

Initial Conservation & Reclamation Plan

Georgetown Solar Energy Project Mossleigh, Alberta



Prepared for:

Georgetown Solar Inc.

Suite 615, 800 West Pender Street
Vancouver, British Columbia, V6C 2V6

Prepared by:

Western EcoSystems Technology, ULC

Suite 303, 1000 9 Avenue SW
Calgary, Alberta, T2P 2Y6

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STUDY PARTICIPANTS

Western EcoSystems Technology, ULC	
Alexa Busef	Wetland Biologist Author
Nick Bartok	Senior Reviewer Project Manager
Beth Markhart	Senior Restoration Ecologist
Natasha Johnson	Senior Wetland Biologist
Victoria Lukasik	Ecologist
Janet Bauman	Senior Ecologist Senior Reviewer
Michael Van Laeken	Restoration Ecologist
Brian Barbieri	GIS Specialist

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INTRODUCTION

Georgetown Solar Inc. (Georgetown Solar), is proposing to develop the Georgetown Solar + Energy Storage Project, a 230-megawatt (MW) solar power facility coupled with a 100MW/200MWh battery energy storage system (the Project) located in Vulcan County, approximately 8 kilometres (km), northwest of Mossleigh, Alberta.

Western EcoSystems Technology, ULC (WEST) was retained to complete environmental work on the project including this initial Conservation and Reclamation Plan (C&R Plan). The purpose of a C&R Plan is to include project-specific information from a Desktop Review Assessment, consistent with the *Conservation and Reclamation Directive for Renewable Energy Operations* (Government of Alberta; Alberta Environment and Parks 2018), including:

- Sensitive areas such as native grasslands and wetlands;
- Preliminary soils mapping;
- Preliminary vegetation mapping; and
- Project siting and design.

Updates to this initial C&R Plan will include project-specific information for:

- Land use planning;
- Temporary and progressive reclamation;
- Pre-disturbance site assessments (PDSA);
- Conservation planning;
- Reclamation planning;
- Interim monitoring site assessments (IMSA);
- Final reclamation certification; and
- Reclamation criteria.

SUMMARY OF UPDATES

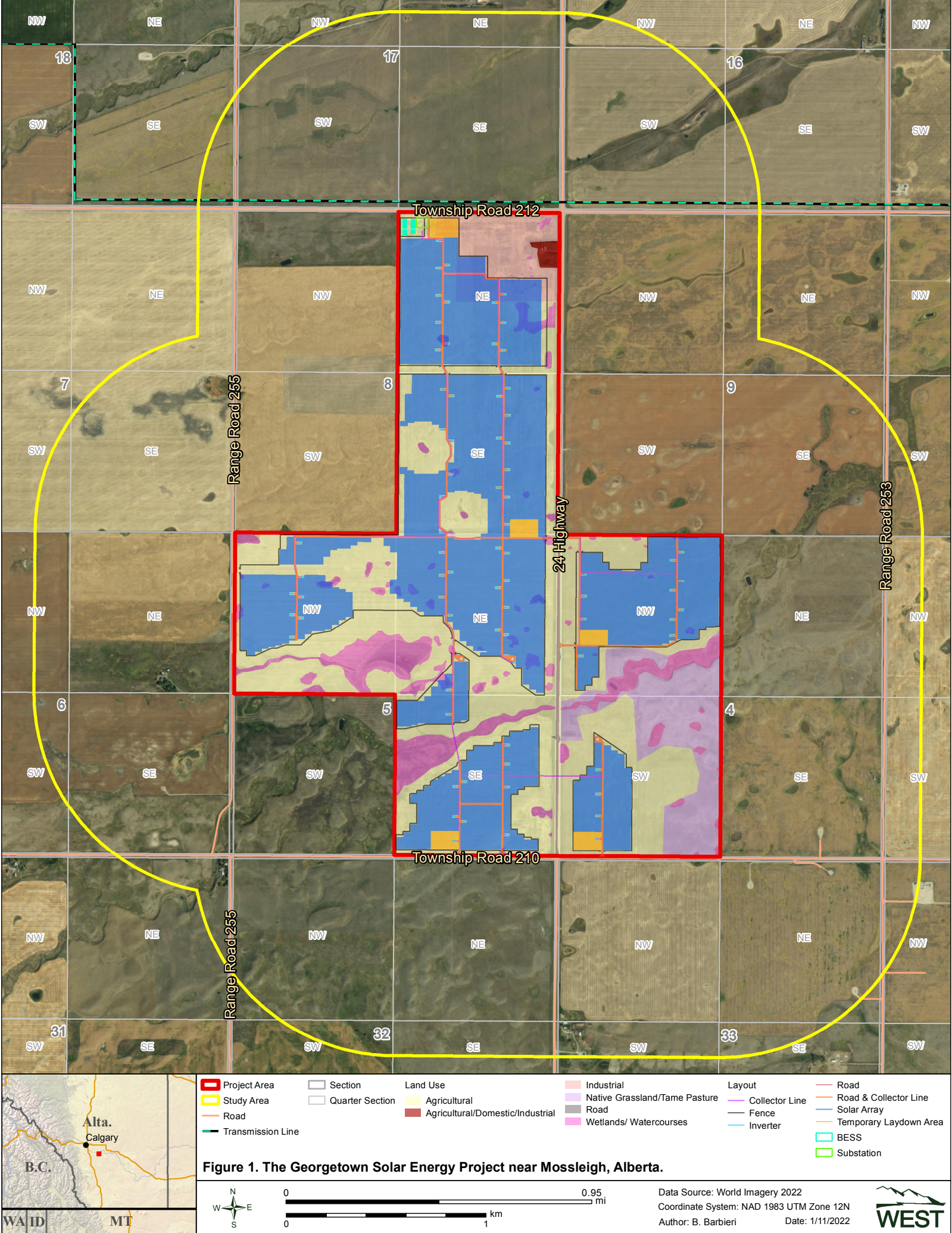
This C&R Plan will be updated annually, or as needed, with new information as development and reclamation progresses, PDSA's and IMSA's are completed, new approvals and/or permits are obtained, approvals and/or permits are renewed, and stakeholder input is received that influences or alters the C&R planning. This section is a placeholder to include a summary of future updates.

Table 1. Summary of Conservation and Reclamation Plan updates.

REO C&R Section	Update Summary
placeholder	placeholder

PROJECT DESCRIPTION

The proposed Project is planned as a 230-MW, alternating current (AC), photovoltaic (PV) solar generation facility and a 100MW/200MWh battery energy storage system (BESS). The proposed construction footprint for the Project is 221.5 hectares (ha), and the proposed operational footprint is also 221.5 ha. (Figure 1). The Project Footprint (i.e., the area where infrastructure installation and temporary disturbance for construction will occur) extends over seven quarter sections (NE & SE of section 8; NW, NE & SE of section 5; and NW & SW of section 4-21-25 W4M). Those seven quarter sections are held for the Project and make up the Project Area.



Pending Alberta Utilities Commission (AUC) approval, Project construction is anticipated to begin in August 2022. The anticipated in-service date and commencement of commercial operation is in September 2023. Clean up and reclamation activities are planned to be completed Q2 – Q3 2023.

The solar component of the Project requires installation of solar panels and associated racking and foundations, inverter and transformer stations, a collector system and substation, and access roads. The BESS requires installation of modular battery units, transformers, safety systems and controls, and an access road to be shared with the Project substation. The Project infrastructure will be surrounded by chain-linked fencing.

Project Components

- **Bi-Facial Solar PV Modules:** Bi-facial solar panels have been selected for the Project due to the ability to receive and transform solar radiation from both the top and bottom sides.
- **Racking and Mounting Systems:** The solar panels will be installed on a fixed-tilt racking system mounted on screw piles, which remains at a stationary tilt angle throughout the year. The panels will range in height between approximately 1.0 metres (m) to 2.5 m above ground level.
- **Inverters/Transformer stations:** Power conversion stations that receive the direct-current (DC) power collected by the solar panels and convert it to AC power at key junction points where the stations connect to the collector system. Transformers are electrical equipment that increase the voltage of the electricity produced by the solar PV facility to connect into the Alberta Electricity System.
- **Electrical Collection System:** The collection system for the Project consists of underground cables connecting the inverters to a step-up transformer within the Project substation.
- **Collector Substation:** A main power transformer located at the Project substation will take the generated power at 34.5 kilovolts (kV) and will step up the voltage to 240 kV to connect into the Alberta Electric System.
- **Battery Station:** The BESS will be situated adjacent to the Project substation and will share common access.
- **Modular Battery Units:** The site is proposed to contain 84 lithium ion phosphate (LFP) battery modular units approximately 9.3m long and 1.7m wide and 2.75MWdc in size.
- **BESS Inverters:** There will be 21 bi-directional inverters situated alongside the battery units to convert between DC and AC power.
- **Interconnection:** Georgetown Solar proposes to connect the Project to the existing 240-kV transmission line located north of the Project boundary. A short connection line will be required to connect the Project substation to the 240-kV transmission line. This line is planned to be located on a combination of private land participating in the Project and existing AltaLink right-of-way.
- **Access Roads:** In order to deliver and transport materials during the construction phase, and to access the Project equipment for regular operations and maintenance the Project will require construction of new access roads or upgrades to existing access where possible to minimize additional disturbance. During construction and operations, the entire Project will be fenced for security and safety reasons.

Project Schedule

The conservation and reclamation work, relative to the construction and operation of the proposed Project, is illustrated below and that conservation and reclamation is ongoing, throughout the life of the Project and after decommissioning (Table 2).

Table 2. Preliminary timeline of the conservation and reclamation effort at the Georgetown Solar Energy Project.

Activity	2022				2023				2024				End of Project*				Final Reclamation			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Construction																				
In-service date																				
Commencement of commercial Operations																				
Interim Reclamation																				
Monitoring for Vegetation Establishment and Erosion																				
Monitoring for Erosion and Weeds																				
Weed Management & Control																				
Decommissioning																				
Recontouring and Soil Replacement																				
Seeding and Revegetation																				
Monitoring for Vegetation Establishment and Erosion																				
Corrective Measures																				
Reclamation Certificate																				

* Actual dates of end of Project and final reclamation are undetermined due to opportunities to extend lease agreements and retrofit the site with new solar technology as it advances, and the progression of vegetation growth.

CONSERVATION PLANNING

Conservation planning entails methods to ensure a successful reclamation outcome after the life of the Project. Conservation planning begins at the Project siting phase. The Project Area includes all lands held for the Project. The Project Footprint includes the area upon which Project infrastructure and components will be placed, or where ground will be disturbed (e.g., temporary workspaces).

Policy Alignment

Land-use planning and C&R planning, execution, and certification in Alberta are guided by legislation and associated regulations. Under the legislation and regulations, regional plans are developed for land use planning. To support land use and C&R planning, several directives, guides, standards and best management practices (BMPs) have been developed and implemented.

Legislation and Regulations

The *Environmental Protection and Enhancement Act* (EPEA; Government of Alberta 2021a) and the associated *Conservation and Reclamation Regulation* (Government of Alberta 2018a) provide the legislative authority for directing reclamation in Alberta. Under this legislation and regulation, the Government of Alberta, through Alberta Environment and Parks (AEP), assures that land used for industrial activities is conserved and reclaimed.

The *Alberta Land Stewardship Act* (ALSA; Government of Alberta 2021b) provides the legal basis for regional land-use planning and the development of regional plans. The Government of Alberta can give direction and provide leadership in identifying provincial objectives, during the development of regional plans. Objectives include those that are economic, environmental and social, in nature.

The *Municipal Government Act* (Government of Alberta 2021c) provides the legislative framework to guide the operations of municipalities. The purpose of municipalities are to provide good government; foster the well-being of the environment; provide services, facilities and/or other things deemed necessary or desirable within the municipality; develop and maintain safe and viable communities; and work collaboratively with neighbouring municipalities for coordinating inter-municipal services.

Other applicable legislation and regulations that must be adhered to include:

- *Historical Resources Act* (Government of Alberta 2021d),
- *Water Act* (Government of Alberta 2021e),
- *Weed Control Act* (Government of Alberta 2017a) and *Weed Control Regulation* (Government of Alberta 2016a); and

- *Wildlife Act* (Government of Alberta 2020a) and *Wildlife Regulation* (Government of Alberta 2021f).

Regional Plans

Regional plans, developed under the ALSA, help plan for the future through sustainable development and coordination of decisions that balance the environment, land, species, natural resources and human settlement, while striving to meet the reasonably foreseeable needs of current and future generations of all Albertans.

The Project is located within the boundaries of the *South Saskatchewan Regional Plan* (SSRP; GOA 2018b). The SSRP is a 10-year plan to establish and maintain growth, sustainable development, healthy environments, and thriving communities via sound regulatory and policy provisions.

The Project is consistent with the following objectives under the SSRP implementation plan:

- “Economy and Renewable Energy – maintaining opportunities for the responsible development of the region’s abundant renewable energy resources in support of Alberta’s commitment to greener energy production, economic development, and the diversification and sustainability of industries and communities.
- Biodiversity and Ecosystems – maintaining terrestrial and aquatic species and ecosystem diversity through environmental studies and applied Project mitigations, preservation of native prairie habitats and obligate species by siting the Project on cultivated lands.
- Watershed Management - maintaining surface water quality by avoiding wetlands, named watercourses, and mitigating impacts to ephemeral, temporary and seasonal wetlands.
- Efficient Land Use – siting the Project adjacent to transmission infrastructure to avoid unnecessary build out of new transmission lines and substation.
- Historic Resources – ensuring the identification and preservation of historic resources, artifacts, aboriginal heritage sites, and fossils through avoidance and site screenings.
- Planning Cooperation and Integration – ensuring Project information is shared with all residents, landowners, occupants, communities, government agencies, industry, and other stakeholders to ensure multiple interests are considered during Project planning and presented to regulatory agencies.

Section 33 of the Vulcan County Land Use Bylaw No. 2020-028 (Vulcan County 2021), establishes the standards for commercial renewable energy projects, within the county. Georgetown Solar has initiated engagement with Vulcan County. Georgetown Solar will further engage with Vulcan County about Municipal Development Approval in Q2 2022. The Project is located on private lands currently zoned as Rural General, a designation whose purpose is to protect the agricultural land base within Vulcan County, while allowing non-agricultural developments that complement the county’s economy.

Vulcan County considers commercial scale renewable energy developments to be a discretionary use, on lands designated as Rural General (Vulcan County 2021).

Directives, Standards, and Criteria

The following directives contain standards, BMPs, and/or criteria that the Project will implement and adhere to:

- *Wildlife Directive for Alberta Solar Energy Projects* (Government of Alberta 2017b);
- *Alberta Wetland Mitigation Directive* (Government of Alberta 2018c); and
- *Conservation and Reclamation Directive for Renewable Energy Operations* (Government of Alberta 2018).

Additionally, the Project will follow the reclamation criteria described in the *2010 Reclamation Criteria for Wellsites and Associated Facilities for Cultivated Lands* (Government of Alberta 2013).

Best Management Practices

As part of conservation planning, an Environmental Protection Plan (EPP) was completed for the Project (WEST 2021). BMP and mitigation measures relevant to soils, vegetation, wetlands and general BMPs include the following:

- Soils
 - Minimize disturbed area by maximizing use of existing roads.
 - Where new access roads are required, minimize the number, length, and area.
 - Construction will be conducted under dry or frozen ground conditions to limit the potential for soil disturbance and compaction, or rig matting will be used.
 - Construction will not occur during or after high rainfall events when soil is wet and risk of compaction is increased, unless low tire pressure equipment, tracked equipment, or rig matting will be used.
 - The Environmental Monitor will inspect the construction area regularly for excessive rutting and compaction.
 - Compacted areas will be paratilled or harrowed, and rutted areas will be bladed smooth.
 - Minimal surface disturbance techniques, such as matting, reduced soil stripping, frozen construction, minimized fencing, and reduced road grades, will be implemented and followed.
 - Underground boring will be used to place collector lines across Highway 24 and the watercourse located in the SE-05-21-25W4M.
 - Erosion and sediment control measures will be implemented where necessary (e.g., straw bales, silt fencing).
 - The collector system will be ploughed in to further minimize soil handling.

- For short areas of collector line, tie-in areas at inverter stations and the collector substation, each extremity of underground bores, and other small areas that may require excavation, trenching installation will be required using a small (12-18 inch wide) bucket on a small rubber-tired backhoe. Soils will be salvaged from these areas prior to trenching/excavation.
- Topsoil will be salvaged from trenched areas of collector lines, inverter stations, substation and BESS station and stored separately from subsoils.
- Subsoil and top soil will be replaced following backfill of the excavated areas.
- At the substation and BESS station, top soil will be salvaged and stockpiled in a location determined by the Construction Manager and Vegetation Reclamation Manager (VRM).
- If topsoil needs to be sourced, it will be sourced locally.
- Material stockpiles will be sheltered from wind erosion or dust suppressants (e.g., being sprayed with water) will be used to minimize wind erosion.
- Vegetation
 - Minimize soil disturbance, soil salvage, and soil handling to reduce germination and spread of weed seeds in the seedbank.
 - Construction equipment and employee vehicles should arrive to the construction site clean and free of soil or plant debris.
 - Environmental Monitor(s) should inspect equipment as it arrives to site. Any equipment failing inspection will need to be cleaned and re-inspected before being allowed onto the site.
 - Herbicides will be used in consultation with the Construction Manager and the VRM and if used, not used within 30 m of an open water body (consistent with the *Weed Control Act* [Government of Alberta 2017a]).
 - Vegetation clearing will be limited to the minimum amounts required for construction and operation.
 - Construction areas will be clearly marked before clearing to avoid accidental vegetation removal.
 - Areas where vegetation has been accidentally removed or damaged will be re-planted with similar native species.
 - Revegetation will occur as soon as practicable.
 - In areas that will not be impacted by ongoing construction activities (e.g., high traffic areas), terrestrial soil surfaces will be protected within 14 days of clearing by seeding cover crop (i.e., annual grass seed species, such as wild oats [*Avena* spp.] or winter wheat [*Triticum aestivum*]), temporary erosion control blankets, or any combination of temporary erosion control installed as a system fit for the terrain and drainage patterns of the disturbed area.
- Wetlands and Waterbodies
 - Low tire pressure equipment, tracked equipment, or rig matting will be used to reduce the potential for adverse effects to soil quality and amphibians when working within 100 m seasonal or higher-classed wetlands.

- *Water Act* (Government of Alberta 2021e) approval will be obtained prior to any impacts to wetlands.
- Wetland setbacks will be marked in advance of construction activities.
- All construction will occur outside of the wetland setbacks between April and September.
- Construction within the wetland setbacks to only occur between October and March and low tire pressure equipment, tracked equipment, or rig matting will be used.
- Silt fencing will be erected around all wetlands between the wetland and construction activities.
- Silt fencing will protect seasonal and higher-classed wetlands within 100 m of the Project Footprint from temporary soil placement and construction site surface water flow from bare and eroding soils (all bare soil is planned to be stabilized with cover crop).
- Snow removal will not occur within setbacks of waterbodies or wetlands.
- Snow will not be placed within waterbodies during removal.
- General
 - A spill and leaks protocol will be followed to prevent, minimize and clean up any spills or leaks that may cause contamination of soils.
 - Emergency spill kits will be kept onsite.
 - Hazardous materials will be stored in appropriate locations and disposed of by authorized means.
 - If a spill occurs, work will cease in the spill area and the appropriate authorities notified. Efforts will be made to control the spill. The Construction Manager and Environmental Advisor will be notified immediately.
 - Hazardous materials will be appropriately labelled in accordance with applicable regulations and stored in designated areas with appropriate safety measures as outlined in the spill management and prevention plan.
 - All fuel storage and equipment servicing areas will be located at least 100 m away from any wetland and/or waterbody.
 - All garbage, construction materials, debris, and hazardous waste will be contained and disposed of by authorized and approved off-site vendors.
 - Georgetown Solar will develop and implement a stormwater management plan prior to the start of construction.
 - Snow will be removed from construction areas, where necessary, to provide safe working conditions and/or to expose soils for grading and excavation.
 - Snow removal equipment will remain within the Project Footprint and access roads.

When solar array construction has been completed, perennial grassland seed mixes will be planted to stabilize the disturbed workspace around each array (in alleys and under panels). Following construction, Georgetown Solar will be responsible for establishing and maintaining

perennial grassland vegetation in the entirety of the restoration footprint. This restoration vegetation will be expected to perform the following functions for the life of the Project:

- Provide nesting habitat to ground-nesting songbirds.
- Create pollinator-friendly habitat.
- Provide suitable grazing opportunities for sheep.
- Provide opportunities for native seed harvesting.
- Protect the structural integrity of the solar facility structural features through uniform soil stability lacking erosion rills and gullies.
- Withstand drought and the need for supplemental watering through deep root systems.
- Build soil health and maintain a competitive advantage against noxious weed establishment through maintenance practices, which maintain healthy above- and below-ground plant biomass.
- While native grassland seed mixes are not required for disturbances to areas that were previously not native grassland, such mixes will be used to provide the vegetation restoration functions listed above.

Adaptive Management

During the conservation and reclamation of a project, site conditions may be encountered that were not anticipated, or new approval/permit conditions may be imposed. Adaptive management allows the opportunity to develop, modify, and update the reclamation techniques or strategies as the Project is developed and becomes operational. Adaptive management will be implemented throughout all phases of the Project (i.e., construction, operation, decommissioning, reclamation) based on the results of monitoring programs (e.g., IMSA). As part of adaptive management, this C&R Plan will be regularly updated with information from the IMSA.

The IMSA is intended to monitor the Project Area for alignment with conservation and reclamation targets, including, but not limited to, soil stability, revegetation, and weeds. During an IMSA, factors that may be affecting the meeting of targets should be identified, if possible. IMSA results will be incorporated into future updates of this C&R Plan to inform changes to mitigation measures, BMPs or reclamation techniques (e.g., weed control, erosion control, soil salvage and handling, revegetation techniques, seed mixes). Updates based on IMSA data will be applied to future reclaimed areas.

Adaptive management will also allow Georgetown Solar to incorporate:

- the latest advancements in reclamation strategies and techniques;
- new technologies and machinery;
- results from applicable regional research programs;
- experience of other projects in the area;

- ongoing stakeholder feedback and consultation; and
- new reclamation criteria established for the region.

Any variances that occur between this C&R Plan and the activities/plans that are implemented during construction to address variances will be documented in updated versions of this C&R Plan.

Baseline Conditions

The Project Area is located primarily in the Foothills Fescue Natural Subregion, with a small portion in the Mixedgrass Natural Subregion of the Grassland Natural Region. Key features of the Foothill Fescue Subregion include nearly level cultivated plains with rolling to hummocky uplands (Natural Regions Committee 2006). Native grassland communities are abundant with little forested or shrubby areas. Trees and shrubs can be found in poorly drained depressions and along rivers. Key features of the Mixedgrass Subregion include intensively cultivated areas dominated by fertile soils and scattered prairies (Natural Regions Committee 2006). Shrub communities are predominantly found in depressions, ravines, coulees and northerly aspects. Trees and tall shrubs are generally absent, except adjacent to rivers. Land use in the Project Area is dominated by agricultural activity. Native grassland and tame grassland areas are used for grazing livestock. Shallow oil and gas exploration and development is common in the Mixedgrass Subregion and significant in the Foothills Fescue Subregion, with extensive wellsite, pipeline, and access infrastructure.

The Project Area is situated in cultivated cropland (80%) and native grassland (7%). Several small- to medium-sized wetlands also occur, composing 5% of the Project Area. The Project was sited to access the existing transmission infrastructure north of the Project Area, existing access roads, relatively level topography, and cultivated lands.

Wildlife and wildlife habitat and wetland field studies were completed by WEST during 2020 and 2021. These studies informed the Project design and layout and the Project schedule in consideration of mitigating adverse effects to environmental features. WEST conducted a wildlife assessment and prepared a post-construction monitoring plan, both of which were submitted to AEP for a referral report.

Soils

Methods

A desktop assessment was completed using the Agricultural Regions of Alberta Soil Inventory Database (AGRASID). The Alberta Soil Information Viewer was used to identify the soil series and subgroups present within the Project Area (Government of Alberta 2016b). Once the Pre-Disturbance Site Assessment (PDSA) has been completed, this section will be updated with field verified soil types and reclamation suitability information.

Results

According to AGRASID the majority of the Project Area is composed of Chernozemic soils with areas of Gleysolic soils (Government of Alberta 2016b). Soils are heavily disturbed by agriculture activities, cultivated throughout, or used as pasture. Twelve soil series were identified using AGRASID within the Project Area, comprising four subgroups: Orthic Dark Brown Chernozem, Orthic Black Chernozem, Rego Black Chernozem, and Orthic Humic Gleysol (Table 3). The parent material, drainage, calcareousness, and salinity characteristics are also identified in Table 3 for each soil series (Government of Alberta 2016b). General site photographs are provided in Appendix A.

Table 3. Soil series and AGRASID information

Soil Series	Soil Group	Parent Material	Drainage¹	Calcareousness	Salinity
Delacour	Orthic Black Chernozem	Morainal Till	Well	Moderately	Non to very weak
Highwood	Rego Black Chernozem	Glaciofluvial	Rapidly	Strongly	Non to very weak
Midnapore	Orthic Black Chernozem	Glaciofluvial	Well	Strongly	Non to very weak
Pulteney	Orthic Dark Brown Chernozem	Morainal Till	Well	Moderately	Non to very weak
Readymade	Orthic Dark Brown Chernozem	Morainal Till	Well	Moderately	Non to very weak
Rockyview	Orthic Black Chernozem	Glaciolacustrine	Well	Strongly	Non to very weak
Rosebud	Orthic Black Chernozem	Glaciofluvial	Well	Strongly	Non to very weak
Whitney	Orthic Dark Brown Chernozem	Glaciolacustrine	Well	Moderately	Non to very weak
Misc. Coarse	Orthic Black Chernozem	Undifferentiated Mineral	Well	None	None
Misc. Eroded	Orthic Black Chernozem	Undifferentiated Mineral	Well	None	None
Misc. Eroded	Orthic Dark Brown Chernozem	Undifferentiated Mineral	Well	None	None
Misc. Gleysol	Orthic Humic Gleysol	Undifferentiated Mineral	Poorly	None	None

Source: Agriculture Region of Alberta Soil Inventory Database (Government of Alberta 2016b)

¹ Drainage Class: Poorly – water removed so slowly versus supply that soil remains wet for a large part of the time it is not frozen; Imperfectly – water is removed slow enough versus supply to keep its wet for a significant part of the growing season; Well – water is removed readily versus supply, but not rapidly; Rapidly – water is removed rapidly in relation to supply. Excess water flows downward if underlying material is pervious. Soils have low available water storage capacity.

Vegetation and Wetlands

WEST conducted a wetland and vegetation assessment, consisting of both desktop review and a field survey.

Methods

Desktop

A desktop delineation was conducted to identify and delineate the wetland boundaries identified in historical and recent aerial photographs and satellite imagery, as outlined in the *Alberta Wetland Identification and Delineation Directive* (Government of Alberta 2015a). Google imagery from 1949, 1962, 1967, 1989, 1997, 2004, 2009, 2012, 2013, and 2015 was used, as well as current (2020) imagery from Google and Esri (2020).

Field

A field assessment was conducted between June 1 to 2, 2021 to confirm and clarify the presence of the wetlands identified in the desktop study. Per the *Alberta Wetland Identification and Delineation Directive* (Government of Alberta 2015a), the boundary of the wetland is identified by the primary indicators, which are vegetation and soil characteristics that can be reliably used to indicate the presence of a wetland. Since the land use within the Project Area was agricultural and the land had been cultivated, in many cases the vegetation indicators were unclear or not present. Soil indicators (e.g., mottling, gleying) were used to confirm the boundary and presence of wetlands in the absence of vegetation. Some wetlands were also classified as ephemeral/temporary waterbodies. This was due to the lack of vegetation indicators with strong soil indicators, providing evidence to not rule them out as a temporary wetland class. Wetland surveys for the *Water Act* application will be completed in 2022. Classification followed the *Alberta Wetland Classification System* (Government of Alberta 2015b). If present, wetland plants were identified to species. Weeds and invasive species were also recorded, if observed. Photographs were also taken to illustrate the site conditions of the wetland.

Results

The field surveys identified eighty-three wetlands within the Project Area: 16 seasonal graminoid marshes, 43 temporary graminoid marshes, 7 ephemeral/temporary graminoid marshes, and 17 ephemeral graminoid marshes. One small permanent watercourse, 1 intermittent watercourse, and 33 ephemeral draws were also identified in the Project Area.

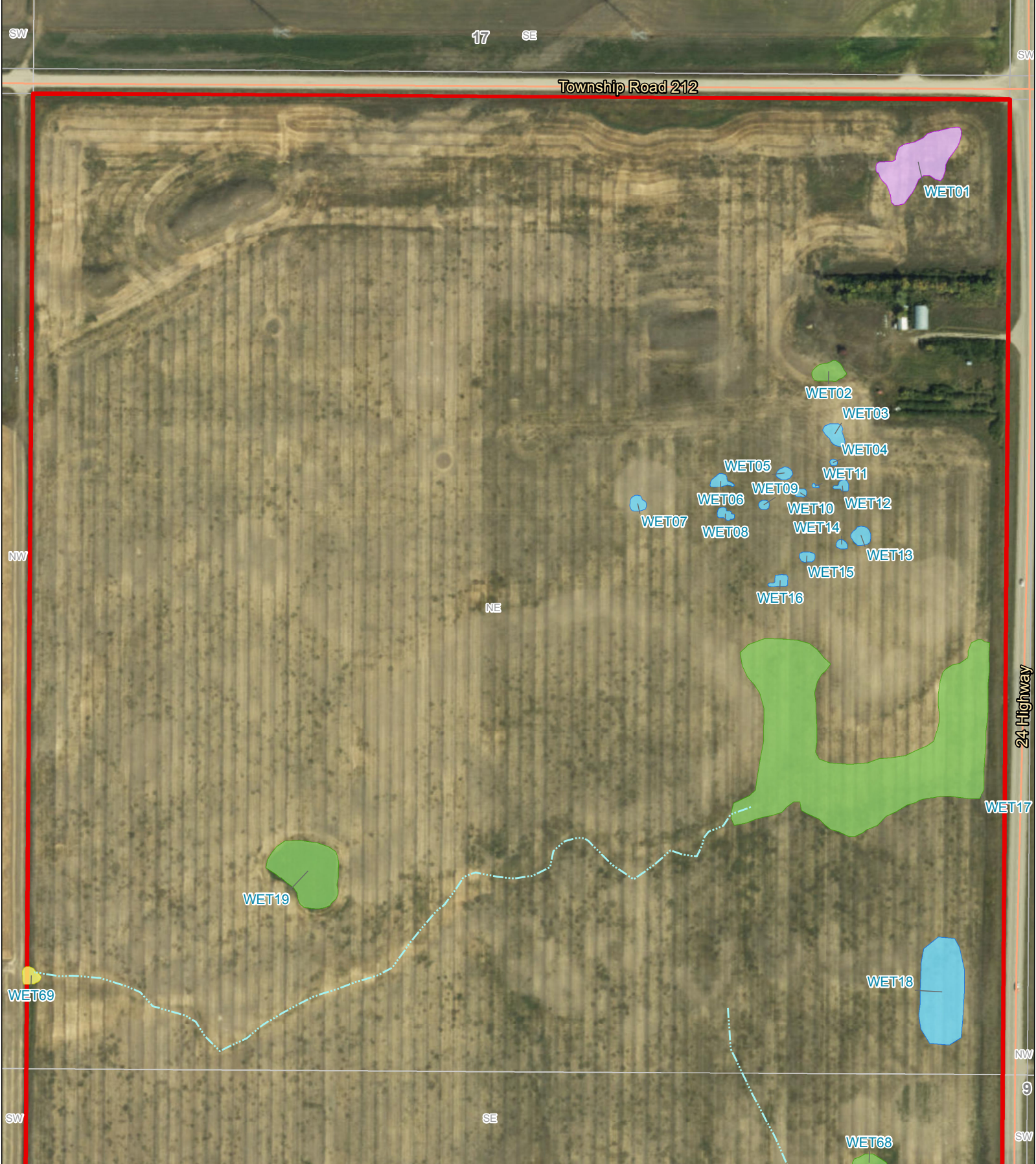
Georgetown Solar will adhere to the 100 m setback for all seasonal and higher-class wetlands, except wetland GEWET70. This is a small wetland (i.e., less than 0.3 ha) that has been entirely cultivated through and a fence line will be on the quarter line to the west at 93 m. A collector line will cross under the small permanent watercourse (GEWAC01), but will be installed via a directional drill to avoid impact to the watercourse and setback. The intermittent watercourse will maintain a setback of 45 m. Georgetown Solar will submit applications for *Water Act* (Government of Alberta 2021e) approvals for any affected wetlands, as required.

In addition, where Georgetown Solar proposes to reduce the setback on seasonal wetland GEWET70, they will commit to:

- Developing procedures to minimize the risk of water contamination or siltation from construction activities.

- Construction during frozen ground conditions. If construction under these conditions is not possible, rig matting will be placed to prevent compaction of hibernating amphibians.
- Construction in accordance with the *Water Act* (Government of Alberta 2021e), following existing disturbances, using appropriate construction methods and equipment.
- Delaying construction during sensitive periods for amphibians (e.g., ground conditions conducive to emergence, dispersal of young, high amphibian abundance);
- Erecting silt fencing around all wetlands with a setback encroachment, to avoid amphibians moving in to the construction area.
- Having a wildlife monitor be present during construction within setback to monitor for amphibian presence, and relocate amphibians as required.
- Consulting with a qualified wildlife biologist on any amphibian issues.

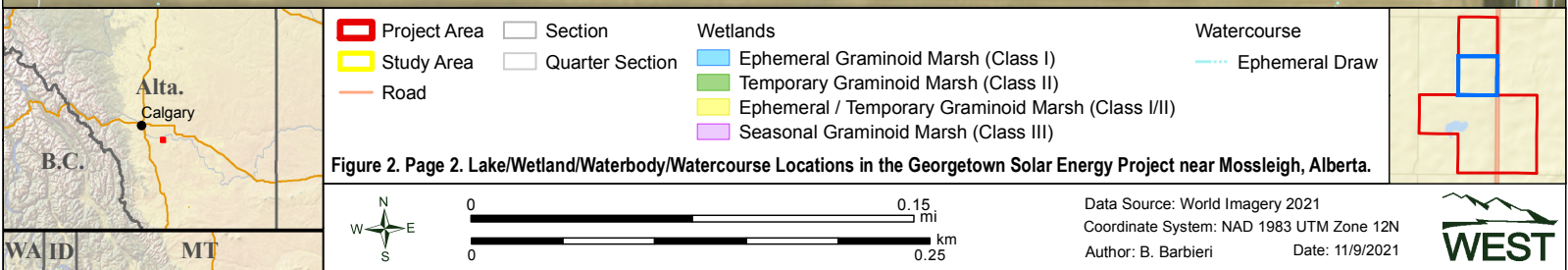
During the 2021 wetland and watercourse surveys, the land was all cultivated and currently seeded to annual crops. An area of approximately 14.5 hectares in the northernmost portion of NE-08-21-25W4M has been disturbed by significant civil earthworks prior to Georgetown obtaining its land lease. This may have impacted the local seasonal drainage patterns, which are predominantly west to east in this area. Incidental observations of weeds included one species of noxious weed: creeping thistle (*Cirsium arvense*). Flixweed (*Descurainia sophia*) and dandelion (*Taraxacum officinale*) were also observed throughout the Project Area. Observed weeds and invasive species occurred sporadically throughout the Project Area.



Project Area	Section	Wetlands	Watercourse
Study Area	Quarter Section	Ephemeral Graminoid Marsh (Class I)	Ephemeral Draw
Road		Temporary Graminoid Marsh (Class II)	
		Ephemeral / Temporary Graminoid Marsh (Class I/II)	
		Seasonal Graminoid Marsh (Class III)	

Figure 2. Page 1. Lake/Wetland/Waterbody/Watercourse Locations in the Georgetown Solar Energy Project near Mossleigh, Alberta.

Data Source: World Imagery 2021
Coordinate System: NAD 1983 UTM Zone 12N
Author: B. Barbieri
Date: 11/9/2021



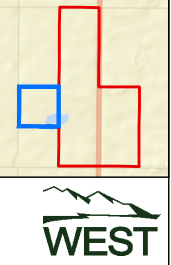


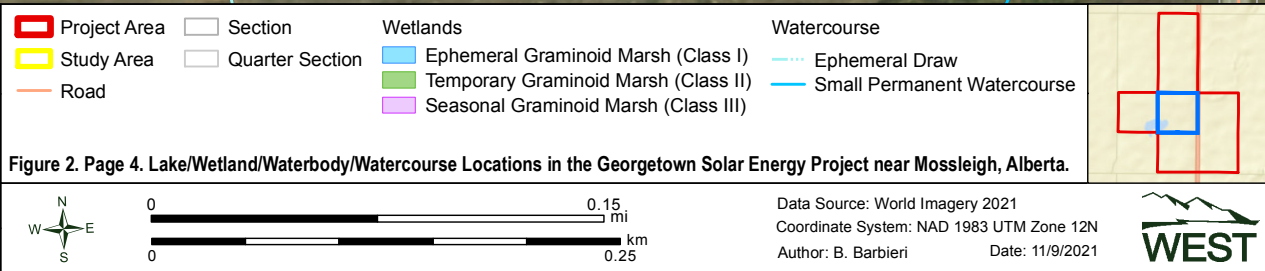
- | | | | |
|---|--|--|--|
| Project Area | Section | Wetlands | --- Watercourse |
| Study Area | Quarter Section | Temporary Graminoid Marsh (Class II) | --- Ephemeral Draw |
| Road | | Seasonal Graminoid Marsh (Class III) | --- Intermittent Watercourse |

Figure 2. Page 3. Lake/Wetland/Waterbody/Watercourse Locations in the Georgetown Solar Energy Project near Mossleigh, Alberta.



Data Source: World Imagery 2021
 Coordinate System: NAD 1983 UTM Zone 12N
 Author: B. Barbieri
 Date: 11/9/2021







 Project Area	 Section	Wetlands	Watercourse
 Study Area	 Quarter Section	 Ephemeral Graminoid Marsh (Class I)	--- Ephemeral Draw
 Road		 Temporary Graminoid Marsh (Class II)	— Small Permanent Watercourse
		 Ephemeral / Temporary Graminoid Marsh (Class I/II)	

Figure 2. Page 5. Lake/Wetland/Waterbody/Watercourse Locations in the Georgetown Solar Energy Project near Mossleigh, Alberta.

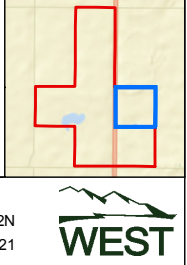
0 0.15 mi

0 0.25 km

Data Source: World Imagery 2021

Coordinate System: NAD 1983 UTM Zone 12N

Author: B. Barbieri Date: 11/9/2021





<div style="border: 2px solid red; width: 20px; height: 10px; display: inline-block; margin-right: 5px;"></div> Project Area <div style="border: 2px solid yellow; width: 20px; height: 10px; display: inline-block; margin-right: 5px;"></div> Study Area <div style="border-bottom: 2px solid orange; width: 20px; display: inline-block; margin-right: 5px;"></div> Road	<div style="border: 1px solid gray; width: 20px; height: 10px; display: inline-block; margin-right: 5px;"></div> Section <div style="border: 1px solid gray; width: 20px; height: 10px; display: inline-block; margin-right: 5px;"></div> Quarter Section	Wetlands <div style="display: inline-block; width: 15px; height: 10px; background-color: #90EE90; border: 1px solid black; margin-right: 5px;"></div> Temporary Graminoid Marsh (Class II) <div style="display: inline-block; width: 15px; height: 10px; background-color: #DDA0DD; border: 1px solid black; margin-right: 5px;"></div> Seasonal Graminoid Marsh (Class III)	Watercourse <div style="border-bottom: 2px dashed blue; width: 20px; display: inline-block; margin-right: 5px;"></div> Ephemeral Draw <div style="border-bottom: 2px solid blue; width: 20px; display: inline-block; margin-right: 5px;"></div> Small Permanent Watercourse
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Figure 2. Page 6. Lake/Wetland/Waterbody/Watercourse Locations in the Georgetown Solar Energy Project near Mossleigh, Alberta.

Data Source: World Imagery 2021
 Coordinate System: NAD 1983 UTM Zone 12N
 Author: B. Barbieri
 Date: 11/9/2021

0 0.15 mi
0 0.25 km

Approvals and Permits

This section is a placeholder to insert the approvals and permits, with associated conditions, as they are received.

A summary of all approvals and permits currently held for the Project, including conditions is provided below (Table 4). This table will be updated as new approvals and/or permits are acquired or renewed.

Table 4. Approval and permits.

Approval/Permit Type & Number	Conditions
<i>placeholder</i>	<i>placeholder</i>

Soil Conservation

The overall Project design will not strip topsoil for stockpiling and subsequent replacement. Soils will be protected during construction by residue of the previous crop. Except for the cut and fill areas for localized knolls and depressions (non-wetland), no overall site grading will occur. The facility stormwater strategy will utilize soil infiltration capacity to maintain snowmelt and rain events onsite, following a green infrastructure approach. Structural appurtenances, such as drainage pipes and catch basins, are not intended. Culverts will be placed under the access road, where necessary, to maintain existing drainage.

The final design of the post and racking installation has not been determined; however, it is anticipated that screw piles will be installed using a small mobile-tracked rig (e.g., Bobcat® or similar). The geotechnical site investigation will confirm the use of screw piles as the foundation and inform size requirements of the shaft and helix. Georgetown Solar anticipates using a suspended table racking system whereby the table racking is supported between two piles. The intent of this racking system is to minimize the amount of ground penetration by reducing the number of required piles and precludes the need for larger equipment to install (and remove) driven piles. Georgetown Solar expects that approximately 61,000 screw piles will be required, subject to change based on the detailed engineering design and geotechnical analysis.

Collector lines will be placed underground and plough-in will be the predominant installation method. To avoid small permanent watercourses a collector line will be installed via a directional drill to avoid impact to watercourses and setbacks. A setback will be maintained and no collector lines will be installed under any intermittent watercourses. Soils will not be salvaged from the alignment prior to ploughing. For short areas of collector line, tie-in areas at inverter stations and the collector substation, each extremity of underground bores, and other small areas that may require excavation, trenching installation will be required using a small (12-18 inch wide) bucket on a small rubber-tired backhoe. Soils will be salvaged from these areas prior to trenching/excavation.

The Project has been sited on mostly flat terrain; therefore, minimal site grading is expected. Localized grading may be required for the inverter, substation, laydowns, and yards. The areas expected to be graded will be confirmed through site inspections, topographical surveys, engineering design, and wildlife surveys. Results will be used as soon as available to update the specific impact areas.

No soil stripping is planned under panels nor at the screw pile locations, unless required to smooth out localized knolls and depressions, or to facilitate appropriate stormwater runoff.

As the Project is largely situated in cultivation, before construction starts (anticipated to start construction August 2022) the crop will be cut to a level that does not impede construction and crop residues (stubble) will be maintained to protect the soil.

In areas to be developed into impervious surfaces (e.g., inverters, substation), soils will be salvaged.

Vegetation and Weed Management

The weed management strategy will be to reduce weed seed germination and to create a targeted weed management schedule to target potential locations of spread for management during construction. Weed seed germination reduction will be tied into the topsoil erosion protection strategy of maintaining crop residue. The purpose of landowners preparing crop residue after harvest is two-fold. First, the residue limits topsoil erosion, and second, not cultivating the soil before Project construction will reduce the germination of weeds over the Project Area. This important site-preparation step helps facilitate the restoration of sustainable vegetation. “Sustainable vegetation” is that which will last for the life of the Project without the costs of re-seeding, fertilizers, Project-wide broadcast weed spraying, and irrigation.

RECLAMATION PLANNING

Objectives

The goal of reclamation is to allow for return of the land to pre-Project conditions, or an equivalent land capability. Reclamation for this Project would entail returning the lands to crop production, unless the land owner requests the vegetation established after construction remain intact following decommissioning.

Stakeholder Involvement

The Participant Involvement Program (PIP) was initiated in 2020 with host landowner consultation and acquisition of land leases and is ongoing. Georgetown Solar continues to collect feedback and engage the local community. The concerns brought forward during the PIP are summarized below (Table 5).

Table 5. Participant Involvement Program – concerns.

Concern	Response Provided
Weeds	Weed management will be part of a detailed Vegetation Management Plan and ascertained annually through the IMSA process and long-term monitoring.
Seeding	An approved seed mix has not yet been confirmed, but will be a mix of short grass native grassland seeds. Details will be included in the Vegetation Management Plan.
Final Reclamation	Lands will be returned to pre-construction land use or left as is following decommissioning. Either way a reclamation certificate will be acquired.

As described in the Project application to the AUC, lease agreements with the landowners require that sufficient funds will be set aside at Year 15 of Project operations, in favour of the Project lessors, to cover the cost of decommissioning and reclamation by a qualified third party at the end of the Project's life. The funds will be secured in the form of a security bond or other security or insurance, a segregated reclamation fund or such other alternative as is reasonably acceptable to the Project lessor(s). Alternatively, the lease agreements also provide that Georgetown Solar may comply with any mandatory reclamation regulations implemented by the government in effect at the applicable time. Should Georgetown Solar, for any reason, including but not limited to bankruptcy, be unable to reclaim the property as required, then the funds shall be made available to the Project lessor(s) to complete the reclamation.

Criteria

The Project will follow the reclamation criteria described in the *2010 Reclamation Criteria for Wellsites and Associated Facilities for Cultivated Lands* (Government of Alberta 2013).

End Land-Use

The Project site may be returned to agricultural land use, consistent with pre-Project conditions and surrounding land-use. While the site will be revegetated to native grassland plant species during operation, the land is easily converted back to annual cropland, and/or established wildflowers and grasses can be used for seed collection as a crop should the landowner wish.

Soil Replacement

Topsoil and subsoil salvage and replacement volumes will be provided after completion of the PDSA and the below table updated (Table 6).

Table 6. Soil salvage and replacement volumes.

Project Component	Soil Salvage Volume	Soil Replacement Volume

Temporary Revegetation

While crop residue is the primary strategy for topsoil erosion protection, some soil will be disturbed and require stabilization by other means. Temporary seeding along with hydro- or other means of mulching will be used. In areas that will not be impacted by ongoing construction activities (e.g.,

high traffic areas), terrestrial soil surfaces will be protected within 14 days of clearing by using cover crop seeding (i.e., annual grass seed species, such as wild oats or winter wheat), temporary erosion control blankets, or any combination of temporary erosion control installed as a system fit for the terrain and drainage patterns of the disturbed region.

If soil stockpiles are anticipated to remain in place longer than six months, a temporary cover of annual vegetation will be seeded to reduce erosion.

Vegetation and Weed Management Plan

A detailed Vegetation Management Plan (VMP) will be created and implemented for inclusion in the Engineering, Procurement, and Construction (EPC) tender release. The VMP will be concurrent with interim reclamation activities during the construction phase and immediately after construction to ensure that the seeding establishes, weeds do not proliferate, and perennial grassland vigor is maintained through to decommissioning. The following sections outline the general approach of the VMP.

The planned reclamation species are semi-arid grassland species suited to the soil (predominantly loam) and drainage characteristics (predominantly well-drained), with mature heights not expected to interfere with panel operation, and requiring minimal long-term management expense. Depending on the seasonal rainfall and grass productivity, height reduction at the edges of the panels may be required. When needed, the vegetation will be trimmed or mowed outside of the avian breeding season (approximately April 15 – August 31; Government of Canada 2018). In general, “panel zone mowing” will be used, meaning that only the area of potential panel interference will be disturbed. The timing of this mowing will typically be in mid-late July. If the avian breeding season cannot be avoided, nest surveys will be conducted in areas planned for panel zone mowing.

Following construction, Georgetown Solar will be responsible for establishing and maintaining perennial grassland vegetation in the entirety of the restoration footprint. This restoration vegetation will be expected to perform the following functions for the life of the Project:

- Provide nesting habitat to ground-nesting songbirds.
- Create pollinator-friendly habitat.
- Provide suitable grazing opportunities for sheep.
- Provide opportunities for native seed harvesting.
- Protect the structural integrity of the solar facility structural features through uniform soil stability lacking erosion rills and gullies.
- Withstand drought and the need for supplemental watering through deep root systems.
- Build soil health and maintain a competitive advantage against noxious weed establishment through maintenance practices, which maintain healthy above- and below-ground plant biomass.

While native grassland seed mixes are not required for disturbances to areas that were previously not native grassland, such mixes shall be used to provide the vegetation restoration functions listed above. Appropriate seed mixes of species requiring minimal maintenance and control will be used in consultation with the Project landowners. Recent drought years, particularly 2021, have resulted in the depletion of soil moisture in the region. If conditions do not improve, this could result in challenges to the establishment of vegetation on the site.

Low-growing, ecologically appropriate grass seed mixes will be sowed throughout the Project Footprint that can be mowed or grazed where panel interference may occur. In ecologically appropriate locations around the perimeter, seed mixes for both grasses and wildflowers beneficial to pollinators will be sowed. Periodically, all areas of the Project will need to be mowed or otherwise grazed to target woody stems that establish and reduce build-up of thatch that can inhibit regrowth of stems and seed. It is highly likely that native species adapted to the regional conditions and able to sustain themselves over time without fertilizer inputs, irrigation, and re-seeding will be used.

Species selection will be influenced by commercial availability of seeds and can be further tailored if drought conditions persist, such as establishment of a drought-tolerant annual cover crop like fall rye (*Secale cereale*). Potential plant species include (selected from *Mixedgrass – Upland Dark Brown Soils*, from Native Plant Working Group [2000] and from the *Mesic Grassland categories in the Mixedgrass Subregion and Foothills Subregion* from Sinton Gerling et al. [1996]):

Graminoids

- Needle-and-thread grass (*Hesperostipa comata*)
- Western porcupine grass (*Hesperostipa curtisetia*)
- Green needle grass (*Nassella viridula*)
- Richardson needle grass (*Achnatherum richardsonii*)
- Plains reed grass (*Calamagrostis montanensis*)
- Northern wheat grass (*Elymus lanceolatus*)
- Slender wheat grass (*Elymus trachycaulus*)
- Sweet grass (*Anthoxanthum hirtum*)
- June grass (*Koeleria macrantha*)
- Blue grama (*Bouteloua gracilis*)
- Western wheat grass (*Pascopyrum smithii*)
- Sandberg bluegrass (*Poa secunda*)
- Early bluegrass (*Poa cusickii*)
- Blunt sedge (*Carex obtusata*)
- low sedge (*Carex duriuscula*)

- Sprengel's sedge (*Carex sprengelii*)
- Parry oat grass (*Danthonia parryi*)
- bluebunch fescue (*Festuca idahoensis*)
- Hooker's oat grass (*Avenula hookeri*)
- Pumpelly brome (*Bromus pumpellianus*)

Wildflowers and Forbs

- Common annual sunflower (*Helianthus annuus*)
- Scarlet mallow (*Sphaeralcea coccinea*)
- Bee plant (*Peritoma serrulata*)
- Prairie selaginella (*Selaginella densa*)
- Pasture sagewort (*Artemisia frigida*)
- Moss phlox (*Phlox hoodii*)
- Tufted white prairie aster (*Symphyotrichum ericoides*)
- Creeping prairie aster (*Symphyotrichum falcatum*)
- Golden aster (*Heterotheca villosa*)
- Low goldenrod (*Solidago missouriensis*)
- Slender milkvetch (*Astragalus flexuosus*)
- Small-leaved everlasting (*Antennaria parvifolia*)
- Rosy everlasting (*Antennaria rosea*)
- Showy milkweed (*Asclepias speciosa*)
- three-flowered avens (*Geum triflorum*)
- Yellow beardtongue (*Penstemon confertus*)
- Slender blue beardtongue (*Penstemon procerus*)
- Wild strawberry (*Fragaria virginiana*)
- Graceful cinquefoil (*Potentilla gracilis*)
- Common yarrow (*Achillea millefolium*)
- Sticky purple geranium (*Geranium viscosissimum*)
- alpine hedysarum (*Hedysarum alpinum*)
- Harebell (*Campanula rotundifolia*)
- Smooth fleabane (*Erigeron glabellus*)
- Showy fleabane (*Erigeron speciosus*)
- Northern bedstraw (*Galium boreale*)

- Smooth aster (*Symphyotrichum laeve*)
- wild bergamot (*Monarda fistulosa*)
- Low larkspur (*Delphinium bicolor*)
- Common blue-eyed grass (*Sisyrinchium montanum*)
- mountain cinquefoil (*Potentilla diversifolia*)
- Cut-leaved anemone (*Anemone multifida*)
- Prairie crocus (*Anemone patens*)
- long-fruited anemone (*Anemone cylindrica*)
- Silky perennial lupine (*Lupinus sericeus*)
- Silvery perennial lupine (*Lupinus argenteus*)
- gaillardia (*Gaillardia aristata*)
- low goldenrod (*Solidago missouriensis*)
- Wild blue flax (*Linum lewisii*)
- wild vetch (*Vicia americana*)
- Broomweed (*Gutierrezia sarothrae*)
- Golden bean (*Thermopsis rhombifolia*)
- Spiny ironplant (*Xanthisma spinulosum*)
- Scarlet butterflyweed (*Oenothera suffrutescens*)
- Narrow-leaved milk vetch (*Astragalus pectinatus*)
- Purple prairie-clover (*Dalea purpurea*)
- White prairie clover (*Dalea candida*)
- Shining arnica (*Arnica fulgens*)
- Twin arnica (*Arnica soroia*)
- Dotted blazingstar (*Liatris punctata*)
- Yellow evening-primrose (*Oenothera biennis*)
- Wild licorice (*Glycyrrhiza lepidota*)
- Prairie coneflower (*Ratibida columnifera*)

The Project lands will be seeded with a drill seeder.

The weed management strategy previously described will be implemented prior to and during construction.

To limit the introduction of weed seed to the site, construction equipment and employee vehicles should arrive to the construction site clean and free of soil or plant debris. An Environmental

Monitor should inspect equipment as it arrives at the site. Any equipment failing inspection will need to be cleaned and re-inspected before being allowed onto the site.

A representative of, or on behalf of, Georgetown Solar, with specialized knowledge of specific plant species of the region, will assess for weeds according to the targeted weed management schedule and trigger deployment of a qualified contractor to manage weeds in selected locations.

The targeted weed management schedule will be updated toward the end of construction to reflect newly identified species and/or locations for targeting during the first three years of seed establishment. Weed management will be timed to avoid the avian breeding seasons, and nest surveys will be conducted in advance of management activities if avoidance of this period is not possible. The method of weed management and control will vary depending on the species, level of infestation (numbers and area), stage of growth and location. Methods may include mowing, hand-pulling, chemical control (e.g., herbicides), or biological control (e.g., sheep [*Ovis aries*]). Biological control programs exist for some species of prohibited noxious and noxious weeds. Should these species be found to occur within the Project or in the region, the Project Area may serve as a point of deployment.

During operation, a representative of, or on behalf of, Georgetown Solar, with specialized knowledge of plant species of the region, will oversee long-term vegetation management decision-making. Actions taken will include annual training of operations staff for supporting observations, triggering deployment of qualified contractors, including contract grazers, and periodic health assessments of the overall vegetation.

Post-Construction Monitoring/Interim Monitoring Site Assessments

As per the *Conservation and Reclamation Directive for Renewable Energy Operations* (Government of Alberta 2018), a qualified environmental professional will complete interim monitoring site assessments following construction, during operation at key milestones (e.g., retrofitting), and when any temporary reclamation activities occur. Vegetation monitoring will be conducted for a minimum of three growing season after construction.

Progressive Reclamation

Temporary work spaces will be reclaimed as the areas become unnecessary for construction. Soils will be replaced and the sites revegetated. Any erosion, compaction, rutting, admixing, or contamination will be addressed prior to soil replacement and revegetation. Revegetation will utilize the same native seed mix and seeding methods described in the *Vegetation and Weed Management Plan*, above, unless IMSA and adaptive management have led to changes in the species composition and methods.

IMSA monitoring will occur after areas are reclaimed, to ensure targets are met, erosion is not occurring, seeds are establishing, and weeds are managed/controlled. All IMSA results will be incorporated into the C&R and updates will be implemented during reclamation of the next area.

Decommissioning and Remediation

After finalization of the Project design, a detailed decommissioning plan will be completed. The removal of all structural features will be performed with the least amount of impact to the vegetation established post-construction. After removal of the infrastructure, the site will be assessed through Phase 1 and 2 Environmental Site Assessments (ESAs), as standardized under the *Contaminated Sites Policy Framework* (Government of Alberta 2014).

Should contamination be identified during Phase 1 and 2 ESAs, Georgetown Solar will remediate the affected areas utilizing the end points for site remediation established by the Alberta Tier 1 and Tier 2 guidelines (Government of Alberta 2019a, 2019b) and the *Alberta Exposure Control Guide* (Government of Alberta 2016c).

Final Reclamation

After the Project is decommissioned and any contamination remediated, the Project Area will undergo final reclamation. All updates to the REO C&R will be applied during final reclamation. Areas disturbed during decommissioning and remediation will undergo soil de-compaction, if required.

Monitoring

After final reclamation has been completed and vegetation has had a chance to establish, a Reclamation Certificate Site Assessment will be completed to ensure the site meets the *2010 Reclamation Criteria for Wellsites and Associated Facilities for Cultivated Lands* (Government of Alberta 2013).

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Appendix A



Photo 1. Seasonal graminoid marsh in a cultivated crop field (GEWET70). Photo facing South.



Photo 2. Seasonal graminoid marsh in a tame pasture (GEWET80). Photo facing West.



Photo 3. Temporary graminoid marsh in a cultivated crop field (GEWET60). Photo facing East.



Photo 4. Temporary graminoid marsh in a tame pasture (GEWET78). Photo facing East.



Photo 5. Temporary/ephemeral graminoid marsh in a cultivated crop field (GEWET62). Photo facing East.



Photo 6. Temporary/ephemeral graminoid marsh in a tame pasture (GEWET74). Photo facing East.



**Photo 7. Ephemeral graminoid marsh in a cultivated crop field (GEWET34).
Photo facing West.**



**Photo 8. Ephemeral graminoid marsh in a cultivated crop field (GEWET18).
Photo facing North.**



Photo 9. Small permanent watercourse in a cultivated crop field (GEWAC01, transect 1). Photo facing East.



Photo 10. Small permanent watercourse with a large culvert under the main highway (GEWAC01, transect 4). Photo facing East.



Photo 11. Small permanent watercourse through a cultivated crop field (GEWAC01, transect 5). Photo facing East.

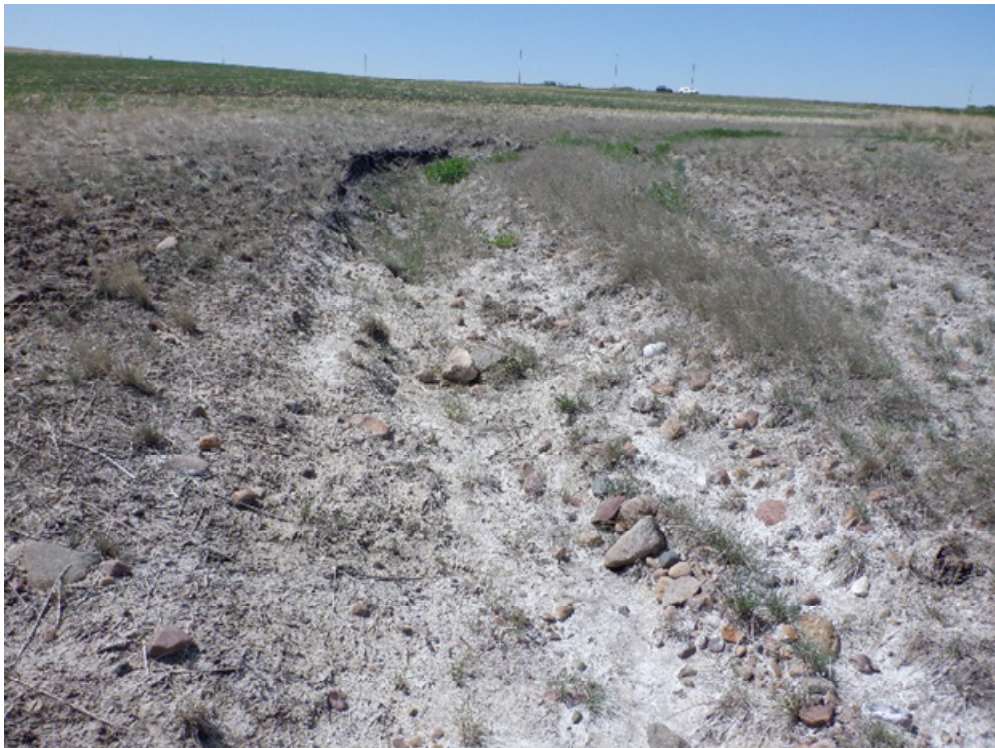


Photo 12. Intermittent watercourse in a cultivated crop field (GEWAC02, transect 2). Photo facing West.



Photo 13. Intermittent watercourse culvert under a gravel road (GEWAC02, transect 1). Photo facing West.



Photo 14. Intermittent watercourse overview in a cultivated crop field (GEWAC02, transect 2).