

# Dundonald Avenue Solar Farm

## Landscaping Considerations

### **Background**

The proposed solar site has a grass mix assumed to be a Saskatoon dryland mix. The grass is currently mowed once a month which is expected to be maintained after implementation of the project, resulting in significant Operating and Maintenance (O&M) costs over the 30-year life of the solar project. Various landscaping considerations for new, short native grass and flower species that can be added to the site are explored to reduce O&M costs and achieve additional co-benefits.

### **Research Findings**

Market research has identified four landscaping options that are commonly utilized with solar farms as follows:

#### **Option A: Retain Existing Landscaping**

The existing site landscaping can be retained which would require continuation of routine mowing of grass, involving multiple days and workers, while creating risks that are not necessary. Some of the inherent risks imposed by retaining the existing landscaping include:

- High O&M costs;
- Environmentally damaging greenhouse gas from mowing equipment;
- Damage from landscaping equipment running into the solar panels and electrical equipment;
- Projectile damage from the mower's blades, such as a rocks, nuts or bolts, could cause damage to the solar panels and nearby workers;
- Dust and sand could also be picked up by the mowers which could settle on the solar panels, making them less efficient and creates the need for the solar panels to be cleaned more frequently; and
- Shading from overgrown weeds and volunteer trees can result in reduced efficiency or throughput from the solar panels.

Though this method is widely adopted across, many developers are looking for alternative methods to lower O&M costs and to minimize financial risk on each solar farm project.



Solar Farm with Naturalized Landscape being mowed

### Option B: Overseed with Native Short Grass

Another alternative option is to overseed the existing landscape with a native “low growing” grass mix which would reduce the interference frequency of grass mowing site. Native low growing grass mixes are generally more expensive than the regular grass mix.

This option has proven to be effective in some areas but will still require weed management. As the grass grows, weeds become an inevitable part of the landscape. Tall weeds can interfere with the operation and maintenance of the solar system and will require some maintenance. Effective weed management using herbicides and chemicals are necessary to control weed growth.

This is a viable option for lowering O&M costs while maintaining a naturalized landscape.

### Option C: Overseed with Native Wildflowers

This option presents a more esthetically pleasing alternative, and provides a source of food for pollinators of regional food crops, which has been shown to be on the decline worldwide.



Native Wildflowers Visualized on the Proposed Site

The Stantec Feasibility Study report recommended this option.

The pollinator landscape is described as the use of flowering plants that attracts animals and insects that pollinate these types of plants. This type of landscape would include native and hardy plant species, typically flowers, that thrive in an urban grassland landscape. They are low maintenance, diverse, and attract different insects and small animals. The addition of pollinator plantings will provide color and texture to a predominantly grassed area. The establishment for a pollinator landscape is like the process for native grass (Option B). A seed mix will be determined to include species known to thrive in the Saskatoon area with similar site conditions: soil type, exposure, topography, moisture, existing vegetation, etc. Some seeds can be overseeded directly into the existing grass, but other seeds will prefer exposed soil for the best germination and establishment. Vegetation under the solar panels can contribute to lower soil temperatures and increase solar performance. The establishment of pollinators can be a long process but has biodiversity value. The flowering plants will spread and thrive wherever the conditions are beneficial. The overall site landscaping should focus on low maintenance activities throughout the establishment and operations stages.

### Advantages

Adding a native landscape to a solar site creates even greater community benefits:

- *Established Pollinator Habitat:* One-third of our food production requires pollinators, as does livestock forage and most wild plants that produce seeds. However, bees, birds, monarch butterflies, and critical pollinators are disappearing by the hundreds of millions significantly due to habitat loss. Other studies have shown that bees, birds, and butterflies thrive on solar sites planted with a mixture of native grasses and wildflowers. Appropriate species can be used to enhance, mitigate and augment landscaping to minimize the visual impact on the project site.

- *Improved Water Management and Soil Conditions:* A five year storm water study conducted by the U.S. Geological Survey revealed striking differences between turf and prairie vegetation. The study found prairie vegetation had greater median infiltration rates than those with turf grass, and roots in the prairie vegetation plot were found to be deeper than those of the turf. This shows the potential of prairie vegetation in holding soil in place.
- *Reduced Fire Risk:* Though there is not yet enough research available on this subject, some research in the US has shown that non-native invasive grasses can promote fire, creating new fire regimes that are unsuitable for native species, and lead to lower diversity and localized extinctions. The altered fire regimes also create favorable conditions for the invasive grasses, which recover and spread quickly postfire, resulting in a “grass-fire cycle.” From this research, it is expected that a higher percentage of native forbs will help reduce the risk of grass fires in some climates.

### Disadvantages

Maintenance requirements will vary as the seeded landscape becomes established. Early in the seed establishment process, spot weed killing will be required regularly to help the new pollinators establish. As the seed establishes, these routines can be minimized and ultimately, the land area would require lesser maintenance.

### Options from Other Solar Farm Projects in Canada

In Edmonton, EPCOR is currently constructing a 12 MW Solar Farm just south of their existing E.L. Smith Water Treatment Plant, where completion is scheduled for next spring. The 51-acre land, characterized by non-native plants and noxious weeds, will be replaced with a diverse species mix to grow underneath the solar panels to significantly increase biodiversity. EPCOR has chosen the naturalized option of over-seeding with native short grasses and planting of native wildflowers to enrich habitat for small and medium animals and for pollinators.

### Conclusion

Naturalized landscaping, as seen in Options B and C, is suitable to establish with lower associated risks. Increasing plant richness, through the addition of forbs to the native grasses, enhances the functional diversity and stacks benefits provided by these systems. A naturalized landscape on solar sites will hold both the soil in place and significantly improve its quality over the life of the project. If the project is decommissioned, the land would be left better than it was originally.