

# TAEOR SOLAR

## REVEGETATION PLAN

Morgan County, Colorado



*Prepared for*



**BALANCED ROCK**  
POWER

*Prepared by*

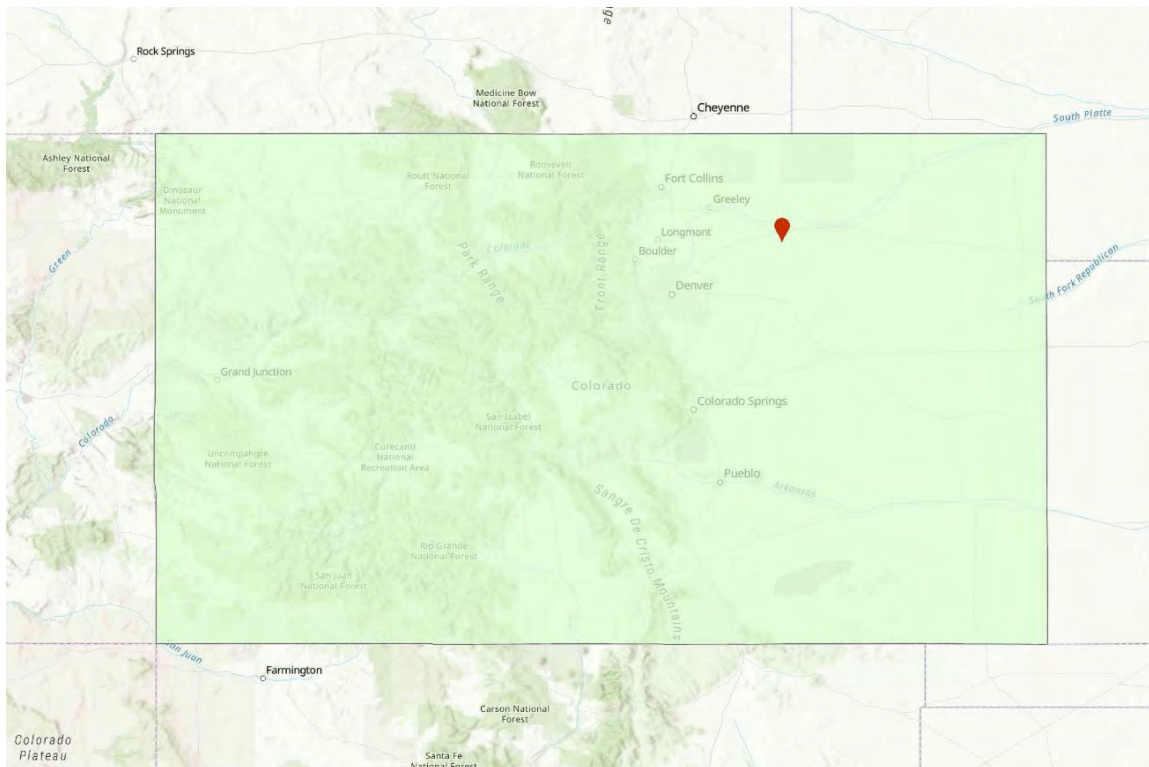
**KERTEC**  **LLC**

## 1.0 INTRODUCTION

Balanced Rock Power (BRP) is designing Taelor Solar (Project) in Morgan County, Colorado. BRP has engaged KerTec, LLC (KerTec) to prepare this site-specific Revegetation Plan (Plan) for implementation on the Project. This Plan has been initiated and will be amended as civil designs are completed and further site details are developed and made known. The purpose of this Plan is specifically designed to focus on soil preservation, land stewardship, and revegetation with regard to erosion control and the site's future vegetative-longevity. This Plan is to be implemented utilizing a dynamic approach—multiple reclamation services may be required during the course of construction to ensure stability and success of the land. This Plan will work to properly identify potential erosion potential and mitigation measures, vegetation limiting factors, as well as the proper formation of a sustainable and executable plan. This Plan has been developed based on approximately 10% engineering design with additional details to come and be incorporated herein.

### 1.1 THE PROJECT

The Project is slated to be under construction in 2025. The Project is located at Lat/Long 40.145, -104.127 in Morgan County, Colorado, northeast of Denver set to encompass approximately 4,410 acres. The Project aims to achieve 250 MWac power generation.



**FIGURE 1. Proposed location of the Project, Morgan County, Colorado.**

## 2.0 PLANNING

### 2.1 ENVIRONMENT

The state of Colorado is located within an arid region of the United States. Lower annual levels of precipitation are likely, especially on the Front Range. However, the Front Range is known to experience temperatures ranging from lows near 20°F to highs approaching 90°F. Average annual precipitation is around 20.1”, with the greatest amounts typically received in the 2<sup>nd</sup> and 3<sup>rd</sup> quarters of the year (growing season). Average hours of sun exposure range from 209 hours in February to an excess of 323 hours in August<sup>1</sup>.

### 2.2 SOILS

The Project consists of a multitude of soil types but Morgan County is typically known to consist of very deep, well drained, slow or medium permeable loamy sand or sandy loam soils formed in eolian materials. These gently sloping uplands range from 0-6% slope<sup>2</sup>. Being an arid climate compounded by relatively low average rainfall and wind, the Project must anticipate and strive to prevent not only water erosion but also wind erosion of the topsoil.

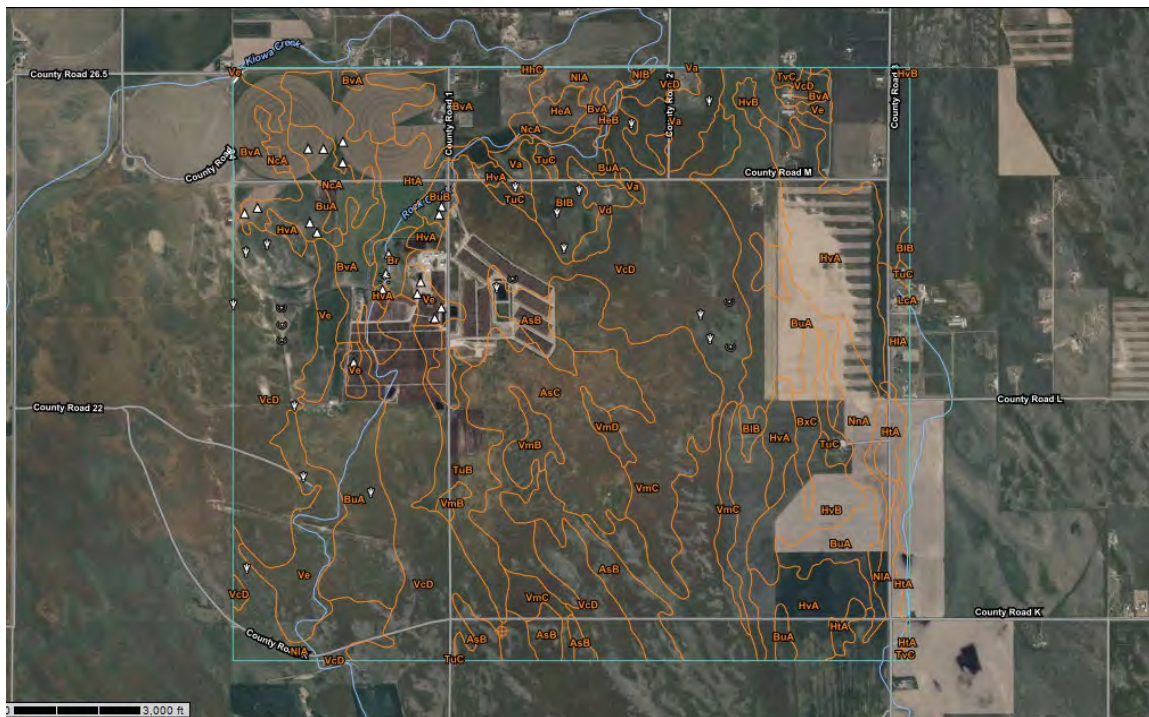


FIGURE 2. USDA-NRCS Web Soil Survey

<sup>1</sup> <https://www.weatherwx.com/climate-averages/co/morgan+county.html>

<sup>2</sup> <https://soilseries.sc.egov.usda.gov/>

## 2.3 HISTORIC & CURRENT LAND USE

Based upon desktop review, the site is expected to have been historically used as open rangeland with recent transitions to farming and livestock production.

The expected condition of the range is a function of land management practices over time. In order to assess the expected condition of the range at the Project, one must know the range's potential condition as a function of vegetative production and ecological climax species composition. The range's potential condition is referred to as a "reference site". The reference site is based on the use of sound rangeland management practices. Examples of sound rangeland management practices include, but are not limited to: proper grazing management, brush control, and weed control. When sound rangeland management practices are not consistently implemented, the condition of the range declines and transitions into a state of invasive species encroachment and topsoil erosion. Therefore, the range's natural plant community composition and health is negatively affected. This translates into a reduction of animals (livestock, wildlife, and or pollinators) the land is able to ultimately feed and support.

## 2.4 NOXIOUS WEEDS

Noxious weed encroachment should be monitored, identified, and removed to prevent infestation and competition with desirable plant species. The Colorado Noxious Weed Act<sup>3</sup> directs each county within the state to adopt a Noxious Weed Management Plan. Per the Morgan County Noxious Weed and Pest Management Plan, noxious weeds should be managed using cultural, mechanical, biological and chemical methods. Preferred methods for managing noxious weeds include properly timed cultural and mechanical practices such as mowing, plowing and seeding, as well as grazing. Chemical methods including spot spraying or the use of selective herbicides can be used in conjunction with cultural and mechanical methods to reduce infestation sizes without negatively impacting all vegetation onsite. The Morgan County Noxious Weed List and Noxious Weed and Pest Management Plan can be found in Appendix A.

## 3.0 REVEGETATION MANAGEMENT

Revegetation planning and implementation is a technical, science-based discipline requiring academic credentials and extensive, on-the-job experience. The following revegetation plan should be developed and administered by the site's professional, qualified as such. In order to mitigate the risk of revegetation failure, this Plan will address:

- Topsoil Preservation
- Soil Stabilization
- Fertility
- Seedbed Conditions & Preparation
- Seeding
- Monitoring
- Weed Management

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<sup>3</sup> Colorado Revised Statutes 35-5.5

### 3.1 TOPSOIL PRESERVATION

Topsoil preservation is of utmost importance where construction-based soil disturbance is anticipated to take place. In the event of grading, it is recommended that topsoil be properly separated from the subsoil to ensure optimum soil media for revegetation. Stockpiling of topsoil is recommended on the downhill side of cleared areas and should be stabilized using Best Management Practices (BMPs) including but not limited to: seeding and mulch. Areas stockpiled should be contained using vegetated berms, compost wattles, or silt fence structures to further prevent loss from the Project. Stockpiled topsoil should then be redistributed across its origin during final grading, as much as practicable, to ensure healthy soil for the purpose of revegetation.

### 3.2 SOIL STABILIZATION

BMPs are to be implemented and utilized as means to ensure stability of the project site, especially during construction. BMPs include but are not limited to: temporary and/or permanent seeding, straw mulch, hydromulch, erosion control blankets, wattles, silt fence, concrete fleximat, etc. Implementing different BMP techniques, according to what the landscape and climate dictates, will help ensure the site is able to successfully sustain stability.

#### PROPOSED LAND TREATMENT PER EVALUATED SLOPE - PHASE 1

SLOPE RANGE	EROSION CONTROL (OPTION A)*	EROSION CONTROL (OPTION B)	EROSION CONTROL (OPTION C)
0.00 – 2.50%	DRILL SEEDING	DRILL SEEDING (NO CHANGE FROM OPTION A)	DRILL SEEDING (NO CHANGE FROM OPTION A OR OPTION B)
2.50 – 12.5%	DRILL SEEDING + STRAW APPLICATION (4,000 lbs HAY PER ACRE)	DRILL SEEDING + STRAW APPLICATION (2,000 lbs HAY PER ACRE)	DRILL SEEDING
12.5 – 30.0%	DRILL SEEDING + KOTON HYDROMULCH (5,000 lbs MULCH PER ACRE)	DRILL SEEDING + STRAW APPLICATION (4,000 lbs HAY PER ACRE)	DRILL SEEDING + STRAW APPLICATION (2,000 lbs HAY PER ACRE)
30.0 % <	DRILL SEEDING + DOUBLE LAYER COCONUT EROSION CONTROL MATTING	DRILL SEEDING + KOTON HYDROMULCH (5,000 lbs MULCH PER ACRE)	DRILL SEEDING + STRAW APPLICATION (4,000 lbs HAY PER ACRE)

#### LAND TREATMENT NOTES:

KNOWN CONCENTRATED FLOW AREAS SHALL RECEIVE PYRAMAT® 75 HIGH PERFORMANCE TURF REINFORCEMENT MATTING, REGARDLESS OF OPTION SELECTION

\*CONTRACTOR TO SELECT EROSION CONTROL OPTION. **OPTION A** IS PREFERRED AS IT OFFERS GREATER RISK MITIGATION REGARDING EROSION POTENTIAL COMPARED TO OPTIONS B & C. CONTRACTOR SHALL ENSURE THAT REGARDLESS OF OPTION SELECTED, CONTINUAL STORMWATER POLLUTION PREVENTION PLAN (SWPPP) MONITORING IS TO BE ASSESSED AND APPROPRIATE FIELD-MODIFICATIONS IMPLEMENTED TO ENSURE CONTINUAL SWPPP COMPLIANCE.

**FIGURE 3. Proposed Land Treatment Per Evaluated Slope**

### 3.3 FERTILITY & COMPACTION

It is recommended that a preliminary sampling of one soil sample per 100 acres be collected and tested for compaction, macro/micronutrient availability, soil biology, and soil health to determine the benchmark soil health for the site. Understanding the compaction level and nutrient availability is essential for successful vegetation success. As construction progresses, additional samplings will be taken from cut/fill acres to determine if any additional nutrient or decompaction requirements are applicable.

### 3.4 SEEDBED CONDITIONS & PREPARATION

In order to prepare a suitable seed bed, the need for soil decompaction, grading, fertilizer, topsoil, and compost should be evaluated. Soil should be de-compacted to a minimum depth of 5". Remove all material larger than 3". Decompaction of the seedbed (top 5" of the soil surface) to <200 psi must be accomplished for the soil to express vegetation quantities capable of protecting the site from wind or water erosion. The decompaction process should yield soil aggregates <1" in

diameter. Aggregate material over 1” to be removed, hauled off, and properly disposed of prior to planting, as needed. Material, such as large areas of mulch or debris from vegetation clearing, can cause negative impacts to vegetation establishment by suppressing growth and therefore should be removed.

### 3.5 SEEDING

<u>Recommended Temporary Seeding</u>		
<u>Dormant Season - Spring</u> (Jan 1 - April 15)	<u>Growing Season</u> (April 15 - Aug 31)	<u>Dormant Season - Fall</u> (Sept 1 - December 31)
Spring Oats ( <i>Avena sativa</i> )	Proso Millet ( <i>Panicum miliaceum</i> )	Hard Red Winter Wheat ( <i>Triticum aestivum</i> )
Hard Red Winter Wheat ( <i>Triticum aestivum</i> )	Western Wheatgrass ( <i>Pascopyrum smithii</i> )	Annual Rye Grass ( <i>Lolium multiflorum</i> )
Triticale ( <i>X Triticosecale</i> )	Teff grass ( <i>Eragrostis tef</i> )	Hairy vetch ( <i>Vicia villosa</i> )
-----	Assorted Clovers	Assorted Clovers

FIGURE 4. Recommended Temporary Seeding Mixes & Timeframes

<u>Common Name</u>	<u>LBS/Acre</u>	<u>Total LBS</u>
White Dutch Clover	2.000	2.000
Annual Ryegrass	10.000	10.000
Crested Wheatgrass (Turf Type)	5.000	5.000
Kentucky Bluegrass (Bronze Tier)	20.000	20.000
Solar Array Brand Fine Fescue Mix	40.000	40.000
Blue Grama	1.250	1.250
Prairie Junegrass	0.250	0.250
Sand Dropseed	0.100	0.100
Sideoats Grama	1.400	1.400
<b>Total Seeding Rate (LB/Acre)</b>	<b>80.000</b>	<b>80.000</b>

FIGURE 5. Recommended Permanent Seeding Mix

Pre-construction and during construction, the site should be seeded and stabilized with a temporary cover crop (blend to be determined by applicable season) to allow for immediate stabilization. Planting a desirable temporary blend will reduce competition from undesirable species as well as prepare the soil for permanent seeding. Seeding should occur using a no-till drill. It is recommended that permanent seeding take place post-pile installation but pre-driveline and torque tube installation, co-planted with temporary cover species for quick germination. In areas with limited access, a broadcast seeding method may be utilized. Upon completion of construction, subsequent disturbed areas of the site should be touch-up seeded with a permanent blend consisting of native grasses and forbs.

After permanent seeding, bare ground areas not expressing vegetation in excess of 10 square feet should be identified and the following soil characteristics supervised by a Soil Scientist or Certified Crop Advisor:

- Soil compaction
- Soil fertility (via sampling and lab analysis)
- Sterilization herbicide contamination
- Soil structure
- pH (via sampling and lab analysis)
- Electroconductivity

A mitigation strategy should be developed by a qualified professional (examples in 3.6) to address needed soil amendments, seed selection for the respective area, stabilization protocol, and follow-up monitoring intervals.

Implementing a temporary cover crop on constructed areas will be critical in the Project's ability to mitigate encroachment of undesirable plant species "weeds", and to ultimately prevent erosion. The Project should require close watch for signs of erosion and the site should be diligent to take precautions to prevent erosion, whether through the combined use of temporary stabilization techniques and/or implementation of permanent stabilization techniques.

### 3.6 MONITORING

This site should be monitored by regularly scheduled site inspections for erosion issues, invasive/noxious species, vegetation growth, compliance with the Fire Mitigation Plan, and other general site conditions. Inspections should occur monthly during the growing season to monitor vegetation growth, species competition, and potential bare ground areas. During the dormant season, inspections should occur quarterly. The results of inspections can lead to the development of implementation of mechanical and chemical control, mitigation strategies or BMP installation plans.

Examples of qualified professional for site monitoring supervision:

- Professional Soil Scientist
  - Masters of Science in Agronomy or Plant and Soil Science
  - Active and current Certified Professional Agronomist
  - or BRP approved equal

### 3.7 WEED MANAGEMENT

Weed management will consist of the treatment of noxious weeds and potential woody species, as needed, and mowing of all other vegetation pre-construction, during construction and post-construction. Regular mechanical and chemical treatment of weedy species will reduce undesirable species populations and encourage proliferation of desirable species. See Section 2.4 for noxious weed control.

### 4.0 CONCLUSION

Through the various soil and vegetation management techniques outlined in this Plan, the Project will have the capability of being a successful land-stewarding solar facility in the BRP portfolio, for years to come. It should be expected that within the first three years of site management, plans, protocols, and costs may be more than subsequent years. By allocating proper resources on the front-end of the project, and maintaining site compliance with the Fire Mitigation Plan, BRP can gradually expect a reduced number of inputs over the life of the project.



**Morgan County Noxious Weed and Pest Management Plan and Noxious Weed List**

Common Name	Scientific Name
List A	
Camelthorn	<i>Alhagi pseudalhagi</i>
Common crupina	<i>Crupina vulgaris</i>
Giant salvinia	<i>Salvinia molesta</i>
Hydrilla	<i>Hydrilla verticillate</i>
Medusahead	<i>Taeniatherum caput-medusae</i>
Parrotfeather	<i>Myriophyllum aquaticum</i>
Squarrose knapweed	<i>Centaurea virgata</i>
African rue	<i>Peganum harmala</i>
Dyer's woad	<i>Isatis tinctoria</i>
Elongated mustard	<i>Brassica elongate</i>
Flowering rush	<i>Butomus umbellatus</i>
Meadow knapweed	<i>Centaurea x moncktonii</i>
Rush skeletonweed	<i>Chondrilla juncea</i>
Tansy ragwort	<i>Senecio jacobaea</i>
Yellow starthistle	<i>Centaurea solstitialis</i>
Cypress spurge	<i>Euphorbia cyparissias</i>
Giant reed	<i>Arundo donax</i>
Hairy willow-herb	<i>Epilobium hirsutum</i>
Knotweeds	<i>Japanese, Giant, and Bohemian</i>
Mediterranean sage	<i>Salvia aethiopsis</i>
Myrtle spurge	<i>Euphorbia myrsinites</i>
Orange hawkweed	<i>Hieracium aurantiacum</i>
Purple loosestrife	<i>Lythrum salicaria</i>
Yellow flag iris	<i>Iris pseudacorus</i>
List B	
Absinth wormwood	<i>Artemisia absinthium</i>
Black henbane	<i>Hyoscyamus niger</i>
Bouncingbet	<i>Saponaria officinalis</i>
Bull thistle	<i>Cirsium vulgare</i>
Canada thistle	<i>Cirsium arvense</i>
Chinese clematis	<i>Clematis orientalis</i>
Common tansy	<i>Tanacetum vulgare</i>
Common & Cutleaf teasel	<i>Dipsacus fullonum</i>
Dalmatian toadflax	<i>Linaria dalmatica &amp; genistifolia</i>
Dames rocket	<i>Hesperis matronalis</i>
Diffuse knapweed	<i>Centaurea diffusa</i>
Eurasian watermilfoil	<i>Myriophyllum spicatum</i>
Hoary cress	<i>Lepidium draba</i>
Houndstongue	<i>Cynoglossum officinale</i>
Hybrid knapweed	<i>Centaurea x psammogena = C. stoebe x C. diffusa</i>

Hybrid toadflax	<i>Linaria vulgaris x L. dalmatica</i>
Jointed goatgrass	<i>Aegilops cylindrica</i>
Leafy spurge	<i>Euphorbia esula</i>
Mayweed chamomile	<i>Anthemis cotula</i>
Moth mullein	<i>Verbascum blattaria</i>
Musk thistle	<i>Carduus nutans</i>
Oxeye daisy	<i>Leucanthemum vulgare</i>
Perennial pepperweed	<i>Lepidium latifolium</i>
Plumeless thistle	<i>Carduus acanthoides</i>
Russian knapweed	<i>Acroptilon repens</i>
Russian olive	<i>Elaeagnus angustifolia</i>
Salt cedar	<i>Tamarix chinensis, T. parviflora, and T.</i>
Scentless chamomile	<i>Tripleurospermum inodorum</i>
Scotch thistle	<i>Onopordum acanthium</i>
Spotted knapweed	<i>Centaurea stoebe</i>
Sulfur cinquefoil	<i>Potentilla recta</i>
Wild caraway	<i>Carum carvi</i>
Yellow nutsedge	<i>Cyperus esculentus</i>
Yellow toadflax	<i>Linaria vulgaris</i>

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List C

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Bulbous bluegrass	<i>Poa bulbosa</i>
Chicory	<i>Cichorium intybus</i>
Common burdock	<i>Arctium minus</i>
Common mullein	<i>Verbascum Thapsus</i>
Common St. Johnswort	<i>Hypericum perforatum</i>
Downy brome	<i>Bromus tectorum</i>
Field bindweed	<i>Convolvulus arvensis</i>
Halogeton	<i>Halogeton glomeratus</i>
Johnsongrass	<i>Sorghum halepense</i>
Perennial sowthistle	<i>Sonchus arvensis</i>
Poison hemlock	<i>Conium maculatum</i>
Puncturevine	<i>Tribulus terrestris</i>
Quackgrass	<i>Elymus repens</i>
Redstem filaree	<i>Erodium cicutarium</i>
Siberian elm	<i>Ulmus pumila</i>
Tree of Heaven	<i>Ailanthus altissima</i>
Velvetleaf	<i>Abutilon theophrasti</i>
Wild-proso millet	<i>Panicum miliaceum</i>

<https://morgancounty.colorado.gov/sites/morgancounty/files/Noxious-Weed-and-Pest-Mgmt-Plan.pdf>