



Crestone Peak Resources, LLC

TOPSOIL PROTECTION PLAN

FOR

State Sunlight/Long

Prepared For:



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Prepared By:



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Date Prepared: December 2024

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1. INTRODUCTION

This Topsoil Protection Plan (Plan) was prepared by RPG Resources, LLC (RPG) to support Crestone Peak Resources, LLC (Crestone) in preparing Form 2A to permit oil and gas development of the State Sunlight/Long Pad.

The intent of this plan is to provide site-specific guidance and recommended best management practices (BMPs) for topsoil management throughout the construction and interim reclamation project phases. The operator has developed this plan to comply with federal, state, and local criteria and guidelines, as they relate to topsoil management. The following procedures will be implemented to ensure protection of soils through all oil and gas exploration and production phases.

2. SITE DESCRIPTION

2.1. General

The State Sunlight/Long Site will be located entirely within Township 5 South, Range 65 West, Section 27 in Arapahoe County, Colorado. For the purposes of this plan, the Limit of Disturbance (LOD) refers to the proposed development of an Oil and Gas Location and is hereafter referred to as the Site.

2.2. Topography and Land use

The Site slopes southeast at a 5-6% grade. The Site is located on rangeland, within the Western Great Plains Range and Irrigated Region Land Resource Region (LRR) of the Central High Plains, southern part Major Land Resource Region (MLRA).

2.3. Natural features

RPG completed a review of published resources prior to conducting a field survey on May 14, 2024. There are two (2) National Wetland Inventory (NWI) feature mapped within 1,000 feet of the proposed oil and gas location. There is one (1) National Wetland Inventory (NWI) R4SBA (riverine, intermittent, streambed, temporary flooded) stream feature located approximately six hundred and fourteen (614) feet east of the proposed oil and gas location and down gradient. There is one (1) National Wetland Inventory (NWI) PEM1 C (palustrine, emergent, persistent, seasonally flooded) freshwater emergent wetland located approximately six hundred and twenty (620) feet southeast of the proposed oil and gas location and down gradient. The field survey verified the presence of both features, and an ordinary high-water mark (OHWM) was observed. No additional unmapped wetland or waterway features were identified at the time of the field survey. Stormwater best management practices (BMPs) will be installed prior to initiating construction. Impacts to wetlands or waterways are not anticipated as a part of this project.

3. FIELD OBSERVATIONS

3.1. Methodology

Topsoil depth was evaluated using physical and morphological soil characteristics. As described below, fourteen (14) soil test pits, measuring approximately thirty-six (36) inches in total depth, were evaluated across the proposed disturbance area for the State Sunlight/Long Site (see Appendix B). Soil colors were evaluated using a Munsell Soil Color Book. Four (4) of the fourteen (14) test pit locations had soil samples collected within the proposed topsoil salvage depths. Soil samples were submitted to Weld Laboratories in Greeley, CO, and Elevation Diagnostics Laboratories in Aurora, CO for analysis of baseline agronomic

soil properties. The results will be used to apply topsoil reclamation amendments as needed. See Appendix C for laboratory results.

3.2. Soil Physical & Morphological Characteristics

Three (3) soil types were identified by the United States Department of Agriculture (USDA) Natural Resource Conservation Service (NRCS) Web Soil Survey (WSS): Buick loam, 5 to 9 percent slopes (BxD), and Renohill-Little-Thedalund complex, 9 to 30 percent slopes (RtE). Naming conventions of the test pits discussed within the subsections below refer to the WSS map symbology.

Buick loam, 5 to 9 percent slopes (BxD), covers approximately 0.01 acres of land within the proposed disturbance area, and 1 test pit was dug within the mapped limits of soil type BxD, described below as LOW-BxD-002. Renohill-Little-Thedalund complex, 9 to 30 percent slopes (RtE) covers approximately 35.21 acres of land within the proposed disturbance area, and 13 test pits were dug within the mapped limits of soil type RtE, described below as LOW-RtE-001, LOW-RtE-003, LOW-RtE-004, LOW-RtE-005, LOW-RtE-006, LOW-RtE-007, LOW-RtE-008, LOW-RtE-009, LOW-RtE-010, STL-RtE-007, STL-RtE-010, STL-RtE-011, and STL-RtE-012.

Table 1. Soil Test Pit Characteristics

Test Pit	A Horizon (topsoil)	B Horizon (subsoil)	C Horizon (substratum)
LOW-RtE-001	Depth: 0-9 inches Color: 10YR 3/4 Texture: sandy loam	Depth: 9-24 inches Color: 10YR 5/3 Texture: loam	Depth: 24-36 inches Color: 10YR 6/3 Texture: silt
LOW-BxD-002	Depth: 0-4 inches Color: 10YR 3/3 Texture: loam	Depth: 4-17 inches Color: 10YR 4/4 Texture: clay loam Depth: 17-24 inches Color: 10YR 5/4 Texture: sandy loam Depth: 24-31 inches Color: 10YR 7/2 Texture: sandy loam	Depth: 31-36 inches Color: 10YR 8/1 Texture: sandy loam
LOW-RtE-003	Depth: 0-9 inches Color: 10YR 4/2 Texture: clay Minor occurrences of mottling observed from 0-16 inches.	Depth: 9-28 inches Color: 10YR 3/2 Texture: clay	Depth: 28-36 inches Color: 10YR 4/3 Texture: silty clay
LOW-RtE-004	Depth: 0-9 inches Color: 10YR 3/2 Texture: sandy silt	Depth: 9-27 inches Color: 10YR 3/2 Texture: sandy loam	Depth: 27-36 inches Color: 10YR 4/2 Texture: sandy clay

LOW-RtE-005	Depth: 0-9 inches Color: 10YR 3/4 Texture: loam	Depth: 9-15 inches Color: 10YR 6/4 Texture: sandy loam Depth: 15-31 inches Color: 10YR 7/2 Texture: silt loam	Depth: 31-36 inches Color: 10YR 8/1 Texture: silt loam
LOW-RtE-006	Depth: 0-10 inches Color: 10YR 3/3 Texture: sandy loam CaCO ₃ observed between 0-4 inches.	Depth: 10-21 inches Color: 10YR 4/4 Texture: sandy loam	Depth: 21-36 inches Color: 10YR 3/4 Texture: sandy loam
LOW-RtE-007	Depth: 0-7 inches Color: 10YR 3/4 Texture: clay	Depth: 7-28 inches Color: 10YR 4/4 Texture: clay loam	Depth: 28-36 inches Color: 10YR 4/4, 10YR 7/2 Texture: clay loam
LOW-RtE-008	Depth: 0-8 inches Color: 7.5YR 2.5/2 Texture: clay loam	Depth: 8-13 inches Color: 7.5YR 3/2 Texture: clay loam Depth: 13-21 inches Color: 10YR 5/3 Texture: sandy loam Depth: 21-26 inches Color: 10YR 5/2 Texture: sandy loam	Depth: 26-36 inches Color: 10YR 7/1 Texture: sandy loam
LOW-RtE-009	Depth: 0-5 inches Color: 10YR 4/2 Texture: sandy clay loam	Depth: 5-11 inches Color: 10YR 5/3 Texture: sandy loam	Depth: 11-36 inches Color: 10YR 6/3 Texture: sandy loam Soft masses of redox observed between 20-36 inches.
LOW-RtE-010	Depth: 0-16 inches Color: 10YR 4/2 Texture: sandy loam	Depth: 16-36 inches Color: 5Y 4/2 Texture: clay	Not observed
STL-RtE-007	Depth: 0-23 inches Color: 10YR 3/6 Texture: silty clay	Depth: 23-36 inches Color: 10YR 5/3 Texture: clayey silt	Not observed

STL-RtE-010	Depth: 0-11 inches Color: 7.5YR 3/3 Texture: silty clay	Depth: 11-23 inches Color: 7.5YR 4/4 Texture: clayey silt	Depth: 23-36 inches Color: 10YR 6/3 Texture: sandy silt
STL-RtE-011	Depth: 0-13 inches Color: 10YR 4/3 Texture: silty clay	Depth: 13-23 inches Color: 10YR 5/3 Texture: clayey silt	Depth: 23-36 inches Color: 10YR 7/3 Texture: sandy silt
STL-RtE-012	Depth: 0-15 inches Color: 7.5YR 4/2 Texture: clay loam	Depth: 15-36 inches Color: 7.5YR 2.5/1 Texture: silty clay	Not observed

3.3. Conclusions

The observed topsoil color was recorded as 10YR 3/2, 10YR 4/2, 10YR 3/3, 10YR 4/3, 10YR 3/4, 10YR 3/6, 7.5YR 2.5/2, 7.5YR 4/2 and 7.5YR 3/3. The topsoil texture was recorded as clay, silty clay, clay loam, sandy silt, sandy clay loam, and sandy loam. Based on a calculated weighted average of acres of land within each soil type, and the number of inches of topsoil observed within each test pit, we recommend salvaging approximately eleven (11) inches of topsoil across the Site. The weighted average calculation can be found within Table 2, below.

Table 2. Topsoil Depth Calculation

Soil Type	Acres within LOD	Number of Samples Taken	Average A Horizon depth within soil type (inches)	Weighted Average (inches)	Weighted Average (inches) (Rounded)
BxD	0.01	1	4.00		
RtE	35.20	13	11.08		
Totals	35.21	14	7.54	10.57	11

4. OPERATIONAL PHASES

4.1. Construction Activities

4.1.1. Soil removal and segregation

During all excavation activities on Site, the Operator shall separate and store the topsoil horizon as defined above, and mark or document stockpile locations to facilitate subsequent reclamation. When separating the soil horizons, the Operator shall segregate the horizon based upon noted changes in physical characteristics such as organic content, color, texture, density, or consistency.

4.1.2. Horizons Too Rocky or Too Thin

This site is not expected to have both rocky soil horizons within any of the proposed excavation areas. However, if encountered, the Operator shall use best practices to properly segregate and store the topsoil to the extent practicable.

Too rocky shall mean that the soil horizon consists of greater than thirty-five percent (35%) by volume rock fragments larger than ten (10) inches in diameter. Too thin shall mean soil horizons that are less than six (6) inches in thickness. The Operator shall segregate remaining soils to the extent practicable to a depth of three (3) feet below the ground surface or bedrock, whichever is shallower, based upon noted changes in physical characteristics such as color, texture, density or consistency and such soils shall be stockpiled to avoid loss and mixing with other soils.

4.1.3. Stabilization

It is anticipated that topsoil will be stockpiled on location for a duration greater than thirty (30) days. All stockpiled topsoil shall be stabilized as soon as possible, but no later than fourteen (14) days after completion of construction activities. All topsoil stockpiles will be drill seeded and mulched using a certified weed free mixture or similar hydroseeding application with binding agent to ensure seed takes to soil. Surface roughening should occur prior to seeding to assist the holding seed/mulch and or hydroseed, particularly after rain events.

Approximately 1,001,214 cubic feet (37,082 cubic yards) of total topsoil will be segregated and stockpiled along the northeastern region of the pad. The stockpile will measure approximately nine (9) feet in height and be staged at a ratio of 4:1.

4.2. Drilling and Completions

4.2.1. Protection of Soils

All stockpiled soils shall be protected from degradation due to contamination, compaction and, to the extent practicable, from wind and water erosion during drilling and production operations. BMPs to prevent weed establishment and to maintain soil microbial activity shall be implemented.

4.2.2. Weed Management

During normal operations and stormwater inspections, Crestone employees and contractors will monitor the stockpile for erosion and establishment of undesirable and noxious weeds. Weeds will be treated mechanically with a mower whenever plant height exceeds six (6) inches or before seed development. Chemical treatment of weeds with broad-leaf herbicides will only occur in spot-specific situations where prostrate weed growth or other site conditions preventing mechanical treatment are encountered. Soil sterilant and non-selective herbicides will not be used.

4.2.3. Maintenance & Repairs

Any identified erosion will be repaired as soon as practicable, typically within seventy-two (72) hours. Additional stormwater control measures will be deployed as needed. All deployed temporary stormwater control measures will be maintained and will remain in place until the disturbance achieves final stabilization as defined in the Colorado Department of Public Health and Environment (CDPHE) Water Quality Control Division COR400000 permit.

4.3. Interim Reclamation

When the Location enters the production phase of operations, areas no longer in use, totaling approximately 14.28 acres, will be interim reclaimed. Eleven (11) inches of topsoil will be redistributed throughout the interim reclamation area and contoured to match pre-disturbance

topography. The redistributed soils will be tilled to adequately prepare the seedbed for seeding operations. Approximately 518,373 cubic feet (19,199 cubic yards) of total topsoil will be used during the interim reclamation phase.

4.3.1. Stockpile Management

Prior to the stockpile being adequately stabilized, perimeter sediment BMPs should be utilized to minimize any topsoil migration off Site due to a rain event. Perimeter BMPs can be removed after stabilization is achieved. Once vegetative growth begins, the stockpile should be mowed periodically to help promote even vegetation cover. Weeds should be removed if present. Soil sampling and chemical or mechanical remedies such as pH additives or aeration, respectively, may be needed if grass growth is not achieved during the growing season. Additional seeding might also be required to achieve widespread coverage.

4.3.2. Inspections

Inspection of BMPs shall occur for as long as they remain installed onsite. As per the CDPHE guidance, over the course of active construction, inspection shall occur every seven (7) days; or every fourteen (14) days with post-storm inspections completed within twenty-four (24) hours of precipitation accumulation or snow melt. When the construction Site is considered idle, routine inspections must be performed minimally every fourteen (14) days and within seventy-two (72) hours following storm events. When construction is complete, and the Site is awaiting vegetative growth inspections shall be conducted once every thirty (30) days. Post storm inspections are not required during this phase of construction. During all inspections, necessary repairs to BMPs will be noted and corrective action shall be immediately implemented. If noted deficiencies cannot be immediately addressed, the reasoning shall be noted, and repair will be scheduled.

Topsoil will continue to be monitored during thirty (30)-day stormwater inspections conducted, until the disturbance meets the 70% of reference area density specified for achieving final stabilization under applicable stormwater CDPHE stormwater permit requirements. Topsoil protection, weed management and erosion control/repair will continue throughout the life of the Location per Colorado Energy and Carbon Management Commission (ECMC) 1000 Series Rules.

5. SITE SPECIFIC BMPS

Each of the BMPs listed below are intended for use at this Site specifically (see Topsoil Protection Plan Exhibit in Appendix B). These BMPs are also consistent with the field-wide Stormwater Management Plan (SWMP) for Crestone.

- Stockpile Management
 - Topsoil will be stockpiled along the southeast edge of the proposed pad. To mitigate topsoil loss and migration of soil offsite, the stockpile will be contained using a perimeter erosion control device. Perimeter erosion controls will remain in place at any time the stockpile is not being actively accessed and until vegetative cover is established. Erosion control devices shall be placed within 5-10 feet of the toe of slope.

- Seeding
 - Once topsoil segregation and stockpiling are complete, the soil will be seeded with the specified seed mix (see Appendix D). Establishing vegetative cover will help to stabilize the soil, reduce wind, and water erosion, minimize sheet flow and rill erosion, and reduce overall surface runoff. The stockpile will be regularly monitored for noxious weed growth. Re-seeding will occur as necessary, over the course of the project life in order to achieve widespread, uniform vegetative cover.
- Mulching
 - Post seeding, a layer of straw or hay mulch will be installed via crimping along the stockpile, in order to promote seed germination and further stabilization of the soil. Mulching helps to mitigate the impacts of rainfall and increase soil moisture retention. Mulching will be monitored and re-applied as necessary, until vegetative growth is established.
- Surface Roughening and Vertical Tracking
 - Surface roughening creates horizontal grooves and ridges in the soil to reduce runoff velocity, encourage infiltration and trap sediment. This practice will be implemented on the proposed topsoil stockpile location, on the eastern region of the disturbance area.

PHOTOS



1. LOW-RtE-001 Soil Test Pit.



2. LOW-BxD-002 Soil Test Pit.

PHOTOS



3. LOW-RtE-003 Soil Test Pit.



4. LOW-RtE-004 Soil Test Pit.

PHOTOS



5. LOW-RtE-005 Soil Test Pit.



6. LOW-RtE-006 Soil Test Pit.

PHOTOS



7. LOW-RtE-007 Soil Test Pit.



8. LOW-RtE-008 Soil Test Pit.

PHOTOS



9. LOW-RtE-009 Soil Test Pit.



10. LOW-RtE-010 Soil Test Pit.

PHOTOS



11. LOW-RtE-007 Soil Test Pit.



12. STL-RtE-010 Soil Test Pit.

PHOTOS



13. STL-RtE-011 Soil Test Pit.



14. STL-RtE-012 Soil Test Pit.



Division of Environmental Testing

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Aurora, CO 80045

800-440-5184

July 03, 2024

1720 S Bellaire St. Suite 400
Denver, CO 80222
330-303-7896
apastore@rpgres.com

Project Manager : Annamaria Pastore

Project Name : Sun Long Pad

Project Number : N/A

Attached are the analytical results for Sun Long Pad N/A received by Elevation Diagnostics, Division of Environmental Testing on June 27, 2024. This is associated with Elevation's number AA09421 .

The results were analyzed under the guidelines of various methods. These methods are identified in the report as follows: "SW" is referring to the EPA's SW-846 Compendium; "EPA" is referring to 40 CFR part 136; "HACH" is referring to a method which was validated by HACH®; "SM" is referring to a revision of the Standard Methods For the Examination of Water and Wastewater; and "ASTM" is referring to the standard test method set forth by ASTM International.

The analytical results in this report apply specifically to the samples listed in the attached Chain of Custody. This report may only be duplicated in full.

Any deviations to sample integrity, method specifications, or Elevation Diagnostics's standard operating procedures are documented in the report below.

Please contact us for any questions or comments concerning the content of this report.

Thank you,

Elevation Diagnostics, Division of Environmental Testing

Kristen Reichel
Laboratory Director
CSO,CCO

Required Testing for Topsoil Samples

1. SAR – from saturated paste extract
2. EC – Saturated Paste
3. ESP %
4. CEC
5. pH - saturated paste method
6. % Organic matter – Walkely-Black method
7. NO₃ – Nitrate – nitrogen - AB-DTPA
8. NH₄ - Ammonium – nitrogen - AB-DTPA
9. P – Phosphorous AB-DTPA
10. K - Potassium AB-DTPA
11. Zn - AB-DTPA
12. Fe - AB-DTPA
13. Mn - AB-DTPA
14. Cu - AB-DTPA
15. Cl – Chloride
16. % calcium carbonate equivalent - gravimetric
17. Texture – by hydrometer with textures reported as USDA
18. Boron, hot water soluble method



Division of Environmental Testing

2115 N Scranton St Suite 3040A

Aurora, CO 80045

800-440-5184

Report Date : 7/3/2024

Report Time : 10:44

FINAL RESULTS REPORT

Project Manager: Annamaria Pastore

Project Name: Sun Long Pad

Project Number: N/A

Sample ID	Customer ID	Collected	Dilution	Result	Units	RL	Method Ref.
Analyte Name		Analysis Start					Recovery
AA09421-1	LOW-BxD-002	Collected : 05/14/2024	12:00				
AB-DTPA Metals - Copper		07/01/2024	09:21 10.00	<50.000 - RL1	ppm	50.000	AB-DTPA
AB-DTPA Metals - Iron		07/01/2024	09:21 10.00	10.333	ppm	0.500	AB-DTPA
AB-DTPA Metals - Manganese		07/01/2024	09:21 10.00	<5.000 - RL1	ppm	5.000	AB-DTPA
AB-DTPA Metals - Phosphorous		07/01/2024	09:21 10.00	<5.000 - RL1	ppm	5.000	AB-DTPA
AB-DTPA Metals - Potassium		07/01/2024	09:21 10.00	328.347	ppm	0.500	AB-DTPA
AB-DTPA Metals - Zinc		07/01/2024	09:21 10.00	Not Detected	ppm	5.000	AB-DTPA
Ammonia-Nitrogen, Soil		07/01/2024	15:06	<1.00	mg/kg	1.00	
Calcium Carbonate		07/01/2024	08:53	1.05	%	0.5	Gravimetric
Cation Exchange Capacity		07/01/2024	15:09	0.16	NH4/L	0.00	
Chloride, Soils		06/28/2024	15:23	<5.000	mg/kg	5.00	HACH 10291
ESP		07/02/2024	10:46	0	%		Soil Paste Extraction
Hot Water Soluble Boron		06/28/2024	11:01	0.272	mg/kg	0.050	Boron Hot Water Extraction
Nitrate-Nitrogen, Soil		07/01/2024	15:38	10.87	mg/kg	0.30	HACH 10206
Organic Matter		07/02/2024	08:34	1.27	%OC	0.26	Walkley Black
pH, Soils Temperature		06/28/2024	14:03	21	°C		
pH, Soils		06/28/2024	14:03	7.86	S.U.	0.01	EPA 9045D
SAR - Calcium		07/02/2024	10:15	5.746	mEq/L	0.000	EPA 6020B
SAR - Magnesium		07/02/2024	10:15	1.035	mEq/L	0.000	EPA 6020B
SAR - Sodium		07/02/2024	10:15	0.085	mEq/L	0.000	EPA 6020B
SAR - Sodium Adsorption Ratio		07/02/2024	10:15	0.046		0.000	EPA 6020B
Soil Conductivity		06/28/2024	17:02	0.920	mmhos/cm		USDA 60
Soil Texture		07/02/2024	07:02	Loam			Hydrometer
AA09422-1	LOW-RtE-006	Collected : 05/14/2024	12:00				
AB-DTPA Metals - Copper		07/01/2024	09:21 10.00	<50.000 - RL1	ppm	50.000	AB-DTPA
AB-DTPA Metals - Iron		07/01/2024	09:21 10.00	19.584	ppm	0.500	AB-DTPA
AB-DTPA Metals - Manganese		07/01/2024	09:21 10.00	<0.500	ppm	0.500	AB-DTPA
AB-DTPA Metals - Phosphorous		07/01/2024	09:21 10.00	<5.000 - RL1	ppm	5.000	AB-DTPA
AB-DTPA Metals - Potassium		07/01/2024	09:21 10.00	222.779	ppm	0.500	AB-DTPA
AB-DTPA Metals - Zinc		07/01/2024	09:21 10.00	Not Detected	ppm	5.000	AB-DTPA
Ammonia-Nitrogen, Soil		07/01/2024	15:06	<1.00	mg/kg	1.00	
Calcium Carbonate		07/01/2024	08:53	<0.5	%	0.5	Gravimetric
Cation Exchange Capacity		07/01/2024	15:09	0.09	NH4/L	0.00	
Chloride, Soils		06/28/2024	15:23	<5.000	mg/kg	5.00	HACH 10291
ESP		07/02/2024	10:46	0	%		Soil Paste Extraction
Hot Water Soluble Boron		06/28/2024	11:01	0.213	mg/kg	0.050	Boron Hot Water Extraction
Nitrate-Nitrogen, Soil		07/01/2024	15:38	<0.30	mg/kg	0.30	HACH 10206
Organic Matter		07/02/2024	08:34	0.75	%OC	0.26	Walkley Black
pH, Soils Temperature		06/28/2024	14:03	21.3	°C		
pH, Soils		06/28/2024	14:03	6.16	S.U.	0.01	EPA 9045D
SAR - Calcium		07/02/2024	10:15	3.067	mEq/L	0.000	EPA 6020B
SAR - Magnesium		07/02/2024	10:15	0.581	mEq/L	0.000	EPA 6020B
SAR - Sodium		07/02/2024	10:15	0.105	mEq/L	0.000	EPA 6020B
SAR - Sodium Adsorption Ratio		07/02/2024	10:15	0.078		0.000	EPA 6020B



Division of Environmental Testing

2115 N Scranton St Suite 3040A

Aurora, CO 80045

800-440-5184

Report Date : 7/3/2024

Report Time : 10:44

FINAL RESULTS REPORT

Project Manager: Annamaria Pastore

Project Name: Sun Long Pad

Project Number: N/A

Sample ID	Customer ID	Collected	Dilution	Result	Units	RL	Method Ref.
Analyte Name		Analysis Start					Recovery
Soil Conductivity		06/28/2024	17:02	0.561	mmhos/cm		USDA 60
Soil Texture		07/02/2024	07:02	Sandy Loam			Hydrometer
AA09423-1	LOW-RtE-009	Collected : 05/14/2024 12:00					
AB-DTPA Metals - Copper		07/01/2024	09:21 10.00	<50.000 - RL1	ppm	50.000	AB-DTPA
AB-DTPA Metals - Iron		07/01/2024	09:21 10.00	10.967	ppm	0.500	AB-DTPA
AB-DTPA Metals - Manganese		07/01/2024	09:21 10.00	<0.500	ppm	0.500	AB-DTPA
AB-DTPA Metals - Phosphorous		07/01/2024	09:21 10.00	<0.500	ppm	0.500	AB-DTPA
AB-DTPA Metals - Potassium		07/01/2024	09:21 10.00	236.788	ppm	0.500	AB-DTPA
AB-DTPA Metals - Zinc		07/01/2024	09:21 10.00	Not Detected	ppm	5.000	AB-DTPA
Ammonia-Nitrogen, Soil		07/01/2024	15:06	<1.00	mg/kg	1.00	
Calcium Carbonate		07/01/2024	08:53	<0.5	%	0.5	Gravimetric
Cation Exchange Capacity		07/01/2024	15:09	0.10	NH4/L	0.00	
Chloride, Soils		06/28/2024	15:23	<5.000	mg/kg	5.00	HACH 10291
ESP		07/02/2024	10:46	0	%		Soil Paste Extraction
Hot Water Soluble Boron		06/28/2024	11:01	0.156	mg/kg	0.050	Boron Hot Water Extraction
Nitrate-Nitrogen, Soil		07/01/2024	15:38	<0.30	mg/kg	0.30	HACH 10206
Organic Matter		07/02/2024	08:34	1.05	%OC	0.26	Walkley Black
pH, Soils Temperature		06/28/2024	14:03	20.9	°C		
pH, Soils		06/28/2024	14:03	7.81	S.U.	0.01	EPA 9045D
SAR - Calcium		07/02/2024	10:15	6.280	mEq/L	0.000	EPA 6020B
SAR - Magnesium		07/02/2024	10:15	1.352	mEq/L	0.000	EPA 6020B
SAR - Sodium		07/02/2024	10:15	0.141	mEq/L	0.000	EPA 6020B
SAR - Sodium Adsorption Ratio		07/02/2024	10:15	0.072		0.000	EPA 6020B
Soil Conductivity		06/28/2024	17:02	0.823	mmhos/cm		USDA 60
Soil Texture		07/02/2024	07:02	SandyClayLoam			Hydrometer



Division of Environmental Testing

2115 N Scranton St Suite 3040A

Aurora, CO 80045

800-440-5184

Report Date : 7/3/2024

Report Time : 10:44

FINAL RESULTS REPORT

Project Manager: Annamaria Pastore

Project Name: Sun Long Pad

Project Number: N/A

QC Report

AMMONIA_NITROGEN-3694									
Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%Rec	% REC Limits	RPD	RPD Limit
DUP AA09402	<1.00	1.00	mg/kg		<1.00				
MB AA09571	-0.22		mg/kg						
LCS AA09572	2.39		mg/kg	2.00		120	80 - 120		
LCS AA09573	12.56		mg/kg	11.00		114	80 - 120		

BORON-3650									
Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%Rec	% REC Limits	RPD	RPD Limit
DUP AA09419	0.531	0.050	mg/kg		0.490			8.0313	-15 - 15
MB AA09440	0.005		mg/kg						
LCS AA09441	1.160		mg/kg	1.00		116	80 - 120		
LCS AA09442	8.199		mg/kg	9.00		91.1	80 - 120		

CALCIUM CARBONATE-3673									
Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%Rec	% REC Limits	RPD	RPD Limit
DUP AA09402	2.65	0.5	%		1.16			4.0665	
Matrix Spike AA09402	2.76	0.5	%	2.00	1.16	80.0			

CHLORIDE_SOILS-3682									
Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%Rec	% REC Limits	RPD	RPD Limit
DUP AA09402	18.128	5.00	mg/kg		17.833			1.6407	-15 - 15
MB AA09497	2.153	5	mg/L						
LCS AA09498	9.061	5	mg/L	10.000		90.6	80 - 120		
LCS AA09499	88.644	5	mg/L	90.000		98.5	80 - 120		

ECISOIL_MMHOS-3680									
Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%Rec	% REC Limits	RPD	RPD Limit
DUP AA09419	0.866		mmhos/cm		0.838			3.2864	
LCS AA09487	9.89		mmhos/cm	10.000		98.9			
LCS AA09488	9.93		mmhos/cm	10.000		99.3			

NITRATE_NITROGEN-3701									
Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%Rec	% REC Limits	RPD	RPD Limit
DUP AA09402	<0.30	0.30	mg/kg		<0.30				
MB AA09580	0.86		mg/kg						
LCS AA09581	1.54	0.30	mg/kg	1.50		103	80 - 120		
LCS AA09582	13.04	0.30	mg/kg	12.00		109	80 - 120		

ORGANIC_MATTER-3691									
Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%Rec	% REC Limits	RPD	RPD Limit
DUP AA09402	7.505				1.41			0.76239	
Matrix Spike AA09402	7.448		mg		1.41				
MB AA09551	-0.24		%						

PH_S-3652									
Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%Rec	% REC Limits	RPD	RPD Limit
DUP AA09419	7.44	0.01	S.U.		7.45			0.1343183344	-5 - 5
LCS AA09451	6.90	0.01	S.U.	6.86		101	95 - 105		
LCS AA09452	6.91	0.01	S.U.	6.86		101	95 - 105		

SOIL_TEXTURE-3677									
Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%Rec	% REC Limits	RPD	RPD Limit
DUP AA09402	Clay Loam				Clay Loam				



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Project Manager: Annamaria Pastore

Project Name: Sun Long Pad

Project Number: N/A

QC Report

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%Rec	% REC Limits	RPD	RPD Limit
---------	--------	-----------------	-------	-------------	---------------	------	--------------	-----	-----------

METALS_ABDTPA-3672

AA09424

DUP

Copper	<50.000	50.000	ppm		<50.000				
Iron	65.370	0.500	ppm		60.457			7.81	
Manganese	23.746	0.500	ppm		22.485			5.46	
Phosphorous	15.204	0.500	ppm		14.747			3.05	
Potassium	931.334	0.500	ppm		936.460			0.549	
Zinc	Not Detected	0.500	ppm		Not Detected				

AA09470

MB

Copper	-0.181		ppm						
Iron	-0.027		ppm						
Manganese	0.000		ppm						
Phosphorous	-0.045		ppm						
Potassium	0.007		ppm						
Zinc	-0.210		ppm						

AA09472

LCS

Copper	61.779		ppm			103			
Iron	52.133		ppm			86.9			
Manganese	50.046		ppm			83.4			
Phosphorous	61.079		ppm			102			
Potassium	54.262		ppm			90.4			
Zinc	55.921		ppm			93.2			

AA09473

Copper	62.377		ppm			104			
Iron	56.903		ppm			94.8			
Manganese	52.317		ppm			87.2			
Phosphorous	69.592		ppm			116			
Potassium	51.444		ppm			85.7			
Zinc	54.663		ppm			91.1			

SAR-3708

AA09601

MB

Calcium	0.008		mEq/L						
Magnesium	0.009		mEq/L						
Sodium	0.015		mEq/L						

AA09602

LCS

Calcium	8.834		ppm			88.3			
Magnesium	8.584		ppm			85.8			
Sodium	8.325		ppm			83.2			

AA09603



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FINAL RESULTS REPORT

Project Manager: Annamaria Pastore

Project Name: Sun Long Pad

Project Number: N/A

QC Report

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%Rec	% REC Limits	RPD	RPD Limit
Calcium	370.321		ppm			92.6			
Magnesium	347.027		ppm			86.8			
Sodium	346.444		ppm			86.6			

Qualifier

Explanation

- H1 Sample received outside of regulatory holding time.
- H2 Sample analyzed outside of regulatory holding time due to a laboratory error.
- P1 Sample received outside temperature requirements, 0-6°C.
- P2 Sample received unpreserved.
- P3 Broken or leaking sample container.
- P4 Sample improperly collected
- P5 Sample incorrectly preserved
- B1 Blank failed high, indicating possible high bias in sample results.
- B2 Blank failed low, indicating possible low bias in sample results.
- MS Matrix Spike / Matrix Spike Duplicate recovery and/or RPD limit exceeded, indicating potential matrix interference.
- D1 Duplicate RPD limit exceeded due to low sample concentration.
- D2 Duplicate RPD limit exceeded due to matrix interference.
- S Surrogate recovery failed, indicating potential matrix interference.
- RL1 Reporting limits raised due to matrix interference.
- RL2 Reporting limits raised due to limited sample.
- U Sample result less than method detection limit.
- J Sample result less than reporting limit but higher than method detection limit.
- E Electronic loss or corruption of data.
- I Subcontracted sample

WELD LABORATORIES, INC.

1527 First Avenue • Greeley, Colorado 80631
Phone: (970) 353-8118 • Fax: (970) 353-1671
www.weldlabs.com

December 13, 2023

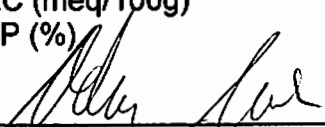
RPG Resources

Attn: Russell Beam

1313 Ben Nevis Ave

Broomfield, CO 80020

Laboratory No.	E23263-5A	Extraction Method
Sample ID	STL-R+E-012 8-30	
Sodium (ppm)	6.42	Saturated Paste
Calcium (ppm)	131.90	
Magnesium (ppm)	21.17	
pH	7.24	
EC (mS/cm)	0.657	
Saturated Paste %	50.38	
SAR	0.14	
Nitrate-N (ppm)	0.35	AB-DPTA
Phosphorus (ppm)	0.59	
Potassium (ppm)	220.9	
Copper (ppm)	2.57	
Iron (ppm)	16.8	
Manganese (ppm)	1.2	
Zinc (ppm)	0.3	
Ammonia-N (ppm)	4.4	KCl
Chloride (ppm)	79.1	Water
Boron (ppm)	0.3	
Sand (%)	19.0	
Fine Sand (%)	12.9	
Silt (%)	30.8	
Clay (%)	37.4	
Classification	CLAY LOAM	
Organic Matter (%)	1.4	Walkley-Black
% CaCO ₃ -C equivalent	5.55	
CEC (meq/100g)	32.66	
ESP (%)	0.09	

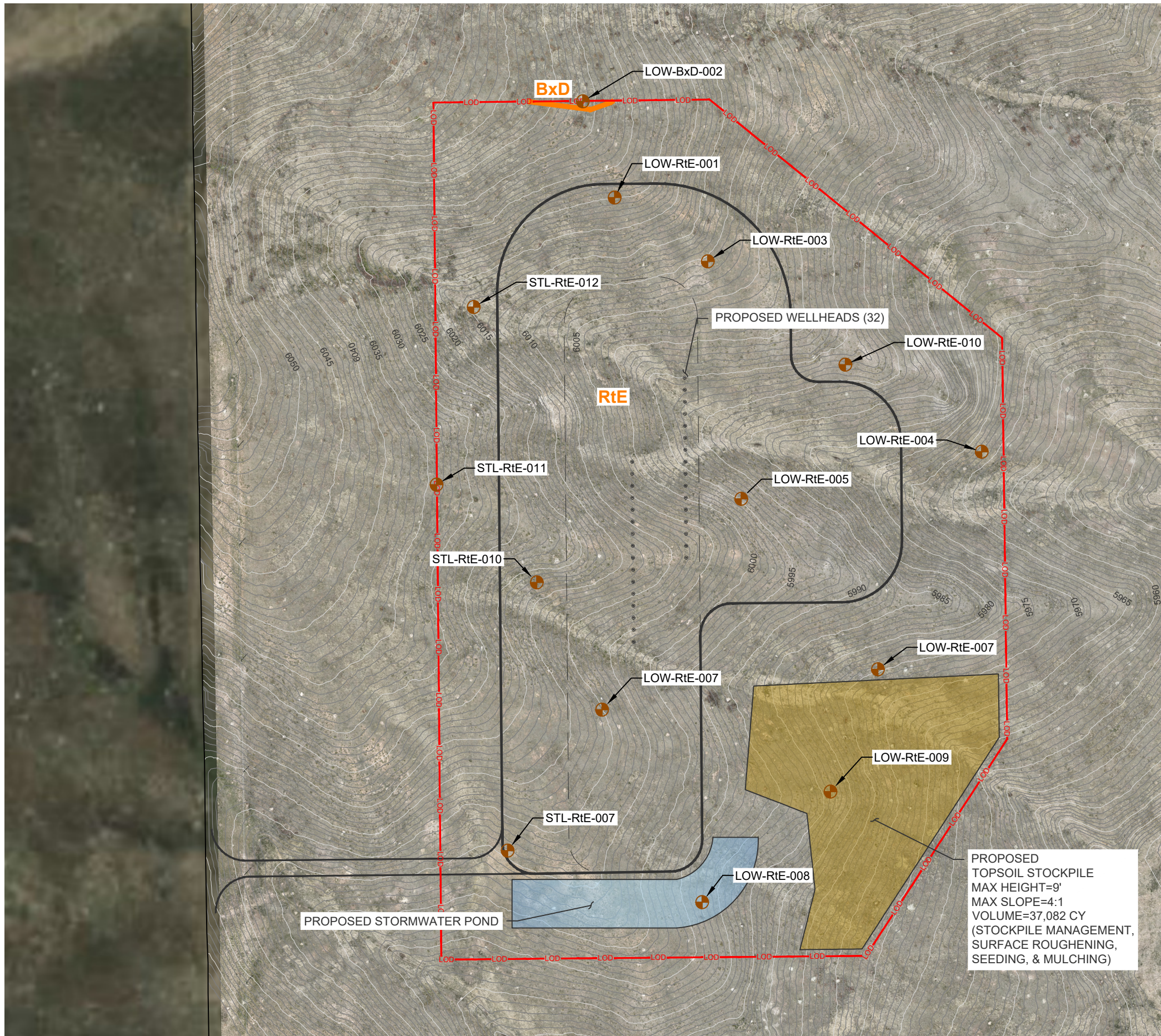

Project Manager

12-13-23
Date

APPENDIX B

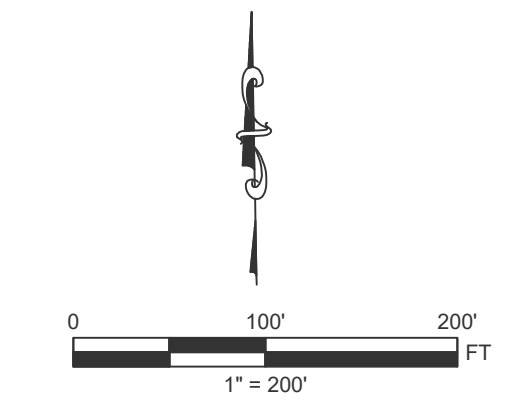
Topsoil Protection Plan Exhibit

R:\00 Projects\Cristina\Peak Resources\2024 Projects\State Sunlight (back, slash)\Long\1 - Engineering\1 - Engineering\1 - Design Phase\1 - Civil 3D\T01.dwg Last Saved By: gfinch 11/26/2024 8:11 AM Plotted By: Grant Finch 11/26/2024 11:48 AM



LEGEND	
	EXISTING MAJOR CONTOUR
	EXISTING MINOR CONTOUR
	PROPOSED WELL PAD EDGE
	PROPOSED ACCESS ROAD
	LIMITS OF DISTURBANCE
	PROPOSED TOPSOIL/STOCKPILE
	PROPOSED STORMWATER POND
	SOIL UNIT BOUNDARY
	SOIL SAMPLE SYMBOL
	SOIL SAMPLE LOCATION
	PROPOSED WELLHEAD

MAP UNIT SYMBOL	MAP UNIT NAME	ACRES IN AOI	PERCENTAGE OF AOI
BxD	BUICK LOAM 5-9% SLOPES	0.01	0.1%
RtE	RENOHILL -LITTLE-THEDALUND COMPLEX 9-30% SLOPES	35.20	99.9%
TOTALS AREA OF INTEREST		35.21	100%



STATE SUNLIGHT / LONG TOPSOIL PROTECTION EXHIBIT

SECTION 27, TOWNSHIP 5N, RANGE 65 WEST, ARAPAHOE COUNTY, COLORADO

SHEET NAME: TOPSOIL PLAN	SHEET NO. 01
-----------------------------	-----------------

PROPOSED TOPSOIL STOCKPILE
 MAX HEIGHT=9'
 MAX SLOPE=4:1
 VOLUME=37,082 CY
 (STOCKPILE MANAGEMENT, SURFACE ROUGHENING, SEEDING, & MULCHING)

PROPOSED STORMWATER POND

PROPOSED WELLHEADS (32)

APPENDIX C
BMP Datasheets

2. Mulching, Agricultural Straw or Hay, and Mulch Tackifier (MU)



1. DESCRIPTION:

Mulching is a temporary control measure used for interim and permanent stabilization that consists of mechanically placing a uniform layer of agricultural straw or hay mulch that is crimped in and sprayed with tackifiers over disturbed construction areas. It protects disturbed areas immediately after seeding from the forces of rainfall impacts; it also increases infiltration. Mulching assists with germination success of seeded areas by conserving moisture and protecting against temperature extremes until permanent vegetation is established.



Straw Mulching on disturbed side slope

2. CONTROL MEASURE OBJECTIVES

- Erosion Control
- Sediment Control
- Site/Materials Management

3. RELEVANT SPECIFICATION SECTIONS

[Section 213](#) - Mulching

- a) [213.02.\(a\)/\(c\)/\(f\)](#) - Materials
- b) [213.03.\(a\)/\(d\)/\(g\)](#) - Construction Requirements
- c) [213.04](#) - Method of Measurement
- d) [213.05](#) - Basis of Payment

4. RELEVANT M-STANDARD DETAILS

Section not applicable for this control measure.

5. BASIS OF PAYMENT

Pay item	Description	Pay Unit
213-00002	Mulching (Weed Free Hay)	ACRE
213-00004	Mulching (Weed Free Straw)	ACRE
213-00061	Mulch Tackifier	LB

6. APPLICATIONS

- Use in conjunction with seeding to protect and stabilize disturbed soil.
- Use to cover disturbed areas for extended periods of time as a stabilization strategy.

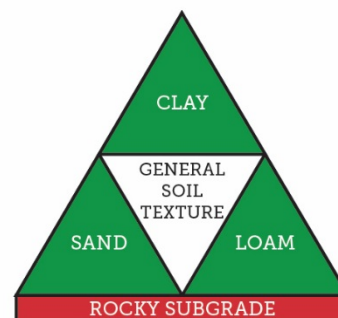
7. LIMITATIONS

- Material availability can impact feasibility of this control measure.
- Potential for introduction of weeds and other non-native plant materials.
- Potentially costlier due to increased labor requirements
- Permanent stabilization strategies for slope applications steeper than 2.5H:1V should consider Soil Retention Blanket or Mulching (Hydraulically applied)

8. SOILS TRIANGLE

SOIL TEXTURE AND SUBGRADE CONDITIONS

- APPROPRIATE
- SOMEWHAT APPROPRIATE
- NOT APPROPRIATE



2. Mulching, Agricultural Straw or Hay, and Mulch Tackifier (MU)



9. SWMP ADMINISTRATOR FOR DESIGN CRITERIA

- Tackifier must be used in conjunction with straw mulch in accordance with Section 213.02(c).
- Apply simultaneously or immediately after mulching and crimping to provide uniform coverage.
- Agricultural hay or straw should not be specified in concentrated flow areas either as interim or permanent stabilization. Hay and straw can also clog inlets and should not be used within water quality extended detention basins or sand filter structures.
- Agricultural hay or straw should not be specified in concentrated flow areas either as interim or permanent stabilization.
- Hay and straw can also clog inlets and should not be used within water quality extended detention basins or sand filter structures.

10. INSTALLATION CRITERIA

- Projects within Forest Service ROW or adjacent to sensitive areas might need special approval for the use of agricultural weed free straw or hay.
- Mulch materials should be air-dried and free of impurities in accordance with Section 213.
- For mulched areas to be seeded, native topsoil or approved equal (free of rocks, woody debris or soil clumps) shall be applied to disturbed areas in accordance with Section 207, or a Project Special Provision for Topsoil Management.
- Apply straw mulch at a rate of 1.5 to 2 tons per acre, in accordance with Section 213.
- Mechanically apply mulch at a depth of 1-2 inches. Hand application will require a thicker layer (2-3 inches, or as needed depending upon site conditions).
- Evenly distribute mulch over entire area, with at least 90% coverage.
- Apply mulch according to Section 213 using approved organic tackifier, crimping and anchoring within 4 hours.
- Do not place mulch on drainage channels, walls, sidewalks, pathways, or over existing vegetation.

11. MAINTENANCE AND REMOVAL

- Visually inspect at regular intervals and after every storm event to ensure mulch meets required coverage on all disturbed areas and slopes.
- Apply additional mulch as needed to meet the required soil coverage.
- Apply mulch tackifier with each additional mulching application.
- Manual inspection might be required to ensure appropriate adhesion has occurred.
- Mulching does not need to be removed as it will biodegrade with time.

7. Seeding (TS)

1. DESCRIPTION:

This control measure practice involves the establishment of a permanent, perennial vegetative cover over areas disturbed during construction activities. The main goal of seeding is to stabilize the soil, reduce wind and water erosion, minimize sheet flow and rill erosion, increase infiltration rates, and reduce overall surface runoff.

2. CONTROL MEASURE OBJECTIVES

- Erosion Control
- Sediment Control
- Site/Materials Management

3. RELEVANT SPECIFICATION SECTIONS

[Section 212](#) - Seeding, Fertilizer, Soil Conditioner, and Sodding

[Section 207](#) - Topsoil

4. RELEVANT M-STANDARD DETAILS

Section not applicable for this control measure.

5. BASIS OF PAYMENT

Pay Item	Description	Pay Unit
212-00005	Seeding (Native)	LB
212-00006	Seeding (Native)	ACRE
212-00007	Seeding (Native)(Hydraulic)	ACRE
212-00009	Seeding (Temporary)	ACRE
212-00010	Seeding (Lawn)	LB
212-00011	Seeding (Lawn)	ACRE
212-00015	Seeding (Forbs)	LB
212-00020	Seeding (Forbs)	OZ
212-00022	Seeding (Riparian)	ACRE
212-00025	Seeding (Shrubs)	LB
212-00027	Seeding (Trees)	LB
212-00028	Seeding (Wetlands)	ACRE
212-00009	Seeding (Temporary)	ACRE



Drill Seeder Calibration

6. APPLICATIONS

- Used as part of the permanent stabilization steps for disturbed areas after construction activities are completed.
- Used only after topsoil has been dispersed on the site and soil conditioning amendments are applied.

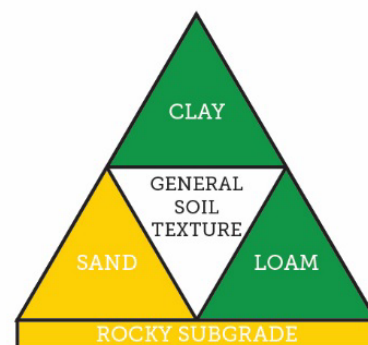
7. LIMITATIONS

- Permanent stabilization seeding can only be done in the approved seeding season windows for the different elevation ranges in Colorado.

8. SOILS TRIANGLE

SOIL TEXTURE AND SUBGRADE CONDITIONS

- APPROPRIATE
- SOMEWHAT APPROPRIATE
- NOT APPROPRIATE



This Control Measure may be appropriate for all soil types with the appropriate installation procedures for topsoil requirements, and other considerations as directed by the Transportation Erosion Control Supervisor or Regional Environmental Staff

7. Seeding (TS)



9. SWMP ADMINISTRATOR FOR DESIGN CRITERIA

- Soil surface preparation must be completed before application of seed.
- To select species for the permanent stabilization see mixes, the Designer should utilize the CDOT Landscape Architecture Section’s Native Seed Calculator, found at: <https://www.codot.gov/programs/environmental/news/native-seed-calculator>
- Topsoil management strategies must be included in the Stormwater Management Plan. These should include locations for the salvaged topsoil as either stock piles or windrow.
- Ground surface should not be compacted nor too loose.
- Temporary seeding consists of planting an annual grass.
- Drill seeding rates for temporary annual grasses are as follows:

Common Name	Botanical Name	Application Time	Seeding Rates (LBS PLS/acre)	Planting Depth (inches)
Oats	Avena sativa	October 1 - May 1	35	1 - 2
Foxtail Millet	Setaria italica	May 2 - September 30	30	1/2 - 3/4

- CDOT has created training videos demonstrating best field practices for landscape architecture pertaining to reclamation, revegetation, and stormwater management to help ensure compliance with CDOT Standard Specifications and CDPHE’s regulations for transportation projects. These videos include guidance for:
 - [Percent Vegetation Cover](#)
 - [Soil Preparation, Ripping and Tilling](#)
 - [Composting and Fertilizers](#)
 - [Drill Seeding Application Rate](#)
 - [Straw Mulching](#)
 - [Crimping and Tackifier](#)

For more information visit the Landscape Architecture Program web page at: <https://www.codot.gov/programs/environmental/landscape-architecture>

10. INSTALLATION CRITERIA

- Drill seeding is the most desirable method.
- Seeding seasons (Section 212.03) must be followed for native seeding.

11. MAINTENANCE AND REMOVAL

- Seeded areas require monitoring to ensure successful germination.
- Seeded areas require protection from vehicle and pedestrian traffic

29. Stockpile Management (SM)



1. DESCRIPTION:

Stockpile areas are used for temporary storage of construction materials and must be managed to minimize erosion and sediment transport from erodible material stockpiles.

2. CONTROL MEASURE USES

- Erosion Control
- Sediment Control
- Site/Materials Management

3. RELEVANT SPECIFICATION SECTIONS

[Section 208](#) - Erosion Control

- a) **208.07** - Stockpile Management

4. RELEVANT M-STANDARD DETAILS

No Standard Details exist for this Management Strategy.

5. BASIS OF PAYMENT

Pay item	Description	Pay Unit
208-00028	Plastic Sheeting	SY
213	Mulching	VARIES
208	Various items to contain perimeter	

6. APPLICATIONS

Areas where active and nonactive stockpiles of construction materials are stored.

7. LIMITATIONS

- Stockpiles should not be placed on paved areas unless no other practical alternative exists on-site.

8. APPROVED PRODUCTS LIST

Refer to: <https://www.codot.gov/business/apl>



Erosion Logs used for stockpile management practices

9. PROCEDURES

- Stockpiles should be placed a minimum of 50 feet away from State Waters and shall be confined so that no potential pollutants will enter State Waters and other sensitive areas. Stockpiles shall also be protected with a temporary perimeter control measure. Level-to-gently-sloping grassed areas provide good stockpile sites and should not be placed in or along wetlands, ditches, swales, or against slopes that are more than 2:1.
- Stockpiling of contaminated soils should be avoided. If unavoidable, these stockpiles should be covered with plastic sheeting with berms surrounding the stockpile to prevent runoff from leaving the construction site. Contaminated soils should be transported offsite.
- Implement wind erosion control practices in accordance with Wind Erosion Control (fact sheet No. 38) as appropriate on all stockpiles.
- Erodible stockpiles (including topsoil) must be contained with an acceptable control measure at the toe (within 5 to 10 feet of the toe) at all times

29. Stockpile Management (SM)



10. PROTECTION OF STOCKPILES FOR PROJECTS TEMPORARILY HALTED FOR 14 DAYS

- Soil Stockpiles:
 - Soil stockpiles should be covered or protected with interim stabilization in accordance with 208.04(e). If no longer needed, the stockpiles should be removed and disposed of properly.
- Stockpiles of aggregate base, or aggregate subbase:
 - These stockpiles should be covered or protected with a perimeter sediment barrier at all times. If no longer needed, the stockpiles should be removed and disposed of properly.
- Stockpiles of “cold mix”:
 - Cold mix stockpiles should be placed on and covered with plastic sheeting material at all times and surrounded by a berm.
- Stockpiles/storage of pressure treated wood with copper chromium and arsenic or ammonia, copper, zinc, and arsenate:
 - Treated wood should be covered with plastic sheeting material at all times and placed on pallets.
 - Along with plastic sheeting material, tarps can be used to cover unused materials and materials on pallets.

11. PROTECTION OF ACTIVE STOCKPILES

- Prior to the onset of precipitation, active stockpiles of the identified material should be protected further, as follows:
 - All stockpiles require temporary stabilization at the end of each day in accordance with 2018.04(e), and require a sediment barrier, such as Erosion Logs, Silt Fence, or Compacted Berms.
 - Stockpiles of cold mix should be placed on and covered with plastic sheeting material.

12. MAINTENANCE AND REMOVAL

- Routinely spot-check stockpile areas for compliance. Repair perimeter control and covers as needed. Sediment should be removed when sediment accumulation reaches half of the barrier height.
- Inspect containment structures or other perimeter controls routinely and repair when signs of degradation are visible.
- Remove stockpiles and dispose of properly if no longer needed.
- Re-vegetate or install other approved methods of final stabilization in areas where stockpiles and access roads are located.

6. Surface Roughening and Vertical Tracking (SR)

1. DESCRIPTION:

Surface Roughening and Vertical Tracking (also referred to as temporary stabilization) are control measure practices that manipulate the subsoil by either creating different textures over the unfinished grade or using a tracked vehicle to drive over the surface, creating horizontal grooves and ridges. Surface roughening texture to the soil surface will reduce runoff velocity, encourage infiltration, and trap sediment..

2. CONTROL MEASURE OBJECTIVES

- Erosion Control
- Sediment Control
- Site/Materials Management

3. RELEVANT SPECIFICATION SECTIONS

[Section 208](#) - Erosion Control

- a) [208.04 \(e\).1](#) - Temporary Stabilization
- b) [208.05 \(s\)/\(t\)](#) - Construction of Control Measures

4. RELEVANT M-STANDARD DETAILS

Section not applicable for this control measure.

5. BASIS OF PAYMENT

Not measured or paid for separately but shall be included in the work.

6. APPLICATIONS

- Used to temporarily stabilize disturbed areas during construction and prior to final stabilization activities.
- Used along disturbed slopes, temporary stockpiles, sediment basins, and/or compacted soil diversion berms.



Vertical tracking on disturbed side slope

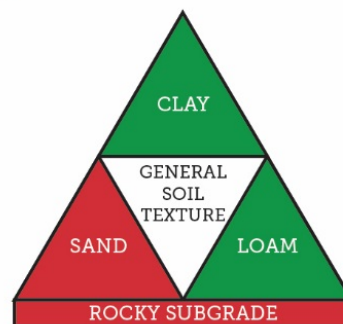
7. LIMITATIONS

- Not intended to be used as a standalone control measure. Will required a secondary erosion control measure.
- Only to be used as a temporary means of erosion control.
- Cannot be used on topsoil (spread out on the surface or in stockpiles) because of the compaction.
- Special care must be given to existing utilities around the area when performing roughening operations.

8. SOILS TRIANGLE

SOIL TEXTURE AND SUBGRADE CONDITIONS

- APPROPRIATE
- SOMEWHAT APPROPRIATE
- NOT APPROPRIATE



6. Surface Roughening and Vertical Tracking (SR)



9. SWMP ADMINISTRATOR FOR DESIGN CRITERIA

- Surface Roughening is recommended for all smooth graded slopes steeper than 5H:1V.
- Track walking texture must be parallel to the slope contour.
- Surface Roughening techniques may include:
 - **Machine Tracking** on cut or fill slopes in conjunction with grading operations by equipment heavy enough to texture the soil.
 - **Stair-step grading** on erodible material soft enough to be ripped with a bulldozer. Soft rock subgrades with subsoil are optimal for this technique.
 - **Grooving** on cut or fill slopes by tilling, disking, or harrowing, ensuring that grooves are less than 10 inches apart and at least 1 inch deep.

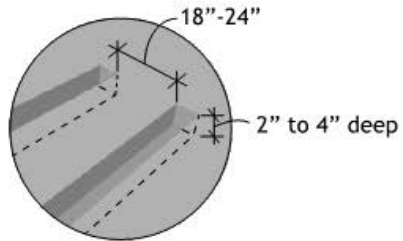
10. INSTALLATION CRITERIA

- Surface Roughening and Vertical Tracking must be provided on disturbed subsoils at the end of each day.
- Where topsoil is to be placed immediately after grading or where topsoil has already been placed, Surface Roughening or Vertical Tracking is **PROHIBITED**.
- Farming disks may not be used to provide surface roughening. It is preferred that ripping or tilling equipment be used along the contours.

11. MAINTENANCE AND REMOVAL

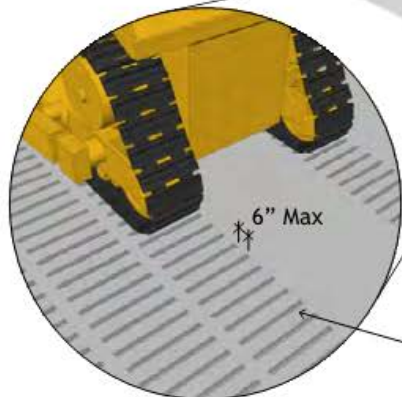
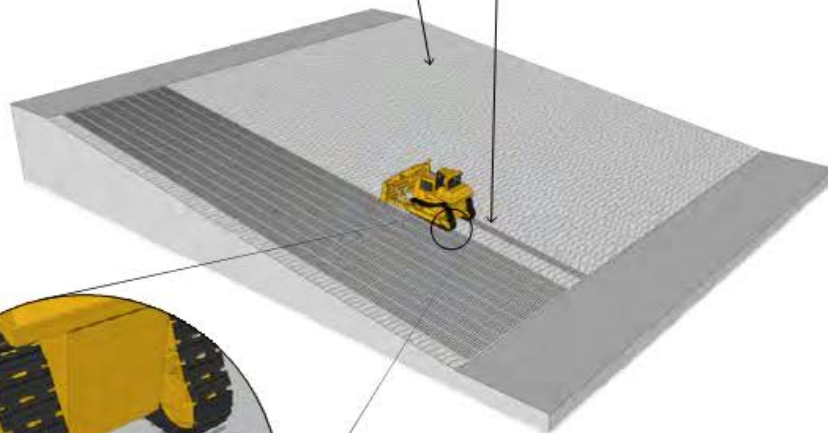
- Inspect site frequently, and before and after storm events, to ensure erosion or riling is not occurring within the small depressions created by tracking or roughening.
- Surface roughening is a temporary control measure and it may be necessary to continue to roughen the area multiple times until topsoil placement and permanent stabilization measures can be implemented.
- When revegetation is planned, subgrade preparation (ripping) is required prior to placing topsoil.

6. Surface Roughening and Vertical Tracking (SR)



DETAIL

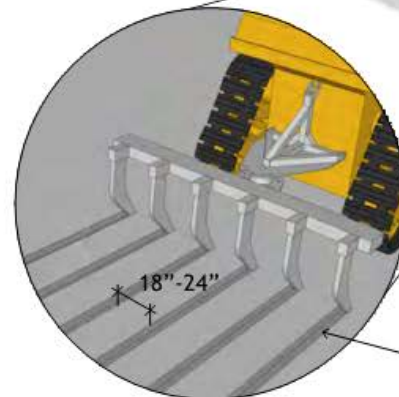
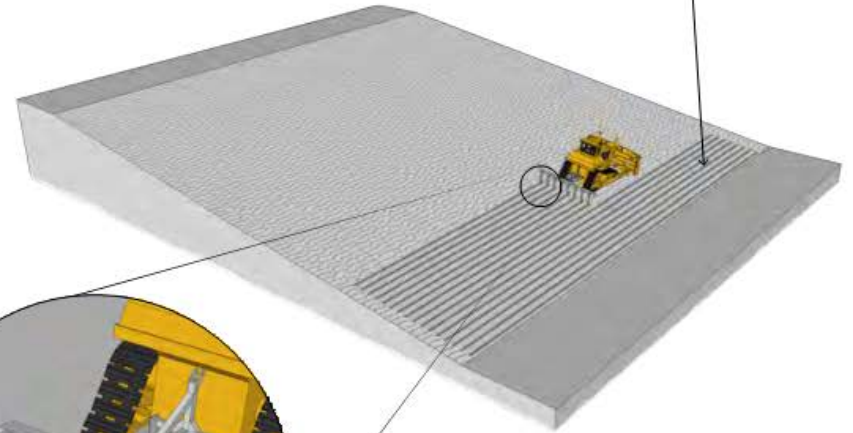
Roughly graded slope
May use machine tracking, stair-step grading or grooving depending on soil conditions



SR - 1. VERTICAL TRACKING
FOR STEEP SLOPES (3:1 OR STEEPER)

Vertical tracks are spaced a maximum of 6 inches and can be up to 4 inches deep

May use machine tracking, stair-step grading or grooving depending on soil conditions



SR - 2. SURFACE ROUGHENING
FOR LOW SLOPES (LESS THAN 3:1)

Roughened rows are spaced a maximum of 6 inches and can be up to 4 inches deep

APPENDIX D
Seed Mix

PBSI Low Grow Native Mix

- (25%) Idaho Fescue
- (25%) Sandberg Bluegrass
- (25%) Rocky Mountain Fescue
- (25%) Canby Bluegrass

\$8.85 / lb
5 lbs/1,000 s.f.

PBSI Foothills Native Mix

- (5%) Indian Ricegrass
- (5%) Little Bluestem
- (5%) Blue Grama
- (10%) Switchgrass
- (10%) ~~8111h9 M1111111a11.ee.018: C«Ef,cJ /lftdl~~ IC: j And/or INDIAN RICEGRASS
- (5%) Sideoats Grama
- (5%) Beardless Wheatgrass
- (10%) Big Bluestem
- (10%) Sandberg Bluegrass
- (5%) Green Needlegrass
- (10%) Slender Wheatgrass
- (10%) Thickspike/Streambank/Western Wheatgrass
- (5%) Sand Dropseed
- (5%) Yellow Indiangrass

\$10.55 /lb
25 lbs/Acre

PBSI Native Prairie Mix

- (20%) Blue Grama
- (10%) Buffalograss
- (24%) Green Needlegrass
- (20%) Sideoats Grama
- (24%) Western Wheatgrass
- (2%) Sand Dropseed

\$14.00 / pis
15 pis lbs/Acre

PBSI Native Sandyland Mix

- (10%) Little Bluestem
- (10%) Indian Ricegrass
- (10%) Sideoats Grama
- (5%) Sand Lovegrass
- (19%) Swfohgrass
- (5%) Sand Bluestem
- (19%) Big Bluestem
- (2%) Sand Dropseed
- (10%) Western Wheatgrass
- (10%) Yellow Indlangrass

\$16.00 / pis
11 pis lbs/Acre

PBSI Dry Native Mountain Mix

- (20%) Mountain Bromegrass
- (10%) Slender Wheatgrass
- (15%) Streambank Wheatgrass
- (10%) Rocky Mountain Fescue
- (5%) Prairie Junegrass
- (15%) Thickspike Wheatgrass
- (10%) Beardless Bluebunch Wheatgrass
- (5%) Bottlebrush Squirreltail
- (10%) Sandberg Bluegrass

\$9.00 / lb
50 lbs/Acre

PBSI Native Mountain Mix

- (20%) Streambank Wheatgrass
- (20%) Mountain Bromegrass
- (20%) Slender Wheatgrass
- (15%) Blue Wildrye
- (5%) Sherman/Canby Bluegrass
- (5%) Rocky Mountain Fescue
- (5%) Sandberg Bluegrass
- (5%) Prairie Junegrass
- (5%) Tufted Hairgrass

\$7.50 /lb
50 lbs/Acre

PBSI Native Lawn Mix

\$19.00 /lb