $2\frac{1}{2}$ " or greater in surface diameter shall be plugged in the subsurface to prevent the migration of fluid from one stratum to another. If water is encountered plugging shall be accomplished as outlined below.

Holes that encounter significant amounts of non-artesian water shall be plugged by placing a 50' cement plug immediately above and below the aquifer(s) or filling from the bottom up (through the drill stem) with a high-grade bentonite/water slurry mixture. The slurry shall have a Marsh funnel viscosity of at least 50 seconds per quart before the adding of any cuttings.

R647-4-109 - Impact Assessment

109.1 - Impacts to surface & groundwater systems

Surface Water Protection

Surface water is protected during active mining by use of one major culvert, manmade and natural stormwater catchments, and proper sediment control features. Structures and laydown areas associated with the Operation are located in topographically flat locations, and are properly bermed so as to ensure no impact on surface water resources (**Map 5**). Fuel and oil containment areas will be checked monthly per the Company's SPCC. Spill kits will be kept onsite and readily available in the event of a localized spill. Large spills will be mitigated by use of berming the spill area, and excavating the contaminated soils using heavy equipment. Detailed spill response procedures can be found in the Company's SPCC.

To the extent possible, stormwater is diverted around and through the active mine area using existing natural drainage channels. Where stormwater falls within the active mine area, the stormwater is diverted to onsite manmade and natural catchments where it is allowed to infiltrate or evaporate. Potential impacts associated with long-term surface and ground water hydrology and erosion control will be mitigated during reclamation activities as discussed in more detail in Section 110 below.

The Company maintains a Storm Water Pollution Prevention Plan (SWPPP) in accordance with the Utah Pollutant Discharge Elimination System (UPDES) Permit and UPDES General Multi-Sector General Permit (MSGP). The MSGP authorizes storm water discharges related to crushing and screening operations.

The SWPPP describes pollution prevention and control practices designed to minimize the contact of storm water with "significant materials", and thereby avoiding impacts, or otherwise manage water after such contact, so there is no discharge.

The SWPPP authorizes the diversion of surface water around the active mining area. Activities in the active mining area include the following:

- Road Construction
- Drilling and blasting
- Open-pit excavation
- Material hauling and stockpiling
- Material Processing
- Vehicle maintenance and parking

The Company avoids impacts to surface water systems through implementation of best management practices (BMP) in accordance with the SWPPP. BMP are developed to minimize the potential for non-point source pollution to surface waters.

BMPs include both structural and non-structural controls. Structural controls include:

- Diversion
- Retention
- Erosion and Sediment Control
- Stabilization
- Energy Dissipation

Structural control methods are implemented to site conditions, and modified as site conditions change with on-going mine development. These include:

- Diverting runoff away from roads and other denuded areas by using berms, ditches, and other functionally equivalent diversions.
- Preparation of road drainages and outlets by removing fugitive outfalls and consolidating runoff into designed outfall structures that are capable of managing the expected runoff volume.
- Reducing runoff velocities by using energy dissipation devices and minimizing grade.
- Trapping sediment on-site in sediment ponds, sumps, and other functionally equivalent structural controls.
- Capturing runoff, when practical, to eliminate the potential for storm water discharges.

Diversion channels and retention ponds comprise the primary structural controls at the Operation.

Non-structural controls include maintenance, spill prevention & response, inspections, training, and record keeping. These controls are detailed in the SWPPP.

Groundwater Protection

There is no anticipated discharge to ground water from the actions proposed herein.

There are no projected impacts to surface or ground water systems.

Water Rights Use and Water Quantity Protection

Water is hauled from nearby sources. The Company does not intend to use water from surface or underground sources within the AOI.

Actions to Mitigate Impacts to Surface and Ground Water

Surface Water

Surface water impacts will be mitigated during active mining by ensuring drainage diversion systems are maintained and cleared of debris. If sediment and/or debris build-up occurs, removal of sediments/debris will be scheduled during a period of low precipitation risk. Natural drainage channels surrounding the mine area will be kept in place, and not impounded or otherwise impacted by mining. Where impacted, the Company will work with the appropriate agencies to design and install re-routes to ensure surface water flow is continued unencumbered.

Surface Water features will not be impacted by active mining.

As no modifications are proposed that would impact surface water resources, the drainages and other surface water features as seen on **Map 5** will remain unchanged during post-closure.

Ground Water

Ground water is not anticipated to be encountered by mining operations.

109.2 - Impacts to threatened & endangered wildlife/habitat

As stated in Section 106.7, an updated IPaC report was gathered for the AOI. According to the IPaC report, the AOI does not contain critical habitat.

IPaC – Designated Species List

While no habitats exist within the AOI for IPaC designated species, the following species may potentially

be affected by the activities within the AOI:

Mammals

- Utah Prairie Dog – Threatened (no critical habitat exists within the AOI)

Birds

- California Condor – Experimental, non-essential (proposed critical habitat, not yet adopted)
- Mexican Spotted Owl – Threatened (no critical habitat exists within the AOI)
- Yellow-billed Cuckoo – Threatened (no critical habitat exists within the AOI)

Insects

- Monarch Butterfly – Candidate (no critical habitats have been designated)

Plants

- Ute Ladies' tresses – Threatened (no critical habitats have been designated)

Eagles & Migratory Birds

- Bald Eagle – this is not a bird of conservation concern within this area
- Golden Eagle – this is not a bird of conservation concern within this area
- Pinyon Jay – This is a bird of conservation concern
- Virginia's Warbler – This is a bird of conservation concern

Utah Sensitive Species List

According to the Utah Division of Wildlife Resources, the following Sensitive Species have the potential to occur near the AOI (UDWR, 2024):

Birds

- Bendire's Thrasher – Breeds in open sagebrush and sagebrush-juniper; limited to no suitable habitat within the AOI
- Black Swift – habitat requirements include water; no suitable habitat within the AOI
- Burrowing Owl – occurrence in desert valleys/prairie dog colonies; no suitable habitat within the AOI
- Band-tailed Pigeon – generally occurs in woodlands and cultivated areas; limited to no suitable habitat within the AOI
- Flammulated Owl – generally occurs in forested areas; no suitable habitat within the AOI
- Ferruginous Hawk – open desert, barren cliffs and bluffs; limited to no suitable habitat within the AOI
- Snowy Plover – habitat includes beaches, dry mud or salt flats, and shores; no suitable habitat within the AOI
- Peregrine Falcon – cliffs, bluffs, caves, and rock pockets; limited to no suitable habitat exists within the AOI

Mammals

- Pygmy Rabbit – generally occurs in dense sagebrush; no suitable habitat within the AOI
- Little Brown Myotis – caves, hollow trees, manmade structures; limited to no suitable habitat within the AOI
- Spotted Bat – deep, narrow rocky canyons crevices in cliff walls; no suitable habitat exists within the AOI

Amphibians

- Northern Leopard Frog – occurs near springs, streams, marshes, bogs, etc.; no suitable habitat exists within the AOI

Printouts of all UDWR species reports can be found in **Appendix F**.

The Company will mitigate potential impacts on wildlife by implementing the following:

The Company will mitigate potential impacts on migratory birds and raptors by only performing new disturbances outside of the migratory bird fledgling window of March 15 – June 30. New disturbances between March 15 and June 30 will occur within ten days of completion of a migratory bird survey. If any nests are located, disturbance within those surveyed areas will be delayed until after the fledgling window stated above.

Blasting will occur during daylight hours only to reduce the presence of bats and other nocturnal wildlife within the AOI.

109.3 - Impacts on existing soils resources

Mining operations will be conducted in accordance with R647-4-107.3 Erosion Control. The Company's compliance with R647-4-107.3 helps minimize the loss of soil resources due to erosion. Erosion is the only anticipated impact on existing soils due to mining operations.

Salvageable growth medium (soil and vegetation) will continue to be grubbed from disturbed areas and stockpiled in the locations described in Section 106.5

As described in Section 106.5 and 106.6, the Company will stockpile all salvaged growth media in designated locations as seen on **Map 7**. Stockpiled topsoil will be bermed around the base perimeter to prevent loss of soil due to erosion. The Company will also treat the topsoil stockpiles with an interim seed mix approved by the Division, and listed in Section 110.5.

109.4 - Slope stability, erosion control, air quality, safety

There are no large long-term stockpiles planned for the site. Short-term slope stability, erosion control, air quality, and safety measures will follow the Company's Air Quality Approval Order and Fugitive Dust Control Plan. These include:

- Water spraying of stockpiles to reduce fugitive dust;
- Water spraying of all roads, staging areas, and working areas to reduce fugitive dust;
- Reducing the height of stockpiles;
- Proper stockpile excavation techniques to eliminate overhang and vertical walls;
- Berming around the perimeter of processing operations to reduce sediment runoff.

Pits

No pits are planned for this operation. Instead, the steep hilly slopes will be mined in terraces creating stable terracing for long-term use.

Waste dumps

No waste dumps are planned for this operation.

Erosion

The Company manages erosion from two main sources: wind and storm water. It is anticipated that the wind will blow dust from disturbed surfaces around and off the site. It is also anticipated that storm water will move sediment during rain events. Erosion control methods will be employed to help minimize erosion, as needed, while stable revegetation establishes following final regrading of any remaining stockpiles. Such methods may include recontouring of the stockpiles to blend with surrounding topography.

Storm water erosion

Storm water is managed in accordance with UPDES permit and the SWPPP. Storm water is diverted through the mine site to both reduce erosion and minimize storm water's interaction with disturbed areas. Sediment traps and berms will be installed as necessary and or by condition of permits. Sediment traps may be expanded into larger basins to mitigate flooding in response to rainfall events.

Wind based erosion

Wind based erosion will be managed in accordance with the air quality permit, as needed. Wind erosion is managed by reclaiming disturbed areas, seeding growth media stockpiles, and utilizing a water truck to keep dust generated by mobile equipment and crushing activities to a minimum.

Emissions

The Company manages two emissions impacting air quality: tail pipe emissions from equipment, both mobile and stationary, and fugitive dust. The Company maintains an Air Quality Permit administered by the Utah Division of Air Quality (UDAQ).

Tail Pipe Emissions

The Company complies with an air quality permit administered by the UDAQ. All equipment used on the site is maintained according to a preventative maintenance schedule promoting optimal operation and minimal emissions.

Fugitive Dust

The Company complies with the fugitive dust control plan and air quality permit exemption administered by the UDAQ. Dust is controlled by operation of water trucks and associated sprays. Opacity is monitored by visual observation.

Public Health and Safety

The Company manages multiple potential impacts to public health and safety including fugitive dust, water quality, site access, and hazardous materials.

Public Health and Safety are a primary concern of the Company. The Company manages fugitive dust, as discussed in both the Erosion Control and Air Quality sections, by way of monitoring dust and reclaiming disturbed areas and the watering of roadways. The Company controls access to the site by way of fencing, berms, signage, on-site personnel, and/or video surveillance. The Company manages hazardous materials by following permit conditions, MSHA, and associated rules and regulations.

109.5 - Actions to mitigate any impacts

Mitigation is discussed in sections 109.1 through 109.4, and is supported by reclamation plans in section 110.

R647-4-110 - Reclamation Plan

110.1 Current Land Use and Post – Mining Land Use

The current land use in the AOI is industrial (for the private land portion), recreation, rangeland and wildlife habitat (for the public land portion). Post-mining land use will be industrial (for the private land portion), recreation, rangeland and wildlife habitat (for the public land portion).

110.2 Reclamation of Roads, Highwalls, Slopes, Leach Pads, Dumps, Etc.

Roads, and other Ancillary Facilities

All surfaces, haul roads, and roads not deemed essential by the private landowner, DOGM or the BLM will be reclaimed. Reclamation will include ripping/re-grading, followed by topsoil placement, unless approved otherwise by the Division, and re-seeding. The ripping and/or re-grading of the haul roads and adjacent slopes (if applicable) will be performed to match surrounding terrain and surface conditions.

Highwalls

The mine plan will generate terraced benches that will be stable at greater than 45 degrees from the crest of the upper terrace to the outer-most extent of the lower terrace. Highwalls will be left un-reclaimed, and will be graded for post-mining land use on the private land. On the public land, highwalls will be left un-reclaimed and will be left in a long-term stable condition.

Crushing Area & Ancillary Structures

All mining and crushing equipment and ancillary structures will be removed from site or moved to the post-closure laydown yard on the private land (Map 7). Demolition material, if applicable, will be hauled to the local landfill or, if steel, to the local recycling facility for final disposal. No concrete is expected to be poured at the site, as all site facilities are considered mobile. Jersey blocks and other retaining structures will be removed from site, or stored in the Company's post-closure laydown yard, as applicable.

Waste Dumps & Crushed Stone Stockpiles

No waste dumps will be associated with the Operation.

Remaining crushed stone stockpiles will be pushed to cover the crushing area and mine areas to assist with the post-mining re-contouring. For the purposes of the reclamation cost estimate, a total of 150,000 tons of remaining crushed stone will be re-handled for post-mining re-contouring purposes.

Mine Areas

The mine areas will consist of mined-out hillsides, which will be mined in terraces for post-mining land use on the private land. The mine areas on public land will be mined in terraces, and will be left in long-term stable conditions.

Following shutdown of operations, the mine areas will be ripped and re-graded. Growth media will be placed to a depth of 6 inches over the re-contoured surfaces, followed by seeding with a Division-approved seed mix.

Site-Wide

Following site shutdown, all trash, scrap metal, and woody debris will be removed from the project area and hauled to the local landfill or recycling facility, as applicable. Remaining access routes and disturbed areas will be ripped and re-graded to blend with surrounding contour.

Drainages & Sumps

No natural ephemeral drainages will be disturbed as part of this operation, so post-closure drainage re-installment is necessary. The culvert will remain in place post-closure.

Seeding

Seeding in all areas of the disturbance footprint other than the Company's proposed post-closure laydown yard will be performed using either aerial seeding, broadcast seeding, or other methods that have been proved to have viability within the surrounding areas. Seeding will occur either in the very early part of spring, before final thaw, or in the latter part of the year, right after the first snowfall.

110.3 Surface Facilities to be Left

The only permanent surface facilities to be left would be the culvert and other stormwater control features.

The landowner may, at the Company's discretion, use the area defined in Map 7 as a permanent post-closure laydown and storage yard for the Company's equipment. Various crushing and mining equipment may remain at site, on private property, post-closure.

Post-Closure Management of Fences, Berms, Signs and Treatment Systems

No fencing is expected to be placed post-closure.

Berms a minimum of four feet high will be placed around the perimeter of the remaining high walls on public land, and will be signed with appropriate signages for the presence of a steep face. Signs will be placed at a minimum every 100 feet, due to the amount of recreational activity in the area. Signs will also be placed appropriately to indicate the area as a reclamation site. The purposes of the reclamation signs will hopefully deter recreational activities on the areas that are undergoing re-seeding treatment.

110.4 Treatment, Location, and Disposition of Deleterious Materials

As the primary purpose of the Operation is to produce crushed stone and gypsum product, no deleterious materials other than fuels and oils will be used.

Fuels & Oils

All fuels and oils will be held at the Operation in double-walled tanks or within appropriately sized and installed secondary containment areas. At closure, the fuel and oil tanks will be moved to the Company's post-closure laydown yard for continued use in other operations.

110.5 Re-vegetation Planting Program and Topsoil Re-distribution

Top Soil Material Replacement

Growth media will be spread over the re-contoured and ripped areas, and along all ripped access roads. Growth media will be spread using loaders, haul trucks, bulldozers, and graders. Growth media will be spread to a depth of 6 inches.

No additional borrow material is expected to be needed.

Estimated topsoil quantities needed for final reclamation is 61,226 cubic yards.

The Company is proposing to bond a total of **75.5** acres of disturbance.

Seed Bed Preparation

Growth media will be spread in the same way for all of the reclamation across the site other than in the laydown yard as seen on Map 7, and will be spread to a depth of 6 inches unless otherwise specified.

Seed Mixture

[placeholder]

Method

The seeding method will vary and include broadcasting, drill seeding, and aerial seeding with the objective to meet the reclamation standard of 70% of the baseline vegetation cover.

Fertilization

No fertilizers will be used.

Timing of Seeding

Seeding will be conducted in the very early spring, before thaw, or in the late fall up and until snow begins to accumulate.

110.6 Commitment statement

The Company is committed to successful reclamation of the mine site with a minimum of 70% of the baseline vegetation cover. Concurrent reclamation, permit compliance, and surety demonstrate this commitment.

R647-4-111 Reclamation Practices

During reclamation activities the Company will conform to the practices listed under R647 section 111 unless the Division grants a variance in writing.

R647-4-112 Variance

The Company requests a variance to R647-4-111.11: Structures and Equipment. The Company requests that structures and equipment be left onsite within the Company's designated Laydown yard, as per the landowner's request for post-closure land use. This variance should be granted as the land is designated as 'industrial' by Iron County, and as such, may be used by the landowner for a post-mining laydown yard. The Company is owned by the Landowner, and the Landowner intends to use the laydown yard for storage of the Company's equipment, machinery, and structures for use in other locations operated by the Company.

The Company requests a variance from R647-4-111.13: Revegetation. The Company requests that the laydown yard, having post-mining land use by the landowner and Company, does not need to be re-topsoiled. As topsoil is scarce in this area, the non-topsoiling and non-reclaiming of the laydown yard will help ensure adequate topsoil is present for other sites within the AOI.

R647-4-113 Surety

The Company has completed a reclamation cost estimate, as detailed in Appendix I of this NOI.

R647-4-114 Failure to Reclaim

The Company understands the implications if they fail to reclaim.

Acronyms & Abbreviations

Acronym & Abbreviation	Full Phrase
UDOGM	Utah Division of Oil, Gas and Mining
BLM	Bureau of Land Management
CCFO	Cedar City Field Office
Company	Progressive Contracting, Inc.
UDAQ	Utah Division of Air Quality
SWPPP	Storm Water Pollution Prevention Plan
SPCC	Spill Prevention Control & Countermeasures
SMO	Small Mining Operations
LMO	Large Mining Operations
tph	Tons per hour
Ag	Agricultural
AOI	Area of Interest
amsl	above mean sea level
WRCC	Western Regional Climate Center
BMP	Best Management Practice

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P.C.I.
PROGRESSIVE CONTRACTING INC.

APPENDIX A

ASSOCIATED PERMITS

Account 0307287

Location	Owner	Value	
Parcel Number D-0250-0000-0000	Name 8 MILE L C	Market (2023)	\$9,396
Account Number 0307287	1001 W CEDAR KNOLLS S	Taxable	\$9,395
Tax District 10 - COUNTY WCD	CEDAR CITY, UT 84720	Tax Area: 10	Tax Rate:
Acres 62.64			0.007876
Situs , 0		Type Actual Assessed Acres	
Legal LOT 1 & NE1/4NW1/4 SEC 18,T36S,R10W, SLM. LESS 20 AC CENTRALLY ASSESSED SA-D- 250 #499546 & S-6943 #499547.		Land \$9,396	\$9,395 62.640
Parent Parcels			
Parent Accounts			
Child Parcels SA-D-0250-0000-0000			
Child Accounts 0499546			

Transfers

Doc Description
Quit Claim Deed
Warranty Deed

Images

DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
MINING CLAIMS
(MASS) Serial Register Page

Run Date/Time: 8/2/2023 15:36 PM

Page 1 Of 4

01 10-21-1976;090STAT0090;43USC1744

Case Group: 38

Case Type : PLACER CLAIM

Claim Name: SALT CREEK # 1

Date of Location: 01/31/2023

Date Filed: 02/07/2023

Case Disposition: FILED

Disposition Date: 02/07/23

Required Maintenance Fee: \$1320.00

Next Payment Due Date: 09/01/23

Total Acres

160

Serial Number

UT105817198

Lead File Number

UT105817198

Name & Address	Interest Relationship
XXXXXXXXXX	CLAIMANT
XXXXXXXXXX XXXXXXXXXXXX, XX XXXXX-XXX	
XXXXXXXXXX	CLAIMANT
XXXXXXXXXX XXXXXXXXXXXX, XX XXXXX-XXX	
XXXXXXXXXX	CLAIMANT
XXXXXXXXXX XXXXXXXXXXXX, XX XXXXX-XXX	
XXXXXXXXXX	CLAIMANT
XXXXXXXXXX XXXXXXXXXXXX, XX XXXXX-XXX	
XXXXXXXXXX	CLAIMANT
XXXXXXXXXX XXXXXXXXXXXX, XX XXXXX-XXX	
XXXXXXXXXX	CLAIMANT
XXXXXXXXXX XXXXXXXXXXXX, XX XXXXX-XXX	
XXXXXXXXXX	CLAIMANT
XXXXXXXXXX XXXXXXXXXXXX, XX XXXXX-XXX	
XXXXXXXXXX	CLAIMANT
XXXXXXXXXX XXXXXXXXXXXX, XX XXXXX-XXX	

County	State	District/Field Office
Mer Twp Rng Sec	Quadrant	
26 0360S 0100W 007	SW, SE	

Date Filed	Code	Action Text	Action Status	Action Remarks	Receipt Number
02/07/2023	395	RECORDATION NOTICE RECD	FILED		5155982
03/20/2023	963	CASE MICROFILMED/SCANNED	ACCEPTED	SCANNED	
02/07/2023	113	ADDITIONAL INFO RECEIVED	ACCEPTED	E2SW & W2SE SEC 7	

Remarks

NO WARRANTY IS MADE BY BLM FOR USE OF THE DATA FOR PURPOSES NOT INTENDED BY BLM

DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
MINING CLAIMS

(MASS) Serial Register Page

Run Date/Time: 8/2/2023 15:36 PM

Page 2 Of 4

01 10-21-1976;090STAT0090;43USC1744

Total Acres

Serial Number

Case Group: 38

80

UT105817199

Case Type : PLACER CLAIM

Claim Name: SALT CREEK # 2

Lead File Number

Date of Location: 01/31/2023

UT105817198

Date Filed: 02/07/2023

Case Disposition: FILED

Disposition Date: 02/07/23

Required Maintenance Fee: \$660.00

Next Payment Due Date: 09/01/23

Name & Address	Interest Relationship
XXXXXXXXXX	CLAIMANT
XXXXXXXXXX XXXXXXXXXXXX, XX XXXXX-XXX	
XXXXXXXXXX	CLAIMANT
XXXXXXXXXX XXXXXXXXXXXX, XX XXXXX-XXX	
XXXXXXXXXX	CLAIMANT
XXXXXXXXXX XXXXXXXXXXXX, XX XXXXX-XXX	
XXXXXXXXXX	CLAIMANT
XXXXXXXXXX XXXXXXXXXXXX, XX XXXXX-XXX	

County	State	District/Field Office
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Mer Twp Rng Sec	Quadrant
26 0360S 0100W 007	NE, NW

Date Filed	Code	Action Text	Action Status	Action Remarks	Receipt Number
02/07/2023	395	RECORDATION NOTICE RECD	FILED		5155982
03/20/2023	963	CASE MICROFILMED/SCANNED	ACCEPTED	SCANNED	
02/07/2023	113	ADDITIONAL INFO RECEIVED	ACCEPTED	SENE & SWNE SEC 7	

Remarks

DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
MINING CLAIMS

Run Date/Time: 8/2/2023 15:36 PM

(MASS) Serial Register Page

Page 3 Of 4

01 10-21-1976;090STAT0090;43USC1744

Total Acres

Serial Number

Case Group: 38

40

UT105817200

Case Type : PLACER CLAIM

Claim Name: SALT CREEK # 3

Lead File Number

Date of Location: 01/31/2023

UT105817198

Date Filed: 02/07/2023

Case Disposition: FILED

Disposition Date: 02/07/23

Required Maintenance Fee: \$330.00

Next Payment Due Date: 09/01/23

Name & Address	Interest Relationship
XXXXXXXXXXXX XXXXXXXXXXXX XXXXXXXXXXXX, XX XXXXX-XXX	CLAIMANT
XXXXXXXXXXXX XXXXXXXXXXXX XXXXXXXXXXXX, XX XXXXX-XXX	CLAIMANT
XXXXXXXXXXXX XXXXXXXXXXXX XXXXXXXXXXXX, XX XXXXX-XXX	CLAIMANT
XXXXXXXXXXXX XXXXXXXXXXXX XXXXXXXXXXXX, XX XXXXX-XXX	CLAIMANT

County	State	District/Field Office
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Mer Twp Rng Sec	Quadrant
26 0360S 0100W 007	SW

Date Filed	Code	Action Text	Action Status	Action Remarks	Receipt Number
02/07/2023	395	RECORDATION NOTICE RECD	FILED		5155982
03/20/2023	963	CASE MICROFILMED/SCANNED	ACCEPTED	SCANNED	
02/07/2023	113	ADDITIONAL INFO RECEIVED	ACCEPTED	E2SWSW & E2NWSW SEC 7	

Remarks

DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
MINING CLAIMS

Run Date/Time: 8/2/2023 15:36 PM

(MASS) Serial Register Page

Page 4 Of 4

01 10-21-1976;090STAT0090;43USC1744

Total Acres

Serial Number

Case Group: 38

40

UT105817201

Case Type : PLACER CLAIM

Claim Name: SALT CREEK # 4

Lead File Number

Date of Location: 01/31/2023

UT105817198

Date Filed: 02/07/2023

Case Disposition: FILED

Disposition Date: 02/07/23

Required Maintenance Fee: \$330.00

Next Payment Due Date: 09/01/23

Name & Address	Interest Relationship
XXXXXXXXXX XXXXXXXXXX XXXXXXXXXXXX, XX XXXXX-XXX	CLAIMANT
XXXXXXXXXX XXXXXXXXXX XXXXXXXXXXXX, XX XXXXX-XXX	CLAIMANT
XXXXXXXXXX XXXXXXXXXX XXXXXXXXXXXX, XX XXXXX-XXX	CLAIMANT
XXXXXXXXXX XXXXXXXXXX XXXXXXXXXXXX, XX XXXXX-XXX	CLAIMANT

County	State	District/Field Office
--------	-------	-----------------------

Mer Twp Rng Sec	Quadrant
26 0360S 0100W 018	NE

Date Filed	Code	Action Text	Action Status	Action Remarks	Receipt Number
02/07/2023	395	RECORDATION NOTICE RECD	FILED		5155982
03/20/2023	963	CASE MICROFILMED/SCANNED	ACCEPTED	SCANNED	
02/07/2023	113	ADDITIONAL INFO RECEIVED	ACCEPTED	NWNE SEC 18	

Remarks

P.C.I.
PROGRESSIVE CONTRACTING INC.

APPENDIX B

**PHOTOGRAPHS OF EXISTING VEGETATION AND
SURFACE CONDITION OF AFFECTED LAND**









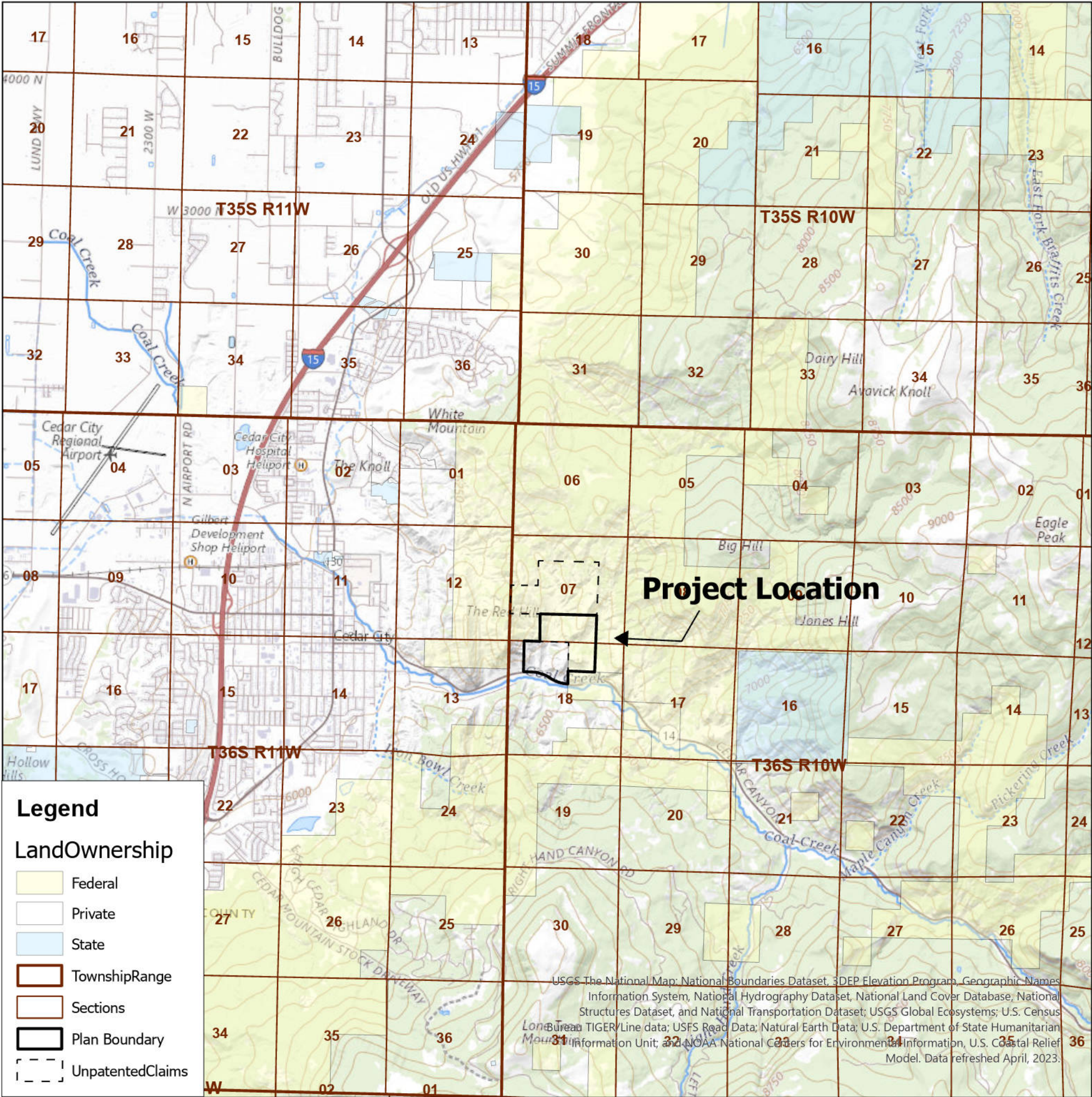




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APPENDIX C

MAPS AND FIGURES



0 1 2 3 4 Miles

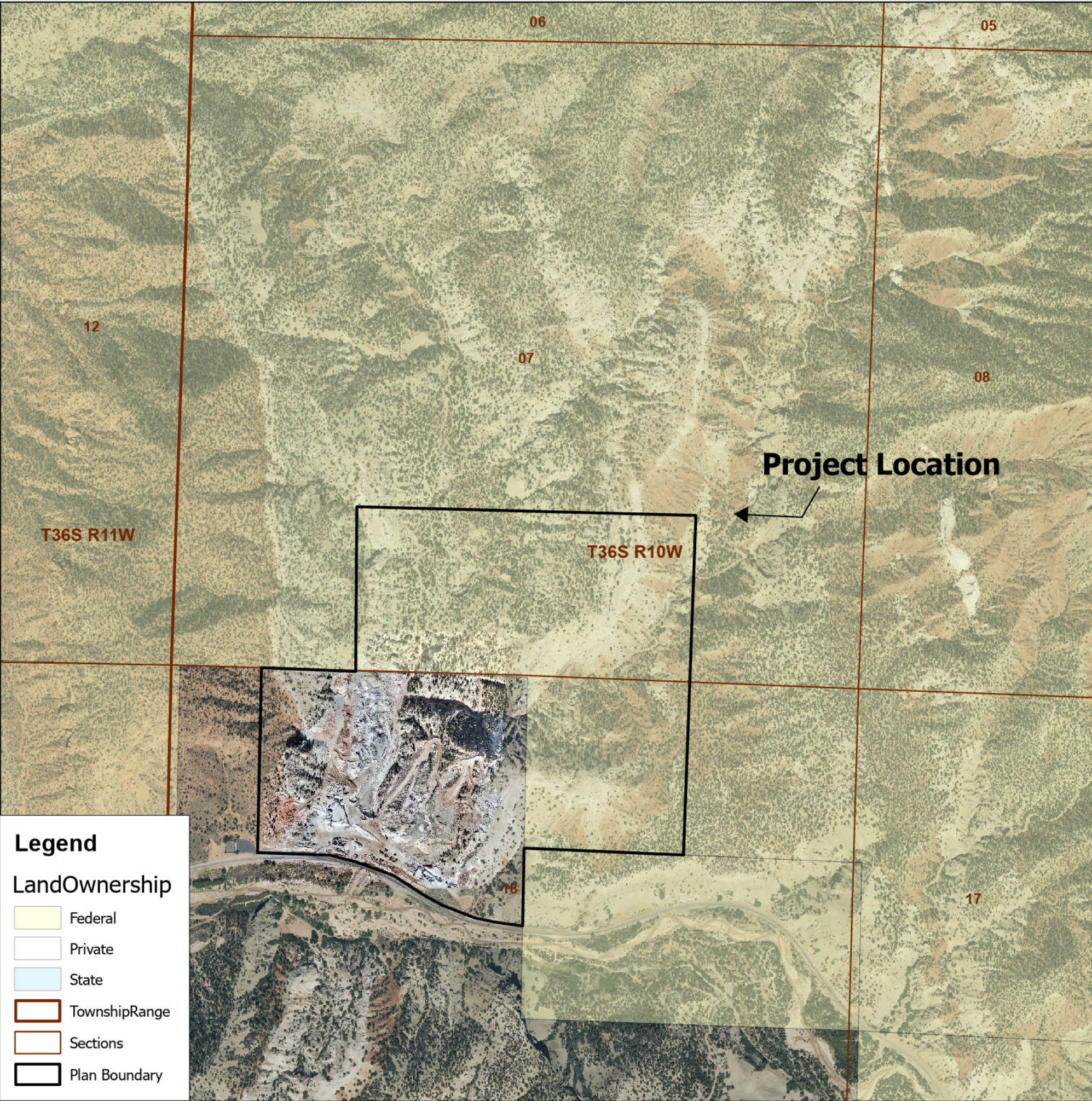
PROGRESSIVE CONTRACTING NOTICE OF INTENT & PLAN OF OPERATIONS M/021/0041 UTU-XXXXX

FIGURE 1 GENERAL LOCATION

Date: 08 January 2024

Drawn By: ADT E&M

ADT Environmental & Mineral Consultants, LLC
26849 Road M
Cortez, CO 81321
[P] (801) 918-0799
[E] aly@adtenviron.com

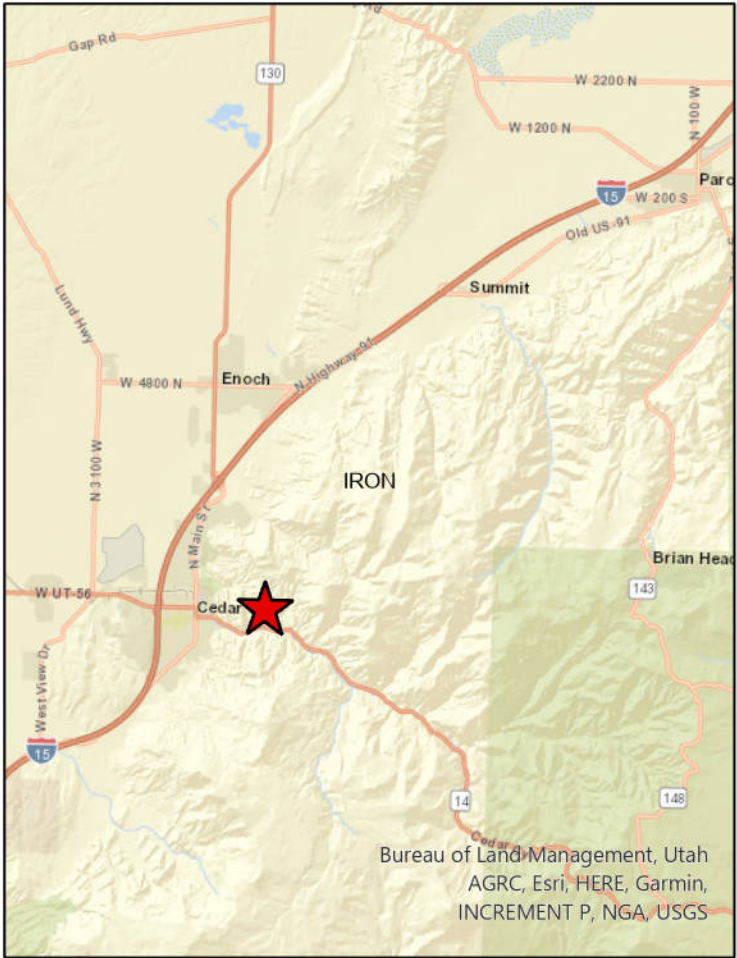


**PROGRESSIVE CONTRACTING
NOTICE OF INTENT &
PLAN OF OPERATIONS
M/021/0041 UTU-XXXXX**

**FIGURE 2
GENERAL SITE AREA**

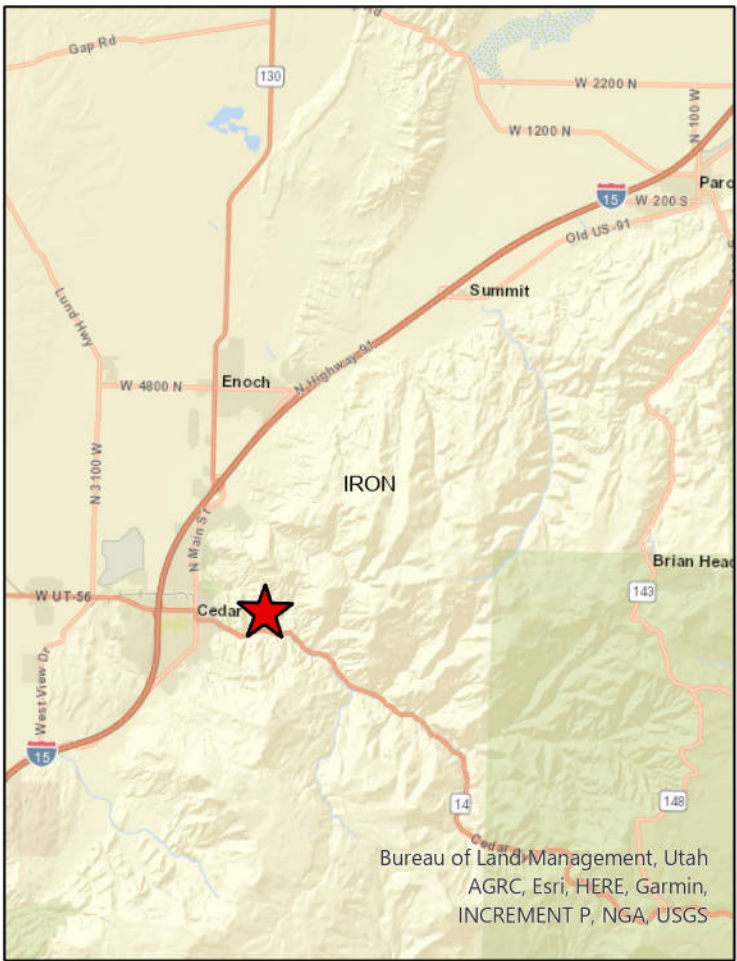
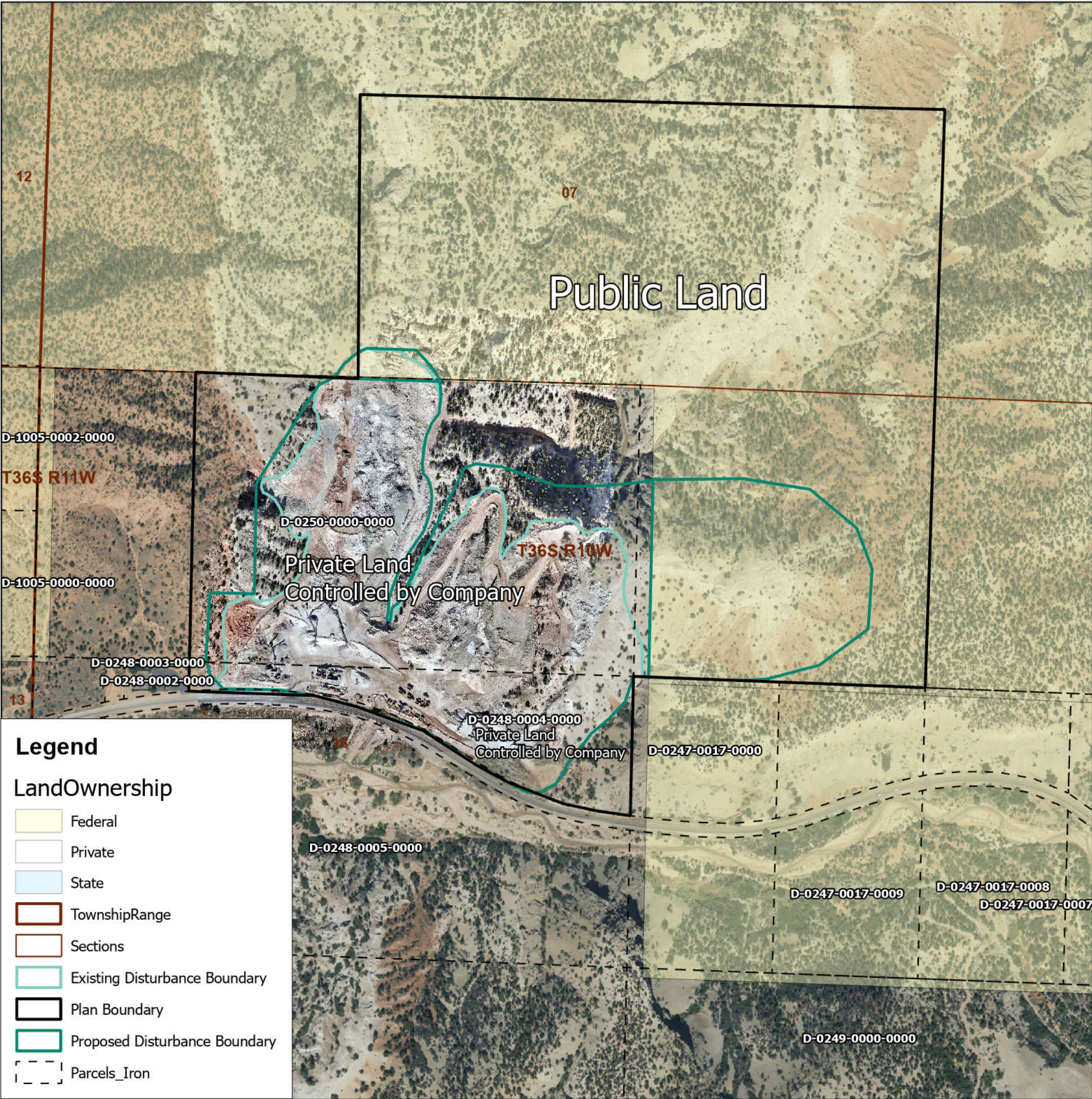
Date: 08 January 2024

Drawn By: ADT E&M



ADT Environmental & Mineral Consultants, LLC
26849 Road M
Cortez, CO 81321
[P] (801) 918-0799
[E] aly@adtenviro.com





**PROGRESSIVE CONTRACTING
NOTICE OF INTENT &
PLAN OF OPERATIONS
M/021/0041 UTU-XXXXX**

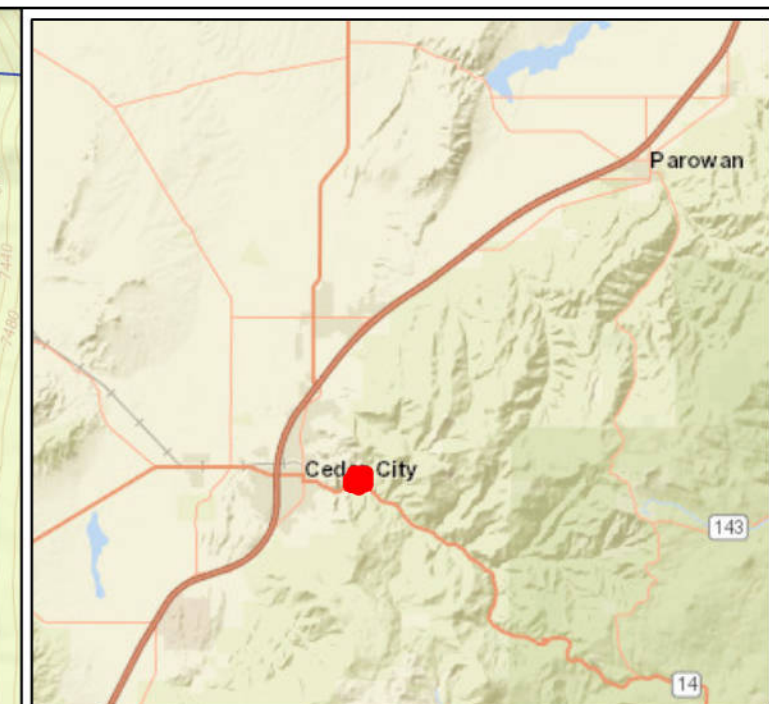
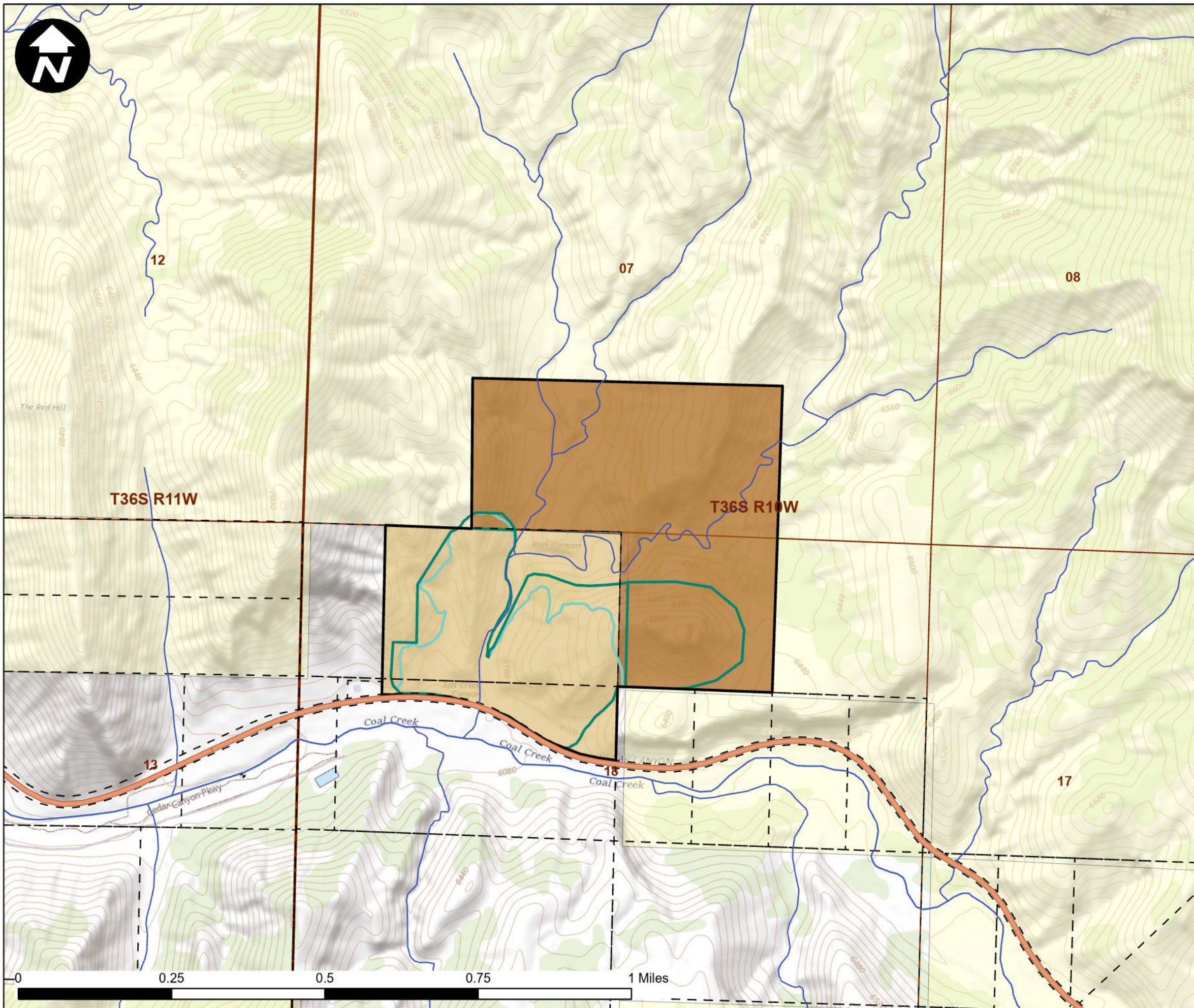
**FIGURE 3
OWNERSHIP MAP**

Date: 08 January 2024

Drawn By: ADT E&M

ADT Environmental & Mineral Consultants, LLC
26849 Road M
Cortez, CO 81321
[P] (801) 918-0799
[E] aly@adtenviro.com





Dry Creek Mine
Location:
Sections 07 & 18
Township 36 South, Range 10 West
Salt Lake Base & Meridian
Iron County, Utah USA

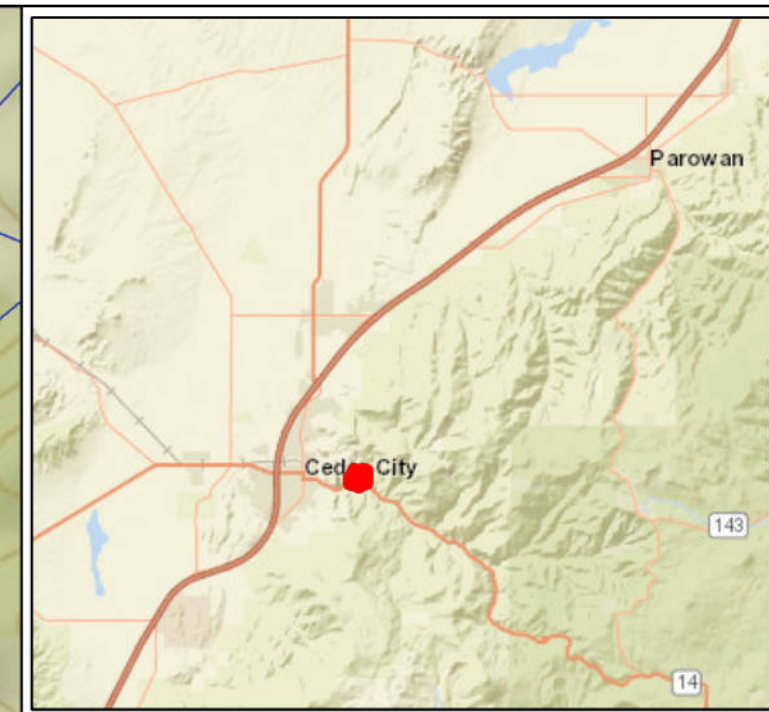
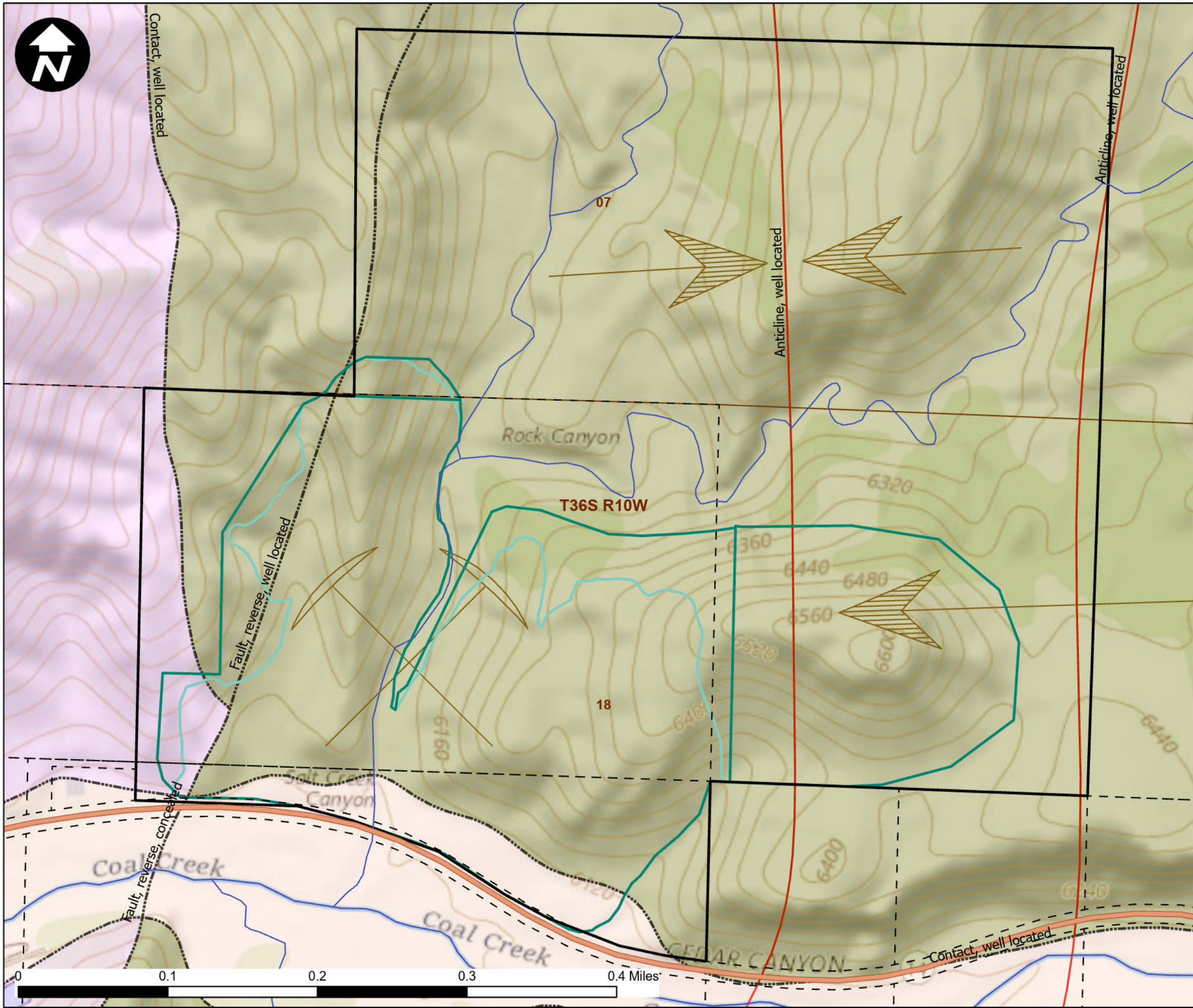
- Legend**
- UT-14 Highway
 - StreamsNHDHighRes
 - Parcels_Iron
 - Plan Boundary
 - Proposed Disturbance Boundary
 - Existing Disturbance Boundary
 - Progressive_PrivateLand
 - Progressive_UnpatentedClaims

- LandOwnership**
- Federal
 - Private
 - State



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801-918-0799
ay@adtenviro.coml

MAP 1
Dry Creek - General Layout
Designed By: ADT
Data: Utah Layer Files; ArcGIS
Current as of: January 2024



Dry Creek Mine
Location:
Sections 07 & 18
Township 36 South, Range 10 West
Salt Lake Base & Meridian
Iron County, Utah USA

Legend

- UT-14 Highway
- StreamsNHDHighRes
- Parcels_Iron
- Plan Boundary
- Proposed Disturbance Boundary
- Existing Disturbance Boundary

Geologic Unit

- Carmel and Temple Cap Formations, undivided
- Navajo Sandstone
- young alluvial-fan deposits
- MapSymbols
- StructureLine
- GeologicLines



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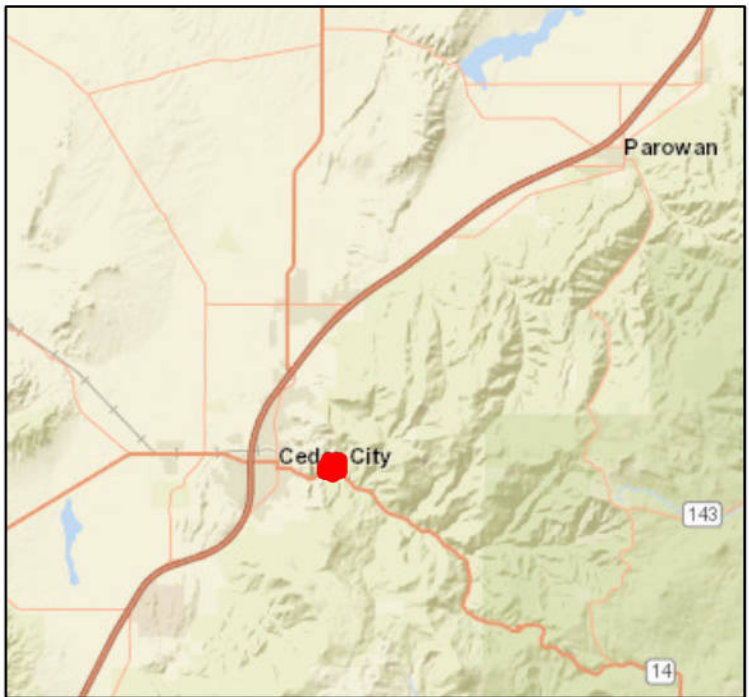
MAP 2

Geologic Map

Designed By: ADT

Data: Utah Layer Files; ArcGIS

Current as of: January 2024



Dry Creek Mine
Location:
Sections 07 & 18
Township 36 South, Range 10 West
Salt Lake Base & Meridian
Iron County, Utah USA

- Legend**
- UT-14 Highway
 - StreamsNHDHighRes
 - Culvert
 - Plan Boundary
 - Proposed Disturbance Boundary
 - Existing Disturbance Boundary
- LandOwnership**
- Federal
 - Private
 - State



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MAP 3

Existing Facilities Map

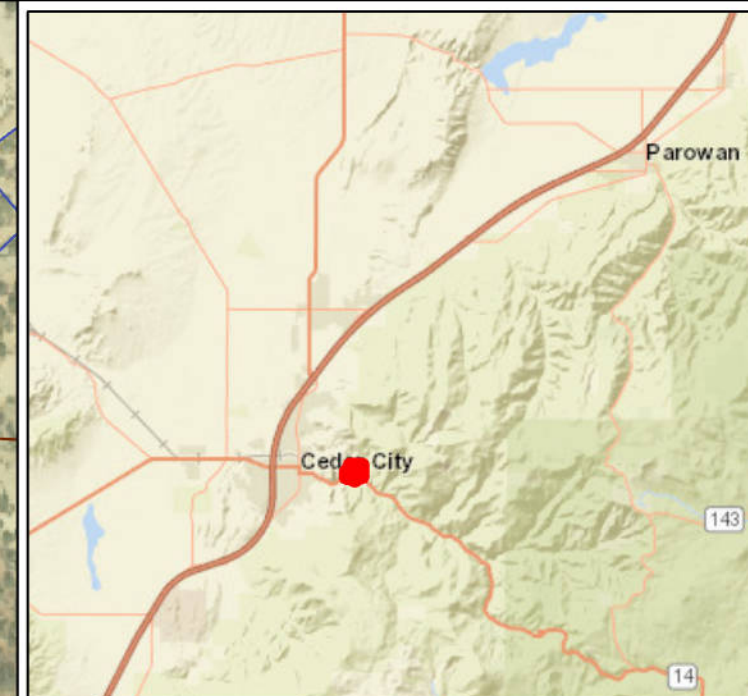
Designed By: ADT

Data: Utah Layer Files; ArcGIS

Current as of: January 2024



Dry Creek Mine
Location:
Sections 07 & 18
Township 36 South, Range 10 West
Salt Lake Base & Meridian
Iron County, Utah USA



Topsoil will be stockpiled in locations outside of drainage areas and away from roadways.
Mining will continue onto the public lands as mining reaches final terracing within the private land portion.
Northern mining area will be reclaimed and converted into the new primary gypsum process area.

Legend

- UT-14 Highway
- StreamsNHDHighRes
- Culvert
- Plan Boundary
- Proposed Disturbance Boundary
- Existing Disturbance Boundary

LandOwnership

- Federal
- Private
- State



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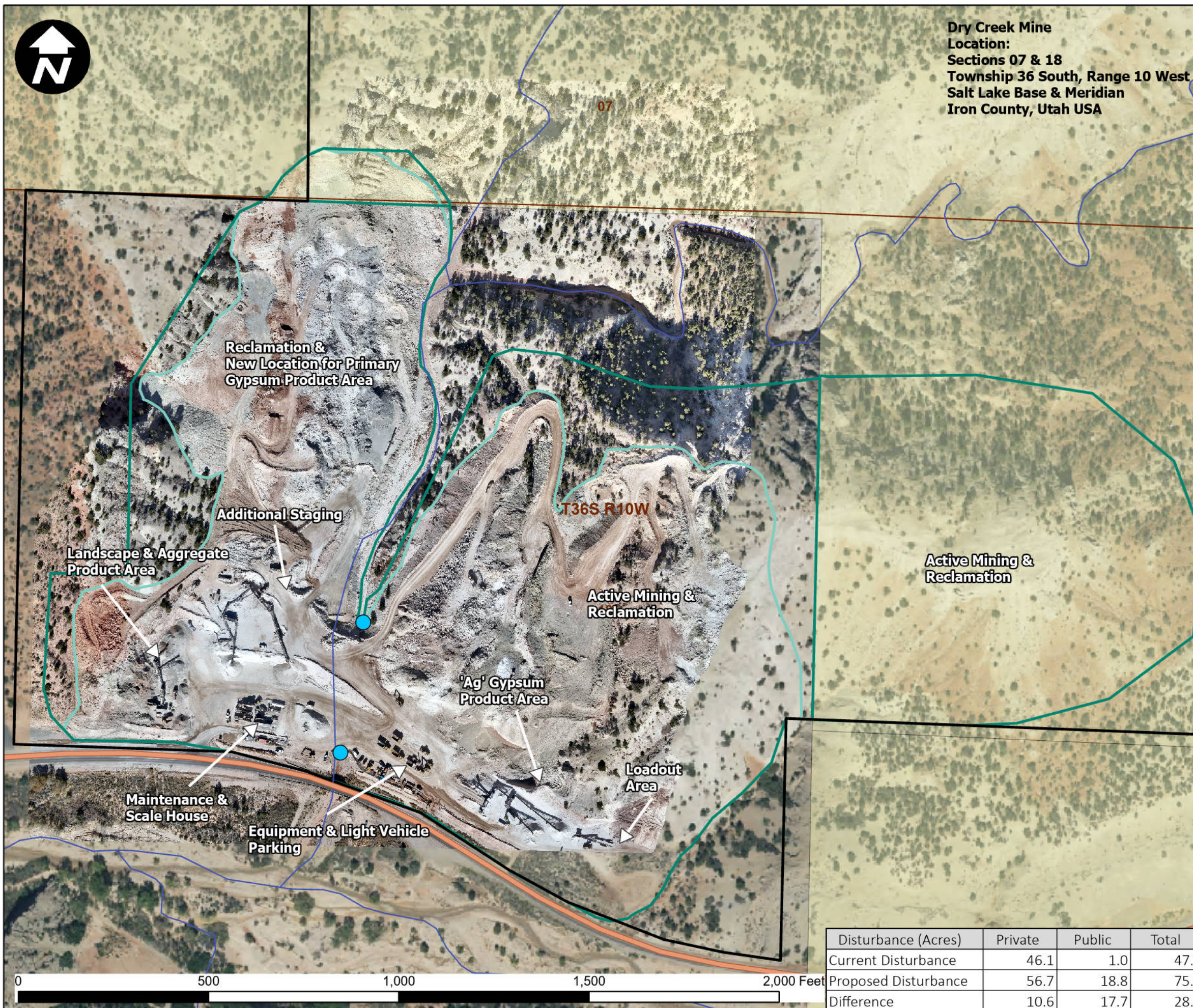
MAP 4

Proposed Development Map

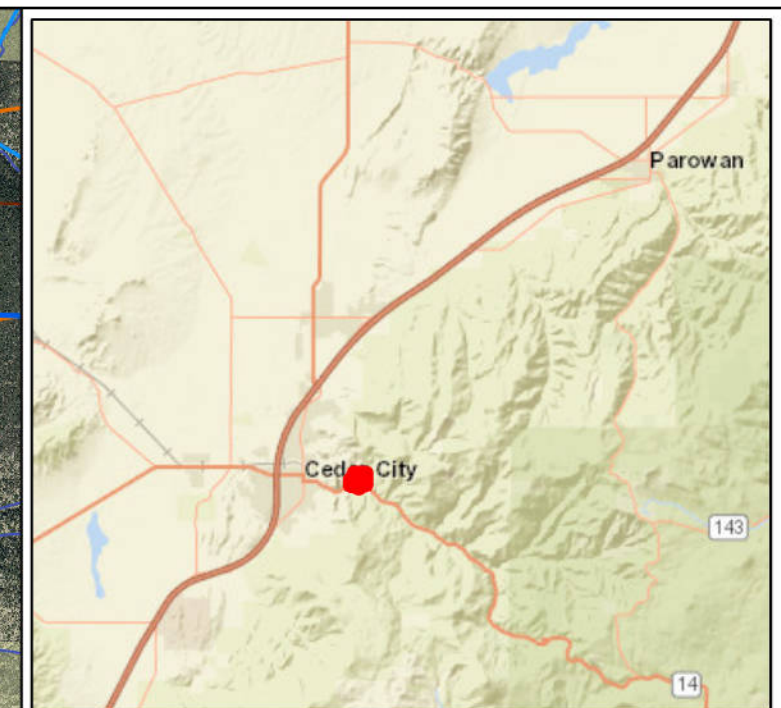
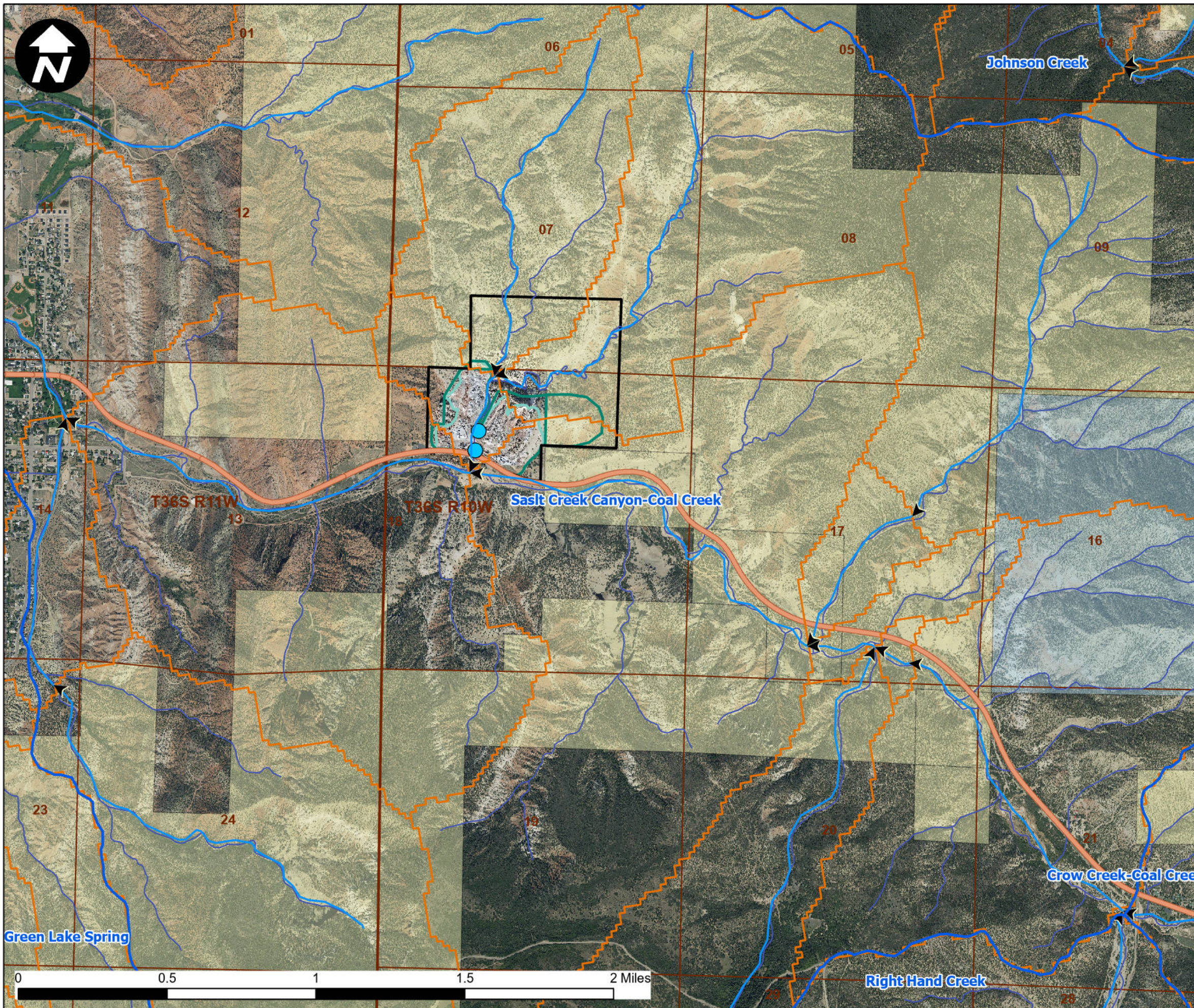
Designed By: ADT

Data: Utah Layer Files; ArcGIS

Current as of: January 2024



Disturbance (Acres)	Private	Public	Total
Current Disturbance	46.1	1.0	47.1
Proposed Disturbance	56.7	18.8	75.5
Difference	10.6	17.7	28.4



Dry Creek Mine
Location:
Sections 07 & 18
Township 36 South, Range 10 West
Salt Lake Base & Meridian
Iron County, Utah USA

Legend

- WBDHU12
- Culvert
- UT-14 Highway
- StreamsNHDHighRes
- Plan Boundary
- Proposed Disturbance Boundary
- Existing Disturbance Boundary

LandOwnership

- Federal
- Private
- State



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801-918-0799
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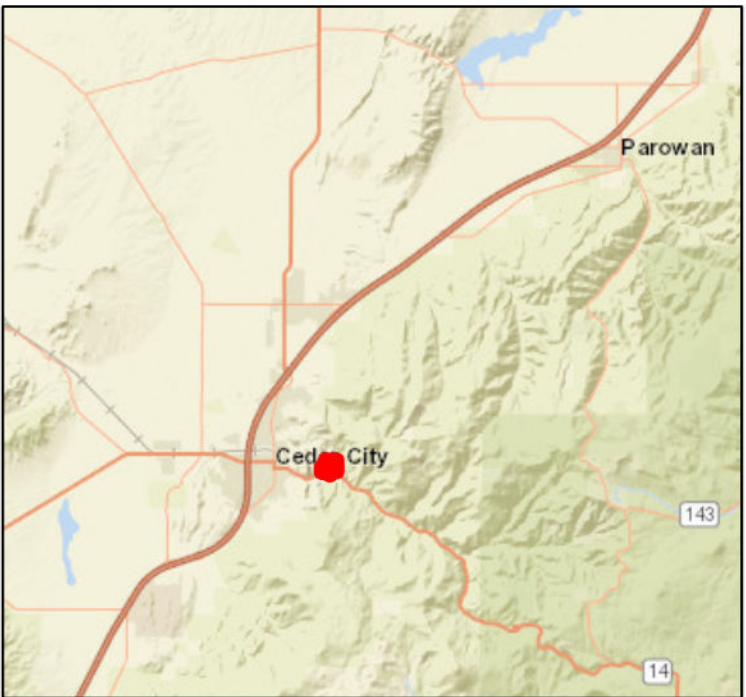
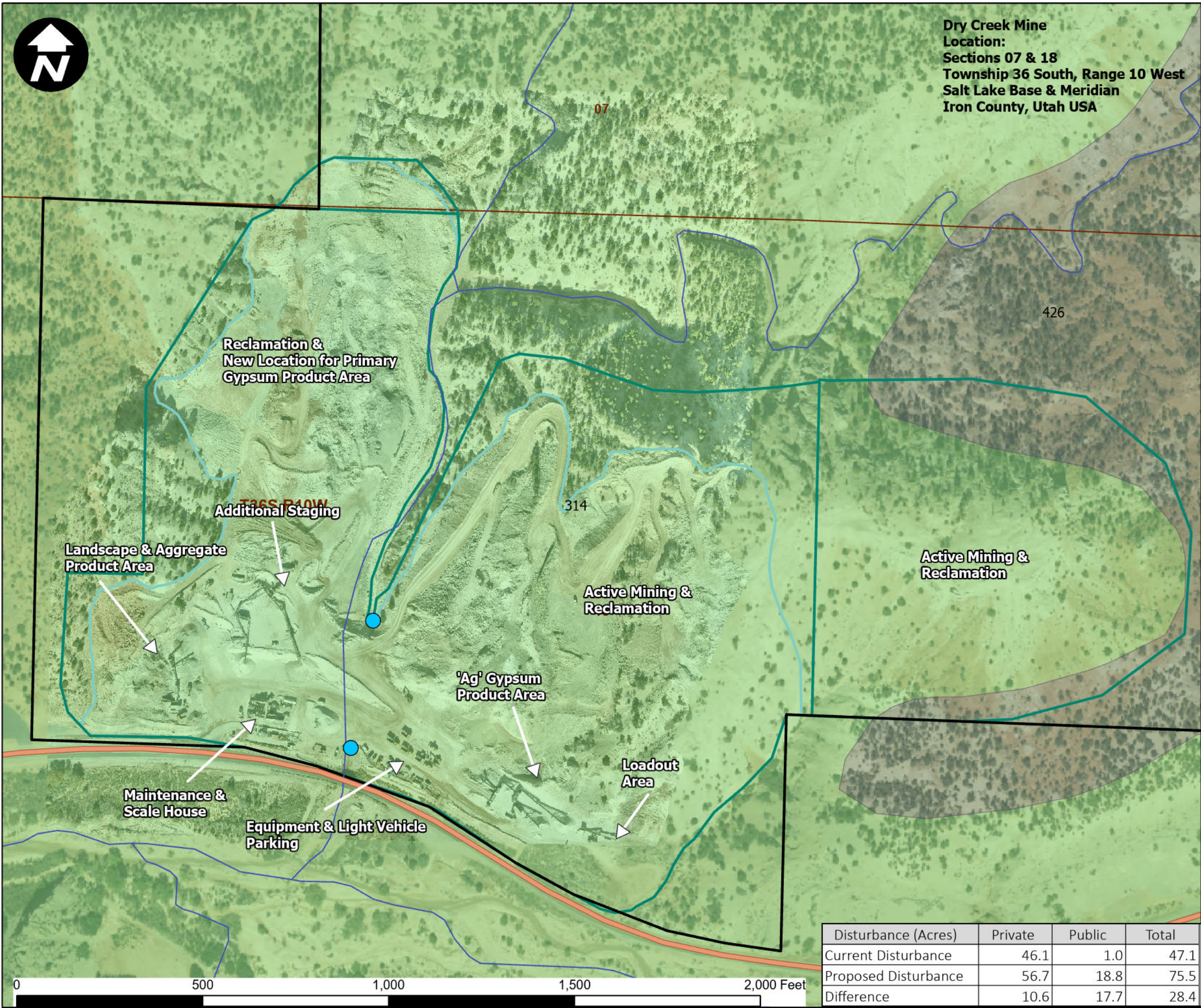
MAP 5

Existing Surface Water Resources

Designed By: ADT

Data: Utah Layer Files; ArcGIS

Current as of: January 2024



Topsoil will be stockpiled in locations outside of drainage areas and away from roadways.
Mining will continue onto the public lands as mining reaches final terracing within the private land portion.
Northern mining area will be reclaimed and converted into the new primary gypsum process area.

Legend

- Culvert
- UT-14 Highway
- StreamsNHDHighRes
- Plan Boundary
- Proposed Disturbance Boundary
- Existing Disturbance Boundary

Soil Class

- 314-Badland-Moondog Rock outcrop complex
- 426-Moondot-Lorhunt Rock outcrop complex



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Cortez, CO 81321
801-918-0799
ay@adtenviro.coml

MAP 6

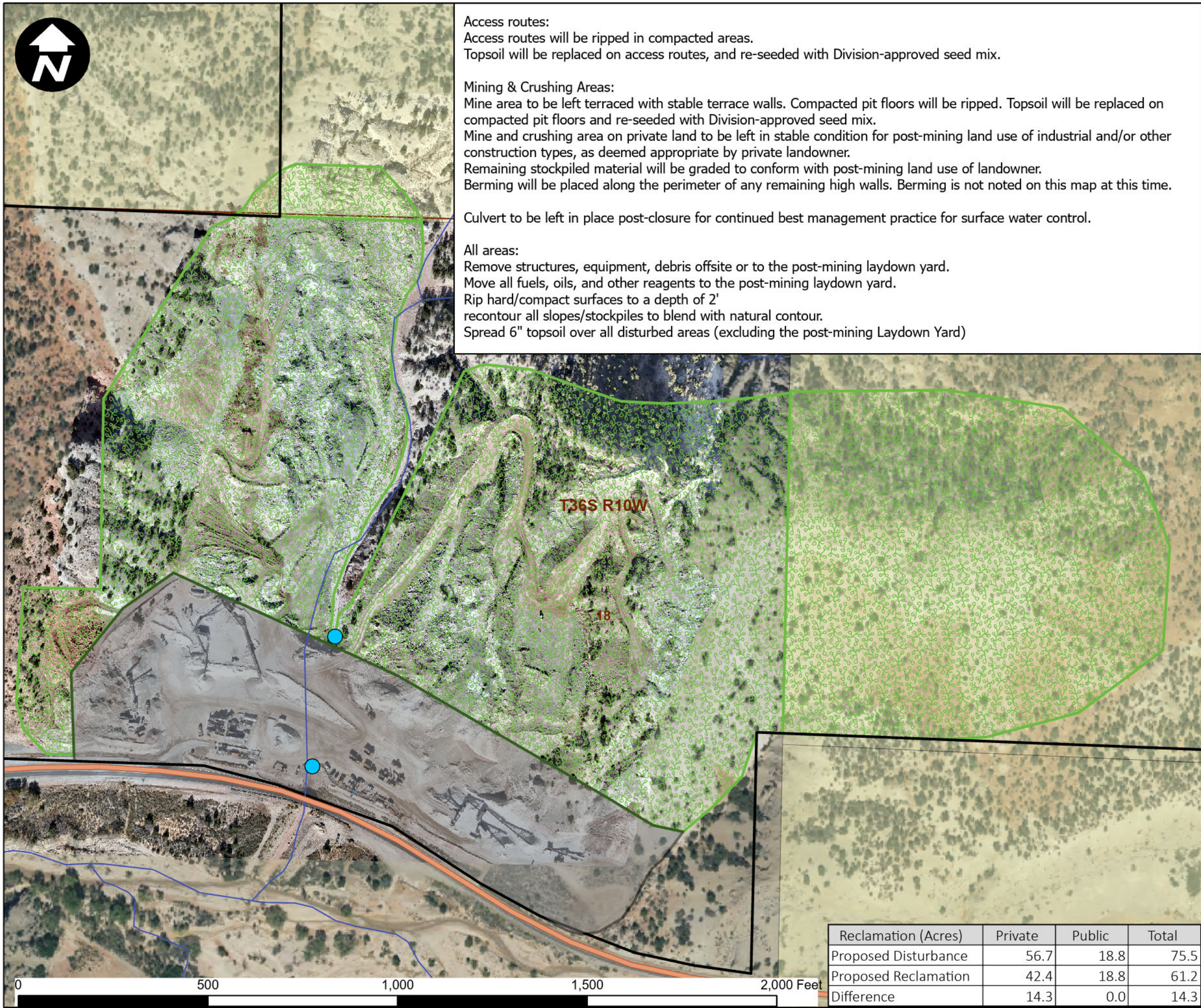
Existing Soil Resources

Designed By: ADT

Data: Utah Layer Files; ArcGIS

Current as of: January 2024

Disturbance (Acres)	Private	Public	Total
Current Disturbance	46.1	1.0	47.1
Proposed Disturbance	56.7	18.8	75.5
Difference	10.6	17.7	28.4

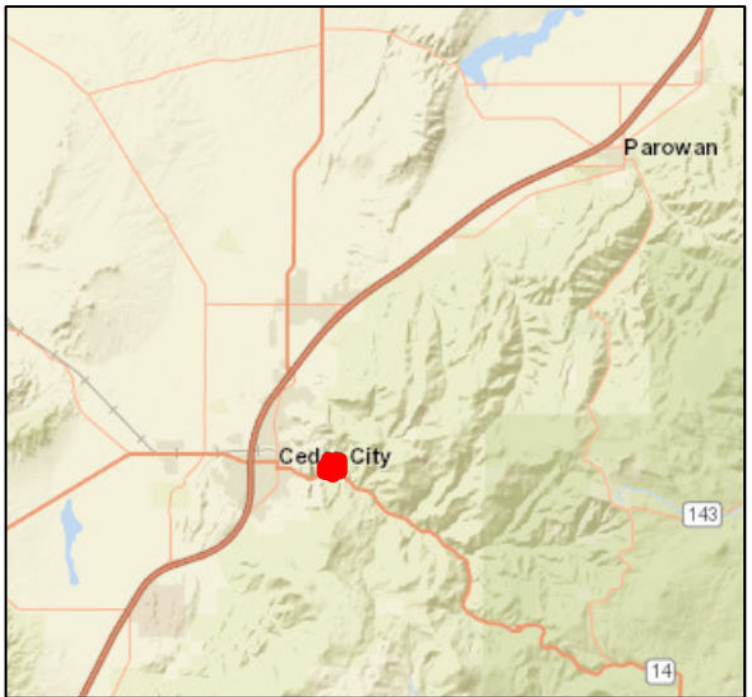


Access routes:
Access routes will be ripped in compacted areas.
Topsoil will be replaced on access routes, and re-seeded with Division-approved seed mix.

Mining & Crushing Areas:
Mine area to be left terraced with stable terrace walls. Compacted pit floors will be ripped. Topsoil will be replaced on compacted pit floors and re-seeded with Division-approved seed mix.
Mine and crushing area on private land to be left in stable condition for post-mining land use of industrial and/or other construction types, as deemed appropriate by private landowner.
Remaining stockpiled material will be graded to conform with post-mining land use of landowner.
Berミング will be placed along the perimeter of any remaining high walls. Berミング is not noted on this map at this time.

Culvert to be left in place post-closure for continued best management practice for surface water control.

All areas:
Remove structures, equipment, debris offsite or to the post-mining laydown yard.
Move all fuels, oils, and other reagents to the post-mining laydown yard.
Rip hard/compact surfaces to a depth of 2'
recontour all slopes/stockpiles to blend with natural contour.
Spread 6" topsoil over all disturbed areas (excluding the post-mining Laydown Yard)



Dry Creek Mine
Location:
Sections 07 & 18
Township 36 South, Range 10 West
Salt Lake Base & Meridian
Iron County, Utah USA

Legend

- Culvert
- UT-14 Highway
- StreamsNHDHighRes
- Plan Boundary
- Reclamation Boundary
- Post-mining Laydown Yard

LandOwnership

- Federal
- Private
- State



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Cortez, CO 81321
801-918-0799
ay@adtenviro.coml

MAP 7

Reclamation Map

Designed By: ADT

Data: Utah Layer Files; ArcGIS

Current as of: January 2024

Reclamation (Acres)	Private	Public	Total
Proposed Disturbance	56.7	18.8	75.5
Proposed Reclamation	42.4	18.8	61.2
Difference	14.3	0.0	14.3

P.C.I.
PROGRESSIVE CONTRACTING INC.

APPENDIX D

LIST OF FIXED EQUIPMENT AND FACILITIES

Progressive Contracting, Inc.

Dry Creek Mine List of Equipment & Facilities

Date: 08 January 2024

Fuels and their use

Low-sulfur diesel for use in generators and associated off-highway vehicles. Generators used are listed in the following tables.

Table 1: Mining Equipment used in process

Type of Equipment	Use
40 ton haul trucks	Mining and general construction
50 ton haul trucks	Mining
Excavators	Mining and general site maintenance
Loaders & backhoes	Mining and general site maintenance
Dozers	Mining and general site maintenance
Fork Lifts	General site maintenance
Skid steers	General site maintenance
Fuel trucks, lube trucks, maintenance vehicles	General site maintenance
Light vehicles	General site maintenance & supervision

Table 2: Crushing Equipment used in process

Aggregate Crushing Spread

Loading Hoppers	Description or ID #	Controls? Y(Specify)/N	<u>Project-specific</u> Feed Rate (tons/hr)	Capacity (tons)
Jaw1	Jaw Crusher	Y; spraybars	<100	20-25 tons
Conveyor Belts	Description or ID #	Controls? Y(Specify)/N	<u>Project-specific</u> Feed Rate (tons/hr)	Electric Motor Horsepower (hp)
C1	conveyor	Y; spraybars	400	20
Stacker Belts	Description or ID #	Controls? Y(Specify)/N	<u>Project-specific</u> Feed Rate (tons/hr)	Electric Motor Horsepower (hp)
S1	stacker	Y; spraybars	80	37
S2	stacker	Y; spraybars	90	37
Screens (Grizzly/Vibrating)	Description or ID #	Controls? Y(Specify)/N	<u>Project-specific</u> Feed Rate (tons/hr)	Electric Motor Horsepower (hp)
Screen1	Screen Plant	Y; spraybars	<100	50
Crushers (Rock/Jaw)	Description or ID #	Controls? Y(Specify)/N	<u>Project-specific</u> Feed Rate (tons/hr)	Electric Motor Horsepower (hp)
Jaw1	Jaw Crusher	Y; spraybars	<100	20-25 tons
Cone1	Cone Crusher	Y; spraybars	<100	20-25 tons
Diesel-Fired Generator	Description or ID #	Controls? Y(Specify)/N	KW Rating	Notes
Generator 1	Cummins Diesel Generator	N	225	

Ag' Gypsum Crushing Spread

Loading Hoppers	Description or ID #	Controls? Y(Specify)/N	<u>Project-specific</u> Feed Rate (tons/hr)	Capacity (tons)
Impactor1	Impact Crusher	Y; spraybars	<100	20-25 tons
Conveyor Belts	Description or ID #	Controls? Y(Specify)/N	<u>Project-specific</u> Feed Rate (tons/hr)	Electric Motor Horsepower (hp)
C1	conveyor	Y; spraybars	<100	20
C2	conveyor	Y; spraybars	<100	20
C3	conveyor	Y; spraybars	<100	20
Stacker Belts	Description or ID #	Controls? Y(Specify)/N	<u>Project-specific</u> Feed Rate (tons/hr)	Electric Motor Horsepower (hp)
S1	stacker	Y; spraybars	<100	37
S2	stacker	Y; spraybars	<100	37
S3	stacker	Y; spraybars	<100	37
Screens (Grizzly/Vibrating)	Description or ID #	Controls? Y(Specify)/N	<u>Project-specific</u> Feed Rate (tons/hr)	Electric Motor Horsepower (hp)
Screen1	Screen Plant	Y; spraybars	<100	50
Crushers (Rock/Jaw)	Description or ID #	Controls? Y(Specify)/N	<u>Project-specific</u> Feed Rate (tons/hr)	Electric Motor Horsepower (hp)
Impactor1	Impact Crusher	Y; spraybars	<100	20-25 tons
Diesel-Fired Generator	Description or ID #	Controls? Y(Specify)/N	KW Rating	Notes
Generator 1	Komatsu Diesel Generator	N	189	

Primary Gypsum Product Spread

Loading Hoppers	Description or ID #	Controls? Y(Specify)/N	<u>Project-specific</u> Feed Rate (tons/hr)	Capacity (tons)
Impactor1	Closed-circuit impact crusher	Y; spraybars	300	20-25 tons
Conveyor Belts	Description or ID #	Controls? Y(Specify)/N	<u>Project-specific</u> Feed Rate (tons/hr)	Electric Motor Horsepower (hp)
C1	conveyor	Y; spraybars	300	20
C2	conveyor	Y; spraybars	300	20
C3	conveyor	Y; spraybars	300	20
C4	conveyor	Y; spraybars	300	20
Stacker Belts	Description or ID #	Controls? Y(Specify)/N	<u>Project-specific</u> Feed Rate (tons/hr)	Electric Motor Horsepower (hp)
S1	stacker	Y; spraybars	300	37
S2	stacker	Y; spraybars	300	37
S3	stacker	Y; spraybars	300	37
Screens (Grizzly/Vibrating)	Description or ID #	Controls? Y(Specify)/N	<u>Project-specific</u> Feed Rate (tons/hr)	Electric Motor Horsepower (hp)
Screen1	Screen Plant	Y; spraybars	300	50
Crushers (Rock/Jaw)	Description or ID #	Controls? Y(Specify)/N	<u>Project-specific</u> Feed Rate (tons/hr)	Electric Motor Horsepower (hp)
Impactor1	Impact Crusher	Y; spraybars	300	20-25 tons
Diesel-Fired Generator	Description or ID #	Controls? Y(Specify)/N	KW Rating	Notes
Generator 1	Whisperwatt Diesel Generator	N	165	

Loadout Area

Loading Hoppers	Description or ID #	Controls? Y(Specify)/N	<u>Project-specific</u> Feed Rate (tons/hr)	Capacity (tons)
Hopper	Hopper	N	<100	10-15 tons
Conveyor Belts	Description or ID #	Controls? Y(Specify)/N	<u>Project-specific</u> Feed Rate (tons/hr)	Electric Motor Horsepower (hp)
C1	conveyor	Y; spraybars	<100	20
Stacker Belts	Description or ID #	Controls? Y(Specify)/N	<u>Project-specific</u> Feed Rate (tons/hr)	Electric Motor Horsepower (hp)
S1	stacker	Y; spraybars	<100	37
Diesel-Fired Generator	Description or ID #	Controls? Y(Specify)/N	KW Rating	Notes
Generator 1	Hokuetsu Diesel Generator	N	25	

Table 3: Tanks & Structures

Fuel Tanks

Location	Length (ft)	Diameter (ft)	Volume (cy)	Gallons (rated)
Primary Gypsum area	30	8	56	10,000
Maintenance	30	8	56	10,000

Water Tanks

Location	Length (ft)	Diameter (ft)	Volume (cy)	Gallons (rated)
Ag' Gypsum area	20	6	21	4,000
Primary Gypsum area	30	8	56	10,000

Storage Containers

Location	Length (ft)	Width (ft)	Height (ft)	Volume (cy)
Scale House 1	14	14	12	87
Scale House 2	20	8	8	47
Maintenance	45	8	8	107

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APPENDIX E

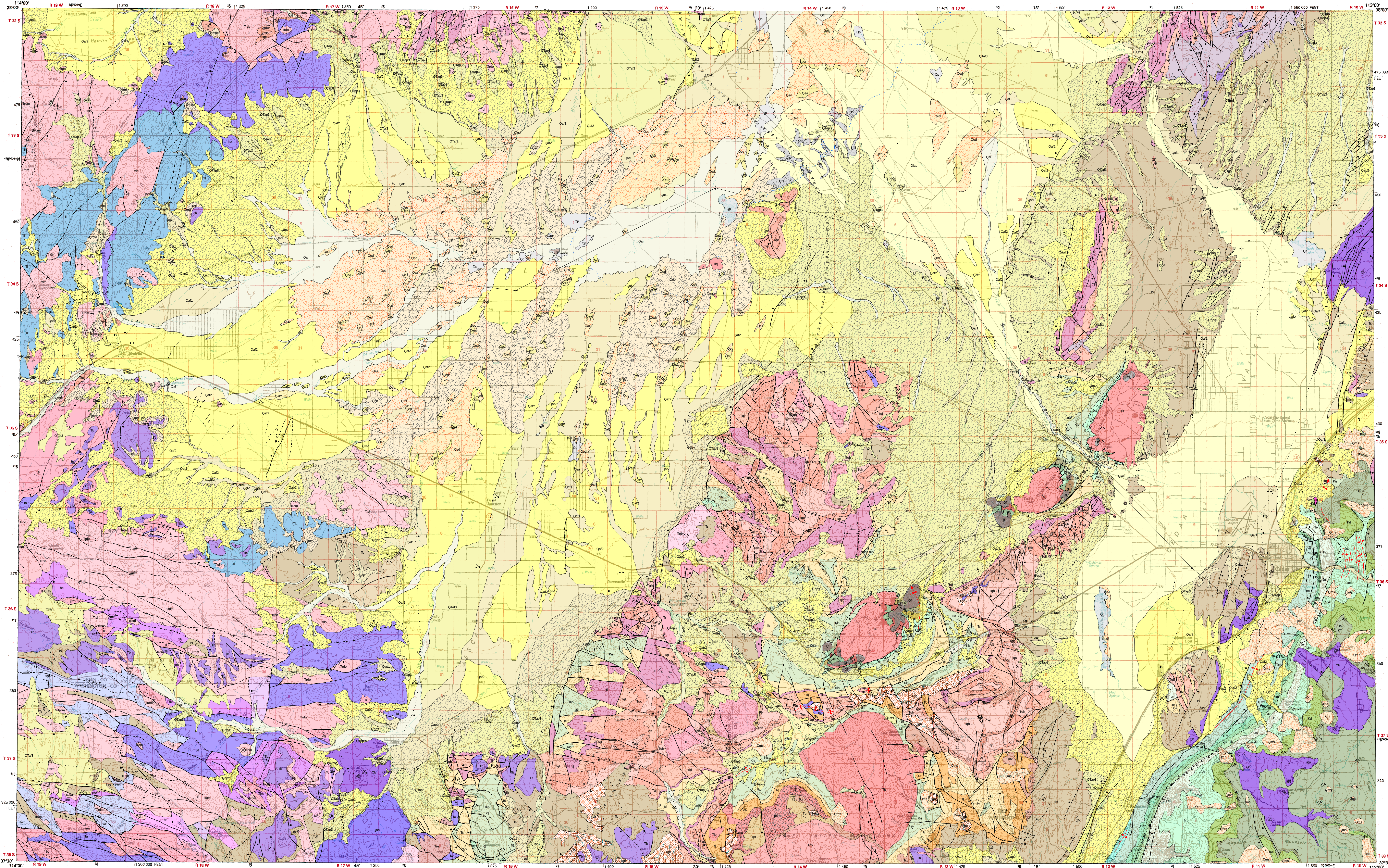
GEOLOGIC INFORMATION

Interim Geologic Map of the Cedar City 30' x 60' Quadrangle, Iron and Washington Counties, Utah

By
Peter D. Rowley, Van S. Williams, Garrett S. Vice, David J. Maxwell, David B. Hacker, Lawrence W. Snee, and J. Hoover Mackin
2006

Utah Geological Survey
a division of
Utah Department of Natural Resources

Plate 1
Utah Geological Survey 2006
Open-File Report 476DM
Geologic Map of the Cedar City Quadrangle

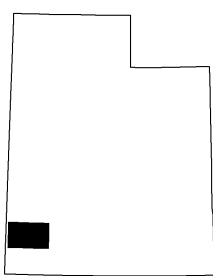


Base from U. S. Geological Survey Cedar City 30' x 60' Quadrangle, 1982.
Although this product represents the work of professional scientists, the Utah Department of Natural Resources, Utah Geological Survey, makes no warranty, expressed or implied, regarding its suitability for any particular use. The Utah Department of Natural Resources, Utah Geological Survey, shall not be liable under any circumstances for any direct, indirect, special, incidental, or consequential damages with respect to claims by users of this product.

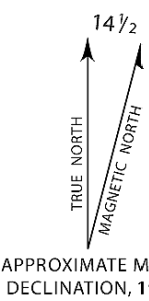
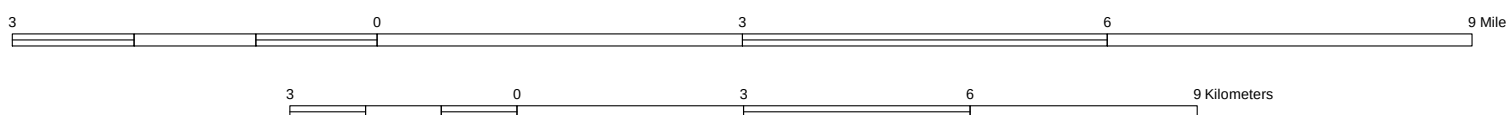
This geologic map was funded by the Utah Geological Survey and the U.S. Geological Survey, National Cooperative Geologic Mapping Program through USGS STATEMAP award number G29HQAG0055. The views and conclusions contained in this document are those of the author, and should not be interpreted as necessarily the official policies, either expressed or implied, of the U.S. government.

This open-file release is a progress report that provides the public with the preliminary results of mapping during the lengthy review process. The map may be incomplete and inconsistent, errors, and omissions have not been resolved. The map may not conform to USGS policy and editorial standards and it may be premature for an individual or group to take action based on its contents.

For use at 1:100,000 scale only. The Utah Geological Survey (UGS) does not guarantee accuracy or completeness of data.



SCALE 1:100 000
CONTOUR INTERVAL 50 METERS



APPROXIMATE MEAN DECLINATION, 1982

This open-file report will be superseded by an improved geologic map following completion of reviews.

Digital Cartography by:
Southern Utah University GIS Laboratory
Garret S. Vice of Southern Utah University
Darryl Greer and J. Buck Elder of the
Utah Geological Survey

Project Manager: Grant Willis

P.C.I.
PROGRESSIVE CONTRACTING INC.

APPENDIX F

SOIL, VEGETATION, & WILDLIFE INFORMATION



United States
Department of
Agriculture

NRCS

Natural
Resources
Conservation
Service

A product of the National
Cooperative Soil Survey,
a joint effort of the United
States Department of
Agriculture and other
Federal agencies, State
agencies including the
Agricultural Experiment
Stations, and local
participants

Custom Soil Resource Report for Iron-Washington Area, Utah, Parts of Iron, Kane, and Washington Counties

Iron County, UT



January 6, 2024

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (<http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/>) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (<https://offices.sc.egov.usda.gov/locator/app?agency=nrcs>) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Contents

Preface	2
How Soil Surveys Are Made	5
Soil Map	8
Soil Map.....	9
Legend.....	10
Map Unit Legend.....	12
Map Unit Descriptions.....	12
Iron-Washington Area, Utah, Parts of Iron, Kane, and Washington Counties.....	14
314—Badland-Moondog-Rock outcrop complex, 30 to 70 percent slopes.....	14
426—Moondog-Lorhunt-Rock outcrop complex, 30 to 70 percent slopes..	15
References	18

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

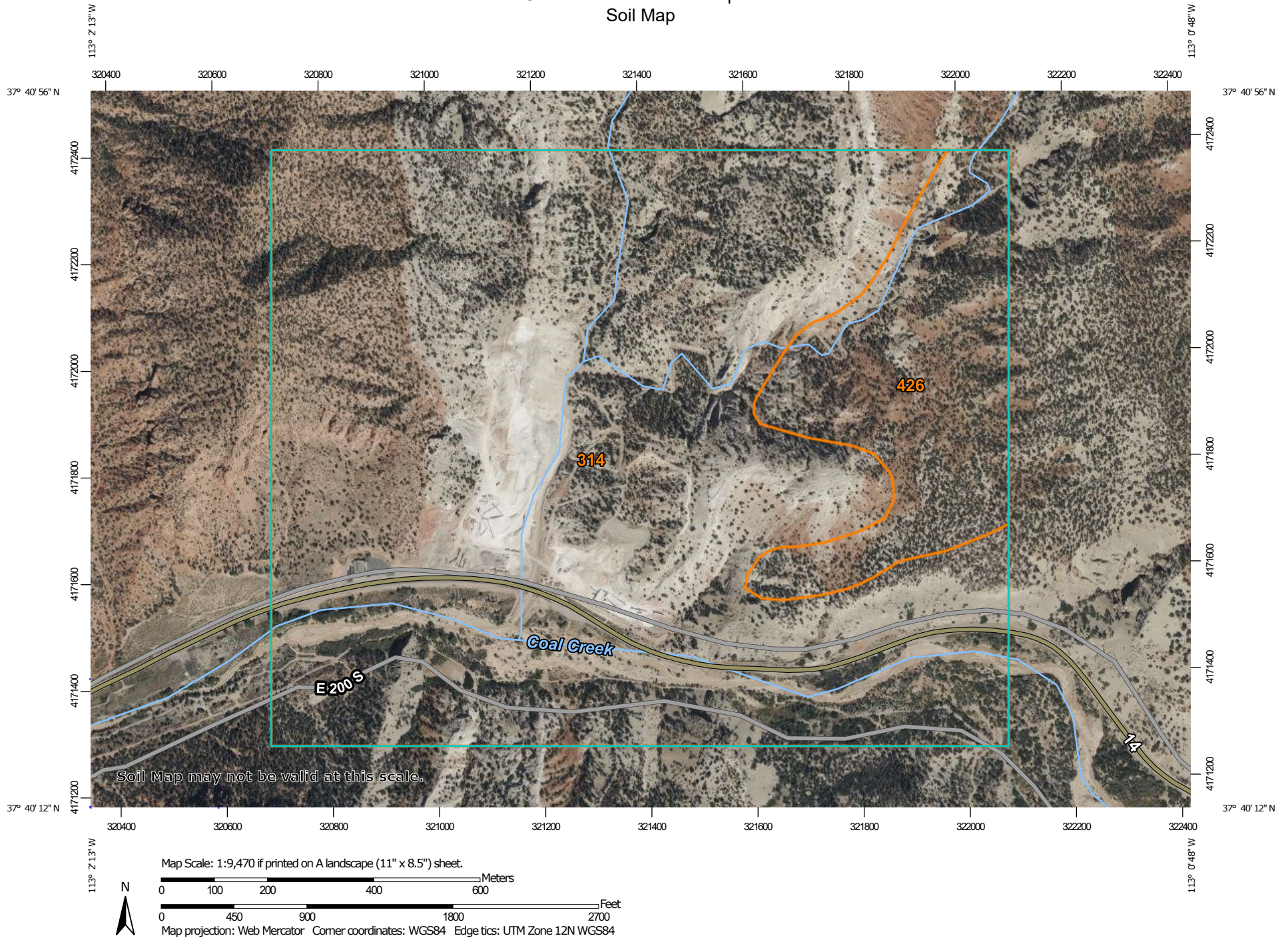
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identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

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MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

Special Point Features

 Blowout

 Borrow Pit

 Clay Spot

 Closed Depression

 Gravel Pit

 Gravelly Spot

 Landfill

 Lava Flow

 Marsh or swamp

 Mine or Quarry

 Miscellaneous Water

 Perennial Water

 Rock Outcrop

 Saline Spot

 Sandy Spot

 Severely Eroded Spot

 Sinkhole

 Slide or Slip

 Sodic Spot

 Spoil Area

 Stony Spot

 Very Stony Spot

 Wet Spot

 Other

 Special Line Features

Water Features

 Streams and Canals

Transportation

 Rails

 Interstate Highways

 US Routes

 Major Roads

 Local Roads

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service

Web Soil Survey URL:

Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Iron-Washington Area, Utah, Parts of Iron, Kane, and Washington Counties

Survey Area Data: Version 16, Sep 9, 2023

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Sep 8, 2022—Sep 29, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

MAP LEGEND

MAP INFORMATION

imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
314	Badland-Moondog-Rock outcrop complex, 30 to 70 percent slopes	326.2	84.7%
426	Moondog-Lorhunt-Rock outcrop complex, 30 to 70 percent slopes	59.1	15.3%
Totals for Area of Interest		385.2	100.0%

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The

delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Iron-Washington Area, Utah, Parts of Iron, Kane, and Washington Counties

314—Badland-Moondog-Rock outcrop complex, 30 to 70 percent slopes

Map Unit Setting

National map unit symbol: j7gl
Elevation: 6,000 to 7,800 feet
Mean annual precipitation: 12 to 16 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 90 to 110 days
Farmland classification: Not prime farmland

Map Unit Composition

Badland: 40 percent
Moondog and similar soils: 30 percent
Rock outcrop: 15 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Badland

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydric soil rating: No

Description of Moondog

Setting

Landform: Mountain slopes, hills
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Alluvium derived from sedimentary rock and/or colluvium derived from sedimentary rock and/or residuum weathered from sedimentary rock

Typical profile

A - 0 to 3 inches: very stony silty clay loam
C - 3 to 17 inches: gravelly silty clay loam
2C - 17 to 22 inches: extremely gravelly silty clay loam
Cr - 22 to 32 inches: weathered bedrock

Properties and qualities

Slope: 30 to 70 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.00 to 0.28 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 2.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7e

Hydrologic Soil Group: C

Ecological site: R028AY338UT - Upland Stony Loam (Pinyon-Utah Juniper)

Hydric soil rating: No

Description of Rock Outcrop

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 8

Hydric soil rating: No

Minor Components

Lorhunt

Percent of map unit: 10 percent

Hydric soil rating: No

Frigid soils

Percent of map unit: 5 percent

426—Moondog-Lorhunt-Rock outcrop complex, 30 to 70 percent slopes

Map Unit Setting

National map unit symbol: j7ll

Elevation: 6,000 to 7,800 feet

Mean annual precipitation: 12 to 16 inches

Mean annual air temperature: 45 to 48 degrees F

Frost-free period: 90 to 120 days

Farmland classification: Not prime farmland

Map Unit Composition

Moondog and similar soils: 40 percent

Lorhunt and similar soils: 35 percent

Rock outcrop: 15 percent

Minor components: 10 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Moondog

Setting

Landform: Mountain slopes, hills

Landform position (three-dimensional): Side slope

Down-slope shape: Convex

Across-slope shape: Convex

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Parent material: Alluvium derived from sedimentary rock and/or colluvium derived from sedimentary rock and/or residuum weathered from sedimentary rock

Typical profile

A - 0 to 3 inches: very stony silty clay loam
C - 3 to 17 inches: gravelly silty clay loam
2C - 17 to 22 inches: extremely gravelly silty clay loam
Cr - 22 to 32 inches: weathered bedrock

Properties and qualities

Slope: 30 to 70 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.00 to 0.28 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 2.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: C
Ecological site: R028AY338UT - Upland Stony Loam (Pinyon-Utah Juniper)
Hydric soil rating: No

Description of Lorhunt

Setting

Landform: Hills, mountain slopes
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Colluvium derived from sedimentary rock and/or residuum weathered from sedimentary rock

Typical profile

A - 0 to 4 inches: gravelly loam
C - 4 to 14 inches: very gravelly loam
R - 14 to 24 inches: unweathered bedrock

Properties and qualities

Slope: 30 to 70 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.01 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 35 percent
Available water supply, 0 to 60 inches: Very low (about 1.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified

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Land capability classification (nonirrigated): 7s

Hydrologic Soil Group: D

Ecological site: R028AY324UT - Upland Shallow Loam (Utah Juniper - Singleleaf Pinyon)

Hydric soil rating: No

Description of Rock Outcrop

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 8

Hydric soil rating: No

Minor Components

Badland

Percent of map unit: 5 percent

Hydric soil rating: No

Ikit

Percent of map unit: 3 percent

Hydric soil rating: No

Frigid soils

Percent of map unit: 2 percent

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Ecological site R028AY338UT **Upland Stony Loam (Pinyon-Utah Juniper)**

Accessed: 01/07/2024

General information

Provisional. A provisional ecological site description has undergone quality control and quality assurance review. It contains a working state and transition model and enough information to identify the ecological site.

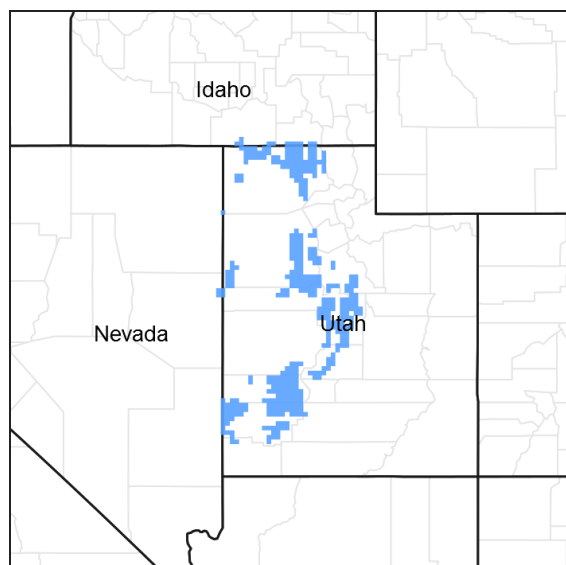


Figure 1. Mapped extent

Areas shown in blue indicate the maximum mapped extent of this ecological site. Other ecological sites likely occur within the highlighted areas. It is also possible for this ecological site to occur outside of highlighted areas if detailed soil survey has not been completed or recently updated.

MLRA notes

Major Land Resource Area (MLRA): 028A—Ancient Lake Bonneville

MLRA-D28A, Great Salt Lake Area, occurs in the eastern portion of the Basin and Range Ecological Province. This area is composed of nearly level basins located between widely separated mountain ranges that run mostly north and south. Basin edges are often bordered by gently sloping alluvial fans. The mountains are uplifted fault blocks with steep side slopes.

Associated sites

R028AY310UT	Upland Loam (Bonneville Big Sagebrush) North
R028AY324UT	Upland Shallow Loam (Utah Juniper - Singleleaf Pinyon)
R028AY325UT	Upland Shallow Loam (Black Sagebrush)
R028AY334UT	Upland Stony Loam (Wyoming Big Sagebrush)

Similar sites

R028AY324UT	Upland Shallow Loam (Utah Juniper - Singleleaf Pinyon)
R028AY320UT	Upland Shallow Hardpan (Pinyon-Utah Juniper)

Table 1. Dominant plant species

Tree	(1) <i>Pinus monophylla</i> (2) <i>Juniperus osteosperma</i>
Shrub	(1) <i>Artemisia tridentata</i> var. <i>vaseyana</i> (2) <i>Purshia tridentata</i>
Herbaceous	(1) <i>Pseudoroegneria spicata</i> (2) <i>Achnatherum hymenoides</i>

Physiographic features

This site occurs on fan remnants, hills, mountain slopes, terraces and the toeslopes of drainageways at elevations between 4,350 to 8,770 feet. The site is found on slopes ranging from 2% to 70%, occurs on all aspects and produces low to very high amounts of runoff depending on soil.

Table 2. Representative physiographic features

Landforms	(1) Mountain slope (2) Fan remnant (3) Hill
Flooding frequency	None
Ponding frequency	None
Elevation	4,350–8,770 ft
Slope	2–70%
Aspect	Aspect is not a significant factor

Climatic features

The climate of this site is characterized by cold, snowy winters and warm dry summers. The average annual precipitation is mostly 9 to 13 (16 at highest elevations) inches. June and July are commonly the driest months. Annual distribution varies from 40 to 50 percent during plant growth period, May to October. Precipitation during the growing season is not always effective because it comes as small intermittent showers which do not wet the soil deeply, especially in the hottest months of July and August. The most effective moisture for plant growth is the portion that falls as snow during the plant dormant period and enters the soil during the growing season.

Ranges in values for precipitation reported here incorporate variability across the geographic extent of this ecological site and variability between years using 25 and 75 percent quartiles.

Mean Annual Air Temperature: 38-52 degrees.

Table 3. Representative climatic features

Frost-free period (average)	135 days
Freeze-free period (average)	163 days
Precipitation total (average)	16 in

Influencing water features

There are no influencing water features on this ecological site.

Soil features

The characteristic soils in this site are 12 to 40 inches deep over bedrock and well drained. They formed in alluvium, colluvium and residuum derived from a mixture of parent materials including sandstone, limestone, quartzite, igneous rock, metamorphic rock, shale and chert. The soil surface has textures ranging from clay loams to sandy loams. Rock fragments may cover up to 60 percent of the soil surface. The volume of rock fragments in the soil profile ranges from 35 to about 60 percent. Soils have slow to moderately rapidly permeable. A layer of carbonate accumulation is usually within 30 inches of the surface. Available water holding capacity is 1.4 to 4.7 inches. The soil moisture regime is xeric and the soil moisture regime is frigid or mesic.

Natural geologic erosion in potential is approximately 0.2 tons/acre/year.

Soil Survey Area: Soil Components (Map units in parentheses).

Box Elder County - Western Part (UT601): Clavicon; Fonteen; Phage.

Box Elder County - Eastern Part (UT602): Promo; Rozlee; Sandall.

Millard County-Eastern Part (UT618): Bodacious.

Sanpete Valley Area (UT627): Bodacious; Fonteen.

Iron-Washington Area (UT634): Abela; Bamos; Bodacious; Fonteen; Moondog; Rob Roy; Waltershow.

Table 4. Representative soil features

Parent material	(1) Alluvium—limestone, sandstone, and shale (2) Colluvium—quartzite (3) Residuum—chert
Surface texture	(1) Gravelly loam (2) Very gravelly sandy loam (3) Cobbly silt loam
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Slow to moderately rapid
Soil depth	12–40 in
Surface fragment cover ≤3"	1–45%
Surface fragment cover >3"	3–41%
Available water capacity (0–40in)	3–5 in
Calcium carbonate equivalent (0–40in)	0–40%
Electrical conductivity (0–40in)	0–2 mmhos/cm
Sodium adsorption ratio (0–40in)	0–5
Soil reaction (1:1 water) (0–40in)	6.6–8.4
Subsurface fragment volume ≤3" (Depth not specified)	5–32%
Subsurface fragment volume >3" (Depth not specified)	7–56%

Ecological dynamics

This site is found in the Great Salt Lake Area of the Basin and Range Ecological Province. It developed under the natural ecological conditions found there, including the normal influences of native wildlife herbivory, fire and climate. Species composition is generally dominated by an overstory canopy of either two-needle or singleleaf pinyon with lesser amounts of Utah juniper. Mountain big sagebrush dominates the shrub layer. A mix of other

shrubs including antelope bitterbrush, black sagebrush and Utah serviceberry are commonly found. Perennial herbaceous species occurrence and production is directly related to overstory canopy density with bluebunch wheatgrass, Nevada bluegrass and Indian ricegrass found most often. Warm season species including James galleta and blue grama become more prominent on the site as one travels from north to south throughout its range.

Evidence indicates that this site historically maintained a fairly long burn cycle (100 years or more). Very old singleleaf or two-needle pinyon and Utah juniper are common on most undisturbed sites. Over time, without fire, tree and shrub canopies increase in density, slowly reducing understory herbaceous vegetation. Following stand removing fire, perennial grasses and forbs flourish for a time, but without fire are again reduced.

Severe drought and insect damage can affect pinyon trees in some locations, causing them to die back. This event may allow Utah juniper to increase. This event can also allow for an increase in shrubs and herbaceous species during periods when wetter years return.

Because of the sites stony, somewhat shallow soils and steep slopes, it is rarely chained and/or seeded to introduced forage species. Cheatgrass and annual forbs are most likely to invade this site.

As vegetative communities respond to changes caused by natural or manmade events that cause them to cross ecological thresholds, a return to previous states may not be possible. The amount of effort needed to affect desired vegetative shifts depends on a sites present biotic and abiotic features and the desired results.

The following State and Transition diagram depicts the most common plant communities found on this ecological site. It does not necessarily depict all the plant communities that can occur, but does show the most prevalent and repeatable. As more data are collected, some of these plant communities may be revised or removed, and new ones added. These descriptions capture the current knowledge and experience at the time of this revision.

State and transition model

State and Transition Model

State: Utah

Site Type: Rangeland

MLRA: D-28A – Great Salt Lake Area

R028AY338UT – Upland Stony Loam (Pinyon, Utah Juniper/Mountain Big Sagebrush/Bluebunch Wheatgrass).

1. Reference State

1.1 Open Canopy – Pinyon/Juniper/Mountain Big Sagebrush/Bluebunch Wheatgrass Community Phase. Two-needle pinyon with lesser amounts of Utah juniper form an open overstory canopy. Mountain big sagebrush dominates the shrub layer. A mixture of other shrubs including antelope bitterbrush & Utah serviceberry may be present. Bluebunch wheatgrass and Indian ricegrass are the most prominent grasses. Site production is approximately 55% grasses; 5% forbs; 25% shrubs & 15% trees.

NF, T, D, IPG

1.1A →

← 1.2A

F, W, PG

1.2 Closed Canopy – Pinyon/Juniper/Mountain Big Sagebrush Community Phase. Two-needle pinyon with lesser amounts of Utah juniper form a dense overstory canopy. Mountain big sagebrush dominates the shrub layer. A mixture of other shrubs including antelope bitterbrush & Utah serviceberry may be present. Perennial grasses are much reduced. Site production is approximately 20% grasses; 5% forbs; 40% shrubs & 35% trees.

T1A

T, D, IS, IPG

2. Current Potential State

2.1 Open Canopy – Pinyon-Juniper/Mountain Big Sagebrush/Bluebunch Wheatgrass/ Invasive Weed Community Phase. Two-needle pinyon with lesser amounts of Utah juniper form an open overstory canopy. Mountain big sagebrush dominates the shrub layer. Bluebunch wheatgrass, Indian ricegrass and cheatgrass are the most prominent grasses. Other invasive grasses and forbs are present. Site production is approximately 40% grasses; 10% forbs; 30% shrubs & 20% trees.

D, NF, T, IPG

2.1A →

← 2.2A

F, W, PG

2.2 Closed Canopy – Pinyon/Juniper/Mountain Big Sagebrush/ Invasive Weed Community Phase. Two-needle pinyon and Utah juniper form a dense overstory canopy. Mountain big sagebrush dominates the shrub layer. Native perennial grasses are much reduced. Cheatgrass and other invasive grasses and forbs may dominate the site. Site production is approximately 25% grasses; 10% forbs; 30% shrubs & 45% trees.

PG, T, NF

R3A

T2A

F, D, IPG, JR

3. Disturbance State.

3.1 Recent Crown Fire Community Phase. Site has recently burned resulting in the removal of overstory trees and fire sensitive shrubs. Sprouting shrubs may be present and could be increasing. Native grasses & forbs along with cheatgrass, mustard species and other non-native species are present in various amounts. Site production is approximately 65% grasses; 10% forbs; 20% shrubs & 5% trees.

3.2 Recent Chaining/Pushing Community Phase. Site has been sawed, chained or pushed resulting in the removal of overstory trees. Shrubs are present and may be increasing. Native grasses & forbs along with cheatgrass, mustard species and other non-native species are present in various amounts. Site production is approximately 65% grasses; 10% forbs; 20% shrubs & 5% trees.

Legend:

D = Drought

F = Fire

NF = No Fire

T = Time

JR = Juniper Removal

IS = Establishment of Invasive Species.

W = Wet Weather Periods

IPG = Improper Livestock Grazing

PG = Proper Livestock Grazing

State 1
Reference State

This state describes the various biotic communities that are expected to be found on this ecological site under natural conditions. This reference state has an overstory canopy of singleleaf and/or two-needle pinyon, with lesser amounts of Utah juniper. The shrub layer is typically dominated by mountain big sagebrush. A mixture of other shrubs including black sagebrush, antelope bitterbrush and Utah serviceberry are commonly found. Bluebunch wheatgrass is the dominant herbaceous species with Nevada bluegrass and Indian ricegrass commonly occurring. Other native grasses, forbs, and shrubs will often produce a significant portion of vegetative composition in the plant community. This site occurs on 2% to 70% slopes on all aspects. It is typically found on fan remnants, hills, mountain slopes, terraces and the toeslopes of drainageways. Its soils are shallow to moderately deep, well drained and gravelly or cobbly loams in texture. The reference state is self-sustaining and resistant to change due to a good natural resilience to its natural disturbances. The primary natural disturbance mechanisms are wildlife population densities which can affect the shrub layer composition, weather fluctuations, and fire period. Definitions: Reference State: Natural plant communities as influenced by tree and shrub canopy densities, long term weather fluctuations, and periodic fire. Indicators: These communities are dominated by pinyon/juniper, mountain big sagebrush and bluebunch wheatgrass. The density of the tree and shrub canopies determines the amount and composition of the other native species present in the community. Feedbacks: Natural fluctuations in weather patterns that allow for a self-sustaining tree, shrub and native grass community. Prolonged drought, an increase in fire frequency, or other disturbances may allow for the establishment of invasive species. At-risk Community Phase: All communities are at risk when native plants are stressed and conditions are created that may allow invasive plants to establish. Trigger: The establishment of invasive plant species.

Community 1.1
Open Canopy - Pinyon/Juniper/Mountain Big Sage/Bluebunch Wheatgrass Community Phase.



Figure 5. Community Phase 1.1

This community phase is characterized by an open overstory canopy of either singleleaf or two-needle pinyon along with lesser amounts of Utah juniper. Mountain big sagebrush is the dominant shrub. Antelope bitterbrush, black sagebrush and Utah serviceberry are common understory shrubs. Commonly occurring grasses and grasslikes include bluebunch wheatgrass, Nevada bluegrass, Geyer sedge and Indian ricegrass. Other perennial grasses, shrubs, and forbs are also often present. This community phase is fairly early in its natural fire cycle and, over time, the canopy of trees and shrubs will slowly close, reducing the sites herbaceous vegetation as described in community phase 1.2. Air dry composition of this site is approximately 55 percent grasses, 5 percent forbs, and 25 percent shrubs and 15% trees. Bare ground is variable (2-50%) depending on biological crust cover, which is also variable (1-25%) and surface rock fragments (2-70%). Biological crusts can vary from sites dominated by light cyanobacteria in the plant interspaces, with occasional moss and lichen pinnacles under shrub canopies, to those dominated by lichen and moss pinnacles as well as cyanobacteria in the site interspaces. The following tables provide an example the typical vegetative floristics of a community phase 1.1 plant community.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Shrub/Vine	140	275	400
Grass/Grasslike	130	250	360
Tree	50	75	110
Forb	30	50	80
Total	350	650	950

Table 6. Ground cover

Tree foliar cover	5-10%
Shrub/vine/liana foliar cover	15-30%
Grass/grasslike foliar cover	10-25%
Forb foliar cover	2-3%
Non-vascular plants	0%
Biological crusts	0%
Litter	0%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	0%

Table 7. Canopy structure (% cover)

Height Above Ground (Ft)	Tree	Shrub/Vine	Grass/ Grasslike	Forb
<0.5	—	—	—	—
>0.5 <= 1	—	—	—	—
>1 <= 2	—	—	20-30%	0-5%
>2 <= 4.5	—	25-35%	—	—
>4.5 <= 13	5-15%	—	—	—
>13 <= 40	—	—	—	—
>40 <= 80	—	—	—	—
>80 <= 120	—	—	—	—
>120	—	—	—	—

**Figure 7. Plant community growth curve (percent production by month).
UT3381, PNC. Excellent Condition.**

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	10	30	45	5	5	5	0	0	0

Community 1.2

Closed Canopy - Pinyon/Juniper/Mountain Big Sage/Bluebunch Wheatgrass Community Phase.



Figure 8. Community Phase 1.2

This community phase is characterized by a closed overstory canopy of either singleleaf or two-needle pinyon along with lesser amounts of Utah juniper. Mountain big sagebrush is the dominant shrub. Antelope bitterbrush, black sagebrush and Utah serviceberry are common understory shrubs. Commonly occurring grasses and grasslikes include bluebunch wheatgrass, Indian ricegrass, Nevada bluegrass, Geyer sedge and Indian ricegrass. Other perennial grasses, shrubs, and forbs are also often present. This community phase typically occurs late in the sites natural fire cycle. Over time, the canopy of trees and shrubs will continue to slowly close, further reducing the sites herbaceous vegetation as described in community phase 1.1. Air dry composition of this site is approximately 20 percent grasses, 5 percent forbs, and 40 percent shrubs and 35% trees. Bare ground is variable (2-50%) depending on biological crust cover, which is also variable (1-25%) and surface rock fragments (2-70%). Biological crusts can vary from sites dominated by light cyanobacteria in the plant interspaces, with occasional moss and lichen pinnacles under shrub canopies, to those dominated by lichen and moss pinnacles as well as cyanobacteria in the site interspaces. The following tables provide an example the typical vegetative floristics of a community phase 1.2 plant community.

Table 8. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Shrub/Vine	140	275	400
Grass/Grasslike	130	250	360
Tree	50	75	110
Forb	30	50	80
Total	350	650	950

Table 9. Ground cover

Tree foliar cover	5-10%
Shrub/vine/liana foliar cover	15-30%
Grass/grasslike foliar cover	10-25%
Forb foliar cover	2-3%
Non-vascular plants	0%
Biological crusts	0%
Litter	0%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%
Bedrock	0%
Water	0%

Bare ground	0%
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Table 10. Canopy structure (% cover)

Height Above Ground (Ft)	Tree	Shrub/Vine	Grass/ Grasslike	Forb
<0.5	—	—	—	—
>0.5 <= 1	—	—	—	—
>1 <= 2	—	—	20-30%	0-5%
>2 <= 4.5	—	25-35%	—	—
>4.5 <= 13	5-15%	—	—	—
>13 <= 40	—	—	—	—
>40 <= 80	—	—	—	—
>80 <= 120	—	—	—	—
>120	—	—	—	—

**Figure 10. Plant community growth curve (percent production by month).
UT3381, PNC. Excellent Condition.**

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	10	30	45	5	5	5	0	0	0

Pathway 1.1A Community 1.1 to 1.2



**Open Canopy -
Pinyon/Juniper/Mountain Big
Sage/Bluebunch Wheatgrass
Community Phase.**



**Closed Canopy -
Pinyon/Juniper/Mountain Big
Sage/Bluebunch Wheatgrass
Community Phase.**

This community pathway occurs when long-term drought and/or extended periods without fire allows canopies of Utah juniper and two-needle or singleleaf pinyon to significantly increase. This closing canopy event causes understory vegetation to be reduced and eventually nearly eliminated from the site. Drought alone can also reduce native perennial grass production and eventually eliminate some species from the system. Improper livestock grazing during these periods can facilitate this process.

Pathway 1.2A Community 1.2 to 1.1



**Closed Canopy -
Pinyon/Juniper/Mountain Big
Sage/Bluebunch Wheatgrass
Community Phase.**



**Open Canopy -
Pinyon/Juniper/Mountain Big
Sage/Bluebunch Wheatgrass
Community Phase.**

This community pathway occurs when weather patterns return to within normal ranges and some level of fire reduces Utah juniper and two-needle or singleleaf pinyon, significantly opening the sites canopy. Insect damage on singleleaf pinyon can also cause its canopy to be reduced on this site. This more open canopy allows understory vegetation to recover and increase in production, and under some circumstances, flourish on the site. Proper livestock grazing during these periods can facilitate this process.

State 2

Current Potential State.

The Current Potential State is similar to the Reference State except that non-native species are now present. This state describes the plant communities that may or have become established on this ecological site under various successional sequences and disturbance conditions. This state typically has a well developed overstory canopy composed of either two-needle or singleleaf pinyon with lesser amounts of Utah juniper. Mountain big sagebrush often dominates the shrub layer. Black sagebrush, antelope bitterbrush and Utah serviceberry are common shrub species. Bluebunch wheatgrass is the dominant herbaceous species with Indian ricegrass, Nevada bluegrass and other perennial grasses and forbs also commonly found in abundance. Cheatgrass, alyssum, various mustard species and other non-native species are present on the site and, under certain circumstances, may visually dominate the sites aspect. The primary disturbance mechanisms are the tree and shrub layer densities; the amount and kinds of invasive species present; weather fluctuations; and fire. The current potential state is still self-sustaining but may be losing its resistance to change due to the impact of disturbances with less resilience following those disturbances. Definitions: Current Potential State: Plant communities influenced by tree and shrub canopy density, long term weather fluctuations, and periodic fire. Invasive species are present in various amounts. Indicators: A community dominated by pinyon/ juniper, mountain big sagebrush and bluebunch wheatgrass. The density of the tree and shrub canopies determines the amount and composition of the other native and introduced grasses and forbs that may be present. Feedbacks: Natural fluctuations in weather patterns that allow for a self sustaining shrub and native grass community. Prolonged drought, more frequent fires, and/or other disturbances that may allow for the increase of invasive species. At-risk Community Phase: All communities are at risk when native plants are stressed and nutrients become available for invasive plants to increase. Trigger: A reduction of perennial grass and forb species combined with an increase of invasive plant species.

Community 2.1

Open Canopy - Pinyon/Juniper/Mountain Big Sage/Bluebunch Wheatgrass Invasive Weed Community Phase.

bluebunch wheatgrass, annual weeds.
Soil Survey: UT601 Box Elder County, West.
UTM: NAD83, 12T, E287578, N4633224.
Photo by: L. A. Wadman.
Date: October 9, 2013
This photo provides the best example available of
what a community phase 2.1 plant community might
have looked like.

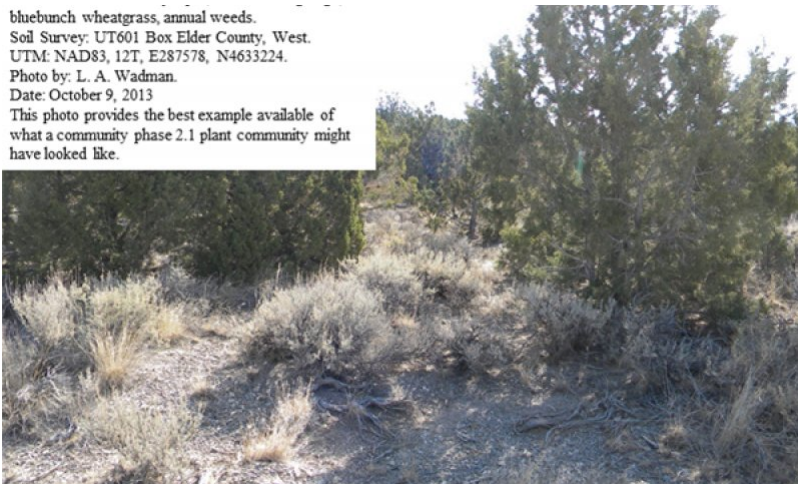


Figure 11. Community Phase 2.1

This community phase is characterized by an open overstory canopy of either singleleaf or two-needle pinyon along with lesser amounts of Utah juniper. Mountain big sagebrush is the dominant shrub. Antelope bitterbrush, black sagebrush and Utah serviceberry are common understory shrubs. Commonly occurring grasses and grasslikes include bluebunch wheatgrass, Nevada bluegrass, Geyer sedge and Indian ricegrass. Other perennial grasses, shrubs, and forbs are also often present. Non-native species including cheatgrass, Russian thistle and various annual mustard species are now present in the all plant communities and are expected to remain a permanent part of these communities. This community phase is fairly early in its natural fire cycle and, over time, the canopy of trees and shrubs will slowly close, reducing the sites herbaceous vegetation as described in community phase 2.2. Air dry composition of this site is approximately 40 percent grasses, 10 percent forbs, and 30 percent shrubs and 20% trees. Bare ground is variable (2-50%) depending on biological crust cover, which is also variable (1-25%) and surface rock fragments (2-70%). Biological crusts can vary from sites dominated by light cyanobacteria in the plant interspaces, with occasional moss and lichen pinnacles under shrub canopies, to those dominated by lichen and moss pinnacles as well as cyanobacteria in the site interspaces. The following tables provide an example the typical

vegetative floristics of a community phase 1.1 plant community.

Table 11. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Shrub/Vine	140	275	400
Grass/Grasslike	130	250	360
Tree	50	75	110
Forb	30	50	80
Total	350	650	950

Table 12. Ground cover

Tree foliar cover	5-10%
Shrub/vine/liana foliar cover	15-30%
Grass/grasslike foliar cover	10-25%
Forb foliar cover	2-3%
Non-vascular plants	0%
Biological crusts	0%
Litter	0%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	0%

Table 13. Canopy structure (% cover)

Height Above Ground (Ft)	Tree	Shrub/Vine	Grass/ Grasslike	Forb
<0.5	—	—	—	—
>0.5 <= 1	—	—	—	—
>1 <= 2	—	—	20-30%	0-5%
>2 <= 4.5	—	25-35%	—	—
>4.5 <= 13	5-15%	—	—	—
>13 <= 40	—	—	—	—
>40 <= 80	—	—	—	—
>80 <= 120	—	—	—	—
>120	—	—	—	—

**Figure 13. Plant community growth curve (percent production by month).
UT3381, PNC. Excellent Condition.**

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	10	30	45	5	5	5	0	0	0

Community 2.2

Closed Canopy - Pinyon/Juniper/Mountain Big Sage/Community Phase.

Dominant Plants: Utah juniper, Mountain big sage,
annual weeds.
Soil Survey: UT601 Box Elder County, West.
UTM: NAD83, 12T, E295361, N4647076.
Photo by: L. A. Wadman.
Date: October 9, 2013
This photo provides the best example available of
what a community phase 2.2 plant community might
have looked like.

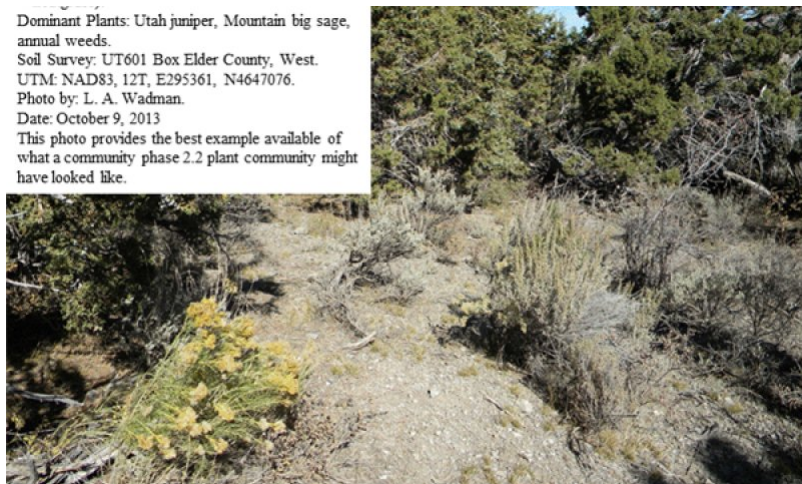


Figure 14. Community Phase 2.2

This community phase is characterized by a closed overstory canopy of either singleleaf or two-needle pinyon along with lesser amounts of Utah juniper. Mountain big sagebrush is the dominant shrub. Antelope bitterbrush, black sagebrush and Utah serviceberry are common understory shrubs. Herbaceous species including bluebunch wheatgrass, Indian ricegrass, Nevada bluegrass, and Indian ricegrass are typically much reduced. Other perennial grasses, shrubs, and forbs may or may not be present. Non-native species including cheatgrass, Russian thistle and various annual mustard species are now present in the all plant communities and are expected to remain a permanent part of these communities. This community phase typically occurs late in the sites natural fire cycle. Over time, the canopy of trees and shrubs will continue to slowly close, further reducing the sites herbaceous vegetation. Air dry composition of this site is approximately 25 percent grasses, 10 percent forbs, and 30 percent shrubs and 45% trees. Bare ground is variable (2-50%) depending on biological crust cover, which is also variable (1-25%) and surface rock fragments (2-70%). Biological crusts can vary from sites dominated by light cyanobacteria in the plant interspaces, with occasional moss and lichen pinnacles under shrub canopies, to those dominated by lichen and moss pinnacles as well as cyanobacteria in the site interspaces. The following tables provide an example the typical vegetative floristics of a community phase 2.2 plant community.

Table 14. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Shrub/Vine	140	275	400
Grass/Grasslike	130	250	360
Tree	50	75	110
Forb	30	50	80
Total	350	650	950

Table 15. Ground cover

Tree foliar cover	5-10%
Shrub/vine/liana foliar cover	15-30%
Grass/grasslike foliar cover	10-25%
Forb foliar cover	2-3%
Non-vascular plants	0%
Biological crusts	0%
Litter	0%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%
Bedrock	0%
Water	0%

Bare ground	0%
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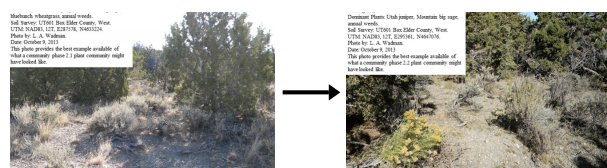
Table 16. Canopy structure (% cover)

Height Above Ground (Ft)	Tree	Shrub/Vine	Grass/ Grasslike	Forb
<0.5	—	—	—	—
>0.5 <= 1	—	—	—	—
>1 <= 2	—	—	20-30%	0-5%
>2 <= 4.5	—	25-35%	—	—
>4.5 <= 13	5-15%	—	—	—
>13 <= 40	—	—	—	—
>40 <= 80	—	—	—	—
>80 <= 120	—	—	—	—
>120	—	—	—	—

Figure 16. Plant community growth curve (percent production by month). UT3381, PNC. Excellent Condition.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	10	30	45	5	5	5	0	0	0

Pathway 2.1A Community 2.1 to 2.2



Open Canopy - Pinyon/Juniper/Mountain Big Sage/Bluebunch Wheatgrass Invasive Weed Community Phase.

Closed Canopy - Pinyon/Juniper/Mountain Big Sage/Community Phase.

This community pathway occurs when long-term drought and/or extended periods without fire allows canopies of Utah juniper and two-needle or singleleaf pinyon to significantly increase. This closing canopy event causes understory vegetation to be reduced and eventually nearly eliminated from the site. Drought alone can also reduce native perennial grass production and eventually eliminate some species from the system. Improper livestock grazing during these periods can facilitate this process.

Pathway 2.2A Community 2.2 to 2.1



Closed Canopy - Pinyon/Juniper/Mountain Big Sage/Community Phase.

Open Canopy - Pinyon/Juniper/Mountain Big Sage/Bluebunch Wheatgrass Invasive Weed Community Phase.

This community pathway occurs when weather patterns return to within normal ranges and some level of fire reduces Utah juniper and two-needle or singleleaf pinyon, significantly opening the sites canopy. Insect damage on singleleaf pinyon can also cause its canopy to be reduced on this site. This more open canopy allows understory vegetation to recover and increase in production, and under some circumstances, flourish on the site. Proper

livestock grazing during these periods can facilitate this process.

State 3

Disturbance State

This state describes the plant communities that may or have become established on this ecological site under various successional sequences and disturbance conditions. Two distinct community phases have been observed to date. The first describes the effects of recent crown fire, and the other describes communities where dense canopies of pinyon and juniper have been removed either by chaining, pushing or chainsaw cutting. Non-native species are normally present in all community phases. This states vegetative communities are quite variable depending the disturbance mechanism and pre-disturbance conditions. Fire will normally also remove mountain big sage and other fire sensitive species while mechanical removal usually leaves these species. Bluebunch wheatgrass, Indian ricegrass, Nevada bluegrass and other native perennial grass species are often abundant following fire but may also be reduced or missing following either disturbance. Western wheatgrass is usually still present on the site and along with invasive weedy species, including cheatgrass, alyssum, various mustard species and other non-native species, may visually dominate the sites herbaceous layer. The primary disturbance mechanisms include recent crown fire or the mechanical removal of the overstory of pinyon/juniper; a shrub layer comprised of various amounts of mountain big sagebrush; significant amounts of invasive herbaceous species present; weather fluctuations, and pre-disturbance conditions. This state may be losing its resistance to change due to the impact of these disturbances and may have less resilience following those disturbances. Definitions:

Disturbance State: Plant communities impacted by the removal of overstory of pinyon/juniper; a shrub canopy that may or may not contain mountain big sagebrush; long term weather fluctuations; and periodic fire. **Indicators:** The density of the remaining tree and shrub canopies following disturbance determines the amount and composition of the other native and introduced grasses and forbs that may be present. **Feedbacks:** Natural fluctuations in weather patterns following the removal of pinyon/juniper that may impact the remaining native shrub and grass communities. Prolonged drought, improper livestock grazing and/or other disturbances that allow for the increase of invasive species. **At-risk Community Phase:** All communities are at risk when native plants are stressed and nutrients become available for invasive plants to increase. **Trigger:** A reduction of perennial grass and forb species combined with an increase of invasive plant species.

Community 3.1

Recent Crown Fire Community Phase.



R028AY338UT- Upland Stony Loam (Pinyon-Juniper, Mountain Big Sage, Bluebunch Wheatgrass). Dominant Plants: Mountain big sage, bluebunch wheatgrass, Nevada bluegrass. Soil Survey: UT602 Box Elder County, East. UTM: NAD83, 12T, E394495, N4646972. Photo by: L. A. Wadman. Date: April 20, 2013

Figure 17. Community Phase 3.1

This community phase is at the beginning of the sites natural fire cycle. It is created after a fire has recently (typically 1 to 5 years) removed most of the singleleaf or two-needle pinyon and Utah juniper from the site. Mountain big sage, black sagebrush and antelope bitterbrush have also been reduced but those species that are sprouters may be recovering. Commonly occurring grasses and grasslikes include cheatgrass, bluebunch wheatgrass, Nevada bluegrass and Indian ricegrass. Non-native species are present in the all plant communities and are expected to remain a permanent part and potentially dominate these communities. Air dry composition of this site is approximately 65 percent grasses, 10 percent forbs, and 20 percent shrubs and 5% trees. Bare ground is variable (2-50%) depending on biological crust cover, which is also variable (1-25%) and surface rock fragments (10-70%). Biological crusts can vary from sites dominated by light cyanobacteria in the plant interspaces, with occasional

moss and lichen pinnacles under shrub canopies, to those dominated by lichen and moss pinnacles as well as cyanobacteria in the site interspaces. The following tables provide an example the typical vegetative floristics of a community phase 3.1 plant community.

Table 17. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Shrub/Vine	140	275	400
Grass/Grasslike	130	250	360
Tree	50	75	110
Forb	30	50	80
Total	350	650	950

Table 18. Ground cover

Tree foliar cover	5-10%
Shrub/vine/liana foliar cover	15-30%
Grass/grasslike foliar cover	10-25%
Forb foliar cover	2-3%
Non-vascular plants	0%
Biological crusts	0%
Litter	0%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	0%

Table 19. Canopy structure (% cover)

Height Above Ground (Ft)	Tree	Shrub/Vine	Grass/ Grasslike	Forb
<0.5	—	—	—	—
>0.5 <= 1	—	—	—	—
>1 <= 2	—	—	20-30%	0-5%
>2 <= 4.5	—	25-35%	—	—
>4.5 <= 13	5-15%	—	—	—
>13 <= 40	—	—	—	—
>40 <= 80	—	—	—	—
>80 <= 120	—	—	—	—
>120	—	—	—	—

Figure 19. Plant community growth curve (percent production by month).
UT3381, PNC. Excellent Condition.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	10	30	45	5	5	5	0	0	0

Community 3.2

Recent Chaining/Pushing Community Phase.

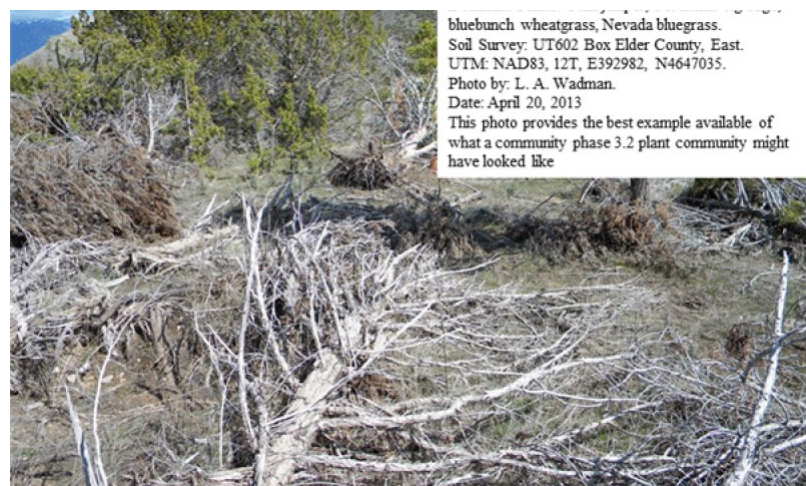


Figure 20. Community Phase 3.2

The site has been chain-sawed, mechanically chained or pushed to remove the overstory singleleaf or two-needle pinyon and Utah juniper. Mountain big sagebrush, antelope bitterbrush and other shrubs may or may not be present. Native perennial grasses are typically much reduced or missing from the herbaceous layer. The site is occasionally seeded to smooth brome or intermediate wheatgrass. Various amounts of native grasses and forbs may still be present but often at reduced levels. Non-native species are present on the site and will be present in the seeded community. Some pinyon and juniper seedlings are also typically present in the community. The sites vegetative composition by air-dry weight is approximately 65 percent grasses and introduced weedy species, 10 percent forbs, 20 percent shrubs and 5% trees. The following tables provide an example of the typical vegetative floristics of a community phase 3.2 plant community.

Table 20. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Shrub/Vine	140	275	400
Grass/Grasslike	130	250	360
Tree	50	75	110
Forb	30	50	80
Total	350	650	950

Table 21. Ground cover

Tree foliar cover	5-10%
Shrub/vine/liana foliar cover	15-30%
Grass/grasslike foliar cover	10-25%
Forb foliar cover	2-3%
Non-vascular plants	0%
Biological crusts	0%
Litter	0%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	0%

Table 22. Canopy structure (% cover)

Height Above Ground (Ft)	Tree	Shrub/Vine	Grass/ Grasslike	Forb
<0.5	—	—	—	—
>0.5 <= 1	—	—	—	—
>1 <= 2	—	—	20-30%	0-5%
>2 <= 4.5	—	25-35%	—	—
>4.5 <= 13	5-15%	—	—	—
>13 <= 40	—	—	—	—
>40 <= 80	—	—	—	—
>80 <= 120	—	—	—	—
>120	—	—	—	—

Figure 22. Plant community growth curve (percent production by month).
UT3381, PNC. Excellent Condition.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	10	30	45	5	5	5	0	0	0

Transition T1A

State 1 to 2

This transitional pathway occurs when any combination of improper livestock grazing, prolonged drought or other disturbance causes the perennial herbaceous community to become significantly reduced allowing non-native species such as cheatgrass, alysium, Russian thistle and other invasive weeds to become established. Broom snakeweed may also increase during this time. Once invasive species occupy the site, a threshold has been crossed. Cheatgrass, however, has been known to become established in healthy communities on this site.

Transition T2A

State 2 to 3

This transitional pathway occurs when a major fire or mechanical treatment removes nearly all the Utah juniper and any pinyon present from the site. A combination of improper livestock grazing, prolonged drought or other disturbance can slow the expected recovery of the perennial herbaceous community, allowing non-native species such as cheatgrass, alysium, russian thistle and other invasive weeds to flourish. Broom snakeweed may also increase during this time. Fire tolerant shrubs will often recover quickly during these periods.

Restoration pathway R3A

State 3 to 2

This restoration pathway occurs when the site is well managed and fire is excluded for long periods of time. The natural fire cycle will be expected to occur but not for many years. The site will normally have a mix of native and introduced species including perennial grasses and annual and perennial grasses. Mountain big sagebrush will normally increase until it again dominates the shrub layer. Pinyon and Utah juniper will also return to normal, pre-disturbance levels during this time.

Additional community tables

Table 23. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1	Primary Grasses			200–350	
	bluebunch wheatgrass	PSSP6	<i>Pseudoroegneria spicata</i>	125–175	—

	Indian ricegrass	ACHY	<i>Achnatherum hymenoides</i>	60–90	–
	needle and thread	HECO26	<i>Hesperostipa comata</i>	30–60	–
	muttongrass	POFE	<i>Poa fendleriana</i>	30–60	–
4	Secondary Grasses			60–90	
	James' galleta	PLJA	<i>Pleuraphis jamesii</i>	20–30	–
	Geyer's sedge	CAGE2	<i>Carex geyeri</i>	20–30	–
	squirreltail	ELEL5	<i>Elymus elymoides</i>	10–20	–
	slender wheatgrass	ELTR7	<i>Elymus trachycaulus</i>	10–20	–
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	10–20	–
	saline wildrye	LESAS	<i>Leymus salinus</i> ssp. <i>salinus</i>	10–20	–
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	10–20	–
	Sandberg bluegrass	POSE	<i>Poa secunda</i>	10–20	–
	Grass, perennial	2GP	<i>Grass, perennial</i>	10–20	–
	Letterman's needlegrass	ACLE9	<i>Achnatherum lettermanii</i>	10–20	–
	Columbia needlegrass	ACNE9	<i>Achnatherum nelsonii</i>	10–20	–
	purple threeawn	ARPU9	<i>Aristida purpurea</i>	10–20	–
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	10–20	–
Forb					
2				30–60	
	tapertip hawksbeard	CRAC2	<i>Crepis acuminata</i>	20–40	–
	fiddleleaf hawksbeard	CRRU3	<i>Crepis runcinata</i>	10–20	–
	cushion buckwheat	EROV	<i>Eriogonum ovalifolium</i>	10–20	–
	shaggy fleabane	ERPU2	<i>Erigeron pumilus</i>	10–20	–
	northern bedstraw	GABO2	<i>Galium boreale</i>	10–20	–
	ballhead ipomopsis	IPCOC3	<i>Ipomopsis congesta</i> ssp. <i>congesta</i>	10–20	–
	blue flax	LIPE2	<i>Linum perenne</i>	10–20	–
	tailcup lupine	LUCA	<i>Lupinus caudatus</i>	10–20	–
	hoary tansyaster	MACA2	<i>Machaeranthera canescens</i>	10–20	–
	lobeleaf groundsel	PAMU11	<i>Packera multilobata</i>	10–20	–
	low beardtongue	PEHU	<i>Penstemon humilis</i>	10–20	–
	rock goldenrod	PEPU7	<i>Petradoria pumila</i>	10–20	–
	Chambers' twinpod	PHCH2	<i>Physaria chambersii</i>	10–20	–
	spiny phlox	PHHO	<i>Phlox hoodii</i>	10–20	–
	longleaf phlox	PHLO2	<i>Phlox longifolia</i>	10–20	–
	scarlet globemallow	SPCO	<i>Sphaeralcea coccinea</i>	10–20	–
	Pacific aster	SYCHC	<i>Symphotrichum chilense</i> var. <i>chilense</i>	10–20	–
	yellow salsify	TRDU	<i>Tragopogon dubius</i>	10–20	–
	salsify	TRPO	<i>Tragopogon porrifolius</i>	10–20	–
	Forb, annual	2FA	<i>Forb, annual</i>	10–20	–
	Forb, perennial	2FP	<i>Forb, perennial</i>	10–20	–
	low pussytoes	ANDI2	<i>Antennaria dimorpha</i>	10–20	–
	Utah milkvetch	ASUT	<i>Astragalus utahensis</i>	10–20	–
	Wyoming Indian paintbrush	CALI4	<i>Castilleja linariifolia</i>	10–20	–

	sego lily	CANU3	<i>Calochortus nuttallii</i>	10–20	–
	maiden blue eyed Mary	COPA3	<i>Collinsia parviflora</i>	10–20	–
	bastard toadflax	COUM	<i>Comandra umbellata</i>	10–20	–
Shrub/Vine					
3	Primary Shrubs			250–375	
	mountain big sagebrush	ARTRV	<i>Artemisia tridentata</i> ssp. <i>vaseyana</i>	150–200	–
	antelope bitterbrush	PUTR2	<i>Purshia tridentata</i>	70–100	–
	black sagebrush	ARNO4	<i>Artemisia nova</i>	30–60	–
	Utah serviceberry	AMUT	<i>Amelanchier utahensis</i>	20–40	–
	Nevada jointfir	EPNE	<i>Ephedra nevadensis</i>	20–40	–
5	Secondary Shrubs			40–80	
	Shrub (>.5m)	2SHRUB	<i>Shrub (>.5m)</i>	10–20	–
	fourwing saltbush	ATCA2	<i>Atriplex canescens</i>	10–20	–
	alderleaf mountain mahogany	CEMO2	<i>Cercocarpus montanus</i>	10–20	–
	yellow rabbitbrush	CHVI8	<i>Chrysothamnus viscidiflorus</i>	10–20	–
	mormon tea	EPVI	<i>Ephedra viridis</i>	10–20	–
	slender buckwheat	ERMI4	<i>Eriogonum microthecum</i>	10–20	–
	rubber rabbitbrush	ERNA10	<i>Ericameria nauseosa</i>	10–20	–
	broom snakeweed	GUSA2	<i>Gutierrezia sarothrae</i>	10–20	–
	creeping barberry	MARE11	<i>Mahonia repens</i>	10–20	–
	plains pricklypear	OPPO	<i>Opuntia polyacantha</i>	10–20	–
	rock goldenrod	PEPU7	<i>Petroradia pumila</i>	10–20	–
	Mexican cliffrose	PUME	<i>Purshia mexicana</i>	10–20	–
	Gambel oak	QUGA	<i>Quercus gambelii</i>	10–20	–
	skunkbush sumac	RHTR	<i>Rhus trilobata</i>	10–20	–
	mountain snowberry	SYOR2	<i>Symphoricarpos oreophilus</i>	10–20	–
	spineless horsebrush	TECA2	<i>Tetradymia canescens</i>	10–20	–
Tree					
6	Trees			120–160	
	twoneedle pinyon	PIED	<i>Pinus edulis</i>	80–100	–
	singleleaf pinyon	PIMO	<i>Pinus monophylla</i>	80–100	–
	Utah juniper	JUOS	<i>Juniperus osteosperma</i>	20–40	–

Table 24. Community 1.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1	Primary Grasses			100–200	
	Indian ricegrass	ACHY	<i>Achnatherum hymenoides</i>	30–60	–
	needle and thread	HECO26	<i>Hesperostipa comata</i>	30–60	–
	muttongrass	POFE	<i>Poa fendleriana</i>	30–60	–
	bluebunch wheatgrass	PSSP6	<i>Pseudoroegneria spicata</i>	30–60	–
4	Secondary Grasses			60–90	
	James' galleta	PLJA	<i>Pleuraphis jamesii</i>	20–30	–

	Geyer's sedge	CAGE2	<i>Carex geyeri</i>	20–30	–
	squirreltail	ELEL5	<i>Elymus elymoides</i>	10–20	–
	slender wheatgrass	ELTR7	<i>Elymus trachycaulus</i>	10–20	–
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	10–20	–
	saline wildrye	LESAS	<i>Leymus salinus</i> ssp. <i>salinus</i>	10–20	–
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	10–20	–
	Sandberg bluegrass	POSE	<i>Poa secunda</i>	10–20	–
	Grass, perennial	2GP	<i>Grass, perennial</i>	10–20	–
	Letterman's needlegrass	ACLE9	<i>Achnatherum lettermanii</i>	10–20	–
	Columbia needlegrass	ACNE9	<i>Achnatherum nelsonii</i>	10–20	–
	purple threeawn	ARPU9	<i>Aristida purpurea</i>	10–20	–
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	10–20	–

Forb

2	Secondary Forbs			30–60	
	tapertip hawksbeard	CRAC2	<i>Crepis acuminata</i>	20–40	–
	fiddleleaf hawksbeard	CRRU3	<i>Crepis runcinata</i>	10–20	–
	cushion buckwheat	EROV	<i>Eriogonum ovalifolium</i>	10–20	–
	shaggy fleabane	ERPU2	<i>Erigeron pumilus</i>	10–20	–
	northern bedstraw	GABO2	<i>Galium boreale</i>	10–20	–
	ballhead ipomopsis	IPCOC3	<i>Ipomopsis congesta</i> ssp. <i>congesta</i>	10–20	–
	blue flax	LIPE2	<i>Linum perenne</i>	10–20	–
	tailcup lupine	LUCA	<i>Lupinus caudatus</i>	10–20	–
	hoary tansyaster	MACA2	<i>Machaeranthera canescens</i>	10–20	–
	lobeleaf groundsel	PAMU11	<i>Packera multilobata</i>	10–20	–
	low beardtongue	PEHU	<i>Penstemon humilis</i>	10–20	–
	elephant grass	PEPU2	<i>Pennisetum purpureum</i>	10–20	–
	Chambers' twinpod	PHCH2	<i>Physaria chambersii</i>	10–20	–
	spiny phlox	PHHO	<i>Phlox hoodii</i>	10–20	–
	longleaf phlox	PHLO2	<i>Phlox longifolia</i>	10–20	–
	scarlet globemallow	SPCO	<i>Sphaeralcea coccinea</i>	10–20	–
	Pacific aster	SYCHC	<i>Symphyotrichum chilense</i> var. <i>chilense</i>	10–20	–
	yellow salsify	TRDU	<i>Tragopogon dubius</i>	10–20	–
	salsify	TRPO	<i>Tragopogon porrifolius</i>	10–20	–
	Forb, annual	2FA	<i>Forb, annual</i>	10–20	–
	Forb, perennial	2FP	<i>Forb, perennial</i>	10–20	–
	low pussytoes	ANDI2	<i>Antennaria dimorpha</i>	10–20	–
	Utah milkvetch	ASUT	<i>Astragalus utahensis</i>	10–20	–
	Wyoming Indian paintbrush	CALI4	<i>Castilleja linariifolia</i>	10–20	–
	naked mariposa lily	CANU2	<i>Calochortus nudus</i>	10–20	–
	sego lily	CANU3	<i>Calochortus nuttallii</i>	10–20	–
	maiden blue eyed Mary	COPA3	<i>Collinsia parviflora</i>	10–20	–
	bastard toadflax	COUM	<i>Comandra umbellata</i>	10–20	–

Shrub/Vine

3	Primary Shrubs			350–450	
	mountain big sagebrush	ARTRV	<i>Artemisia tridentata</i> ssp. <i>vaseyana</i>	200–300	–
	antelope bitterbrush	PUTR2	<i>Purshia tridentata</i>	70–100	–
	black sagebrush	ARNO4	<i>Artemisia nova</i>	30–60	–
	Utah serviceberry	AMUT	<i>Amelanchier utahensis</i>	20–40	–
	Nevada jointfir	EPNE	<i>Ephedra nevadensis</i>	20–40	–
5	Secondary Shrubs			40–80	
	Shrub (>.5m)	2SHRUB	<i>Shrub (>.5m)</i>	10–20	–
	fourwing saltbush	ATCA2	<i>Atriplex canescens</i>	10–20	–
	alderleaf mountain mahogany	CEMO2	<i>Cercocarpus montanus</i>	10–20	–
	yellow rabbitbrush	CHVI8	<i>Chrysothamnus viscidiflorus</i>	10–20	–
	mormon tea	EPVI	<i>Ephedra viridis</i>	10–20	–
	slender buckwheat	ERMI4	<i>Eriogonum microthecum</i>	10–20	–
	rubber rabbitbrush	ERNA10	<i>Ericameria nauseosa</i>	10–20	–
	broom snakeweed	GUSA2	<i>Gutierrezia sarothrae</i>	10–20	–
	creeping barberry	MARE11	<i>Mahonia repens</i>	10–20	–
	plains pricklypear	OPPO	<i>Opuntia polyacantha</i>	10–20	–
	rock goldenrod	PEPU7	<i>Petradoria pumila</i>	10–20	–
	Mexican cliffrose	PUME	<i>Purshia mexicana</i>	10–20	–
	Gambel oak	QUGA	<i>Quercus gambelii</i>	10–20	–
	skunkbush sumac	RHTR	<i>Rhus trilobata</i>	10–20	–
	mountain snowberry	SYOR2	<i>Symphoricarpos oreophilus</i>	10–20	–
	spineless horsebrush	TECA2	<i>Tetradymia canescens</i>	10–20	–
Tree					
6	Trees			220–260	
	twoneedle pinyon	PIED	<i>Pinus edulis</i>	120–160	–
	singleleaf pinyon	PIMO	<i>Pinus monophylla</i>	120–160	–
	Utah juniper	JUOS	<i>Juniperus osteosperma</i>	80–120	–

Table 25. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1	Primary Grasses			200–350	
	bluebunch wheatgrass	PSSP6	<i>Pseudoroegneria spicata</i>	125–175	–
	Indian ricegrass	ACHY	<i>Achnatherum hymenoides</i>	60–90	–
	cheatgrass	BRTE	<i>Bromus tectorum</i>	30–60	–
	needle and thread	HECO26	<i>Hesperostipa comata</i>	30–60	–
	muttongrass	POFE	<i>Poa fendleriana</i>	30–60	–
4	Secondary Grasses			60–90	
	James' galleta	PLJA	<i>Pleuraphis jamesii</i>	20–30	–
	Geyer's sedge	CAGE2	<i>Carex geyeri</i>	20–30	–
	squirreltail	ELEL5	<i>Elymus elymoides</i>	10–20	–
	slender wheatgrass	ELTR7	<i>Elymus trachycaulus</i>	10–20	–

	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	10–20	–
	saline wildrye	LESAS	<i>Leymus salinus</i> ssp. <i>salinus</i>	10–20	–
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	10–20	–
	Sandberg bluegrass	POSE	<i>Poa secunda</i>	10–20	–
	sixweeks fescue	VUOC	<i>Vulpia octoflora</i>	10–20	–
	bulbous bluegrass	POBU	<i>Poa bulbosa</i>	10–20	–
	Grass, perennial	2GP	<i>Grass, perennial</i>	10–20	–
	Letterman's needlegrass	ACLE9	<i>Achnatherum lettermanii</i>	10–20	–
	Columbia needlegrass	ACNE9	<i>Achnatherum nelsonii</i>	10–20	–
	crested wheatgrass	AGCR	<i>Agropyron cristatum</i>	10–20	–
	purple threeawn	ARPU9	<i>Aristida purpurea</i>	10–20	–
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	10–20	–
	red brome	BRRU2	<i>Bromus rubens</i>	10–20	–

Forb

2	Secondary Forbs			30–60	
	tapertip hawksbeard	CRAC2	<i>Crepis acuminata</i>	20–40	–
	fiddleleaf hawksbeard	CRRU3	<i>Crepis runcinata</i>	10–20	–
	western tansymustard	DEPI	<i>Descurainia pinnata</i>	10–20	–
	herb sophia	DESO2	<i>Descurainia sophia</i>	10–20	–
	cushion buckwheat	EROV	<i>Eriogonum ovalifolium</i>	10–20	–
	shaggy fleabane	ERPU2	<i>Erigeron pumilus</i>	10–20	–
	northern bedstraw	GABO2	<i>Galium boreale</i>	10–20	–
	saltlover	HAGL	<i>Halogeton glomeratus</i>	10–20	–
	common sunflower	HEAN3	<i>Helianthus annuus</i>	10–20	–
	ballhead ipomopsis	IPCOC3	<i>Ipomopsis congesta</i> ssp. <i>congesta</i>	10–20	–
	prickly lettuce	LASE	<i>Lactuca serriola</i>	10–20	–
	blue flax	LIPE2	<i>Linum perenne</i>	10–20	–
	tailcup lupine	LUCA	<i>Lupinus caudatus</i>	10–20	–
	hoary tansyaster	MACA2	<i>Machaeranthera canescens</i>	10–20	–
	lobeleaf groundsel	PAMU11	<i>Packera multilobata</i>	10–20	–
	low beardtongue	PEHU	<i>Penstemon humilis</i>	10–20	–
	elephant grass	PEPU2	<i>Pennisetum purpureum</i>	10–20	–
	Chambers' twinpod	PHCH2	<i>Physaria chambersii</i>	10–20	–
	spiny phlox	PHHO	<i>Phlox hoodii</i>	10–20	–
	longleaf phlox	PHLO2	<i>Phlox longifolia</i>	10–20	–
	Russian thistle	SAKA	<i>Salsola kali</i>	10–20	–
	tall tumbled mustard	SIAL2	<i>Sisymbrium altissimum</i>	10–20	–
	scarlet globemallow	SPCO	<i>Sphaeralcea coccinea</i>	10–20	–
	Pacific aster	SYCHC	<i>Symphyotrichum chilense</i> var. <i>chilense</i>	10–20	–
	yellow salsify	TRDU	<i>Tragopogon dubius</i>	10–20	–
	salsify	TRPO	<i>Tragopogon porrifolius</i>	10–20	–
	Forb, annual	2FA	<i>Forb, annual</i>	10–20	–
	Forb. perennial	2FP	<i>Forb. perennial</i>	10–20	–

	desert madwort	ALDE	<i>Alyssum desertorum</i>	10–20	–
	low pussytoes	ANDI2	<i>Antennaria dimorpha</i>	10–20	–
	Utah milkvetch	ASUT	<i>Astragalus utahensis</i>	10–20	–
	Wyoming Indian paintbrush	CALI4	<i>Castilleja linariifolia</i>	10–20	–
	naked mariposa lily	CANU2	<i>Calochortus nudus</i>	10–20	–
	sego lily	CANU3	<i>Calochortus nuttallii</i>	10–20	–
	lambsquarters	CHAL7	<i>Chenopodium album</i>	10–20	–
	crossflower	CHTE2	<i>Chorispota tenella</i>	10–20	–
	maiden blue eyed Mary	COPA3	<i>Collinsia parviflora</i>	10–20	–
	bastard toadflax	COUM	<i>Comandra umbellata</i>	10–20	–
Shrub/Vine					
3	Primary Shrubs			250–375	
	mountain big sagebrush	ARTRV	<i>Artemisia tridentata</i> ssp. <i>vaseyana</i>	150–200	–
	antelope bitterbrush	PUTR2	<i>Purshia tridentata</i>	70–100	–
	black sagebrush	ARNO4	<i>Artemisia nova</i>	30–60	–
	Utah serviceberry	AMUT	<i>Amelanchier utahensis</i>	20–40	–
	Nevada jointfir	EPNE	<i>Ephedra nevadensis</i>	20–40	–
5	Secondary Shrubs			40–80	
	Shrub (>.5m)	2SHRUB	<i>Shrub (>.5m)</i>	10–20	–
	fourwing saltbush	ATCA2	<i>Atriplex canescens</i>	10–20	–
	alderleaf mountain mahogany	CEMO2	<i>Cercocarpus montanus</i>	10–20	–
	yellow rabbitbrush	CHVI8	<i>Chrysothamnus viscidiflorus</i>	10–20	–
	mormon tea	EPVI	<i>Ephedra viridis</i>	10–20	–
	slender buckwheat	ERMI4	<i>Eriogonum microthecum</i>	10–20	–
	rubber rabbitbrush	ERNA10	<i>Ericameria nauseosa</i>	10–20	–
	broom snakeweed	GUSA2	<i>Gutierrezia sarothrae</i>	10–20	–
	creeping barberry	MARE11	<i>Mahonia repens</i>	10–20	–
	plains pricklypear	OPPO	<i>Opuntia polyacantha</i>	10–20	–
	rock goldenrod	PEPU7	<i>Petradoria pumila</i>	10–20	–
	Mexican cliffrose	PUME	<i>Purshia mexicana</i>	10–20	–
	Gambel oak	QUGA	<i>Quercus gambelii</i>	10–20	–
	skunkbush sumac	RHTR	<i>Rhus trilobata</i>	10–20	–
	mountain snowberry	SYOR2	<i>Symphoricarpos oreophilus</i>	10–20	–
	spineless horsebrush	TECA2	<i>Tetradymia canescens</i>	10–20	–
Tree					
6	Trees			120–160	
	twoneedle pinyon	PIED	<i>Pinus edulis</i>	80–100	–
	singleleaf pinyon	PIMO	<i>Pinus monophylla</i>	80–100	–
	Utah juniper	JUOS	<i>Juniperus osteosperma</i>	20–40	–

Table 26. Community 2.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
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Grass/Grasslike

1	Primary Grasses			100–200	
	cheatgrass	BRTE	<i>Bromus tectorum</i>	60–90	–
	needle and thread	HECO26	<i>Hesperostipa comata</i>	30–60	–
	muttongrass	POFE	<i>Poa fendleriana</i>	30–60	–
	bluebunch wheatgrass	PSSP6	<i>Pseudoroegneria spicata</i>	30–60	–
	Indian ricegrass	ACHY	<i>Achnatherum hymenoides</i>	30–60	–
4	Secondary Grasses			60–90	
	sixweeks fescue	VUOC	<i>Vulpia octoflora</i>	20–30	–
	James' galleta	PLJA	<i>Pleuraphis jamesii</i>	20–30	–
	bulbous bluegrass	POBU	<i>Poa bulbosa</i>	20–30	–
	red brome	BRRU2	<i>Bromus rubens</i>	20–30	–
	Geyer's sedge	CAGE2	<i>Carex geyeri</i>	20–30	–
	squirreltail	ELEL5	<i>Elymus elymoides</i>	10–20	–
	slender wheatgrass	ELTR7	<i>Elymus trachycaulus</i>	10–20	–
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	10–20	–
	saline wildrye	LESAS	<i>Leymus salinus</i> ssp. <i>salinus</i>	10–20	–
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	10–20	–
	Sandberg bluegrass	POSE	<i>Poa secunda</i>	10–20	–
	Grass, perennial	2GP	<i>Grass, perennial</i>	10–20	–
	Letterman's needlegrass	ACLE9	<i>Achnatherum lettermanii</i>	10–20	–
	Columbia needlegrass	ACNE9	<i>Achnatherum nelsonii</i>	10–20	–
	purple threeawn	ARPU9	<i>Aristida purpurea</i>	10–20	–
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	10–20	–

Forb

2	Secondary Forbs			30–60	
	tapertip hawksbeard	CRAC2	<i>Crepis acuminata</i>	20–40	–
	western tansymustard	DEPI	<i>Descurainia pinnata</i>	20–30	–
	herb sophia	DESO2	<i>Descurainia sophia</i>	20–30	–
	desert madwort	ALDE	<i>Alyssum desertorum</i>	20–30	–
	lambsquarters	CHAL7	<i>Chenopodium album</i>	20–30	–
	crossflower	CHTE2	<i>Chorispora tenella</i>	20–30	–
	prickly lettuce	LASE	<i>Lactuca serriola</i>	20–30	–
	saltlover	HAGL	<i>Halogeton glomeratus</i>	20–30	–
	common sunflower	HEAN3	<i>Helianthus annuus</i>	20–30	–
	Russian thistle	SAKA	<i>Salsola kali</i>	20–30	–
	tall tumbledustard	SIAL2	<i>Sisymbrium altissimum</i>	20–30	–
	scarlet globemallow	SPCO	<i>Sphaeralcea coccinea</i>	10–20	–
	Pacific aster	SYCHC	<i>Symphyotrichum chilense</i> var. <i>chilense</i>	10–20	–
	yellow salsify	TRDU	<i>Tragopogon dubius</i>	10–20	–
	salsify	TRPO	<i>Tragopogon porrifolius</i>	10–20	–
	ballhead ipomopsis	IPCOC3	<i>Ipomopsis congesta</i> ssp. <i>congesta</i>	10–20	–
	blue flax	LIPE2	<i>Linum perenne</i>	10–20	–

	tailcup lupine	LUCA	<i>Lupinus caudatus</i>	10–20	–
	hoary tansyaster	MACA2	<i>Machaeranthera canescens</i>	10–20	–
	lobeleaf groundsel	PAMU11	<i>Packera multilobata</i>	10–20	–
	low beardtongue	PEHU	<i>Penstemon humilis</i>	10–20	–
	elephant grass	PEPU2	<i>Pennisetum purpureum</i>	10–20	–
	Chambers' twinpod	PHCH2	<i>Physaria chambersii</i>	10–20	–
	spiny phlox	PHHO	<i>Phlox hoodii</i>	10–20	–
	longleaf phlox	PHLO2	<i>Phlox longifolia</i>	10–20	–
	maiden blue eyed Mary	COPA3	<i>Collinsia parviflora</i>	10–20	–
	bastard toadflax	COUM	<i>Comandra umbellata</i>	10–20	–
	low pussytoes	ANDI2	<i>Antennaria dimorpha</i>	10–20	–
	Utah milkvetch	ASUT	<i>Astragalus utahensis</i>	10–20	–
	Wyoming Indian paintbrush	CALI4	<i>Castilleja linariifolia</i>	10–20	–
	naked mariposa lily	CANU2	<i>Calochortus nudus</i>	10–20	–
	sego lily	CANU3	<i>Calochortus nuttallii</i>	10–20	–
	cushion buckwheat	EROV	<i>Eriogonum ovalifolium</i>	10–20	–
	shaggy fleabane	ERPU2	<i>Erigeron pumilus</i>	10–20	–
	northern bedstraw	GABO2	<i>Galium boreale</i>	10–20	–
	fiddleleaf hawksbeard	CRRU3	<i>Crepis runcinata</i>	10–20	–
	Forb, annual	2FA	<i>Forb, annual</i>	10–20	–
	Forb, perennial	2FP	<i>Forb, perennial</i>	10–20	–

Shrub/Vine

3	Primary Shrubs			350–450	
	mountain big sagebrush	ARTRV	<i>Artemisia tridentata ssp. vaseyana</i>	200–300	–
	antelope bitterbrush	PUTR2	<i>Purshia tridentata</i>	70–100	–
	black sagebrush	ARNO4	<i>Artemisia nova</i>	30–60	–
	Utah serviceberry	AMUT	<i>Amelanchier utahensis</i>	20–40	–
	Nevada jointfir	EPNE	<i>Ephedra nevadensis</i>	20–40	–
5	Secondary Shrubs			40–80	
	Shrub (>.5m)	2SHRUB	<i>Shrub (>.5m)</i>	10–20	–
	fourwing saltbush	ATCA2	<i>Atriplex canescens</i>	10–20	–
	alderleaf mountain mahogany	CEMO2	<i>Cercocarpus montanus</i>	10–20	–
	yellow rabbitbrush	CHVI8	<i>Chrysothamnus viscidiflorus</i>	10–20	–
	mormon tea	EPVI	<i>Ephedra viridis</i>	10–20	–
	slender buckwheat	ERMI4	<i>Eriogonum microthecum</i>	10–20	–
	rubber rabbitbrush	ERNA10	<i>Ericameria nauseosa</i>	10–20	–
	broom snakeweed	GUSA2	<i>Gutierrezia sarothrae</i>	10–20	–
	creeping barberry	MARE11	<i>Mahonia repens</i>	10–20	–
	plains pricklypear	OPPO	<i>Opuntia polyacantha</i>	10–20	–
	rock goldenrod	PEPU7	<i>Petradoria pumila</i>	10–20	–
	Mexican cliffrose	PUME	<i>Purshia mexicana</i>	10–20	–
	Gambel oak	QUGA	<i>Quercus gambelii</i>	10–20	–
	skunkbush sumac	RHTR	<i>Rhus trilobata</i>	10–20	–

	mountain snowberry	SYOR2	<i>Symphoricarpos oreophilus</i>	10–20	–
	spineless horsebrush	TECA2	<i>Tetradymia canescens</i>	10–20	–
Tree					
6	Trees			220–260	
	twoneedle pinyon	PIED	<i>Pinus edulis</i>	120–160	–
	singleleaf pinyon	PIMO	<i>Pinus monophylla</i>	120–160	–
	Utah juniper	JUOS	<i>Juniperus osteosperma</i>	80–120	–

Table 27. Community 3.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1	Primary Grasses			200–350	
	bluebunch wheatgrass	PSSP6	<i>Pseudoroegneria spicata</i>	125–175	–
	Indian ricegrass	ACHY	<i>Achnatherum hymenoides</i>	60–90	–
	cheatgrass	BRTE	<i>Bromus tectorum</i>	30–60	–
	needle and thread	HECO26	<i>Hesperostipa comata</i>	30–60	–
	muttongrass	POFE	<i>Poa fendleriana</i>	30–60	–
4	Secondary Grasses			60–90	
	James' galleta	PLJA	<i>Pleuraphis jamesii</i>	20–30	–
	Geyer's sedge	CAGE2	<i>Carex geyeri</i>	20–30	–
	squirreltail	ELEL5	<i>Elymus elymoides</i>	10–20	–
	slender wheatgrass	ELTR7	<i>Elymus trachycaulus</i>	10–20	–
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	10–20	–
	saline wildrye	LESAS	<i>Leymus salinus</i> ssp. <i>salinus</i>	10–20	–
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	10–20	–
	Sandberg bluegrass	POSE	<i>Poa secunda</i>	10–20	–
	sixweeks fescue	VUOC	<i>Vulpia octoflora</i>	10–20	–
	bulbous bluegrass	POBU	<i>Poa bulbosa</i>	10–20	–
	Grass, perennial	2GP	<i>Grass, perennial</i>	10–20	–
	Letterman's needlegrass	ACLE9	<i>Achnatherum lettermanii</i>	10–20	–
	Columbia needlegrass	ACNE9	<i>Achnatherum nelsonii</i>	10–20	–
	crested wheatgrass	AGCR	<i>Agropyron cristatum</i>	10–20	–
	purple threeawn	ARPU9	<i>Aristida purpurea</i>	10–20	–
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	10–20	–
	red brome	BRRU2	<i>Bromus rubens</i>	10–20	–
Forb					
2	Secondary Forbs			30–60	
	tapertip hawksbeard	CRAC2	<i>Crepis acuminata</i>	20–40	–
	fiddleleaf hawksbeard	CRRU3	<i>Crepis runcinata</i>	10–20	–
	western tansymustard	DEPI	<i>Descurainia pinnata</i>	10–20	–
	herb sophia	DESO2	<i>Descurainia sophia</i>	10–20	–
	cushion buckwheat	EROV	<i>Eriogonum ovalifolium</i>	10–20	–
	shaggy fleabane	ERPU2	<i>Erigeron pumilus</i>	10–20	–
	northern bedstraw	GABO2	<i>Galium boreale</i>	10–20	–

	saltlover	HAGL	<i>Halogeton glomeratus</i>	10–20	–
	common sunflower	HEAN3	<i>Helianthus annuus</i>	10–20	–
	ballhead ipomopsis	IPCOC3	<i>Ipomopsis congesta</i> ssp. <i>congesta</i>	10–20	–
	prickly lettuce	LASE	<i>Lactuca serriola</i>	10–20	–
	blue flax	LIPE2	<i>Linum perenne</i>	10–20	–
	tailcup lupine	LUCA	<i>Lupinus caudatus</i>	10–20	–
	hoary tansyaster	MACA2	<i>Machaeranthera canescens</i>	10–20	–
	lobeleaf groundsel	PAMU11	<i>Packera multilobata</i>	10–20	–
	low beardtongue	PEHU	<i>Penstemon humilis</i>	10–20	–
	elephant grass	PEPU2	<i>Pennisetum purpureum</i>	10–20	–
	Chambers' twinpod	PHCH2	<i>Physaria chambersii</i>	10–20	–
	spiny phlox	PHHO	<i>Phlox hoodii</i>	10–20	–
	longleaf phlox	PHLO2	<i>Phlox longifolia</i>	10–20	–
	Russian thistle	SAKA	<i>Salsola kali</i>	10–20	–
	tall tumbled mustard	SIAL2	<i>Sisymbrium altissimum</i>	10–20	–
	scarlet globemallow	SPCO	<i>Sphaeralcea coccinea</i>	10–20	–
	Pacific aster	SYCHC	<i>Symphotrichum chilense</i> var. <i>chilense</i>	10–20	–
	yellow salsify	TRDU	<i>Tragopogon dubius</i>	10–20	–
	salsify	TRPO	<i>Tragopogon porrifolius</i>	10–20	–
	Forb, annual	2FA	<i>Forb, annual</i>	10–20	–
	Forb, perennial	2FP	<i>Forb, perennial</i>	10–20	–
	desert madwort	ALDE	<i>Alyssum desertorum</i>	10–20	–
	low pussytoes	ANDI2	<i>Antennaria dimorpha</i>	10–20	–
	Utah milkvetch	ASUT	<i>Astragalus utahensis</i>	10–20	–
	Wyoming Indian paintbrush	CALI4	<i>Castilleja linariifolia</i>	10–20	–
	naked mariposa lily	CANU2	<i>Calochortus nudus</i>	10–20	–
	sego lily	CANU3	<i>Calochortus nuttallii</i>	10–20	–
	lambsquarters	CHAL7	<i>Chenopodium album</i>	10–20	–
	crossflower	CHTE2	<i>Chorispora tenella</i>	10–20	–
	maiden blue eyed Mary	COPA3	<i>Collinsia parviflora</i>	10–20	–
	bastard toadflax	COUM	<i>Comandra umbellata</i>	10–20	–

Shrub/Vine

3	Primary Shrubs			100–150	
	antelope bitterbrush	PUTR2	<i>Purshia tridentata</i>	70–100	–
	black sagebrush	ARNO4	<i>Artemisia nova</i>	30–60	–
	mountain big sagebrush	ARTRV	<i>Artemisia tridentata</i> ssp. <i>vaseyana</i>	30–60	–
	Nevada jointfir	EPNE	<i>Ephedra nevadensis</i>	20–40	–
	Utah serviceberry	AMUT	<i>Amelanchier utahensis</i>	20–40	–
5	Secondary Shrubs			40–80	
	Shrub (>.5m)	2SHRUB	<i>Shrub (>.5m)</i>	10–20	–
	fourwing saltbush	ATCA2	<i>Atriplex canescens</i>	10–20	–
	alderleaf mountain mahogany	CEMO2	<i>Cercocarpus montanus</i>	10–20	–

	yellow rabbitbrush	CHVI8	<i>Chrysothamnus viscidiflorus</i>	10–20	–
	mormon tea	EPVI	<i>Ephedra viridis</i>	10–20	–
	slender buckwheat	ERMI4	<i>Eriogonum microthecum</i>	10–20	–
	rubber rabbitbrush	ERNA10	<i>Ericameria nauseosa</i>	10–20	–
	broom snakeweed	GUSA2	<i>Gutierrezia sarothrae</i>	10–20	–
	creeping barberry	MARE11	<i>Mahonia repens</i>	10–20	–
	plains pricklypear	OPPO	<i>Opuntia polyacantha</i>	10–20	–
	rock goldenrod	PEPU7	<i>Petroradia pumila</i>	10–20	–
	Mexican cliffrose	PUME	<i>Purshia mexicana</i>	10–20	–
	Gambel oak	QUGA	<i>Quercus gambelii</i>	10–20	–
	skunkbush sumac	RHTR	<i>Rhus trilobata</i>	10–20	–
	mountain snowberry	SYOR2	<i>Symphoricarpos oreophilus</i>	10–20	–
	spineless horsebrush	TECA2	<i>Tetradymia canescens</i>	10–20	–
Tree					
6	Trees			60–90	
	Utah juniper	JUOS	<i>Juniperus osteosperma</i>	20–40	–
	twoneedle pinyon	PIED	<i>Pinus edulis</i>	20–40	–
	singleleaf pinyon	PIMO	<i>Pinus monophylla</i>	20–40	–

Table 28. Community 3.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1	Primary Grasses			200–350	
	bluebunch wheatgrass	PSSP6	<i>Pseudoroegneria spicata</i>	125–175	–
	intermediate wheatgrass	THIN6	<i>Thinopyrum intermedium</i>	60–90	–
	Indian ricegrass	ACHY	<i>Achnatherum hymenoides</i>	60–90	–
	smooth brome	BRIN2	<i>Bromus inermis</i>	60–90	–
	cheatgrass	BRTE	<i>Bromus tectorum</i>	30–60	–
	needle and thread	HECO26	<i>Hesperostipa comata</i>	30–60	–
	muttongrass	POFE	<i>Poa fendleriana</i>	30–60	–
4	Secondary Grasses			60–90	
	James' galleta	PLJA	<i>Pleuraphis jamesii</i>	20–30	–
	Geyer's sedge	CAGE2	<i>Carex geyeri</i>	20–30	–
	squirreltail	ELEL5	<i>Elymus elymoides</i>	10–20	–
	slender wheatgrass	ELTR7	<i>Elymus trachycaulus</i>	10–20	–
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	10–20	–
	saline wildrye	LESAS	<i>Leymus salinus</i> ssp. <i>salinus</i>	10–20	–
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	10–20	–
	Sandberg bluegrass	POSE	<i>Poa secunda</i>	10–20	–
	sixweeks fescue	VUOC	<i>Vulpia octoflora</i>	10–20	–
	bulbous bluegrass	POBU	<i>Poa bulbosa</i>	10–20	–
	Grass, perennial	2GP	<i>Grass, perennial</i>	10–20	–
	Letterman's needlegrass	ACLE9	<i>Achnatherum lettermanii</i>	10–20	–

	Columbia needlegrass	ACNE9	<i>Acnathnerum neisonii</i>	10–20	–
	crested wheatgrass	AGCR	<i>Agropyron cristatum</i>	10–20	–
	purple threeawn	ARPU9	<i>Aristida purpurea</i>	10–20	–
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	10–20	–
	red brome	BRRU2	<i>Bromus rubens</i>	10–20	–
Forb					
2	Secondary Forbs			30–60	
	tapertip hawksbeard	CRAC2	<i>Crepis acuminata</i>	20–40	–
	fiddleleaf hawksbeard	CRRU3	<i>Crepis runcinata</i>	10–20	–
	western tansymustard	DEPI	<i>Descurainia pinnata</i>	10–20	–
	herb sophia	DESO2	<i>Descurainia sophia</i>	10–20	–
	cushion buckwheat	EROV	<i>Eriogonum ovalifolium</i>	10–20	–
	shaggy fleabane	ERPU2	<i>Erigeron pumilus</i>	10–20	–
	northern bedstraw	GABO2	<i>Galium boreale</i>	10–20	–
	saltlover	HAGL	<i>Halogeton glomeratus</i>	10–20	–
	common sunflower	HEAN3	<i>Helianthus annuus</i>	10–20	–
	ballhead ipomopsis	IPCOC3	<i>Ipomopsis congesta</i> ssp. <i>congesta</i>	10–20	–
	prickly lettuce	LASE	<i>Lactuca serriola</i>	10–20	–
	blue flax	LIPE2	<i>Linum perenne</i>	10–20	–
	tailcup lupine	LUCA	<i>Lupinus caudatus</i>	10–20	–
	hoary tansyaster	MACA2	<i>Machaeranthera canescens</i>	10–20	–
	lobeleaf groundsel	PAMU11	<i>Packera multilobata</i>	10–20	–
	low beardtongue	PEHU	<i>Penstemon humilis</i>	10–20	–
	elephant grass	PEPU2	<i>Pennisetum purpureum</i>	10–20	–
	Chambers' twinpod	PHCH2	<i>Physaria chambersii</i>	10–20	–
	spiny phlox	PHHO	<i>Phlox hoodii</i>	10–20	–
	longleaf phlox	PHLO2	<i>Phlox longifolia</i>	10–20	–
	Russian thistle	SAKA	<i>Salsola kali</i>	10–20	–
	tall tumbled mustard	SIAL2	<i>Sisymbrium altissimum</i>	10–20	–
	scarlet globemallow	SPCO	<i>Sphaeralcea coccinea</i>	10–20	–
	Pacific aster	SYCHC	<i>Symphyotrichum chilense</i> var. <i>chilense</i>	10–20	–
	yellow salsify	TRDU	<i>Tragopogon dubius</i>	10–20	–
	salsify	TRPO	<i>Tragopogon porrifolius</i>	10–20	–
	Forb, annual	2FA	<i>Forb, annual</i>	10–20	–
	Forb, perennial	2FP	<i>Forb, perennial</i>	10–20	–
	desert madwort	ALDE	<i>Alyssum desertorum</i>	10–20	–
	low pussytoes	ANDI2	<i>Antennaria dimorpha</i>	10–20	–
	Utah milkvetch	ASUT	<i>Astragalus utahensis</i>	10–20	–
	Wyoming Indian paintbrush	CALI4	<i>Castilleja linariifolia</i>	10–20	–
	naked mariposa lily	CANU2	<i>Calochortus nudus</i>	10–20	–
	sego lily	CANU3	<i>Calochortus nuttallii</i>	10–20	–
	lambsquarters	CHAL7	<i>Chenopodium album</i>	10–20	–
	crossflower	CHTE2	<i>Chorispora tenella</i>	10–20	–

	maiden blue eyed mary	COPA3	<i>Collinsia parviflora</i>	10–20	–
	bastard toadflax	COUM	<i>Comandra umbellata</i>	10–20	–
Shrub/Vine					
3	Primary Shrubs			250–375	
	mountain big sagebrush	ARTRV	<i>Artemisia tridentata ssp. vaseyana</i>	150–200	–
	antelope bitterbrush	PUTR2	<i>Purshia tridentata</i>	70–100	–
	black sagebrush	ARNO4	<i>Artemisia nova</i>	30–60	–
	Utah serviceberry	AMUT	<i>Amelanchier utahensis</i>	20–40	–
	Nevada jointfir	EPNE	<i>Ephedra nevadensis</i>	20–40	–
5	Secondary Shrubs			40–80	
	Shrub (>.5m)	2SHRUB	<i>Shrub (>.5m)</i>	10–20	–
	fourwing saltbush	ATCA2	<i>Atriplex canescens</i>	10–20	–
	alderleaf mountain mahogany	CEMO2	<i>Cercocarpus montanus</i>	10–20	–
	yellow rabbitbrush	CHVI8	<i>Chrysothamnus viscidiflorus</i>	10–20	–
	mormon tea	EPVI	<i>Ephedra viridis</i>	10–20	–
	slender buckwheat	ERMI4	<i>Eriogonum microthecum</i>	10–20	–
	rubber rabbitbrush	ERNA10	<i>Ericameria nauseosa</i>	10–20	–
	broom snakeweed	GUSA2	<i>Gutierrezia sarothrae</i>	10–20	–
	creeping barberry	MARE11	<i>Mahonia repens</i>	10–20	–
	plains pricklypear	OPPO	<i>Opuntia polyacantha</i>	10–20	–
	rock goldenrod	PEPU7	<i>Petradoria pumila</i>	10–20	–
	Mexican cliffrose	PUME	<i>Purshia mexicana</i>	10–20	–
	Gambel oak	QUGA	<i>Quercus gambelii</i>	10–20	–
	skunkbush sumac	RHTR	<i>Rhus trilobata</i>	10–20	–
	mountain snowberry	SYOR2	<i>Symphoricarpos oreophilus</i>	10–20	–
	spineless horsebrush	TECA2	<i>Tetradymia canescens</i>	10–20	–
Tree					
6	Trees			60–80	
	Utah juniper	JUOS	<i>Juniperus osteosperma</i>	20–40	–
	twoneedle pinyon	PIED	<i>Pinus edulis</i>	20–40	–
	singleleaf pinyon	PIMO	<i>Pinus monophylla</i>	20–40	–

Animal community

--Wildlife Interpretation--

This ecological site, in its reference state, produces significant amounts of nutritious forage that was utilized by native herbivores including Rocky Mountain elk, mule deer and pronghorn antelope who lived here along with their associated predators. Although a portion of this site is presently different from the reference state, it is still very important as wildlife habitat. Other wildlife commonly observed using this site include mountain lions, rabbits, coyotes, badgers, and red fox's.

This site also provides habitat to raptors and other bird species including golden eagles, red-tailed hawks, ferruginous hawks, and several species of owls. Ringneck pheasant, sage grouse, chukars, and California quail are also commonly found.

--Grazing Interpretations--

This site provides good spring, fall, and winter grazing conditions for domestic livestock due to its accessibility and its supply of nutritious forage. The herbaceous plant community is primarily grasses, with the majority of forage production being attributed to bluebunch wheatgrass, Indian ricegrass and Nevada bluegrass. Improper livestock grazing can cause these species to decrease while annual forbs, black sagebrush and rabbitbrush species increase.

When this site is stressed, cheatgrass, alyssum, Russian thistle and halogeton are likely to invade.

Hydrological functions

The soils associated with this ecological site are generally in Hydrologic Soil Groups B and C (NRCS National Engineering Handbook) with runoff curves ranging from 61 to 79 and 74 to 86 respectively, depending on hydrologic condition. These soils are saturated quickly due to high infiltration rates and somewhat shallow soils; once soils are saturated, run off potential varies but typically ranges from moderate to high. Hydrological groups are used in equations that estimate runoff from rainfall. These estimates are needed for solving hydrologic problems that arise in planning watershed-protection and flood-prevention projects and for designing structures for the use, control and disposal of water. Heavy grazing can alter the hydrology by decreasing plant cover and increasing bare ground. Fire can also affect hydrology, but its affect is variable. Fire intensity, fuel type, soil, climate, and topography can each have different influences. Fires can increase areas of bare ground and hydrophobic layers that reduce infiltration and increase runoff (National Range and Pasture Handbook, 2003).

Recreational uses

Recreation activities include aesthetic value and good opportunities for hiking, horseback riding, hunting, and off-road vehicle use. Due to the high erosion potential after a surface disturbance, care should be taken when planning recreational activities. Camp sites are usually limited due to lack of sheltering trees or rock outcrop.

Wood products

Utah juniper and singleleaf and/or two-needle pinyon can provide firewood and fence post where growth is sufficient and regulations allow for such use. The pinyon trees are a good source of pine-nuts and make nice Christmas trees.

Other products

None.

Other information

--Poisonous and Toxic Plant Communities--

Toxic plants associated with this site include woolly locoweed, broom snakeweed, and Russian thistle.

Woolly locoweed is toxic to all classes of livestock and wildlife. Locoweed is palatable and has similar nutrient value to alfalfa, which may cause animals to consume it even when other forage is available. Locoweed contains swainsonine (indolizidine alkaloid) and is poisonous at all stages of growth. Poisoning will become evident after 2-3 weeks of continuous grazing and is associated with 4 major symptoms: 1) neurological damage, 2) emaciation, 3) reproductive failure and abortion, and 4) congestive heart failure linked with "high mountain disease".

Broom snakeweed contains steroids, terpenoids, saponins, and flavones that can cause abortions or reproductive failure in sheep and cattle, however, cattle are most susceptible. These toxins are most abundant during active growth and leafing stage. Cattle and sheep generally will only graze broom snakeweed when other forage is unavailable, typically in winter when toxicity levels are at their lowest (Knight and Walter, 2001).

Russian thistle is an invasive toxic plant, causing nitrate and to a lesser extent oxalate poisoning, which affects all classes of livestock. The buildup of nitrates in these plants is highly dependent upon environmental factors such as after a rain storm, during a drought, during periods with cool/cloudy days, and when growing on soils high in nitrogen and low in sulfur and phosphorus. Nitrate collects in the stems and can persist throughout the growing season. Clinical signs of nitrate poisoning include drowsiness, weakness, muscular tremors, increased heart and respiratory rates, staggering gait, and death. Conversely, oxalate poisoning causes kidney failure; clinical signs

include muscle tremors, tetany, weakness, and depression. Poisoning generally occurs when livestock consume and are not accustomed to grazing oxalate-containing plants. Animals with prior exposure to oxalates have increased numbers of oxalate-degrading rumen microflora, and thus, are able to degrade the toxin before clinical poisoning can occur.

--Invasive Plant Communities--

Generally, as ecological conditions deteriorate and perennial vegetation decreases due to disturbance (fire, drought, off road vehicle overuse, erosion, etc.) annual forbs and grasses may invade the site. Of particular concern in semi-arid environments are annual invaders including cheatgrass, Russian thistle, alyssum and annual mustards. The presence of these species will depend on soil properties and moisture availability; however, these invaders are highly adaptive and can flourish in many locations. Once established, complete removal is difficult, but suppression may be possible.

On well developed Utah juniper and singleleaf pinyon communities, soils are often completely occupied by lateral roots which can inhibit the herbaceous understory as well as limit annual invasive species. Once these sites are disturbed and pinyon-juniper communities begin to decline, their increase or invasion is possible.

--Fire Ecology--

The ability for an ecological site to carry fire depends primarily on its' present fuel load and plant moisture content. Sites with small fuel loads will burn more slowly and less intensely than sites with large fuel loads. The Utah juniper and singleleaf and/or two-needle pinyon communities growing on shallow soils are quite unique. These trees can support stand-replacing fires, though historically, fires were likely a mixture of surface and crown fires with intensities and frequencies dependent on site productivity. Most research agrees that historic fire return intervals are at a minimum 100 years, indicating that fire may have not played an important role in short term community dynamics. Fires are more common when trees are stressed or dead due to drought and/or beetle infestations. Pinyon-juniper stands reestablish either by seeds dispersed from adjacent unburned patches or by unburned seeds found at the burn site. Continuous (every 20-40 years) burning of these ecological sites can result in shrub dominated communities, due to the relatively fast recovery of shrubs when compared to trees. If invasive annual grasses are allowed to establish, fires may become more frequent, inhibiting the site's ability to recover.

Type locality

Location 1: Box Elder County, UT	
General legal description	Cedar Hills West of Yost, Box Elder County, Utah,
Location 2: Iron County, UT	
Township/Range/Section	T14N R16W S3
General legal description	1500 ft. North 500 ft. East of SW Corner of Section 3, Township 14N, Range 16W. Indian Peak, Iron County.

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Contributors

David J. Somorville

DJS

V. Keith Wadman

Rangeland health reference sheet

Interpreting Indicators of Rangeland Health is a qualitative assessment protocol used to determine ecosystem condition based on benchmark characteristics described in the Reference Sheet. A suite of 17 (or more) indicators are typically considered in an assessment. The ecological site(s) representative of an assessment location must be known prior to applying the protocol and must be verified based on soils and climate. Current plant community cannot be used to identify the ecological site.

Author(s)/participant(s)	Jack Alexander, Range Specialist, Synergy Resource Solutions, Inc. Julia Kluck, Soil Scientist, Synergy Resource Solutions, Inc. Shane Green, State Range Specialist, Utah NRCS. Revised to reflect new concepts and terminology by V. Keith Wadman (NRCS, Retired).
Contact for lead author	Shane Green, Shane.Green@ut.usda.gov
Date	04/03/2013
Approved by	Shane A. Green
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** Rills common. This site is subject to some rilling even in reference condition due to slope, erodible soils, and percent bare ground. Rill development may increase following large storm events, but should begin to heal during the following growing season. Frost heaving will accelerate recovery. Rill development may increase when

run inflow enters site from other sites that produce large amounts of runoff (i.e. steeper sites, slickrock, rock outcrop).

2. **Presence of water flow patterns:** Water flow patterns are common. Some are long (15-20'). They are generally very widely spaced (about 20-30' apart). Flow patterns occur in low places associated with microtopography commonly occurring on this site.
-

3. **Number and height of erosional pedestals or terracettes:** Plants may have small pedestals (1-3") where they are adjacent to water flow patterns, but without exposed roots. Terracettes should be few and stable. Terracettes should be small (1-3") and show little sign of active erosion. Some plants may appear to have a pedestal but rather than be formed by erosion, the only place litter accumulates and soil collects is at plant bases forming the appearance of a pedestal.

Well-developed biological crusts may appear pedestalled, but are actually a characteristic of the crust formation. Some plants may appear to have a pedestal but rather than be formed by erosion, the only place litter accumulates and soil collects is at plant bases forming the appearance of a pedestal.

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** 15-25% bare ground (soil with no protection from raindrop impact). Herbaceous communities are most likely to have lower values. As species composition by shrubs increases, bare ground is likely to increase. Poorly developed biological soil crust that is susceptible to raindrop splash erosion should be recorded as bare ground. Very few if any bare spaces of greater than 1 square foot.
-

5. **Number of gullies and erosion associated with gullies:** No gullies present on site. A very few gullies may be present in landscape settings where they transport runoff from areas of greater water flow such as exposed bedrock. These gullies will be limited to slopes exceeding 10% and adjacent to sites where this runoff accumulation occurs. Any gullies present should show little sign of accelerated erosion and should be stabilized with perennial vegetation.
-

6. **Extent of wind scoured, blowouts and/or depositional areas:** Very minor evidence of active wind-generated soil movement. Wind scoured (blowouts) and depositional areas are rarely present. If present they have muted features and are mostly stabilized with vegetation and/or biological crust. Gravel or desert pavement protects the site from wind scour.
-

7. **Amount of litter movement (describe size and distance expected to travel):** Most litter resides in place with some redistribution caused by water and wind movement. Very minor litter removal may occur in flow patterns and rills with deposition occurring at points of obstruction. The majority of litter accumulates at the base of plants. Some leaves, stems, and small twigs may accumulate in soil depressions adjacent to plants. Woody stems are not likely to move. On steep slopes (>30%), litter will move downhill to next obstruction.
-

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** This site should have an erosion rating of 4 or 5 under plant canopies and a rating of 3 to 4 in the interspaces with an average rating of 4 using the soil stability kit test.
-

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** This description is based on the modal soil (Abela GRV-L, soil survey area: 611, Tooele). This site has 4 correlated soils, resulting in variation of each of these attributes. Unless working on a location with the modal soil, it is critical to supplement this description with the soil-specific information from the published soil survey.

Soil surface horizon is typically 14 inches deep. Structure is typically weak fine and medium granular. Color is typically grayish brown (10YR 5/2), dark brown (10YR 3/3) moist. Mollic epipedon is common.

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Vascular plants and any well-developed biological soil crusts (where present) will break raindrop impact and splash erosion. Spatial distribution of vascular plants and interspaces between well-developed biological soil crusts (where present) provide detention storage and surface roughness that slows runoff allowing time for infiltration. Crowns of trees and accumulating litter at base of trees appear to create a micro-topography that may enhance development of water flow patterns below the drip line of the canopy. Significant increases in pinyon-juniper canopy reduces understory vegetation and increases runoff.
-

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** None. Naturally occurring soil horizons may be harder than the surface because of an accumulation of calcium carbonate and should not be considered as compaction layers.
-

12. **Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):**

Dominant: Trees (Pinyon, Utah Juniper) > Perennial cool season bunchgrasses (bluebunch wheatgrass, Indian ricegrass) > Nonsprouting shrubs (mountain big sagebrush) > Sprouting Shrubs (bitterbrush, black sagebrush).

Sub-dominant: Sprouting shrubs, (green rabbitbrush) > Perennial Grasses, (prairie junegrass, muttongrass) > Perennial Forbs (gooseberryleaf globemallow).

Other: Biological soil crust is variable in its expression where present on this site and is measured as a component of ground cover. Forbs can be expected to vary widely in their expression in the plant community based upon departures from average growing conditions.

Additional: In the northern portion of the MLRA cool-season perennial grasses (Indian ricegrass, needle and thread) dominate. In the southernmost portion of the MLRA warm-season perennial grasses (galleta, sand dropseed) dominate. The two groups share dominance in the middle portion of the MLRA.

Functional/structural groups may appropriately contain non-native species if their ecological function is the same as the native species in the reference state. Biological soil crust is variable in its expression on this site and is measured as a component of ground cover. Forbs can be expected to vary widely in their expression in the plant community based upon departures from average growing conditions.

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** During years with average to above average precipitation, there should be very little recent mortality or decadence apparent in either the shrubs or grasses. Some bunchgrass and shrub mortality may occur during severe droughts, particularly on the shallower and coarser soils associated with this site.
-

14. **Average percent litter cover (%) and depth (in):** Litter cover includes litter under plants. Most litter will be fine litter. Depth should be 1-2 leaf thickness in the interspaces and up to 1/2" under canopies. Litter cover may increase to 15-20% following years with favorable growing conditions. Excess litter may accumulate in absence of disturbance. Vegetative production may be reduced if litter cover exceeds 40%.
-
15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** Annual production in air-dry herbage should be approximately 650#/acre on an average year, but could range from 350 to 950#/acre during periods of prolonged drought or above average precipitation. Even the most stable communities exhibit a range of production values. Production will vary between communities and across the MRLA. Refer to the community descriptions in the ESD. Production will differ across the MLRA due to the naturally occurring variability in weather, soils, and aspect. The biological processes on this site are complex; therefore, representative values are presented in a land management context.
-
16. **Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site:** Cheatgrass, Russian thistle and annual forbs.
-
17. **Perennial plant reproductive capability:** All perennial plants should have the ability to reproduce sexually or asexually, except in drought years. Density of plants indicates that plants reproduce at level sufficient to fill available resource. Within capability of site there are no restrictions on seed or vegetative reproductive capacity.
-

IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Location

Iron County, Utah



Local office

Utah Ecological Services Field Office

☎ (801) 975-3330

📠 (801) 975-3331

2369 West Orton Circle, Suite 50
West Valley City, UT 84119-7603

NOT FOR CONSULTATION

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species¹ and their critical habitats are managed by the [Ecological Services Program](#) of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries²).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact [NOAA Fisheries](#) for [species under their jurisdiction](#).

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1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the [listing status page](#) for more information. IPaC only shows species that are regulated by USFWS (see FAQ).

2. [NOAA Fisheries](#), also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Mammals

NAME	STATUS
Utah Prairie Dog <i>Cynomys parvidens</i> Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/5517	Threatened

Birds

NAME	STATUS
California Condor <i>Gymnogyps californianus</i> There is proposed critical habitat for this species. https://ecos.fws.gov/ecp/species/8193	EXPN
Mexican Spotted Owl <i>Strix occidentalis lucida</i> Wherever found There is final critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/8196	Threatened
Yellow-billed Cuckoo <i>Coccyzus americanus</i> There is final critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/3911	Threatened

Insects

NAME	STATUS
Monarch Butterfly <i>Danaus plexippus</i> Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/9743	Candidate

Flowering Plants

NAME	STATUS
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Wherever found

No critical habitat has been designated for this species.

<https://ecos.fws.gov/ecp/species/2159>

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

There are no critical habitats at this location.

You are still required to determine if your project(s) may have effects on all above listed species.

Bald & Golden Eagles

Bald and golden eagles are protected under the Bald and Golden Eagle Protection Act¹ and the Migratory Bird Treaty Act².

Any person or organization who plans or conducts activities that may result in impacts to bald or golden eagles, or their habitats³, should follow appropriate regulations and consider implementing appropriate conservation measures, as described in the links below.

Specifically, please review the "[Supplemental Information on Migratory Birds and Eagles](#)".

Additional information can be found using the following links:

- Eagle Management <https://www.fws.gov/program/eagle-management>
- Measures for avoiding and minimizing impacts to birds
<https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds>
- Nationwide conservation measures for birds
<https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf>
- Supplemental Information for Migratory Birds and Eagles in IPaC
<https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action>

There are bald and/or golden eagles in your project area.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, see the PROBABILITY OF PRESENCE SUMMARY below to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle <i>Haliaeetus leucocephalus</i> This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.	Breeds Dec 1 to Aug 31
Golden Eagle <i>Aquila chrysaetos</i> This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1680	Breeds Dec 1 to Aug 31

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read ["Supplemental Information on Migratory Birds and Eagles"](#), specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.

2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is $0.25/0.25 = 1$; at week 20 it is $0.05/0.25 = 0.2$.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

Breeding Season (■)

Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)

Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

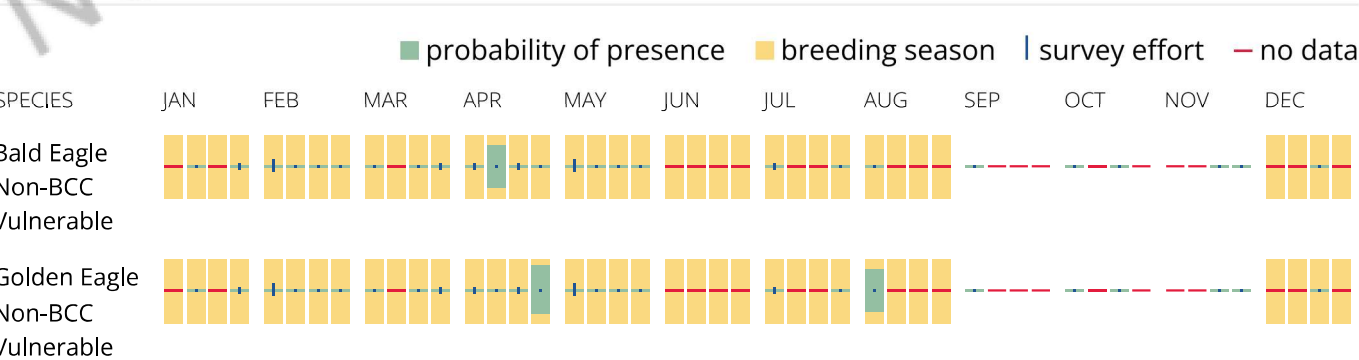
To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (—)

A week is marked as having no data if there were no survey events for that week.

Survey Timeframe

Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.



What does IPaC use to generate the potential presence of bald and golden eagles in my specified location?

The potential for eagle presence is derived from data provided by the [Avian Knowledge Network \(AKN\)](#). The AKN data is based on a growing collection of [survey, banding, and citizen science datasets](#) and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle ([Eagle Act](#) requirements may apply). To see a list of all birds potentially present in your project area, please visit the [Rapid Avian Information Locator \(RAIL\) Tool](#).

What does IPaC use to generate the probability of presence graphs of bald and golden eagles in my specified location?

The Migratory Bird Resource List is comprised of USFWS [Birds of Conservation Concern \(BCC\)](#) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the [Avian Knowledge Network \(AKN\)](#). The AKN data is based on a growing collection of [survey, banding, and citizen science datasets](#) and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle ([Eagle Act](#) requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the [Rapid Avian Information Locator \(RAIL\) Tool](#).

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the [Eagle Act](#) should such impacts occur. Please contact your local Fish and Wildlife Service Field Office if you have questions.

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act¹ and the Bald and Golden Eagle Protection Act².

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats³ should follow appropriate regulations and consider implementing appropriate conservation measures, as described in the links below. Specifically, please review the ["Supplemental Information on Migratory Birds and Eagles"](#).

1. The [Migratory Birds Treaty Act](#) of 1918.
2. The [Bald and Golden Eagle Protection Act](#) of 1940.

Additional information can be found using the following links:

- Eagle Management <https://www.fws.gov/program/eagle-management>

- Measures for avoiding and minimizing impacts to birds
<https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds>
- Nationwide conservation measures for birds <https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf>
- Supplemental Information for Migratory Birds and Eagles in IPaC
<https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action>

The birds listed below are birds of particular concern either because they occur on the [USFWS Birds of Conservation Concern](#) (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ [below](#). This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the [E-bird data mapping tool](#) (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found [below](#).

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, see the PROBABILITY OF PRESENCE SUMMARY below to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle <i>Haliaeetus leucocephalus</i> This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.	Breeds Dec 1 to Aug 31
Golden Eagle <i>Aquila chrysaetos</i> This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1680	Breeds Dec 1 to Aug 31
Pinyon Jay <i>Gymnorhinus cyanocephalus</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9420	Breeds Feb 15 to Jul 15

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

<https://ecos.fws.gov/ecp/species/9441>

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read ["Supplemental Information on Migratory Birds and Eagles"](#), specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is $0.25/0.25 = 1$; at week 20 it is $0.05/0.25 = 0.2$.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

Breeding Season (■)

Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (I)

Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

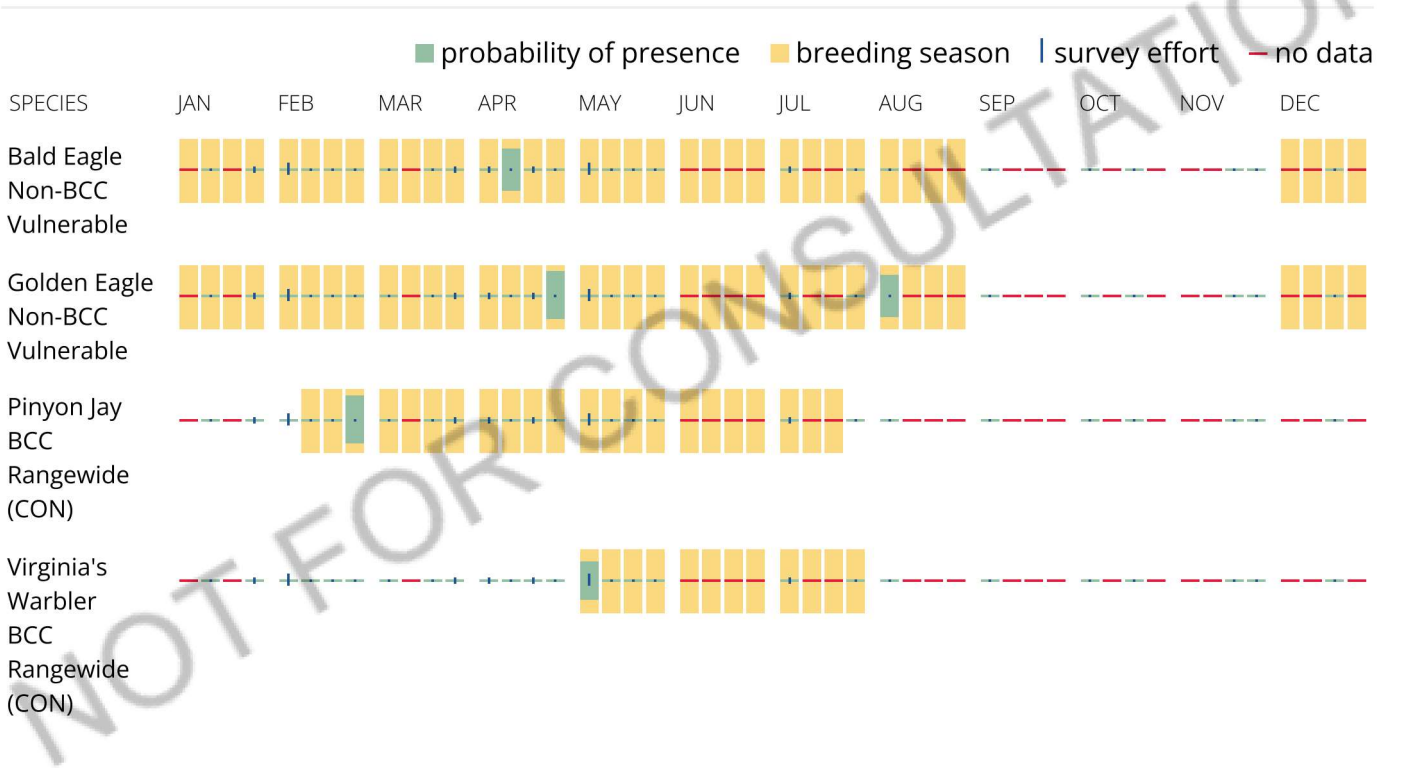
To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (-)

A week is marked as having no data if there were no survey events for that week.

Survey Timeframe

Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.



Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

[Nationwide Conservation Measures](#) describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. [Additional measures](#) or [permits](#) may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the list of migratory birds that potentially occur in my specified location?

The Migratory Bird Resource List is comprised of USFWS [Birds of Conservation Concern \(BCC\)](#) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the [Avian Knowledge Network \(AKN\)](#). The AKN data is based on a growing collection of [survey, banding, and citizen science datasets](#) and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle ([Eagle Act](#) requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the [Rapid Avian Information Locator \(RAIL\) Tool](#).

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the [Avian Knowledge Network \(AKN\)](#). This data is derived from a growing collection of [survey, banding, and citizen science datasets](#).

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering or migrating in my area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may query your location using the [RAIL Tool](#) and look at the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are [Birds of Conservation Concern](#) (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the [Eagle Act](#) requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the [Northeast Ocean Data Portal](#). The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the [NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf](#) project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the [Diving Bird Study](#) and the [nanotag studies](#) or contact [Caleb Spiegel](#) or [Pam Loring](#).

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to [obtain a permit](#) to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the [National Wildlife Refuge](#) system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

There are no refuge lands at this location.

Fish hatcheries

There are no fish hatcheries at this location.

Wetlands in the National Wetlands Inventory (NWI)

Impacts to [NWI wetlands](#) and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local [U.S. Army Corps of Engineers District](#).

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

This location overlaps the following wetlands:

RIVERINE

[R4SBC](#)

A full description for each wetland code can be found at the [National Wetlands Inventory website](#)

NOTE: This initial screening does **not** replace an on-site delineation to determine whether wetlands occur. Additional information on the NWI data is provided below.

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tubercid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate Federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

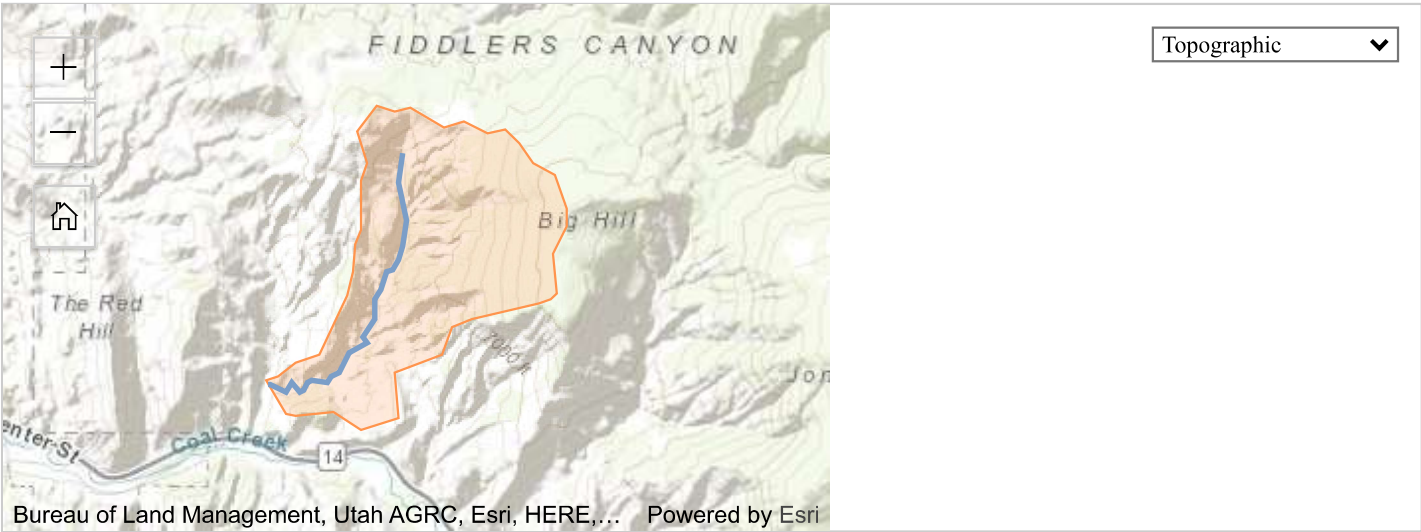
P.C.I.
PROGRESSIVE CONTRACTING INC.

APPENDIX G

WATER RESOURCE INFORMATION

Watershed Report

The Watershed Report provides a variety of stream, catchment and watershed related information from the [National Hydrography Dataset Plus](#) (NHDPlus Version 2) and other sources including the extensive collection of [StreamCat](#) landscape layers. A catchment is the local area draining directly to the selected stream segment. A watershed is the drainage area extending from the downstream end of the stream segment (outlet) upstream to the headwaters. The map displays the stream segment and catchment.



For the stream segment	Value
Stream Name	Not Available
Stream Order	1
Stream Level	6
Mean annual flow volume (estimate)	0.06 cfs
Mean annual flow velocity (estimate)	0.79 fps
Stream Length	2.67 km
Stream Time of Travel (estimate)	0.13 days

View catchment and watershed data from either the NHDPlus or StreamCat datasets by clicking on the appropriate tab below:

NHDPlus Catchment and Watershed Data

StreamCat Catchment and Watershed Data

For the catchment (local area draining directly to the selected stream segment)	
Metrics	Catchment Total
Catchment area measurement	2.90 km²

Metrics	Catchment Total
Mean annual temperature	7.90 °C
Mean annual precipitation	394.67 mm

2011 National Land Cover Dataset	Catchment Total
Open Water (11)	0%
Low Intensity Residential (21)	0%
Commercial (23)	0%
Deciduous Forest (41)	0%
Evergreen Forest (42)	65.69%
Mixed Forest (43)	0%
Other	34.31%

For the watershed (drainage area extending from the outlet upstream to the headwaters)

Since this is a headwater stream segment, its catchment and watershed are the same.

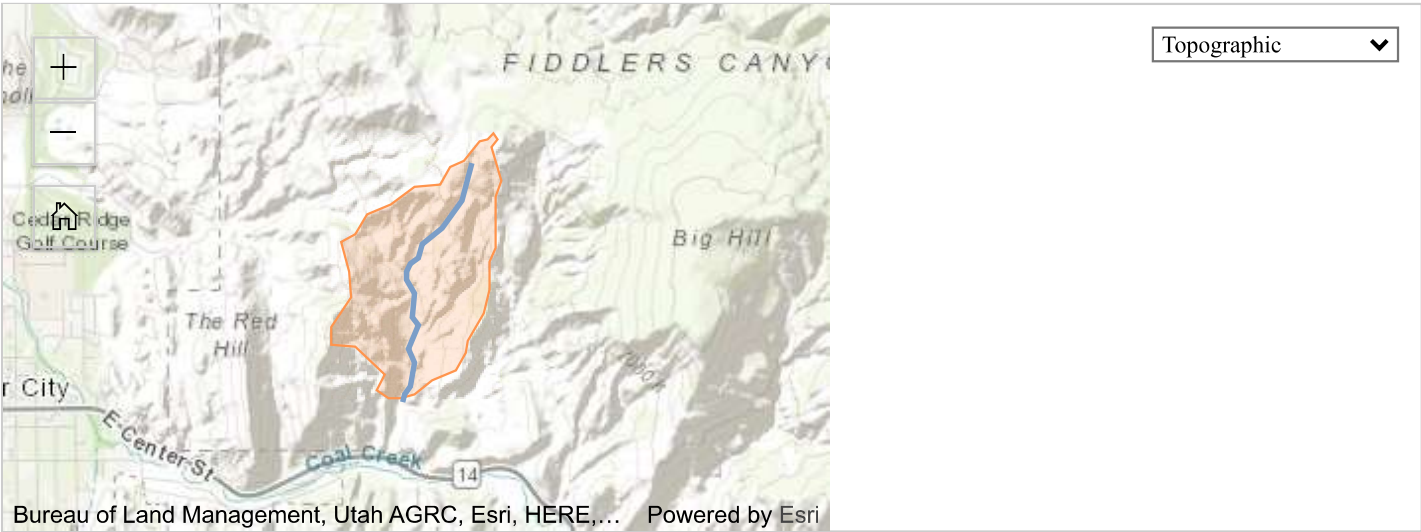
[Download Full Report \(.json\)](#)

NHDPlus data extracted as of March 2019.
More information on the [NHDPlus dataset](#).

LAST UPDATED ON FEBRUARY 15, 2017

Watershed Report

The Watershed Report provides a variety of stream, catchment and watershed related information from the [National Hydrography Dataset Plus](#) (NHDPlus Version 2) and other sources including the extensive collection of [StreamCat](#) landscape layers. A catchment is the local area draining directly to the selected stream segment. A watershed is the drainage area extending from the downstream end of the stream segment (outlet) upstream to the headwaters. The map displays the stream segment and catchment.



For the stream segment	Value
Stream Name	Not Available
Stream Order	1
Stream Level	7
Mean annual flow volume (estimate)	0.03 cfs
Mean annual flow velocity (estimate)	0.77 fps
Stream Length	2.10 km
Stream Time of Travel (estimate)	0.10 days

View catchment and watershed data from either the NHDPlus or StreamCat datasets by clicking on the appropriate tab below:

NHDPlus Catchment and Watershed Data

StreamCat Catchment and Watershed Data

For the catchment (local area draining directly to the selected stream segment)	
Metrics	Catchment Total
Catchment area measurement	1.58 km²

Metrics	Catchment Total
Mean annual temperature	8.82 °C
Mean annual precipitation	370.29 mm

2011 National Land Cover Dataset	Catchment Total
Open Water (11)	0%
Low Intensity Residential (21)	0%
Commercial (23)	0%
Deciduous Forest (41)	0%
Evergreen Forest (42)	35.42%
Mixed Forest (43)	0%
Other	64.58%

For the watershed (drainage area extending from the outlet upstream to the headwaters)

Since this is a headwater stream segment, its catchment and watershed are the same.

[Download Full Report \(.json\)](#)

NHDPlus data extracted as of March 2019.
More information on the [NHDPlus dataset](#).

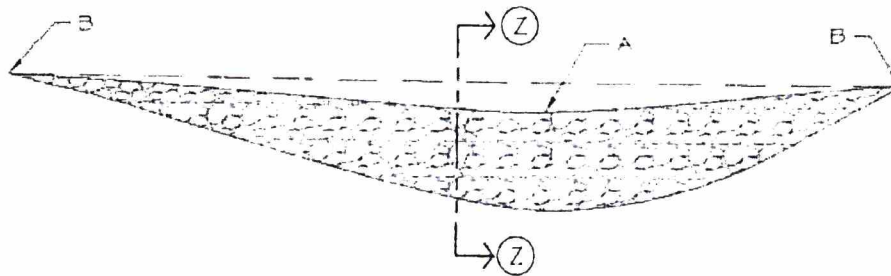
LAST UPDATED ON FEBRUARY 15, 2017

APPROVED

5/18/00

DIV. OIL GAS & MINING

CONSTRUCT THE CHECK DAM SO THAT POINT "A" IS
APPROXIMATELY 4" LOWER THAN POINT "B"

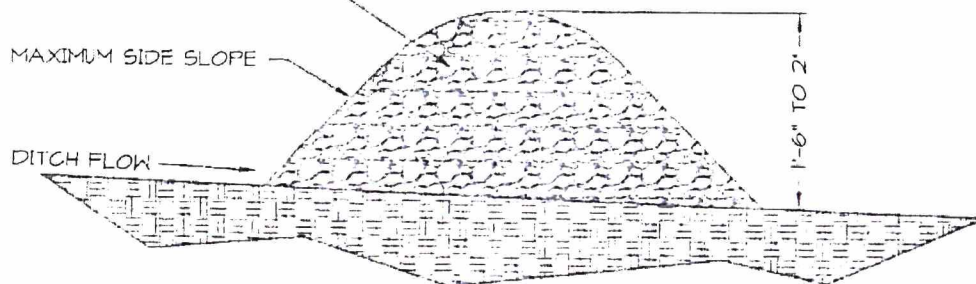


STONE CHECK DAM

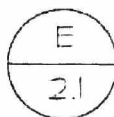
STONE: WELL GRADED, RANGING
FROM 1/2" TO 1-1/2"

1:1 MAXIMUM SIDE SLOPE

DITCH FLOW



SECTION Z-Z



STONE CHECK DAM

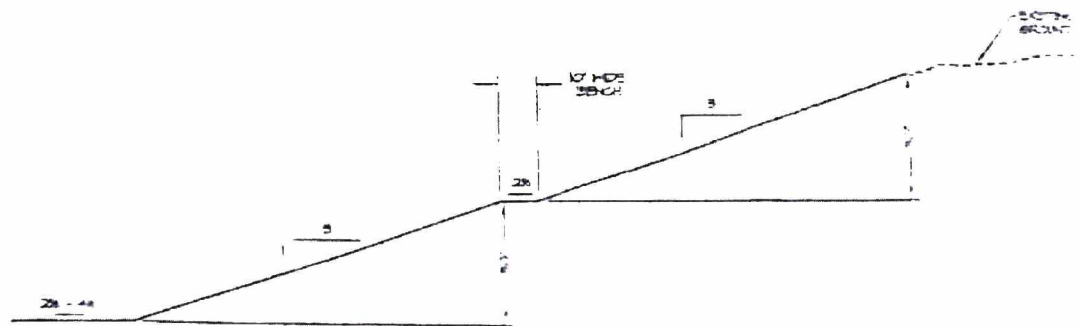
BMP C210
SCALE: N.T.S.

NOTES:

1. PLACE CHECK DAMS PERPENDICULAR TO THE FLOWLINE OF THE DITCH.
2. DO NOT PLACE CHECK DAMS ACROSS NATURAL STREAM BEDS.
3. CONSTRUCT CHECK DAMS TO ENSURE WATER DOES NOT FLOW AROUND THE ENDS OF THE DAM.

APPROVED

DIV. OIL GAS & MINING



BENCHING DETAIL

1" = 40'

DATE	8-25-61
BY	W. H. H. H. H.
DESIGNED BY	J. L. H.
CHECKED BY	W. H. H.
APP. 200' PLANS	

FIGURE 8 - BENCHING DETAIL
FOR
P.C.I. QUARRY
ST. GEORGE WASHINGTON COUNTY, UTAH

By: W. H. H. H. H.	W. H. H. H. H.
By: W. H. H. H. H.	W. H. H. H. H.
By: W. H. H. H. H.	W. H. H. H. H.
By: W. H. H. H. H.	W. H. H. H. H.



ROSENBERG
ASSOCIATES
1000 E. 1000 N. SALT LAKE CITY, UTAH

200' PLANS

EXISTING GROUND

0.3H:1V MAX

30'

10'

0.3H:1V MAX

30'

BOTTOM OF EXCAVATION



BENCH CUT DETAIL

SCALE: 1" = 20'

EXISTING GROUND

60' TYP.

0.5H:1V MAX

BOTTOM OF EXCAVATION

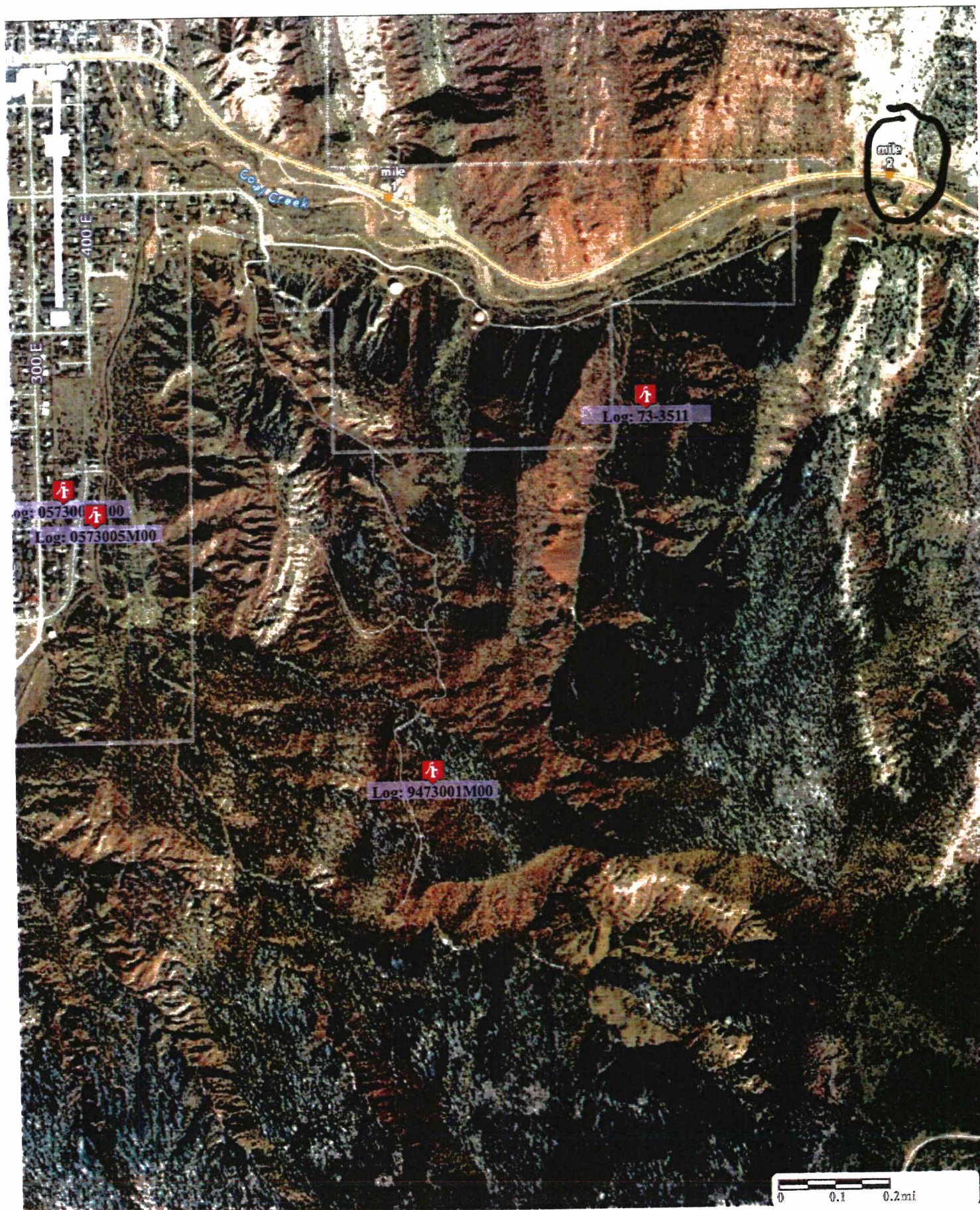


SLOPE CUT DETAIL

SCALE: 1" = 20'

Services

Agencies



Municipal Separate Storm Sewer System (MS4) Compliance Plan Standard Operating Procedure

Purpose

The purpose of the MS4 Compliance Plan is to ensure that all projects that have under an acre of earth disturbance include Best Management Practices (BMPs) to prevent discharges of pollutants associated with construction activity from the UDOT right-of-way and any staging/storage areas.

Design Phase

- If the environmental document determines the project to disturb less than an acre of soil, the contractor will be required to prepare and submit an MS4 Compliance Plan to the Resident Engineer (RE) for the project.

Project Advertisement

- The contractor will be responsible for incorporating the costs of any selected BMPs into the bid presented to UDOT. These costs will be incorporated into the mobilization costs of the project unless they are specifically itemized in the Engineer's Estimate.

Notice to Proceed

- The MS4 Compliance Plan will be provided to the contractor at the pre-construction meeting.
- The MS4 Compliance Plan must be submitted to the RE and/or Region Stormwater Program Coordinator (RSC) before the project begins for review to ensure that the selected controls and BMPs are sufficient to contain the potential discharges associated with the site.

The MS4 Compliance Plan Contents

- The Plan is intended to let the contractor select the combination of BMPs for the project that will prevent discharges from the project site and any staging areas. The plan must, at a minimum, include the following information.
 - The type of BMPs selected
 - The quantity or length of each BMP selected
 - A general description of where each type of BMP will be located
 - For example, identifying mileposts and hillslopes where fiber rolls will be installed, or locations where concrete washout containers will be sited
 - A site map may be used for identifying BMP locations in addition to, or in lieu of, a written description
 - A map of any staging areas including locations of any materials, waste containers, portable toilets, or any other BMPs
 - ECS or RSI certification of an individual working on the project
- The Plan must also be signed by both the contractor and the RE before the project begins and stored in Projectwise or MasterWorks along with other project submittals.

The following page contains an example template of an MS4 Compliance Plan. Different projects will have different construction activities, potential pollutants, environments and surroundings, and different BMPs. An MS4 compliance plan can be formatted differently to accommodate those differences.

Municipal Separate Storm Sewer System (MS4) Compliance Plan

Project Name: Dry Creek Mine Industrial _____

Project Number: 20339 _____

PIN: _____

Contractor Selected Best Management Practices for Project Site and Staging/Storage Areas

Quantity	BMP Description	UDOT Standards		Where Will Control Measure be Implemented? (Provide a site map if desired.)
		Dwg	Spec	
	Fiber Roll Check Dam	EN 1	01571	Fiber rolls/wattles along bridge over wash (approx.. 200')
	Stone Check Dam	EN 1	01571	Slopes on the wash over bridge, north of mine entrance (approx.. 80')
	Silt Fence	EN 2	01571	
	Temporary Berm	EN 3	01571	Shoulders of roadway along SR-14 between mileposts 1.8 and 2.05 (approx.. 3600')
	Temporary Slope Drain	EN 3	01571	
	Fiber Roll Drop Inlet Barrier	EN 4	01571	
	Silt Fence Drop Inlet Barrier	EN 4	01571	
	Pipe Inlet Barrier	EN 5	01571	
	Gutter Inlet Barrier	EN 5	01571	
	Sediment Trap	EN 6	01571	
	Stabilized Construction Entrance	EN 6	01571	
	Straw Bale Barrier	EN 7	01571	
	Concrete Washout		01355	Onsite at mine
	Portable Toilet		01355	Onsite at mine
	Waste Container or Dumpster		01355	
	Sweeping		01355	Street sweeping daily along road length
	Spill Kit		01355	
	Sweepings Containment Area		01355	
	Erosion Control Blanket (ECB)		02376	
	Flexible Channel Liner (FCL)		02376	
	Turf Reinforcement Mat (TRM)		02376	
	Hydraulic Erosion Control Products (HECP) Type 1, 2 & 3		02911	
	Strip, Stockpile and Spread Topsoil		02912	
	Broadcast or Drill Seed		02922	
	Preserve Existing Vegetation (LID)			
	Sheet Flow Off Pavement (LID)			
	Vegetated Landscaping (LID)			
	Rock Mulch Landscaping (LID)			
	Rock Lined or Vegetated Swale (LID)			
	Riprap Lined Ditch			Riprap on slopes/embankment at bridge

Municipal Separate Storm Sewer System (MS4) Compliance Plan

	Catch Basin with Hooded Outlet Cover			
	Catch Basin with Lowered Invert			
	Riprap / Stilling Basin at Culvert Outlet			
	Energy Dissipater Structure			

Resident Engineer Signature Date

Contractor Signature Date

CYPRUS
MOUNTAIN AREA



ROUTE 101 (NORTH-SOUTH)

LEGEND



BERMS/SILT FENCING

WATTLES

RIPRAP

TRACKOUT

Certified

under the direction of

The Utah Chapter of the American Public Works Association
and the

Utah Storm Water Committee

in coordination with the

State of Utah Department of Environmental Quality, Division of Water Quality

James Armstrong

has passed the competency examination, and met all further requirements,
to qualify as a

Registered SWPPP Writer


M. Scott Bird, USWAC Chair

Jul 8, 2023

Expires

Certified

under the direction of

The Utah Chapter of the American Public Works Association
and the

Utah Storm Water Committee
in coordination with the

State of Utah Department of Environmental Quality, Division of Water Quality

James Armstrong

has passed the competency examination, and met all further requirements,
to qualify as a

Registered Storm Water Inspector


M. Scott Bird, USWAC Chair

Apr 1, 2023

Expires

Customer ID: P00000087400

Facility ID: Progressive Contracting
Incorporated- Portable Aggregate and
Asphalt Equipment

Facility ID: 11097

EMISSIONS TOTALS	
Regulated Air Pollutant Fee Subtotal (tons):	3.26
HAP and Additional Regulated Air Pollutant Fee Subtotal (tons):	+ 0
Emissions Subject to Fee TOTAL (tons):	= 3.26

EMISSIONS INVENTORY FEE		
Emissions Subject to Fee TOTAL (tons):	Emissions Fee Rate	Fee Due
3.26 Tons	X \$92.58 Per Ton =	\$301.81

REGULATED AIR POLLUTANTS			
Regulated Air Pollutant	Total Emissions (tons) (full amount, may be over 4,000.0 tons per pollutant)	Total Tailpipe Emissions (tons) (not subject to fees)	Emissions Subject to Fees (tons) (maximum of 4,000.0 tons per pollutant)
PM10-PRI	1.86	0.0	1.86
PM10-FIL	1.86	0.0	No Fee Required
PM25-PRI	0.18	0.0	No Fee Required
PM25-FIL	0.17	0.0	No Fee Required
PM-CON	0.0	0.0	No Fee Required
SO2	0.11	0.0	0.11
NOX	1.25	0.0	1.25
VOC	0.04	0.0	0.04
CO	0.33	0.0	No Fee Required
Regulated Air Pollutants Subtotal (tons):			3.26

HAZARDOUS AIR POLLUTANTS (HAP) AND ADDITIONAL REGULATED AIR POLLUTANTS (hazardous air pollutants and additional regulated air pollutants that are also a VOC or PM are not subject to fees, to avoid double counting)			
Pollutant Name	CAS No.	Total Emissions (tons)	Emissions Subject to Fees (tons)
HAP and Additional Regulated Air Pollutants Subtotal (tons):			0.0



STATE OF UTAH

Spencer J. Cox
Governor

Deidre Henderson
Lieutenant Governor

DEPARTMENT OF
ENVIRONMENTAL QUALITY
Kimberly D. Shelley
Executive Director

DIVISION OF AIR QUALITY
Bryce C. Bird
Director

SLBS
Form Version: 09/01/2021
Generated: 08/08/2022
Facility ID: 11097

BILL TO:

Progressive Contracting Incorporated
230 E Tabernacle, PO Box 1930
St. George, UT 84771-1930

sam@progressivecontracting.com

PERTAINING TO:

11097 - Progressive Contracting Incorporated-
Portable Aggregate and Asphalt Equipment
Portable Equipment, Not permanently based at a
site.
Portable Source, UTAH 84000

CUSTOMER ID: P00000087400

INVOICE ID: 3126

INVOICE DATE: 08/08/2022

INVOICE DUE DATE: 10/01/2022

Emissions Inventory Fee Due: **\$301.81**

Under Utah Code Section 19-2-109-1 and Utah Operating Permits Rule R307-415 UAC, any facility subject to the operating permit requirements (Major source or area source subject to NSPS/MACT/NESHAP) is subject to an emission fee of \$92.58/ton for up to 4,000.0 tons of any single pollutant. Failure to pay the fee within 30 days of the due date may result in a penalty of up to 50.00% of the fee, plus interest on the fee computed at 12.00% annually. Fees are for the period 07/01/2022 through 06/30/2023, and are based on the 2020 emissions inventory unless your company elected to base the fee on allowable emissions.

Notes:

1. Off-highway mobile-source tailpipe emissions are not chargeable.
2. Chargeable emissions having a ceiling of 4,000.0 tons/year per pollutant.
3. Hazardous air pollutants that were reported as VOC or PM10 are charged only as VOC or PM10, respectively.
4. CO is not a chargeable emission.

To ensure proper credit, please attach a copy of this document with your payment.

195 North 1950 West - Salt Lake City, UT
Mailing Address: P.O. Box 144820 - Salt Lake City, UT 84114-4820
Telephone: (801) 536-4000 - Fax: (801) 536-4099 - T.D.D.: (801) 536-4414
www.deq.utah.gov



TECHNICAL MEMORANDUM

Date: July 19, 2022

To: Mr. Russell Limb
Progressive Contracting, Inc. (PCI)
P.O. Box 1930, St. George, Utah 84770

From: Rob Reid, P.E

Subject: Drainage Impacts at SR-14 Milepost 1.95 – 2.05
PCI Cedar Valley Gypsum Pit, Iron County, UT
RA Project No. 125888-21

1.0 INTRODUCTION

This technical memorandum was prepared by Rosenberg Associates (RA) in response to a letter sent by the Utah Department of Transportation (UDOT) to PCI dated July 11, 2022 concerning drainage impacts to SR-14 between mileposts 1.95 and 2.05. The purpose of the UDOT letter was to inform PCI that due to its mining operations: (a) the Dry Creek drainage that drains into a 36-inch culvert has been blocked and/or filled in; and (b) the Salt Creek drainage channel that passes under SR-14 has been greatly altered from its natural channel and capacity.

2.0 BACKGROUND INFORMATION

UDOT indicates that PCI is responsible for maintaining the historic drainage channels in this area and allowing water to pass through its historic outfall. Any alterations or modifications to these historic drainages need to be designed appropriately and approved by the governing jurisdiction of the drainages for adequate sizing and location.

3.0 PRELIMINARY REMEDIATION OPTIONS

Based on the background information presented above, it is RA's opinion that:

1. Both the locations and capacities of the historic drainages of Dry Creek and Salt Creek should be reestablished through the mining operations to allow non-impeded flow

352 East Riverside Drive, Suite A-2 St. George, Utah 84790 (435) 673-8586 Phone • (435) 673-8397

www.racivil.com

toward the existing drainage crossings under SR-14.

2. Reestablished drainage channels should be designed to accommodate flows associated with a 100-year 3-hour storm event. Minimum open channel configurations are discussed in Section 4.1.
3. Temporary crossings within the limits of the mining operations could be accomplished by installing temporary culvert pipes within the drainage channels designed to accommodate flows associated with 100-year 3-hour storm events. Minimum temporary culvert sizes are discussed in Section 4.2. It should be noted that the banks of the drainage channels approaching and leaving the temporary crossings would have to be raised to at least match the heights of the crossings.

4.0 NATURAL DRAINAGE CHANNEL EVALUATIONS

HEC-HMS1 Version 4.9 was used to perform the hydrologic analyses of the Dry Creek and Salt Creek drainage basins. Curve numbers were calculated using a custom Natural Resources Conservation Service (NRCS) Soil Report. The Farmer-Fletcher distribution was used for the 3-hour storm events. Simulated precipitation values were determined using the Point Precipitation Frequency Estimates from the NOAA Atlas 142. Utilizing the model input values listed in Table 4.0a, the HEC-HMS model yielded the design storm peak flow values summarized in Table 4.0b.

TABLE 4.0a – HYDRAULIC MODEL INPUT

WATERSHED AREA		AREA (acre)	SCS CN	LENGTH (ft)	SLOPE (%)	LAG TIME (min)
BASIN A	Dry Creek Watershed	72.53	88	4,025	23.1	5.01
BASIN B	Salt Creek Watershed	1,127.80	74	14,635	14.5	8.13

TABLE 4.0b – HYDRAULIC MODEL OUTPUT

HYDRAULIC ELEMENT		10Y-3H (cfs)	25Y-3HR (cfs)	50Y-3HR (cfs)	100Y-3HR (cfs)
BASIN A	Dry Creek Watershed	52.4	82.7	113.4	157.1
BASIN B	Salt Creek Watershed	95.6	253.5	447.7	762.3
J-1	Junction Combining BASINS A & B	125.3	305.5	539.6	883.1

1 U.S. Army Corps of Engineers, Hydraulic Engineering Circular Hydrologic Modeling System (HEC-HMS) software, Version 4.9.

2 NOAA's National Weather Service. Precipitation Frequency Data Server.

4.1 Trapezoidal Channel Capacities

Dry Creek: The capacity of the Dry Creek channel was sized to carry a maximum of 157.1 cfs which is equivalent to the 100-year 3-hour design storm generated within the drainage basin. Based on the results of the evaluation, the channel should have a minimum depth of 2 feet with a minimum bottom width of 10 feet and side slopes of 4H:1V. The channel flow capacity was analyzed for a 2% grade utilizing Bentley OpenFlows FlowMaster software for open channel flow conditions.

Salt Creek: The capacity of the Salt Creek channel was sized to carry a maximum of 762.3 cfs which is equivalent to the 100-year 3-hour design storm generated within the drainage basin. Based on the results of the evaluation, the channel should have a minimum depth of 5 feet with a minimum bottom width of 10 feet and side slopes of 3H:1V. The channel flow capacity was analyzed for a 2% grade utilizing Bentley OpenFlows FlowMaster software for open channel flow conditions.

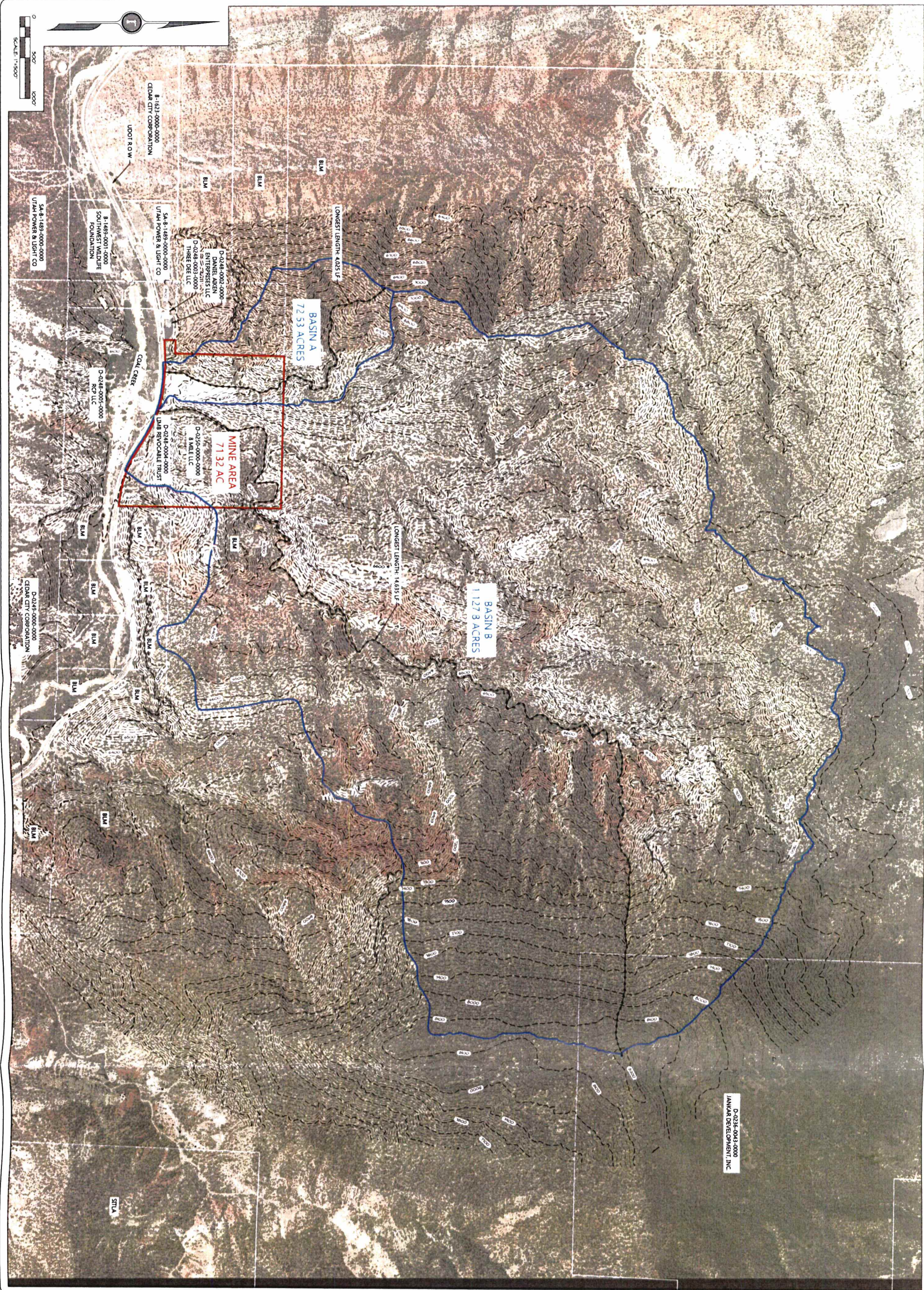
4.2 Temporary Crossing / Culvert Capacities

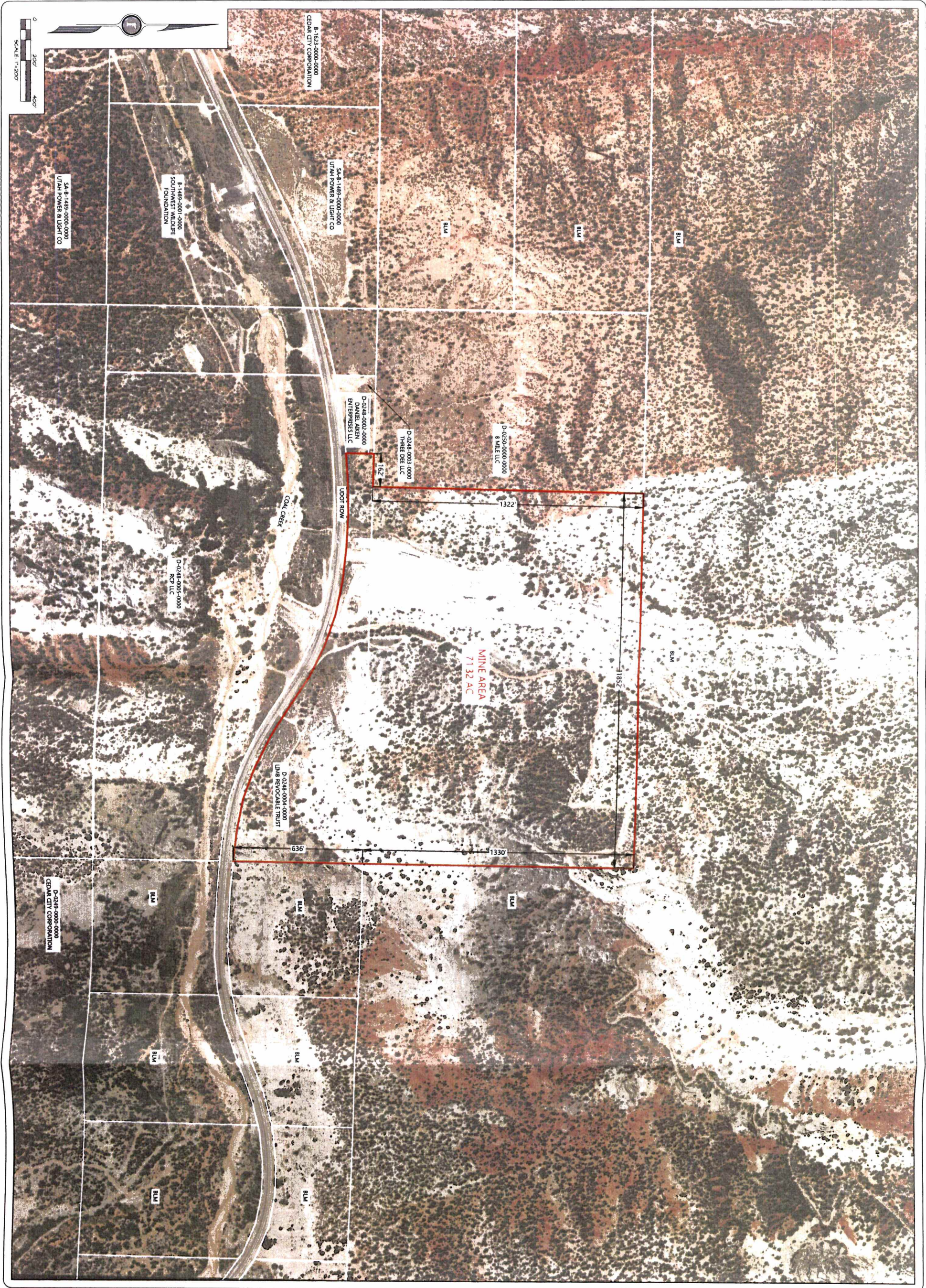
Dry Creek: The capacity of a temporary crossing culvert was evaluated for the 100-year 3-hour design stormwater flows of 157.1 cfs. Based on the results of the analysis, temporary crossing culverts placed within Dry Creek should be 4-feet or larger in diameter assuming a minimum slope of 2 percent.

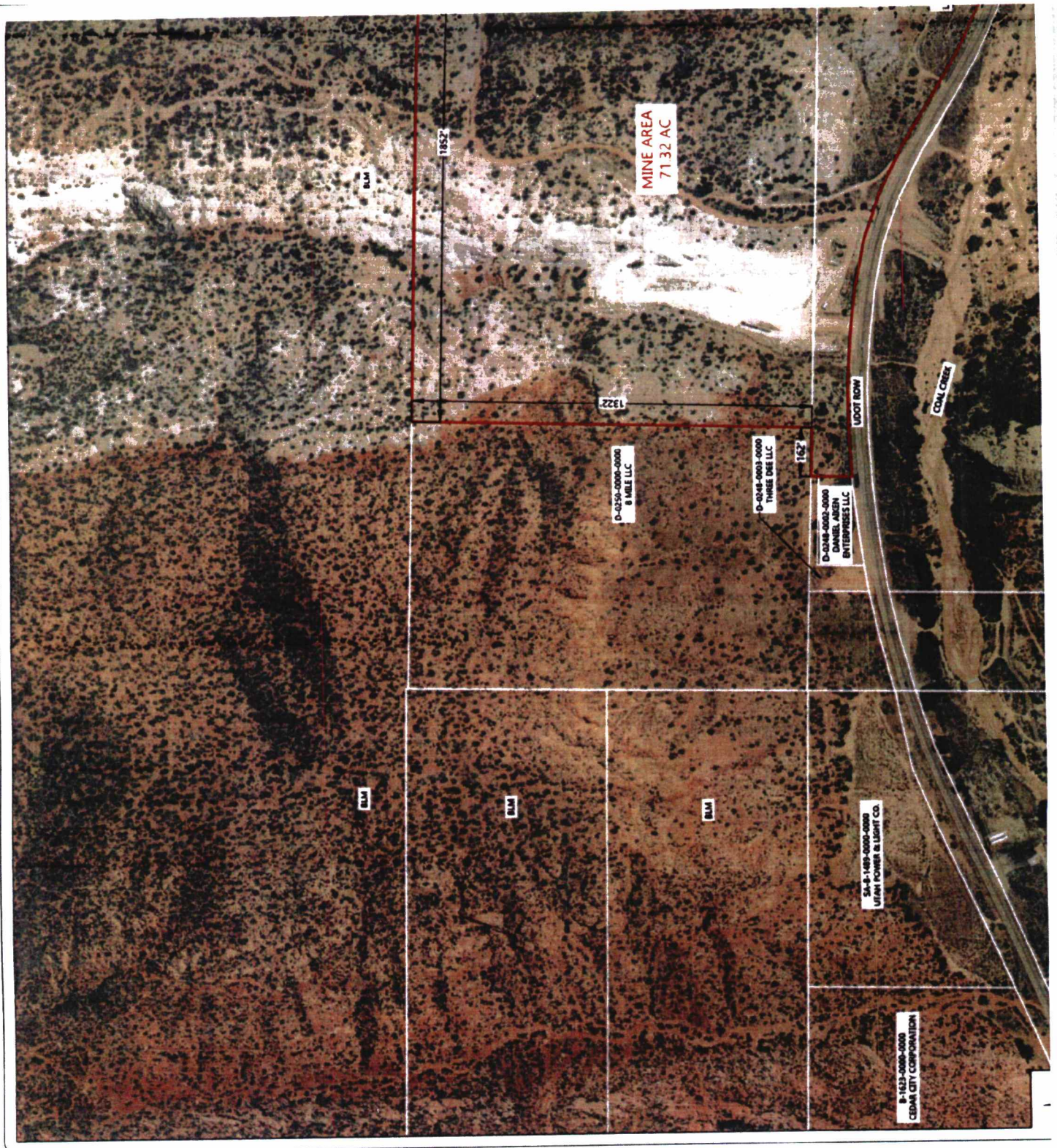
Salt Creek: The capacity of a temporary crossing culvert was evaluated for the 100-year 3-hour design stormwater flows of 762.3 cfs. Based on the results of the analysis, temporary crossing culverts placed within Salt Creek should be 7-feet or larger in diameter assuming a minimum slope of 2 percent.

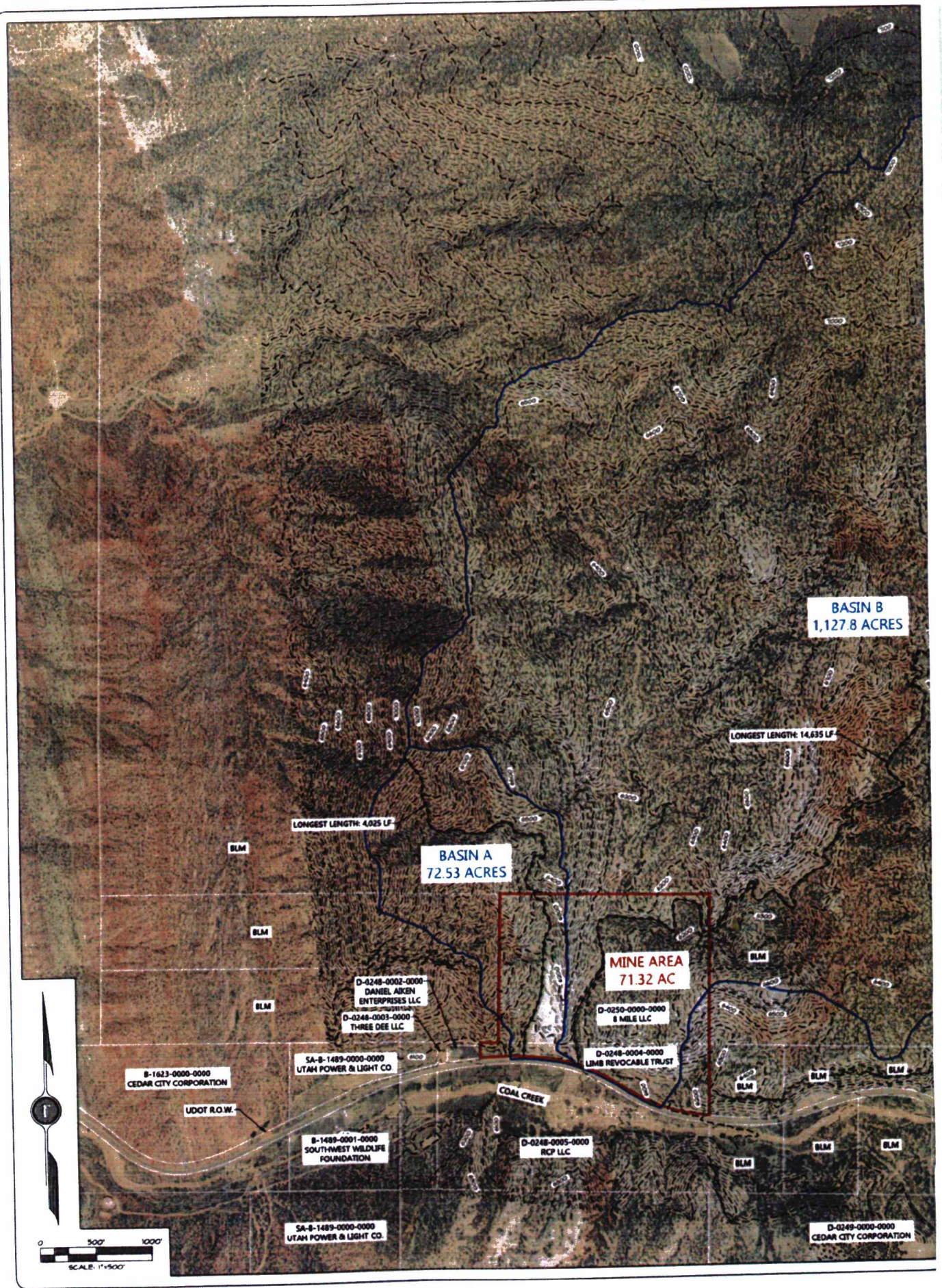
5.0 CLOSURE

We appreciate the opportunity to be of service on this project. Any preliminary recommendations made in this memorandum are not final engineering plans or specifications and are not issued for construction. Should you have any questions regarding this memorandum or wish to discuss additional services, please contact us at (435)-673-8586.









BASIN B
1,127.8 ACRES

BASIN A
72.53 ACRES

MINE AREA
71.32 AC

LONGEST LENGTH: 4,025 LF

LONGEST LENGTH: 14,635 LF

BLM

BLM

BLM

BLM

BLM

BLM

BLM

BLM

BLM

D-0249-0000-0000
CEDAR CITY CORPORATION

D-0250-0000-0000
8 MILE LLC

D-0248-0004-0000
LUMB REVOCABLE TRUST

D-0248-0005-0000
RCP LLC

D-0248-0002-0000
DANIEL ARKEN
ENTERPRISES LLC

D-0248-0003-0000
THREE DEE LLC

SA-8-1489-0000-0000
UTAH POWER & LIGHT CO.

B-1489-0001-0000
SOUTHWEST WILDLIFE
FOUNDATION

SA-8-1489-0000-0000
UTAH POWER & LIGHT CO.

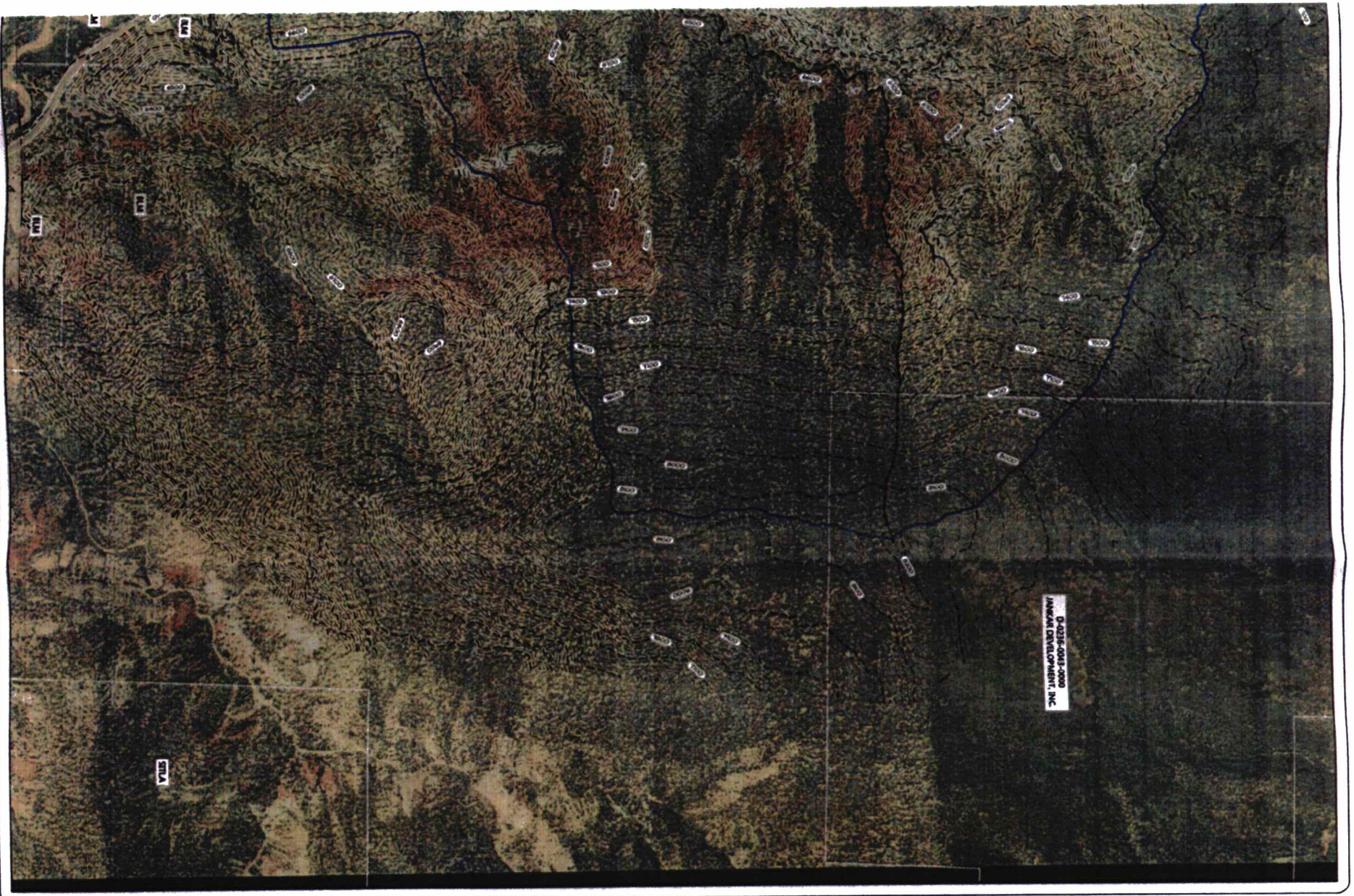
B-1623-0000-0000
CEDAR CITY CORPORATION

UDOT R.O.W.

COAL CREEK



0 500' 1000'
SCALE: 1"=500'



SHEET 1 OF 1 SHEETS	DRAINAGE BASIN DELINEATION FOR PCI CEDAR CANYON GYPSUM PIT CEDAR VALLEY UTAH	303 East Riverside Drive, Suite 303 St. George, Utah 84770 PH (435) 637-0000 FX (435) 637-0099 www.roseberg.com	 ROSENBERG ASSOCIATES CIVIL ENGINEERS • LAND SURVEYORS	DATE	1/4/2022
				JOB NO.	125609-21
				DESIGNED BY	GRF
				CHECKED BY	RAJ
				DATE	1-9-02

Worksheet for Cut Ditch for Dry Creek

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Roughness Coefficient	0.050
Channel Slope	0.020 ft/ft
Left Side Slope	3.000 H:V
Right Side Slope	3.000 H:V
Bottom Width	10.00 ft
Discharge	157.10 cfs
Results	
Normal Depth	23.1 in
Flow Area	30.3 ft ²
Wetted Perimeter	22.16 ft
Hydraulic Radius	16.4 in
Top Width	21.54 ft
Critical Depth	19.9 in
Critical Slope	0.035 ft/ft
Velocity	5.18 ft/s
Velocity Head	0.42 ft
Specific Energy	2.34 ft
Froude Number	0.770
Flow Type	Subcritical
GVF Input Data	
Downstream Depth	0.0 in
Length	0.00 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	23.1 in
Critical Depth	19.9 in
Channel Slope	0.020 ft/ft
Critical Slope	0.035 ft/ft

Worksheet for Cut Ditch for Salt Creek

Project Description

Friction Method	Manning
	Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.050
Channel Slope	0.020 ft/ft
Left Side Slope	3.000 H:V
Right Side Slope	3.000 H:V
Bottom Width	10.00 ft
Discharge	762.30 cfs

Results

Normal Depth	50.7 in
Flow Area	95.7 ft ²
Wetted Perimeter	36.71 ft
Hydraulic Radius	31.3 in
Top Width	35.34 ft
Critical Depth	46.7 in
Critical Slope	0.028 ft/ft
Velocity	7.96 ft/s
Velocity Head	0.99 ft
Specific Energy	5.21 ft
Froude Number	0.853
Flow Type	Subcritical

GVF Input Data

Downstream Depth	0.0 in
Length	0.00 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	0.00 ft/s
Upstream Velocity	0.00 ft/s
Normal Depth	50.7 in
Critical Depth	46.7 in
Channel Slope	0.020 ft/ft
Critical Slope	0.028 ft/ft

Worksheet for Pipe 120-inch at 1% Slope

Project Description	
Friction Method	Manning Formula
Solve For	Full Flow Capacity
Input Data	
Roughness Coefficient	0.013
Channel Slope	0.010 ft/ft
Normal Depth	120.0 in
Diameter	120.0 in
Discharge	1,653.62 cfs
Results	
Discharge	1,653.62 cfs
Normal Depth	120.0 in
Flow Area	78.5 ft ²
Wetted Perimeter	31.42 ft
Hydraulic Radius	30.0 in
Top Width	0.00 ft
Critical Depth	111.4 in
Percent Full	100.0 %
Critical Slope	0.009 ft/ft
Velocity	21.05 ft/s
Velocity Head	6.89 ft
Specific Energy	16.89 ft
Froude Number	(N/A)
Maximum Discharge	1,778.81 cfs
Discharge Full	1,653.62 cfs
Slope Full	0.010 ft/ft
Flow Type	Undefined
GVF Input Data	
Downstream Depth	0.0 in
Length	0.00 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	100.0 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	120.0 in
Critical Depth	111.4 in
Channel Slope	0.010 ft/ft
Critical Slope	0.009 ft/ft

Worksheet for Pipe 120-inch at 2% Slope

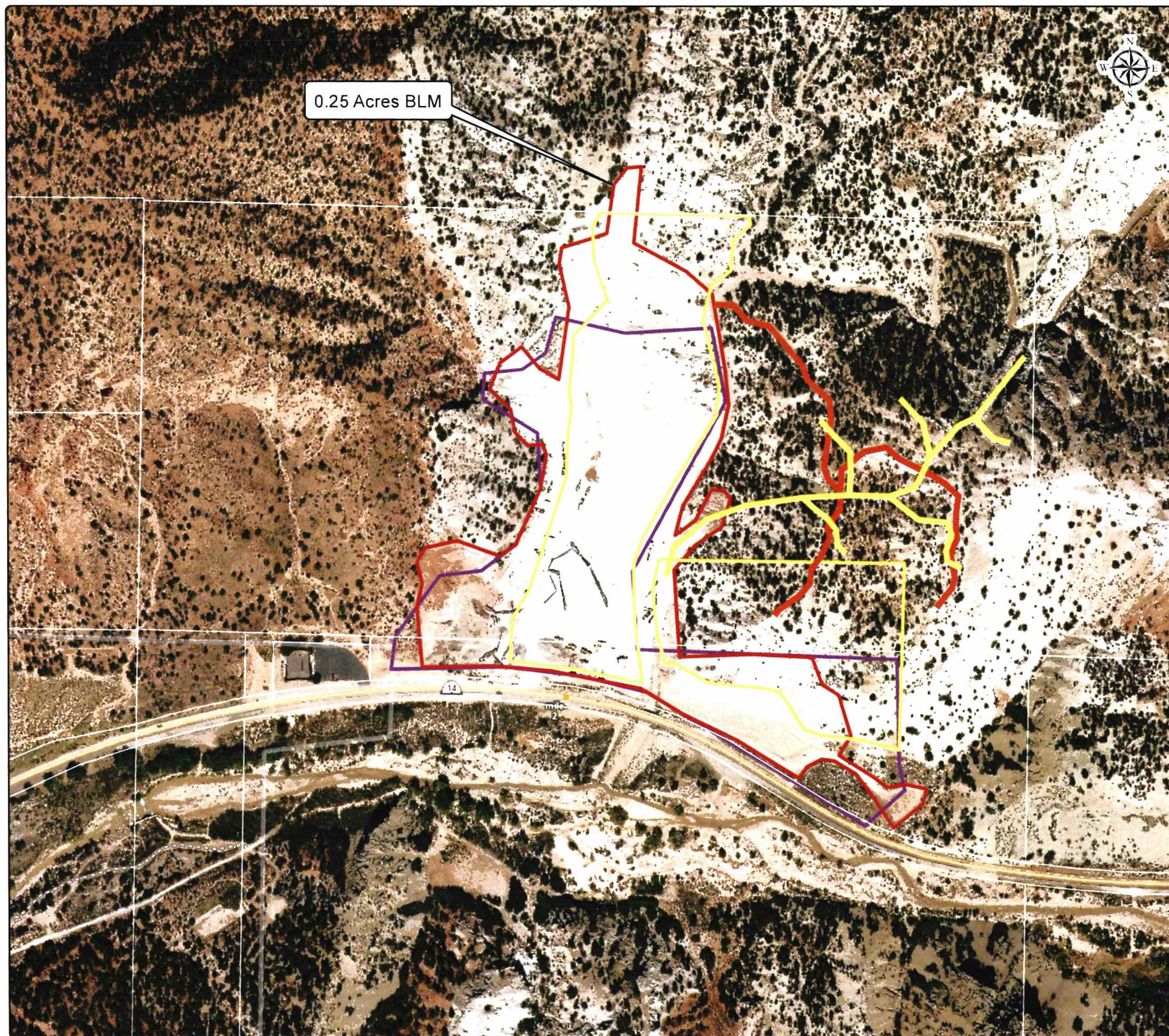
Project Description	
Friction Method	Manning Formula
Solve For	Full Flow Capacity
Input Data	
Roughness Coefficient	0.013
Channel Slope	0.020 ft/ft
Normal Depth	120.0 in
Diameter	120.0 in
Discharge	2,338.57 cfs
Results	
Discharge	2,338.57 cfs
Normal Depth	120.0 in
Flow Area	78.5 ft ²
Wetted Perimeter	31.42 ft
Hydraulic Radius	30.0 in
Top Width	0.00 ft
Critical Depth	117.6 in
Percent Full	100.0 %
Critical Slope	0.018 ft/ft
Velocity	29.78 ft/s
Velocity Head	13.78 ft
Specific Energy	23.78 ft
Froude Number	(N/A)
Maximum Discharge	2,515.61 cfs
Discharge Full	2,338.57 cfs
Slope Full	0.020 ft/ft
Flow Type	Undefined
GVF Input Data	
Downstream Depth	0.0 in
Length	0.00 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	100.0 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	120.0 in
Critical Depth	117.6 in
Channel Slope	0.020 ft/ft
Critical Slope	0.018 ft/ft

Worksheet for Pipe Capacity for Dry Creek 2% Slope

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth
Input Data	
Roughness Coefficient	0.013
Channel Slope	0.020 ft/ft
Diameter	48.0 in
Discharge	157.10 cfs
Results	
Normal Depth	31.7 in
Flow Area	8.8 ft ²
Wetted Perimeter	7.59 ft
Hydraulic Radius	13.9 in
Top Width	3.79 ft
Critical Depth	43.8 in
Percent Full	66.0 %
Critical Slope	0.010 ft/ft
Velocity	17.85 ft/s
Velocity Head	4.95 ft
Specific Energy	7.59 ft
Froude Number	2.064
Maximum Discharge	218.51 cfs
Discharge Full	203.13 cfs
Slope Full	0.012 ft/ft
Flow Type	Supercritical
GVF Input Data	
Downstream Depth	0.0 in
Length	0.00 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	66.0 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	31.7 in
Critical Depth	43.8 in
Channel Slope	0.020 ft/ft
Critical Slope	0.010 ft/ft

Worksheet for Pipe Capacity for Salt Creek 2% Slope

Project Description	
Friction Method	Manning
	Formula
Solve For	Normal Depth
Input Data	
Roughness Coefficient	0.013
Channel Slope	0.020 ft/ft
Diameter	84.0 in
Discharge	762.30 cfs
Results	
Normal Depth	59.2 in
Flow Area	29.0 ft ²
Wetted Perimeter	13.94 ft
Hydraulic Radius	24.9 in
Top Width	6.39 ft
Critical Depth	80.0 in
Percent Full	70.4 %
Critical Slope	0.012 ft/ft
Velocity	26.32 ft/s
Velocity Head	10.76 ft
Specific Energy	15.69 ft
Froude Number	2.179
Maximum Discharge	971.79 cfs
Discharge Full	903.40 cfs
Slope Full	0.014 ft/ft
Flow Type	Supercritical
GVF Input Data	
Downstream Depth	0.0 in
Length	0.00 ft
Number Of Steps	0
GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	70.4 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	59.2 in
Critical Depth	80.0 in
Channel Slope	0.020 ft/ft
Critical Slope	0.012 ft/ft



LEGEND

2020 Area Proposed
~20 Acres

2021 Area Proposed
~20 Acres

2021 Actual
~22 Acres

2020 Proposed Drill
~2640'

2021 Actual Drill
~2117'

DATE

9/6/2022

Utah

Location of Map



NOTES

DRAWN: KMC
DESIGNER: WHW
REVIEWED: GBR



MINE NAME/MINE NUMBER

Mine Name: Dry Creek
Mine S/021/0041

SCALES

HORIZ 1"=400'
(8.5"X11")

0 100 200 Feet

SET:

PRELIM

FIGURE:

AREA

Service Layer Credits UGRC 09052021

P.C.I.
PROGRESSIVE CONTRACTING INC.

APPENDIX H

SWPPP

Industrial Stormwater Pollution Prevention Plan

for:

DRY CREEK MINE

SR 14 Milepost 2.00
Cedar City, Utah 84721

FACILITY/SITE SWPPP CONTACT:

Progressive Contracting, Inc.

John Wilson

3657 S 1700 E

P.O. Box 1930

Saint George, UT, 84790

Washington County

Phone: (435)628-6662

Email: johnwilson@progressivecontracting.com

EMERGENCY CONTACT:

Progressive Contracting, Inc.

Sam McDowell

P.O. Box 1930

Saint George, UT, 84770

Phone: (435)619-6110

Email: sammcdowell@progressivecontracting.com

Landmark Project No.:
20339

SWPPP Preparation Date:
04/11/2023

UPDES project or permit tracking number: UTRC06682

Table of Contents

Table of Contents	i
SWPPP Appendices	iii
SECTION 1: CONTACT INFORMATION/ RESPONSIBLE PARTIES	1
1.1 Responsible Parties Contact Information	1
1.2 Stormwater Team	2
SECTION 2: SITE EVALUATION, ASSESSMENT, & PLANNING	3
2.1 Project/Site Information	3
2.2 Site Map	5
2.3 Site / Facility Security	6
2.4 Facility Estimates	6
2.5 Soils, Slopes, Vegetation, and Current Drainage Patterns	6
2.6 Emergency Related Projects.....	6
2.7 Site Features and Sensitive Areas to be Protected	6
SECTION 3: WATER QUALITY	7
3.1 UIC Class 5 Injection Wells.....	7
3.2 Discharge Information.....	7
3.3 Receiving Waters	7
3.4 Impaired Waters	7
3.5 High Water Quality	8
3.6 Control Storm Water Flowing onto and Through the Site	8
3.7 Protect Storm Drain Inlets.....	8
3.8 Existing Stormwater Sampling Data	8
SECTION 4: POLLUTION PREVENTION STANDARDS	9
4.1 Natural Buffers or Equivalent Sediment Controls	9
4.2 Potential Sources of Pollution	9
4.3 Spill or Leak Potential.....	11
4.4 List of Significant Spills and Leaks	11
4.5 Non-Stormwater Discharges	11
4.6 Spill Prevention and Response.....	12

SECTION 5: FACILITY EVALUATION AND STORMWATER CONTROL MEASURES	14
5.1 Facility Evaluation Worksheets	14
5.2 Stormwater Control Measures / Best Management Practices (BMPs)	18
5.3 Sector-Specific Stormwater Control Measures / Best Management Practices (BMPs)	24
5.4 Other Pollution Prevention Practices	25
SECTION 6: Inspections and Monitoring/Sampling.....	27
6.1 Routine Facility Inspections.....	27
6.2 Inspector Qualifications	27
6.3 Quarterly Visual Assessment of Stormwater Discharges	28
6.4 Monitoring / Sampling	28
6.5 Annual Comprehensive Stormwater Evaluation	29
6.6 Corrective Actions.....	29
SECTION 7: DOCUMENTATION TO SUPPORT ELIGIBILITY CONSIDERATIONS UNDER OTHER FEDERAL LAWS.....	30
7.1 Documentation Regarding Endangered Species	30
7.2 Historic Preservation	31
7.3 Permit Regulations-Applicable Federal, Tribal, State, or Local Programs.....	32
7.4 Consistency with Other Plans and Permits	32
SECTION 8: TRAINING AND RECORD KEEPING	33
8.1 Training	33
8.2 Recordkeeping.....	33
8.3 Log of Changes to the SWPPP.....	33
8.4 Facility NOI / NOT Permit.....	33
8.5 Delegation of Authority	35
SECTION 9: CERTIFICATION.....	36
SWPPP APPENDICES	37
VISUAL STORM WATER DISCHARGE MONITORING REPORT (SWDMR).....	51
ANALYTICAL STORM WATER DISCHARGE MONITORING REPORT (SWDMR).	58

SWPPP Appendices

Appendix A:	General Location Map
Appendix B:	Site Maps
Appendix C:	MSGP – Industrial Multi-Sector General Permit
Appendix D:	Appendix II Sector Regulations for Sector Letter
Appendix E:	Inspection Reports
Appendix F:	Corrective Action Log (or in Part 6.3)
Appendix G:	Industrial SWPPP Amendment Log (or in Part 8.3)
Appendix H:	Training Log
Appendix I:	Visual Sample SWDMR
Appendix J:	Analytical Sample SWMDR
Appendix K:	Delegation of Authority
Appendix L:	Subcontractor Certification / Agreement
Appendix M:	Other SWPPP Documentation, Site Notice, Expired Permits, Out of Date SWPPP Items
Appendix N:	BMP Specifications

SECTION 1: CONTACT INFORMATION/ RESPONSIBLE PARTIES

1.1 Responsible Parties Contact Information

Owner / Operator:

Progressive Contracting, Inc.
John Wilson
3657 S 1700 E
P.O. Box 1930
Saint George, UT, 84790
Phone: (435)628-6662
Email:
johnwilson@progressivecontracting.com

Emergency 24-Hour Contact:

Progressive Contracting, Inc.
Sam McDowell
(435)619-6110

Primary SWPPP Contact:

Progressive Contracting, Inc.
John Wilson
P.O. Box 1930
Saint George, UT, 84770
Phone: (435)628-6662
Email:
johnwilson@progressivecontracting.com

Back-Up SWPPP Contacts(s):

Progressive Contracting, Inc.
Sam McDowell
P.O. Box 1930
Saint George, UT, 84770
Phone: (435)619-6110
Email:
sammcdowell@progressivecontracting.com

1.2 Stormwater Team

Development of SWPPP

Plan Writing

Landmark Testing and Engineering
James Armstrong, RSW, RSI, ECS
435-730-4629

specialprojects@landmarktesting.com

Plan Review

Landmark Testing and Engineering
Jeff Webb, RSI, ECS, RSW
435-319-7073

jeff@landmarktesting.com

Conduct Site Inspections

Landmark Testing and Engineering
James Armstrong, RSW, RSI, ECS
435-730-4629

specialprojects@landmarktesting.com

Landmark Testing and Engineering
Jeff Webb, RSI, ECS
435-319-7073

jeff@landmarktesting.com

SWPPP modifications, Compliance with permit requirements (installing and maintaining storm water controls, taking corrective action)

Progressive Contracting, Inc.

John Wilson

Phone: (435)628-6662

Email: johnwilson@progressivecontracting.com

SECTION 2: SITE EVALUATION, ASSESSMENT, & PLANNING

2.1 Project/Site Information

Project / Site Name: Dry Creek Mine

Project Address / Location: Highway 14/East Center Street, Mile 2

Project City: Cedar City State: UT Zipcode: 84721

Project County: Iron County

Latitude: 37.674154°N Longitude: 113.028052°W

Method for determining latitude / longitude:

☐ USGS topographic map (specify scale: _____)

☐ EPA Website

☐ GPS

☒ Google Earth

Is the project located in Indian country? ☐ Yes ☒ No

If yes, name of Reservation: _____

Is this project considered a federal facility? ☐ Yes ☒ No

UPDES project or permit tracking number: _____

Brief site/facility description:

This facility is an addition to a 10-acre gypsum mine operating at Mile 2 of Highway 14, adjacent to Rusty's Ranch House Restaurant in Cedar City, Utah. The gypsum being mined is a bedding plane of steeply dipping layer of the Carmel and Temple Cap Formations. The area consists of a steep ridge flanked to the West by a larger ridge and a smaller ridge to the east. A dry wash is just east of the main mining activities and leads to a small, active body of water, Coal Creek, which is located South from the site, approximately 400 feet down-stream. Site activities include gypsum excavation, processing, loading of rock trucks, weighing, and site maintenance.

What is the function of the facility?

☐ Residential

☐ Commercial

☒ Industrial

☒ Other: Gypsum Mine, Sector Letter J

Analytical Monitoring Required? ☒ Yes ☐ No

If Yes, Then When: Four times (once each quarter) per year, during years one and three of the permit. See Appendix D for additional information.

Visual Monitoring Required? ☒ Yes ☐ No

If Yes, Then When: At least once per quarter during daylight hours unless there is an insufficient amount of snow melt or rainfall to produce a runoff event. See Appendix D for additional information.

Required Monitoring Submittal to State? ☒ Yes ☐ No

If Yes Explain Requirement: See Appendix D for additional information.

Are spill kits located on site? ☒ Yes ☐ No

If Yes, Then Where Are they located: Spill kits are located in the scale house near the front entrance of the site.

Is this a new facility or existing facility?

☐ New Facility

☒ Existing Facility

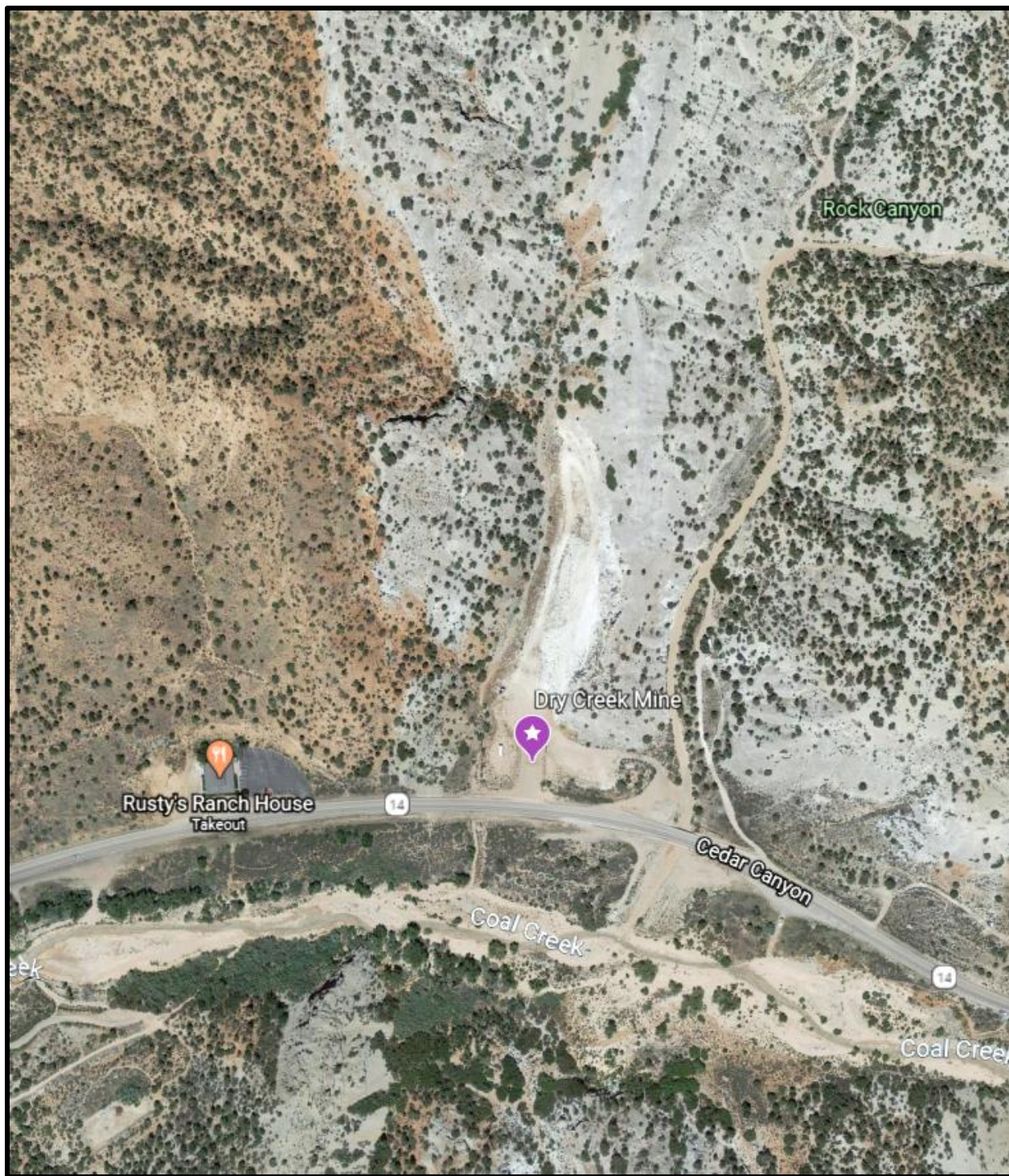
Month and Year of Beginning Facility Operations: April 24, 2023

☐ This is known

☒ This is a guess

2.2 Site Map

Additional maps included in Appendices A and B.



2.3 Site / Facility Security

The entrance to the site has a gate which is locked after hours. Camera surveillance is set up at the scale house.

2.4 Facility Estimates

The following are estimates of the site / facility:

Total facility area:	10 acres
Percentage impervious area:	10%
Runoff coefficient:	0.60

2.5 Soils, Slopes, Vegetation, and Current Drainage Patterns

Soil type(s): Rock Outcrops and Silty Sand with Gravel (SM)

Slopes: North-South trending steep slopes

Drainage patterns: Water drains from the slopes to the East and the West with water generally trending Southward into Coal Creek.

Vegetation: Minimal: Desert brush, Juniper Trees, and weeds

Other: None.

2.6 Emergency Related Projects

Emergency-Related Project? ☐ Yes ☒ No
Describe:

2.7 Site Features and Sensitive Areas to be Protected

Care should be taken to prevent debris and pollutants from entering the dry wash, especially during wet seasons. Vegetation should be preserved, where possible, to minimize erosivity.

SECTION 3: WATER QUALITY

3.1 UIC Class 5 Injection Wells

No UIC Class 5 Injection Wells anticipated for this site.

3.2 Discharge Information

Does your project/site discharge storm water into a Municipal Separate Storm Sewer System (MS4)? ☐ Yes ☒ No

Are there any surface waters that are located within 50 feet of your construction disturbances? ☐ Yes ☒ No

3.3 Receiving Waters

Table 1 B Names of Receiving Waters

Name(s) of the first surface water that receives storm water directly from your site and/or from the MS4.
1. Coal Creek
2.

3.4 Impaired Waters

Table 2 – Names of Impaired Waters

	Is this surface water listed as “impaired”?	If you answered yes, then answer the following:		
		What pollutant(s) are causing the impairment?	Has a TMDL been completed?	Pollutant(s) for which there is a TMDL
1.	☒ Yes ☐ No	Temperature	☒ Yes ☐ No	Temperature
2.	☐ Yes ☐ No		☐ Yes ☐ No	

3.5 High Water Quality

Table 3 B High Water Quality

	Is this surface water designated as High Water Quality? (see Appendix C)	If you answered yes, specify which category the surface water is designated as?
1.	☐ Yes ☒ No	☐ Category 1 ☐ Category 2
2.	☐ Yes ☐ No	☐ Category 1 ☐ Category 2

3.6 Control Storm Water Flowing onto and Through the Site

BMP Description: Earth berms constructed along certain areas of the perimeter of the construction area to prevent any sediment from runoff from entering or leaving the project. See BMP Specifications in Appendix N for details regarding placement and construction of the BMP.

Installation Schedule:	Ongoing as needed
Maintenance and Inspection:	Every other week, and after a storm event. Remove sediment when it reaches one third the height of the berms. Repair when damaged.
Responsible Staff:	Progressive Contracting, Inc.

BMP Description: Avoid disturbance to existing vegetation

Installation Schedule:	Ongoing
Maintenance and Inspection:	All construction personnel should take care to avoid damage to existing vegetation and historical features outside of the work area. Additionally, open construction areas should be minimized.
Responsible Staff:	Progressive Contracting, Inc.

3.7 Protect Storm Drain Inlets

There are no storm drain inlets on or near the site.

3.8 Existing Stormwater Sampling Data

None

SECTION 4: POLLUTION PREVENTION STANDARDS

4.1 Natural Buffers or Equivalent Sediment Controls

Are there any surface waters within 50 feet of your project's earth disturbances?

☐ YES

☒ NO

4.2 Potential Sources of Pollution

Pollutant-Generating Activity	Pollutants or Pollutant Constituents <i>(that could be discharged)</i>	Location on Site <i>(for reference SWPPP site map where this is shown)</i>
Site Preparation: Road construction removal of overburden, removal of waste rock to expose the mineral body.	Dust, total suspended solids (TSS), total dissolved solids (TDS, and turbidity.	Throughout the facility area.
Mineral Extraction: blasting and/or excavating activities.	Dust, TSS	Throughout the project North of the scale house.
Mineral processing Activities: Rock sorting, rock crushing, rock washing, raw material storage, waste rock storage, raw material loading, processing materials unloading, raw or waste material transportation.	Dust, TSS, TDS, turbidity, fines, pH, diesel/gas fuel, oil, and lime.	North of the scale house near the site entrance.
Other Activities: Sedimentation pond upsets, sedimentation pond sludge removal and disposal, air emission control cleaning, and reclamation activities including site preparation for stabilization and fertilizers.	Dust, TSS, TDS, turbidity, pH, nitrogen, and phosphorous.	Throughout the facility area.
Materials stockpiles	Sediment, Dust	Revolving stockpiles are located North of the scale house near the site entrance.

Pollutant-Generating Activity	Pollutants or Pollutant Constituents (that could be discharged)	Location on Site (for reference SWPPP site map where this is shown)
Equipment/vehicle maintenance: Leaks or spills of gasoline, diesel, fuel, and fuel oil, Parts cleaning; Waste disposal of solvents, oily rags, oil and gas filters, batteries, coolants, and degreasers; Fluid replacement including lubricating fluids, hydraulic fluid, oil transmission fluid, radiator fluids, solvents, and grease; Vehicle fueling.	O&G, BOD, COD COD, BOD, O&G, pH O&G, lead, iron, zinc, aluminum, COD, pH O&G, arsenic, lead, cadmium, chromium, COD, benzene Gas/diesel fuel, fuel additives	Generally taking place near the entrance and scale house. Fueling and maintenance activities being conducted by mobile service trucks.

Specific Industrial Activity Information provided by:

https://www.epa.gov/sites/production/files/2015-10/documents/sector_j_mineralmining.pdf

Potential pollutants and sources, other than sediment, to stormwater runoff:

Pollutant-Generating Activity	Pollutants or Pollutant Constituents (that could be discharged if exposed to storm water)	Location on Site (or reference SWPPP site map where this is shown)
Diesel Fuel	Petroleum distillates, oil & grease, naphthalene, xylenes	Generally taking place near the entrance and scale house. Fueling and maintenance activities being conducted by mobile service trucks.
Hydraulic oil / fluids	Mineral oil	Generally taking place near the entrance and scale house. Fueling and maintenance activities being conducted by mobile service trucks.

4.3 Spill or Leak Potential

Instructions: Describe the areas at the facility that have spill or leak potential.

Describe the Locations and Activities of the Spill or Leak Potential	Potential Discharge Locations	Describe the BMPs In Place for These Areas
Site activities do not cause there to be materials of reportable quantities on site.	Salt Creek Canyon dry wash	Spill kits, earth berms, concrete barriers.

4.4 List of Significant Spills and Leaks

Instructions: Record below all significant spills and significant leaks of toxic or hazardous pollutants that have occurred at the facility in the three years prior to the effective date of the permit.

Definitions: Significant spills include, but are not limited to, releases of oil or hazardous substances in excess of reportable quantities.

Describe the location of spills or leaks (more than 25 gallons of oils or small amounts of hazardous chemicals in the last 3 years)	Quantity (Units)	Describe the cause of the spill or leak	Describe clean up and the BMPs that are in place in these areas	Describe if additional BMPs are needed in these areas
No spills or leaks of reportable quantities in the last 3 years.				

4.5 Non-Stormwater Discharges

Authorized Non-Storm Water Discharges	Comments
Discharges from emergency fire-fighting	Not anticipated
Fire hydrant flushing	Not anticipated
Landscape irrigation	Not anticipated. No runoff of irrigations water to ditches or roadway
Waters used to wash vehicles and equipment	Not anticipated. Only with approval from CO in designated area and not detergents or cleaning solvents

Authorized Non-Storm Water Discharges	Comments
Water used to control dust	Apply in amounts to prevent runoff
Potable water including uncontaminated	Not anticipated
Routine external building wash down	Not anticipated
Uncontaminated air conditioning or compressor condensate	Not anticipated

4.6 Spill Prevention and Response

These practices are implemented to prevent and control spills to ensure that spills and leaks do not result in water quality impacts. This BMP applies to all construction activities. Spill prevention and control measures shall be implemented any time chemicals or hazardous substances are used, stored, or handled. If petroleum products are stored in containers of 55 gallons or more with a total stored volume over 1,320 gallons, a Spill Prevention, Control, and Countermeasures Plan will be developed for this facility and its requirements will be incorporated herein. Spill prevention and control measures will include:

Spill Prevention Procedures

- Project areas and activities potentially susceptible to spills shall be identified. Areas and activities that are most vulnerable to spills include: loading and unloading areas, fuel and material storage areas, process activities, dust or particulate generating processes, and waste disposal activities.
- Spills shall be contained and cleaned up as soon as possible.
- If complete cleanup is not immediately possible, then spills shall be fully covered and not exposed to rainfall.
- Spills shall not be washed down or buried.
- Residuals left over from the cleanup activity such as absorbent pads or containers of spill material shall be disposed of properly.
- Proper spill and illicit discharge reporting procedures shall be followed for both hazardous and non-hazardous materials.
- An area where a spill has occurred shall be inspected to verify that spill residuals are not present after the initial cleaning and that the area does not need to be re-cleaned.
- Emergency phone numbers shall be posted at the construction area.
- Personnel shall be trained in emergency response procedures.
- Proper notification of regulatory agencies shall occur in the event of a reportable spill.

Cleanup Response Procedures

Response guidelines have been identified below for responding to spills that may potentially result in an illicit discharge. It is the contractor's responsibility to have all emergency phone numbers available at the construction site as well to notify the proper response agencies in a timely manner. It is also the contractor's responsibility to ensure timely and proper cleanup of any spill.

- Clean up spill immediately. Use absorbent materials if the material is on an impermeable surface.
- Construct an earthen dike to contain a spill on dirt areas. If rainfall is present at the time of the spill, cover the spill with a tarp to prevent contaminating runoff.
- Use a licensed contractor or HazMat team to properly clean up spills as needed.
- Dispose of the absorbent and other response material properly, in accordance with applicable laws and regulations.
- Do not hose down spill area with water.

Any discharges in 24 hours equal to or in excess of the reportable quantities listed in 40 CFR 117, 40 CFR 110, and 40 CFR 302 will be reported to the National Response Center and the Division of Water Quality (DWQ) as soon as practical after knowledge of the spill is known to the permittees. The permittee shall submit within 14 calendar days of knowledge of the release a written description of: the release (including the type and estimate of the amount of material released), the date that such release occurred, the circumstances leading to the release, and measures taken and/or planned to be taken to the Division of Water Quality (DWQ), 288 North 1460 West, P.O. Box 144870, Salt Lake City, Utah 84114-4870. The Storm Water Pollution Prevention Plan must be modified within 14 calendar days of knowledge of the release to provide a description of the release, the circumstances leading to the release, and the date of the release. In addition, the plan must be reviewed to identify measures to prevent the reoccurrence of such releases and to respond to such releases, and the plan must be modified where appropriate.

Agency	Phone Number
National Response Center	(800) 424-8802
Division of Water Quality (DWQ) 24-Hr Reporting	(801) 231-1769 (801) 536-4123
Utah Department of Health Emergency Response	(801) 580-6681
City of Cedar City Police Department	(435) 586-2956
City of Cedar City Fire Department	(435) 586-2964

Material	Media Released To	Reportable Quantity
Engine oil, fuel, hydraulic & brake fluid	Land	25 gallons
Paints, solvents, thinners	Land	100 lbs (13 gallons)
Engine oil, fuel, hydraulic & brake fluid	Water	Visible Sheen
Antifreeze, battery acid, gasoline, engine degreasers	Air, Land, Water	100 lbs (13 gallons)
Refrigerant	Air	1 lb

SECTION 5: FACILITY EVALUATION AND STORMWATER CONTROL MEASURES

5.1 Facility Evaluation Worksheets

5.1.1 *Worksheet #1: Material Inventory*

Instructions: List all materials that are used, stored, or produced on site other than those chemicals that will be listed on a following table. Assess and evaluate these materials for their potential to contribute pollutants to stormwater runoff. The locations of the materials are shown on the SWPPP map.

Material Name/ Purpose of Material	Storage Methods/BMPs in Place	Exposed in the Last 3 Years? (Yes / No)
No chemicals or materials with potential to contribute to stormwater runoff stored on site.		

Notes: _____

5.1.2 *Worksheet #2: Tank and Drum Identification*

Instructions: List all materials and chemicals stored in tanks, drums, buckets, and other containers on site. Assess and evaluate these containers and the materials or chemicals they hold for their potential to contribute pollutants to stormwater runoff. The locations of the tank, drums, buckets, and other containers are shown on the SWPPP map.

Material Name / Purpose of Material	Quantity (include units)	Tank Type/Storage Methods/BMPs in Place	Exposed in Last 3 Years? (Yes / No)
No chemicals or materials with potential to contribute to stormwater runoff stored on site.			

Notes: _____

5.1.3 Worksheet #3: Machinery and Equipment Inventory

Instructions: List all machinery that is used or stored on site. Assess and evaluate the machinery for its potential to contribute pollutants to stormwater runoff. The locations of the machinery or equipment are shown on the SWPPP map. If any vehicles, machinery, or equipment are in need of maintenance, they must be confined in a designated area with measures to prevent pollution and the area must be shown on the SWPPP Map.

Machinery/Equipment Purpose	Storage Method/BMPs in Place	Exposed in Last 3 Years? (Yes / No)
Track Hoe (2)	Mobile, drip pans where leaking	Yes
Crusher	Mobile, drip pans where leaking	Yes
Loader	Mobile, drip pans where leaking	Yes
Drill	Mobile, drip pans where leaking	Yes

Notes: _____

5.1.4 Worksheet #4: Section 313 Chemicals

Instructions: List all Section 313 Chemicals that are used or stored on site. Assess and evaluate the 313 chemicals for their potential to contribute pollutants to stormwater runoff. The locations of the 313 Chemicals are shown on the SWPPP map. See Part III E of the MSGP for requirements of 313 Chemicals.

Are there any Section 313 Chemicals on site?

☐ Yes

☒ No

Material Name/ Purpose of Material	Quantity (include units)	Storage Methods/BMPs in Place	Exposed in the Last 3 Years? (Yes / No)	Notes
No Section 313 Chemicals are used or stored on site.				

5.1.5 Worksheet #5: Loading and Unloading Areas

Instructions: Describe the loading and unloading areas located at the facility. Include areas where you will be loading or unloading materials, chemicals, or other items that may contribute pollutants to stormwater runoff.

Describe the Location of the Loading and Unloading Area	What is Loaded or Unloaded at the Location?	BMPs in Place to Prevent Spills or Leaks	Exposed in the Last 3 Years? (Yes / No)
Stockpiles/designated areas near entrance and scale house	Gypsum, overburden	Located in designated areas on site. The stockpiles are kept in place and cleaned up as needed.	Yes
Fueling of vehicles /designated area near entrance and scale house	Fuel	Drip pans and spill kits.	Yes

Notes: _____

5.1.6 Worksheet #6: Outdoor Processing Areas

Instructions: Describe the outdoor processing areas that are located at the facility. Also describe the measures that are in place to prevent leaks, spills, or dust/particles from leaving the site.

Are there any Outdoor Processing Areas on site?

☒ Yes

☐ No

Describe the Location of the Outdoor Processing Area	BMPs in Place to Prevent Dust/Particulates	BMPs in Place to Prevent Spills or Leaks
Moving of Aggregates	Move the aggregate in a manner that prevents kicking up dust	The machinery and equipment are maintained and monitored on a regular basis.
Truck Loading	Move the aggregate in a manner that prevents kicking up dust	The machinery and equipment are maintained and monitored on a regular basis.

Notes: _____

5.1.7 Worksheet #7: Dust Control and Particulate Generating Processes and Vehicle Tracking

Instructions: Describe the dust and particulate generating activities at the facility and the measures taken to minimize them. Describe the dust control and vehicle tracking activities and the measures taken to minimize them. Measures that should be considered include, but are not limited to sprinkling/irrigation, vegetative cover, mulch, wind breaks, tillage, stone, or spray chemicals. Also describe any additional BMPs that may be needed.

Describe the Dust Generating Locations at the Facility	BMPs in Place to Reduce Dust/Particulates
Loading/Unloading of Haul Trucks	Preserve vegetation where possible
Blasting	Preserve vegetation where possible
Excavating	Preserve vegetation where possible

Notes: _____

Include Fugitive Dust Control Plan here if applicable

5.1.8 Worksheet #8: Waste Management

Instructions: Describe the areas at the facility that have waste that needs to be managed. Waste can include but is not limited to trashed, used oils, biproducts from industrial activities.

Describe the Waste Management and Location at the Facility	Waste Products	Storage/BMPs in Place	Exposed in the Last 3 Years? (Yes / No)
Portable toilet	Sanitary Waste	Staked down at opposite corners, located a minimum of 10 feet away from roadways and curb and gutter.	Yes
Garbage Dumpster	Garbage	Dumpster must be covered to prevent debris from being blown away.	Yes

Notes: _____

5.1.9 Worksheet #9: Illicit Connections

Instructions: Describe where shop drains go from the facility. Describe any additional illicit connections that are possible on site.

Are there any illicit connections or connections in question at the facility?

☐ Yes

☒ No

Description of Drains on Site and Where they Drain To	Notes/Describe Any Illicit Connections that Need to be Addressed
None	

5.1.10 Worksheet#10 Detention, Retention, or Sediment Pond Maintenance

Instructions: The detention, retention, and sediment pond maintenance. Maintenance of the detention, retention, or sediment ponds needs to occur at minimum every spring and fall or when the capacity is reduced to 50% by sediment or debris. All maintenance performed on any pond needs to be recorded in the SWPPP. Maintenance records need to be filed each spring and fall at minimum.

Date	Pond Description	Describe Maintenance That Was Performed
N/A	No detention, retention, or sediment ponds located on or near the site.	N/A

5.2 Stormwater Control Measures / Best Management Practices (BMPs)

Section 5.2.1 Minimize Exposure BMPs

BMP Description: Cover Production Area	
Installation Schedule:	Install in designated areas where potential stormwater contaminants will be utilized.
Maintenance and Inspection:	Covering production areas with roofs, buildings, plastic sheeting, etc., reduces material loss from wind, and prevents potential pollutants from coming into contact with storm water. Place materials/stockpiles on elevated surfaces if possible, and use a containment control such as berms, curbs or fiber roll around the outside to prevent stormwater run-on. Inspect frequently for rips, holes, or damage, and repair or replace if needed.
Responsible Staff:	Progressive Contracting, Inc.

BMP Description: Material Management	
Installation Schedule:	To be in place prior to materials being brought onto the project site.
Maintenance and Inspection:	• No material may be stored within 50 feet of a surface water, unless specified in the 404 Permit. • Materials (construction materials, fuel, waste, etc.) must be covered or otherwise stored to prevent contact with rainwater. • Fuels and other vehicle maintenance liquids (antifreeze, motor oil, hydraulic fluid, etc.) shall be stored in water-tight containers in a bermed area in containers compatible with the fuel stored. • Material safety data sheets (MSDS) shall be made available for all materials. • Personnel shall be trained in proper material handling and storage techniques. • Sufficient separation shall be allowed between storage containers to allow for cleanup and emergency response. • Chemically incompatible materials shall not be stored together or in the same storage facility. • All containers and materials shall be properly and legibly labeled. • Hazardous material storage and handling shall comply with applicable regulations and requirements. • Leaks or spills shall be contained and cleaned up immediately using dry methods where possible. • Used spill cleanup materials must be properly disposed. • Do not hose down spills/leaks. • Wastes must be segregated and stored in sealed containers compatible with the material stored.
Responsible Staff:	Progressive Contracting, Inc.
BMP Description: Avoid disturbance to existing vegetation	
Installation Schedule:	Ongoing
Maintenance and Inspection:	All construction personnel should take care to avoid damage to existing vegetation and historical features outside of the work area. Additionally, open construction areas should be minimized.
Responsible Staff:	Progressive Contracting, Inc.

BMP Description: Material Use	
Installation Schedule:	To be in place prior to materials being brought onto the project site.
Maintenance and Inspection:	• MSDSs shall be made available for all materials. • Original labels shall not be removed. Materials shall be re-labeled properly to maintain current, legible labels with proper safety and disposal information. • Less hazardous, recycled, or non-toxic materials shall be used whenever possible. • Used and excess materials shall be recycled and/or properly disposed of. • Materials shall be used only where and when necessary to complete the construction activity. Excess application of materials shall be avoided. • Non-hazardous wastes, such as used aqueous cleaning solutions and contaminated turbine oils, shall be handled by properly licensed contractors and disposed of according to applicable regulations. • Hazardous wastes, such as used solvents and contaminated fuels, shall be handled by properly licensed contractors and disposed of according to applicable regulations. • Pesticides and fertilizers must be used in accordance with manufacture's labeled instructions
Responsible Staff:	Progressive Contracting, Inc.

Section 5.2.2 Pollution Prevention Control BMPs

BMP Description: Drip Pans	
Installation Schedule:	Potential or Existing Areas of Leakage.
Maintenance and Inspection:	Drip pans are positioned below a potential area of leakage as an added safeguard to storm water protection. Drips and leaks from piping, valves, spouts, etc. are caught by using drip pans so that the chemical or fluid may be cleaned-up or recycled easily before contaminating storm water. Drip pans can provide a temporary solution to a drip or leak where a delay in repair or replacement is warranted. Place drip pans in a secure location where they cannot be bumped or spilled but can be removed easily for disposal. Inspect and clean drip pans regularly and replace if any cracks or holes are found. Empty when 1/3 full, using proper methods of disposal.
Responsible Staff:	Progressive Contracting, Inc.

BMP Description: Truck Positioning for Material Transfer	
Installation Schedule:	Designated areas of the site for loading & unloading of materials.
Maintenance and Inspection:	Potential material spills or leaks during loading and unloading. Trucks are positioned correctly prior to material transfer to eliminate or reduce pollutant discharge to storm water via material spills or leaks. A seal or skirt between the building and trailer is used to prevent exposure to rainfall. Cover the material transfer areas to reduce pollutant discharge to storm water and exposure to rainfall. Inspect docks regularly and make repairs if needed. Inspect material transfer equipment regularly for leaks.
Responsible Staff:	Progressive Contracting, Inc.
BMP Description: Secondary Containment for Fuels and Oils	
Installation Schedule:	Potential or Existing Areas of Leakage.
Maintenance and Inspection:	Leakage from Tanks/Drums. Secondary containment systems provide an added safeguard from leaks or spills flowing into larger areas of the site and minimizes clean up. Inspect spill pallets, curbing, or other secondary containment systems regularly for any holes, cracks, breaks, or damage. Repair or replace as needed. Leakage or spills should be cleaned up immediately to prevent storm water pollution.
Responsible Staff:	Progressive Contracting, Inc.
BMP Description: Fueling and Maintenance of Equipment or Vehicles. The EPA BMP is presented in Appendix N.	
Installation Schedule:	These practices will be implemented upon project initiation and continue through project completion.
Maintenance and Inspection:	• If applicable (i.e., greater than 1,320-gal oil capacity onsite), comply with the Spill Prevention, Control, and Countermeasures (SPCC) requirements in 40 CFR 112. • Adequate supplies will be available at all times to handle spills, leaks, and disposal of used liquids. • Use drip pans or absorbent materials under equipment to catch/contain leaks. • Use proper waste or recycling drums for used or spilled fluids; separate and recycle materials when possible. • Dispose or recycle oil and oily wastes in accordance with other federal, state, and local requirements. • Clean up spills or contaminated surfaces immediately, using dry clean up measures where possible, and eliminate the source of the spill to prevent a discharge or a furtherance of an ongoing discharge. • Do not hose down workstations.

	• Vehicles and equipment must be located where any spill of fuel and lubricants cannot reach flowing water. • Perform cleaning, washing, and maintenance in a centralized station offsite where possible. • Designated onsite stations should preferably be located indoors on impervious surfaces where possible. • Eliminate or reduce the amount of toxic or hazardous solvent used where possible. • Do not pour liquid waste onto the ground. • Routinely check vehicles and equipment for leaking oil or fluids. • Proper spill and illicit discharge reporting and cleanup procedures shall be followed for both hazardous and non-hazardous materials.
Responsible Staff:	Progressive Contracting, Inc.

BMP Description: Covering of Stockpiles/Materials	
Installation Schedule:	Install for stockpiles that will remain on site longer than 14 consecutive days.
Maintenance and Inspection:	Covering stockpile areas with roofs, buildings, plastic sheeting, etc., reduces material loss from wind, and prevents potential pollutants from coming into contact with stormwater. Place materials/stockpiles on elevated surfaces if possible, and use a containment control such as berms, curbs or fiber roll around the outside to prevent stormwater run-on. Inspect frequently for rips, holes, or damage, and repair or replace if needed.
Responsible Staff:	Progressive Contracting, Inc.

BMP Description: Earth berms constructed along the top of any slopes steeper than 7 percent to prevent any sediment from runoff from eroding the slope. See BMP Specifications in Appendix N for details regarding placement and construction of the BMP.	
Installation Schedule:	As needed for the duration of site activity or until permanently stabilized.
Maintenance and Inspection:	Monthly, and after a storm event. Remove sediment when it reaches one-third the height of the berms. Repair when damaged.
Responsible Staff:	Progressive Contracting, Inc.

Section 5.2.3 Good Housekeeping BMPs

BMP Description: Construct vehicle track pads at entrance and exit points for the facility. See BMP Specifications in Appendix N for details regarding placement and construction of the BMP.

Installation Schedule:	Must be installed and maintained for the duration of site activity.
Maintenance and Inspection:	Every other week, and after a storm event. Place additional replace gravel when it becomes filled with sediment. Repair when damaged.
Responsible Staff:	Progressive Contracting, Inc.

BMP Description: Street Sweeping

Installation Schedule:	As needed along surrounding streets
Maintenance and Inspection:	Site-specific particles and sediment from leaving the site. Street sweeping is needed as equipment and vehicles track dirt and concrete particles onto the roads.
Responsible Staff:	Progressive Contracting, Inc.

BMP Description: Organize and Clean Site

Installation Schedule:	Designated areas of the site where associated mining activities exist.
Maintenance and Inspection:	Inspect the site on a semi-annual basis. Organize and clean-up Production areas, Tanks/Drums Storage, and Loading/Unloading Areas as needed.
Responsible Staff:	Progressive Contracting, Inc.

BMP Description: Covered Dumpster

Installation Schedule:	Designated areas near scale house
Maintenance and Inspection:	Dumpsters are in place for manufacturing waste on site to prevent trash, blowable debris and other pollutants from entering stormwater. Dumpsters will be emptied prior to trash and debris reaching above the rim of the dumpster. Inspect regularly for leaks, and repair or replace if needed.
Responsible Staff:	Progressive Contracting, Inc.

BMP Description: Trash and Debris Management

Installation Schedule:	Throughout the site
Maintenance and Inspection:	Blowable trash and debris, and discarded parts/equipment. Trash and debris management keeps the site clean and prevents pollutants from entering storm water. All blowable trash must be placed in a covered trash can or bagged and placed in a dumpster. Discarded parts/equipment must be disposed of properly.
Responsible Staff:	Progressive Contracting, Inc.

BMP Description: Sanitary and Septic Waste Management - applies to facilities or designated construction work areas that use temporary or portable sanitary and septic waste system.

Installation Schedule:	To be put in place during mobilization.
Maintenance and Inspection:	- Sanitary wastes will be stored in individual portable port-o-lets, which will be periodically hauled off by a licensed disposer. - Temporary sanitary facilities shall be a minimum of 50 feet located away from drainage ways, inlets, receiving waters, areas of high traffic, and areas susceptible to flooding or damage by construction equipment. - Position portable toilets so that they are secure and will not be tipped or knocked over. - In project areas susceptible to strong winds, temporary sanitary facilities shall be secured to prevent overturning.
Responsible Staff:	Progressive Contracting, Inc.

Section 5.2.4 Preventative Maintenance BMPs

BMP Description: Signs and Labels

Installation Schedule:	Material storage areas, transfer areas, and anywhere labeling information could prevent pollution coming into contact with stormwater.
Maintenance and Inspection:	Drum labeling. Signs and labels provide the name of the material being stored and provide easy recognition. They can also give instructions for use. Labeling can also be effective with organization efforts on large sites. Inspect signs and labels for visibility, wear & tear, and that the information listed is correct. Replace and update if needed.
Responsible Staff:	Progressive Contracting, Inc.

5.3 Sector-Specific Stormwater Control Measures / Best Management Practices (BMPs)

The requirements in Appendix II.J of the UPDES permit are sector-specific and are in addition to the requirements in Parts 1 through 5 of the permit. Where co-located industrial activities occur, the additional conditions and requirements in Appendix II for each of these activates also apply. Refer to Part 1.C of the permit for more information on co-located industrial activities.

The requirements under this section apply to stormwater discharges from activities identified and described as Group 3 in Sector J. Sector J industrial activities are described by the following Standard Industrial Classification (SIC) codes:

Sector J

SIC Code	Description of Industry Sub-sector
Primary:	1400 Mining and quarrying of nonmetallic minerals (no fuels)
Secondary:	1429 Other crushed and broken stone mining and quarrying

SIC information was provided by <http://www.osha.gov/pls/imis/sicsearch.html>.

Sector J Specific Requirements

Pollution Prevention Team
 Description of Potential Pollutant Sources
 Measures and Controls
 Spill and Leak Prevention and Response Procedures
 Inspections
 Employee Training
 Comprehensive Site Compliance Evaluation
 Recordkeeping and Internal Reporting Procedures

5.4 Other Pollution Prevention Practices

BMP Description: Soils where construction will be temporarily stopped, should track-walked to provide a compacted, roughened surface.	
Installation Schedule:	As required
Maintenance and Inspection:	Every other week, and after a storm event.
Responsible Staff:	Progressive Contracting, Inc.

BMP Description: Solid Waste Management - This applies to facilities or designated construction work areas where solid waste is generated. Solid waste can be classified as non-hazardous solid material including: concrete, rock, debris, soil, wood, plastic, fabrics, mortar, metal scraps, Styrofoam, and general litter created by the public, such as, but not limited to, beverage containers and plastic wrappers.	
Installation Schedule:	To be put in place during mobilization.
Maintenance and Inspection:	- Litter shall be minimized in all construction areas and collected on a regular basis into water-tight, predator-proof dumpsters. Trash receptacles shall be provided in various locations within the construction site boundaries. Collected trash shall not be placed near drainage inlets or watercourses. - A trash hauling contractor shall be used to properly dispose of the collected waste in a timely manner. - Dumpster washout at the construction site is not permissible.

	- Storage areas for solid waste shall be located at least 50 feet from drainage ways and watercourses, and shall not be located in areas susceptible to frequent flooding. Sediment barriers such as berms, dikes, or other temporary diversion structures shall be used to prevent stormwater runoff from contacting stored solid waste at the project site. - Solid waste shall be segregated properly into various categories for recycling or disposal. Proper disposal is required for each waste category. - Hazardous or toxic waste must be stored in sealed containers, which are constructed of suitable materials to prevent leakage and corrosion and properly labeled in accordance with RCRA and other applicable regulations. - Hazardous or toxic waste must be stored within a secondary containment structure. - The contractor shall make every attempt to recycle useful vegetation, packaging material, and surplus construction materials when practical. Most construction materials can be recycled at recycling facilities.
Responsible Staff:	Progressive Contracting, Inc.

SECTION 6: Inspections and Monitoring/Sampling

6.1 Routine Facility Inspections

6.1.1. Inspection Personnel: Identify the person(s) who will be responsible for conducting inspections and describe their qualifications:

Landmark Testing and Engineering
Brianna Vasquez, RSI, ECS
435-703-3138
brianna@landmarktesting.com

Landmark Testing and Engineering
Jeff Webb, RSI, ECS
435-319-7073
jeff@landmarktesting.com

See Appendix E for Certifications

6.1.2. Inspection Schedule and Procedures

Sector Specific Inspection Schedule:

- ☐ At least once Monthly, and an Annual Comprehensive Site Compliance Evaluation
- ☒ At least once Quarterly
- ☐ Other (if you want to do a more stringent schedule): _____

6.1.3. Inspection Report

Attach a copy of the inspection report you will use for your site.

See Appendix E

6.2 Inspector Qualifications

Insert the qualifications for all those that will conduct inspections at this facility.

6.3 Quarterly Visual Assessment of Stormwater Discharges

Visual stormwater samples will be taken quarterly if measurable rainfall is received that quarter. The sample will be a grab sample taken within 30 minutes of runoff or within one hour if a sample is not practical within the first 30 minutes. A report stating why the sample could not be taken within the first 30 minutes will be kept with the sample results. The samples will be observed for color, odor, clarity, floating solids, settled solids, suspended solids, foam, oil sheen, and other obvious indicators of stormwater pollution. The date and time the sample was collected will be kept with the sample and included in the sample results. The results will be kept with the pollution prevention plan for at least three years after the permit expires.

When to take samples - when to turn into the state:

Visual samples are required quarterly every year. Monitoring results shall be submitted to the Executive Secretary on signed copies of SWDMR form(s), and be postmarked no later than the last day of the following March (see APPENDIX II.J.10 of the MSGP).

See the Visual SWDMR in Appendix I

6.4 Monitoring / Sampling

Sector Specific Analytical Sampling

Analytical Stormwater Samples (If Required in your Sector)

- For analytical stormwater samples fill out an Analytical SWDMR, a chain of custody letter, and the results of the test from the lab.
- Staple or fasten the SWDMR, the chain of custody letter, and the results of the test.

When to take samples – when to turn into the state:

Analytical samples for Sector J are required quarterly in years 1 and 3 of the permit. Monitoring results shall be submitted to the Executive Secretary on signed copies of SWDMR form(s) postmarked no later than the 31st day of the following March (see APPENDIX II.J.10 of the MSGP).

See the Analytical SWDMR in Appendix J

- Sample for the items in the following tables:

Table J-1.

Concrete and Gypsum Product Manufacturers, and Manufacturers of Mineral and Earth Products (SIC 3271, 3272, 3273, 3275, 3295) Monitoring Requirements

Pollutants of Concern	Benchmark Monitoring Cut-Off Concentration
Total Suspended Solids	100 mg/L
Nitrate plus Nitrite Nitrogen	0.68 mg/L
pH	6.5 to 9.0

6.5 Annual Comprehensive Stormwater Evaluation

The comprehensive site evaluation is to assess and improve on the facility and the SWPPP program to ensure that the proper practices, controls, and BMPs are being used to meet the UPDES requirements and to prevent the discharge of pollutants from this facility. The Comprehensive Site Evaluation will be performed annually and can replace one of the regularly scheduled monthly inspections. Qualified personnel will perform the evaluation and complete a full assessment of the facilities Stormwater controls and the companies Stormwater pollution prevention program. The reports will be maintained with the SWPPP for a minimum of three years after the when a new NOI permit is obtained and will be made available to UDEQ personnel upon request.

During the Annual Comprehensive Stormwater Evaluation, the following assessments will be made and used to create a plan to improve the results of each item:

1. The analytical sampling results
2. The quarterly visual evaluations
3. The implementation of the SWPPP document
4. The inspections for the year
5. The facility and operations for pollutant generating and containment activities
6. New Pollutants at the facility and its operations and how they will be included in the SWPPP
7. The training of the pollution prevention team and facility personnel
8. The overall program at the facility

Insert a copy of the inspection form

6.6 Corrective Actions

Corrective Action Log:

See Appendix F

SECTION 7: DOCUMENTATION TO SUPPORT ELIGIBILITY CONSIDERATIONS UNDER OTHER FEDERAL LAWS

7.1 Documentation Regarding Endangered Species

Endangered and threatened species in Iron County as listed by the U.S. Fish and Wildlife Service:

The following list is of endangered and threatened species in Iron County. The list also includes species of concern, and species receiving special management to keep them off the federal threatened and endangered species list.

Group	Name	Population Location	Status
Birds	California condor (<i>Gymnogyps californianus</i>)	U.S.A. only, except where listed as an experimental population	Endangered
Birds	California condor (<i>Gymnogyps californianus</i>)	U.S.A. (specific portions of Arizona, Nevada, and Utah)	Experimental Population, Non-Essential
Birds	Yellow-billed Cuckoo (<i>Coccyzus americanus</i>)	Western U.S. DPS	Threatened
Birds	Mexican spotted owl (<i>Strix occidentalis lucida</i>)	Wherever found	Threatened
Birds	Southwestern willow flycatcher (<i>Empidonax traillii extimus</i>)	Wherever found	Endangered
Flowering Plants	Autumn Buttercup (<i>Ranunculus aestivalis</i>)	Wherever found	Endangered
Mammals	Utah prairie dog (<i>Cynomys parvidens</i>)	Wherever found	Threatened

Source: <https://ecos.fws.gov/ecp0/reports/species-by-current-range-county?fips=49021>

See Appendix B for additional information.

7.2 Historic Preservation

Are there any historic or culturally sensitive sites present on or near the facility?

☐ Yes

☒ No

If yes then describe: See Appendix B for additional information.

Is there a potential for stormwater runoff or BMPs to affect any historic properties?

☐ Yes

☒ No

If yes then describe: See Appendix B for additional information.

[If yes, then insert the coordination documents with the state historic agency that describes how to prevent problems with the historic properties]

Describe how this determination was made: N/A

The map below shows registered historic properties marked with a purple circle.



7.3 Permit Regulations-Applicable Federal, Tribal, State, or Local Programs

This Project may also be governed by the local MS4 stormwater ordinance. Specific requirements that are different or unique from the State of Utah UPDES permit are outlined below.

MS4 Requirements:

No MS4 in place for Cedar City, UT

Please access the City of Cedar City requirements with the following link:

N/A

7.4 Consistency with Other Plans and Permits

The SWPPP must address any requirements from any other permit as well as any federal, state, or local rules and regulations. The following plans or requirements were considered for the facility:

Plan/Permit/Requirement	Comment
Spill Prevention Control and Countermeasures (SPCC) Plan - This is required if more than 1,320 gallons of petroleum products are stored onsite in aboveground or in certain underground storage tanks and have the potential to reach Waters of the U.S.	No chemicals or materials with potential to contribute to stormwater runoff stored on site.
Clean Air Act Permits - Required for certain industrial activities that have air emissions.	Yes. See Appendix M for more information.
Wetland Permits - Required whenever a facility disturbs more than 0.5 acres of a wetland habitat.	Not applicable
Wastewater Discharge Permit - Required whenever industrial wastewater is discharged to a municipal wastewater treatment facility.	Not applicable
Other UPDES Permits	Not applicable

SECTION 8: TRAINING AND RECORD KEEPING

8.1 Training

Individual(s) Responsible for Training:

Describe Training Conducted:

- General stormwater and BMP awareness training for staff and subcontractors
- Detailed training for staff and subcontractors with specific stormwater responsibilities

Training Attendee Name	Title of Training	Duration	Date of Training

Additional training documentation should be included in Appendix J.

8.2 Recordkeeping

Records will be retained for a minimum period of at least 3 years after the permit is terminated.

See Appendix I for dates.

8.3 Log of Changes to the SWPPP

Log of changes and updates to the SWPPP

See Appendix G

8.4 Facility NOI / NOT Permit

When a NOI is filed, place a signed copy in this section of the SWPPP.

Who May File A Notice of Termination (NOT) Form:

Permittees who are presently covered under the State issued Utah Pollutant Discharge Elimination System (UPDES) General Multi-Sector Permit for Stormwater Discharges Associated with Industrial Activity may submit a Notice of Termination (NOT) form when their facilities no longer have any stormwater discharges associated with industrial activity as defined in the stormwater regulations at UAC R317-8-3.8(b)(c) and (d), or when they are no longer the operator of the facilities.

When a NOT is filed, place a signed copy in this section of the SWPPP.

8.5 Delegation of Authority

Duly Authorized Representative(s) or Position(s):

For a signed delegation of authority form in Appendix K.

SECTION 9: CERTIFICATION

Owner

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name: John Wilson Title: Project Manager
Signature: John Wilson Date: 4/12/23

General Contractor

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

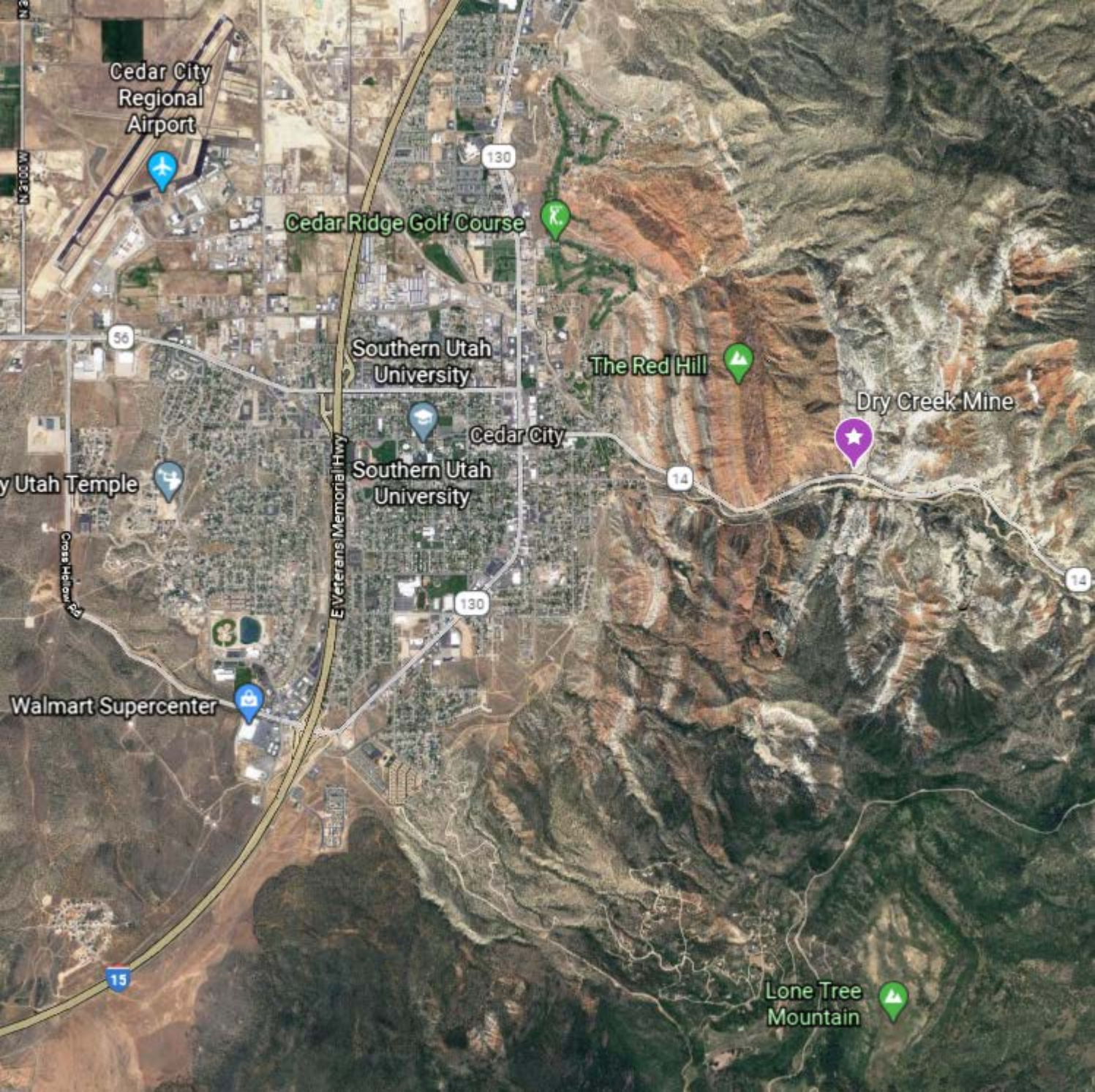
Name: John Wilson Title: Project Manager
Signature: John Wilson Date: 4/12/23

SWPPP APPENDICES

Appendix A:	General Location Map
Appendix B:	Site Maps
Appendix C:	MSGP – Industrial Multi-Sector General Permit
Appendix D:	Appendix II Sector Regulations for Sector Letter
Appendix E:	Inspection Reports
Appendix F:	Corrective Action Log (or in Part 6.3)
Appendix G:	Industrial SWPPP Amendment Log (or in Part 8.3)
Appendix H:	Training Log
Appendix I:	Visual Sample SWDMR
Appendix J:	Analytical Sample SWMDR
Appendix K:	Delegation of Authority
Appendix L:	Subcontractor Certification / Agreement
Appendix M:	Other SWPPP Documentation, Site Notice, Expired Permits, Out of Date SWPPP Items
Appendix N:	BMP Specifications

APPENDIX A

GENERAL LOCATION MAP



Cedar City
Regional
Airport

Cedar Ridge Golf Course

Southern Utah
University

The Red Hill

Dry Creek Mine

Cedar City

Southern Utah
University

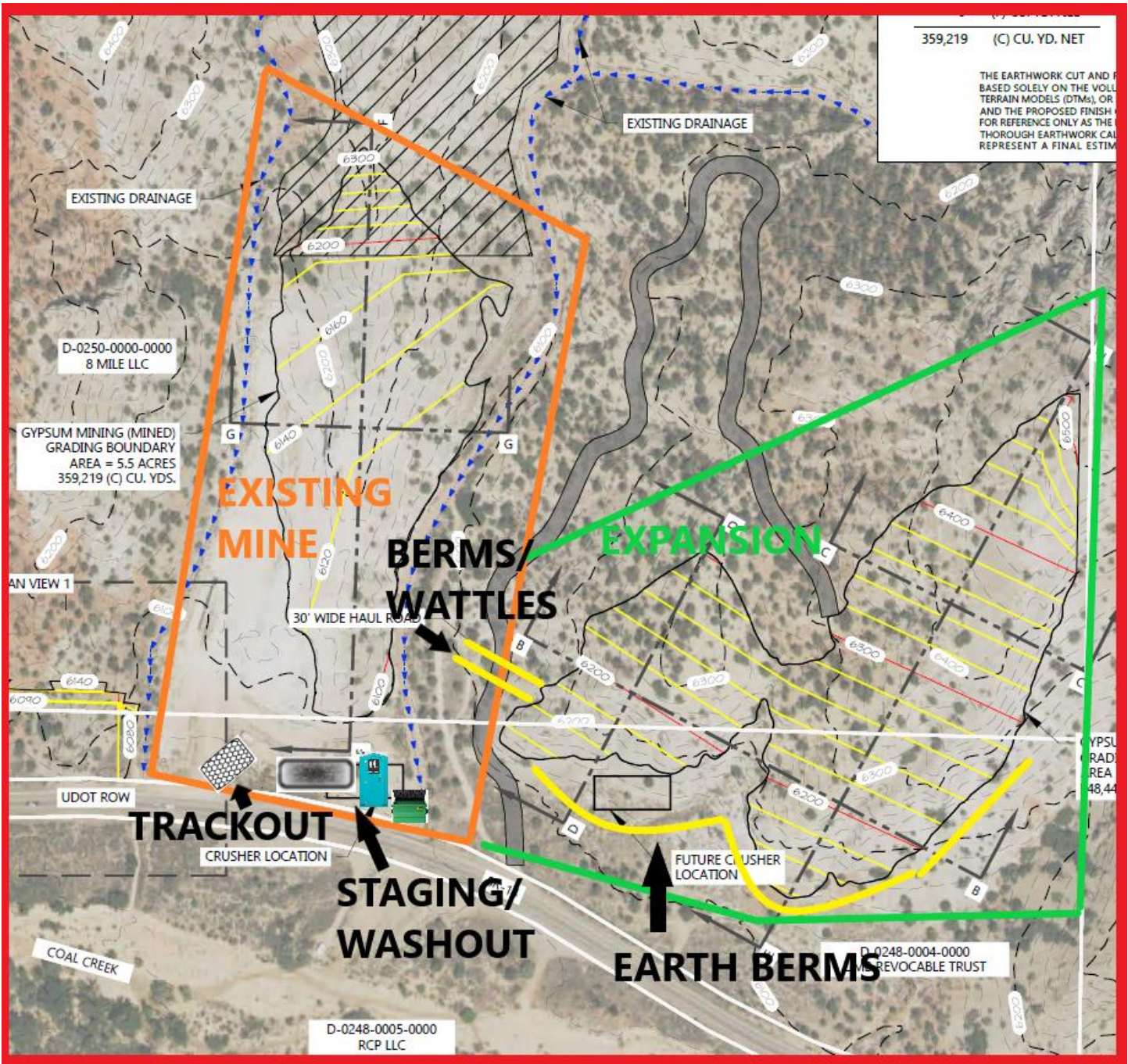
y Utah Temple

Walmart Supercenter

Lone Tree
Mountain

APPENDIX B

SITE MAPS



APPENDIX C

MSGP – INDUSTRIAL MULTI-SECTOR GENERAL PERMIT

APPENDIX D

APPENDIX II SECTOR REGULATIONS FOR SECTOR LETTER

J. Storm Water Discharges Associated With Industrial Activity From Mineral Mining and Processing Facilities.

1. Coverages of This Section.

- a. Discharges Covered Under This Section. This permit covers discharges of storm water associated with industrial activity to waters of the State from active and inactive mineral mining and processing facilities (generally identified by Standard Industrial Classification (SIC) Major Group 14), except for storm water discharges identified under paragraph *1.b.*
- b. Limitations on Coverage. The following storm water discharges associated with industrial activity are not authorized by this permit:
 - 1) Storm water discharges associated with industrial activity which are subject to an existing effluent limitation guideline (*40 CFR Part 436*),
 - 2) Storm water discharges associated with industrial activity from inactive mineral mining activities occurring on Federal lands where an operator cannot be identified are not eligible for coverage under this permit.
- c. Co-Located Construction Activity. This permit may authorize storm water discharges associated with industrial activity that are mixed with storm water discharges associated with construction activities, provided that the storm water discharge from the construction activity is in compliance with the terms, including applicable *Notice of Intent (NOI)* or application requirements, of the *UPDES* general storm water permit for construction activity (Permit No.: *UTR300000*).
- d. Co-Located Industrial Activity. When an industrial facility, described by the above coverage provisions of this section, has industrial activities being conducted onsite that meet the description(s) of industrial activities in another section(s), that industrial facility shall comply with any and all applicable monitoring and pollution prevention plan requirements of the other section(s) in addition to all applicable requirements in this section. The monitoring and pollution prevention plan terms and conditions of this multi-sector permit are additive for industrial activities being conducted at the same industrial facility. The operator of the facility shall determine which other monitoring and pollution prevention plan section(s) of this permit (if any) are applicable to the facility.

2. Special Conditions.

- a. Prohibition of Non-storm Water Discharges. This section of this permit does not cover any discharge subject to process wastewater effluent limitation guidelines, including storm water that combines with process wastewater. *Part II.A.2.* of this permit does allow certain non-storm water discharges to be covered by this permit.

3. Storm Water Pollution Prevention Plan Requirements.

- a. Contents of Plan. The plan shall include at a minimum, the following items:
 - 1) Pollution Prevention Team. Each plan shall identify a specific individual or individuals within the facility organization as members of a storm water Pollution

Prevention Team that are responsible for developing the storm water pollution prevention plan and assisting the facility or plant manager in its implementation, maintenance, and revision. The plan shall clearly identify the responsibilities of each team member. The activities and responsibilities of the team shall address all aspects of the facility's storm water pollution prevention plan.

- 2) Description of Potential Pollutant Sources. Each storm water pollution prevention plan must describe industrial activities, significant materials, and physical features of the facility that may contribute to storm water runoff or, during periods of dry weather, result in dry weather flows and mine pumpout. Plans must describe the following elements:
 - a) Drainage. The plan must contain a map of the site that shows the pattern of storm water drainage, structural or nonstructural features that control pollutants in storm water runoff and process wastewater discharges, surface water bodies (including wetlands), places where significant materials are exposed to rainfall and runoff, and locations of major spills and leaks that occurred in the 3 years prior to the date of the submission of a *Notice of Intent (NOI)* to be covered under this permit. The map also must show areas where the following activities take place: fueling, vehicle and equipment maintenance and/or cleaning, loading and unloading, material storage (including tanks or other vessels used for liquid or waste storage), material processing, and waste disposal, haul roads, access roads, and rail spurs. In addition, the map must indicate the outfall locations and the types of discharges contained in the drainage areas of the outfalls.
 - b) Inventory of Exposed Materials. Facility operators are required to carefully conduct an inspection of the site and related records to identify significant materials that are or may be exposed to storm water. The inventory must address materials that within 3 years prior to the date of the submission of a *Notice of Intent (NOI)* to be covered under this permit have been handled, stored, processed, treated, or disposed of in a manner to allow exposure to storm water. Findings of the inventory must be documented in detail in the pollution prevention plan. At a minimum, the plan must describe the method and location of onsite storage or disposal; practices used to minimize contact of materials with rainfall and runoff; existing structural and nonstructural controls that reduce pollutants in storm water runoff; existing structural controls that limit process wastewater discharges; and any treatment the runoff receives before it is discharged to surface waters or a separate storm sewer system. The description must be updated whenever there is a significant change in the types or amounts of materials or material management practices that may affect the exposure of materials to storm water.
 - c) Significant Spills and Leaks. The plan must include a list of any significant spills and leaks of toxic or hazardous pollutants that occurred in the 3 years prior to the date of the submission of a *Notice of Intent (NOI)* to be covered under this permit. Significant spills include, but are not limited to, releases of oil or hazardous substances in excess of quantities that are reportable under *Section 311 of CWA* (see *40 CFR 110.10* and *117.21*) or *Section 102 of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)* (see *40 CFR 302.4*). Significant spills may also include releases of

oil or hazardous substances that are not in excess of reporting requirements and releases of materials that are not classified as oil or a hazardous substance.

- d) Sampling Data. Any existing data on the quality or quantity of storm water discharges from the facility must be described in the plan. The description should include a discussion of the methods used to collect and analyze the data. Sample collection points should be identified in the plan and shown on the site map.
 - e) Risk Identification and Summary of Potential Pollutant Sources. The description of potential pollution sources culminates in a narrative assessment of the risk potential that sources of pollution pose to storm water quality. This assessment should clearly point to activities, materials, and physical features of the facility that have a reasonable potential to contribute significant amounts of pollutants to storm water. Any such industrial activities, significant materials, or features must be addressed by the measures and controls subsequently described in the plan. In conducting the assessment, the facility operator must consider the following activities: loading and unloading operations; outdoor storage activities; outdoor processing activities; significant dust or particulate generating processes; and onsite waste disposal practices. The assessment must list any significant pollution sources at the site and identify the pollutant parameter or parameters (i.e., total suspended solids, total dissolved solids, etc.) associated with each source.
- 3) Measures and Controls. Following completion of the source identification and assessment phase, the permittee must evaluate, select, and describe the pollution prevention measures, *best management practices (BMPs)*, and other controls that will be implemented at the facility. The permittee must assess the applicability of the following *BMPs* for their site: discharge diversions, drainage/storm water conveyance systems, runoff dispersions, sediment control and collection mechanisms, vegetation/soil stabilization, and capping of contaminated sources. In addition, *BMPs* include processes, procedures, schedules of activities, prohibitions on practices, and other management practices that prevent or reduce the discharge of pollutants in storm water runoff.
- a) The pollution prevention plan must discuss the reasons each selected control or practice is appropriate for the facility and how each will address the potential sources of storm water pollution. The plan also must include a schedule specifying the time or times during which each control or practice will be implemented. In addition, the plan should discuss ways in which the controls and practices relate to one another and, when taken as a whole, produce an integrated and consistent approach for preventing or controlling potential storm water contamination problems.
 - b) Good Housekeeping. Good housekeeping requires the maintenance of areas which may contribute pollutants to storm waters discharges in a clean, orderly manner.
 - c) Preventive Maintenance. The maintenance program requires periodic removal of debris from discharge diversions and conveyance systems. These activities

should be conducted in the spring, after snowmelt, and during the fall season. Permittees using ponds to control their effluents frequently use impoundments or sedimentation ponds as their BAT/BCT. Maintenance schedules for these ponds must be provided in the pollution prevention plan.

- d) Spill Prevention and Response Procedures. Areas where potential spills which can contribute pollutants to storm water discharges can occur, and their accompanying drainage points shall be identified clearly in the storm water pollution prevention plan. Where appropriate, specifying material handling procedures, storage requirements, and use of equipment such as diversion valves in the plan should be considered. Procedures for cleaning up spills shall be identified in the plan and made available to the appropriate personnel. The necessary equipment to implement a clean up should be available to personnel.
- e) Inspections.
 - (1) Facilities, Areas and Frequency. Operators of active facilities are required to conduct quarterly visual inspections of all *BMPs*. Temporarily and permanently inactive operations are required to perform annual inspections. The inspections shall include:
 - (a) an assessment of the integrity of storm water discharge diversions, conveyance systems, sediment control and collection systems, and containment structures;
 - (b) visual inspections of vegetative *BMPs*, serrated slopes, and benched slopes to determine if soil erosion has occurred; and
 - (c) visual inspections of material handling and storage areas and other potential sources of pollution for evidence of actual or potential pollutant discharges of contaminated storm water.
 - (2) Inspection Period and Conditions. The inspection must be made at least once in each designated period during daylight hours unless there is insufficient rainfall or snow-melt to produce a runoff event. Inspections shall be conducted in each of the following periods for the purposes of inspecting storm water quality associated with storm water runoff and snow melt: January through March (storm water runoff or snow melt); April through June(storm water runoff); July through September (storm water runoff); October through December (storm water runoff or snow melt).
- f) Employee Training. Employee training programs shall inform personnel responsible for implementing activities identified in the storm water pollution prevention plan or otherwise responsible for storm water management at all levels of responsibility of the components and goals of the storm water pollution prevention plan. Training should address topics such as spill response, good housekeeping and material management practices. The pollution prevention plan shall identify periodic dates for such training.

- g) Recordkeeping and Internal Reporting Procedures. A description of incidents such as spills or other discharges along with other information describing the quality and quantity of storm water discharges shall be included in the plan required under this part. The permittee must describe procedures for developing and retaining records on the status and effectiveness of plan implementation. The plan must address spills, monitoring, and *BMP* inspection and maintenance activities. Ineffective *BMPs* must be recorded and the date of their corrective action noted.
- h) Non-storm Water Discharges.
- (1) Certification. The plan shall include a certification that the discharge has been tested or evaluated for the presence of non-storm water discharges. The certification shall include the identification of potential significant sources of non-storm water at the site, a description of the results of any test and/or evaluation for the presence of non-storm water discharges, the evaluation criteria or testing method used, the date of any testing and/or evaluation, and the onsite drainage points that were directly observed during the test. Certifications shall be signed in accordance with *Part VI.G.* of this permit. Such certification may not be feasible if the facility operating the storm water discharge associated with industrial activity does not have access to an outfall, manhole, or other point of access to the ultimate conduit which receives the discharge. In such cases, the source identification section of the storm water pollution prevention plan shall indicate why the certification required by this part was not feasible, along with the identification of potential significant sources of non-storm water at the site. A discharger that is unable to provide the certification required by this paragraph must notify the *Director* in accordance with paragraph 3.a.(g)(iii) (Failure to Certify) of this section.
 - (2) Exceptions. Except for flows from fire fighting activities, sources of non-storm water listed in *Part II.A.2.* (Prohibition of Non-storm Water Discharges) of this permit that are combined with storm water discharges associated with industrial activity must be identified in the plan. The plan shall identify and ensure the implementation of appropriate pollution prevention measures for the non-storm water component(s) of the discharge.
 - (3) Failure to Certify. Any facility that is unable to provide the certification required (testing for non-storm water discharges), must notify the *Director* within 180 days after submitting a notice of intent to be covered by this permit. If the failure to certify is caused by the inability to perform adequate tests or evaluations, such notification shall describe: the procedure of any test conducted for the presence of non-storm water discharges; the results of such test or other relevant observations; potential sources of non-storm water discharges to the storm sewer; and why adequate tests for such storm sewers were not feasible. Non-storm water discharges to waters of the State which are not authorized by a *UPDES* permit are unlawful and must be terminated.

- i) Sediment and Erosion Control. The plan shall identify areas which, due to topography, activities, or other factors, have a high potential for significant soil erosion, and identify structural, vegetative, and/or stabilization measures to be used to limit erosion.
 - (1) Permittees must indicate the location and design for proposed *BMPs* to be implemented prior to land disturbance activities. For sites already disturbed but without *BMPs*, the permittee must indicate the location and design of *BMPs* that will be implemented. The permittee is required to indicate plans for grading, contouring, stabilization, and establishment of vegetative cover for all disturbed areas, including road banks. Reclamation activities must continue until final closure notice has been issued.
 - j) Management of Runoff. The plan shall contain a narrative consideration of the appropriateness of traditional storm water management practices (practices other than those which control the generation or source(s) of pollutants) used to divert, infiltrate, reuse, or otherwise manage storm water runoff in a manner that reduces pollutants in storm water discharges from the site. The plan shall provide that measures that the permittee determines to be reasonable and appropriate shall be implemented and maintained. The potential of various sources at the facility to contribute pollutants to storm water discharges associated with industrial activity [see paragraph 3.a.(2) (Description of Potential Pollutant Sources) of this section] shall be considered when determining reasonable and appropriate measures. Appropriate measures may include: vegetative swales and practices, reuse of collected storm water (such as for a process or as an irrigation source), inlet controls (such as oil/water separators), snow management activities, infiltration devices, wet detention/retention devices, or equivalent measures. In addition, the permittee must describe the storm water pollutant source area or activity (i.e., loading and unloading operations, raw material storage piles, etc.) to be controlled by each storm water management practice.
- 4) Comprehensive Site Compliance Evaluation. Qualified personnel shall conduct site compliance evaluations at appropriate intervals specified in the plan, but, in no case less than once a year. When annual compliance evaluations are shown in the plan to be impractical for inactive mining sites, due to remote location and inaccessibility, site evaluations must be conducted at least once every 3 years. Such evaluations shall provide:
- a) Areas contributing to a storm water discharge associated with industrial activity shall be visually inspected for evidence of, or the potential for, pollutants entering the drainage system. Measures to reduce pollutant loadings shall be evaluated to determine whether they are adequate and properly implemented in accordance with the terms of the permit or whether additional control measures are needed. Structural storm water management measures, sediment and erosion control measures, and other structural pollution prevention measures identified in the plan shall be observed to ensure that they are operating correctly. A visual inspection of equipment needed to implement the plan, such as spill response equipment, shall be made.

- b) Based on the results of the evaluation, the description of potential pollutant sources identified in the plan in accordance with paragraph 3.a.(2) (Description of Potential Pollutant Sources) of this section and pollution prevention measures and controls identified in the plan in accordance with paragraph 3.a.(3) (Measures and Controls) of this section shall be revised as appropriate within 2 weeks of such evaluation and shall provide for implementation of any changes to the plan in a timely manner, but in no case more than 12 weeks after the evaluation.
 - c) A report summarizing the scope of the evaluation, personnel making the evaluation, the date(s) of the evaluation, major observations relating to the implementation of the storm water pollution prevention plan, and actions taken in accordance with paragraph 3.a.(4)(b) (above) of the section shall be made and retained as part of the storm water pollution prevention plan for at least 3 years from the date of the evaluation. The report shall identify any incidents of noncompliance. Where a report does not identify any incidents of noncompliance, the report shall contain a certification that the facility is in compliance with the storm water pollution prevention plan and this permit. The report shall be signed in accordance with *Part VI.G.* (Signatory Requirements) of this permit.
 - d) The storm water pollution prevention plan must describe the scope and content of comprehensive site evaluation that qualified personnel will conduct to; 1) confirm the accuracy of the description of potential pollution sources contained in the plan, 2) determine the effectiveness of the plan, and 3) assess compliance with the terms and conditions of the permit. Where compliance evaluation schedules overlap with inspections required under 3.a.(3)(d), the compliance evaluation may be conducted in place of one such inspection.
4. Numeric Effluent Limitations. There are no additional numeric effluent limitations beyond those described in *Part IV.B.* of this permit.
5. Monitoring and Reporting Requirements.
- a. Analytical Monitoring Requirements. During the first and third year of the permit, permittees with dimension and crushed stone, and nonmetallic minerals (except fuels), and sand and gravel mining activities must monitor their storm water discharges associated with industrial activity at least quarterly, except as provided in paragraphs 5.a.(3) (Sampling Waiver), 5.a.(4) (Representative Discharge), and 5.a.(5) (Alternative Certification). Such facilities are required to monitor their storm water discharges for the pollutants of concern listed in Table J-1 below. Facilities must report in accordance with 5.b. (Reporting). In addition to the parameters listed in Table J-1 below, the permittee shall provide the date and duration (in hours) of the storm event(s) sampled; rainfall measurements or estimates (in inches) of the storm event that generated the sampled runoff; the duration between the storm event sampled and the end of the previous measurable (greater than 0.1 inch rainfall) storm event; and an estimate of the total volume (in gallons) of the discharge sampled.

Table J-1.
Monitoring Requirements

Subsector (You may be subject to requirements for more than one sector/subsector)	Parameter	Benchmark Cut-Off Concentration
Sand and Gravel Mining (SIC Codes 1442 and 1446)	Nitrate plus Nitrite Nitrogen	0.68 mg/L
	Total Suspended Solids (TSS)	100 mg/L
Dimension and Crushed Stone and Nonmetallic Minerals (except fuels) (SIC Codes 1411, 1422-1429, 1481, and 1499)	Total Suspended Solids (TSS)	100 mg/L

- 1) Monitoring Periods. Facilities subject to analytical monitoring requirements shall monitor samples collected during the sampling periods of: January through March, April through June, July through September, and October through December for the years specified in paragraph *a.* (above).
- 2) Sample Type. A minimum of one grab sample shall be taken. All such samples shall be collected from the discharge resulting from a storm event that is greater than 0.1 inches in magnitude and that occurs at least 72 hours from the previously measurable (greater than 0.1 inch rainfall) storm event. The required 72-hour storm event interval is waived where the preceding measurable storm event did not result in a measurable discharge from the facility. The required 72-hour storm event interval may also be waived where the permittee documents that less than a 72-hour interval is representative for local storm events during the season when sampling is being conducted. The grab sample shall be taken during the first 30 minutes of the discharge. If the collection of a grab sample during the first 30 minutes is impracticable, a grab sample can be taken during the first hour of the discharge, and the discharger shall submit with the monitoring report a description of why a grab sample during the first 30 minutes was impracticable. If storm water discharges associated with industrial activity commingle with process or nonprocess water, then where practicable permittees must attempt to sample the storm water discharge before it mixes with the non-storm water discharge.
- 3) Sampling Waiver.
 - a) Adverse Conditions. When a discharger is unable to collect samples within a specified sampling period due to adverse climatic conditions, the discharger shall collect a substitute sample from a separate qualifying event in the next period and submit the data along with the data for the routine sample in that period. Adverse weather conditions that may prohibit the collection of samples include weather conditions that create dangerous conditions for personnel (such as local flooding, high winds, hurricanes, tornadoes, electrical storms, etc.) or otherwise make the collection of a sample impracticable (drought, extended frozen conditions, etc.).
 - b) Low Concentration Waiver. When the average concentration for a pollutant

calculated from all monitoring data collected from an outfall during the first year monitoring period is less than the corresponding value for that pollutant listed in Table J-1 under the column Monitoring Cut-Off Concentration, a facility may waive monitoring and reporting requirements in the third year monitoring period. The facility must submit to the *Director*, in lieu of the monitoring data, a certification that there has not been a significant change in industrial activity or the pollution prevention measures in area of the facility that drains to the outfall for which sampling was waived.

- c) Inactive and Unstaffed Site. When a discharger is unable to conduct quarterly chemical storm water sampling at an inactive and unstaffed site, the operator of the facility may exercise a waiver of the monitoring requirements as long as the facility remains inactive and unstaffed. The facility must submit to the *Director*, in lieu of monitoring data, a certification statement on the *Storm Water Discharge Monitoring Report (SWDMR)* stating that the site is inactive and unstaffed so that collecting a sample during a qualifying event is not possible.
- 4) Representative Discharge. When a facility has two or more outfalls that, based on a consideration of industrial activity, significant materials, and management practices and activities within the area drained by the outfall, the permittee reasonably believes discharge substantially identical effluents, the permittee may test the effluent of one of such outfalls and report that the quantitative data also applies to the substantially identical outfall(s) provided that the permittee includes in the storm water pollution prevention plan a description of the location of the outfalls and explains in detail why the outfalls are expected to discharge substantially identical effluents. In addition, for each outfall that the permittee believes is representative, an estimate of the size of the drainage area (in square feet) and an estimate of the runoff coefficient of the drainage area [e.g., low (under 40 percent), medium (40 to 65 percent), or high (above 65 percent)] shall be provided in the plan. The permittee shall include the description of the location of the outfalls, explanation of why outfalls are expected to discharge substantially identical effluents, and estimate of the size of the drainage area and runoff coefficient with the *Storm Water Discharge Monitoring Report (SWDMR)*.
- 5) Alternative Certification. A discharger is not subject to the monitoring requirements of this section provided the discharger makes a certification for a given outfall or on a pollutant-by-pollutant basis in lieu of monitoring reports required under paragraph *b.* below, under penalty of law, signed in accordance with *Part VI.G.* (Signatory Requirements), that material handling equipment or activities, raw materials, intermediate products, final products, waste materials, by-products, industrial machinery or operations, or significant materials from past industrial activity that are located in areas of the facility within the drainage area of the outfall are not presently exposed to storm water and are not expected to be exposed to storm water for the certification period. Such certification must be retained in the storm water pollution prevention plan, and submitted to *DWQ* in accordance with *Part V.B.* of this permit. In the case of certifying that a pollutant is not present, the permittee must submit the certification along with the monitoring reports required under paragraph *b.* below. If the permittee cannot certify for an entire period, they must submit the date exposure was eliminated and any monitoring required up until that date. This certification option is not applicable to compliance monitoring requirements associated with effluent guidelines.

- b. Reporting. Permittees with dimension and crushed stone, sand and gravel or nonmetallic mineral (except fuels) mining facilities shall submit monitoring results for each outfall associated with industrial activity [or a certification in accordance with Sections (3), (4), or (5) above] obtained during the first year reporting period on *Storm Water Discharge Monitoring Report (SWDMR)* form(s) postmarked no later than the 31st day of the following March. Monitoring results [or a certification in accordance with Sections (3), (4), or (5) above] obtained during the third year reporting period, shall be submitted on *SWDMR* form(s) postmarked no later than the 31st day of the following March. For each outfall, one signed *SWDMR* form must be submitted to the *Director* per storm event sampled. Signed copies of *SWDMRs*, or said certifications, shall be submitted to the *Director* at the address listed in *Part V.B.* of the permit.
- 1) Additional Notification. In addition to filing copies of discharge monitoring reports in accordance with paragraph b. (above), sand and gravel mining facilities with at least one storm water discharge associated with industrial activity through a large or medium municipal separate storm sewer system (systems serving a population of 100,000 or more) must submit signed copies of *SWDMRs* to the operator of the municipal separate storm sewer system in accordance with the dates provided in paragraph b. (above).
- c. Quarterly Visual Examination of Storm Water Quality. Mineral mining and processing facilities covered under this sector shall perform and document a visual examination of a storm water discharge associated with industrial activity from each outfall, except discharges exempted below. The examinations must be made at least once in each designated period [described in (1), below] during daylight hours unless there is insufficient rainfall or snow melt to produce a runoff event.
- 1) Visual Monitoring Periods. Examinations shall be conducted in each of the following periods for the purposes of visually inspecting storm water quality associated with storm water runoff or snow melt: January through March; April through June; June through September; and October through December.
- 2) Sample and Data Collection. Examinations shall be made of samples collected within the first 30 minutes (or as soon thereafter as practical, but not to exceed one hour) of when the runoff or snowmelt begins discharging. The examinations shall document observations of color, odor, clarity, floating solids, settled solids, suspended solids, foam, oil sheen, and other obvious indicators of storm water pollution. The examination must be conducted in a well lit area. No analytical tests are required to be performed on the samples. All such samples shall be collected from the discharge resulting from a storm event that is greater than 0.1 inches in magnitude and that occurs at least 72 hours from the previously measurable (greater than 0.1 inch rainfall) storm event. Where practicable, the same individual will carry out the collection and examination of discharges for the life of the permit.
- 3) Adverse Conditions. When a discharger is unable to collect samples over the course of the visual examination period as a result of adverse climatic conditions, the discharger must document the reason for not performing the visual examination and retain this documentation onsite with the records of the visual examinations. Adverse weather conditions which may prohibit the collection of samples include weather conditions that create dangerous conditions for personnel (such as local flooding, high winds,

hurricane, tornadoes, electrical storms, etc.) or otherwise make the collection of a sample impracticable (drought, extended frozen conditions, etc.).

- 4) Visual Storm Water Discharge Examination Reports. Visual examination reports must be maintained onsite in the pollution prevention plan. The report shall include the examination date and time, examination personnel, the nature of the discharge (i.e., runoff or snow melt), visual quality of the storm water discharge (including observations of color, odor, clarity, floating solids, settled solids, suspended solids, foam, oil sheen, and other obvious indicators of storm water pollution), and probable sources of any observed storm water contamination.
- 5) Representative Discharge. When a facility has two or more outfalls that, based on a consideration of industrial activity, significant materials, and management practices and activities within the area drained by the outfall, the permittee reasonably believes discharge substantially identical effluents, the permittee may collect a sample of effluent of one of such outfalls and report that the examination data also applies to the substantially identical outfalls provided that the permittee includes in the storm water pollution prevention plan a description of the location of the outfalls and explaining in detail why the outfalls are expected to discharge substantially identical effluents. In addition, for each outfall that the permittee believes is representative, an estimate of the size of the drainage area (in square feet) and an estimate of the runoff coefficient of the drainage area [e.g., low (under 40 percent), medium (40 to 65 percent), or high (above 65 percent)] shall be provided in the plan.
- 6) Inactive and Unstaffed Site. When a discharger is unable to conduct visual storm water examinations at an inactive and unstaffed site, the operator of the facility may exercise a waiver of the monitoring requirement as long as the facility remains inactive and unstaffed. The facility must maintain a certification with the pollution prevention plan stating that the site is inactive and unstaffed so that performing visual examinations during a qualifying event is not feasible.

APPENDIX E

INSPECTION REPORTS

Stormwater Construction Site Inspection Report

General Information			
Project Name			
NPDES Tracking No.		Location	
Date of Inspection		Start/End Time	
Inspector's Name(s)			
Inspector's Title(s)			
Inspector's Contact Information			
Inspector's Qualifications			
Describe present phase of construction			
Type of Inspection: ☐ Regular ☐ Pre-storm event ☐ During storm event ☐ Post-storm event			
Weather Information			
Has there been a storm event since the last inspection? ☐ Yes ☐ No If yes, provide: Storm Start Date & Time: Storm Duration (hrs): Approximate Amount of Precipitation (in):			
Weather at time of this inspection? ☐ Clear ☐ Cloudy ☐ Rain ☐ Sleet ☐ Fog ☐ Snowing ☐ High Winds ☐ Other: Temperature:			
Have any discharges occurred since the last inspection? ☐ Yes ☐ No If yes, describe:			
Are there any discharges at the time of inspection? ☐ Yes ☐ No If yes, describe:			

Site-specific BMPs

- Number the structural and non-structural BMPs identified in your SWPPP on your site map and list them below (add as many BMPs as necessary). Carry a copy of the numbered site map with you during your inspections. This list will ensure that you are inspecting all required BMPs at your site.
- Describe corrective actions initiated, date completed, and note the person that completed the work in the Corrective Action Log.

	BMP	BMP Installed?	BMP Maintenance Required?	Corrective Action Needed and Notes
1		☐ Yes ☐ No	☐ Yes ☐ No	
2		☐ Yes ☐ No	☐ Yes ☐ No	
3		☐ Yes ☐ No	☐ Yes ☐ No	
4		☐ Yes ☐ No	☐ Yes ☐ No	
5		☐ Yes ☐ No	☐ Yes ☐ No	
6		☐ Yes ☐ No	☐ Yes ☐ No	
7		☐ Yes ☐ No	☐ Yes ☐ No	
8		☐ Yes ☐ No	☐ Yes ☐ No	
9		☐ Yes ☐ No	☐ Yes ☐ No	
10		☐ Yes ☐ No	☐ Yes ☐ No	
11		☐ Yes ☐ No	☐ Yes ☐ No	
12		☐ Yes ☐ No	☐ Yes ☐ No	
13		☐ Yes ☐ No	☐ Yes ☐ No	

	BMP	BMP Installed?	BMP Maintenance Required?	Corrective Action Needed and Notes
14		☐ Yes ☐ No	☐ Yes ☐ No	
15		☐ Yes ☐ No	☐ Yes ☐ No	
16		☐ Yes ☐ No	☐ Yes ☐ No	
17		☐ Yes ☐ No	☐ Yes ☐ No	
18		☐ Yes ☐ No	☐ Yes ☐ No	
19		☐ Yes ☐ No	☐ Yes ☐ No	
20		☐ Yes ☐ No	☐ Yes ☐ No	

Overall Site Issues

Below are some general site issues that should be assessed during inspections. Customize this list as needed for conditions at your site.

	BMP/activity	Implemented?	Maintenance Required?	Corrective Action Needed and Notes
1	Are all slopes and disturbed areas not actively being worked properly stabilized?	☐ Yes ☐ No	☐ Yes ☐ No	
2	Are natural resource areas (e.g., streams, wetlands, mature trees, etc.) protected with barriers or similar BMPs?	☐ Yes ☐ No	☐ Yes ☐ No	
3	Are perimeter controls and sediment barriers adequately installed (keyed into substrate) and maintained?	☐ Yes ☐ No	☐ Yes ☐ No	
4	Are discharge points and receiving waters free of any sediment deposits?	☐ Yes ☐ No	☐ Yes ☐ No	
5	Are storm drain inlets properly protected?	☐ Yes ☐ No	☐ Yes ☐ No	
6	Is the construction exit preventing sediment from being tracked into the street?	☐ Yes ☐ No	☐ Yes ☐ No	
7	Is trash/litter from work areas collected and placed in covered dumpsters?	☐ Yes ☐ No	☐ Yes ☐ No	
8	Are washout facilities (e.g., paint, stucco, concrete) available, clearly marked, and maintained?	☐ Yes ☐ No	☐ Yes ☐ No	

	BMP/activity	Implemented?	Maintenance Required?	Corrective Action Needed and Notes
9	Are vehicle and equipment fueling, cleaning, and maintenance areas free of spills, leaks, or any other deleterious material?	☐ Yes ☐ No	☐ Yes ☐ No	
10	Are materials that are potential stormwater contaminants stored inside or under cover?	☐ Yes ☐ No	☐ Yes ☐ No	
11	Are non-stormwater discharges (e.g., wash water, dewatering) properly controlled?	☐ Yes ☐ No	☐ Yes ☐ No	
12	(Other)	☐ Yes ☐ No	☐ Yes ☐ No	

Non-Compliance

Describe any incidents of non-compliance not described above:

CERTIFICATION STATEMENT

“I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.”

Print name and title: _____

Signature: _____ **Date:** _____

APPENDIX F

CORRECTIVE ACTION LOG

Appendix F B Corrective Action Log

Project Name:
SWPPP Contact:

[illegible]

APPENDIX G

INDUSTRIAL SWPPP AMENDMENT LOG

Appendix G B Industrial SWPPP Amendment Log

Project Name:

SWPPP Contact:

[illegible]

APPENDIX H

TRAINING LOG

Appendix H B SWPPP Training Log

Project Name: _____

Project Location: _____

Instructor=s Name(s): _____

Instructor=s Title(s): _____

Course Location: _____

Date: _____

Course Length (hours): _____

Stormwater Training Topic:

- ~ Erosion Control BMPs
- ~ Sediment Control BMPs
- ~ Non-Stormwater BMPs
- ~ Emergency Procedures
- ~ Good Housekeeping BMPs

Specific Training Objective: _____

Attendee Roster:

No.	Name of Attendee	Company
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

APPENDIX I

VISUAL SAMPLE SWDMR

VISUAL STORM WATER DISCHARGE MONITORING REPORT (SWDMR)

(For additional forms copy this form or contact the DWQ)

IDENTIFICATION & LOCATION

Name: _____

Permit No. UTR: _____

Mailing Address:

Site Location (if different):

Monitoring Period:

From: Month _____ Day _____ Year _____

To: Month _____ Day _____ Year _____

Total Storm Water Discharge Points: _____

Number assigned to this Discharge Point: _____

INDUSTRY SECTOR(s)

Industrial Activities or Industry Sector(s) Drained by this Discharge:

- A. Timber Products Facilities
- B. Paper and allied Products Manufacturing Facilities.
- C. Chemical and allied Products Manufacturing Facilities.
- D. Asphalt paving, Roofing materials, and Lubricant Manufacturing Facilities.
- E. Glass, Clay, Cement, Concrete, and Gypsum Product Manufacturing Facilities.
- F. Primary Metals Facilities.
- G. Metal Mines (Ore Mining and Dressing).
- H. Coal Mines and Coal Mine-Related Facilities.
- I. Oil or Gas Extraction Facilities.
- J. Mineral Mining and Processing Facilities.
- K. Hazardous Waste Treatment Storage or Disposal Facilities.
- L. Landfills and Land Application Sites.
- M. Automobile Salvage Yards.
- N. Scrap Recycling and Waste Recycling Facilities.
- O. Steam Electric Power Generating Facilities.
- P. Motor Freight transportation Facilities, Passenger Transportation Facilities, Petroleum Bulk Oil Stations and Terminals, the United States Postal Service, or Railroad Transportation Facilities.
- Q. Vehicle Maintenance Areas and Equipment Cleaning Areas of Water Transportation Facilities.
- R. Ship or Boat Building and Repair Yards.
- S. Vehicle Maintenance Areas, Equipment Cleaning Areas or Airport Deicing Operations located at Air Transportation Facilities.
- T. Wastewater Treatment Works.
- U. Food and Kindred Products Facilities.
- V. Textile Mills, Apparel and Other Fabric Product Manufacturing Facilities.
- W. Furniture and fixture manufacturing Facilities.
- X. Printing and Publishing Facilities.
- Y. Rubber and Miscellaneous Plastic Product Manufacturing Facilities.
- Z. Leather Tanning and Finishing Facilities
- AA. Facilities That Manufacture Metal Products including Jewelry, Silverware and Plated Ware..
- AB. Facilities That Manufacture Transportation Equipment, Industrial or Commercial Machinery.
- AC. Facilities That Manufacture Electronic and Electrical Equipment and Components, Photographic and Optical Goods.
- AD. Non-Classified Facilities

VISUAL MONITORING REQUIREMENTS

Sample and Data Collection: Visual examinations shall be made of samples collected within the first 30 minutes (or as soon thereafter as practical, but not to exceed one hour) of when the runoff or snowmelt begins discharging. The examinations shall document observations of color, odor, clarity, floating solids, settled solids, suspended solids, foam, oil sheen, and other obvious indicators of storm water pollution. The examination must be conducted in a well-lit area. No analytical tests are required to be performed on the samples. All such samples shall be collected from the discharge resulting from a storm event that is greater than 0.1 inches in magnitude and that occurs at least 72 hours from the previously measurable (greater than 0.1 inch of rainfall) storm event. Where practicable, the same individual should carry out the collection and examination of discharges for the life of the permit.

Date of Examination	Month: _____ Day: _____ Year: _____
Time of Examination	AM / PM (circle)
Total Storm Water Discharge Points: _____	Number Assigned to this Discharge Point: _____
Examination Personnel	
Probable Source of Observed Stormwater Contamination	

COLOR (Circle the one that apply):

1. Identification of Color:

- | | | |
|--|--|--|
| ☐ Black Brown | ☐ Dark Chocolate Brown | ☐ Medium Brown |
| ☐ Light Brown | ☐ Tan | ☐ Other _____ |
| ☐ Dark Grey | ☐ Medium Grey Yellow | |
| ☐ Light Grey-Green | | |

2. Intensity of Color:

- | | |
|--|--|
| ☐ Perceptible | ☐ Moderately Perceptible |
| ☐ Very Intense Prominent | ☐ Hardly Perceptible |

Comments: _____

CLARITY (Circle the right one):

☐ *Totally Opaque*

☐ *Translucent*

☐ *Nearly Transparent*

☐ *Slightly Translucent*

☐ *Transparent*

ODOR (Circle the ones that apply):

☐ *Diesel*

☐ *Musty*

☐ *Sulfur*

☐ *Gasoline*

☐ *Sewage*

☐ *No Odor*

☐ *Petroleum*

☐ *Chlorine*

☐ *Noxious*

☐ *Solvent*

☐ *Rotten Egg*

☐ *Other* _____

Comments: _____

SOLIDS:

Floating Solids (Description): _____

Suspended and Settled Solids (Description): _____

**FOAM, OIL, SHEEN OR OTHER OBVIOUS
INDICATORS OF POLLUTION:**

[illegible]

U.S.C. 1001 and 33 U.S.C. 1319. (penalties under these statutes may include fines up to \$10,000 and or maximum imprisonment of between 6 months and 5 years)

[illegible]

INFORMATION

Adverse Weather Waiver. When a discharger is unable to collect samples within a specified sampling period due to adverse climatic conditions, the discharger shall collect a substitute sample from a separate qualifying event in the next period and submit the data along with data for the routine sample in that period. Adverse weather conditions that may prohibit the collection of samples include weather conditions that create dangerous conditions for personnel (such as local flooding, high winds, hurricanes, tornadoes, electrical storms, etc.) or otherwise make the collection of a sample impracticable (drought, extended frozen conditions, etc.).

Exemption to Monitoring Requirements. (Does not apply to sector S or any Visual Monitoring Requirements.) As an alternative to monitoring an outfall, an annual certification may be made that material handling equipment or activities; raw or waste materials; intermediate, final or by-products; industrial machinery or operations; and significant materials from past industrial activity that are located in areas of the facility within the drainage area of the outfall are not presently exposed to storm water and will not be exposed to storm water for the certification period. Such certification must be retained in the storm water pollution prevention plan, and submitted to the DWQ in accordance with Part V.B of the permit. In the case of certifying that a pollutant is not present, the permittee must submit the certification along with the monitoring reports required under reporting requirements in the sector. If the permittee cannot certify for an entire period, they must submit the date exposure was eliminated and any monitoring required up until that date. This certification option is not applicable to compliance monitoring requirements associated with effluent limitations.

When to Monitor and Report. Samples must be collected and analyzed at least once during each three month monitoring period. Monitoring results must be submitted annually. See Reporting for dates.

More Frequent Monitoring. If sampling is conducted more frequently than semi-annually, all sampling results must be submitted. A separate SWDMR is required for each storm event sampled.

How to Report. A separate SWDMR form is required for each storm event and for each outfall sampled. SWDMRs must be

signed and mailed to the Division of Water Quality, and must be postmarked by the date specified under Monitoring Periods and Reporting Deadlines. The permittee should retain a copy. The address and phone number for questions or to mail the SWDMR is:

Department of Environmental Quality
Division of Water Quality
Attention: Industrial Storm Water Program
Coordinator
PO Box 144870
Salt Lake City, UT 84114-4870

801.536.4300

Substantially Identical Discharges. If there is a reason to believe that the discharges from two or more outfalls are substantially identical, one of the outfalls may be monitored and that data submitted for all substantially identical outfalls. A description of the location of the outfalls, an explanation of why the outfalls have substantially identical discharges, and the size of the drainage area and runoff coefficient must be an attachment to the SWDMR.

APPENDIX J

ANALYTICAL SAMPLE SWMDR

ANALYTICAL STORM WATER DISCHARGE MONITORING REPORT (SWDMR)

(For additional forms copy this form or contact the DWQ)

IDENTIFICATION & LOCATION

Name: _____

Permit No. UTR: _____

Mailing Address:

Site Location (if different):

Monitoring Period:

From: Month _____ Day _____ Year _____

To: Month _____ Day _____ Year _____

Total Storm Water Discharge Points: _____

Number assigned to this Discharge Point: _____

INDUSTRY SECTOR(s)

Industrial Activities or Industry Sector(s) Drained by this Discharge:

- A. Timber Products Facilities
- B. Paper and allied Products Manufacturing Facilities.
- C. Chemical and allied Products Manufacturing Facilities.
- D. Asphalt paving, Roofing materials, and Lubricant Manufacturing Facilities.
- E. Glass, Clay, Cement, Concrete, and Gypsum Product Manufacturing Facilities.
- F. Primary Metals Facilities.
- G. Metal Mines (Ore Mining and Dressing).
- H. Coal Mines and Coal Mine-Related Facilities.
- I. Oil or Gas Extraction Facilities.
- J. Mineral Mining and Processing Facilities.
- K. Hazardous Waste Treatment Storage or Disposal Facilities.
- L. Landfills and Land Application Sites.
- M. Automobile Salvage Yards.
- N. Scrap Recycling and Waste Recycling Facilities.
- O. Steam Electric Power Generating Facilities.
- P. Motor Freight transportation Facilities, Passenger Transportation Facilities, Petroleum Bulk Oil Stations and Terminals, the United States Postal Service, or Railroad Transportation Facilities.
- Q. Vehicle Maintenance Areas and Equipment Cleaning Areas of Water Transportation Facilities.
- R. Ship or Boat Building and Repair Yards.
- S. Vehicle Maintenance Areas, Equipment Cleaning Areas or Airport Deicing Operations located at Air Transportation Facilities.
- T. Wastewater Treatment Works.
- U. Food and Kindred Products Facilities.
- V. Textile Mills, Apparel and Other Fabric Product

- Manufacturing Facilities.
- W. Furniture and fixture manufacturing Facilities.
- X. Printing and Publishing Facilities.
- Y. Rubber and Miscellaneous Plastic Product Manufacturing Facilities.
- Z. Leather Tanning and Finishing Facilities
- AA. Facilities That Manufacture Metal Products including Jewelry, Silverware and Plated Ware..
- AB. Facilities That Manufacture Transportation Equipment, Industrial or Commercial Machinery.
- AC. Facilities That Manufacture Electronic and Electrical Equipment and Components, Photographic and Optical Goods.
- AD. Non-Classified Facilities

ANALYTICAL MONITORING DATA

(For sectors where it is required)

Storm Event: *All samples shall be collected from the discharge resulting from a storm event that is greater than 0.1 inches in magnitude and that occurs at least 72 hours from an event. This data must be submitted to the Division of Water Quality.*

Please <i>circle</i> if there has been no discharge of Stormwater during this reporting period. (If none please explain in comment section)	NO Discharge
---	---------------------

Date of Storm Event	Month: _____ Day: _____ Year: _____
Duration of Storm Event	Hours
Rainfall Measurement	Inches
Time Elapsed Between Previous Storm Event and Current Recorded Storm Event	Days
Estimated Total Volume of Discharge (Indicate units; gal., etc.)	

Sample Type: *Data shall be reported for a grab sample taken during the first thirty minutes of the discharge. If the collection of a grab sample during the first thirty minutes is impracticable, a grab sample can be taken during the first hour of the discharge, and the discharger shall submit with the monitoring report a description of why a grab sample during the first thirty minutes was impracticable.*

[illegible]

SIGNATURE

Name/Title Principle Executive Officer
(Typed or Printed)

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations. See 18

U.S.C. 1001 and 33 U.S.C. 1319. (penalties under these statutes may include fines up to \$10,000 and or maximum imprisonment of between 6 months and 5 years)

***Signature of Principle Executive
Officer or Authorized Agent***

Date

Comments: _____

[illegible]

INFORMATION

Adverse Weather Waiver. When a discharger is unable to collect samples within a specified sampling period due to adverse climatic conditions, the discharger shall collect a substitute sample from a separate qualifying event in the next period and submit the data along with data for the routine sample in that period. Adverse weather conditions that may prohibit the collection of samples include weather conditions that create dangerous conditions for personnel (such as local flooding, high winds, hurricanes, tornadoes, electrical storms, etc.) or otherwise make the collection of a sample impracticable (drought, extended frozen conditions, etc.).

Exemption to Monitoring Requirements. (Does not apply to sector S or any Visual Monitoring Requirements.) As an alternative to monitoring an outfall, an annual certification may be made that material handling equipment or activities; raw or waste materials; intermediate, final or by-products; industrial machinery or operations; and significant materials from past industrial activity that are located in areas of the facility within the drainage area of the outfall are not presently exposed to storm water and will not be exposed to storm water for the certification period. Such certification must be retained in the storm water pollution prevention plan, and submitted to the DWQ in accordance with Part V.B of the permit. In the case of certifying that a pollutant is not present, the permittee must submit the certification along with the monitoring reports required under reporting requirements in the sector. If the permittee cannot certify for an entire period, they must submit the date exposure was eliminated and any monitoring required up until that date. This certification option is not applicable to compliance monitoring requirements associated with effluent limitations.

When to Monitor and Report. Samples must be collected and analyzed at least once during each three-month monitoring period. Monitoring results must be submitted annually. See Reporting for dates.

More Frequent Monitoring. If sampling is conducted more frequently than semi-annually, all sampling results must be submitted. A separate SWDMR is required for each storm event sampled.

How to Report. A separate SWDMR form is required for each storm event and for each outfall sampled. SWDMRs must be

signed and mailed to the Division of Water Quality, and must be postmarked by the date specified under Monitoring Periods and Reporting Deadlines. The permittee should retain a copy. The address and phone number for questions or to mail the SWDMR is:

Department of Environmental
Quality Division of Water Quality
Attention: Industrial Storm Water
Program Coordinator
PO Box 144870
Salt Lake City, UT 84114-4870

801.536.4300

Substantially Identical Discharges. If there is a reason to believe that the discharges from two or more outfalls are substantially identical, one of the outfalls may be monitored and that data submitted for all substantially identical outfalls. A description of the location of the outfalls, an explanation of why the outfalls have substantially identical discharges, and the size of the drainage area and runoff coefficient must be included as an attachment to the SWDMR.

APPENDIX K

DELEGATION OF AUTHORITY

Appendix K B Delegation of Authority Form

Delegation of Authority

I, John Wilson, hereby designate the person or specifically described position below to be a duly authorized representative for the purpose of overseeing compliance with environmental requirements, including the Construction General Permit, at the _____ construction site. The designee is authorized to sign any reports, stormwater pollution prevention plans and all other documents required by the permit.

Name and Title:

James Armstrong

Company:

Landmark Testing & Engineering

Address:

795 E. Factory Dr.
St. George, UT 84790

Phone:

435-730-4629

By signing this authorization, I confirm that I meet the requirements to make such a designation as set forth in UTRC 0000 (Reference State Permit), and that the designee above meets the definition of a duly authorized representative as set forth in UTRC 0000 (Reference State Permit).

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name:

John Wilson

Company:

PCL

Title:

Project Manager

Signature:

John Wilson

Date:

4-12-23

APPENDIX L

SUBCONTRACTOR CERTIFICATIONS / AGREEMENTS

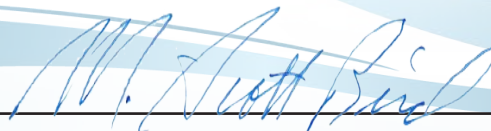
Certified

under the direction of
The Utah Chapter of the American Public Works Association
and the
Utah Storm Water Committee
in coordination with the
State of Utah Department of Environmental Quality, Division of Water Quality

James Armstrong

has passed the competency examination, and met all further requirements,
to qualify as a

Registered SWPPP Writer



M. Scott Bird, USWAC Chair

Jul 8, 2023

Expires

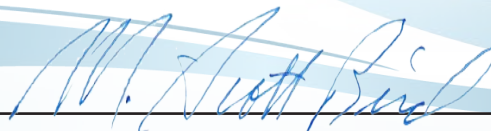
Certified

under the direction of
The Utah Chapter of the American Public Works Association
and the
Utah Storm Water Committee
in coordination with the
State of Utah Department of Environmental Quality, Division of Water Quality

James Armstrong

has passed the competency examination, and met all further requirements,
to qualify as a

Registered Storm Water Inspector



M. Scott Bird, USWAC Chair

Apr 1, 2023

Expires

Appendix L B Subcontractor Certifications/Agreements

SUBCONTRACTOR CERTIFICATION STORMWATER POLLUTION PREVENTION PLAN

Project Number: _____

Project Title: _____

Operator(s): _____

As a subcontractor, you are required to comply with the Stormwater Pollution Prevention Plan (SWPPP) for any work that you perform on-site. Any person or group who violates any condition of the SWPPP may be subject to substantial penalties or loss of contract. You are encouraged to advise each of your employees working on this project of the requirements of the SWPPP. A copy of the SWPPP is available for your review at the office trailer.

Each subcontractor engaged in activities at the construction site that could impact stormwater must be identified and sign the following certification statement:

I certify under the penalty of law that I have read and understand the terms and conditions of the SWPPP for the above designated project and agree to follow the BMPs and practices described in the SWPPP.

This certification is hereby signed in reference to the above-named project:

Company: _____

Address: _____

Telephone Number: _____

Type of construction service to be provided: _____

Signature: _____

Title: _____

Date: _____

APPENDIX M

**OTHER SWPPP DOCUMENTATION, SITE NOTICE, EXPIRED PERMITS, OUT OF
DATE SWPPP ITEMS**

Table II. EPCRA Section 313 Chemical List For Reporting Year 2017 (including Toxic Chemical Categories)

Individually listed EPCRA Section 313 chemicals with CAS numbers are arranged alphabetically starting on page II-3. Following the alphabetical list, the EPCRA Section 313 chemicals are arranged in CAS number order. Covered chemical categories follow.

Note: Chemicals may be added to or deleted from the list. The Emergency Planning and Community Right-to-Know Call Center or the TRI-Listed Chemicals website will provide up-to-date information on the status of these changes. See section B.3.c of the instructions for more information on the *de minimis* % limits listed below. There are no *de minimis* levels for PBT chemicals since the *de minimis* exemption is not available for these chemicals (an asterisk appears where a *de minimis* limit would otherwise appear in Table II). However, for purposes of the supplier notification requirement only, such limits are provided in Appendix C.

Chemical Qualifiers

Certain EPCRA Section 313 chemicals listed in Table II have parenthetical “qualifiers.” These qualifiers indicate that these EPCRA Section 313 chemicals are subject to the section 313 reporting requirements if manufactured, processed, or otherwise used in a specific form or when a certain activity is performed. An EPCRA Section 313 chemical that is listed without a qualifier is subject to reporting in all forms in which it is manufactured, processed, and otherwise used. The following chemicals are reportable only if they are manufactured, processed, or otherwise used in the specific form(s) listed below:

Chemical/ Chemical Category	CAS Number	Qualifier
Aluminum (fume or dust)	7429-90-5	<u>Only</u> if it is a fume or dust form.
Aluminum oxide (fibrous forms)	1344-28-1	<u>Only</u> if it is a fibrous form.
Ammonia (includes anhydrous ammonia and aqueous ammonia from water dissociable ammonium salts and other sources; 10 percent of total aqueous ammonia is reportable under this listing)	7664-41-7	<u>Only</u> 10% of aqueous forms. 100% of anhydrous forms.
Asbestos (friable)	1332-21-4	<u>Only</u> if it is a friable form.
Hydrochloric acid (acid aerosols including mists, vapors, gas, fog, and other airborne forms of any particle size)	7647-01-0	<u>Only</u> if it is an aerosol form as defined.
Nitrate compounds (water dissociable; reportable only when in aqueous solution)	NA	<u>Only</u> if in aqueous solution
Phosphorus (yellow or white)	7723-14-0	<u>Only</u> if it is a yellow or white form.
Sulfuric acid (acid aerosols including mists, vapors, gas, fog, and other airborne forms of any particle size)	7664-93-9	<u>Only</u> if it is an aerosol form as defined.
Vanadium (except when contained in an alloy)	7440-62-2	<u>Except</u> if it is contained in an alloy.
Zinc (fume or dust)	7440-66-6	<u>Only</u> if it is in a fume or dust form.

The qualifier for the following three chemicals is based on the chemical activity rather than the form of the chemical. These chemicals are subject to EPCRA section 313 reporting requirements only when the indicated activity is performed.

Chemical/ Chemical Category	CAS Number	Qualifier
Dioxin and dioxin-like compounds (manufacturing; and the processing or otherwise use of dioxin and dioxin-like compounds if the dioxin and dioxin-like compounds are present as contaminants in a chemical and if they were created during the manufacture of that chemical.)	NA	<u>Only</u> if they are manufactured at the facility; or are processed or otherwise used when present as contaminants in a chemical but only if they were created during the manufacture of that chemical.
Isopropyl alcohol (only persons who manufacture by the strong acid process are subject, no supplier notification)	67-63-0	<u>Only</u> if it is being manufactured by the strong acid process. Facilities that process or otherwise use isopropyl alcohol are <u>not</u> covered and should <u>not</u> file a report.
Saccharin (only persons who manufacture are subject, no supplier notification)	81-07-2	<u>Only</u> if it is being manufactured.

Supplier Notification Implications

There are no supplier notification requirements for isopropyl alcohol and saccharin since the processors and users of these chemicals are not required to report. Manufacturers of these chemicals do not need to notify their customers that these are reportable EPCRA section 313 chemicals.

Qualifier Definitions

Fume or dust. Two of the metals on the list (aluminum and zinc) contain the qualifier “fume or dust.” Fume or dust refers to dry forms of these metals but does not refer to “wet” forms such as solutions or slurries. As explained in Section B.3.a of these instructions, the term manufacture includes the generation of an EPCRA Section 313 chemical as a byproduct or impurity. In such cases, a facility should determine if, for example, it generated more than 25,000 pounds of aluminum fume or dust in the reporting year as a result of its activities. If so, the facility must report that it manufactures “aluminum (fume or dust).” Similarly, there may be certain technologies in which one of these metals is processed in the form of a fume or dust to make other EPCRA Section 313 chemicals or other products for distribution in commerce. In reporting releases, the facility would only report releases of the fume or dust.

EPA considers dusts to consist of solid particles generated by any mechanical processing of materials including crushing, grinding, rapid impact, handling, detonation, and decrepitation of organic and inorganic materials such as rock, ore, and metal. Dusts do not tend to flocculate, except under electrostatic forces.

EPA considers a fume to be an airborne dispersion consisting of small solid particles created by condensation from a gaseous state, in distinction to a gas or vapor. Fumes arise from the heating of solids such as lead. The condensation is often accompanied by a chemical reaction, such as oxidation. Fumes flocculate and sometimes coalesce.

Manufacturing qualifiers. Two of the entries in the EPCRA Section 313 chemical list contain a qualifier relating to manufacture. For isopropyl alcohol, the qualifier is “only persons who manufacture by the strong acid process are subject, no supplier notification.” For saccharin, the qualifier is “only persons who manufacture are subject, no supplier notification.” For isopropyl alcohol, the qualifier means that only facilities manufacturing isopropyl alcohol by the strong acid process are required to report. In the case of saccharin, only manufacturers of the EPCRA Section 313 chemical are subject to the reporting requirements. A facility that only processes or otherwise uses either of these EPCRA Section 313 chemicals is not required to report for these EPCRA Section 313 chemicals. In both cases, supplier notification does not apply because only manufacturers, not users, of these two EPCRA Section 313 chemicals must report.

Ammonia (includes anhydrous ammonia and aqueous ammonia from water dissociable ammonium salts and other sources; 10 percent of total aqueous ammonia is reportable under this listing). The qualifier for ammonia means that anhydrous forms of ammonia are 100% reportable and aqueous forms are limited to 10% of total aqueous ammonia. Therefore, when determining threshold and releases and other waste management quantities all anhydrous ammonia is included but only 10% of total aqueous ammonia is included. Any evaporation of ammonia from aqueous ammonia solutions is considered anhydrous ammonia and should be included in threshold determinations and release and other waste management calculations.

Sulfuric acid and Hydrochloric acid (acid aerosols including mists, vapors, gas, fog, and other airborne forms of any particle size). The qualifier for sulfuric acid and hydrochloric acid means that the only forms of these chemicals that are reportable are airborne forms. Aqueous solutions are not covered by this listing but any aerosols generated from aqueous solutions are covered.

Nitrate compounds (water dissociable; reportable only when in aqueous solution). The qualifier for the nitrate compounds category limits the reporting to nitrate compounds that dissociate in water, generating nitrate ion. For the purposes of threshold determinations, the entire weight of the nitrate compound must be included in all calculations. For the purposes of reporting releases and other waste management quantities only the weight of the nitrate ion should be included in the calculations of these quantities.

Phosphorus (yellow or white). The listing for phosphorus is qualified by the term “yellow or white.” This means that only manufacturing, processing, or otherwise use of phosphorus in the yellow or white chemical form triggers reporting. Conversely, manufacturing, processing, or otherwise use of “black” or “red” phosphorus does not trigger reporting. Supplier notification also applies only to distribution of yellow or white phosphorus.

Asbestos (friable). The listing for asbestos is qualified by the term “friable,” referring to the physical characteristic of being able to be crumbled, pulverized, or reducible to a powder with hand pressure. Only manufacturing, processing, or otherwise use of asbestos in the friable form triggers reporting. Supplier notification applies only to distribution of mixtures or other trade name products containing friable asbestos.

Aluminum Oxide (fibrous forms). The listing for aluminum oxide is qualified by the term “fibrous forms.” Fibrous refers to a man-made form of aluminum oxide that is processed to produce strands or filaments which can be cut to various lengths depending on the application. Only manufacturing, processing, or otherwise use of aluminum oxide in the fibrous form triggers reporting. Supplier notification applies only to distribution of mixtures or other trade name products containing fibrous forms of aluminum oxide.

Table II. EPCRA Section 313 Chemical List for Reporting Year 2017

Notes for Sections A and B of following list of TRI chemicals:

“Color Index” indicated by “C.I.”

* There are no *de minimis* levels for PBT chemicals, except for supplier notification purposes (see Appendix C).

**a. Individually-Listed Toxic Chemicals
Arranged Alphabetically**

CAS Number	Chemical Name	De minimis % Limit
71751-41-2	Abamectin [Avermectin B1]	1.0
30560-19-1	Acephate (Acetylphosphoramidothioic acid O,S-dimethyl ester)	1.0
75-07-0	Acetaldehyde	0.1
60-35-5	Acetamide	0.1
75-05-8	Acetonitrile	1.0
98-86-2	Acetophenone	1.0
53-96-3	2-Acetylaminofluorene	0.1
62476-59-9	Acifluorfen, sodium salt [5-(2-Chloro-4-(trifluoromethyl)phenoxy)-2-nitrobenzoic acid, sodium salt]	1.0
107-02-8	Acrolein	1.0
79-06-1	Acrylamide	0.1
79-10-7	Acrylic acid	1.0
107-13-1	Acrylonitrile	0.1
15972-60-8	Alachlor	1.0
116-06-3	Aldicarb	1.0
309-00-2	Aldrin	*
	[1,4:5,8-Dimethanonaphthalene, 1,2,3,4,10,10-hexachloro-1,4,4a,5,8,8a-hexahydro-(1 α ,4 α ,4a β ,5 α ,8 α ,8a β)-]	
28057-48-9	d-trans-Allethrin [d-trans-Chrysanthemic acid of d-allethrine]	1.0
107-18-6	Allyl alcohol	1.0
107-11-9	Allylamine	1.0
107-05-1	Allyl chloride	1.0
7429-90-5	Aluminum (fume or dust)	1.0
20859-73-8	Aluminum phosphide	1.0
1344-28-1	Aluminum oxide (fibrous forms)	1.0
834-12-8	Ametryn (N-Ethyl-N'-(1-methylethyl)-6-(methylthio)-1,3,5-triazine-2,4-diamine)	1.0
117-79-3	2-Aminoanthraquinone	0.1
60-09-3	4-Aminoazobenzene	0.1
92-67-1	4-Aminobiphenyl	0.1
82-28-0	1-Amino-2-methylanthraquinone	0.1
81-49-2	1-Amino-2,4-dibromoanthraquinone	0.1

CAS Number	Chemical Name	De minimis % Limit
33089-61-1	Amitraz	1.0
61-82-5	Amitrole	0.1
7664-41-7	Ammonia (includes anhydrous ammonia and aqueous ammonia from water dissociable ammonium salts and other sources; 10 percent of total aqueous ammonia is reportable under this listing)	1.0
101-05-3	Anilazine [4,6-Dichloro-N-(2-chlorophenyl)-1,3,5-triazin-2-amine]	1.0
62-53-3	Aniline	1.0
90-04-0	o-Anisidine	0.1
104-94-9	p-Anisidine	1.0
134-29-2	o-Anisidine hydrochloride	0.1
120-12-7	Anthracene	1.0
7440-36-0	Antimony	1.0
7440-38-2	Arsenic	0.1
1332-21-4	Asbestos (friable)	0.1
1912-24-9	Atrazine (6-Chloro-N-ethyl-N'-(1-methylethyl)-1,3,5-triazine-2,4-diamine)	1.0
7440-39-3	Barium	1.0
22781-23-3	Bendiocarb [2,2-Dimethyl-1,3-benzodioxol-4-ol methylcarbamate]	1.0
1861-40-1	Benfluralin (N-Butyl-N-ethyl-2,6-dinitro-4-(trifluoromethyl)benzenamine)	1.0
17804-35-2	Benomyl	1.0
98-87-3	Benzal chloride	1.0
55-21-0	Benzamide	1.0
71-43-2	Benzene	0.1
92-87-5	Benzidine	0.1
98-07-7	Benzoic trichloride (Benzo trichloride)	0.1
191-24-2	Benzo(g,h,i)perylene	*
98-88-4	Benzoyl chloride	1.0
94-36-0	Benzoyl peroxide	1.0
100-44-7	Benzyl chloride	1.0
7440-41-7	Beryllium	0.1
82657-04-3	Bifenthrin	1.0
92-52-4	Biphenyl	1.0
3296-90-0	2,2-bis(Bromomethyl)-1,3-propanediol	0.1
111-91-1	Bis(2-chloroethoxy)methane	1.0
111-44-4	Bis(2-chloroethyl)ether	1.0
542-88-1	Bis(chloromethyl)ether	0.1
108-60-1	Bis(2-chloro-1-methylethyl)ether	1.0
56-35-9	Bis(tributyltin)oxide	1.0
10294-34-5	Boron trichloride	1.0
7637-07-2	Boron trifluoride	1.0

Table II. EPCRA Section 313 Chemical List for Reporting Year 2017

CAS Number	Chemical Name	De minimis % Limit	CAS Number	Chemical Name	De minimis % Limit
314-40-9	Bromacil	1.0	57-74-9	Chlordane	*
53404-19-6	(5-Bromo-6-methyl-3-(1-methylpropyl)-2,4(1H,3H)-pyrimidinedione)	1.0		[4,7-Methanoindan, 1,2,4,5,6,7,8,8-octachloro-2,3,3a,4,7,7a-hexahydro-]	
	Bromacil, lithium salt	1.0	115-28-6	Chlorendic acid	0.1
	[2,4(1H,3H)-Pyrimidinedione, 5-bromo-6-methyl-3-(1-methylpropyl), lithium salt]	1.0	90982-32-4	Chlorimuron ethyl	1.0
7726-95-6	Bromine	1.0		[Ethyl-2-[[[(4-chloro-6-methoxyprimidin-2-yl)amino]carbonyl]amino]sulfonyl]benzoate]	
35691-65-7	1-Bromo-1-(bromomethyl)-1,3-propanedicarbonitrile	1.0	7782-50-5	Chlorine	1.0
353-59-3	Bromochlorodifluoromethane (Halon 1211)	1.0	10049-04-4	Chlorine dioxide	1.0
75-25-2	Bromoform (Tribromomethane)	1.0	79-11-8	Chloroacetic acid	1.0
74-83-9	Bromomethane (Methyl bromide)	1.0	532-27-4	2-Chloroacetophenone	1.0
75-63-8	Bromotrifluoromethane (Halon 1301)	1.0	4080-31-3	1-(3-Chloroallyl)-3,5,7-triaza-1-azoniaadamantane chloride	1.0
1689-84-5	Bromoxynil	1.0	106-47-8	p-Chloroaniline	0.1
	(3,5-Dibromo-4-hydroxybenzonitrile)	1.0	108-90-7	Chlorobenzene	1.0
1689-99-2	Bromoxynil octanoate (Octanoic acid, 2,6-dibromo-4-cyanophenylester)	1.0	510-15-6	Chlorobenzilate	1.0
106-94-5	1-Bromopropane	0.1		[Benzeneacetic acid, 4-chloro- α -(4-chlorophenyl)- α -hydroxy-, ethyl ester]	
357-57-3	Brucine	1.0	75-68-3	1-Chloro-1,1-difluoroethane (HCFC-142b)	1.0
106-99-0	1,3-Butadiene	0.1	75-45-6	Chlorodifluoromethane (HCFC-22)	1.0
141-32-2	Butyl acrylate	1.0	75-00-3	Chloroethane (Ethyl chloride)	1.0
71-36-3	n-Butyl alcohol	1.0	67-66-3	Chloroform	0.1
78-92-2	sec-Butyl alcohol	1.0	74-87-3	Chloromethane (Methyl chloride)	1.0
75-65-0	tert-Butyl alcohol	1.0	107-30-2	Chloromethyl methyl ether	0.1
106-88-7	1,2-Butylene oxide	0.1	563-47-3	3-Chloro-2-methyl-1-propene	0.1
123-72-8	Butyraldehyde	1.0	104-12-1	p-Chlorophenyl isocyanate	1.0
7440-43-9	Cadmium	0.1	76-06-2	Chloropicrin	1.0
156-62-7	Calcium cyanamide	1.0	126-99-8	Chloroprene	0.1
133-06-2	Captan	1.0	542-76-7	3-Chloropropionitrile	1.0
	[1H-Isoindole-1,3(2H)-dione, 3a,4,7,7a-tetrahydro-2-[(trichloromethyl)thio]-]	1.0	63938-10-3	Chlorotetrafluoroethane	1.0
63-25-2	Carbaryl [1-Naphthalenol, methylcarbamate]	1.0	354-25-6	1-Chloro-1,1,2,2-tetrafluoroethane (HCFC-124a)	1.0
1563-66-2	Carbofuran	1.0	2837-89-0	2-Chloro-1,1,1,2-tetrafluoroethane (HCFC-124)	1.0
75-15-0	Carbon disulfide	1.0	1897-45-6	Chloroethanol	0.1
56-23-5	Carbon tetrachloride	0.1		[1,3-Benzenedicarbonitrile, 2,4,5,6-tetrachloro-]	
463-58-1	Carbonyl sulfide	1.0	95-69-2	p-Chloro-o-toluidine	0.1
5234-68-4	Carboxin	1.0	75-88-7	2-Chloro-1,1,1-trifluoroethane (HCFC-133a)	1.0
	(5,6-Dihydro-2-methyl-N-phenyl-1,4-oxathiin-3-carboxamide)	1.0	75-72-9	Chlorotrifluoromethane (CFC-13)	1.0
120-80-9	Catechol	0.1	460-35-5	3-Chloro-1,1,1-trifluoropropane (HCFC-253fb)	1.0
2439-01-2	Chinomethionat	1.0	5598-13-0	Chlorpyrifos methyl	1.0
	[6-Methyl-1,3-dithiolo[4,5-b]quinoxalin-2-one]	1.0		[O,O-Dimethyl-O-(3,5,6-trichloro-2-pyridyl)phosphorothioate]	
133-90-4	Chloramben	1.0			
	[Benzoic acid, 3-amino-2,5-dichloro-]	1.0			

Table II. EPCRA Section 313 Chemical List for Reporting Year 2017

CAS Number	Chemical Name	De minimis % Limit	CAS Number	Chemical Name	De minimis % Limit
64902-72-3	Chlorsulfuron [2-Chloro-N-[[[(4-methoxy-6-methyl-1,3,5-triazin-2-yl)amino]carbonyl] benzenesulfonamide]	1.0	533-74-4	Dazomet (Tetrahydro-3,5-dimethyl-2H-1,3,5-thiadiazine-2-thione)	1.0
7440-47-3	Chromium	1.0	53404-60-7	Dazomet, sodium salt [Tetrahydro-3,5-dimethyl-2H-1,3,5-thiadiazine-2-thione, ion(1-), sodium]	1.0
4680-78-8	C.I. Acid Green 3	1.0	94-82-6	2,4-DB	1.0
6459-94-5	C.I. Acid Red 114	0.1	1929-73-3	2,4-D butoxyethyl ester	0.1
569-64-2	C.I. Basic Green 4	1.0	94-80-4	2,4-D butyl ester	0.1
989-38-8	C.I. Basic Red 1	1.0	2971-38-2	2,4-D chlorocrotyl ester	0.1
1937-37-7	C.I. Direct Black 38	0.1	1163-19-5	Decabromodiphenyl oxide	1.0
2602-46-2	C.I. Direct Blue 6	0.1	13684-56-5	Desmedipham	1.0
28407-37-6	C.I. Direct Blue 218	1.0	1928-43-4	2,4-D 2-ethylhexyl ester	0.1
16071-86-6	C.I. Direct Brown 95	0.1	53404-37-8	2,4-D 2-ethyl-4-methylpentyl ester	0.1
2832-40-8	C.I. Disperse Yellow 3	1.0	2303-16-4	Diallate [Carbamothioic acid, bis(1-methylethyl)-S-(2,3-dichloro-2-propenyl)ester]	1.0
3761-53-3	C.I. Food Red 5	0.1	615-05-4	2,4-Diaminoanisole	0.1
81-88-9	C.I. Food Red 15	1.0	39156-41-7	2,4-Diaminoanisole sulfate	0.1
3118-97-6	C.I. Solvent Orange 7	1.0	101-80-4	4,4'-Diaminodiphenyl ether	0.1
97-56-3	C.I. Solvent Yellow 3	0.1	95-80-7	2,4-Diaminotoluene	0.1
842-07-9	C.I. Solvent Yellow 14	1.0	25376-45-8	Diaminotoluene (mixed isomers)	0.1
492-80-8	C.I. Solvent Yellow 34 (Auramine)	0.1	333-41-5	Diazinon	0.1
128-66-5	C.I. Vat Yellow 4	1.0	334-88-3	Diazomethane	1.0
7440-48-4	Cobalt	0.1	132-64-9	Dibenzofuran	1.0
7440-50-8	Copper	1.0	96-12-8	1,2-Dibromo-3-chloropropane (DBCP)	0.1
8001-58-9	Creosote	0.1	106-93-4	1,2-Dibromoethane (Ethylene dibromide)	0.1
120-71-8	p-Cresidine	0.1	124-73-2	Dibromotetrafluoroethane (Halon 2402)	1.0
108-39-4	m-Cresol	1.0	84-74-2	Dibutyl phthalate	1.0
95-48-7	o-Cresol	1.0	1918-00-9	Dicamba (3,6-Dichloro-2-methoxybenzoic acid)	1.0
106-44-5	p-Cresol	1.0	99-30-9	Dichloran [2,6-Dichloro-4-nitroaniline]	1.0
1319-77-3	Cresol (mixed isomers)	1.0	95-50-1	1,2-Dichlorobenzene	1.0
4170-30-3	Crotonaldehyde	1.0	541-73-1	1,3-Dichlorobenzene	1.0
98-82-8	Cumene	0.1	106-46-7	1,4-Dichlorobenzene	0.1
80-15-9	Cumene hydroperoxide	1.0	25321-22-6	Dichlorobenzene (mixed isomers)	0.1
135-20-6	Cupferron [Benzeneamine, N-hydroxy-N-nitroso, ammonium salt]	0.1	91-94-1	3,3'-Dichlorobenzidine	0.1
21725-46-2	Cyanazine	1.0	612-83-9	3,3'-Dichlorobenzidine dihydrochloride	0.1
1134-23-2	Cycloate	1.0	64969-34-2	3,3'-Dichlorobenzidine sulfate	0.1
110-82-7	Cyclohexane	1.0	75-27-4	Dichlorobromomethane	0.1
108-93-0	Cyclohexanol	1.0	764-41-0	1,4-Dichloro-2-butene	1.0
68359-37-5	Cyfluthrin [3-(2,2-Dichloroethenyl)-2,2-dimethylcyclopropanecarboxylic acid, cyano(4-fluoro-3-phenoxyphenyl)methyl ester]	1.0	110-57-6	trans-1,4-Dichloro-2-butene	1.0
68085-85-8	Cyhalothrin [3-(2-Chloro-3,3,3-trifluoro-1-propenyl)-2,2-dimethylcyclopropanecarboxylic acid cyano(3-phenoxyphenyl)methyl ester]	1.0	1649-08-7	1,2-Dichloro-1,1-difluoroethane (HCFC-132b)	1.0
94-75-7	2,4-D [Acetic acid, (2,4-dichlorophenoxy)-]	0.1	75-71-8	Dichlorodifluoromethane (CFC-12)	1.0

Table II. EPCRA Section 313 Chemical List for Reporting Year 2017

CAS Number	Chemical Name	De minimis % Limit
107-06-2	1,2-Dichloroethane (Ethylene dichloride)	0.1
540-59-0	1,2-Dichloroethylene	1.0
1717-00-6	1,1-Dichloro-1-fluoroethane (HCFC-141b)	1.0
75-43-4	Dichlorofluoromethane (HCFC-21)	1.0
75-09-2	Dichloromethane (Methylene chloride)	0.1
127564-92-5	Dichloropentafluoropropane	1.0
13474-88-9	1,1-Dichloro-1,2,2,3,3-pentafluoropropane (HCFC-225cc)	1.0
111512-56-2	1,1-Dichloro-1,2,3,3,3-pentafluoropropane (HCFC-225eb)	1.0
422-44-6	1,2-Dichloro-1,1,2,3,3-pentafluoropropane (HCFC-225bb)	1.0
431-86-7	1,2-Dichloro-1,1,3,3,3-pentafluoropropane (HCFC-225da)	1.0
507-55-1	1,3-Dichloro-1,1,2,2,3-pentafluoropropane (HCFC-225cb)	1.0
136013-79-1	1,3-Dichloro-1,1,2,3,3-pentafluoropropane (HCFC-225ea)	1.0
128903-21-9	2,2-Dichloro-1,1,1,3,3-pentafluoropropane (HCFC-225aa)	1.0
422-48-0	2,3-Dichloro-1,1,1,2,3-pentafluoropropane (HCFC-225ba)	1.0
422-56-0	3,3-Dichloro-1,1,1,2,2-pentafluoropropane (HCFC-225ca)	1.0
97-23-4	Dichlorophene [2,2'-Methylenebis(4-chlorophenol)]	1.0
120-83-2	2,4-Dichlorophenol	1.0
78-87-5	1,2-Dichloropropane	0.1
10061-02-6	trans-1,3-Dichloropropene	0.1
78-88-6	2,3-Dichloropropene	1.0
542-75-6	1,3-Dichloropropylene	0.1
76-14-2	Dichlorotetrafluoroethane (CFC-114)	1.0
34077-87-7	Dichlorotrifluoroethane	1.0
90454-18-5	Dichloro-1,1,2-trifluoroethane	1.0
812-04-4	1,1-Dichloro-1,2,2-trifluoroethane (HCFC-123b)	1.0
354-23-4	1,2-Dichloro-1,1,2-trifluoroethane (HCFC-123a)	1.0
306-83-2	2,2-Dichloro-1,1,1-trifluoroethane (HCFC-123)	1.0

CAS Number	Chemical Name	De minimis % Limit
62-73-7	Dichlorvos [Phosphoric acid, 2,2-dichloroethenyl dimethyl ester]	0.1
51338-27-3	Diclofop methyl [2-[4-(2,4-Dichlorophenoxy)phenoxy]propanoic acid, methyl ester]	1.0
115-32-2	Dicofol [Benzenemethanol, 4-chloro- α -(4-chlorophenyl)- α -(trichloromethyl)-]	1.0
77-73-6	Dicyclopentadiene	1.0
1464-53-5	Diepoxybutane	0.1
111-42-2	Diethanolamine	1.0
38727-55-8	Diethyl ethyl	1.0
117-81-7	Di(2-ethylhexyl)phthalate (DEHP)	0.1
64-67-5	Diethyl sulfate	0.1
35367-38-5	Diflubenzuron	1.0
101-90-6	Diglycidyl resorcinol ether	0.1
94-58-6	Dihydrosafrole	0.1
55290-64-7	Dimethipin [2,3-Dihydro-5,6-dimethyl-1,4-dithiin-1,1,4,4-tetraoxide]	1.0
60-51-5	Dimethoate	1.0
119-90-4	3,3'-Dimethoxybenzidine	0.1
20325-40-0	3,3'-Dimethoxybenzidine dihydrochloride (o-Dianisidine dihydrochloride)	0.1
111984-09-9	3,3'-Dimethoxybenzidine hydrochloride (o-Dianisidine hydrochloride)	0.1
124-40-3	Dimethylamine	1.0
2300-66-5	Dimethylamine dicamba	1.0
60-11-7	4-Dimethylaminoazobenzene	0.1
121-69-7	N,N-Dimethylaniline	1.0
119-93-7	3,3'-Dimethylbenzidine (o-Tolidine)	0.1
612-82-8	3,3'-Dimethylbenzidine dihydrochloride (o-Tolidine dihydrochloride)	0.1
41766-75-0	3,3'-Dimethylbenzidine dihydrofluoride (o-Tolidine dihydrofluoride)	0.1
79-44-7	Dimethylcarbaryl chloride	0.1
2524-03-0	Dimethyl chlorothiophosphate	1.0
68-12-2	N,N-Dimethylformamide	1.0
57-14-7	1,1-Dimethyl hydrazine	0.1
105-67-9	2,4-Dimethylphenol	1.0
131-11-3	Dimethyl phthalate	1.0
77-78-1	Dimethyl sulfate	0.1
99-65-0	m-Dinitrobenzene	1.0
528-29-0	o-Dinitrobenzene	1.0
100-25-4	p-Dinitrobenzene	1.0
88-85-7	Dinitrobutyl phenol (Dinoseb)	1.0
534-52-1	4,6-Dinitro-o-cresol	1.0

Table II. EPCRA Section 313 Chemical List for Reporting Year 2017

CAS Number	Chemical Name	De minimis % Limit
51-28-5	2,4-Dinitrophenol	1.0
121-14-2	2,4-Dinitrotoluene	0.1
606-20-2	2,6-Dinitrotoluene	0.1
25321-14-6	Dinitrotoluene (mixed isomers)	1.0
39300-45-3	Dinocap	1.0
123-91-1	1,4-Dioxane	0.1
957-51-7	Diphenamid	1.0
122-39-4	Diphenylamine	1.0
122-66-7	1,2-Diphenylhydrazine (Hydrazobenzene)	0.1
2164-07-0	Dipotassium endothall [7-Oxabicyclo(2.2.1)heptane-2,3-dicarboxylic acid, dipotassium salt]	1.0
136-45-8	Dipropyl isocinchomeronate	1.0
138-93-2	Disodium cyanodithioimidocarbonate	1.0
94-11-1	2,4-D isopropyl ester	0.1
541-53-7	2,4-Dithiobiuret	1.0
330-54-1	Diuron	1.0
2439-10-3	Dodine [Dodecylguanidine monoacetate]	1.0
120-36-5	2,4-DP	0.1
1320-18-9	2,4-D propylene glycol butyl ether ester	0.1
2702-72-9	2,4-D sodium salt	0.1
106-89-8	Epichlorohydrin	0.1
13194-48-4	Ethoprop [Phosphorodithioic acid O-ethyl S,S-dipropyl ester]	1.0
110-80-5	2-Ethoxyethanol	1.0
140-88-5	Ethyl acrylate	0.1
100-41-4	Ethylbenzene	0.1
541-41-3	Ethyl chloroformate	1.0
759-94-4	Ethyl dipropylthiocarbamate (EPTC)	1.0
74-85-1	Ethylene	1.0
107-21-1	Ethylene glycol	1.0
151-56-4	Ethyleneimine (Aziridine)	0.1
75-21-8	Ethylene oxide	0.1
96-45-7	Ethylene thiourea	0.1
75-34-3	Ethylidene dichloride	1.0
52-85-7	Famphur	1.0
60168-88-9	Fenarimol	1.0
	[α -(2-Chlorophenyl)- α -(4-chlorophenyl)-5-pyrimidinemethanol]	
13356-08-6	Fenbutatin oxide (Hexakis(2-methyl-2-phenylpropyl)distannoxane)	1.0
66441-23-4	Fenoxaprop ethyl [2-(4-((6-Chloro-2-benzoxazolylen)oxy)phenoxy)propanoic acid, ethyl ester]	1.0

CAS Number	Chemical Name	De minimis % Limit
72490-01-8	Fenoxycarb [[2-(4-Phenoxyphenoxy)ethyl]carbamic acid ethyl ester]	1.0
39515-41-8	Fenpropathrin [2,2,3,3-Tetramethylcyclopropane carboxylic acid cyano(3-phenoxyphenyl)methyl ester]	1.0
55-38-9	Fenthion [O,O-Dimethyl O-[3-methyl-4-(methylthio)phenyl]ester, phosphorothioic acid]	1.0
51630-58-1	Fenvalerate [4-Chloro- α -(1-methylethyl)benzeneacetic acid cyano(3-phenoxyphenyl)methyl ester]	1.0
14484-64-1	Ferbam [Tris(dimethylcarbamodithioato-S,S')iron]	1.0
69806-50-4	Fluazifop butyl [2-[4-[[5-(Trifluoromethyl)-2-pyridinyl]oxy]phenoxy]propanoic acid, butyl ester]	1.0
2164-17-2	Fluometuron [Urea, N,N-dimethyl-N'-[3-(trifluoromethyl)phenyl]-]	1.0
7782-41-4	Fluorine	1.0
51-21-8	Fluorouracil (5-Fluorouracil)	1.0
69409-94-5	Fluvalinate [N-[2-Chloro-4-(trifluoromethyl)phenyl]-DL-valine(+)-cyano(3-phenoxyphenyl)methyl ester]	1.0
133-07-3	Folpet	1.0
72178-02-0	Fomesafen [5-(2-Chloro-4-(trifluoromethyl)phenoxy)-N-methylsulfonyl-2-nitrobenzamide]	1.0
50-00-0	Formaldehyde	0.1
64-18-6	Formic acid	1.0
76-13-1	Freon 113 [Ethane, 1,1,2-trichloro-1,2,2-trifluoro-]	1.0
110-00-9	Furan	0.1
556-52-5	Glycidol	0.1
76-44-8	Heptachlor [1,4,5,6,7,8,8-Heptachloro-3a,4,7,7a-tetrahydro-4,7-methano-1H-indene]	*
118-74-1	Hexachlorobenzene	*
87-68-3	Hexachloro-1,3-butadiene	1.0
319-84-6	alpha-Hexachlorocyclohexane	0.1
77-47-4	Hexachlorocyclopentadiene	1.0
67-72-1	Hexachloroethane	0.1
1335-87-1	Hexachloronaphthalene	1.0
70-30-4	Hexachlorophene	1.0

Table II. EPCRA Section 313 Chemical List for Reporting Year 2017

CAS Number	Chemical Name	De minimis % Limit	CAS Number	Chemical Name	De minimis % Limit
680-31-9	Hexamethylphosphoramide	0.1	109-77-3	Malononitrile	1.0
110-54-3	n-Hexane	1.0	12427-38-2	Maneb	1.0
51235-04-2	Hexazinone	1.0		[Carbamodithioic acid, 1,2-ethanediylbis-, manganese complex]	
67485-29-4	Hydramethylnon	1.0	7439-96-5	Manganese	1.0
	[Tetrahydro-5,5-dimethyl-2(1H)-pyrimidinone[3-[4-(trifluoromethyl)phenyl]-1-[2-[4-(trifluoromethyl)phenyl]ethenyl]-2-propenylidene]hydrazone]		93-65-2	Mecoprop	0.1
302-01-2	Hydrazine	0.1	149-30-4	2-Mercaptobenzothiazole (MBT)	1.0
10034-93-2	Hydrazine sulfate	0.1	7439-97-6	Mercury	*
7647-01-0	Hydrochloric acid	1.0	150-50-5	Merphos	1.0
	(acid aerosols including mists, vapors, gas, fog, and other airborne forms of any particle size)		126-98-7	Methacrylonitrile	1.0
74-90-8	Hydrogen cyanide	1.0	137-42-8	Metham sodium (Sodium methylthiocarbamate)	1.0
7664-39-3	Hydrogen fluoride	1.0	67-56-1	Methanol	1.0
7783-06-4	Hydrogen sulfide	1.0	20354-26-1	Methazole	1.0
123-31-9	Hydroquinone	1.0		[2-(3,4-Dichlorophenyl)-4-methyl-1,2,4-oxadiazolidine-3,5-dione]	
35554-44-0	Imazalil	1.0	2032-65-7	Methiocarb	1.0
	[1-[2-(2,4-Dichlorophenyl)-2-(2-propenyloxy)ethyl]-1H-imidazole]		94-74-6	Methoxone	0.1
55406-53-6	3-Iodo-2-propynyl butylcarbamate	1.0		((4-Chloro-2-methylphenoxy) acetic acid) (MCPA)	
13463-40-6	Iron pentacarbonyl	1.0	3653-48-3	Methoxone sodium salt	0.1
78-84-2	Isobutyraldehyde	1.0		((4-Chloro-2-methylphenoxy) acetate sodium salt)	
465-73-6	Isodrin	*	72-43-5	Methoxychlor	*
25311-71-1	Isofenphos[2-[[Ethoxyl[(1-methylethyl)amino]phosphinothioyl]oxy]benzoic acid 1-methylethyl ester]	1.0		[Benzene, 1,1'-(2,2,2-trichloroethylidene)bis[4-methoxy-]]	
78-79-5	Isoprene	0.1	109-86-4	2-Methoxyethanol	1.0
67-63-0	Isopropyl alcohol	1.0	96-33-3	Methyl acrylate	1.0
	(only persons who manufacture by the strong acid process are subject, no supplier notification)		1634-04-4	Methyl tert-butyl ether	1.0
80-05-7	4,4'-Isopropylidenediphenol	1.0	79-22-1	Methyl chlorocarbonate	1.0
120-58-1	Isosafrole	1.0	101-14-4	4,4'-Methylenebis(2-chloroaniline) (MBOCA)	0.1
77501-63-4	Lactofen	1.0	101-61-1	4,4'-Methylenebis(N,N-dimethyl) benzenamine	0.1
	[Benzoic acid, 5-[2-Chloro-4-(trifluoromethyl)phenoxy]-2-nitro-, 2-ethoxy-1-methyl-2-oxoethyl ester]		74-95-3	Methylene bromide	1.0
7439-92-1	Lead	*	101-77-9	4,4'-Methylenedianiline	0.1
	(when lead is contained in stainless steel, brass or bronze alloys the <i>de minimis</i> level is 0.1)		93-15-2	Methyleugenol	0.1
58-89-9	Lindane	0.1	60-34-4	Methyl hydrazine	1.0
	[Cyclohexane, 1,2,3,4,5,6-hexachloro-, (1 α ,2 α ,3 β ,4 α ,5 α ,6 β)-]		74-88-4	Methyl iodide	1.0
330-55-2	Linuron	1.0	108-10-1	Methyl isobutyl ketone	0.1
554-13-2	Lithium carbonate	1.0	624-83-9	Methyl isocyanate	1.0
121-75-5	Malathion	0.1	556-61-6	Methyl isothiocyanate	1.0
108-31-6	Maleic anhydride	1.0		[Isothiocyanatomethane]	
			75-86-5	2-Methylactonitrile	1.0
			80-62-6	Methyl methacrylate	1.0
			924-42-5	N-Methylolacrylamide	1.0
			298-00-0	Methyl parathion	1.0
			109-06-8	2-Methylpyridine	1.0
			872-50-4	N-Methyl-2-pyrrolidone	1.0
			9006-42-2	Metiram	1.0
			21087-64-9	Metribuzin	1.0
			7786-34-7	Mevinphos	1.0
			90-94-8	Michler's ketone	0.1

Table II. EPCRA Section 313 Chemical List for Reporting Year 2017

CAS Number	Chemical Name	De minimis % Limit
2212-67-1	Molinate (1H-Azepine-1-carbothioic acid, hexahydro-, S-ethyl ester)	1.0
1313-27-5	Molybdenum trioxide	1.0
76-15-3	Monochloropentafluoroethane (CFC-115)	1.0
150-68-5	Monuron	1.0
505-60-2	Mustard gas [Ethane, 1,1'-thiobis[2-chloro-]]	0.1
88671-89-0	Myclobutanil [α-Butyl-α-(4-chlorophenyl)-1H-1,2,4-triazole-1-propanenitrile]	1.0
142-59-6	Nabam	1.0
300-76-5	Naled	1.0
91-20-3	Naphthalene	0.1
134-32-7	alpha-Naphthylamine	0.1
91-59-8	beta-Naphthylamine	0.1
7440-02-0	Nickel	0.1
1929-82-4	Nitrapyrin (2-Chloro-6-(trichloromethyl)pyridine)	1.0
7697-37-2	Nitric acid	1.0
139-13-9	Nitrilotriacetic acid	0.1
100-01-6	p-Nitroaniline	1.0
91-23-6	o-Nitroanisole	0.1
99-59-2	5-Nitro-o-anisidine	1.0
98-95-3	Nitrobenzene	0.1
92-93-3	4-Nitrobiphenyl	0.1
1836-75-5	Nitrofen [Benzene, 2,4-dichloro-1-(4-nitrophenoxy)-]	0.1
51-75-2	Nitrogen mustard [2-Chloro-N-(2-chloroethyl)-N-methylethanamine]	0.1
55-63-0	Nitroglycerin	1.0
75-52-5	Nitromethane	0.1
88-75-5	2-Nitrophenol	1.0
100-02-7	4-Nitrophenol	1.0
79-46-9	2-Nitropropane	0.1
924-16-3	N-Nitrosodi-n-butylamine	0.1
55-18-5	N-Nitrosodiethylamine	0.1
62-75-9	N-Nitrosodimethylamine	0.1
86-30-6	N-Nitrosodiphenylamine	1.0
156-10-5	p-Nitrosodiphenylamine	1.0
621-64-7	N-Nitrosodi-n-propylamine	0.1
759-73-9	N-Nitroso-N-ethylurea	0.1
684-93-5	N-Nitroso-N-methylurea	0.1
4549-40-0	N-Nitrosomethylvinylamine	0.1
59-89-2	N-Nitrosomorpholine	0.1
16543-55-8	N-Nitrosornicotine	0.1
100-75-4	N-Nitrosopiperidine	0.1
88-72-2	o-Nitrotoluene	0.1
99-55-8	5-Nitro-o-toluidine	1.0

CAS Number	Chemical Name	De minimis % Limit
27314-13-2	Norflurazon [4-Chloro-5-(methylamino)-2-[3-(trifluoromethyl)phenyl]-3(2H)-pyridazinone]	1.0
2234-13-1	Octachloronaphthalene	1.0
29082-74-4	Octachlorostyrene	*
19044-88-3	Oryzalin [4-(Dipropylamino)-3,5-dinitrobenzene sulfonamide]	1.0
20816-12-0	Osmium tetroxide	1.0
301-12-2	Oxydemeton methyl [S-(2-(Ethylsulfinyl)ethyl) O,O-dimethyl ester phosphorothioic acid]	1.0
19666-30-9	Oxydiazon [3-[2,4-Dichloro-5-(1-methylethoxy)phenyl]-5-(1,1-dimethylethyl)-1,3,4-oxadiazol-2(3H)-one]	1.0
42874-03-3	Oxyfluorfen	1.0
10028-15-6	Ozone	1.0
123-63-7	Paraldehyde	1.0
1910-42-5	Paraquat dichloride	1.0
56-38-2	Parathion [Phosphorothioic acid, O,O-diethyl-O-(4-nitrophenyl)ester]	0.1
1114-71-2	Pebulate [Butylethylcarbamothioic acid S-propyl ester]	1.0
40487-42-1	Pendimethalin [N-(1-Ethylpropyl)-3,4-dimethyl-2,6-dinitrobenzenamine]	*
608-93-5	Pentachlorobenzene	*
76-01-7	Pentachloroethane	1.0
87-86-5	Pentachlorophenol (PCP)	0.1
57-33-0	Pentobarbital sodium	1.0
79-21-0	Peracetic acid	1.0
594-42-3	Perchloromethyl mercaptan	1.0
52645-53-1	Permethrin [3-(2,2-Dichloroethenyl)-2,2-dimethylcyclopropanecarboxylic acid, (3-phenoxyphenyl)methyl ester]	1.0
85-01-8	Phenanthrene	1.0
108-95-2	Phenol	1.0
77-09-8	Phenolphthalein	0.1
26002-80-2	Phenothrin [2,2-Dimethyl-3-(2-methyl-1-propenyl)cyclopropanecarboxylic acid (3-phenoxyphenyl)methyl ester]	1.0
95-54-5	1,2-Phenylenediamine	1.0
108-45-2	1,3-Phenylenediamine	1.0
106-50-3	p-Phenylenediamine	1.0
615-28-1	1,2-Phenylenediamine dihydrochloride	1.0

Table II. EPCRA Section 313 Chemical List for Reporting Year 2017

CAS Number	Chemical Name	De minimis % Limit	CAS Number	Chemical Name	De minimis % Limit
624-18-0	1,4-Phenylenediamine dihydrochloride	1.0	91-22-5	Quinoline	1.0
90-43-7	2-Phenylphenol	1.0	106-51-4	Quinone	1.0
57-41-0	Phenytoin	0.1	82-68-8	Quintozone	1.0
75-44-5	Phosgene	1.0		(Pentachloronitrobenzene)	
7803-51-2	Phosphine	1.0	76578-14-8	Quizalofop-ethyl	1.0
7723-14-0	Phosphorus (yellow or white)	1.0		[2-[4-[(6-Chloro-2-quinoxalinyloxy]phenoxy]propanoic acid ethyl ester]	
85-44-9	Phthalic anhydride	1.0	10453-86-8	Resmethrin	1.0
1918-02-1	Picloram	1.0		[[5-(Phenylmethyl)-3-furanyl]methyl-2,2-dimethyl-3-(2-methyl-1-propenyl)cyclopropanecarboxylate]	
88-89-1	Picric acid	1.0	81-07-2	Saccharin (only persons who manufacture are subject, no supplier notification)	1.0
51-03-6	Piperonyl butoxide	1.0			
29232-93-7	Pirimiphos methyl	1.0	94-59-7	Safrole	0.1
	[O-(2-(Diethylamino)-6-methyl-4-pyrimidinyl)-O,O-dimethylphosphorothioate]		7782-49-2	Selenium	1.0
1336-36-3	Polychlorinated biphenyls (PCBs)	*	74051-80-2	Sethoxydim	1.0
7758-01-2	Potassium bromate	0.1		[2-[1-(Ethoxyimino)butyl]-5-[2-(ethylthio)propyl]-3-hydroxyl-2-cyclohexen-1-one]	
128-03-0	Potassium dimethyldithiocarbamate	1.0	7440-22-4	Silver	1.0
137-41-7	Potassium N-methyldithiocarbamate	1.0	122-34-9	Simazine	1.0
41198-08-7	Profenofos	1.0	26628-22-8	Sodium azide	1.0
	[O-(4-Bromo-2-chlorophenyl)-O-ethyl-S-propyl phosphorothioate]		1982-69-0	Sodium dicamba	1.0
7287-19-6	Prometryn	1.0		[3,6-Dichloro-2-methoxybenzoic acid, sodium salt]	
	[N,N'-Bis(1-methylethyl)-6-methylthio-1,3,5-triazine-2,4-diamine]		128-04-1	Sodium dimethyldithiocarbamate	1.0
23950-58-5	Pronamide	1.0	62-74-8	Sodium fluoroacetate	1.0
1918-16-7	Propachlor	1.0	7632-00-0	Sodium nitrite	1.0
	[2-Chloro-N-(1-methylethyl)-N-phenylacetamide]		131-52-2	Sodium pentachlorophenate	0.1
1120-71-4	Propane sultone	0.1	132-27-4	Sodium o-phenylphenoxide	0.1
709-98-8	Propanil	1.0	100-42-5	Styrene	0.1
	[N-(3,4-Dichlorophenyl)propanamide]		96-09-3	Styrene oxide	0.1
2312-35-8	Propargite	1.0	7664-93-9	Sulfuric acid	1.0
107-19-7	Propargyl alcohol	1.0		(acid aerosols including mists, vapors, gas, fog, and other airborne forms of any particle size)	
31218-83-4	Propetamphos	1.0	2699-79-8	Sulfuryl fluoride (Vikane)	1.0
	[3-[[[(Ethylamino)methoxyphosphinothioyl]oxy]-2-butenic acid, 1-methylethyl ester]		35400-43-2	Sulprofos	1.0
60207-90-1	Propiconazole	1.0		[O-Ethyl O-[4-(methylthio)phenyl]phosphorodithioic acid S-propylester]	
	[1-[2-(2,4-Dichlorophenyl)-4-propyl-1,3-dioxolan-2-yl]methyl-1H-1,2,4-triazole]		34014-18-1	Tebuthiuron	1.0
57-57-8	beta-Propiolactone	0.1		[N-[5-(1,1-Dimethylethyl)-1,3,4-thiadiazol-2-yl]-N,N'-dimethylurea]	
123-38-6	Propionaldehyde	1.0	3383-96-8	Temephos	1.0
114-26-1	Propoxur	1.0	5902-51-2	Terbacil	1.0
	[Phenol, 2-(1-methylethoxy)-, methylcarbamate]			[5-Chloro-3-(1,1-dimethylethyl)-6-methyl-2,4(1H,3H)-pyrimidinedione]	
115-07-1	Propylene (Propene)	1.0	79-94-7	Tetrabromobisphenol A	*
75-55-8	Propyleneimine	0.1			
75-56-9	Propylene oxide	0.1			
110-86-1	Pyridine	1.0			

Table II. EPCRA Section 313 Chemical List for Reporting Year 2017

CAS Number	Chemical Name	De minimis % Limit
630-20-6	1,1,1,2-Tetrachloroethane	0.1
79-34-5	1,1,2,2-Tetrachloroethane	0.1
127-18-4	Tetrachloroethylene (Perchloroethylene)	0.1
354-11-0	1,1,1,2-Tetrachloro-2-fluoroethane (HCFC-121a)	1.0
354-14-3	1,1,2,2-Tetrachloro-1-fluoroethane (HCFC-121)	1.0
961-11-5	Tetrachlorvinphos [Phosphoric acid, 2-chloro-1-(2,4,5-trichlorophenyl)ethenyl dimethyl ester]	1.0
64-75-5	Tetracycline hydrochloride	1.0
116-14-3	Tetrafluoroethylene	0.1
509-14-8	Tetranitromethane	0.1
7696-12-0	Tetramethrin [2,2-Dimethyl-3-(2-methyl-1-propenyl)cyclopropanecarboxylic acid (1,3,4,5,6,7-hexahydro-1,3-dioxo-2H-isoindol-2-yl)methyl ester]	1.0
7440-28-0	Thallium	1.0
148-79-8	Thiabendazole [2-(4-Thiazolyl)-1H-benzimidazole]	1.0
62-55-5	Thioacetamide	0.1
28249-77-6	Thiobencarb [Carbamic acid, diethylthio-, S-(p-chlorobenzyl)ester]	1.0
139-65-1	4,4'-Thiodianiline	0.1
59669-26-0	Thiodicarb	1.0
23564-06-9	Thiophanate ethyl [[1,2-Phenylene-bis(iminocarbonothioyl)]biscarbamic acid diethylester]	1.0
23564-05-8	Thiophanate methyl	1.0
79-19-6	Thiosemicarbazide	1.0
62-56-6	Thiourea	0.1
137-26-8	Thiram	1.0
1314-20-1	Thorium dioxide	1.0
7550-45-0	Titanium tetrachloride	1.0
108-88-3	Toluene	1.0
584-84-9	Toluene-2,4-diisocyanate	0.1
91-08-7	Toluene-2,6-diisocyanate	0.1
26471-62-5	Toluene diisocyanate (mixed isomers)	0.1
95-53-4	o-Toluidine	0.1
636-21-5	o-Toluidine hydrochloride	0.1
8001-35-2	Toxaphene	*
43121-43-3	Triadimefon [1-(4-Chlorophenoxy)-3,3-dimethyl-1-(1H-1,2,4-triazol-1-yl)-2-butanone]	1.0
2303-17-5	Triallate	1.0

CAS Number	Chemical Name	De minimis % Limit
68-76-8	Triaziquone	1.0
101200-48-0	[2,5-Cyclohexadiene-1,4-dione, 2,3,5-tris(1-aziridinyl)-] Tribenuron methyl [Benzoic acid, 2-[[[(4-Methoxy-6-methyl-1,3,5-triazin-2-yl)methylamino]carbonyl]amino]sulfony]-, methyl ester]	1.0
1983-10-4	Tributyltin fluoride	1.0
2155-70-6	Tributyltin methacrylate	1.0
78-48-8	S,S,S-Tributyltrithiophosphate (DEF)	1.0
52-68-6	Trichlorfon [Phosphoric acid, (2,2,2-trichloro-1-hydroxy-ethyl)-, dimethyl ester]	1.0
76-02-8	Trichloroacetyl chloride	1.0
120-82-1	1,2,4-Trichlorobenzene	1.0
71-55-6	1,1,1-Trichloroethane (Methyl chloroform)	1.0
79-00-5	1,1,2-Trichloroethane	1.0
79-01-6	Trichloroethylene	0.1
75-69-4	Trichlorofluoromethane (CFC-11)	1.0
95-95-4	2,4,5-Trichlorophenol	1.0
88-06-2	2,4,6-Trichlorophenol	0.1
96-18-4	1,2,3-Trichloropropane	0.1
57213-69-1	Triclopyr triethylammonium salt	1.0
121-44-8	Triethylamine	1.0
1582-09-8	Trifluralin [Benzeneamine, 2,6-dinitro-N,N-dipropyl-4-(trifluoromethyl)-]	*
26644-46-2	Triforine [N,N'-[1,4-Piperazinediylbis-(2,2,2-trichloroethylidene)]bisformamide]	1.0
95-63-6	1,2,4-Trimethylbenzene	1.0
2655-15-4	2,3,5-Trimethylphenyl methylcarbamate	1.0
639-58-7	Triphenyltin chloride	1.0
76-87-9	Triphenyltin hydroxide	1.0
126-72-7	Tris(2,3-dibromopropyl) phosphate	0.1
72-57-1	Trypan blue	0.1
51-79-6	Urethane (Ethyl carbamate)	0.1
7440-62-2	Vanadium (except when contained in an alloy)	1.0
50471-44-8	Vinclozolin [3-(3,5-Dichlorophenyl)-5-ethenyl-5-methyl-2,4-oxazolidinedione]	1.0
108-05-4	Vinyl acetate	0.1
593-60-2	Vinyl bromide	0.1
75-01-4	Vinyl chloride	0.1
75-02-5	Vinyl fluoride	0.1
75-35-4	Vinylidene chloride	1.0
108-38-3	m-Xylene	1.0

Table II. EPCRA Section 313 Chemical List for Reporting Year 2017

CAS Number	Chemical Name	De minimis % Limit
95-47-6	o-Xylene	1.0
106-42-3	p-Xylene	1.0
1330-20-7	Xylene (mixed isomers)	1.0
87-62-7	2,6-Xylidine	0.1
7440-66-6	Zinc (fume or dust)	1.0
12122-67-7	Zineb [Carbamodithioic acid, 1,2-ethanediyibis-, zinc complex]	1.0

**b. Individually Listed Toxic Chemicals
Arranged by CAS Number**

CAS Number	Chemical Name	De minimis % Limit
Arranged by CAS Number		
50-00-0	Formaldehyde	0.1
51-03-6	Piperonyl butoxide	1.0
51-21-8	Fluorouracil (5-Fluorouracil)	1.0
51-28-5	2,4-Dinitrophenol	1.0
51-75-2	Nitrogen mustard [2-Chloro-N-(2-chloroethyl)-N-methylethanamine]	0.1
51-79-6	Urethane (Ethyl carbamate)	0.1
52-68-6	Trichlorfon [Phosphonic acid, (2,2,2-trichloro-1-hydroxyethyl)-, dimethyl ester]	1.0
52-85-7	Famphur	1.0
53-96-3	2-Acetylaminofluorene	0.1
55-18-5	N-Nitrosodiethylamine	0.1
55-21-0	Benzamide	1.0
55-38-9	Fenthion [O,O-Dimethyl O-[3-methyl-4-(methylthio)phenyl]ester, phosphorothioic acid]	1.0
55-63-0	Nitroglycerin	1.0
56-23-5	Carbon tetrachloride	0.1
56-35-9	Bis(tributyltin)oxide	1.0
56-38-2	Parathion [Phosphorothioic acid, O,O-diethyl-O-(4-nitrophenyl) ester]	0.1
57-14-7	1,1-Dimethylhydrazine	0.1
57-33-0	Pentobarbital sodium	1.0
57-41-0	Phenytoin	0.1
57-57-8	beta-Propiolactone	0.1
57-74-9	Chlordane [4,7-Methanoindan, 1,2,4,5,6,7,8,8-octachloro-2,3,3a,4,7,7a-hexahydro-]	*
58-89-9	Lindane [Cyclohexane, 1,2,3,4,5,6-hexachloro-, (1 α ,2 α ,3 β ,4 α ,5 α ,6 β)-]	0.1
59-89-2	N-Nitrosomorpholine	0.1
60-09-3	4-Aminoazobenzene	0.1
60-11-7	4-Dimethylaminoazobenzene	0.1
60-34-4	Methyl hydrazine	1.0

CAS Number	Chemical Name	De minimis % Limit
Arranged by CAS Number		
60-35-5	Acetamide	0.1
60-51-5	Dimethoate	1.0
61-82-5	Amitrole	0.1
62-53-3	Aniline	1.0
62-55-5	Thioacetamide	0.1
62-56-6	Thiourea	0.1
62-73-7	Dichlorvos [Phosphoric acid, 2,2-dichloroethenyl dimethyl ester]	0.1
62-74-8	Sodium fluoroacetate	1.0
62-75-9	N-Nitrosodimethylamine	0.1
63-25-2	Carbaryl [1-Naphthalenol, methylcarbamate]	1.0
64-18-6	Formic acid	1.0
64-67-5	Diethyl sulfate	0.1
64-75-5	Tetracycline hydrochloride	1.0
67-56-1	Methanol	1.0
67-63-0	Isopropyl alcohol (only persons who manufacture by the strong acid process are subject, no supplier notification)	1.0
67-66-3	Chloroform	0.1
67-72-1	Hexachloroethane	0.1
68-12-2	N,N-Dimethylformamide	1.0
68-76-8	Triaziquone [2,5-Cyclohexadiene-1,4-dione, 2,3,5-tris(1-aziridinyl)-]	1.0
70-30-4	Hexachlorophene	1.0
71-36-3	n-Butyl alcohol	1.0
71-43-2	Benzene	0.1
71-55-6	1,1,1-Trichloroethane (Methyl chloroform)	1.0
72-43-5	Methoxychlor [Benzene, 1,1'-(2,2,2-trichloroethylidene)bis[4-methoxy-]]	*
72-57-1	Trypan blue	0.1
74-83-9	Bromomethane (Methyl bromide)	1.0
74-85-1	Ethylene	1.0
74-87-3	Chloromethane (Methyl chloride)	1.0
74-88-4	Methyl iodide	1.0
74-90-8	Hydrogen cyanide	1.0
74-95-3	Methylene bromide	1.0
75-00-3	Chloroethane (Ethyl chloride)	1.0
75-01-4	Vinyl chloride	0.1
75-02-5	Vinyl fluoride	0.1
75-05-8	Acetonitrile	1.0
75-07-0	Acetaldehyde	0.1
75-09-2	Dichloromethane (Methylene chloride)	0.1
75-15-0	Carbon disulfide	1.0
75-21-8	Ethylene oxide	0.1
75-25-2	Bromoform (Tribromomethane)	1.0
75-27-4	Dichlorobromomethane	0.1

Table II. EPCRA Section 313 Chemical List for Reporting Year 2017

CAS Number	Chemical Name	De minimis % Limit	CAS Number	Chemical Name	De minimis % Limit
<i>Arranged by CAS Number</i>			<i>Arranged by CAS Number</i>		
75-34-3	Ethylidene dichloride	1.0	79-22-1	Methyl chlorocarbonate	1.0
75-35-4	Vinylidene chloride	1.0	79-34-5	1,1,2,2-Tetrachloroethane	0.1
75-43-4	Dichlorofluoromethane (HCFC-21)	1.0	79-44-7	DimethylcarbamyI chloride	0.1
75-44-5	Phosgene	1.0	79-46-9	2-Nitropropane	0.1
75-45-6	Chlorodifluoromethane (HCFC-22)	1.0	79 94 7	Tetrabromobisphenol A	*
75-52-5	Nitromethane	0.1	80-05-7	4,4'-Isopropylidenediphenol	1.0
75-55-8	Propyleneimine	0.1	80-15-9	Cumene hydroperoxide	1.0
75-56-9	Propylene oxide	0.1	80-62-6	Methyl methacrylate	1.0
75-63-8	Bromotrifluoromethane (Halon 1301)	1.0	81-07-2	Saccharin (only persons who manufacture are subject, no supplier notification)	1.0
75-65-0	tert-Butyl alcohol	1.0	81-49-2	1-Amino-2,4-dibromoanthraquinone	0.1
75-68-3	1-Chloro-1,1-difluoroethane (HCFC-142b)	1.0	81-88-9	C.I. Food Red 15	1.0
75-69-4	Trichlorofluoromethane (CFC-111)	1.0	82-28-0	1-Amino-2-methylantraquinone	0.1
75-71-8	Dichlorodifluoromethane (CFC-12)	1.0	82-68-8	Quintozene [Pentachloronitrobenzene]	1.0
75-72-9	Chlorotrifluoromethane (CFC-13)	1.0	84-74-2	Dibutyl phthalate	1.0
75-86-5	2-Methylactonitrile	1.0	85-01-8	Phenanthrene	1.0
75-88-7	2-Chloro-1,1,1-trifluoroethane (HCFC-133a)	1.0	85-44-9	Phthalic anhydride	1.0
76-01-7	Pentachloroethane	1.0	86-30-6	N-Nitrosodiphenylamine	1.0
76-02-8	Trichloroacetyl chloride	1.0	87-62-7	2,6-Xylidine	0.1
76-06-2	Chloropicrin	1.0	87-68-3	Hexachloro-1,3-butadiene	1.0
76-13-1	Freon 113 [Ethane, 1,1,2-trichloro-1,2,2-trifluoro-]	1.0	87-86-5	Pentachlorophenol (PCP)	0.1
76-14-2	Dichlorotetrafluoroethane (CFC-114)	1.0	88-06-2	2,4,6-Trichlorophenol	0.1
76-15-3	Monochloropentafluoroethane (CFC-115)	1.0	88-72-2	o-Nitrotoluene	0.1
76-44-8	Heptachlor [1,4,5,6,7,8,8-Heptachloro-3a,4,7,7a-tetrahydro-4,7-methano-1H-indene]	*	88-75-5	2-Nitrophenol	1.0
76-87-9	Triphenyltin hydroxide	1.0	88-85-7	Dinitrobutyl phenol (Dinoseb)	1.0
77-09-8	Phenolphthalein	0.1	88-89-1	Picric acid	1.0
77-47-4	Hexachlorocyclopentadiene	1.0	90-04-0	o-Anisidine	0.1
77-73-6	Dicyclopentadiene	1.0	90-43-7	2-Phenylphenol	1.0
77-78-1	Dimethyl sulfate	0.1	90-94-8	Michler's ketone	0.1
78-48-8	S,S,S-Tributyltrithiophosphate (DEF)	1.0	91-08-7	Toluene-2,6-diisocyanate	0.1
78-79-5	Isoprene	0.1	91-20-3	Naphthalene	0.1
78-84-2	Isobutyraldehyde	1.0	91-22-5	Quinoline	1.0
78-87-5	1,2-Dichloropropane	0.1	91-23-6	o-Nitroanisole	0.1
78-88-6	2,3-Dichloropropene	1.0	91-59-8	beta-Naphthylamine	0.1
78-92-2	sec-Butyl alcohol	1.0	91-94-1	3,3'-Dichlorobenzidine	0.1
79-00-5	1,1,2-Trichloroethane	1.0	92-52-4	Biphenyl	1.0
79-01-6	Trichloroethylene	0.1	92-67-1	4-Aminobiphenyl	0.1
79-06-1	Acrylamide	0.1	92-87-5	Benzidine	0.1
79-10-7	Acrylic acid	1.0	92-93-3	4-Nitrobiphenyl	0.1
79-11-8	Chloroacetic acid	1.0	93-15-2	Methyleugenol	0.1
79-19-6	Thiosemicarbazide	1.0	93-65-2	Mecoprop	0.1
79-21-0	Peracetic acid	1.0	94-11-1	2,4-D isopropyl ester	0.1
			94-36-0	Benzoyl peroxide	1.0
			94-58-6	Dihydrosafrole	0.1
			94-59-7	Safrole	0.1
			94-74-6	Methoxone ((4-Chloro-2-methylphenoxy) acetic acid) (MCPA)	0.1
			94-75-7	2,4-D [Acetic acid, (2,4-dichlorophenoxy)-]	0.1
			94-80-4	2,4-D butyl ester	0.1
			94-82-6	2,4-DB	1.0

Table II. EPCRA Section 313 Chemical List for Reporting Year 2017

CAS Number	Chemical Name	De minimis % Limit	CAS Number	Chemical Name	De minimis % Limit
Arranged by CAS Number			Arranged by CAS Number		
95-47-6	o-Xylene	1.0	106-50-3	p-Phenylenediamine	1.0
95-48-7	o-Cresol	1.0	106-51-4	Quinone	1.0
95-50-1	1,2-Dichlorobenzene	1.0	106-88-7	1,2-Butylene oxide	0.1
95-53-4	o-Toluidine	0.1	106-89-8	Epichlorohydrin	0.1
95-54-5	1,2-Phenylenediamine	1.0	106-93-4	1,2-Dibromoethane (Ethylene dibromide)	0.1
95-63-6	1,2,4-Trimethylbenzene	1.0	106-94-5	1-Bromopropane	0.1
95-69-2	p-Chloro-o-toluidine	0.1	106-99-0	1,3-Butadiene	0.1
95-80-7	2,4-Diaminotoluene	0.1	107-02-8	Acrolein	1.0
95-95-4	2,4,5-Trichlorophenol	1.0	107-05-1	Allyl chloride	1.0
96-09-3	Styrene oxide	0.1	107-06-2	1,2-Dichloroethane (Ethylene dichloride)	0.1
96-12-8	1,2-Dibromo-3-chloropropane (DBCP)	0.1	107-11-9	Allylamine	1.0
96-18-4	1,2,3-Trichloropropane	0.1	107-13-1	Acrylonitrile	0.1
96-33-3	Methyl acrylate	1.0	107-18-6	Allyl alcohol	1.0
96-45-7	Ethylene thiourea	0.1	107-19-7	Propargyl alcohol	1.0
97-23-4	Dichlorophene	1.0	107-21-1	Ethylene glycol	1.0
	[2,2'-Methylenebis(4- chlorophenol)]		107-30-2	Chloromethyl methyl ether	0.1
97-56-3	C.I. Solvent Yellow 3	0.1	108-05-4	Vinyl acetate	0.1
98-07-7	Benzoic trichloride (Benzotrichloride)	0.1	108-10-1	Methyl isobutyl ketone	0.1
98-82-8	Cumene	0.1	108-31-6	Maleic anhydride	1.0
98-86-2	Acetophenone	1.0	108-38-3	m-Xylene	1.0
98-87-3	Benzal chloride	1.0	108-39-4	m-Cresol	1.0
98-88-4	Benzoyl chloride	1.0	108-45-2	1,3-Phenylenediamine	1.0
98-95-3	Nitrobenzene	0.1	108-60-1	Bis(2-chloro-1-methylethyl)ether	1.0
99-30-9	Dichloran [2,6-Dichloro-4- nitroaniline]	1.0	108-88-3	Toluene	1.0
99-55-8	5-Nitro-o-toluidine	1.0	108-90-7	Chlorobenzene	1.0
99-59-2	5-Nitro-o-anisidine	1.0	108-93-0	Cyclohexanol	1.0
99-65-0	m-Dinitrobenzene	1.0	108-95-2	Phenol	1.0
100-01-6	p-Nitroaniline	1.0	109-06-8	2-Methylpyridine	1.0
100-02-7	4-Nitrophenol	1.0	109-77-3	Malononitrile	1.0
100-25-4	p-Dinitrobenzene	1.0	109-86-4	2-Methoxyethanol	1.0
100-41-4	Ethylbenzene	0.1	110-00-9	Furan	0.1
100-42-5	Styrene	0.1	110-54-3	n-Hexane	1.0
100-44-7	Benzyl chloride	1.0	110-57-6	trans-1,4-Dichloro-2-butene	1.0
100-75-4	N-Nitrosopiperidine	0.1	110-80-5	2-Ethoxyethanol	1.0
101-05-3	Anilazine	1.0	110-82-7	Cyclohexane	1.0
	[4,6-Dichloro-N-(2-chlorophenyl)- 1,3,5-triazin-2-amine]		110-86-1	Pyridine	1.0
101-14-4	4,4'-Methylenebis(2-chloroaniline) (MBOCA)	0.1	111-42-2	Diethanolamine	1.0
101-61-1	4,4'-Methylenebis(N,N- dimethyl)benzenamine	0.1	111-44-4	Bis(2-chloroethyl)ether	1.0
101-77-9	4,4'-Methylenedianiline	0.1	111-91-1	Bis(2-chloroethoxy)methane	1.0
101-80-4	4,4'-Diaminodiphenyl ether	0.1	114-26-1	Propoxur [Phenol, 2-(1-methylethoxy)-, methylcarbamate]	1.0
101-90-6	Diglycidyl resorcinol ether	0.1	115-07-1	Propylene (Propene)	1.0
104-12-1	p-Chlorophenyl isocyanate	1.0	115-28-6	Chlorendic acid	0.1
104-94-9	p-Anisidine	1.0	115-32-2	Dicofol [Benzenemethanol, 4-chloro- α -4-(chlorophenyl)- α - (trichloromethyl)-]	1.0
105-67-9	2,4-Dimethylphenol	1.0	116-06-3	Aldicarb	1.0
106-42-3	p-Xylene	1.0	116-14-3	Tetrafluoroethylene	0.1
106-44-5	p-Cresol	1.0	117-79-3	2-Aminoanthraquinone	0.1
106-46-7	1,4-Dichlorobenzene	0.1	117-81-7	Di(2-ethylhexyl)phthalate	0.1
106-47-8	p-Chloroaniline	0.1	118-74-1	Hexachlorobenzene	*

Table II. EPCRA Section 313 Chemical List for Reporting Year 2017

CAS Number	Chemical Name	De minimis % Limit
<i>Arranged by CAS Number</i>		
119-90-4	3,3'-Dimethoxybenzidine	0.1
119-93-7	3,3'-Dimethylbenzidine (o-Tolidine)	0.1
120-12-7	Anthracene	1.0
120-36-5	2,4-DP	0.1
120-58-1	Isosafrole	1.0
120-71-8	p-Cresidine	0.1
120-80-9	Catechol	0.1
120-82-1	1,2,4-Trichlorobenzene	1.0
120-83-2	2,4-Dichlorophenol	1.0
121-14-2	2,4-Dinitrotoluene	0.1
121-44-8	Triethylamine	1.0
121-69-7	N,N-Dimethylaniline	1.0
121-75-5	Malathion	0.1
122-34-9	Simazine	1.0
122-39-4	Diphenylamine	1.0
122-66-7	1,2-Diphenylhydrazine (Hydrazobenzene)	0.1
123-31-9	Hydroquinone	1.0
123-38-6	Propionaldehyde	1.0
123-63-7	Paraldehyde	1.0
123-72-8	Butyraldehyde	1.0
123-91-1	1,4-Dioxane	0.1
124-40-3	Dimethylamine	1.0
124-73-2	Dibromotetrafluoroethane (Halon 2402)	1.0
126-72-7	Tris(2,3-dibromopropyl) phosphate	0.1
126-98-7	Methacrylonitrile	1.0
126-99-8	Chloroprene	0.1
127-18-4	Tetrachloroethylene (Perchloroethylene)	0.1
128-03-0	Potassium dimethyldithiocarbamate	1.0
128-04-1	Sodium dimethyldithiocarbamate	1.0
128-66-5	C.I. Vat Yellow 4	1.0
131-11-3	Dimethyl phthalate	1.0
131-52-2	Sodium pentachlorophenate	0.1
132-27-4	Sodium o-phenylphenoxide	0.1
132-64-9	Dibenzofuran	1.0
133-06-2	Captan [1H-Isoindole-1,3(2H)-dione, 3a,4,7,7a-tetrahydro-2-[(trichloromethyl)thio]-]	1.0
133-07-3	Folpet	1.0
133-90-4	Chloramben [Benzoic acid, 3-amino-2,5-dichloro-]	1.0
134-29-2	o-Anisidine hydrochloride	0.1
134-32-7	alpha-Naphthylamine	0.1
135-20-6	Cupferron [Benzeneamine, N-hydroxy-N-nitroso, ammonium salt]	0.1
136-45-8	Dipropyl isocinchomeronate	1.0
137-26-8	Thiram	1.0

CAS Number	Chemical Name	De minimis % Limit
<i>Arranged by CAS Number</i>		
137-41-7	Potassium N-methyldithiocarbamate	1.0
137-42-8	Metham sodium (Sodium methyldithiocarbamate)	1.0
138-93-2	Disodium cyanodithioimido-carbonate	1.0
139-13-9	Nitrilotriacetic acid	0.1
139-65-1	4,4'-Thiodianiline	0.1
140-88-5	Ethyl acrylate	0.1
141-32-2	Butyl acrylate	1.0
142-59-6	Nabam	1.0
148-79-8	Thiabendazole [2-(4-Thiazolyl)-1H-benzimidazole]	1.0
149-30-4	2-Mercaptobenzothiazole (MBT)	1.0
150-50-5	Merphos	1.0
150-68-5	Monuron	1.0
151-56-4	Ethyleneimine (Aziridine)	0.1
156-10-5	p-Nitrosodiphenylamine	1.0
156-62-7	Calcium cyanamide	1.0
191-24-2	Benzo(g,h,i)perylene	*
298-00-0	Methyl parathion	1.0
300-76-5	Naled	1.0
301-12-2	Oxydemeton methyl [S-(2-(Ethylsulfinyl)ethyl) O,O-dimethyl ester phosphorothioic acid]	1.0
302-01-2	Hydrazine	0.1
306-83-2	2,2-Dichloro-1,1,1-trifluoroethane (HCFC-123)	1.0
309-00-2	Aldrin [1,4:5,8-Dimethanonaphthalene, 1,2,3,4,10,10-hexachloro-1,4,4a,5,8,8a-hexahydro-(1 α ,4 α ,4a β ,5 α ,8 α ,8a β)-]	*
314-40-9	Bromacil (5-Bromo-6-methyl-3-(1-methylpropyl)-2,4-(1H,3H)-pyrimidinedione)	1.0
319-84-6	alpha-Hexachlorocyclohexane	0.1
330-54-1	Diuron	1.0
330-55-2	Linuron	1.0
333-41-5	Diazinon	0.1
334-88-3	Diazomethane	1.0
353-59-3	Bromochlorodifluoromethane (Halon 1211)	1.0
354-11-0	1,1,1,2-Tetrachloro-2-fluoroethane (HCFC-121a)	1.0
354-14-3	1,1,2,2-Tetrachloro-1-fluoroethane (HCFC-121)	1.0
354-23-4	1,2-Dichloro-1,1,2-trifluoroethane (HCFC-123a)	1.0
354-25-6	1-Chloro-1,1,2,2-tetrafluoroethane (HCFC-124a)	1.0

Table II. EPCRA Section 313 Chemical List for Reporting Year 2017

CAS Number	Chemical Name	De minimis % Limit
<i>Arranged by CAS Number</i>		
357-57-3	Brucine	1.0
422-44-6	1,2-Dichloro-1,1,2,3,3-pentafluoropropane (HCFC-225bb)	1.0
422-48-0	2,3-Dichloro-1,1,1,2,3-pentafluoropropane (HCFC-225ba)	1.0
422-56-0	3,3-Dichloro-1,1,1,2,2-pentafluoropropane (HCFC-225ca)	1.0
431-86-7	1,2-Dichloro-1,1,3,3,3-pentafluoropropane (HCFC-225da)	1.0
460-35-5	3-Chloro-1,1,1-trifluoropropane (HCFC-253fb)	1.0
463-58-1	Carbonyl sulfide	1.0
465-73-6	Isodrin	*
492-80-8	C.I. Solvent Yellow 34 (Auramine)	0.1
505-60-2	Mustard gas [Ethane, 1,1'-thiobis[2-chloro-]]	0.1
507-55-1	1,3-Dichloro-1,1,2,2,3-pentafluoropropane (HCFC-225cb)	1.0
509-14-8	Tetranitromethane	0.1
510-15-6	Chlorobenzilate [Benzeneacetic acid, 4-chloro- α -(4-chlorophenyl)- α -hydroxy-, ethyl ester]	1.0
528-29-0	o-Dinitrobenzene	1.0
532-27-4	2-Chloroacetophenone	1.0
533-74-4	Dazomet (Tetrahydro-3,5-dimethyl-2H-1,3,5-thiadiazine-2-thione)	1.0
534-52-1	4,6-Dinitro-o-cresol	1.0
540-59-0	1,2-Dichloroethylene	1.0
541-41-3	Ethyl chloroformate	1.0
541-53-7	2,4-Dithiobiuret	1.0
541-73-1	1,3-Dichlorobenzene	1.0
542-75-6	1,3-Dichloropropylene	0.1
542-76-7	3-Chloropropionitrile	1.0
542-88-1	Bis(chloromethyl)ether	0.1
554-13-2	Lithium carbonate	1.0
556-52-5	Glycidol	0.1
556-61-6	Methyl isothiocyanate [Isothiocyanatomethane]	1.0
563-47-3	3-Chloro-2-methyl-1-propene	0.1
569-64-2	C.I. Basic Green 4	1.0
584-84-9	Toluene-2,4-diisocyanate	0.1
593-60-2	Vinyl bromide	0.1
594-42-3	Perchloromethyl mercaptan	1.0
606-20-2	2,6-Dinitrotoluene	0.1
608 93 5	Pentachlorobenzene	*

CAS Number	Chemical Name	De minimis % Limit
<i>Arranged by CAS Number</i>		
612-82-8	3,3'-Dimethylbenzidine dihydrochloride (o-Tolidine dihydrochloride)	0.1
612-83-9	3,3'-Dichlorobenzidine dihydrochloride	0.1
615-05-4	2,4-Diaminoanisole	0.1
615-28-1	1,2-Phenylenediamine dihydrochloride	1.0
621-64-7	N-Nitrosodi-n-propylamine	0.1
624-18-0	1,4-Phenylenediamine dihydrochloride	1.0
624-83-9	Methyl isocyanate	1.0
630-20-6	1,1,1,2-Tetrachloroethane	0.1
636-21-5	o-Toluidine hydrochloride	0.1
639-58-7	Triphenyltin chloride	1.0
680-31-9	Hexamethylphosphoramide	0.1
684-93-5	N-Nitroso-N-methylurea	0.1
709-98-8	Propanil (N-(3,4-Dichlorophenyl) propanamide)	1.0
759-73-9	N-Nitroso-N-ethylurea	0.1
759-94-4	Ethyl dipropylthiocarbamate (EPTC)	1.0
764-41-0	1,4-Dichloro-2-butene	1.0
812-04-4	1,1-Dichloro-1,2,2-trifluoroethane (HCFC-123b)	1.0
834-12-8	Ametryn (N-Ethyl-N'-(1-methylethyl)-6-(methylthio)-1,3,5-triazine-2,4-diamine)	1.0
842-07-9	C.I. Solvent Yellow 14	1.0
872-50-4	N-Methyl-2-pyrrolidone	1.0
924-16-3	N-Nitrosodi-n-butylamine	0.1
924-42-5	N-Methylolacrylamide	1.0
957-51-7	Diphenamid	1.0
961-11-5	Tetrachlorvinphos [Phosphoric acid, 2-chloro-1-(2,4,5-trichlorophenyl) ethenyl dimethyl ester]	1.0
989-38-8	C.I. Basic Red 1	1.0
1114-71-2	Pebulate [Butylethylcarbamothioic acid S-propyl ester]	1.0
1120-71-4	Propane sultone	0.1
1134-23-2	Cycloate	1.0
1163-19-5	Decabromodiphenyl oxide	1.0
1313-27-5	Molybdenum trioxide	1.0
1314-20-1	Thorium dioxide	1.0
1319-77-3	Cresol (mixed isomers)	1.0
1320-18-9	2,4-D propylene glycol butyl ether ester	0.1
1330-20-7	Xylene (mixed isomers)	1.0
1332-21-4	Asbestos (friable)	0.1
1335-87-1	Hexachloronaphthalene	1.0
1336-36-3	Polychlorinated biphenyls (PCBs)	*
1344-28-1	Aluminum oxide (fibrous forms)	1.0

Table II. EPCRA Section 313 Chemical List for Reporting Year 2017

CAS Number	Chemical Name	De minimis % Limit
<i>Arranged by CAS Number</i>		
1464-53-5	Diepoxybutane	0.1
1563-66-2	Carbofuran	1.0
1582-09-8	Trifluralin	*
	[Benzeneamine, 2,6-dinitro-N,N-dipropyl-4-(trifluoromethyl)-]	
1634-04-4	Methyl tert-butyl ether	1.0
1649-08-7	1,2-Dichloro-1,1-difluoroethane (HCFC-132b)	1.0
1689-84-5	Bromoxynil (3,5-Dibromo-4-hydroxybenzonitrile)	1.0
1689-99-2	Bromoxynil octanoate (Octanoic acid, 2,6-dibromo-4-cyanophenyl ester)	1.0
1717-00-6	1,1-Dichloro-1-fluoroethane (HCFC-141b)	1.0
1836-75-5	Nitrofen [Benzene, 2,4-dichloro-1-(4-nitrophenoxy)-]	0.1
1861-40-1	Benfluralin (N-Butyl-N-ethyl-2,6-dinitro-4-(trifluoromethyl)benzenamine)	1.0
1897-45-6	Chlorothalonil [1,3-Benzenedicarbonitrile, 2,4,5,6-tetrachloro-]	0.1
1910-42-5	Paraquat dichloride	1.0
1912-24-9	Atrazine (6-Chloro-N-ethyl-N'-(1-methylethyl)-1,3,5-triazine-2,4-diamine)	1.0
1918-00-9	Dicamba (3,6-Dichloro-2-methoxybenzoic acid)	1.0
1918-02-1	Picloram	1.0
1918-16-7	Propachlor [2-Chloro-N-(1-methylethyl)-N-phenylacetamide]	1.0
1928-43-4	2,4-D 2-ethylhexyl ester	0.1
1929-73-3	2,4-D butoxyethyl ester	0.1
1929-82-4	Nitrapyrin (2-Chloro-6-(trichloromethyl)pyridine)	1.0
1937-37-7	C.I. Direct Black 38	0.1
1982-69-0	Sodium dicamba [3,6-Dichloro-2-methoxybenzoic acid, sodium salt]	1.0
1983-10-4	Tributyltin fluoride	1.0
2032-65-7	Methiocarb	1.0
2155-70-6	Tributyltin methacrylate	1.0
2164-07-0	Dipotassium endothall [7-Oxabicyclo(2.2.1)heptane-2,3-dicarboxylic acid, dipotassium salt]	1.0

CAS Number	Chemical Name	De minimis % Limit
<i>Arranged by CAS Number</i>		
2164-17-2	Fluometuron [Urea, N,N-dimethyl-N'-[3-(trifluoromethyl)phenyl]-]	1.0
2212-67-1	Molinate (1H-Azepine-1-carbothioic acid, hexahydro-S-ethyl ester)	1.0
2234-13-1	Octachloronaphthalene	1.0
2300-66-5	Dimethylamine dicamba	1.0
2303-16-4	Diallate [Carbamothioic acid, bis(1-methylethyl)-S-(2,3-dichloro-2-propenyl)ester]	1.0
2303-17-5	Triallate	1.0
2312-35-8	Propargite	1.0
2439-01-2	Chinomethionat [6-Methyl-1,3-dithiolo[4,5-b]quinoxalin-2-one]	1.0
2439-10-3	Dodine [Dodecylguanidine monoacetate]	1.0
2524-03-0	Dimethyl chlorothiophosphate	1.0
2602-46-2	C.I. Direct Blue 6	0.1
2655-15-4	2,3,5-Trimethylphenyl methyl carbamate	1.0
2699-79-8	Sulfuryl fluoride (Vikane)	1.0
2702-72-9	2,4-D sodium salt	0.1
2832-40-8	C.I. Disperse Yellow 3	1.0
2837-89-0	2-Chloro-1,1,1,2-tetrafluoroethane (HCFC-124)	1.0
2971-38-2	2,4-D Chlorocrotyl ester	0.1
3118-97-6	C.I. Solvent Orange 7	1.0
3296-90-0	2,2-bis(Bromomethyl)-1,3-propanediol	0.1
3383-96-8	Temephos	1.0
3653-48-3	Methoxone sodium salt ((4-Chloro-2-methylphenoxy) acetate sodium salt)	0.1
3761-53-3	C.I. Food Red 5	0.1
4080-31-3	1-(3-Chloroallyl)-3,5,7-triaza-1-azoniaadamantane chloride	1.0
4170-30-3	Crotonaldehyde	1.0
4549-40-0	N-Nitrosomethylvinylamine	0.1
4680-78-8	C.I. Acid Green 3	1.0
5234-68-4	Carboxin (5,6-Dihydro-2-methyl-N-phenyl-1,4-oxathiin-3-carboxamide)	1.0
5598-13-0	Chlorpyrifos methyl [O,O-Dimethyl-O-(3,5,6-trichloro-2-pyridyl)phosphorothioate]	1.0
5902-51-2	Terbacil [5-Chloro-3-(1,1-dimethylethyl)-6-methyl-2,4(1H,3H)-pyrimidinedione]	1.0
6459-94-5	C.I. Acid Red 114	0.1

Table II. EPCRA Section 313 Chemical List for Reporting Year 2017

CAS Number	Chemical Name	De minimis % Limit
<i>Arranged by CAS Number</i>		
7287-19-6	Prometryn	1.0
	[N,N'-Bis(1-methylethyl)-6-methylthio-1,3,5-triazine-2,4-diamine]	
7429-90-5	Aluminum (fume or dust)	1.0
7439-92-1	Lead	*
	(when lead is contained in stainless steel, brass or bronze alloys the de minimis level is 0.1)	
7439-96-5	Manganese	1.0
7439-97-6	Mercury	*
7440-02-0	Nickel	0.1
7440-22-4	Silver	1.0
7440-28-0	Thallium	1.0
7440-36-0	Antimony	1.0
7440-38-2	Arsenic	0.1
7440-39-3	Barium	1.0
7440-41-7	Beryllium	0.1
7440-43-9	Cadmium	0.1
7440-47-3	Chromium	1.0
7440-48-4	Cobalt	0.1
7440-50-8	Copper	1.0
7440-62-2	Vanadium (except when contained in an alloy)	1.0
7440-66-6	Zinc (fume or dust)	1.0
7550-45-0	Titanium tetrachloride	1.0
7632-00-0	Sodium nitrite	1.0
7637-07-2	Boron trifluoride	1.0
7647-01-0	Hydrochloric acid	1.0
	(acid aerosols including mists, vapors, gas, fog, and other airborne forms of any particle size)	
7664-39-3	Hydrogen fluoride	1.0
7664-41-7	Ammonia	1.0
	(includes anhydrous ammonia and aqueous ammonia from water dissociable ammonium salts and other sources; 10 percent of total aqueous ammonia is reportable under this listing)	
7664-93-9	Sulfuric acid	1.0
	(acid aerosols including mists, vapors, gas, fog, and other airborne forms of any particle size)	
7696-12-0	Tetramethrin	1.0
	[2,2-Dimethyl-3-(2-methyl-1-propenyl)cyclopropanecarboxylic acid (1,3,4,5,6,7-hexahydro-1,3-dioxo-2H-isoindol-2-yl)methyl ester]	
7697-37-2	Nitric acid	1.0
7723-14-0	Phosphorus (yellow or white)	1.0
7726-95-6	Bromine	1.0

CAS Number	Chemical Name	De minimis % Limit
<i>Arranged by CAS Number</i>		
7758-01-2	Potassium bromate	0.1
7782-41-4	Fluorine	1.0
7782-49-2	Selenium	1.0
7782-50-5	Chlorine	1.0
7783-06-4	Hydrogen sulfide	1.0
7786-34-7	Mevinphos	1.0
7803-51-2	Phosphine	1.0
8001-35-2	Toxaphene	*
8001-58-9	Creosote	0.1
9006-42-2	Metiram	1.0
10028-15-6	Ozone	1.0
10034-93-2	Hydrazine sulfate	0.1
10049-04-4	Chlorine dioxide	1.0
10061-02-6	trans-1,3-Dichloropropene	0.1
10294-34-5	Boron trichloride	1.0
10453-86-8	Resmethrin	1.0
	[[5-(Phenylmethyl)-3-furanyl]methyl-2,2-dimethyl-3-(2-methyl-1-propenyl)cyclopropanecarboxylate]]	
12122-67-7	Zineb	1.0
	[Carbamodithioic acid, 1,2-ethanedithiolbis-, zinc complex]	
12427-38-2	Maneb	1.0
	[Carbamodithioic acid, 1,2-ethanedithiolbis-, manganese complex]	
13194-48-4	Ethoprop	1.0
	[Phosphorodithioic acid O-ethyl S,S-dipropyl ester]	
13356-08-6	Fenbutatin oxide	1.0
	(Hexakis(2-methyl-2-phenylpropyl)distannoxane)	
13463-40-6	Iron pentacarbonyl	1.0
13474-88-9	1,1-Dichloro-1,2,2,3,3-pentafluoropropane (HCFC-225cc)	1.0
13684-56-5	Desmedipham	1.0
14484-64-1	Ferbam	1.0
	[Tris(dimethylcarbamodithioato-S,S')iron]	
15972-60-8	Alachlor	1.0
16071-86-6	C.I. Direct Brown 95	0.1
16543-55-8	N-Nitrosomornicotine	0.1
17804-35-2	Benomyl	1.0
19044-88-3	Oryzalin	1.0
	[4-(Dipropylamino)-3,5-dinitrobenzenesulfonamide]	
19666-30-9	Oxydiazon	1.0
	[3-[2,4-Dichloro-5-(1-methylethoxy)phenyl]-5-(1,1-dimethylethyl)-1,3,4-oxadiazol-2(3H)-one]	

Table II. EPCRA Section 313 Chemical List for Reporting Year 2017

CAS Number	Chemical Name	De minimis % Limit
<i>Arranged by CAS Number</i>		
20325-40-0	3,3'-Dimethoxybenzidine dihydrochloride (o-Dianisidine dihydrochloride)	0.1
20354-26-1	Methazole [2-(3,4-Dichlorophenyl)-4-methyl-1,2,4-oxadiazolidine-3,5-dione]	1.0
20816-12-0	Osmium tetroxide	1.0
20859-73-8	Aluminum phosphide	1.0
21087-64-9	Metribuzin	1.0
21725-46-2	Cyanazine	1.0
22781-23-3	Bendiocarb [2,2-Dimethyl-1,3-benzodioxol-4-ol methylcarbamate]	1.0
23564-05-8	Thiophanate methyl	1.0
23564-06-9	Thiophanate ethyl [[1,2-Phenylenebis(iminocarbonothioyl)] biscarbamic acid diethyl ester]	1.0
23950-58-5	Pronamide	1.0
25311-71-1	Isofenphos [2-[[[Ethoxyl[(1-methylethyl)-amino]phosphinothioyl]oxy] benzoic acid 1-methylethyl ester]	1.0
25321-14-6	Dinitrotoluene (mixed isomers)	1.0
25321-22-6	Dichlorobenzene (mixed isomers)	0.1
25376-45-8	Diaminotoluene (mixed isomers)	0.1
26002-80-2	Phenothrin [2,2-Dimethyl-3-(2-methyl-1-propenyl)cyclopropanecarboxylic acid (3-phenoxyphenyl)methyl ester]	1.0
26471-62-5	Toluene diisocyanate (mixed isomers)	0.1
26628-22-8	Sodium azide	1.0
26644-46-2	Triforine [N,N'-[1,4-Piperazinediylbis (2,2,2-trichloroethylidene)]bisformamide]	1.0
27314-13-2	Norflurazon [4-Chloro-5-(methylamino)-2-[3-(trifluoromethyl)phenyl]-3(2H)-pyridazinone]	1.0
28057-48-9	d-trans-Allethrin [d-trans-Chrysanthemic acid of d-allethrine]	1.0
28249-77-6	Thiobencarb [Carbamic acid, diethylthio-, S-(p-chlorobenzyl)ester]	1.0
28407-37-6	C.I. Direct Blue 218	1.0
29082 74 4	Octachlorostyrene	*
29232-93-7	Pirimiphos methyl [O-(2-(Diethylamino)-6-methyl-4-pyrimidinyl)-O,O-dimethylphosphorothioate]	1.0

CAS Number	Chemical Name	De minimis % Limit
<i>Arranged by CAS Number</i>		
30560-19-1	Acephate (Acetylphosphoramidothioic acid O,S-dimethyl ester)	1.0
31218-83-4	Propetamphos [3-[(Ethylamino) methoxyphosphinothioyl]oxy]-2-butenic acid, 1-methylethyl ester]	1.0
33089-61-1	Amitraz	1.0
34014-18-1	Tebuthiuron [N-[5-(1,1-Dimethylethyl)-1,3,4-thiadiazol-2-yl]-N,N'-dimethylurea]	1.0
34077-87-7	Dichlorotrifluoroethane	1.0
35367-38-5	Di flubenzuron	1.0
35400-43-2	Sulprofos [O-Ethyl O-[4-(methylthio)phenyl]-phosphorodithioic acid S-propyl ester]	1.0
35554-44-0	Imazalil [1-[2-(2,4-Dichlorophenyl)-2-(2-propenyloxy)ethyl]-1H-imidazole]	1.0
35691-65-7	1-Bromo-1-(bromomethyl)-1,3-propanedicarbonitrile	1.0
38727-55-8	Diethatyl ethyl	1.0
39156-41-7	2,4-Diaminoanisole sulfate	0.1
39300-45-3	Dinocap	1.0
39515-41-8	Fenpropathrin [2,2,3,3-Tetramethylcyclopropane carboxylic acid cyano(3-phenoxyphenyl)methyl ester]	1.0
40487-42-1	Pendimethalin [N-(1-Ethylpropyl)-3,4-dimethyl-2,6-dinitrobenzenamine]	*
41198-08-7	Profenofos [O-(4-Bromo-2-chlorophenyl)-O-ethyl-S-propyl phosphorothioate]	1.0
41766-75-0	3,3'-Dimethylbenzidine dihydrofluoride (o-Tolidinedihydrofluoride)	0.1
42874-03-3	Oxyfluorfen	1.0
43121-43-3	Triadimefon [1-(4-Chlorophenoxy)-3,3-dimethyl-1-(1H-1,2,4-triazol-1-yl)-2-butanone]	1.0
50471-44-8	Vinclozolin [3-(3,5-Dichlorophenyl)-5-ethenyl-5-methyl-2,4-oxazolidinedione]	1.0
51235-04-2	Hexazinone	1.0
51338-27-3	Diclofop methyl [2-[4-(2,4-Dichlorophenoxy)-phenoxy]propanoic acid, methyl ester]	1.0

Table II. EPCRA Section 313 Chemical List for Reporting Year 2017

CAS Number	Chemical Name	De minimis % Limit
<i>Arranged by CAS Number</i>		
51630-58-1	Fenvalerate [4-Chloro- α -(1-methylethyl)-benzeneacetic acid cyano(3-phenoxyphenyl)methyl ester]	1.0
52645-53-1	Permethrin [3-(2,2-Dichloroethenyl)-2,2-dimethylcyclopropanecarboxylic acid, (3-phenoxyphenyl)methyl ester]	1.0
53404-19-6	Bromacil, lithium salt [2,4(1H,3H)-Pyrimidinedione, 5-bromo-6-methyl-3-(1-methylpropyl), lithium salt]	1.0
53404-37-8	2,4-D 2-ethyl-4-methylpentyl ester	0.1
53404-60-7	Dazomet, sodium salt [Tetrahydro-3,5-dimethyl-2H-1,3,5-thiadiazine-2-thione, ion(1-), sodium]	1.0
55290-64-7	Dimethipin [2,3-Dihydro-5,6-dimethyl-1,4-dithiin-1,1,4,4-tetraoxide]	1.0
55406-53-6	3-Iodo-2-propynyl butyl carbamate	1.0
57213-69-1	Triclopyr triethylammonium salt	1.0
59669-26-0	Thiodicarb	1.0
60168-88-9	Fenarimol [α -(2-Chlorophenyl)- α -(4-chlorophenyl)-5-pyrimidinemethanol]	1.0
60207-90-1	Propiconazole [1-[2-(2,4-Dichlorophenyl)-4-propyl-1,3-dioxolan-2-yl]methyl-1H-1,2,4-triazole]	1.0
62476-59-9	Acifluorfen, sodium salt [5-(2-Chloro-4-(trifluoromethyl)phenoxy)-2-nitrobenzoic acid, sodium salt]	1.0
63938-10-3	Chlorotetrafluoroethane	1.0
64902-72-3	Chlorsulfuron [2-Chloro-N-[[[(4-methoxy-6-methyl-1,3,5-triazin-2-yl)amino]carbonyl]benzenesulfonamide]	1.0
64969-34-2	3,3'-Dichlorobenzidine sulfate	0.1
66441-23-4	Fenoxaprop ethyl [2-(4-((6-Chloro-2-benzoxazolyl)oxy)phenoxy)propanoic acid, ethyl ester]	1.0
67485-29-4	Hydramethylnon [Tetrahydro-5,5-dimethyl-2(1H)-pyrimidinone[3-[4-(trifluoromethyl)phenyl]-1-[2-[4-(trifluoromethyl)phenyl]ethenyl]-2-propenylidene]hydrazone]	1.0

CAS Number	Chemical Name	De minimis % Limit
<i>Arranged by CAS Number</i>		
68085-85-8	Cyhalothrin [3-(2-Chloro-3,3,3-trifluoro-1-propenyl)-2,2-dimethylcyclopropanecarboxylic acid cyano(3-phenoxyphenyl)methyl ester]	1.0
68359-37-5	Cyfluthrin [3-(2,2-Dichloroethenyl)-2,2-dimethylcyclopropanecarboxylic acid, cyano(4-fluoro-3-phenoxyphenyl)methyl ester]	1.0
69409-94-5	Fluvalinate [N-[2-Chloro-4-(trifluoromethyl)phenyl]DL-valine(+)-cyano(3-phenoxyphenyl)methyl ester]	1.0
69806-50-4	Fluazifop butyl [2-[4-[[5-(Trifluoromethyl)-2-pyridinyl]oxy]phenoxy]propanoic acid, butyl ester]	1.0
71751-41-2	Abamectin [Avermectin B1]	1.0
72178-02-0	Fomesafen [5-(2-Chloro-4-(trifluoromethyl)phenoxy)-N-methylsulfonyl]-2-nitrobenzamide]	1.0
72490-01-8	Fenoxycarb [[2-(4-Phenoxyphenoxy)ethyl]carbamic acid ethyl ester]	1.0
74051-80-2	Sethoxydim [2-[1-(Ethoxyimino)butyl]-5-[2-(ethylthio)propyl]-3-hydroxyl-2-cyclohexen-1-one]	1.0
76578-14-8	Quizalofop-ethyl [2-[4-[(6-Chloro-2-quinoxalinyloxy]phenoxy]propanoic acid ethyl ester]	1.0
77501-63-4	Lactofen [Benzoic acid, 5-[2-Chloro-4-(trifluoromethyl)phenoxy]-2-nitro-, 2-ethoxy-1-methyl-2-oxoethyl ester]	1.0
82657-04-3	Bifenthrin	1.0
88671-89-0	Myclobutanil [α -Butyl- α -(4-chlorophenyl)-1H-1,2,4-triazole-1-propanenitrile]	1.0
90454-18-5	Dichloro-1,1,2-trifluoroethane	1.0
90982-32-4	Chlorimuron ethyl [Ethyl-2-[[[(4-chloro-6-methoxyprimidin-2-yl)amino]carbonyl]amino]sulfonyl]benzoate]	1.0

Table II. EPCRA Section 313 Chemical List for Reporting Year 2017

CAS Number	Chemical Name	De minimis % Limit
Arranged by CAS Number		
101200-48-0	Tribenuron methyl [Benzoic acid, 2-[[[(4-methoxy-6-methyl-1,3,5-triazin-2-yl)methylamino]carbonyl]amino]sulfonyl]-, methyl ester]	1.0
111512-56-2	1,1-Dichloro-1,2,3,3,3-pentafluoropropane (HCFC-225eb)	1.0
111984-09-9	3,3'-Dimethoxybenzidine hydrochloride (o-Dianisidine hydrochloride)	0.1
127564-92-5	Dichloropentafluoropropane	1.0
128903-21-9	2,2-Dichloro-1,1,1,3,3-pentafluoropropane (HCFC-225aa)	1.0
136013-79-1	1,3-Dichloro-1,1,2,3,3-pentafluoropropane (HCFC-225ea)	1.0

c. Chemical Categories

Section 313 requires reporting on the EPCRA Section 313 chemical categories listed below, in addition to the specific EPCRA Section 313 chemicals listed above.

The metal compound categories listed below, unless otherwise specified, are defined as including any unique chemical substance that contains the named metal (e.g., antimony, nickel, etc.) as part of that chemical's structure.

EPCRA Section 313 chemical categories are subject to the 1% *de minimis* concentration unless the substance involved meets the definition of an OSHA carcinogen in which case the 0.1% *de minimis* concentration applies. The *de minimis* concentration for each category is provided in parentheses. The *de minimis* exemption is not available for PBT chemicals, therefore an asterisk appears where a *de minimis* limit would otherwise appear. However, for purposes of the supplier notification requirement only, such limits are provided in Appendix D.

N010 Antimony Compounds (1.0)

Includes any unique chemical substance that contains antimony as part of that chemical's infrastructure.

N020 Arsenic Compounds (inorganic compounds: 0.1; organic compounds: 1.0)

Includes any unique chemical substance that contains arsenic as part of that chemical's infrastructure.

N040 Barium Compounds (1.0)

*Includes any unique chemical substance that contains barium as part of that chemical's infrastructure. This category does not include:
Barium sulfate CAS Number 7727-43-7*

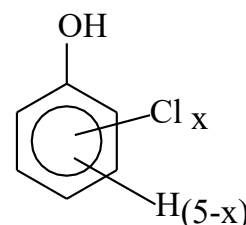
N050 Beryllium Compounds (0.1)

Includes any unique chemical substance that contains beryllium as part of that chemical's infrastructure.

N078 Cadmium Compounds (0.1)

Includes any unique chemical substance that contains cadmium as part of that chemical's infrastructure.

N084 Chlorophenols (0.1)



Where x = 1 to 5

N090 Chromium Compounds

(except for chromite ore mined in the Transvaal Region of South Africa and the unreacted ore component of the chromite ore processing residue (COPR). COPR is the solid waste remaining after aqueous extraction of oxidized chromite ore that has been combined with soda ash and kiln roasted at approximately 2,000 °F.)
(chromium VI compounds: 0.1; chromium III compounds: 1.0)

Includes any unique chemical substance that contains chromium as part of that chemical's infrastructure.

N096 Cobalt Compounds (inorganic compounds: 0.1; organic compounds: 1.0)

Includes any unique chemical substance that contains cobalt as part of that chemical's infrastructure.

N100 Copper Compounds (1.0)

Includes any unique chemical substance that contains copper as part of that chemical's infrastructure. This category does not include copper phthalocyanine compounds that are substituted with only hydrogen, and/or chlorine, and/or bromine.

N106 Cyanide Compounds (1.0)

X⁺CN⁻ where X = H⁺ or any other group where a formal dissociation can be made. For example KCN or Ca(CN)₂

Table II. EPCRA Section 313 Chemical List for Reporting Year 2017

N120 Diisocyanates (1.0)

This category includes only those chemicals listed below.

CAS Number Chemical Name

38661-72-2	1,3-Bis(methylisocyanate)cyclohexane
10347-54-3	1,4-Bis(methylisocyanate)cyclohexane
2556-36-7	1,4-Cyclohexane diisocyanate
134190-37-7	Diethyldiisocyanatobenzene
4128-73-8	4,4'-Diisocyanatodiphenyl ether
75790-87-3	2,4'-Diisocyanatodiphenyl sulfide
91-93-0	3,3'-Dimethoxybenzidine-4,4'-diisocyanate
91-97-4	3,3'-Dimethyl-4,4'-diphenylene diisocyanate
139-25-3	3,3'-Dimethyldiphenylmethane-4,4'-diisocyanate
822-06-0	Hexamethylene-1,6-diisocyanate
4098-71-9	Isophorone diisocyanate
75790-84-0	4-Methyldiphenylmethane-3,4-diisocyanate
5124-30-1	1,1-Methylenebis(4-isocyanatocyclohexane)
101-68-8	Methylenebis(phenylisocyanate) (MDI)
3173-72-6	1,5-Naphthalene diisocyanate
123-61-5	1,3-Phenylene diisocyanate
104-49-4	1,4-Phenylene diisocyanate
9016-87-9	Polymeric diphenylmethane diisocyanate
16938-22-0	2,2,4-Trimethylhexamethylene diisocyanate
15646-96-5	2,4,4-Trimethylhexamethylene diisocyanate

N150 Dioxin and dioxin-like compounds

(Manufacturing; and the processing or otherwise use of dioxin and dioxin-like compounds if the dioxin and dioxin-like compounds are present as contaminants in a chemical and if they were created during the manufacturing of that chemical.) (*) This category includes only those chemicals listed below.
[Note: When completing the Form R Schedule 1, enter the data for each member of the category in the order they are listed here (i.e., 1-17).]

Box #	CAS Number	Chemical Name
1	1746-01-6	2,3,7,8-Tetrachlorodibenzo- <i>p</i> -dioxin
2	40321-76-4	1,2,3,7,8- Pentachlorodibenzo- <i>p</i> -dioxin
3	39227-28-6	1,2,3,4,7,8-Hexachlorodibenzo- <i>p</i> -dioxin
4	57653-85-7	1,2,3,6,7,8-Hexachlorodibenzo- <i>p</i> -dioxin
5	19408-74-3	1,2,3,7,8,9-Hexachlorodibenzo- <i>p</i> -dioxin
6	35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzo- <i>p</i> -dioxin
7	3268-87-9	1,2,3,4,6,7,8,9-Octachlorodibenzo- <i>p</i> -dioxin
8	51207-31-9	2,3,7,8-Tetrachlorodibenzofuran
9	57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran
10	57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran
11	70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran
12	57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran
13	72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran
14	60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran
15	67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran
16	55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran
17	39001-02-0	1,2,3,4,6,7,8,9-Octachlorodibenzofuran

N171 Ethylenebisdithiocarbamic acid, salts and esters EBDCs) (1.0)

Includes any unique chemical substance that contains an EBDC or an EBDC salt as part of that chemical's infrastructure.

N230 Certain Glycol Ethers (1.0)

R - (OCH₂CH₂)_n - OR'

where:

- n = 1, 2, or 3;
- R = Alkyl C7 or less; or
- R = phenyl or alkyl substituted phenyl;
- R' = H or alkyl C7 or less; or
- OR' consisting of carboxylic acid ester, sulfate, phosphate, nitrate, or sulfonate.

Table II. EPCRA Section 313 Chemical List for Reporting Year 2017

N270 Hexabromocyclododecane (*)
(This category includes only those chemicals covered by the CAS numbers listed below)

CAS Number	Chemical Name
3194-55-6	1,2,5,6,9,10-Hexabromocyclododecane
25637-99-4	Hexabromocyclododecane

N420 Lead Compounds (*)
Includes any unique chemical substance that contains lead as part of that chemical's infrastructure.

N450 Manganese Compounds (1.0)
Includes any unique chemical substance that contains manganese as part of that chemical's infrastructure.

N458 Mercury Compounds (*)
Includes any unique chemical substance that contains mercury as part of that chemical's infrastructure.

N495 Nickel Compounds (0.1)
Includes any unique chemical substance that contains nickel as part of that chemical's infrastructure.

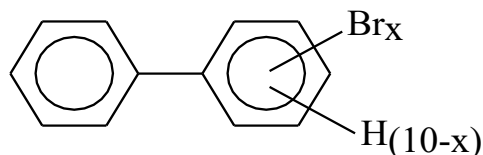
N503 Nicotine and salts (1.0)
Includes any unique chemical substance that contains nicotine or a nicotine salt as part of that chemical's infrastructure.

N511 Nitrate compounds (water dissociable; reportable only when in aqueous solution) (1.0)

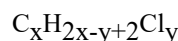
N530 Nonylphenol (1.0)
This category includes only those chemicals listed below.

CAS Number	Chemical Name
104-40-5	4-Nonylphenol
11066-49-2	Isononylphenol
25154-52-3	Nonylphenol
26543-97-5	4-Isononylphenol
84852-15-3	4-Nonylphenol, branched
90481-04-2	Nonylphenol, branched

N575 Polybrominated Biphenyls (PBBs) (0.1)



N583 Polychlorinated alkanes (C₁₀ to C₁₃) (1.0, except for those members of the category that have an average chain length of 12 carbons and contain an average chlorine content of 60% by weight which are subject to the 0.1% *de minimis*)
Includes those chemicals defined by the following formula:



Where $x = 10$ to 13 ;
 $y = 3$ to 12 ; and
where the average chlorine content ranges from 40-70% with the limiting molecular formulas C₁₀H₁₉Cl₃ and C₁₃H₁₆Cl₁₂

N590 Polycyclic aromatic compounds (PACs) (*)
This category includes the chemicals listed below.

CAS Number	Chemical Name
56-55-3	Benz(a)anthracene
205-99-2	Benzo(b)fluoranthene
205-82-3	Benzo(j)fluoranthene
207-08-9	Benzo(k)fluoranthene
206-44-0	Benzo(j,k)fluorene
189-55-9	Benzo(r,s,t)pentaphene
218-01-9	Benzo(a)phenanthrene
50-32-8	Benzo(a)pyrene
226-36-8	Dibenz(a,h)acridine
224-42-0	Dibenz(a,j)acridine
53-70-3	Dibenzo(a,h)anthracene
194-59-2	7H-Dibenzo(c,g)carbazole
5385-75-1	Dibenzo(a,e)fluoranthene
192-65-4	Dibenzo(a,e)pyrene
189-64-0	Dibenzo(a,h)pyrene
191-30-0	Dibenzo(a,l)pyrene
57-97-6	7,12-Dimethylbenz(a)-anthracene
42397-64-8	1,6-Dinitropyrene
42397-65-9	1,8-Dinitropyrene
193-39-5	Indeno(1,2,3-cd)pyrene
56-49-5	3-Methylcholanthrene
3697-24-3	5-Methylchrysene
7496-02-8	6-Nitrochrysene
5522-43-0	1-Nitropyrene
57835-92-4	4-Nitropyrene

N725 Selenium Compounds (1.0)
Includes any unique chemical substance that contains selenium as part of that chemical's infrastructure.

N740 Silver Compounds (1.0)
Includes any unique chemical substance that contains silver as part of that chemical's infrastructure.

Table II. EPCRA Section 313 Chemical List for Reporting Year 2017

N746	Strychnine and salts (1.0) <i>Includes any unique chemical substance that contains strychnine or a strychnine salt as part of that chemical's infrastructure.</i>	N874	Warfarin and salts (1.0) <i>Includes any unique chemical substance that contains warfarin or a warfarin salt as part of that chemical's infrastructure.</i>
N760	Thallium Compounds (1.0) <i>Includes any unique chemical substance that contains thallium as part of that chemical's infrastructure.</i>	N982	Zinc Compounds (1.0) <i>Includes any unique chemical substance that contains zinc as part of that chemical's infrastructure.</i>
N770	Vanadium compounds (1.0) <i>Includes any unique chemical substance that contains vanadium as part of that chemical's infrastructure.</i>		



Beneficial Uses and Water Quality Assessment Map

utah automated geographic
reference center 6/9/2020



Assessment Unit Name: Coal Creek

Unit ID: UT16030006-001_00

Unit Description: Coal Creek and tributaries from Main Street in Cedar City (SR130) to headwaters

Beneficial Uses: Use Class 2B = Infrequent primary contact recreation (e.g. wading, fishing); Use Class 3A = Cold water fishery/aquatic life; Use Class 4 = Agricultural uses (crop irrigation and stock watering)

RIVER_MILE: 45.076

Watershed Management Unit: Cedar / Beaver

Protected: Secondary Contact Recreation, Cold Water Aquatic Life, Agricultural Uses

Blue Ribbon Fishery: none

TMDL Information:

Anti-Degradation Category: Category 1 = No point discharges within U.S. Forest Service outer boundary or to other specified waters of R317-2-12; Category 3 = degradation may be allowed for non-Category 1 waters pursuant to antidegradation review

Perimeter: 86476.852371

Area_m2: 217880719.234

GIS_Acres: 53839.498241

New_AUID: UT16030006-001_00

Shape_Length: 109289.88475

Shape_Area: 348028272.38958

Watershed Scientist: Amy Dickey

Email: adickey@utah.gov

Phone: 801-536-4334

Address: P.O. Box 144870

City: Salt Lake City

State: Utah

Review Plan

Applicant Information

[EDIT](#)

Applicant Type	Sub Contractor
Name	James Armstrong
Mailing Address	795 East Factory Drive
City	Saint George
State	Utah
Zip	84790
Phone	435-730-4629
Email	specialprojects@landmarktesting.com

Project Information

[EDIT](#)

Project Name	Dry Creek Mine
Address	SR-14 MP 2
City	Cedar City
State	Utah
Zip	84721
County	Iron
Acreage	10

Point of Contact

[EDIT](#)

Name	John Wilson
Company	Progressive Contracting Inc.
Address	3657 S 1700 E
City	St. George
State	Utah

Zip	84790
Phone	435-628-6662

BMP 05 Selections

EDIT

05-01. Pre-water and maintain surface soils in a stabilized condition.	05-01. Pre-water and maintain surface soils in a stabilized condition.
05-02. Apply and maintain a chemical stabilizer to surface soils.	false
05-03. Pave operational area(s).	false
05-04. Pre-water material.	05-04. Pre-water material.
05-05. Test material to determine moisture content and silt loading, crush only material that is at optimum moisture content.	false
05-06. Apply water to stabilize material so as to maintain compliance with opacity standards and permit conditions.	05-06. Apply water to stabilize material so as to maintain compliance with opacity standards and permit conditions. *
05-07. Make adjustments to maintain compliance with opacity standards and permit conditions.	05-07. Make adjustments to maintain compliance with opacity standards and permit conditions.
05-08. Install wind break or use enclosure.	false
05-09. Water crushed material immediately following crushing.	05-09. Water crushed material immediately following crushing.
05-10. Apply and maintain a chemical stabilizer to crushed material.	false
05-11. Maintain in enclosure.	false
05-12. Minimize height of stockpile.	05-12. Minimize height of stockpile.
05-13. Minimize vehicle miles.	false
05-14. Reduce truck traffic.	05-14. Reduce truck traffic.
05-15. Reduce truck speed.	05-15. Reduce truck speed.
05-16. Minimize transfer and drop point height.	05-16. Minimize transfer and drop point height. *

BMP 06 Selections

EDIT

06-01. Pre-water and maintain surface soils in a stabilized condition.	06-01. Pre-water and maintain surface soils in a stabilized condition.
--	--

06-02. Apply and maintain a chemical stabilizer to surface soils.

false

06-03. Dig a test hole to depth of cut or equipment penetration to determine if soils are moist at depth. Continue to pre-water if not moist to depth of cut.

06-03. Dig a test hole to depth of cut or equipment penetration to determine if soils are moist at depth. Continue to pre-water if not moist to depth of cut. *

06-04. Apply water to depth of cut prior to subsequent cuts.

06-04. Apply water to depth of cut prior to subsequent cuts. *

06-05. Water disturbed soils to maintain moisture.

06-05. Water disturbed soils to maintain moisture.

06-06. Apply and maintain a chemical stabilizer on disturbed soils to form crust following fill and compaction.

false

06-07. Apply cover (natural or synthetic).

false

BMP 09 Selections

EDIT

09-01. Limit disturbance of soils with the use of fencing, barriers, barricades, and/or wind barriers.

09-01. Limit disturbance of soils with the use of fencing, barriers, barricades, and/or wind barriers.

09-02. Limit vehicle mileage and reduce speed.

09-02. Limit vehicle mileage and reduce speed.

09-03. Apply water to stabilize disturbed soils. Soil moisture must be maintained such that soils can be worked without generating fugitive dust.

09-03. Apply water to stabilize disturbed soils. Soil moisture must be maintained such that soils can be worked without generating fugitive dust.

09-04. Apply and maintain a chemical stabilizer.

false

09-05. Use wind breaks.

false

09-06. Apply cover (natural or synthetic).

false

BMP 10 Selections

EDIT

10-01. Prevent access by fencing, ditches, vegetation, berms or other suitable barrier.

10-01. Prevent access by fencing, ditches, vegetation, berms or other suitable barrier. *

10-02. Apply and maintain a chemical stabilizer on disturbed soils.

false

10-03. Stabilize disturbed soil with vegetation.	false
10-04. Pave or apply surface rock.	false
10-05. Use wind breaks.	false
10-06. Apply water and maintain soil moisture sufficient to avoid generating fugitive dust.	10-06. Apply water and maintain soil moisture sufficient to avoid generating fugitive dust.

BMP 11 Selections

EDIT

11-01. Apply and maintain water/chemical suppressant to operational areas and haul routes.	false
11-02. Limit vehicle mileage and speed.	11-02. Limit vehicle mileage and speed.
11-03. Use tarps or other suitable enclosures on haul trucks.	11-03. Use tarps or other suitable enclosures on haul trucks.
11-04. Apply water prior to transport	11-04. Apply water prior to transport
11-05. Clean wheels.	false
11-06. Sweep or water haul road.	11-06. Sweep or water haul road.

BMP 14 Selections

EDIT

14-01. Pre-water and maintain surface soils in a stabilized condition.	14-01. Pre-water and maintain surface soils in a stabilized condition.
14-02. Apply and maintain a chemical stabilizer on surface soils.	false
14-03. Pave operational area(s).	false
14-04. Apply a dust suppressant to material.	14-04. Apply a dust suppressant to material. *
14-05. Dedicate water source to screening operation and apply water as needed to prevent dust.	14-05. Dedicate water source to screening operation and apply water as needed to prevent dust.
14-06. Install wind barrier upwind of screen as high as the drop point.	false
14-07. Apply water to stabilize screened material and surrounding area.	14-07. Apply water to stabilize screened material and surrounding area.
14-08. Apply and maintain a chemical stabilizer to stabilize screened material and surrounding area.	false

14-09. Minimize storage pile height.

14-09. Minimize storage pile height.

14-10. Drop material through the screen slowly and minimize drop height.

14-10. Drop material through the screen slowly and minimize drop height. *

BMP 15 Selections

EDIT

15-01. Limit vehicle mileage and speed limit.

15-01. Limit vehicle mileage and speed limit.

15-02. Apply water on all vehicle traffic areas in the staging areas and unpaved access routes.

15-02. Apply water on all vehicle traffic areas in the staging areas and unpaved access routes.

15-03. Pre-water and maintain surface soils in a stabilized condition.

15-03. Pre-water and maintain surface soils in a stabilized condition.

15-04. Apply and maintain a chemical stabilizer to surface soils.

false

15-05. Apply a chemical stabilizer.

false

15-06. Apply screened or washed aggregate.

false

15-07. Use wind breaks.

false

15-08. Pave.

false

15-09. Completed project will cover staging area with buildings, paving, and/or landscaping.

false

15-10. Apply water to form adequate crust and prevent access.

15-10. Apply water to form adequate crust and prevent access.

BMP 16 Selections

EDIT

16-01. Pre-water and maintain surface soils in a stabilized condition.

16-01. Pre-water and maintain surface soils in a stabilized condition.

16-02. Apply and maintain a chemical stabilizer on surface soils.

false

16-03. Pave area.

false

16-04. Remove material from the downwind side of the stockpile, when safe to do so.

16-04. Remove material from the downwind side of the stockpile, when safe to do so.

16-05. Reduce height.

16-05. Reduce height.

16-06. Create wind screen

false

16-07. Water stockpiles to form a crust immediately.	16-07. Water stockpiles to form a crust immediately.
16-08. Apply and maintain a chemical stabilizer to all outer surfaces of the stockpiles.	false
16-09. Provide and maintain wind barriers on 3 sides of the pile.	false
16-10. Apply a cover (natural or synthetic)	false
16-11. Wind screen.	false
16-12. Avoid steep sides to prevent material sloughing.	16-12. Avoid steep sides to prevent material sloughing.
16-13. Reduce height.	16-13. Reduce height.

BMP 17 Selections

EDIT

17-01. Pre-water and maintain surface soils in a stabilized condition.	17-01. Pre-water and maintain surface soils in a stabilized condition.
17-02. Apply and maintain a chemical stabilizer on surface soils	false
17-03. Install cover (natural or synthetic).	false
17-04. Apply wind break.	false
17-05. Avoid steep sides or faces	17-05. Avoid steep sides or faces
17-06. Minimizing the area of disturbed tailings.	false
17-07. Restriction the speed of vehicles in and around the tailings operation.	17-07. Restriction the speed of vehicles in and around the tailings operation.

BMP 18 Selections

EDIT

18-01. Clean trackout at the end of the work shift from paved surfaces to maintain dust control	18-01. Clean trackout at the end of the work shift from paved surfaces to maintain dust control
18-02. Maintain dust control during working hours and clean trackout from paved surfaces at the end of the work shift/day.	18-02. Maintain dust control during working hours and clean trackout from paved surfaces at the end of the work shift/day.
18-03. Install gravel pad(s), clean, well-graded gravel or crushed rock.	18-03. Install gravel pad(s), clean, well-graded gravel or crushed rock. Minimum dimensions must be 30 feet wide by 3 inches deep, and, at minimum, 50' or the

Minimum dimensions must be 30 feet wide by 3 inches deep, and, at minimum, 50' or the length of the longest haul truck, whichever is greater. Re-screen, wash or apply additional rock in gravel pad to maintain effectiveness.

length of the longest haul truck, whichever is greater. Re-screen, wash or apply additional rock in gravel pad to maintain effectiveness.

18-04. Install wheel shakers. Clean wheel shakers on a regular basis to maintain effectiveness.

false

18-05. Install wheel washers. Maintain wheel washers on a regular basis to maintain effectiveness.

false

18-06. Motorized vehicles will only operate on paved surfaces.

false

18-07. Install cattle guard before paved road entrance.

false

18-08. Clearly establish and enforce traffic patterns to route traffic over selected trackout control device(s).

18-08. Clearly establish and enforce traffic patterns to route traffic over selected trackout control device(s).

18-09. Limit site accessibility to routes with trackout control devices in place by installing effective barriers on unprotected routes.

18-09. Limit site accessibility to routes with trackout control devices in place by installing effective barriers on unprotected routes.

BMP 19 Selections

EDIT

19-01. Limit vehicle mileage and speeds.

19-01. Limit vehicle mileage and speeds.

19-02. Apply and maintain water on surface soils.

19-02. Apply and maintain water on surface soils.

19-03. Apply and maintain chemical stabilizers on surface soils.

false

19-04. Apply and maintain gravel on surface soils.

false

19-05. Supplement chemical stabilizers, water or aggregate applications as necessary.

false

19-06. Apply recycled asphalt (RAP) to surface soils.

false

BMP 21 Selections

EDIT

21-01. Pre-water and maintain surface soils in a stabilized condition where loaders, support equipment and vehicles will operate.

21-01. Pre-water and maintain surface soils in a stabilized condition where loaders, support equipment and vehicles will operate.

21-02. Apply and maintain a chemical stabilizer on surface soils where loaders, support equipment and vehicles will operate.

false

21-03. Empty loader bucket slowly and keep loader bucket close to the truck to minimize the drop height while dumping.

21-03. Empty loader bucket slowly and keep loader bucket close to the truck to minimize the drop height while dumping.

Print this page for your records or save it as a PDF as specified by your browser or operating system.

By submitting this plan I agree to the following terms:

A. I am authorized, on behalf of the individual or company listed in Section 1, as Applicant, to apply for a Fugitive Dust Control Plan and to commit to all of the terms and conditions of the requested plan.

B. Construction activities will be limited to lands that the applicant either owns or is authorized to use for construction activities.

C. The applicant accepts responsibility for assuring that all contractors, subcontractors, and all other persons on the construction site covered by this plan, comply with the terms and conditions of the Fugitive Dust Control Plan.

D. I understand that any false material statement, representation or certification made in this application may invalidate the plan or cause me to be subject to enforcement action pursuant to Utah Code Ann. 19-2-115. E. Failure to comply with fugitive dust rules may result in compliance action and penalties up to \$10,000 per violation/day.

☐ My plan is ready to be submitted. *

<

PREVIOUS

SUBMIT PLAN

>

[UTAH.GOV HOME](#)

[UTAH.GOV TERMS OF USE](#)

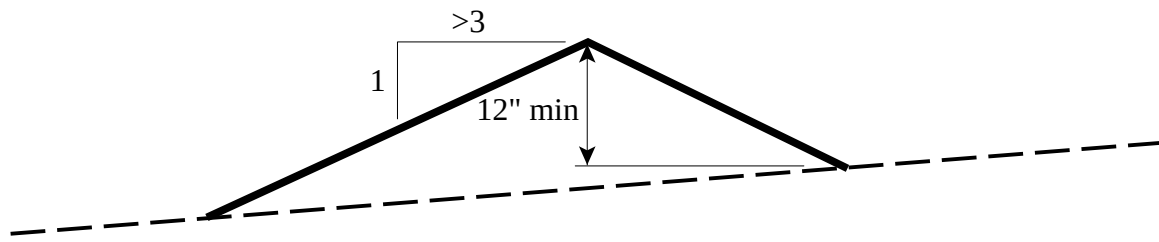
[UTAH.GOV PRIVACY POLICY](#)

[TRANSLATE UTAH.GOV](#)

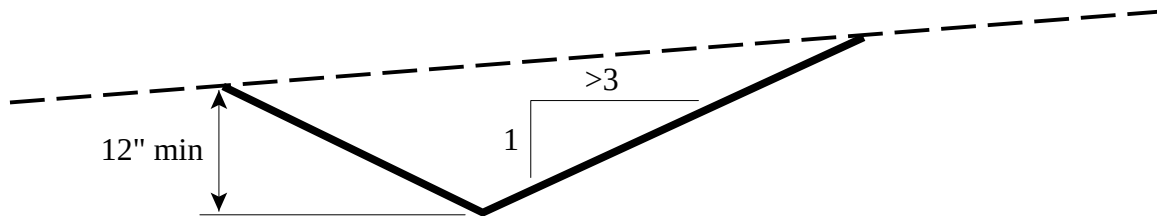
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APPENDIX N

BMP SPECIFICATIONS



Soil Berm



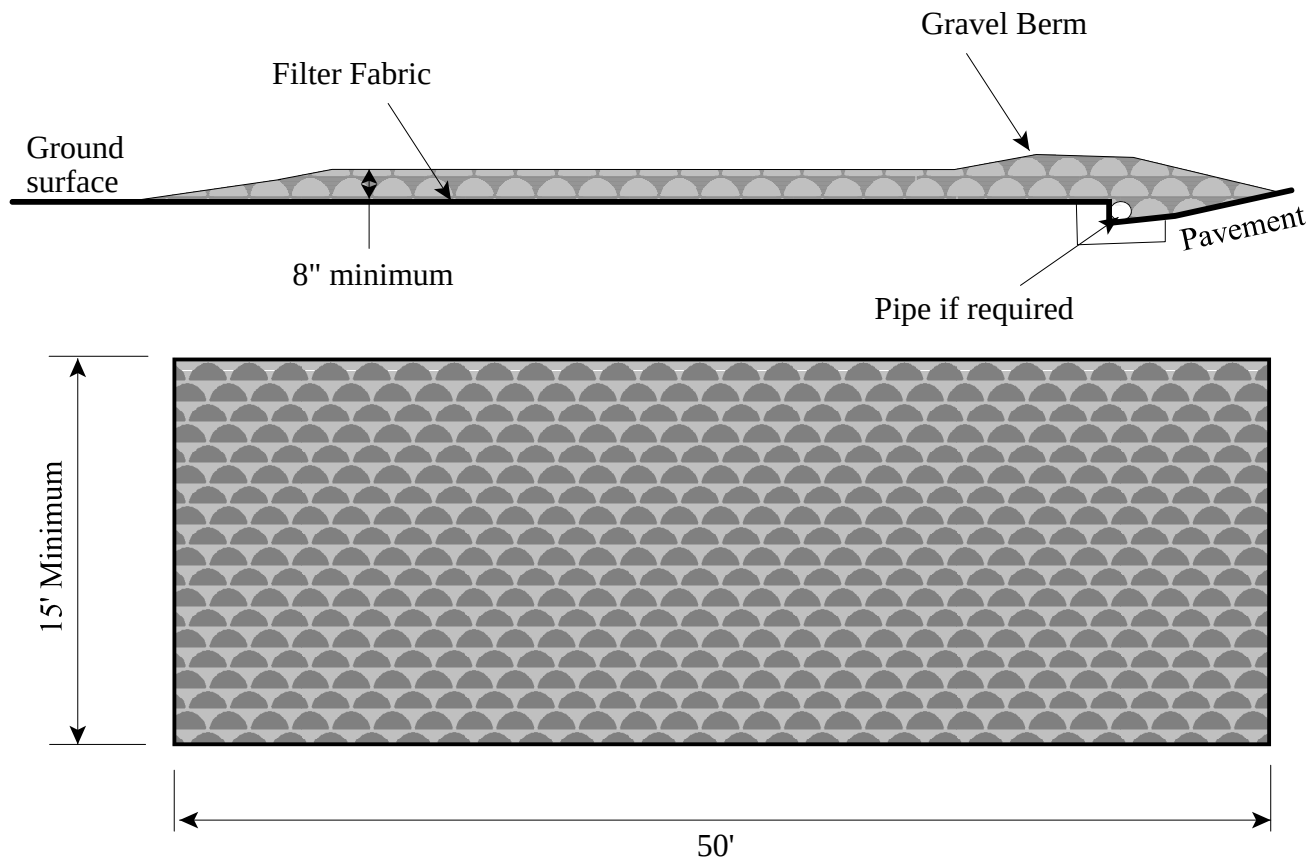
Excavated Swale

Soil Berm and Drainage Swale Installation Notes

1. See Site Plan for location of berms and/or swales
2. Berms and swales shall be installed prior to land-disturbing activities in the area.
3. Berms are to be compacted to 90 percent of the modified Proctor dry density.
4. Swales are to drain to a settling pond.
5. When construction traffic must cross a swale, install a culvert with a minimum diameter of 12 inches.

Soil Berm and Drainage Swale Maintenance Notes:

1. Inspect BMPs each workday and maintain them in effective operating condition. Maintenance of BMPs should be proactive and as soon as possible, and always within 24 hours, following a storm event and perform necessary Maintenance.
2. Frequent observations and maintenance are necessary to maintain BMPs in effective operating condition. Inspections and corrective measures should be documented thoroughly.
3. Debris and/or sediment buildup shall be removed from behind berms and from swales when it reaches one-third the height or depth of the BMP.
4. Where BMPs have failed, repair or replacement should be initiated upon discovery of the failure.
5. Berms and swales should remain in place until the end of construction; if approved by the local jurisdiction, they may remain in place.
6. When a berm or swale is removed, the disturbed area shall be covered with permanent erosion control measures, i.e. Landscaping or structures.

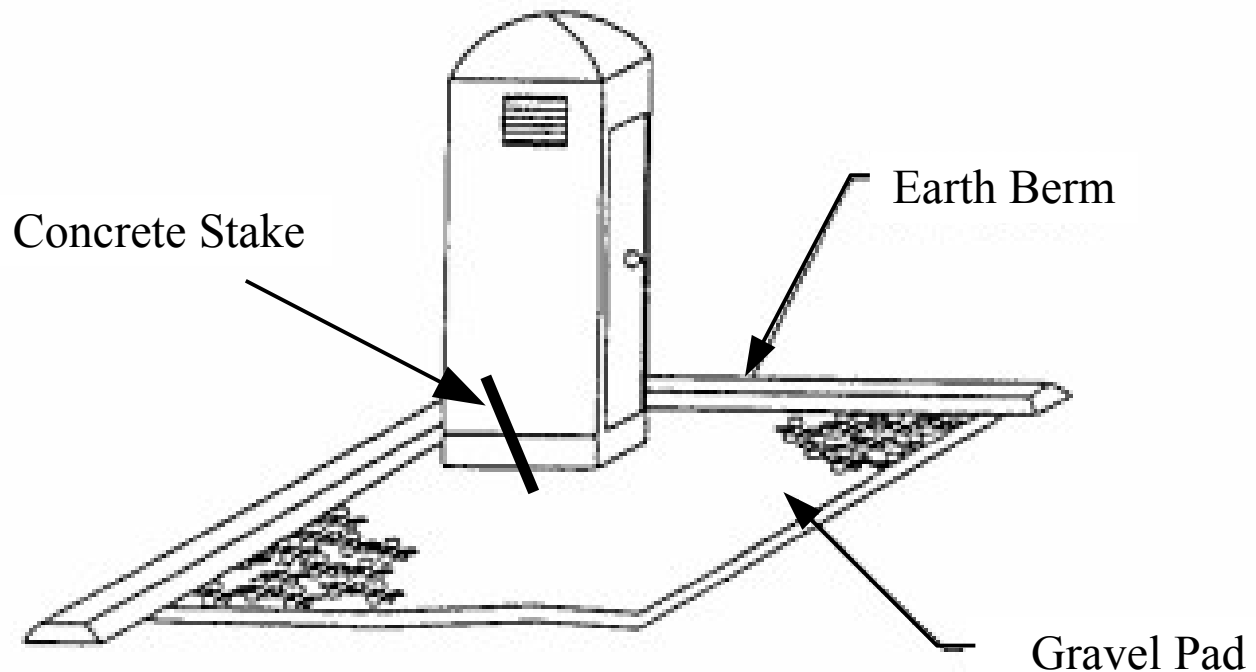


Track-Out Pad Installation Notes:

1. Clear and grub area and provide a maximum slope of 2%.
2. Compact subgrade and place filter fabric is desired (recommended if project duration is longer than 3 months).
3. Place coarse aggregate, 3- to 6-inch clean gravel.
4. Place a gravel berm, 1 foot high and 3 feet wide, on the pavement end of the track-out pad.
5. A drainage pipe may be required if crossing curb and gutter.

Track-Out Pad Maintenance Notes:

1. Inspect BMPs each workday and maintain them in effective operating condition. Maintenance of BMPs should be proactive and as soon as possible, and always within 24 hours, following a storm event and perform necessary Maintenance.
2. Frequent observations and Maintenance are necessary to maintain BMPs in effective operating condition. Inspections and corrective measures should be documented thoroughly.
3. Where BMPs have failed, repair or replacement should be initiated upon discovery of the failure. Additional gravel should be placed as required to maintain effectiveness.
5. The track-out pad should remain in place until the end of construction
6. When the track-out pad is removed, the disturbed area shall be covered with covered with permanent erosion control measures, i.e. landscaping or structures.



Portable Toilet Installation Notes

- Locate portable toilets in convenient locations throughout the site.
- Locate a minimum of 10 feet from the back of sidewalks or curbs and other drainage structures
- Prepare level, gravel surface and provide clear access to the toilets for servicing and for on-site personnel.
- Construct earth berm perimeter (See Earth Berm and Drainage Swale), control for spill/protection leak.
- Use concrete stakes or other mean to prevent tipping.

Portable Toilet Maintenance Notes

- Portable toilets should be maintained in good working order by licensed service with daily observation for leak detection.
- Regular waste collection should be arranged with licensed service.
- All waste should be deposited in sanitary sewer system for treatment with appropriate agency approval.

P.C.I.
PROGRESSIVE CONTRACTING INC.

APPENDIX I

RECLAMATION COST ESTIMATE

2023 MOB/DEMOB using R.S. MEANS and SRCE equipment and DAVIS-BACON wages												
blue font is for project specific user input			Miles from Washoe County Courthouse to project, one way						255			
			Miles from equipment rental yard to project, one way (9)						54			
Dry Creek Mine - Progressive Contracting, Inc.						Hours travel time @ 55 MPH					0.98	
Equipment			Mobilization \$/hour (1)	\$ Flat Rate load & unload (2)	\$/hour Deadhead (empty return cost (3)	Disassembly and assembly (4)	Permit cost \$ (5)	Pilot car costs	# of units	One Way Mob Cost	Total Mob and Demob Cost	
Bulldozers												
D6R	\$ 106	\$ 106	\$ 106	\$ -	\$ -	\$ -	\$ -			\$ -	\$ -	
D7R	\$ 142	\$ 142	\$ 142	\$ -	\$ 25	\$ 124	1	\$ 570	\$ 1,140			
D8R	\$ 167	\$ 167	\$ 167	\$ -	\$ 25	\$ 247	1	\$ 766	\$ 1,533			
D9R	\$ 167	\$ 167	\$ 167	\$ -	\$ 25	\$ 247		\$ -	\$ -			
D10R	\$ 167	\$ 167	\$ 167	\$ 108,000	\$ 25	\$ 371		\$ -	\$ -			
D11R (two transports) (7)	\$ 167	\$ 167	\$ 167	\$ 196,168	\$ 25	\$ 247		\$ -	\$ -			
Motor Graders												
14G/H	\$ 109	\$ 109	\$ 109	\$ -	\$ -	\$ -		\$ -	\$ -			
16G/H	\$ 142	\$ 142	\$ 142	\$ -	\$ 25	\$ 124	1	\$ 570	\$ 1,140			
Track Excavators												
320C	\$ 142	\$ 142	\$ 142	\$ -	\$ -	\$ -		\$ -	\$ -			
325C	\$ 142	\$ 142	\$ 142	\$ -	\$ -	\$ -	1	\$ 421	\$ 842			
345B	\$ 167	\$ 167	\$ 167	\$ -	\$ 25	\$ 247	1	\$ 766	\$ 1,533			
385BL	\$ 167	\$ 167	\$ 167	\$ 85,200	\$ 25	\$ 247		\$ -	\$ -			
Scrapers												
631G	\$ 167	\$ 167	\$ 167	\$ -	\$ 25	\$ 247		\$ -	\$ -			
637G PP	\$ 167	\$ 167	\$ 167	\$ -	\$ 25	\$ 247	2	\$ 1,533	\$ 3,065			
Wheeled Loaders												
928G	\$ 109	\$ 109	\$ 109	\$ -	\$ -	\$ -		\$ -	\$ -			
966G	\$ 109	\$ 109	\$ 109	\$ -	\$ -	\$ -		\$ -	\$ -			
972G	\$ 142	\$ 142	\$ 142	\$ -	\$ -	\$ -		\$ -	\$ -			
988G	\$ 142	\$ 142	\$ 142	\$ -	\$ 25	\$ 124	1	\$ 570	\$ 1,140			
992G (two transports) (7)	\$ 167	\$ 167	\$ 167	\$ 100,800	\$ 25	\$ 247		\$ -	\$ -			
Hydraulic Hammers												
H-120 (fits 325) no charge, mobilize with machine	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		\$ -	\$ -			
H-160 (fits 345) no charge, mobilize with machine	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		\$ -	\$ -			
H-180 (fits 365/385) no charge, mobilize with machine	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		\$ -	\$ -			
Other Equipment												
420D 4WD Backhoe	\$ 109	\$ 109	\$ 109	\$ -	\$ -	\$ -		\$ -	\$ -			
CS563E Vibratory Roller	\$ 109	\$ 109	\$ 109	\$ -	\$ -	\$ -		\$ -	\$ -			
Light Truck - 1.5 Ton	\$ 98	\$ 98	\$ -	\$ -	\$ -	\$ -	1	\$ 195	\$ 390			
Supervisor's Truck	\$ 82	\$ 82	\$ -	\$ -	\$ -	\$ -	1	\$ 163	\$ 326			
Air Compressor + tools	\$ 91	\$ 91	\$ 91	\$ -	\$ -	\$ -		\$ -	\$ -			
Welding Equipment	\$ 91	\$ 91	\$ 91	\$ -	\$ -	\$ -		\$ -	\$ -			
Heavy Duty Drill Rig	\$ 224	\$ 224	\$ -	\$ -	\$ -	\$ -		\$ -	\$ -			
Pump (plugging) Drill Rig	\$ 228	\$ 228	\$ -	\$ -	\$ -	\$ -		\$ -	\$ -			
Concrete Pump	\$ 91	\$ 91	\$ 91	\$ -	\$ -	\$ -		\$ -	\$ -			
Gas Engine Vibrator	\$ 91	\$ 91	\$ 91	\$ -	\$ -	\$ -		\$ -	\$ -			
Generator 5KW	\$ 91	\$ 91	\$ 91	\$ -	\$ -	\$ -		\$ -	\$ -			
HDEP Welder (pipe or liner)	\$ 91	\$ 91	\$ 91	\$ -	\$ -	\$ -		\$ -	\$ -			
5 Ton Crane Truck	\$ 124	\$ 124	\$ -	\$ -	\$ -	\$ -		\$ -	\$ -			
25 Ton Crane	\$ 95	\$ 95	\$ -	\$ -	\$ -	\$ -	1	\$ 189	\$ 378			
Trucks												
725	\$ 109	\$ 109	\$ 109	\$ -	\$ -	\$ -		\$ -	\$ -			
740	\$ 142	\$ 142	\$ 142	\$ -	\$ 25	\$ 124	2	\$ 1,140	\$ 2,279			
769D	\$ 142	\$ 142	\$ 142	\$ -	\$ 25	\$ 247		\$ -	\$ -			
777D (two transports) (8)	\$ 167	\$ 167	\$ 167	\$ 144,000	\$ 25	\$ 371		\$ -	\$ -			
613E (5,000 gal) Water Wagon	\$ 167	\$ 167	\$ 167	\$ -	\$ -	\$ -		\$ -	\$ -			
621E (8,000 gal) Water Wagon	\$ 167	\$ 167	\$ 167	\$ -	\$ 25	\$ 247		\$ -	\$ -			
Dump Truck (10-12 yd³)	\$ 141	\$ 141	\$ 141	\$ -	\$ -	\$ -	1	\$ 417	\$ 835			
Miscellaneous												
Equipment for dry hole abandonment (420D 4WD)	\$ 109	\$ 109	\$ 109	\$ -	\$ -	\$ -		\$ -	\$ -			
Pilot car (Light Truck)	\$ 84	\$ 84	\$ 84	\$ -	\$ -	\$ -		\$ -	\$ -			
Truck Tractor + Lowbed Trailer 75 ton	\$ 167	\$ 167	\$ 167	\$ -	\$ -	\$ -		\$ -	\$ -			
Truck Tractor + Flatbed Trailer 40 ton	\$ 142	\$ 142	\$ 142	\$ -	\$ -	\$ -		\$ -	\$ -			
Light Truck + Flatbed Trailer 25 ton	\$ 91	\$ 91	\$ 91	\$ -	\$ -	\$ -		\$ -	\$ -			
									14	\$ 14,599		
Footnotes and explanations of assumptions												
(1) The sum of the cost of equipment from either the SRCE or RSM equipment tab plus Davis-Bacon labor tab												
(2) Assumes minimum of 30 minutes load and secure and 30 minutes unsecure and unload machine.												
(3) No "Deadhead" (empty) charge for Mob up to 50 miles. More than 50 miles the cost of deadhead same rate as loaded miles.												
(4) Only large equipment requires disassembly for transport. Includes cost of mechanic + mechanic's truck + crane operator + crane.												
(5) Nevada Dept. of Transportation overdimensional permits are \$25 per trip or \$60 per year.												
(6) Sum of mobilization plus all ancillary costs for one way loaded and return empty.												
(7) Two transports are required but the second transport does not need pilot cars or permits or a heavy duty trailer.												
(8) Two transports required with both requiring full complement of pilot cars and permits.												
(9) For large mining operations, mobilization may be required from more than one location. For example, the Elko yard may not have four 631 scrapers. Additional equipment may need to mobilize from Reno, Las Vegas, or Salt Lake City. Input the further distance here.												
(10) Pilot Car costs based on SRCE light truck costs and Davis-Bacon wages												
(11) SRCE costs based on July 2023 vendor quotes.												
(12) RS Means costs based on R.S. Means Heavy Construction Cost Data, 2023 Q2												
(13) Davis Bacon wages based on 2023 determination.												

**Closure Cost Estimate
Property Information**

Enter Data Below in Green and Blue Spaces

STANDARDIZED RECLAMATION COST ESTIMATOR

Version 1.4.1

Build 017b (Revised 16 May 2019)

Approved for use in Nevada, August 1, 2012

COST DATA FILE INFORMATION

File Name:	BlankSRCE_Version_1_4_1_017_NV_2023_Costs.xlsm		
Cost Data File:	SRCE_Cost_Data_File_1_12_Std_2023.xlsm		
Cost Data Date:	August 1, 2023		
Cost Data Basis:	User Data	Data Cost Units:	Imperial
Author/Source:	Nevada Division of Environmental Protection (NDEP) & NV BLM		

PROJECT INFORMATION

Property/Mine Name:	Dry Creek Mine	Property Code:	
Project Name:	Progressive Contracting, Inc.		
Date of Submittal:	January 2024	Average Altitude:	6400 ft.
Select One:	☐ Notice or Sm Exploration Plan ☐ Lg Exploration Plan ☒ Mine Operation		
Select One:	☐ Private Land ☒ Public or Public/Private		
Cost Estimate Type:	Surety		
Cost Basis Category:	Northern Nevada		
Cost Basis Description:	Churchill, Douglas, Elko, Eureka, Humboldt, Lander, Lyon, Mineral, Pershing, Storey, Washoe, and White Pine Counties		

Closure Cost Estimate Table of Contents

Project Name: Progressive Contracting, Inc.
Project Date: January 2024
ankSRCE_Version_1_4_1_017_NV_2023_Costs.xlsm
Reclamation Plan

Table of Contents

- Property Information
- Cost Summary
- Exploration
- Exploration Roads & Pads
- Waste Rock Dumps
- Heap Leach Pads
- Tailings
- Roads
- Pits
- Quarries & Borrow Pits
- Underground Openings
- Material Hauling
- Foundations and Buildings
- Other Demo & Equipment Removal
- Sediment & Drainage Control
- Process Ponds
- Landfills
- Yards, Etc.
- Waste Disposal
- Well Abandonment
- Misc. Costs
- Monitoring
- Construction Management
- Solution Management
- Other User
- Reclamation Quantities
- Labor Costs
- Equipment Costs
- Material Costs
- Misc. Unit Costs
- Fleets (Crews)
- Productivity
- User Tools
- Seed Mixture
- User Sheet 1
- User Sheet 2
- User Sheet 3
- User Sheet 4
- User Sheet 5
- User Sheet 6
- User Sheet 7
- User Sheet 8
- User Sheet 9
- User Sheet 10
- User Sheet 11
- User Sheet 12
- User Sheet 13
- User Sheet 14
- User Sheet 15
- User Sheet 16
- User Sheet 17
- User Sheet 18
- User Sheet 19
- User Sheet 20

[illegible]

Closure Cost Estimate
Cost Summary
Project Name: Progressive Contracting, Inc.
Project Date: January 2024
Model Version: Version 1.4.1
File Name: BlankSRCE_Version_1_4_1_017_NV_2023_Costs.xlsm

A. Earthwork/Recontouring	Labor ⁽¹⁾	Equipment ⁽²⁾	Materials	Total
Exploration	\$0	\$0	\$0	\$0
Exploration Roads & Drill Pads	\$0	\$0	\$0	\$0
Roads	\$0	\$0	\$0	\$0
Well Abandonment	\$0	\$0	\$0	\$0
Pits	\$0	\$0	N/A	\$0
Quarries & Borrow Areas	\$17,629	\$63,014	\$0	\$80,643
Underground Openings	\$0	\$0	\$0	\$0
Process Ponds	\$0	\$0	\$0	\$0
Heaps	\$0	\$0	\$0	\$0
Waste Rock Dumps	\$8,136	\$14,219	\$0	\$22,355
Landfills	\$0	\$0	\$0	\$0
Tailings	\$0	\$0	\$0	\$0
Foundation & Buildings Areas	\$0	\$0	\$0	\$0
Yards, Etc.	\$0	\$0	\$0	\$0
Drainage & Sediment Control	\$0	\$0	\$0	\$0
Generic Material Hauling	\$18,342	\$59,699	\$0	\$78,041
Other User Costs (from Other User sheet)	\$0	\$0	\$0	\$0
Other**				\$0
Subtotal	\$44,107	\$136,932	\$0	\$181,039
Mob/Demob if included in Other User sheet	\$0	\$0	\$0	\$0
Mob/Demob			\$14,599	\$14,599
Subtotal "A"	\$44,107	\$136,932	\$14,599	\$195,638
B. Revegetation/Stabilization	Labor ⁽¹⁾	Equipment ⁽²⁾	Materials	Total
Exploration	\$0	\$0	\$0	\$0
Exploration Roads & Drill Pads	\$0	\$0	\$0	\$0
Roads	\$0	\$0	\$0	\$0
Well Abandonment				N/A
Pits	\$0	\$0	\$0	\$0
Quarries & Borrow Areas	\$11,207	\$6,404	\$19,348	\$36,959
Underground Openings				N/A
Process Ponds	\$0	\$0	\$0	\$0
Heaps	\$0	\$0	\$0	\$0
Waste Rock Dumps	\$0	\$0	\$0	\$0
Landfills	\$0	\$0	\$0	\$0
Tailings	\$0	\$0	\$0	\$0
Foundation & Buildings Areas	\$0	\$0	\$0	\$0
Yards, Etc.	\$0	\$0	\$0	\$0
Drainage & Sediment Control	\$0	\$0	\$0	\$0
Generic Material Hauling	\$7,420	\$4,240	\$12,826	\$24,486
Other User Costs (from Other User sheet)	\$0	\$0	\$0	\$0
Other**				\$0
Subtotal "B"	\$18,627	\$10,644	\$32,174	\$61,445
C. Detoxification/Water Treatment/Disposal of Wastes**	Labor ⁽¹⁾	Equipment ⁽²⁾	Materials	Total
Process Ponds/Sludge				\$0
Heaps				\$0
Dumps (Waste & Landfill)				\$0
Tailings				\$0
Surplus Water Disposal				\$0
Monitoring				\$0
Miscellaneous				\$0
Solid Waste - On Site	\$2,791	\$9,906	N/A	\$12,697
Solid Waste - Off Site				\$0
Hazardous Materials				\$0
Hydrocarbon Contaminated Soils	\$0	\$0	\$0	\$0
Other User Costs (from Other User sheet)	\$0	\$0	\$0	\$0
Other**				\$0
Subtotal "C"	\$2,791	\$9,906	\$0	\$12,697
D. Structure, Equipment and Facility Removal, and Misc.	Labor ⁽¹⁾	Equipment ⁽²⁾	Materials	Total
Foundation & Buildings Areas	\$0	\$0	\$0	\$0
Other Demolition	\$0	\$0	\$0	\$0
Equipment Removal	\$6,300	\$42,000	\$0	\$48,300
Fence Removal	\$0	\$0		\$0
Fence Installation	\$0	\$0	\$0	\$0
Culvert Removal	\$0	\$0	N/A	\$0
Pipe Removal	\$0	\$0	N/A	\$0
Powerline Removal	\$0			\$0
Transformer Removal	\$0			\$0
Rip-rap, rock lining, gabions	\$0	\$0	\$0	\$0
Other Misc. Costs	\$0	\$0	\$0	\$0
Other User Costs (from Other User sheet)	\$0	\$0	\$0	\$0
Other**				\$0
Subtotal "D"	\$6,300	\$42,000	\$0	\$48,300
E. Monitoring	Labor ⁽¹⁾	Equipment ⁽²⁾	Materials	Total
Reclamation Monitoring and Maintenance	\$17,339	\$12,599	\$18,584	\$48,522
Ground and Surface Water Monitoring	\$0	\$0	\$0	\$0
Other User Costs (from Other User sheet)	\$0	\$0	\$0	\$0
Subtotal "E"	\$17,339	\$12,599	\$18,584	\$48,522
F. Construction Management & Support	Labor	Equipment ⁽²⁾	Materials	Total
Construction Management	\$46,094	\$13,973	N/A	\$60,067
Construction Support	\$0	\$231	\$0	\$231
Road Maintenance	\$865	\$1,606	\$0	\$2,471
Other User Costs (from Other User sheet)	\$0	\$0	\$0	\$0
Other**				\$0
Subtotal "F"	\$46,959	\$15,810	\$0	\$62,769
Subtotal Operational & Maintenance Costs	Labor ⁽¹⁾	Equipment ⁽²⁾	Materials ⁽³⁾	Total
Subtotal A through F	\$136,123	\$227,891	\$65,357	\$429,371

** Other Operator supplied costs - additional documentation required.

Indirect Costs	Include?	Total
1. Engineering, Design and Construction (ED&C) Plan (7)		
2. Contingency (8)		\$42,937
3. Insurance (9)	\$2,042	\$2,042
4. Performance Bond (10)		\$12,881
5. Contractor Profit (11)		\$42,937
6. Contract Administration (12)		\$42,937
7. Government Indirect Cost (13)		\$9,017
Subtotal Add-On Costs		\$152,751
Total Indirect Costs as % of Direct Cost		36%
GRAND TOTAL		\$582,122

Administrative Cost Rates (%)	Cost Ranges for Indirect Cost Percentages			
	<=	<=	<=	>
1. Engineering, Design and Construction (ED&C) Plan (7)	\$1,000,000	\$25,000,000		\$25,000,000
Variable Rate	8%	6%		4%
	<=	<=	<=	>
2. Contingency (8)	\$500,000	\$5,000,000	\$50,000,000	\$50,000,000
Variable Rate	10%	8%	6%	4%
3. Insurance (9)	1.5%	of labor costs		
4. Bond (10)	3.0%	of the O&M costs if O&M costs are >\$100,000		
5. Contractor Profit (11)	10%	of the O&M costs		
	<=	<=	<=	>
6. Contract Administration (12)	\$1,000,000	\$25,000,000		\$25,000,000
Variable Rate	10%	8%		6%
Government Indirect Cost (13)	21%	of contract administration		

- RECLAMATION COST ESTIMATION SUMMARY SHEET FOOTNOTES
- Federal construction contracts require Davis-Bacon wage rates for contracts over \$2,000. Wage rate estimates may include base pay, payroll loading.
 - The reclamation cost estimate must include the estimated plugging cost of at least one drill hole for each active drill rig in the project area. Where the
 - Miscellaneous items should be itemized on accompanying worksheets.
 - Fluid management should be calculated only when mineral processing activities are involved. Fluid management represents the costs of maintaining proper
 - Handling of hazardous materials includes the cost of decontaminating, neutralizing, disposing, treating and/or isolating all hazardous materials used,
 - Any mitigation measures required in the Plan of Operations must be included in the reclamation cost estimate. Mitigation may include measures to avoid,
 - Engineering, design and construction (ED&C) plans are often necessary to provide details on the reclamation needed to contract for the required work. To
 - A contingency cost is included in the reclamation cost estimation to cover unforeseen cost elements. Calculate the contingency cost as a percentage of the
 - Insurance premiums are calculated at 1.5% of the total labor costs. Enter the premium amount if liability insurance is not included in the itemized unit costs.
 - Federal construction contracts exceeding \$100,000 require both a performance and a payment bond (Miller Act, 40 USC 270et seq.). Each bond premium
 - For Federal construction contracts, use 10% of estimated O&M cost for the contractor's profit.
 - To estimate the contract administration cost, use 6 to 10% of the operational and maintenance (O&M) cost. Calculate the contract administration cost as a
 - Government indirect cost rate is 21% of the contract administration costs.

Closure Cost Estimate
Other User

Project Name: Progressive Contracting, Inc. - Reclamation Plan
Date of Submittal: January 2024
File Name: BlankSRCE_Version_1_4_1_017_NV_2023_Costs.xlsm
Model Version: Version 1.4.1
Cost Data: User Data
Cost Data File: SRCE_Cost_Data_File_1_12_Std_2023.xlsm
Cost Estimate Type: Surety Cost Basis: Northern Nevada

Other Cost Items Calculated Elsewhere												
	Description (required)	ID Code	Facility Type	Quantity	Units	Total Capital Cost \$	Material Unit Cost \$	Labor Unit Cost \$	Equipment/ Operating Unit Cost \$	Cost Type (select)	Total Cost \$	Comments
						\$0	\$0	\$0	\$0		\$0	

Notes: Capital cost is lump sum (i.e. not multiplied by the quantity).
Material, Labor and Equipment/Operating costs are unit costs (i.e. multiplied by the quantity).

**Closure Cost Estimate
Reclamation Quantities**

Project Name: Progressive Contracting, Inc. - Reclamation Plan
Date of Submittal: January 2024
File Name: BlankSRCE_Version_1_4_1_017_NV_2023_Costs.xlsm
Model Version: Version 1.4.1
Data Cost File: SRCE_Cost_Data_File_1_12_Std_2023.xlsm
Cost Data: User Data
Cost Data File: SRCE_Cost_Data_File_1_12_Std_2023.xlsm
Cost Estimate Type: Surety Cost Basis: Northern Nevada

Reclamation Quantity Summary												Unit Costs					
	Description	Total Regrade or Haul Volume cy	Total Regrade or Haul Cost \$	Total Cover Volume cy	Cover Placement Cost \$	Total Growth Media Volume cy	Growth Media Placement Cost \$	Total Surface Area acres	Total Scarify Cost \$	Total Revetation Cost \$	TOTALS \$	Regrade Unit Cost \$/CY	Material Haul or Backfill Unit Cost \$/CY	Cover Unit Cost \$/CY	Growth Media Unit Cost \$/CY	Scarify Unit Cost \$/CY	Area Unit Cost \$/acre
1	Waste Rock Dumps	115,000	\$ 22,355		\$ -		\$ -	14.12	\$ -	\$ -	\$ 22,355	\$0.19	N/A			\$0.00	\$1,583.22
2	Tailings Impoundments		\$ -		\$ -		\$ -		\$ -	\$ -	\$ -		N/A				
3	Heap Leach Pads		\$ -		\$ -		\$ -		\$ -	\$ -	\$ -		N/A				
5	Open Pits		\$ -							\$ -	\$ -		N/A				
4	Quarries & Borrow Pits		\$ -		\$ -	49,368	\$ 69,217	61.2	\$ -	\$ 35,343	\$ 104,560		N/A		\$1.40	\$0.00	\$1,708.50
6	Roads		\$ -				\$ -		\$ -	\$ -	\$ -		N/A				
7	Landfills		\$ -		\$ -		\$ -		\$ -	\$ -	\$ -		N/A				
8	Buildings		\$ -		\$ -		\$ -		\$ -	\$ -	\$ -		N/A				
9	Yards		\$ -		\$ -		\$ -		\$ -	\$ -	\$ -		N/A				
10	Ponds		\$ -		\$ -		\$ -		\$ -	\$ -	\$ -	N/A					
11	Exploration Roads		\$ -				\$ -		\$ -	\$ -	\$ -		N/A				
12	Exploration Trenches		\$ -				\$ -		\$ -	\$ -	\$ -		N/A				
13	Diversion Ditches		\$ -				\$ -		\$ -	\$ -	\$ -		N/A				
14	Sediment Ponds		\$ -				\$ -		\$ -	\$ -	\$ -		N/A				
15	Generic Haulage/Backfill	49,344	\$ 69,217		\$ -		\$ -	61.2	\$ 8,824	\$ 24,486	\$ 102,527	N/A	\$1.40			\$144.18	\$1,675.28
16	Adit/Decline Backfilling1		\$ -								\$ -	N/A					
17	Shaft Backfilling		\$ -								\$ -	N/A					
TOTALS		164,344	\$ 91,572	-	\$ -	49,368	\$ 69,217	136.52	\$ 8,824	\$ 59,829	\$ 229,442						
Average Costs		per CY	\$0.56	per CY		per CY	\$1.40	per acre	\$64.64	\$6.78	\$1,681	per acre					

Closure Cost Estimate Exploration

Project Name: Progressive Contracting, Inc. - Reclamation Plan
Date of Submittal: January 2024
File Name: BlankSRCE_Version_1_4_1_017_NV_2023_Costs.xlsm
Model Version: Version 1.4.1
Cost Data: User Data
Cost Data File: SRCE_Cost_Data_File_1_12_Std_2023.xlsm
Cost Estimate Type: Surety Cost Basis: Northern Nevada

Exploration - Cost Summary				
	Labor	Equipment	Materials	Totals
Hole Abandonment Costs	\$0	\$0	\$0	\$0
Trench Backfilling Costs	\$0	\$0		\$0
Subtotal Earthworks	\$0	\$0	\$0	\$0
Trench Revegetation Costs	\$0	\$0	\$0	\$0
TOTALS	\$0	\$0	\$0	\$0

Exploration Drillhole Abandonment - User Input

Facility Description			Hole Plugging							
	Description (required)	ID Code	Hole Type (select)	Diameter in	Total Number of Holes	Max Holes Open at One Time	Casing to Remove ft	Average Depth of Hole ⁽¹⁾ ft bgs	Depth to Water ft bgs	Hole Plug Method (select)

Notes:

1. If core holes are pre-drilled, use length of hole below pre-drilled length
2. If Top Plug is selected, assumes maximum 1/2hr laborer time to place plug and backfill with cuttings/soil (including move-to/set up time).

Exploration Trenches - User Input

Facility Description			Trench Parameters					Backfill			Revegetation		
	Description (required)	ID Code	Trench Length ft	Trench Depth ft	Trench Bottom Width ft	Trench Sideslope Angle degrees	Additional Hrs for Walk-in hr ⁽¹⁾	Backfill Material (select)	Cut Material Type (select)	Backfilling Fleet (select)	Seed Mix (select)	Mulch (select)	Fertilizer (select)

Notes:

1. Include one-way hours necessary to walk equipment in from drop-off point to work area
2. Material Types are used for density correction based on material densities in Caterpillar Performance Handbook material density table

Exploration Drillhole Abandonment

	Description (required)	Vol/foot of depth ft3	Hole Plugging Material ⁽¹⁾	Total Grout Volume ⁽²⁾ cy	Total Cuttings Volume cy	Total Top Seal Volume ^(3,4) cy	Total Drillhole Abandon. Hours ^(6,7) hrs	Casing Removal Labor Cost ⁽⁵⁾ \$	Casing Removal Equipment Cost \$	Plugging Labor Cost \$	Plugging Equipment Cost \$	Plugging Material Cost \$	Top Seal Material Cost ^(2,3) \$	Total Cost ^(6,7) \$
								\$0	\$0	\$0	\$0	\$0	\$0	\$0

Notes:

1. Assumes grout backfill from bottom of hole to 50' (15.24m) above static water level, up to 10' (3m) from top of hole
2. Assumes 25% loss to formation for grout backfill
3. If "Top Plug" hole plug method is used, assumes physical plug installed without backfill, grout or cement. Not available option for Nevada projects
4. Assumes top 20' (6 m) of hole is plugged with cement if "Grout Only", "Backfill + Grout", or "Cement Plug" hole plug method are chosen.
5. Assumes that a) casing is not cemented entire length, b) does not include temporary surface casing
6. Assumes minimum 1 hr per hole for abandonment (excluding move-to and casing removal)
7. Assumes fixed hours per hole for setup & tear-down and moving between holes (see Productivity Sheet) per drill hole (includes rig time if grouting required, labor crew only if cuttings backfill only)

Exploration Trenches - Calculations

Exploration Trench Volume Calculation	Dozing & Ripping/Scarifying Calculations
Trench Volume = Trench Length x Cross Sectional Area	Dozing: Dozing distance = 1/2 trench length or 400 ft (max push) whichever is less Assumes flat push (grade correction factor = 1) Revegetation: 10 ft added to trench width to account for revegetation under spoil pile

Exploration Trenches - Backfill/Regrading Costs

Productivity = Dozer Productivity x Grade Correction x Density Correction x Operator (0.75) x Material x Visibility x Job Efficiency (0.83)

	Description (required)	Trench Backfill Volume LCY (BCY+30%)	Dozer Push Distance ft	Equipment Productivity yd3/hr	Dozing Material	Density Correction	Backfilling Fleet	Corrected Hourly Productivity yd3/hr	Total Dozer Hours hr	Trench Backfill Labor Cost \$	Trench Backfill Equipment Cost \$	Total Trench Backfill Cost \$
										\$0	\$0	\$0

Exploration Trenches - Revegetation Costs

	Description (required)	Surface Area acres	Revegetation Labor Cost \$	Revegetation Equipment Cost \$	Revegetation Material Cost \$	Total Revegetation Cost \$
			\$0	\$0	\$0	\$0

Closure Cost Estimate
Expl. Roads & Pads

Project Name: Progressive Contracting, Inc. - Reclamation Plan
Date of Submittal: January 2024
File Name: BlankSRCE_Version_1_4_1_017_NV_2023_Costs.xlsm
Model Version: Version 1.4.1
Cost Data: User Data
Cost Data File: SRCE_Cost_Data_File_1_12_Std_2023.xlsm
Cost Estimate Type: Surety Cost Basis: Northern Nevada

Exploration Roads & Pads - Cost Summary				
	Labor	Equipment	Materials	Totals
Grading Costs	\$0	\$0	N/A	\$0
Cover Placement Cost	\$0	\$0	N/A	\$0
Ripping/Scarifying Cost	\$0	\$0	N/A	\$0
Subtotal Earthworks	\$0	\$0		\$0
Revegetation Cost	\$0	\$0	\$0	\$0
TOTALS	\$0	\$0	\$0	\$0

Exploration Roads & Pads - User Input																	
You must fill in ALL green cells and relevant blue cells in this section for each road																	
Facility Description			Physical (1) - MANDATORY										User Overrides		Growth Media		
	Description (required)	ID Code	Underlying Ground Slope % grade	Ungraded Slope _H:1V	Cut Slope degrees	Road + Drill Pad Length ft	Road Width ft	Number of Drill Pads	Individual Sump Volume cy	Drill Pad Width ft	Drill Pad Length ft	Slope Replacement Percent %	Regrade Volume (if calculated elsewhere) cy	Disturbed Area (if calculated elsewhere) acres	Growth Media Thickness in	Distance to Growth Media Stockpile ft	Slope from Road to Stockpile % grade

- Notes:
- All Physical parameters must be input even if manual overrides for volume or area are used.
 - Slope replacement refers to the percentage of cut volume replaced during regrading.
 - If Slope from facility to borrow source is >20, downhill travel time may be underestimated due to limitation of uphill travel time curves and downhill speed tables from CAT Handbook (see Productivity Sheet)
 - Sump volume will be applied to all roads on slopes <20%. On slopes >20% pad width (i.e. cut volume) should be adequate to account for sump volume.

Exploration Roads & Pads - User Input (cont.)														
			Grading			Growth Media				Revegetation				
	Description (required)	Regrade Material Condition (select)	Cut Material Type (select)	Recontouring Equipment Fleet (select)	Additional Hrs for Walk-in ⁽¹⁾	Growth Media Material Type (select)	Growth Media Placement Equipment Fleet (select)	Maximum Fleet Size (user override)	Additional Hrs for Walk-in ⁽¹⁾	Seed Mix (select)	Mulch (select)	Fertilizer (select)	Scarifying/Ripping? (select)	Ripping Fleet (select)

- Notes:
- Include one-way hours necessary to walk equipment in from drop-off point to work area
 - Material Types are used for density correction based on material densities in Caterpillar Performance Handbook material density table

Regrading Volume and Footprint Volume

Figure 1 - Regrading Volume Calculation

Disturbed slope length = $c_1 + c_2$
Disturbed footprint width = Disturbed slope length x $\cos(\text{Original slope})$
Disturbed slope area = Disturbed slope length x Road length
Disturbed footprint area = Disturbed footprint width x Road length
Assumes 20% swell

Will not allow dozer for slopes greater than 30%
For dozer regrading push distance = road width
Assumes dozer push is uphill
Assumes minimum push distance of 100 ft

Swell Factor: 1.2

Ripping/Scarifying Calculations

Minimum 1 hr ripping/scarifying time per area
Number of passes = Final slope length ÷ Grader width
Travel distance = Number of passes x Road length
Total hours = (Travel distance ÷ Grader productivity) + (Number of passes x Grader maneuver time)
For dozer regrading assumes push distance = 3 x road width

Revegetation Calculations

Minimum of 1 acre crew time per area

Inputting Exploration Roads and Drill Pads

EXAMPLE: Drill road with two drill pads:

Road width = 15 Road length = 800
Drill pad width = 30 Drill pad length = 100

1) Total road length = Road length + (number of drill pads x drill pad length)
Total road length = 800 + (2 x 100) = 1000

2) Enter road length = 1000
3) Enter road and drill pad widths
4) Enter number of pads = 2
5) Enter length of drill pad = 100

Exploration Roads & Pads - Regrading Costs										
	Description (required)	Total Road Length ft	Total Drill Pad Length ft	Regrading Volume cy	Recontouring Fleet	Equipment Productivity cy/hr	Total Equipment Hours ⁽¹⁾ hr	Total Labor Cost \$	Total Equipment Cost \$	Total Regrading Cost \$
								\$0	\$0	\$0

(1) Includes walk-in time based on distance and travel speed (see Productivity sheet for speeds)

Exploration Roads & Pads - Growth Media Costs									
	Description (required)	Growth Media Volume cy	Growth Media Replacement Fleet	Fleet Productivity LCY/hr	Number of Trucks/ Scrapers	Total Fleet Hours	Total Labor Cost \$	Total Equipment Cost \$	Total Growth Media Cost \$
							\$0	\$0	\$0

Exploration Roads & Pads - Scarifying/Revegetation Costs											
	Description (required)	Surface Area acres	Ripping/ Scarifying Fleet	Ripping Hours hrs	Ripping Labor Costs \$	Ripping Equipment Cost \$	Total Ripping Costs \$	Revegetation Labor Cost \$	Revegetation Equipment Cost \$	Revegetation Material Cost \$	Total Revegetation Cost \$
					\$0	\$0	\$0	\$0	\$0	\$0	\$0

Closure Cost Estimate
Waste Rock Dumps

Project Name: Progressive Contracting, Inc. - Reclamation Plan
Date of Submittal: January 2024
File Name: BlankSRCE_Version_1_4_1_017_NV_2023_Costs.xlsm
Model Version: Version 1.4.1
Cost Data: User Data
Cost Data File: SRCE_Cost_Data_File_1_12_Std_2023.xlsm
Cost Estimate Type: Surety Cost Basis: Northern Nevada

Waste Rock Dumps - Cost Summary				
	Labor	Equipment	Materials	Totals
Grading Costs	\$8,136	\$14,219	N/A	\$22,355
Cover Placement Cost	\$0	\$0	N/A	\$0
Topsail Placement Cost	\$0	\$0	N/A	\$0
Ripping/Scarifying Cost	\$0	\$0	N/A	\$0
Subtotal Earthworks	\$8,136	\$14,219	\$0	\$22,355
Revegetation Cost	\$0	\$0	\$0	\$0
TOTALS	\$8,136	\$14,219	\$0	\$22,355

Waste Rock Dumps - User Input				You must fill in ALL green cells in this section for each dump, lift or dump category																
Facility Description				Physical - MANDATORY										Cover				Growth Media		
	Description (required)	ID Code	Type	Underlying Ground Slope % Grade	Ungraded Slope _H:1V	Final Slope _H:1V	Final Top Slope % Grade	Lift (dump) Height ft	Mid-Bench Length ft	Average Flat Area Long Dimension (ripping distance) ft	Final (Regraded) Dump Footprint acres	Regrade Volume (ft) (if calculated elsewhere) cy	Cover Thickness Slopes in	Cover Thickness Flat Areas in	Distance from Cover Borrow ft	Slope from Dump to Cover Borrow % grade	Slope Growth Media Thickness in	Flat Area Growth Media Thickness in	Distance from Growth Media Stockpile ft	Slope from Dump to Stockpile % grade
1	Various Stockpiles		Stockpile	1.0	1.5	4.0	1.0	30	2,100	2,100	14.30	115000								

Notes:
1. All Physical parameters must be input even if manual overrides for volume or area are used.
2. If Slope from facility to borrow source is >20, downhill travel time may be underestimated due to limitation of uphill travel time curves and downhill speed tables from CAT Handbook (see Productivity Sheet)
Re-grading various stockpiles witin the post-mining laydown yard area. Various stockpiles are estimated to be approximately 150,000 tons total. Using a conversion factor of 1.3 tons per cubic yards yields a total regrade volume of 115,000. This is considered conservative as the total stockpiled material will most likely be substantially less, as the landowner/Company intends to sell all product.

Waste Rock Dumps - User Input (cont.)																			
Grading					Cover		Growth Media		Revegetation										
	Description (required)	Regrading Material Condition (select)	Regrading Material Type (select)	Regrading Equipment Fleet (select)	Slot/Side-by- Side (select)	Cover Material Type (select)	Cover Placement Equipment Fleet (select)	Growth Media Material Type (select)	Growth Media Equipment Fleet (select)	Seed Mix Slopes (select)	Seed Mix Areas (select)	Flat (select)	Mulch Slopes (select)	Mulch Flat Areas (select)	Fertilizer Slopes (select)	Fertilizer Flat Areas (select)	Slope Scarify/ Rip? (select)	Flat Area Scarify/ Rip? (select)	Scarify/ Ripping Fleet (select)
1	Various Stockpiles	1.2	Gravel	Small	No														

Notes:
1. Material Types are used for density correction based on material densities in Caterpillar Performance Handbook material density table

Regrading Volume Calculation

Regrading Push Distance Calculation

dozing distance: based on 2/3 final cut slope + 2/3 final fill slope (minimum = 50 ft)

Final Slope Area and Footprint Area Calculations

Ripping/Scarifying Calculations

Minimum 1 hr ripping/scarifying time per dump

Slopes:
Number of passes = Final slope length + Grader width
Travel distance = Number of passes x Mid-bench length
Total hours = (Travel distance + Grader productivity) + (Number of passes x Grader maneuver time)
Minimum 1 hr

Flat Areas:
Flat area width = Final flat area + Average long dimensions
Number of passes = Flat area width + Grader width
Travel distance = Number of passes x Average long dimensions
Total hours = (Travel distance + Grader productivity) + (Number of passes x Grader maneuver time)

Revegetation: Minimum 1 acre revegetation crew time per area

Waste Rock Dumps - Regrading Costs														
Productivity = Dozer Productivity x Grade Correction x Density Correction x Operator (0.75) x Material x Visibility x Job Efficiency (0.83) x (Slot/Side-by-Side) x (Altitude Deration)														
	Description (required)	Regrading Volume cy	Dozing Distance (see above) ft	Regrading Fleet	Uncorrected Dozer Productivity cy/hr	Grade Correction	Dozing Material	Density Correction	Side-by-Side or Slot Dozing	Total Hourly Productivity cy/hr	Total Dozer Hours	Total Labor Cost \$	Total Equipment Cost \$	Total Regrading Cost \$
1	Various Stockpiles	115,000	60	D7/R	934	1.6	1.2	0.90	1.0	1,005	114	\$8,136	\$14,219	\$22,355
		115,000									114	\$8,136	\$14,219	\$22,355

Waste Rock Dumps - Cover and Growth Media Costs																	
Cover (lower layer)										Growth Media Placement							
	Description (required)	Cover Volume cy	Cover Replacement Fleet	Fleet Productivity LCY/hr	Number of Trucks/ Scrapers	Total Fleet Hours	Cover Labor Cost \$	Cover Equipment Cost \$	Total Cover Cost \$	Growth Media Volume cy	Growth Media Replacement Fleet	Fleet Productivity BCY/hr	Number of Trucks/ Scrapers	Total Fleet Hours	Total Labor Cost \$	Total Equipment Cost \$	Total Growth Media Cost \$
1	Various Stockpiles						\$0	\$0	\$0						\$0	\$0	\$0
							\$0	\$0	\$0						\$0	\$0	\$0

Waste Rock Dumps - Scarifying/Revegetation Costs																
	Description (required)	Slope Area acres	Flat Area acres	Total Surface Area acres	Final Slope Length ft	Flat Area Long Dimension ft	Ripping/ Scarifying Fleet	Slope Scarifying/ Ripping Hours hrs	Flat Area Scarifying/ Ripping Hours hrs	Scarifying/ Ripping Labor Costs \$	Scarifying/ Ripping Equipment Cost \$	Total Scarifying/ Ripping Costs \$	Revegetation Labor Cost \$	Revegetation Equipment Cost \$	Revegetation Material Cost \$	Total Revegetation Cost \$
1	Various Stockpiles	6.12	8.00	14.12	127					\$0	\$0	\$0	\$0	\$0	\$0	\$0
		6.12	8.00	14.12							\$0	\$0	\$0	\$0	\$0	\$0

Notes: 1) Minimum total ripping hours = 1 (i.e. If total ripping hrs (slope + flat) < 1, then one hour of fleet time is assumed, regardless of acres shown in in scarifying table.)

Closure Cost Estimate
Heap Leach

Project Name: Progressive Contracting, Inc. - Reclamation Plan
Date of Submittal: January 2024
File Name: BlankSRCE_Version_1_4_1_017_NV_2023_Costs.xlsm
Model Version: Version 1.4.1
Cost Data: User Data
Cost Data File: SRCE_Cost_Data_File_1_12_Std_2023.xlsm
Cost Estimate Type: Surety Cost Basis: Northern Nevada

Heap Leach Pads - Cost Summary				
	Labor	Equipment	Materials	Totals
Drain Installation	\$0	\$0	\$0	\$0
Grading Costs	\$0	\$0	N/A	\$0
Cover Placement Cost	\$0	\$0	N/A	\$0
Topsoil Placement Cost	\$0	\$0	N/A	\$0
Ripping/Scarifying Cost	\$0	\$0	N/A	\$0
Subtotal Earthworks	\$0	\$0	\$0	\$0
Revegetation Cost	\$0	\$0	\$0	\$0
TOTALS	\$0	\$0	\$0	\$0

Heap Leach Pads - User Input			You must fill in ALL green cells and relevant blue cells in this section for each heap, lift or heap category																		
Facility Description				Physical (1) - MANDATORY										Cover				Growth Media			
	Description (required)	ID Code	Type	Underlying Ground Slope % grade	Ungraded Slope _H:1V	Final Slope _H:1V	Final Top Slope % grade	Lift (heap) Height ft	Mid-Bench Length ft	Average Flat Area Long Dimension (ripping distance) ft	Final (Regraded) Heap Footprint acres	Regrade Volume (If calculated elsewhere) cy	Cover Thickness Slopes in	Cover Thickness Flat Areas in	Distance from Cover Borrow ft	Slope from Heap to Cover Borrow % grade	Slope Growth Media Thickness in	Flat Area Growth Media Thickness in	Distance from Growth Material Stockpile ft	Slope from Heap to Stockpile % grade	

- Notes:
- All Physical parameters must be input even if manual overrides for volume or area are used.
 - If Slope from facility to borrow source is >20, downhill travel time may be underestimated due to limitation of uphill travel time curves and downhill speed tables from CAT Handbook (see Productivity Sheet)

Heap Leach Pads - User Input (cont.)		You must fill in ALL green cells and relevant blue cells in this section for each heap, lift or heap category																	
		Grading				Cover		Growth Media		Revegetation									
	Description (required)	Regrading Material Condition (select)	Regrading Material Type (select)	Regrading Equipment Fleet (select)	Slot/Side-by-Side (select)	Cover Material Type (select)	Cover Placement Equipment Fleet (select)	Growth Media Material Type (select)	Growth Media Equipment Fleet (select)	Seed Mix Slopes (select)	Seed Mix Areas (select)	Flat	Mulch Slopes (select)	Mulch Flat Areas (select)	Fertilizer Slopes (select)	Fertilizer Flat Areas (select)	Slope Scarify/ Rip? (select)	Flat Area Scarify/ Rip? (select)	Scarifying/ Ripping/ Fleet (select)

- Notes:
- Material Types are used for density correction based on material densities in Caterpillar Performance Handbook material density table

Heap Leach Pads - User Input (cont.)												
		Solution Collection Ditch Fill							Piping			
	Description (required)	Collection Ditch Length ft	Collection Ditch Top Width ft	Collection Ditch Depth ft	Volume (If calculated elsewhere) cy	Distance from Borrow ft	Slope to Borrow % grade	Drain Rock Equipment Fleet (select)	Solid Pipe Length ft	Solid Pipe Type (select)	Drainage Pipe Length ft	Drainage Pipe Type (select)

- Notes:

Regrading Volume Calculation

Regrading Push Distance Calculation

dozing distance: based on 2/3 final cut slope + 2/3 final fill slope (minimum = 50 ft)

Ripping/Scarifying Calculations

Minimum 1 hr ripping/scarifying per area

Slopes:
Number of passes = Final slope length ÷ Grader width
Travel distance = Number of passes x Mid-bench length
Total hours = (Travel distance ÷ Grader productivity) + (Number of passes x Grader maneuver time)

Flat Areas:
Flat area width = Final flat area ÷ Average long dimensions
Number of passes = Flat area width ÷ Grader width
Travel distance = Number of passes x Average long dimensions
Total hours = (Travel distance ÷ Grader productivity) + (Number of passes x Grader maneuver time)

Revegetation: Minimum 1 acre revegetation crew time per area

Final Slope Area and Footprint Area Calculations

Solution Collection Ditch Calculations

Use when existing heap material is not suitable drain rock
Assume to be constructed in existing solution channels
Assume 2H:1V ditch sideslopes
Drain rock assumed to be Gravel - Dry at 2,550 lb/cy (1,510 kg/m3) from CAT Handbook 35th Ed.

Heap Leach Pad - Drainage Channel Fill & Drainage Pipe Installation													
		Drain Rock Placement							Drainpipe Installation				
	Description (required)	Drain Rock Volume cy	Drain Rock Fleet	Fleet Productivity LCY/hr	Number of Trucks/ Scrapers	Total Fleet Hours hrs	Drainage Labor Cost \$	Drainage Equipment Cost \$	Total Drainage Cost \$	Piping Crew Hours hrs	Piping Labor Cost \$	Piping Equipment Cost \$	Total Pipe Installation Cost \$
						0	\$0	\$0	\$0		\$0	\$0	\$0

Heap Leach Pad - Regrading Costs											
Productivity = Dozer Productivity x Grade Correction x Operator (0.75) x Material x Visibility x Job Efficiency (0.83) x (Slot/Side-by-Side) x (Altitude Deration)											
	Description (required)	Regrading Volume cy	Dozing Distance (see above) ft	Regrading Fleet	Uncorrected Dozer Productivity cy/hr	Grade Correction	Dozing Material	Density Correction	Side-by-Side or Slot Dozing	Total Hourly Productivity cy/hr	Total Dozer Hours hr
											\$0
											\$0
											\$0

Heap Leach Pad - Cover and Growth Media Costs													
		Cover (lower layer)							Growth Media Placement				
	Description (required)	Cover Volume cy	Cover Replacement Fleet	Fleet Productivity LCY/hr	Number of Trucks/ Scrapers	Total Fleet Hours	Cover Labor Cost \$	Cover Equipment Cost \$	Total Cover Cost \$	Growth Media Volume cy	Growth Media Replacement Fleet	Fleet Productivity BCY/hr	Total Growth Media Cost \$
							\$0	\$0	\$0				\$0
													\$0
													\$0

Heap Leach Pad - Scarifying/Revegetation Costs															
	Description (required)	Slope Area acres	Flat Area acres	Total Surface Area acres	Final Slope Length ft	Flat Area Long Dimension ft	Ripping/ Scarifying Fleet	Slope Scarifying/ Ripping Hours hrs	Flat Area Scarifying/ Ripping Hours hrs	Scarifying/ Ripping Labor Costs \$	Scarifying/ Ripping Equipment Cost \$	Total Scarifying/ Ripping Costs \$	Revegetation Labor Cost \$	Revegetation Equipment Cost \$	Total Revegetation Cost \$
										\$0	\$0	\$0	\$0	\$0	\$0

1) Minimum total ripping hours = 1 (i.e. If total ripping hrs (slope + flat) < 1, then one hour of fleet time is assumed, regardless of acres shown in in scarifying table.)

Bond Calculation
Tailings

Project Name: Progressive Contracting, Inc. - Reclamation Plan
Date of Submittal: January 2024
File Name: BlankSRCE_Version_1_4_1_017_NV_2023_Costs.xlsm
Model Version: Version 1.4.1
Cost Data: User Data
Cost Data File: SRCE_Cost_Data_File_1_12_Std_2023.xlsm
Cost Estimate Type: Surety Cost Basis: Northern Nevada

Tailings - Cost Summary				
	Labor	Equipment	Materials	Totals
Embankment Regrading Cost	\$0	\$0	N/A	\$0
Tailings Surface Grading Cost	\$0	\$0	N/A	\$0
Cover Placement Cost	\$0	\$0	N/A	\$0
Topsoil Placement Cost	\$0	\$0	N/A	\$0
Ripping/Scarifying Cost	\$0	\$0	N/A	\$0
Subtotal Earthworks	\$0	\$0	\$0	\$0
Revegetation Cost	\$0	\$0	\$0	\$0
TOTALS	\$0	\$0	\$0	\$0

Tailings - User Input																		
You must fill in ALL green cells and relevant blue cells in this section for each tailings impoundment																		
Facility Description			Physical - MANDATORY								Cover				Growth Media			
	Description (required)	ID Code	Underlying Ground Slope % Grade	Ungraded Slope _H:1V	Final (Regraded) Embankment Slope _H:1V	Final Embankment Height ft	Final Tailings Surface Area acres	Mid-Embankment or Ripping Length ft	Embankment Regrade Volume (If calculated elsewhere) cy	Surface Regrade Volume (calculated elsewhere) cy	Embankment Cover Thickness in	Tailings Surface Cover Thickness in	Distance from Cover Borrow ft	Slope from Tailings to Borrow % grade	Embankment Growth Media Thickness in	Tailings Surface Growth Media Thickness in	Distance from Growth Material Stockpile ft	Slope from Tailings to Stockpile % grade

- Notes:
- All Physical parameters must be input even if manual overrides for volume or area are used.
 - If Slope from facility to borrow source is >20, downhill travel time may be underestimated due to limitation of uphill travel time curves and downhill speed tables from CAT Handbook (see Productivity Sheet)

Tailings - User Input (cont.)																		
You must fill in ALL green cells and relevant blue cells in this section for each tailings impoundment																		
		Grading				Cover		Growth Media		Revegetation								
	Description (required)	Regrading Material Condition (select)	Embankment Material Type (select)	Regrading Equipment Fleet (select)	Slot/Side-by- Side (select)	Cover Material Type (select)	Cover Placement Equipment Fleet (select)	Growth Media Material Type (select)	Growth Media Equipment Fleet (select)	Seed Mix Embankment Slope (select)	Seed Mix Tailings Surface (select)	Mulch Embankment Slopes (select)	Mulch Tailings Surface (select)	Fertilizer Embankment Slopes (select)	Fertilizer Tailing Surface (select)	Embankment Slope Scarify/ Rip? (select)	Tailings Surface Scarify/ Rip? (select)	Scarifying/ Ripping Fleet (select)

- Notes:
- Material Types are used for density correction based on material densities in Caterpillar Performance Handbook material density table

Surface Area Calculations

Top Surface Area provided by user

Figure 1 - Surface Areas

Final Slope Area and Footprint Area Calculations

Overall slope length (c) = $\frac{\text{Embankment height}}{\cos(\text{Overall slope angle})}$

Figure 2 - Final Slope Area and Footprint Area Calculation

Grading Calculations

Grading assumed on impoundment surface only, not embankment.
Average push distance assumed to be 2/3 of the 600 feet maximum from Catepillar Handbook or 400 feet
Material assumed to be loose stockpile (1.2 productivity factor)
Dozing density correction based on dry sand = 2300/2400 = 0.96
Slope assumed to be 0 to 5% (1.0 productivity factor)

Ripping/Scarifying/Revegetation Calculation

Minimum 1 hr ripping/scarifying per area
Minimum 1 acre revegetation crew time per area

Regrading Volume Calculation

Figure 1 - Regrading Volume Calculation

Regrading Push Distance Calculation

Figure 2 - Dozing Distance Calculation

Tailings - Embankment Regrading Costs														
Productivity = Dozer Productivity x Grade Correction x Density Correction x Operator (0.75) x Material x Visibility x Job Efficiency (0.83) x (Slot/Side-by-Side) x (Altitude Deration)														
	Description (required)	Regrading Volume cy	Dozing Distance (see above) ft	Regrading Fleet	Uncorrected Dozer Productivity cy/hr	Grade Correction	Dozing Material Condition	Density Correction	Side-by-Side or Slot Dozing	Total Hourly Productivity cy/hr	Total Dozer Hours hr	Total Labor Cost \$	Total Equipment Cost \$	Total Regrading Cost \$
												\$0	\$0	\$0

Tailings - Surface Regrading Costs														
Productivity = Dozer Productivity x Grade Correction x Density Correction x Operator (0.75) x Material x Visibility x Job Efficiency (0.83) x (Slot/Side-by-Side) x (Altitude Deration)														
	Description (required)	Regrading Volume cy	Dozing Distance (see above) ft	Regrading Fleet	Uncorrected Dozer Productivity cy/hr	Grade Correction	Density Correction	Dozing Material	Side-by-Side or Slot Dozing	Total Hourly Productivity cy/hr	Total Dozer Hours hr	Total Labor Cost \$	Total Equipment Cost \$	Total Regrading Cost \$
												\$0	\$0	\$0

Tailings - Cover and Growth Media Costs																	
		Cover Placement									Growth Media Placement						
	Description (required)	Cover Volume cy	Cover Placement Fleet	Cover Fleet Productivity LCY/hr	Number of Trucks/ Scrapers	Total Fleet Hours	Total Labor Cost \$	Total Equipment Cost \$	Total Cover Placement Cost \$	Growth Media Volume cy	Growth Media Placement Fleet	Growth Media Fleet Productivity LCY/hr	Number of Trucks/ Scrapers	Total Fleet Hours	Total Labor Cost \$	Total Equipment Cost \$	Total Growth Media Cost \$
							\$0	\$0	\$0						\$0	\$0	\$0

Tailings - Scarifying/Revegetation Costs															
	Description (required)	Embankment Slope Area acres	Tailings Surface Area acres	Total Surface Area acres	Final Slope Length ft	Ripping/ Scarifying Fleet	Slope Scarifying/ Ripping Hours hrs	Flat Area Scarifying/ Ripping Hours hrs	Scarifying/ Ripping Labor Cost \$	Scarifying/ Ripping Equipment Cost \$	Total Scarifying/ Ripping Cost \$	Revegetation Labor Cost \$	Revegetation Equipment Cost \$	Revegetation Material Cost \$	Total Revegetation Cost \$
									\$0	\$0	\$0	\$0	\$0	\$0	\$0

Closure Cost Estimate
Roads

Project Name: Progressive Contracting, Inc. - Reclamation Plan
Date of Submittal: January 2024
File Name: BlankSRCE_Version_1_4_1_017_NV_2023_Costs.xlsm
Model Version: Version 1.4.1
Cost Data: User Data
Cost Data File: SRCE_Cost_Data_File_1_12_Std_2023.xlsm
Cost Estimate Type: Surety Cost Basis: Northern Nevada

Roads - Cost Summary				
	Labor	Equipment	Materials	Totals
Grading Costs	\$0	\$0	N/A	\$0
Cover Placement Cost	\$0	\$0	N/A	\$0
Ripping/Scarifying Cost	\$0	\$0	N/A	\$0
Subtotal Earthworks	\$0	\$0		\$0
Revegetation Cost	\$0	\$0	\$0	\$0
TOTALS	\$0	\$0	\$0	\$0

Roads - User Input														
You must fill in ALL green cells and relevant blue cells in this section for each road														
Facility Description				Physical (1) - MANDATORY						User Overrides		Growth Media		
	Description (required)	ID Code	Type	Underlying Ground Slope % grade	Ungraded Slope _H:1V	Cut Slope degrees	Road Width ft	Road Length ft	Slope Replacement Percent %	Regrade Volume (if calculated elsewhere) cy	Disturbed Area (if calculated elsewhere) acres	Growth Media Thickness in	Haul Distance from Growth Media Stockpile ft	Slope from Road to Stockpile % grade

- Notes:
- All Physical parameters must be input even if manual overrides for volume or area are used.
 - If Slope from facility to borrow source is >20, downhill travel time may be underestimated due to limitation of uphill travel time curves and downhill speed tables from CAT Handbook (see Productivity Sheet)
 - Because the work required for building roads with a dozer is similar to that required to regrade a road with a dozer, this sheet could be used to provide a rough estimate of road construction costs if a dozer is selected as the grading fleet.

Roads - User Input (cont.)						
Haul Road Safety Berms						
	Description (required)	Berm Length ft	Berm Height ft	Berm Base Width ft	Berm Sideslope Angle _H:1V	Number of Berms (2) (1 or 2 sides)

(2) Enter 1 if berm on only one side of road, 2 if both sides of road are bermed.

Roads - User Input (cont.)														
You must fill in ALL green cells and relevant blue cells in this section for each road														
		Grading				Growth Media			Revegetation					
	Description (required)	Regrading Material Condition (select)	Regrading Material Type (select)	Regrading Equipment Fleet (select)	No. of Excavators if grade >30% (select)	Growth Media Material Type (select)	Cover Placement Equipment Fleet (select)	Maximum Fleet Size (user override)	Seed Mix (select)	Mulch (select)	Fertilizer (select)	Scarifying/ Ripping? (select)	Ripping Fleet (select)	

- Notes:
- Material Types are used for density correction based on material densities in Caterpillar Performance Handbook material density table
 - If original slope >30% only excavators are allowed.

Regrading Volume and Footprint Volume

Figure 1 - Regrading Volume Calculation

Will not allow dozer for slopes greater than 30%
For dozer regregrading push distance = road width
Assumes dozer push is uphill
Assumes minimum push distance of 100 ft

Safety Berm Volume Calculation

Cross Sectional Area = $\frac{(a+b)}{2} \times h$
Berm Volume = Berm Length x Cross Sectional Area x No. Sides

Total berm volume doubled if both sides of road are bermed.
If length of berm on each side of road is different, input total length of both berms and input 1 for number of sides

Ripping/Scarifying Calculations

Minimum 1 hr ripping/scarifying time per area
Number of passes = Final slope length ÷ Grader width
Travel distance = Number of passes x Road length
Total hours = (Travel distance ÷ Grader productivity) + (Number of passes x Grader maneuver time)
For dozer regregrading assumes push distance = 3 x road width

Revegetation Calculations

Minimum of 1 acre crew time per area

Roads - Regrading Costs								
	Description (required)	Regrading Volume cy	Recontouring Fleet	Fleet Productivity cy/hr	Total Fleet Hours hr	Total Labor Cost \$	Total Equipment Cost \$	Total Regrading Cost \$
						\$0	\$0	\$0

Roads - Growth Media Costs									
	Description (required)	Growth Media Volume cy	Growth Media Replacement Fleet	Fleet Productivity LCY/hr	Number of Trucks/ Scrapers	Total Fleet Hours	Total Labor Cost \$	Total Equipment Cost \$	Total Growth Media Cost \$
							\$0	\$0	\$0

Roads - Scarifying/Revegetation Costs												
	Description (required)	Total Surface Area acres	Final Slope Length ft	Ripping/ Scarifying Fleet	Ripping Hours hrs	Ripping Labor Costs \$	Ripping Equipment Cost \$	Total Ripping Costs \$	Revegetation Labor Cost \$	Revegetation Equipment Cost \$	Revetation Material Cost \$	Total Revegetation Cost \$
						\$0	\$0	\$0	\$0	\$0	\$0	\$0

Closure Cost Estimate
Pits

Project Name: Progressive Contracting, Inc. - Reclamation Plan
Date of Submittal: January 2024
File Name: BlankSRCE_Version_1_4_1_017_NV_2023_Costs.xlsm
Model Version: Version 1.4.1
Cost Data: User Data
Cost Data File: SRCE_Cost_Data_File_1_12_Std_2023.xlsm
Cost Estimate Type: Surety Cost Basis: Northern Nevada

Pits - Cost Summary				
	Labor	Equipment	Materials	Totals
Safety Berm Construction Cost	\$0	\$0	N/A	\$0
Safety Berm Revegetation Cost	\$0	\$0	\$0	\$0
TOTALS	\$0	\$0	\$0	\$0

Pits - User Input																			
Facility Description				Pit Berms					Berm Construction		Excavate or Doze	Hauling (if selected method)					Revegetation		
	Description (required)	ID Code	Type	Berm (or Highwall) Length ft	Berm Height ft	Berm Base Width ft	Berm Sideslope Angle _H:1V	Volume (if calculated elsewhere) cy	Construction Method (select)	Berm Material Type (select)	Berm Construction Equipment Fleet (select)	Berm Hauling Fleet (select)	Distance to Borrow Source ft	Slope to Borrow Source % grade	Maximum Fleet Size (user override)		Seed Mix (select)	Mulch (select)	Fertilizer (select)

- Notes:
1. All Physical parameters must be input even if manual overrides for volume or area are used.
 2. If Slope from facility to borrow source is >20, downhill travel time may be underestimated due to limitation of uphill travel time curves and downhill speed tables from CAT Handbook (see Productivity Sheet)
 3. Material Types are used for density correction based on material densities in Caterpillar Performance Handbook material density table

Safety Berm Volume Calculation

Cross Sectional Area = $\frac{(a + b)}{2} \times h$

Berm Volume = Berm Length x Cross Sectional Area

Dozer productivity assumes push distance of:

100feet

Dozer:

Length x (Berm Base Width + Dozer Push Distance) - accounts for disturbance created in borrow area

Excavator:

Length x (Berm Base Width + (2 x Excavator Track Width) - accounts for disturbance created in borrow area

Haul & Place:

Length x Berm Base Width - if necessary use Yards sheet to account for disturbance created in borrow area

Revegetation Calculations

Minimum 1 acre revegetation crew time per area

Pits - Safety Berm Construction Costs									
		Safety Berm							
	Description (required)	Safety Berm Volume cy	Selected Fleet	Number of Trucks/ Scrapers	Corrected Fleet Productivity cy/hr	Total Hours	Safety Berm Labor Cost \$	Safety Berm Equipment Cost \$	Total Safety Berm Cost \$
							\$0	\$0	\$0

Pits - Safety Berms - Revegetation Costs						
	Description (required)	Flat Area acres	Revegetation Labor Cost \$	Revegetation Equipment Cost \$	Revegetation Material Cost \$	Total Revegetation Cost \$
			\$0	\$0	\$0	\$0

Closure Cost Estimate
Quarries & Borrow Pits

Project Name: Progressive Contracting, Inc. - Reclamation Plan
Date of Submittal: January 2024
File Name: BlankSRCE_Version_1_4_1_017_NV_2023_Costs.xlsm
Model Version: Version 1.4.1
Cost Data: User Data
Cost Data File: SRCE_Cost_Data_File_1_12_Std_2023.xlsm
Cost Estimate Type: Surety Cost Basis: Northern Nevada

Waste Rock Dumps - Cost Summary				
	Labor	Equipment	Materials	Totals
Grading Costs	\$0	\$0	N/A	\$0
Cover Placement Cost	\$0	\$0	N/A	\$0
Topsoil Placement Cost	\$15,131	\$54,086	N/A	\$69,217
Ripping/Scarifying Cost	\$0	\$0	N/A	\$0
Safety Berm Construction Cost	\$2,498	\$8,928	N/A	\$11,426
Subtotal Earthwork	\$17,629	\$63,014	\$0	\$80,643
Revegetation Cost	\$10,710	\$6,120	\$18,513	\$35,343
Safety Berm Revegetation Cost	\$497	\$284	\$835	\$1,616
TOTALS	\$28,836	\$69,418	\$19,348	\$117,602

Quarries & Borrow Pits - User Input																					
You must fill in ALL green cells in this section for each dump, lift or dump category																					
Facility Description				Physical - MANDATORY										Cover				Growth Media			
	Description (required)	ID Code	Type	Underlying Ground Slope % Grade	Ungraded Slope _H:1V	Final Slope _H:1V	Final Top Slope % Grade	Bench or Highwall Height ft	Mid-Bench Length ft	Average Flat Area Long Dimension (ripping distance) ft	Final (Regraded) Footprint acres	Regrade Volume (1) (If calculated elsewhere) cy	Cover Thickness Slopes ft	Cover Thickness Flat Areas in	Distance from Cover Borrow ft	Slope from Dump to Cover Borrow % grade	Slope Growth Media Thickness in	Flat Area Growth Media Thickness in	Distance from Growth Media Stockpile ft	Slope from Dump to Stockpile % grade	
1	North Pit (Private Land)		Quarry	1.0						300	42.40						0.0	6.0	1,200	1.0	
2	East Pit (Public Land)		Quarry	1.0						300	18.80						0.0	6.0	1,800	1.0	

Notes:
1. All Physical parameters must be input even if manual overrides for volume or area are used.
2. If Slope from facility to borrow source is >20, downhill travel time may be underestimated due to limitation of uphill travel time curves and downhill speed tables from CAT Handbook (see Productivity Sheet)
Quarry in this case means the two pits; North Pit (private land) and East Pit (public land). The two pits will be ripped and topsoil placed to a depth of 6 inches. The topsoil stockpiles are estimations only, as topsoil locations have yet to be delineated. The distances listed here are considered conservative, and are based on the GIS maximum distance from the quarry walls to the post-mining laydown yard. That allows ample room for topsoil stockpile location.

Quarries & Borrow Pits - User Input (cont.)																		
Facility Description				Grading			Cover		Growth Media		Revegetation							
	Description (required)	Regrading Material Condition (select)	Regrading Material Type (select)	Regrading Equipment Fleet (select)	Slot/Side-by-Side (select)	Cover Material Type (select)	Cover Placement Equipment Fleet (select)	Growth Media Material Type (select)	Growth Media Equipment Fleet (select)	Seed Mix (select)	Seed Mix Flat Areas (select)	Mulch Slopes (select)	Mulch Flat Areas (select)	Fertilizer Slopes (select)	Fertilizer Flat Areas (select)	Slope Scarify/ Rip? (select)	Flat Area Scarify/ Rip? (select)	Scarify/ Ripping Fleet (select)
1	North Pit (Private Land)	0.6	Sandstone	Small	No			Topsoil	Scraper Dozer	Mix 1								
2	East Pit (Public Land)	0.6	Sandstone	Small	No			Topsoil	Scraper Dozer	Mix 1								

Notes:
1. Material Types are used for density correction based on material densities in Caterpillar Performance Handbook material density table

Quarries & Borrow Pits - User Input (cont.)																
Facility Description		Highwall Berms					Berm Construction		Excavate or Doze	Hauling (if selected method)				Revegetation		
	Description (required)	Berm (or Highwall) Length ft	Berm Height ft	Berm Base Width ft	Berm Sideslope Angle _H:1V	Volume (if calculated elsewhere) cy	Construction Method (select)	Berm Material Type (select)	Berm Construction Equipment Fleet (select)	Berm Hauling Fleet (select)	Distance to Borrow Source ft	Slope to Borrow Source % grade	Maximum Fleet Size (user override)	Seed Mix (select)	Mulch (select)	Fertilizer (select)
1	North Pit (Private Land)	5,000.0	4.0	16.0	2.0		Haul & Place	Sandstone	Small	Scraper Doze	1,200	1.2		Mix 1		
2	East Pit (Public Land)	2,500.0	4.0	16.0	2.0		Haul & Place	Sandstone	Small	Scraper Doze	1,800	1.2		Mix 1		

Notes:
1. All Physical parameters must be input even if manual overrides for volume or area are used.
2. If Slope from facility to borrow source is >20, downhill travel time may be underestimated due to limitation of uphill travel time curves and downhill speed tables from CAT Handbook (see Productivity Sheet)
3. Material Types are used for density correction based on material densities in Caterpillar Performance Handbook material density table
The private area may or may not be bermed, based on final topography. The public area will be bermed a minimum of 4 feet. For sake of conservativeness, it is assumed both the private and public pits will be bermed.

Regrading Volume Calculation

Figure 1 - Regrade Volume Calculation

Regrading Push Distance Calculation

dozing distance: based on 2/3 final cut slope + 2/3 final fill slope (minimum = 50 ft)

Figure 2 - Dozing Distance Calculation

Safety Berm Volume Calculation

Cross Sectional Area = $\frac{(a+b)}{2} \times h$

Berm Volume = Berm Length x Cross Sectional Area

Dozer productivity assumes push distance of: 100 feet

Dozer: Length x (Berm Base Width + Dozer Push Distance) - accounts for disturbance created in borrow area

Excavator: Length x (Berm Base Width + (2 x Excavator Track Width)) - accounts for disturbance created in borrow area

Haul & Place: Length x Berm Base Width - if necessary use Yards sheet to account for disturbance created in borrow area

Final Slope Area and Footprint Area Calculations

Final slope length = $c_1 + c_2$

Final slope area = Final slope length x Mid-bench Length

Final lift height (h_{lift}) = $(c_1 + c_2) \times \sin(\text{Final slope})$

Final slope width (d) = $(c_1 + c_2) \times \cos(\text{Final slope})$

Final slope footprint = Final slope width x Mid-bench Length

Final flat area = Final footprint - Final slope footprint

Figure 3 - Final Slope Area and Footprint Area Calculation

Ripping/Scarifying Calculations

Minimum 1 hr ripping/scarifying time per dump

Slopes:

Number of passes = Final slope length ÷ Grader width

Travel distance = Number of passes x Mid-bench length

Total hours = (Travel distance ÷ Grader productivity) + (Number of passes x Grader maneuver time)

Minimum 1 hr

Flat Areas:

Flat area width = Final flat area ÷ Average long dimensions

Number of passes = Flat area width ÷ Grader width

Travel distance = Number of passes x Average long dimensions

Total hours = (Travel distance ÷ Grader productivity) + (Number of passes x Grader maneuver time)

Revegetation: Minimum 1 acre revegetation crew time per area

Quarries & Borrow Pits - Regrading Costs														
Productivity = Dozer Productivity x Grade Correction x Density Correction x Operator (0.75) x Material x Visibility x Job Efficiency (0.83) x (Slot/Side-by-Side) x (Altitude Deration)														
	Description (required)	Regrading Volume cy	Dozing Distance (see above) ft	Regrading Fleet	Uncorrected Dozer Productivity cy/hr	Grade Correction	Dozing Material	Density Correction	Side-by-Side or Slot Dozing	Total Hourly Productivity cy/hr	Total Dozer Hours hr	Total Labor Cost \$	Total Equipment Cost \$	Total Regrading Cost \$
1	North Pit (Private Land)			D7R								\$0	\$0	\$0
2	East Pit (Public Land)			D7R								\$0	\$0	\$0

Quarries & Borrow Pits - Cover and Growth Media Costs																		
		Cover (lower layer)									Growth Media Placement							
	Description (required)	Cover Volume cy	Cover Replacement Fleet	Fleet Productivity LCY/hr	Number of Trucks/ Scrapers	Total Fleet Hours	Cover Labor Cost \$	Cover Equipment Cost \$	Total Cover Cost \$	Growth Media Volume cy	Growth Media Replacement Fleet	Fleet Productivity BCY/hr	Number of Trucks/ Scrapers	Total Fleet Hours	Total Labor Cost \$	Total Equipment Cost \$	Total Growth Media Cost \$	
1	North Pit (Private Land)						\$0	\$0	\$0	34,203	631G/D10R/D7R	656	1	52	\$11,134	\$39,806	\$50,940	
2	East Pit (Public Land)						\$0	\$0	\$0	15,165	631G/D10R/D7R	1,094	2	14	\$3,997	\$14,280	\$18,277	
							\$0	\$0	\$0	49,368				66	\$15,131	\$54,086	\$69,217	

Quarries & Borrow Pits - Scarifying/Revegetation Costs																	
		Description (required)	Slope Area acres	Flat Area acres	Total Surface Area acres	Final Slope Length ft	Flat Area Long Dimension ft	Ripping/ Scarifying Fleet	Slope Scarifying/ Ripping Hours hrs	Flat Area Scarifying/ Ripping Hours hrs	Scarifying/ Ripping Labor Costs \$	Scarifying/ Ripping Equipment Cost \$	Total Scarifying/ Ripping Costs \$	Revegetation Labor Cost \$	Revegetation Equipment Cost \$	Revegetation Material Cost \$	Total Revegetation Cost \$
1	North Pit (Private Land)		0.00	42.40	42.40						\$0	\$0	\$0	\$7,420	\$4,240	\$12,826	\$24,486
2	East Pit (Public Land)		0.00	18.80	18.80						\$0	\$0	\$0	\$3,290	\$1,880	\$5,687	\$10,857
				61.20	61.20						\$0	\$0	\$0	\$10,710	\$6,120	\$18,513	\$35,343

Notes: 1) Minimum total ripping hours = 1 (i.e. if total ripping hrs (slope + flat) < 1, then one hour of fleet time is assumed, regardless of acres shown in scarifying table.)

Closure Cost Estimate
Underground Openings

Project Name: Progressive Contracting, Inc. - Reclamation Plan
Date of Submittal: January 2024
File Name: BlankSRCE_Version_1_4_1_017_NV_2023_Costs.xlsm
Model Version: Version 1.4.1
Cost Data: User Data
Cost Data File: SRCE_Cost_Data_File_1_12_Std_2023.xlsm
Cost Estimate Type: Surety Cost Basis: Northern Nevada

Underground Openings Cost Summary				
	Labor	Equipment	Materials	Totals
Adits, Portals & Declines Plugging	\$0	\$0	\$0	\$0
Shaft Backfill/Cover	\$0	\$0	N/A	\$0
Shaft Capping	\$0	\$0	\$0	\$0
TOTALS	\$0	\$0	\$0	\$0

Adits, Portals & Declines - User Input									
Facility Description			Physical Characteristics				Backfill Material		
	Description (required)	ID Code	Height ft	Width ft	Backfill/ Plug Type	Distance to Bulkhead ft	Backfill Material Condition (select)	Backfill Material Type (select)	Slope from Adit to Borrow Area % grade

- Notes: 1) Foam (adit) option is for smaller openings that can be plugged with simple forms and a 5 ft thick plug.
2) Foam (production) option is for larger production openings (declines, etc.) and requires larger form construction and minimum 10 ft thick plug.
3) All foam plugs include minimum 15ft of backfill from opening to plug.
4) Bat gate option is for small openings and the material cost is the same for any size opening.
5) Backfilling assumes that small dozer will push material from nearby stockpile or dump
6) Material Types are used for density correction based on material densities in Caterpillar Performance Handbook material density table

Shaft Openings - User Input											
You must fill in ALL green cells and relevant blue cells in this section for each shaft											
Facility Description			Physical Characteristics			Backfill or Foundation Cover					
	Description (required)	ID Code	Diameter ft	Shaft Depth (for backfill method) ft	Backfill/ Plug Type (select)	Backfill Material Type (select)	Cover/ Backfill Fleet (select)	Thickness (if not complete backfill) ft	Distance to Backfill Borrow ft	Slope from Shaft to Borrow Area % grade	Maximum Fleet Size (user override)

- Notes:
1. If Slope from facility to borrow source is >20, downhill travel time may be underestimated due to limitation of uphill travel time curves and downhill speed tables from CAT Handbook (see Productivity Sheet)
2. Material Types are used for density correction based on material densities in Caterpillar Performance Handbook material density table

Adits, Declines and Portals - Volume Calculations

Width (W)

Height (H)

Thickness of Bulkhead (B)

Depth to Bulkhead (D)

Cross-Sectional Area (A) = $W \times H$

Volume of Concrete Bulkhead = $A \times B$

Volume of Backfill = $A \times D$

Concrete Cover/Bulkhead Volume Calculation

Using Means Heavy Construction Cost Data (2004)
Estimate cover/bulkhead thickness
Assumes that all concrete works are reinforced
Productivity for crew from Means Heavy Construction Cost Data (2004) adjusted for supervision (addressed in Misc. Costs) and Davis-Bacon Wage Rates
Assumes 18 in thick slab

Backfill Calculations

Uses 1 large and 1 small dozer for adit backfill
Assumes max 400 foot push
Assumes average operator and 50 min/hr availability

Uses truck & loader load, haul place fleets for shafts
Concrete cap will be 1.5 feet thick, reinforced, structually supported.
If concrete cap is used, assume 10 feet of rock backfill on top of cap.
Assumes that all concrete works are reinforced
If backfill is used, assume overfill by 5 feet
Carpenter rate incl Fringe: per hour

Shaft Volume Calculations

d = Diameter

H = Shaft Depth

Radius (r) = $\frac{1}{2}d$

Cross-Sectional Area (A) = πr^2

Volume = $A \times H$

Adits, Portals & Declines Plugging																		
Uses RS Means Heavy Construction Cost Data for bulkhead production rate, material costs and crews																		
	Description (required)	Bulkhead Volume cy	Backfill (rock) Volume cy	Backfill Equipment Fleet	Backfill Productivity LCY/hr	Backfill Hours	Bulkhead Construction				Backfill or Foam (1)				Bat Gate or Culvert (2,3,4)			
							Total Labor Cost \$	Total Equipment Cost \$	Total Material Cost \$	Total Bulkhead Cost \$	Total Labor Cost \$	Total Equipment Cost \$	Material (Foam) Cost \$	Total Backfill Cost \$	Total Labor Cost \$	Total Equipment Cost \$	Total Material Cost \$	Total Bat Gate Cost \$
							\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0

- Notes:
1) Foam costs include 1 hour move to and setup + 1 hr. minimum crew time
2) Assumes 1 hr walk-in/walk-out time for equipment
3) Batgate assumes 8 hr install time each
4) Bat culvert backfill costs based on one 8-hr day (i.e. backfilling hours = 8 hrs).

Shaft Plugging													
Cover/Cap							Backfill/Cover						
	Description (required)	Cover Area ft2	Backfill or Cover Volume cy	Backfill Equipment Fleet	Number of Trucks	Backfill Productivity LCY/hr	Backfill Hours	Total Labor Cost \$	Total Equipment Cost \$	Total Material Cost \$	Total Shaft Cap Cost \$	Total Labor Cost \$	Total Equipment Cost \$
								\$0	\$0	\$0	\$0	\$0	\$0

Closure Cost Estimate
Haul Material

Project Name: Progressive Contracting, Inc. - Reclamation Plan
Date of Submittal: January 2024
File Name: BlankSRCE_Version_1_4_1_017_NV_2023_Costs.xlsm
Model Version: Version 1.4.1
Cost Data: User Data
Cost Data File: SRCE_Cost_Data_File_1_12_Std_2023.xlsm
Cost Estimate Type: Surety Cost Basis: Northern Nevada

Generic Material Hauling - Cost Summary				
	Labor	Equipment	Materials	Totals
Hauling/Crush/Screen/Compact	\$15,131	\$54,086	N/A	\$69,217
Cover Placement Cost	\$0	\$0	N/A	\$0
Topsoil Placement Cost	\$0	\$0	N/A	\$0
Ripping/Scarifying Cost	\$3,211	\$5,613	N/A	\$8,824
Subtotal Earthworks	\$18,342	\$59,699	\$0	\$78,041
Revegetation Cost	\$7,420	\$4,240	\$12,826	\$24,486
TOTALS	\$25,762	\$63,939	\$12,826	\$102,527

Generic Material Hauling - User Input																				
Facility Description				Physical		Hauled Material			Crushing & Screening					Cover			Growth Media			
	Description (required)	ID Code	Type	Final Surface Area ft acres	Average Ripping Distance ft	Material Volume Required cy	Distance from Borrow Source (1)	Slope to Borrow Source % grade	Crush Material	Screen Material	Loss to Crushing/ Screening %	Distance to Placement Location (2)	Slope to Placement % grade	Cover Thickness in	Distance to Cover Borrow	Slope to Borrow % grade	Growth Media Thickness in	Distance to Growth Material Stockpile ft	Slope to Stockpile % grade	
1	Growth Media Haul - North Pit		Quarry	42.40	300	34,203	1,200	1.2												
2	Growth Media Haul - East Pit		Quarry	18.80	300	15,141	1,800	1.2												

Notes:
1. Input distance to crusher if material to be crushed
2. Input distance from crusher to placement if material to be crushed
3. If Slope from facility to borrow source is >20, downhill travel time may be underestimated due to limitation of uphill travel time curves and downhill speed tables from CAT Handbook (see Productivity Sheet)
Topsoil placement cost is included in the 'Quarries & Borrow Pits' tab. This tab is only for hauling material.

Generic Material Hauling - User Input (cont.)																
		Hauling Material				Cover			Growth Media			Revegetation				
	Description (required)	Haul Material Type (select)	Material Hauling Fleet (select)	Each Fleet Size (from/to crusher) (user override)	Compact After Placement?	Cover Material Type (select)	Cover Placement Equipment Fleet (select)	Maximum Fleet Size (user override)	Growth Media Material Type (select)	Growth Media Equipment Fleet (select)	Maximum Fleet Size (user override)	Seed Mix (select)	Mulch Type (select)	Fertilizer Type (select)	Scarify/ Rip? (select)	Scarifying/ Ripping Fleet (select)
1	Growth Media Haul - North Pit	Topsoil	Scraper Dozer		No							Mix 1			Yes	Small Dozer
2	Growth Media Haul - East Pit	Topsoil	Scraper Dozer		No										Yes	Small Dozer

Notes:
1. Material Types are used for density correction based on material densities in Caterpillar Performance Handbook material density table

Generic Material Hauling - Load, Haul, Place and Grade													
		Material Haulage							Crush and/or Compact				
	Description (required)	Material Volume to Crusher cy	Final Material Volume cy	Material Haulage Fleet	Fleet Productivity LCY/hr	Number of Trucks/ Scrapers	Total Fleet Hours	Hauling Labor Cost \$	Hauling Equipment Cost \$	Total Crush/ Screen Cost \$	Compact Labor Cost \$	Compact Equipment Cost \$	Total Load/Haul/ Place Cost \$
1	Growth Media Haul - North Pit	34,203	34,203	631G/D10R/D7R	656	1	52	\$11,134	\$39,806	\$0	\$0	\$0	\$50,940
2	Growth Media Haul - East Pit	15,141	15,141	631G/D10R/D7R	1,094	2	14	\$3,997	\$14,280	\$0	\$0	\$0	\$18,277
		49,344	49,344				66	\$15,131	\$54,086	\$0	\$0	\$0	\$69,217

Notes: Final Material Volume includes allowance for additional material hauled to crushing/screening plant based on Loss to Crushing/Screening input above.

Generic Material Hauling - Cover and Growth Media Costs																	
		Cover Placement								Growth Media Placement							
	Description (required)	Cover Volume cy	Cover Placement Fleet	Cover Fleet Productivity LCY/hr	Number of Trucks/ Scrapers	Total Fleet Hours	Total Labor Cost \$	Total Equipment Cost \$	Total Cover Placement Cost \$	Growth Media Volume cy	Growth Media Placement Fleet	Growth Media Fleet Productivity LCY/hr	Number of Trucks/ Scrapers	Total Fleet Hours	Total Labor Cost \$	Total Equipment Cost \$	Total Growth Media Cost \$
1	Growth Media Haul - North Pit						\$0	\$0	\$0	0					\$0	\$0	\$0
2	Growth Media Haul - East Pit						\$0	\$0	\$0	0					\$0	\$0	\$0
							\$0	\$0	\$0						\$0	\$0	\$0

Generic Material Hauling - Scarifying/Revegetation Costs											
	Description (required)	Total Surface Area acres	Ripping/ Scarifying Fleet	Scarifying/ Ripping Hours hrs	Scarifying/ Ripping Labor Cost \$	Scarifying/ Ripping Equipment Cost \$	Total Scarifying/ Ripping Cost \$	Revegetation Labor Cost \$	Revegetation Equipment Cost \$	Revegetation Material Cost \$	Total Revegetation Cost \$
1	Growth Media Haul - North Pit	42.40	D7R	31	\$2,212	\$3,867	\$6,079	\$7,420	\$4,240	\$12,826	\$24,486
2	Growth Media Haul - East Pit	18.80	D7R	14	\$999	\$1,746	\$2,745	\$0	\$0	\$0	\$0
		61.20		45	\$3,211	\$5,613	\$8,824	\$7,420	\$4,240	\$12,826	\$24,486

Closure Cost Estimate
Foundations & Buildings

Project Name: Progressive Contracting, Inc. - Reclamation Plan
Date of Submittal: January 2024
File Name: BlankSRCE_Version_1_4_1_017_NV_2023_Costs.xlsm
Model Version: Version 1.4.1
Cost Data: User Data
Cost Data File: SRCE_Cost_Data_File_1_12_Std_2023.xlsm
Cost Estimate Type: Surety Cost Basis: Northern Nevada

Buildings & Foundation Demolition Cost Summary				
	Labor	Equipment	Materials	Totals
Building Demolition Cost	\$0	\$0	N/A	\$0
Wall Demolition Cost	\$0	\$0	N/A	\$0
Slab Demolition	\$0	\$0	N/A	\$0
Subtotal Demolition	\$0	\$0	\$0	\$0
Cover Placement Cost	\$0	\$0	N/A	\$0
Growth Media Placement Cost	\$0	\$0	N/A	\$0
Ripping/Scarifying Cost	\$0	\$0	N/A	\$0
Subtotal Earthworks	\$0	\$0	\$0	\$0
Revegetation Cost	\$0	\$0	\$0	\$0
TOTALS	\$0	\$0	\$0	\$0

Buildings & Foundation - User Input																	
You must fill in ALL green cells and relevant blue cells in this section for each building or facility																	
Facility Description				Physical - MANDATORY								Foundation Cover (1)			Growth Media (1) (entire footprint)		
	Description (required)	ID Code	Type	Length ft	Width ft	Eve Height ft	Slab Thickness in	Foundation Wall Thickness in	Foundation Wall Height ft	Average Flat Area Long Dimension (ripping distance) ft	Building Area Footprint (including surrounding facilities) acres	Foundation Cover Thickness in	Distance from Foundation Cover Borrow Area ft	Slope from Facility to Borrow Area % grade	Growth Media Thickness in	Distance from Growth Media Stockpile ft	Slope from Facility to Stockpile % grade

- Notes:
- Foundation cover only calculated to cover slab. Growth media estimated over entire footprint area
 - If Slope from facility to borrow source is >20, downhill travel time may be underestimated due to limitation of uphill travel time curves and downhill speed tables from CAT Handbook (see Productivity Sheet)
- No foundations exist within the area proposed for reclamation. All fleets and equipment will be moved to the post-mining laydown yard and will be left as-is.

Buildings & Foundation - User Input (cont.)																	
You must fill in ALL green cells and relevant blue cells in this section for each building or facility																	
		Construction Materials			Slab Demolition		Foundation Cover			Growth Media			Revegetation				
	Description (required)	Building Type (select)	Foundation Type (select)	Wall Type (select)	Slab Demo Method (select)	Slab Breaking Equipment Fleet (select)	Cover Material Type (select)	Cover Placement Equipment Fleet (select)	Maximum Fleet Size (user override)	Growth Media Material Type (select)	Growth Media Placement Equipment Fleet (select)	Maximum Fleet Size (user override)	Seed Mix (select)	Mulch (select)	Fertilizer (select)	Scarify/ Rip? (select)	Ripping Fleet (select)

- Notes:
- Material Types are used for density correction based on material densities in Caterpillar Performance Handbook material density table

Buildings & Foundation - Calculations																
Building Volume Calculations																
Using Means Heavy Construction Cost Data (2004) calculates cubic feet from building dimensions Estimate slab thickness and wall thickness if not known Assumes that all concrete slabs are reinforced Productivity for crew from Means Heavy Construction Cost Data (2004) adjusted for supervision (addressed in Misc. Costs) and Davis-Bacon Wage Rates Demolition costs do not include hauling or disposing if debris - Use Waste Disposal module																
Slab Demolition Calculations																
Minimum 1 hr excavator time for slab demolition																
Cover Volume Calculation																
Foundation area x cover thickness If "Bury in Place" is selected as slab demolition method, cover thickness is adjusted such that total cover (cover + growth media) equals value entered in "Minimum thickness of cover over unbroken slab" cell above																
Ripping/Scarifying Calculations																
Flat area width = Final flat area + Average long dimensions Number of passes = Flat area width + Grader width Travel distance = Number of passes x Average long dimensions Total hours = (Travel distance + Grader productivity) + (Number of passes x Grader maneuver time)																
Revegetation																
Minimum 1 acre revegetation crew time per area																

Closure Cost Estimate
Foundations & Buildings

Project Name: Progressive Contracting, Inc. - Reclamation Plan
Date of Submittal: January 2024
File Name: BlankSRCE_Version_1_4_1_017_NV_2023_Costs.xlsm
Model Version: Version 1.4.1
Cost Data: User Data
Cost Data File: SRCE_Cost_Data_File_1_12_Std_2023.xlsm
Cost Estimate Type: Surety Cost Basis: Northern Nevada

Buildings & Foundation Demolition Cost Summary				
	Labor	Equipment	Materials	Totals
Building Demolition Cost	\$0	\$0	N/A	\$0
Wall Demolition Cost	\$0	\$0	N/A	\$0
Slab Demolition	\$0	\$0	N/A	\$0
Subtotal Demolition	\$0	\$0	\$0	\$0
Cover Placement Cost	\$0	\$0	N/A	\$0
Growth Media Placement Cost	\$0	\$0	N/A	\$0
Ripping/Scarifying Cost	\$0	\$0	N/A	\$0
Subtotal Earthworks	\$0	\$0	\$0	\$0
Revegetation Cost	\$0	\$0	\$0	\$0
TOTALS	\$0	\$0	\$0	\$0

Building & Foundation Demolition Costs																			
Uses RS Means Heavy Construction Cost Data for building and wall demolition cost calculations. Uses CAT Handbook for slab breaking production.																			
	Description (required)	Building Footprint (slab area) sqft	Building Volume cu ft	Wall Length ft	Wall Area sq ft	Slab Demolition Fleet	Slab Volume cy	Total Labor Cost \$	Total Equipment Cost \$	Total Building Demolition Cost \$	Total Labor Cost \$	Total Equipment Cost \$	Total Wall Demolition Cost \$	Total Labor Cost \$	Total Equipment Cost \$	Total Slab Breaking Cost \$	Total Labor Cost \$	Total Equipment Cost \$	Total Demolition Costs \$
								\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0

Building & Foundation - Foundation Cover and Growth Media Costs																				
	Description (required)	Foundation Cover							Growth Media							Total Cover & Growth Media Costs				
		Cover Volume cy	Cover Replacement Fleet	Fleet Productivity LCY/hr	Number of Trucks/ Scrapers	Total Fleet Hours	Total Labor Cost \$	Total Equipment Cost \$	Total Cover Cost \$	Growth Media Volume cy	Growth Media Replacement Fleet	Fleet Productivity LCY/hr	Number of Trucks/ Scrapers	Total Fleet Hours	Total Labor Cost \$	Total Equipment Cost \$	Total Growth Media Cost \$	Total Labor Cost \$	Total Equipment Cost \$	Total Costs \$
							\$0	\$0	\$0						\$0	\$0	\$0	\$0	\$0	\$0

Building & Foundation - Scarifying/Revegetation Costs																	
				Scarifying/Ripping			Revegetation				Total Scarify & Revegation Costs						
		Description (required)	Flat Area acres	Ripping/ Scarifying Fleet	Scarifying/ Ripping Hours hrs	Scarifying/ Ripping Labor Costs \$	Scarifying/ Ripping Equipment Cost \$	Total Scarifying/ Ripping Costs \$	Revegetation Labor Cost \$	Revegetation Equipment Cost \$	Revegetation Material Cost \$	Total Revegetation Cost \$	Total Labor Cost \$	Total Equipment Cost \$	Total Material Cost \$	Total Costs \$	
						\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0

Closure Cost Estimate
Other Demo & Equip Removal

Project Name: Progressive Contracting, Inc. - Reclamation Plan
Date of Submittal: January 2024
File Name: BlankSRCE_Version_1_4_1_017_NV_2023_Costs.xlsm
Model Version: Version 1.4.1
Cost Data: User Data
Cost Data File: SRCE_Cost_Data_File_1_12_Std_2023.xlsm
Cost Estimate Type: Surety Cost Basis: Northern Nevada

Other Demolition and Equipment Removal - Cost Summary				
	Labor	Equipment	Materials	Totals
Other Demolition	\$0	\$0	\$0	\$0
Equipment Removal	\$6,300	\$42,000	\$0	\$48,300
TOTALS	\$6,300	\$42,000	\$0	\$48,300

Other Demolition								
Facility Description								
	Description (required)	ID Code	Type	Quantity	Units	Labor Unit Cost \$	Equipment Unit Cost \$	Material Unit Cost \$
						\$0	\$0	\$0

Notes:

Equipment & Material Removal								
Facility Description								
	Description (required)	ID Code	Type	Quantity	Units	Labor Unit Cost (\$)	Equipment Unit Cost (\$)	Material Unit Cost (\$)
1	Crushing Equipment in North Pit		Process - Crushing & Screening	21	Equipment	\$300.00	\$2,000.00	\$0.00
						\$6,300	\$42,000	\$0

Notes: Crushing equipment will be relocated to the North Pit at some later date. Upon closure, the crushing equipment will be removed and relocated to the post-mining laydown yard. The equipment to be moved is located in Table 2 of the Equipment and Facilities document in Appendix D. Total pieces of equipment estimated to be moved = 9 pieces of equipment for 'Ag' gypsum spread; 10 pieces of equipment for Primary gypsum spread; 2 loaders, and 4 haul trucks.
For conservativeness, all equipment is estimated to cost \$2,000 in equipment cost to move (skid mounted and hauling on flatbed), plus two hours per equipment at \$150 per hour

Closure Cost Estimate Sediment & Drainage Control

Project Name: Progressive Contracting, Inc. - Reclamation Plan
Date of Submittal: January 2024
File Name: BlankSRCE_Version_1_4_1_017_NV_2023_Costs.xlsm
Model Version: Version 1.4.1
Cost Data: User Data
Cost Data File: SRCE_Cost_Data_File_1_12_Std_2023.xlsm
Cost Estimate Type: Surety Cost Basis: Northern Nevada

Drainage Control - Cost Summary				
	Labor	Equipment	Materials	Totals
Diversion Ditch Construction	\$0	\$0	N/A	\$0
Diversion Ditch Liner	\$0	\$0	\$0	\$0
Diversion Ditch Rip-Rap	\$0	\$0	\$0	\$0
Sed Pond Construct/Regrade	\$0	\$0	N/A	\$0
Liner Installation	\$0	\$0	\$0	\$0
Sed Pond Cover	\$0	\$0	N/A	\$0
Ripping/Scarifying Cost	\$0	\$0	N/A	\$0
Subtotal Earthworks	\$0	\$0	\$0	\$0
Diversion Ditch Revegetation	\$0	\$0	\$0	\$0
Sediment Pond Revegetation	\$0	\$0	\$0	\$0
Subtotal Revegetation	\$0	\$0	\$0	\$0
TOTALS	\$0	\$0	\$0	\$0

Diversions Ditches - User Input																	
			Diversions Ditches								Revegetation			Liner and Rip-Rap Installation			
		Description (required)	ID Code	Diversion Length ft	Diversion Depth ft	Ditch Bottom Width ft	Ditch Sideslope Angle _H:TV	Excavate Volume (if calculated elsewhere) cy	Excavating Material Condition (select)	Excavating Equipment Fleet (select)	Seed Mix (select)	Mulch (select)	Fertilizer (select)	Liner Area S.Y.	Liner Type (select)	Rip-Rap Area S.Y.	Rip-Rap Type (select type)

Notes:

[illegible]

Notes:

1. All Physical parameters must be input even if manual overrides for volume or area are used.
2. If Slope from facility to borrow source is >20, downhill travel time may be underestimated due to limitation of uphill travel time curves and downhill speed tables from CAT Handbook (see Productivity Sheet)
3. Material Types are used for density correction based on material densities in Caterpillar Performance Handbook material density table

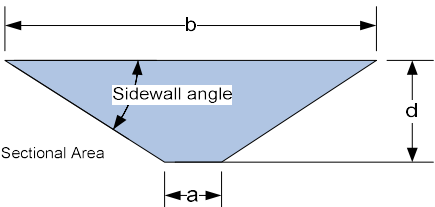
Sediment/Evaporation Pond Construction/Removal - User Input (cont.)													
		Sediment Ponds				Growth Media			Revegetation			Ripping/Scarifying	
	Description (required)	Excavating Material Condition (select)	Material Type (select)	Excavating Equipment Fleet (select)	Liner Type (select)	Growth Media Material Type (select)	Growth Media Placement Equipment Fleet (select)	Maximum Fleet Size (user override)	Seed Mix (select)	Mulch (select)	Fertilizer (select)	Scarify/ Rip? (select)	Scarify/ Ripping Fleet (select)

Notes:

1. Material Types are used for density correction based on material densities in Caterpillar Performance Handbook material density table

Drainage Control - Calculations

Diversion Ditch Volume Calculation



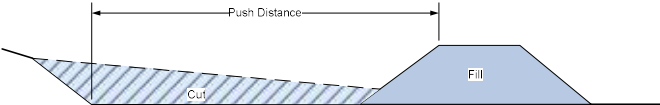
Cross Sectional Area = $\frac{(a + b)}{2} \times d$

Ditch Volume = Ditch Length x Cross Sectional Area

Figure 1 - Ditch Volume Calculation

- 1) Assume 20% swell for excavations
- 2) Assumes heavy duty trenching bucket is used

Sediment/Evaporation Pond Construction Calculation



Cut = Fill
Push distance = pond width up to 2/3 max push distance (400 ft)

Figure 2 - Sediment Ponds

- 1) Assume balanced cut-to-fill for berm construction
- 2) Include cost for liner, if required.
- 3) Include line items for removal, if necessary.
- 4) Assume 20% swell for excavations
- 5) Minimum 1 hr ripping/scarifying per area
- 6) Minimum 1 acre revegetation crew time per area

[illegible]

Notes: LCM assumes 20% swell from ditch volume

Division Ditches - Revegetation Costs						
	Description (required)	Surface Area acres	Revegetation Labor Cost \$	Revegetation Equipment Cost \$	Revegetation Material Cost \$	Total Revegetation Cost \$
			\$0	\$0	\$0	\$0

Sediment/Evaporation Ponds - Construction/Regrading Costs															
Productivity = Dozer Productivity x Grade Correction x Density Correction x Operator (0.75) x Material x Visibility x Job Efficiency (0.83)										Earthwork			Liner		
Description (required)	Regrading Volume cy	Sed/Evap Pond Equipment	Dozing Distance (see above) ft	Uncorrected Dozer Productivity LCY/hr	Grade Correction	Density Correction	Excavating Material	Corrected Productivity LCY/hr	Total Dozer Hours hr	Total Labor Cost \$	Total Equipment Cost \$	Total Constr/ Regrading Cost \$	Total Labor Cost \$	Total Equipment Cost \$	Total Material Cost \$
										\$0	\$0	\$0	\$0	\$0	\$0

Sediment/Evaporation Ponds - Growth Media Costs										
		Growth Media								
		Description (required)	Growth Media Volume cy	Growth Media Fleet	Fleet Productivity LCY/hr	Number of Trucks/ Scrapers	Total Fleet Hours	Total Labor Cost \$	Total Equipment Cost \$	Total Cover Placement Cost \$
								\$0	\$0	\$0

Sediment/Evaporation Ponds - Revegetation Costs													
		Description (required)	Surface Area acres	Long Ripping Distance ft	Ripping/ Scarifying Fleet	Scarifying/ Ripping Hours hrs	Scarifying/ Ripping Labor Costs \$	Scarifying/ Ripping Equipment Cost \$	Total Scarifying/ Ripping Costs \$	Revegetation Labor Cost \$	Revegetation Equipment Cost \$	Revegetation Material Cost \$	Total Revegetation Cost \$
						0	\$0	\$0	\$0	\$0	\$0	\$0	\$0

Closure Cost Estimate
Process Ponds

Project Name: Progressive Contracting, Inc. - Reclamation Plan
Date of Submittal: January 2024
File Name: BlankSRCE_Version_1_4_1_017_NV_2023_Costs.xlsm
Model Version: Version 1.4.1
Cost Data: User Data
Cost Data File: SRCE_Cost_Data_File_1_12_Std_2023.xlsm
Cost Estimate Type: Surety Cost Basis: Northern Nevada

Process Ponds - Cost Summary				
	Labor	Equipment	Materials	Totals
Backfilling Costs	\$0	\$0	N/A	\$0
Growth Media Placement Costs	\$0	\$0	N/A	\$0
Liner Cutting & Folding Costs	\$0	\$0	N/A	\$0
Subtotal Earthworks	\$0	\$0	\$0	\$0
Revegetation Costs	\$0	\$0	\$0	\$0
TOTALS	\$0	\$0	\$0	\$0

Process Ponds - User Input														
You must fill in ALL green cells and relevant blue cells in this section for each pond														
Facility Description			Pond Dimensions (1)					Backfill - (If trucks are used) (1)				Growth Media		
	Description (required)	ID Code	Pond Length ft	Pond Width ft	Pond Depth ft	Pond Sideslope Angle _H:1V	Disturbed Area (if calculated elsewhere) acres	Percent Backfill (100% if blank)	Distance from Backfill Borrow ft	Slope from Facility to Borrow Area % grade	Pond Volume (if calculated elsewhere) cy	Growth Media Thickness in	Distance from Growth Media Stockpile ft	Slope from Facility to Stockpile % grade

- Notes:
- All Physical parameters must be input even if manual overrides for volume or area are used.
 - If Slope from facility to borrow source is >20, downhill travel time may be underestimated due to limitation of uphill travel time curves and downhill speed tables from CAT Handbook (see Productivity Sheet)

Process Ponds - User Input (cont.)											
		Liner	Backfill			Growth Media			Revegetation		
	Description (required)	Crew Cut & Fold Time ⁽²⁾ hrs	Backfill Material Type (select)	Backfill Equipment Fleet (select)	Maximum Fleet Size (user override)	Growth Media Material Type (select)	Growth Media Placement Equipment Fleet (select)	Maximum Fleet Size (user override)	Seed Mix (select)	Mulch (select)	Fertilizer (select)

- Notes:
- Material Types are used for density correction based on material densities in Caterpillar Performance Handbook material density table
 - Pond liner removal crew (2Clab + excavator) = 2 General Laborers + 325C Excavator

Pond Volume Calculation

Area and Volume of the Frustrum of a Pyramid

Surface Area = $ab + cd + (a+b+c+d) \times \frac{s}{2}$

Volume = $\frac{h}{3} (ab + cd + \sqrt{abcd})$

Revegetation Calculations

Minimum 1 acre revegetation crew time per area

Process Ponds - Liner Cutting and Folding					
	Description (required)	Crew Hours hrs	Total Labor Cost \$	Total Equipment Cost \$	Total Liner Removal Cost \$
			\$0	\$0	\$0

Process Ponds - Backfill and Growth Media Costs																	
		Pond Backfill								Growth Media							
	Description (required)	Backfill Volume cy	Backfill Fleet	Fleet Productivity LCY/hr	Number of Trucks/ Scrapers	Total Fleet Hours	Total Labor Cost \$	Total Equipment Cost \$	Total Backfill Cost \$	Growth Media Volume cy	Growth Media Fleet	Fleet Productivity LCY/hr	Number of Trucks/ Scrapers	Total Fleet Hours	Total Labor Cost \$	Total Equipment Cost \$	Total Growth Media Cost \$
							\$0	\$0	\$0						\$0	\$0	\$0

Process Ponds - Revegetation Costs						
	Description (required)	Surface Area acres	Revegetation Labor Cost \$	Revegetation Equipment Cost \$	Revegetation Material Cost \$	Total Revegetation Cost \$
			\$0	\$0	\$0	\$0

Closure Cost Estimate
Landfills

Project Name: Progressive Contracting, Inc. - Reclamation Plan
Date of Submittal: January 2024
File Name: BlankSRCE_Version_1_4_1_017_NV_2023_Costs.xlsm
Model Version: Version 1.4.1
Cost Data: User Data
Cost Data File: SRCE_Cost_Data_File_1_12_Std_2023.xlsm
Cost Estimate Type: Surety Cost Basis: Northern Nevada

Landfills - Cost Summary				
	Labor	Equipment	Materials	Totals
Grading Costs	\$0	\$0	N/A	\$0
Cover Placement Cost	\$0	\$0	N/A	\$0
Topsoil Placement Cost	\$0	\$0	N/A	\$0
Ripping/Scarifying Cost	\$0	\$0	N/A	\$0
Subtotal Earthworks	\$0	\$0	\$0	\$0
Revegetation Cost	\$0	\$0	\$0	\$0
TOTALS	\$0	\$0	\$0	\$0

Landfills - User Input											
You must fill in ALL green cells and relevant blue cells in this section for each landfill											
Facility Description			Physical (1)			Cover			Growth Media		
	Description (required)	ID Code	Final Landfill Footprint acres	Average Long Dimension (ripping distance) ft	Regrade Volume (calculated elsewhere) cy	Cover Thickness in	Distance from Cover Borrow ft	Slope from Landfill to Cover Borrow % grade	Growth Media Thickness in	Distance from Growth Media Stockpile ft	Slope from Landfill to Stockpile % grade

- Notes:
- All Physical parameters must be input even if manual overrides for volume or area are used.
 - If Slope from facility to borrow source is >20, downhill travel time may be underestimated due to limitation of uphill travel time curves and downhill speed tables from CAT Handbook (see Productivity Sheet)

Landfills - User Input (cont.)																	
You must fill in ALL green cells and relevant blue cells in this section for each landfill																	
		Grading				Cover			Growth Media			Revegetation					
	Description (required)	Regrading Material Condition (select)	Regrading Material Type (select)	Regrading Equipment Fleet (select)	Slot/ Side-by-Side (select)	Cover Material Type (select)	Cover Placement Equipment Fleet (select)	Maximum Fleet Size (user override)	Growth Media Material Type (select)	Growth Media Equipment Fleet (select)	Maximum Fleet Size (user override)	Seed Mix (select)	Mulch Type (select)	Fertilizer (select)	Scarify/ Rip? (select)	Scarifying/ Ripping Fleet (select)	

- Notes:
- Material Types are used for density correction based on material densities in Caterpillar Performance Handbook material density table

Landfills - Calculations	
Dozing, Ripping/Scarifying & Revegetation Calculations Dozing: Dozing distance = 2/3 of the 600 feet maximum from Catepillar Handbook or 400 feet Assumes flat push (grade correction factor = 1) Minimum 1 hr per area Ripping: Flat area width = Final flat area ÷ Average long dimensions Number of passes = Flat area width ÷ Grader width Travel distance = Number of passes x Average long dimensions Total hours = (Travel distance ÷ Grader productivity) + (Number of passes x Grader maneuver time) Minimum 1 hr per area Revegetation: Minimum 1 acre revegetation crew time per area	

Landfills - Regrading Costs													
Productivity = Dozer Productivity x Density Correction x Operator (0.75) x Material x Visibility x Job Efficiency (0.83) x (Slot/Side-by-Side)													
	Description (required)	Regrading Volume cy	Dozing Distance (see above) ft	Regrading Fleet	Uncorrected Dozer Productivity cy/hr	Dozing Material	Density Correction	Side-by-Side or Slot Dozing	Total Hourly Productivity LCY/hr	Total Dozer Hours	Total Labor Cost \$	Total Equipment Cost \$	Total Regrading Cost \$
											\$0	\$0	\$0

Landfills - Cover and Growth Media Costs																	
		Cover Placement							Growth Media Placement								
	Description (required)	Cover Volume ft	Cover Replacement Fleet	Fleet Productivity LCY/hr	Number of Trucks/ Scrapers	Total Fleet Hours	Cover Labor Cost \$	Cover Equipment Cost \$	Total Cover Cost \$	Growth Media Volume ft	Growth Media Replacement Fleet	Fleet Productivity LCY/hr	Number of Trucks/ Scrapers	Total Fleet Hours	Total Labor Cost \$	Total Equipment Cost \$	Total Growth Media Cost \$
							\$0	\$0	\$0						\$0	\$0	\$0

Landfills - Scarifying/Revegetation Costs												
	Description (required)	Surface Area acres	Long Dimension ft	Ripping/ Scarifying Fleet	Scarifying/ Ripping Hours hrs	Scarifying/ Ripping Labor Costs \$	Scarifying/ Ripping Equipment Cost \$	Total Scarifying/ Ripping Costs \$	Revegetation Labor Cost \$	Revegetation Equipment Cost \$	Revegetation Material Cost \$	Total Revegetation Cost \$
						\$0	\$0	\$0	\$0	\$0	\$0	\$0

Closure Cost Estimate
Yards, Etc.

Project Name: Progressive Contracting, Inc. - Reclamation Plan
Date of Submittal: January 2024
File Name: BlankSRCE_Version_1_4_1_017_NV_2023_Costs.xlsm
Model Version: Version 1.4.1
Cost Data: User Data
Cost Data File: SRCE_Cost_Data_File_1_12_Std_2023.xlsm
Cost Estimate Type: Surety Cost Basis: Northern Nevada

Yards, Etc. - Cost Summary				
	Labor	Equipment	Materials	Totals
Regrading Cost	\$0	\$0	N/A	\$0
Cover Placement Cost	\$0	\$0	N/A	\$0
Growth Media Placement Cost	\$0	\$0	N/A	\$0
Ripping/Scarifying Cost	\$0	\$0	N/A	\$0
Subtotal Earthworks	\$0	\$0		\$0
Revegetation Cost	\$0	\$0	\$0	\$0
TOTALS	\$0	\$0	\$0	\$0

Yards, Etc. - User Input												
Facility Description					Physical			Cover			Growth Media	
	Description (required)	ID Code	Type	Area acres	Average Flat Area Long Dimension (ripping distance) ft	Regrade Volume (calculated elsewhere) cy	Cover Thickness in	Distance from Cover Borrow Area ft	Slope from Facility to Borrow Area % grade	Growth Media Thickness in	Distance from Growth Media Stockpile ft	Slope from Facility to Stockpile % grade

- Notes:
- All Physical parameters must be input even if manual overrides for volume or area are used.
 - If Slope from facility to borrow source is >20, downhill travel time may be underestimated due to limitation of uphill travel time curves and downhill speed tables from CAT Handbook (see Productivity Sheet)

Yards, Etc. - User Input (cont.)															
You must fill in ALL green cells and relevant blue cells in this section for each building or facility															
		Grading			Cover			Growth Media			Revegetation				
	Description (required)	Regrading Material Condition (select)	Regrading Material Type (select)	Regrading Equipment Fleet (select)	Cover Material Type (select)	Cover Placement Equipment Fleet (select)	Maximum Fleet Size (user override)	Growth Media Material Type (select)	Growth Media Equipment Fleet (select)	Maximum Fleet Size (user override)	Seed Mix (select)	Mulch (select)	Fertilizer (select)	Scarify/ Rip? (select)	Ripping Fleet (select)

- Notes:
- Material Types are used for density correction based on material densities in Caterpillar Performance Handbook material density table

Grading Calculations

Average push distance assumed to be 2/3 of the 600 feet maximum from Catepillar Handbook or 400 feet
Material assumed to be loose stockile (1.2 productivity factor)
Slope assumed to be 0 to 5% (1.0 productivity factor)

Cover Volume Calculation

Yard area x cover thickness

Ripping/Scarifying Calculations

Flat area width = Final flat area ÷ Average long dimensions
Number of passes = Flat area width ÷ Grader width
Travel distance = Number of passes x Average long dimensions
Total hours = (Travel distance ÷ Grader productivity) ÷ (Number of passes x Grader maneuver time)
Minimum 1 hr ripping/scarifying per area

Revegetation

Minimum 1 acre revegetation crew time per area

Yards, Etc. - Regrading Costs														
Productivity = Dozer Productivity x Grade Correction x Density Correction x Operator (0.75) x Material x Visibility x Job Efficiency (0.83) x (Slot/Side-by-Side)														
		Description (required)	Regrading Volume cy	Dozing Distance (see above) ft	Regrading Fleet	Uncorrected Dozer Productivity cy/hr	Grade Correction	Dozing Material	Density Correction	Total Hourly Productivity cy/hr	Total Dozer Hours hr	Total Labor Cost \$	Total Equipment Cost \$	Total Regrading Cost \$
												\$0	\$0	\$0

Yards, Etc. - Cover and Growth Media Costs																	
		Cover							Growth Media								
	Description (required)	Cover Volume cy	Topsoil Repacement Fleet	Fleet Productivity LCY/hr	Number of Trucks/ Scrapers	Total Fleet Hours	Total Labor Cost \$	Total Equipment Cost \$	Total Cover Cost \$	Growth Media Volume cy	Growth Media Fleet	Fleet Productivity LCY/hr	Number of Trucks/ Scrapers	Total Fleet Hours	Total Labor Cost \$	Total Equipment Cost \$	Total Growth Media Cost \$
							\$0	\$0	\$0						\$0	\$0	\$0

Yards, Etc. - Scarifying/Revegetation Costs												
	Description (required)	Surface Area acres	Area Long Dimension ft	Ripping/ Scarifying Fleet	Scarifying/ Ripping Hours hrs	Scarifying/ Ripping Labor Costs \$	Scarifying/ Ripping Equipment Cost \$	Total Scarifying/ Ripping Costs \$	Revegetation Labor Cost \$	Revegetation Equipment Cost \$	Revegetation Material Cost \$	Total Revegetation Cost \$
						\$0	\$0	\$0	\$0	\$0	\$0	\$0

Closure Cost Estimate
Waste Disposal

Project Name: Progressive Contracting, Inc. - Reclamation Plan
Date of Submittal: January 2024
File Name: BlankSRCE_Version_1_4_1_017_NV_2023_Costs.xlsm
Model Version: Version 1.4.1
Cost Data: User Data
Cost Data File: SRCE_Cost_Data_File_1_12_Std_2023.xlsm
Cost Estimate Type: Surety Cost Basis: Northern Nevada

Waste Disposal - Cost Summary				
	Labor	Equipment	Fees	Totals
Solid Waste - On Site	\$2,791	\$9,906	N/A	\$12,697
Solid Waste - Off Site				\$0
Hazardous Materials				\$0
Hydrocarbon Contaminated Soils	\$0	\$0	\$0	\$0
TOTALS	\$2,791	\$9,906	\$0	\$12,697

Waste Disposal - User Input - Solid Waste									
						Landfill (Bulk) Disposal		Dumpster	
	Description (required)	ID Code	Waste Type (select)	Disposal Method (select)	Quantity cy	Distance to Landfill ft	Slope to Landfill % grade	Number of Trucks (user override)	Months Dumpster Rental months
1	Miscellaneous barrels		Process - Other	Landfill (bulk)	1,200	64416	1.0		

Notes:
1. All Physical parameters must be input even if manual overrides for volume or area are used.
2. If Slope from facility to borrow source is >20, downhill travel time may be underestimated due to limitation of uphill travel time curves and downhill speed tables from CAT Handbook (see Productivty Sheet)
There is expected to be some miscellaneous debris to be removed. This is an estimation only, but is considered conservative as very little debris and litter exists at the site.

Waste Disposal - User Input - Hazardous Materials									
	Description (required)	ID Code	Waste Type (select)	Container Type (select)	Vacuum Truck Size (select)	Liquid Quantity gallons	Solid Quantity cy	One Way Travel Distance to Disposal Site mi	One Way Travel Time to Disposal Site hr

Notes:
1. Use Other Demo & Equip Removal Sheet for tank removal

Waste Disposal - User Input - Hydrocarbon Contaminated Soils						
	Description (required)	ID Code	Waste Type (select)	Disposal Method (select)	Quantity cy	Travel Distance to Offsite Disposal mi

Notes:
1. Use Yards or Landfills Sheets for bioremediation facility reclamation

Waste Disposal - Assumptions & Calculations	
Solid Waste Disposal Off site disposal assumes use of average rolloff dumpster [30 cy (m3), 10 ton (tonne)] On site disposal assumes use of small loader/truck fleet for haulage Average density for on site disposal = 2,600 lb/cy (1,540 kg/m3) For on site disposal only 1 truck is required unless total truck hours > 8, only 2 trucks unless total truck hours are > 16	
Hazardous Materials Disposal Assumes all hazardous materials are known Enter EITHER solid or liquid quantity each line. If container type = 55 gallon (200 liter) drum then solid waste hauling costs apply Average density for solids assumed to be 2,600 lb/cy (1,540 kg/m3) Vacuum truck sizes: small = 2,200 gal (~8,300 litres), large = 5,000 gal (~19,000 litres) Vacuum truck on site for 4 hours for each load	
Hydrocarbon Contaminated Soils Disposal Assumes all hazardous materials are known On site disposal assumes biopad treatment Exavation productivity =45 cy./hr (35 m3/hr) (Means Heavy Construction, 2006: 02315-424-0360)	

Waste Disposal - Solid Waste Disposal										
	Description (required)	Waste Volume cy	Number of Off Site Dumpster Loads	Landfill Fleet Equipment	Landfill Fleet Productivity LCY/hr	Number of Trucks	Total Fleet Hours	Total Dumpster Cost \$	Total Labor Cost \$	Total Equipment Cost \$
1	Miscellaneous barrels	1,200		725/966G/D7R	546	26	2	\$0	\$2,791	\$9,906
		1,200					2	\$0	\$2,791	\$9,906

Waste Disposal - Hazardous Materials Disposal									
	Description (required)	Liquid Waste Volume gallons	Solid Waste Volume cy	Number of Truck Loads	Tons of Waste Tons	Pick-up Fees \$	Transport Fees \$	Disposal Fees \$	Total Hazardous Material Cost \$
						\$0	\$0	\$0	\$0

Waste Disposal - Hydrocarbon Contaminated Soils										
	Description (required)	Quantity cy	Disposal Equipment Fleet	Total Fleet Hours	Treatment Cost \$	Transport Fees \$	Disposal Fees \$	Total Labor Cost \$	Total Equipment Cost \$	Total Waste Disposal Cost \$
					\$0	\$0	\$0	\$0	\$0	\$0

Closure Cost Estimate
Well Abandonment

Project Name: Progressive Contracting, Inc. - Reclamation Plan
Date of Submittal: January 2024
File Name: BlankSRCE_Version_1_4_1_017_NV_2023_Costs.xlsm
Model Version: Version 1.4.1
Cost Data: User Data
Cost Data File: SRCE_Cost_Data_File_1_12_Std_2023.xlsm
Cost Estimate Type: Surety Cost Basis: Northern Nevada

Well Abandonment				
	Labor	Equipment	Materials	Totals
Production, Dewatering, Infiltration Wells	\$0	\$0	\$0	\$0
Monitoring Wells	\$0	\$0	\$0	\$0
TOTALS	\$0	\$0	\$0	\$0

Production, Dewatering and Infiltration Well Closure																											
	Description (required)	ID Code	Number of Holes	Casing Diam in	Average Depth ⁽¹⁾ ft bgs	Depth to First Water ft bgs	Original Static Water Level ft bgs	Top of Slotted Casing ⁽²⁾ ft bgs	Blank Casing Below Top of Screen ⁽²⁾ ft	Type of Pump (if any) (select)	Depth to Pump ft bgs	Hole Plug Method (select)	Casing Volume per ft cf	Perforation Length ^(3,4) ft	Grout Volume per Hole ^(4,5) cy	Cement Volume per Hole ⁽⁶⁾ cy	Inert Media Volume per Hole ⁽⁷⁾ cy	Pump Removal Labor Cost \$	Pump Removal Equip Cost \$	Perf Labor Cost \$	Perf Equip Cost ⁽⁸⁾ \$	Grout + Cement Labor Cost ⁽⁹⁾ \$	Grout + Cement Equip Cost ⁽⁹⁾ \$	Grout + Cement Material Cost \$	Inert Media Labor Cost ⁽¹⁰⁾ \$	Inert Media Equip Cost ⁽⁹⁾ \$	
																			\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0

(1) For previously abandoned holes enter "0" for depth
(2) Wells abandoned per Nevada Administrative Code (NAC 534.420). Hole grouted and perforated from bottom to 50 feet (15.24m) above the top of the screen, or first water encountered or original static water level, depending on vertical hydraulic gradient and well construction parameters. Inert media (cuttings or alluvium) used from top of grout to top seal.
(3) Perforation length = amount of blank casing below first water (for confined aquifers) or predicted recovered water table (unconfined aquifers) + 50 feet (15.24m) of blank casing above water table
(4) Assumes 50' (15.24m) sanitary seal at top of hole. Therefore, perforation and grouting only required to bottom of sanitary seal.
(5) Assumes 100% loss to formation for grout (abandonite) for screened and perforated sections.
(6) Assumes 20' (6m) top seal of cement in casing only. See note 4.
(7) Inert material is cuttings or alluvium sourced locally.
(8) Includes perforation tool wear cost/ft of perforation (see Productivity Sheet).
(9) See Productivity Sheet for hourly production. Minimum 1 hr per hole + fixed hours per hole for move and setup. If no perforation required, use standard drill rig.
(10) See Productivity Sheet for hourly production. Minimum 1 hr per hole.

Notes:

Closure Cost Estimate
Well Abandonment

Project Name: Progressive Contracting, Inc. - Reclamation Plan
Date of Submittal: January 2024
File Name: BlankSRCE_Version_1_4_1_017_NV_2023_Costs.xlsm
Model Version: Version 1.4.1
Cost Data: User Data
Cost Data File: SRCE_Cost_Data_File_1_12_Std_2023.xlsm
Cost Estimate Type: Surety Cost Basis: Northern Nevada

Well Abandonment				
	Labor	Equipment	Materials	Totals
Production, Dewatering, Infiltration Wells	\$0	\$0	\$0	\$0
Monitoring Wells	\$0	\$0	\$0	\$0
TOTALS	\$0	\$0	\$0	\$0

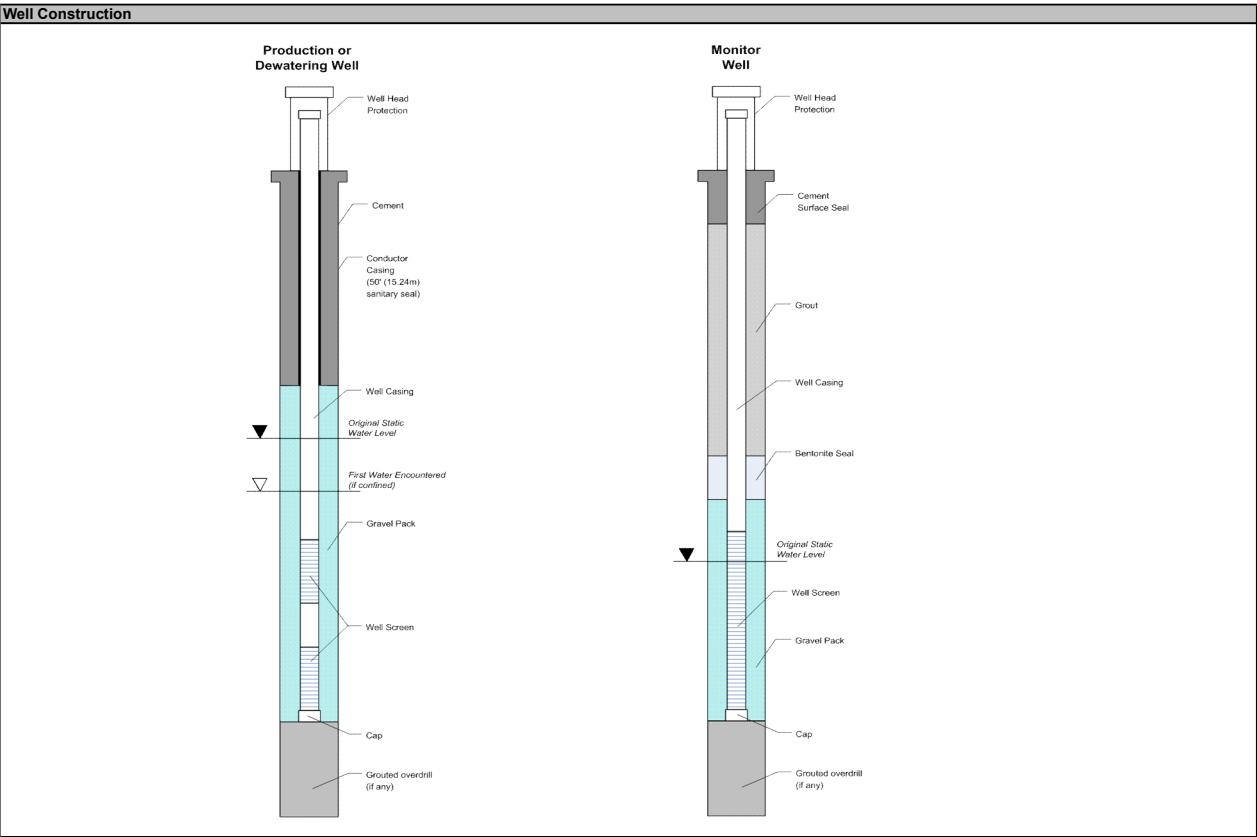
Monitoring Well Closure																		
	Description (required)	ID Code	Number of Holes	Casing Diam in	Average Depth ft bgs	Top of Screen ⁽¹⁾ ft bgs	Hole Plug Method (select)	Casing Volume per ft ft3	Grout Volume/ Well ^(2,3) cy	Cement Volume per Hole ⁽⁴⁾ cy	Inert Backfill Volume per Hole ⁽⁵⁾ cy	Total Grouting Hours/ Hole hr	Total Inert Media Hours/ Hole hr	Grout + Cement Labor Cost ⁽⁶⁾ \$	Grout + Cement Equip Cost ⁽⁶⁾ \$	Grout + Cement Material Cost \$	Inert Material Labor Cost ⁽⁷⁾ \$	Inert Material Equip Cost ⁽⁷⁾ \$
														\$0	\$0	\$0	\$0	\$0

Wells abandoned per NAC 534.420 with bentonite grout placed to 50 feet above the top of the screen (see note 1).
(1) Assumes top of screen is at or above the static water level (in unconfined aquifers) or the depth of first water encountered (in confined aquifers).
(2) Assumes 25% loss to formation for grouting
(3) Grouting only required to 50' (15.24m) above the top of screen because monitor wells are constructed with a seal in the annular space.
(4) Assumes top 20' (6m) plugged with cement.
(5) Assumes hole plugged with inert material (cuttings or alluvium) above grout up to cement surface plug.
(6) See Productivity Sheet for hourly production. Minimum 1 hr per hole + fixed hours per hole for move and setup (see Productivity Sheet).
(7) See Productivity Sheet for hourly production. Minimum 1 hr per hole.

Notes:

Project Name: Progressive Contracting, Inc. - Reclamation Plan
Date of Submittal: January 2024
File Name: BlankSRCE_Version_1_4_1_017_NV_2023_Costs.xlsm
Model Version: Version 1.4.1
Cost Data: User Data
Cost Data File: SRCE_Cost_Data_File_1_12_Std_2023.xlsm
Cost Estimate Type: Surety Cost Basis: Northern Nevada

Well Abandonment				
	Labor	Equipment	Materials	Totals
Production, Dewatering, Infiltration Wells	\$0	\$0	\$0	\$0
Monitoring Wells	\$0	\$0	\$0	\$0
TOTALS	\$0	\$0	\$0	\$0



Closure Cost Estimate
Misc. Costs

Project Name: Progressive Contracting, Inc. - Reclamation Plan
Date of Submittal: January 2024
File Name: BlankSRCE_Version_1_4_1_017_NV_2023_Costs.xlsm
Model Version: Version 1.4.1
Cost Data: User Data
Cost Data File: SRCE_Cost_Data_File_1_12_Std_2023.xlsm
Cost Estimate Type: Surety Cost Basis: Northern Nevada

Miscellaneous Cost Summary				
	Labor	Equipment	Materials	Totals
Fence Removal	\$0	\$0	N/A	\$0
Fence Installation	\$0	\$0	\$0	\$0
Culvert & Buried Pipe Removal	\$0	\$0	N/A	\$0
Surface Pipe Removal	\$0	\$0	N/A	\$0
Power Lines	\$0	N/A	N/A	\$0
Substations/Transformers	\$0	N/A	N/A	\$0
Rip-rap, rock lining, gabions	\$0	\$0	\$0	\$0
Other Costs	\$0	\$0	\$0	\$0
TOTALS	\$0	\$0	\$0	\$0

Fence Removal							
You must fill in ALL green and blue cells							
Costs							
	Description (required)	ID Code	Length ft	Type (select type)	Labor Cost \$	Equipment Cost \$	Total Cost \$
					\$0	\$0	\$0

Notes:

Fence Installation							
You must fill in ALL green and blue cells							
			Input		Costs		
	Description (required)	ID Code	Length ft	Type (select type)	Labor Cost \$	Equipment Cost \$	Material Cost (\$)
					\$0	\$0	\$0

Notes:

Culvert & Buried Pipe Removal							
You must fill in ALL green and blue cells							
			Input			Costs	
	Description (required)	ID Code	Length ft	Type (select type)	Location (select)	Labor Cost \$	Equipment Cost \$
						\$0	\$0

Notes:

Surface Pipe Removal							
You must fill in ALL green and blue cells							
			Input			Costs	
	Description (required)	ID Code	Length ft	Type (select type)	Location (select)	Labor Cost \$	Equipment Cost \$
						\$0	\$0

Notes:

Power Line and Substation Removal							
You must fill in ALL green and blue cells							
			Input				
	Description (required)	ID Code	Power Line Length miles	Power Line Type (select)	Number of Substations #	Location (select)	Power Line Removal \$
							\$0

Notes: If substation owned by operator, use Other Demo & Equipment Removal sheet
User may need to add line items in Foundations & Buildings for substation slab demolition and fence removal
Labor/Equipment costs assume approximately 80% of cost are equipment and 20% are labor related costs

Rip-Rap & Rock Lining							
You must fill in ALL green and blue cells							
			Input		Costs		
	Description (required)	ID Code	Area S.Y.	Type (select type)	Labor Cost \$	Equipment Cost \$	Material Cost \$
					\$0	\$0	\$0

Notes:

Closure Cost Estimate
Monitoring

Project Name: Progressive Contracting, Inc. - Reclamation Plan
Date of Submittal: January 2024
File Name: BlankSRCE_Version_1_4_1_017_NV_2023_Costs.xlsm
Model Version: Version 1.4.1
Cost Data: User Data
Cost Data File: SRCE_Cost_Data_File_1_12_Std_2023.xlsm
Cost Estimate Type: Surety Cost Basis: Northern Nevada

Reclamation Monitoring & Maintenance - Cost Summary				
	Labor	Equipment	Lab & Materials	Totals
Revegetation Maintenance	\$10,751	\$6,143	\$18,584	\$35,478
Erosion Maintenance	\$1,728	\$5,184	N/A	\$6,912
Reclamation Monitoring	\$4,860	\$1,272	N/A	\$6,132
Subtotal Reclamation Monitoring	\$17,339	\$12,599	\$18,584	\$48,522
Water Quality Monitoring	\$0	\$0	\$0	\$0
TOTAL MONITORING	\$17,339	\$12,599	\$18,584	\$48,522

Reclamation Maintenance								
Description	Total Revegetation Surface Area (1,2) acres	% Area Requiring Reseeding	Seed Mix (select)	Area Requiring Reseeding acres	Seed \$/acres	Labor \$/acres	Equipment \$/acres	Totals \$
Revegetation Maintenance	137	45%	Mix 1	61.4	\$302.50	\$175.00	\$100.00	
Labor Equipment Materials Cost/Acre								\$10,751
								\$6,143
								\$18,584
								\$578
							Subtotal	\$35,478
Notes: 1) Surface area is NOT the same as footprint disturbance area typically used for permitting purposes.								
	Total Volume Growth Media cy	% Volume Requiring Maintenance	Average Growth Media Placement Cost \$/CY	Volume Requiring Replacement cy		Labor (assume: 25%) \$/acres	Equipment (assume: 75%) \$/acres	Total \$
Erosion Maintenance	49,368	10%	\$1.40	4,937		\$1,728.00	\$5,184.00	\$6,912
Notes:								

Reclamation Monitoring					
Description	Hrs/Day	Days/Year	Number of Years	Rate \$/hr	
Field Work					
Field Geologist/Engineer				\$175.02	\$0
Range Scientist	8	1	3	\$135.02	\$3,240
Reporting					
Field Geologist/Engineer				\$175.02	\$0
Range Scientist	4	1	3	\$135.02	\$1,620
				Subtotal	\$4,860
Travel					
	Hrs/Trip hr	Trips/Year	Years	Truck Cost \$/hr	
Travel	8	1	3	\$52.98	\$1,272
				Subtotal	\$1,272
				Total Reclamation Monitoring	\$6,132
Notes:					

Water and Rock Sample Analysis										
Description	Samples #	Events/Year	No. Years	First Sample Year closure year (1-100)	No. of Samplers	Days/Event	Hrs/Day	Analysis Cost \$/sample	Supplies \$/sample	Lab Cost \$
										\$0.00

Notes: Sampling labor cost = No. Samplers x Years x Events/year x Days/event x Hour/Day x Labor Rate
Sampling equipment costs include 1 pickup truck for every two samplers

Ground & Surface Water Monitoring					
Pump Costs					
Description	No. of units		Years		Cost \$
Pump (purchased)		Replacement period (yrs):			\$0
Subtotal Field Work					\$0
Notes: Replacement period = frequency of pump replacement					
Reporting					
Description	Hrs/Event	Rate \$/hr	Cost \$		
Field Geologist/Engineer					
Subtotal Reporting					
Notes:					

Closure Cost Estimate
Constr. Mgmt

Project Name: Progressive Contracting, Inc. - Reclamation Plan
Date of Submittal: January 2024
File Name: BlankSRCE_Version_1_4_1_017_NV_2023_Costs.xlsm
Model Version: Version 1.4.1
Cost Data: User Data
Cost Data File: SRCE_Cost_Data_File_1_12_Std_2023.xlsm
Cost Estimate Type: Surety Cost Basis: Northern Nevada

Construction Management & Road Maintenance - Cost Summary				
	Labor	Equipment	Materials	Totals
Construction Management	\$46,094	\$13,973	N/A	\$60,067
Construction Support		\$231		\$231
Road Maintenance	\$865	\$1,606	\$0	\$2,471
TOTAL CONSTRUCTION MANAGEMENT	\$46,959	\$15,810	\$0	\$62,769

Construction Management							
Construction Management Staff							
Description	Duration mo.	Hours/ Month hr.	Number of Supervisors	Supervisor Rate \$/hr	Labor Cost \$	Equipment Cost ⁽¹⁾ \$	Totals \$
Active Reclamation	3	160	1	\$96.03	\$46,094	\$13,973	\$60,067
Monitoring & Maintenance					\$0	\$0	\$0
Total Staff					\$46,094	\$13,973	\$60,067
Construction Management Support							
Description	Duration mo.	Number of Units		Rental Rate \$/mo	Generator Cost \$/mo	Equipment Cost ⁽¹⁾ \$	Totals \$
Temporary Office Rental						\$0	\$0
Temporary Toilets	1	1		\$231		\$231	\$231
Total Support						\$231	\$231
Notes: Office rental assumes only 1 generator required for every 4 trailers							
Total Construction Management							\$60,298

Road Maintenance							
Description	Fleet Size (select)	Number	Duration mo.	Hours/ Month hr.	Labor Cost \$	Equipment Cost \$	Totals \$
Active Reclamation							
Water Truck	Small	1	1	20	\$865	\$1,606	\$2,471
Grader					\$0	\$0	\$0
Monitoring & Maintenance							
Water Truck					\$0	\$0	\$0
Grader					\$0	\$0	\$0
Description	Gallons/ Day	Days/ Month	Duration mo.	Cost/ Gallon \$			Totals \$
Water Fees							
Water Fees							\$0
Total Project Maintenance					\$865	\$1,606	\$2,471
Notes: 1) Supervisor equipment = pickup truck							