

Tab 3

Portage Solar, LLC Portage Great Falls, MT

5/19/2016

Stormwater Erosion and Sediment Control

Soil Compaction Mitigation Measures

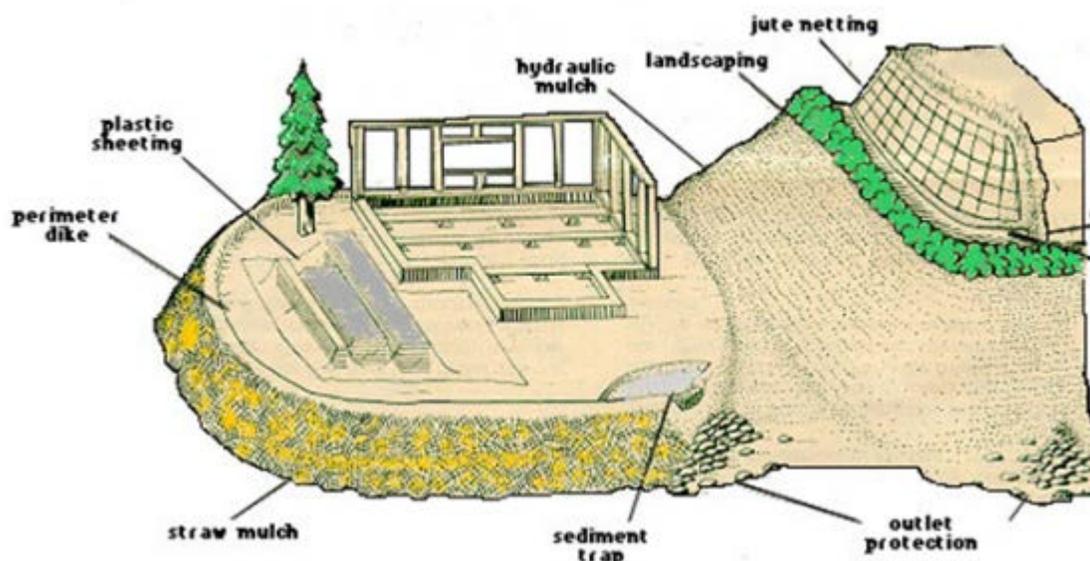
Introduction

Cypress Creek Renewables, LLC (CCR) is developing the Portage Solar, LLC (Portage) Solar Farm located approximately two miles South of Great Falls Town Center off 13th st S. CCR is required to mitigate point source discharges of water-borne pollutants from non-point sources by the standards set forth by the State of Montana Department of Environmental Quality. See Figure 1 for examples of potential mitigation methods.

Soil compaction on and around the project site will be minimized during construction. Compacted soils lose innate water-carrying and holding capacity, which in turn contributes towards higher run-off volumes, pollutant concentration, and delayed recovery of natural vegetation post-construction.

The following memo summarizes measures that will be employed so as to address site specific conditions present on and around the Portage project site such that soil compaction is minimized and water discharges do not contain pollutants or characteristics in levels that would cause receiving water bodies to fail to meet water quality standards.

Figure 1. Some of the erosion and sediment control methods that are employed on active project sites.



Site-specific stormwater erosion and sediment control strategies during construction

The Portage Solar Farm is located in a relatively flat open field with a history of agrarian activity. The project site will require little to no grading and as such is not expected to generate large areas of disturbed and exposed soils.

The project will employ the following measures, where required, as deemed appropriate by erosion and sediment control standards and as recommend by an independent Montana Licensed Civil Engineer:

- 1. General strategy**
 - a. Minimization of disturbed vegetation and soils to only roads and cable trenching which will likely run under the shoulder of the roads.
 - b. Stabilization of disturbed soils to prevent erosion from occurring.
- 2. Sediment basin(s). See Figure 2.**
 - a. Silt fence, gravel, and hay bale/coil logs at sediment basin outlet
 - b. Sediment basin outlet located at natural low point
 - c. Erosion protection at sediment basin outlets
- 3. Drainage features (ditches, roads, open trenches, etc).**
 - a. In areas where there are ditches, hail bail and coil logs will be spaced at intervals so as to divert water around disturbed/exposed soils, slow water down, and capture sediment.
 - b. Silt fences and Jute Netting on open ditch edges.
- 4. Laydown Areas**
 - a. Erosion control measures over exposed raw materials and soils in laydown areas.
 - b. Isolate traffic to a stabilized area.

Soil Compaction Minimization during construction

Project construction requires the use of a combination of mechanical equipment and manual labor. Mechanical equipment, such as material delivery trucks and diggers, will be restricted to roads. Construction of the solar array occurs in roughly the following order, with potential areas of compacted soil marked in **blue**:

- 1. Site preparation**
 - a. Construction of roads – **May result in soil compaction**
 - b. Clearing of obstructive vegetation (large trees)
 - c. Laydown and staging areas
- 2. Solar array construction**
 - a. Driving foundations. See Figure 3.
 - b. Installing solar panel racking
 - c. Installing solar panels
 - d. Digging electrical trenches - **May result in soil compaction**
 - e. Installation of electrical wiring

- f. Placement of inverter/transformer pads
- 3. Post Construction**
- a. Removal of equipment and excess materials
 - b. Re-vegetation using a natural seed mix. See Figure 5.
 - c. Operations and Maintenance (vegetation management and module washing)

Cypress Creek – Statement of Qualifications

The Soil Erosion and Compaction Plans were prepared by Cypress Creek Renewables. The plans were prepared using common principles defined in State Department of Environmental Quality Construction Stormwater Erosion and Sediment Control Manuals (Division, 2013) such as the one listed for Oregon below.

Cypress Creek will use a local Engineering company, with adequate qualifications as the principal engineer for the project.

Cypress Creek Renewables will be serving as developer of the Project. Cypress Creek Renewables is a solar energy development company that specialize in small utility scale solar power plants that range in size from 2-20 MW. Cypress Creek currently owns and operates 200 MWs of solar power projects and has over 100 MWs currently under construction along with over 1000 MW in various stages of development in various markets across the country.

The engineering department of Cypress Creek consists of 15 full time professionals including two professional Engineers. Keith Billy is Cypress Creek's Senior Civil Engineer who is a licensed professional engineer in three states. Keith has over 10 years of experience in the public and private sectors preparing and reviewing site, utility, storm water management, and erosion and sediment control plans.

References

Division, O.D.-W (2013, January). Construction Stormwater Erosion and Sediment Control Manual. Retrieved from <http://www.deq.state.or.us/wq/wqpermit/dpcs/general/npdes1200c/ErosionSedimentControl.pdf>

Figure 2. Sediment basin..



Figure 3. Driving Foundations without compacting soils.



Figure 4. Compacted soil contained within road footprint.



Figure 5. Vegetation recovery within array interior, two months post-construction.

