



**Vegetation Installation & Management Plan
for
Northern Cardinal Solar SCS IL1, LLC
Champaign, Illinois**

Revised January 2021



Table of Contents – Northern Cardinal Solar SCS IL1, LLC

Site location; Site Owner; Vegetation professionals	page 3
Site and vegetation overview	page 4 - 5
Project installation, seed mixes and fees	pages 6 - 8
Vegetation maintenance procedures	page 9
Installation and management timelines	page 10
Annual Maintenance fees	page 11

Northern Cardinal Solar

Site Name & Location:

Northern Cardinal Solar SCS IL1, LLC. 3401 S First Street, Champaign, IL

Owner: Sol Systems, LLC

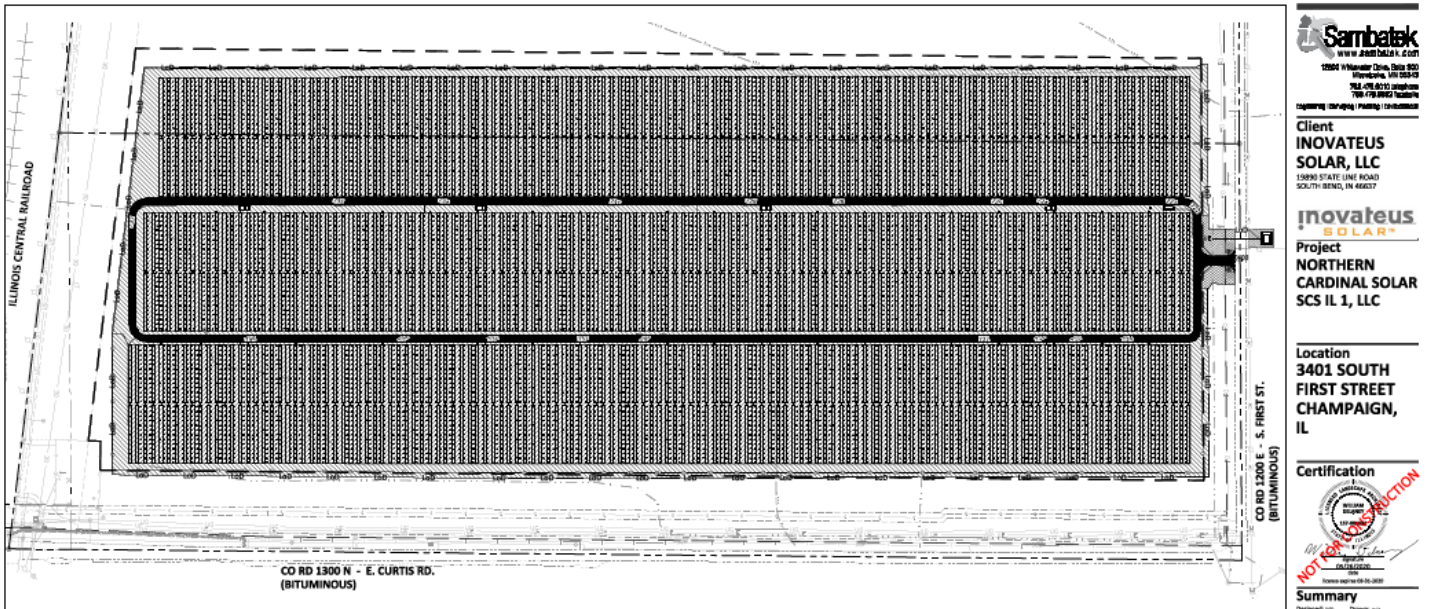
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Northern Cardinal Solar Farm Proposed Array Plan

Overview and Vegetation Installation for Northern Cardinal Solar SCS IL1, LLC Array

Economical production of clean energy is the foremost goal of any solar site. There is a parallel opportunity to provide critically important native habitat: grasses, sedges and forbs (flowering plants), while capitalizing on the long-term, low maintenance aspect of native vegetation.

The Northern Cardinal Solar Farm is in Champaign County, IL adjacent to the University. The site's acreage has most recently been used for typical non-organic row crop farming. The use of bifacial tracking panels with a base edge of approximately 36" from the ground will allow for excellent diversity of native grasses and wildflowers while avoiding shading of the panels.

Site Conditions:

The site consists of 50 acres. It is sloped from west to east and while drain tiles are noted in several areas, there are no indications of wetlands on this site. The soil types found here are medium stiff silty clay to silty clay loam and somewhat poorly draining. The reintroduction of native grasses, sedges and wildflowers will improve soil health, promote soil stabilization and aid in rainwater and snowmelt infiltration to the aquifer, while providing critically needed habitat for area wildlife and native insects. The species specified in our recommended seed mix are tolerant of the heavier, somewhat poorly drained soils found throughout the site.

Native prairie species provide low maintenance vegetation that will not require fertilizer, amended soils or irrigation on this site. Native grasses, sedges and forbs have been selected based on their ecological appropriateness to the conditions of this site, are native to Champaign County, and chosen with consideration to their mature height for a healthy, diverse plant community that simultaneously avoids interference with panel productivity.

Site Seed Mixes:

The original plan from May 2020 called for two grass/sedge mixes and two forb mixes. The plans have been changed, late July 2020, to include native pollinator friendly habitat throughout the 50 acre array with an IDOT mix used along the access roadsides, 1.16 acres.

When the native mixes are properly designed for site soil conditions and panel base heights, site owners see declining maintenance fees, one of the key benefits to choosing native habitat over turf grasses.

It is important to note that the species selected for this site are based on their ability to successfully establish from seed as well as their ability to thrive within the unique conditions found on solar sites. From a practical standpoint, the species contained in these mixes are generally available in the marketplace and, as whole, have reasonable price points. Ultimately, the list is a combination of well-performing, workhorse species coupled with smaller amounts of more unique species for a robust mixture.

With any properly designed mix, there is a healthy balance between the grass/sedge component and the forb component. Grasses and sedges provide long-term stability and structure to the landscape and help fill voids that would otherwise be ripe for weed invasion. Not insignificantly, grasses/sedges also provide excellent habitat for birds and nesting insects.

The forb component contains a diverse blend of species that provide blooms throughout the growing season. This aspect is especially important for the bees and other insects that rely on these blooms at critical stages during their life cycles. The blooming flowers also provide aesthetic benefit throughout the growing season.

The May 2020 plans do not call for live screening (trees and shrubs) for the Northern Cardinal Solar array.



Site Preparation

1. A cover crop can be seeded prior to the start of construction to provide soil stabilization, comply with any SWPPP regulations, and to help prevent muddy conditions during construction. Spring wheat or oats are used, seasonally determined. Grading of the project area will be completed prior to seeding or soil preparation activities (grading to be completed by owner or general contractor).
2. Construction debris, garbage and building materials will be removed and/or staged outside the intended seeding areas (to be completed by owner or general contractor).
3. Rev 01-28-21: This site will now be snow/frost seeded in response to construction timing. Snow seedings are very successful provided the site has an open seed bed, such as the grading recently completed at this site and absence of vegetation on most of the site. An estimated third of this site contains fescues that will need to be sprayed out. This fescue area will be treated in the spring using an herbicide application of glyphosate (Round-up® or equivalent).
4. If broadleaf vegetation is present among the fescues, a triclopyr herbicide will be added (Garlon 3A® or equivalent) as per manufacturer's directions. When a broadleaf herbicide is used it is important to allow a minimum of 30 days before disturbing the site or completing seeding.
- ~~5. Depending on construction schedule and vegetation growth, a mowing or second herbicide application may be necessary (not included in pricing).—Rev 01-28-21~~
6. After the fescues have died back the area will be disked prior to seeding.

Seed and Seeding

1. All native seed will be applied using a mechanical broadcast spreader in a series of separate seeding passes. This is necessary because of the different sizes and weights of grass, sedge and most wildflower seed.
2. A cover crop of wheat will be seeded with the native species as the final step. This cover crop or “nurse crop” aids in rapid green-up and soil stabilization.
3. A final round of harrowing will be completed on the spring-seeded 18 acres to assure good seed-to-soil contact.

Northern Cardinal Solar Site Mixes

Grass Mix

Common Name	Scientific Name	Genetic Origin	% of Mix
Grasses			
Sideoats Grama	Bouteloua curtipendula	Waukesha Co, WI	38.85%
Prairie Brome	Bromus kalmii	Polk Co, MN	0.77%
Plains Oval Sedge	Carex brevior	IA	2.69%
Bicknell's Sedge	Carex bicknellii	Z2 Central IA	1.54%
Brown Fox Sedge	Carex vulpinoidea	Green Lake Co, WI	0.77%
Little Bluestem	Schizachyrium scoparium	Rock Co, WI	31.92%
Prairie Dropseed	Sporobolus heterolepis	Jefferson Co, WI	0.38%

Forb Mix

Forbs

Western Yarrow	Achillea millefolium	Faribault Co, MN	0.35%
Nodding Onion	Allium cernuum	Allamakee Co, IA	0.23%
Lead Plant	Amorpha canescens	Kittson Co, MN	1.33%
Canada Anemone	Anemone canadensis	Vernon Co, WI	0.04%
Columbine	Aquilegia canadensis	Allamakee Co, IA	0.04%
Common Milkweed	Asclepias syriaca	Allamakee Co, IA	0.17%
Butterfly Milkweed	Asclepias tuberosa	Southern MI	0.46%
Sky Blue Aster	Aster azureus	Ringgold Co, IA	0.15%
Canada Milk Vetch	Astragalus canadensis	Allamakee Co, IA	1.04%
Calico Aster	Aster lateriflorus	Benton Co, MN	0.04%
Partridge Pea	Chamaecrista fasciculata	Allamakee Co, IA	3.07%
White Prairie Clover	Dalea candidum	Kossuth Co, IA	4.15%
Purple Prairie Clover	Dalea purpurea	Kittson Co, MN	5.79%
Cream Gentian	Gentiana flavida	Houston Co, MN	0.04%
Mountain Mint	Pycnanthemum virginianum	Allamakee Co, IA	0.09%
Prairie Wild Rose	Rosa arkansana	Houston Co, MN	0.28%
Black-eyed Susan	Rudbeckia hirta	Madison Co, IA	1.85%
Gray Goldenrod	Solidago nemoralis	Rock Co, WI	0.04%
Ohio Spiderwort	Tradescantia ohiensis	Allamakee Co, IA	0.23%
Hoary Vervain	Verbena stricta	Allamakee Co, IA	1.38%
Golden Alexanders	Zizia aurea	Livingston Co, IL	2.31%

13 lbs/acre (71.6 seeds per sq ft)

Northern Cardinal Native Vegetation Installation Fees

Revised Jan 28, 2021 due to construction timing.

Site assessment and Project Management:	\$ 4,500.00
Contractor Mobilization for project:	\$ 2,675.00
Seed Mix Design & Seed for 50 acres @ \$490/acre	\$ 24,500.00
Partial Site Herbicide Application: 18 acres @ \$190/acre	\$ 3,420.00
Partial Seed Bed Prep: 18 acres @ \$195/acre	\$ 3,510.00
Seeding 50 acres @ \$680/acre	<u>\$ 34,000.00</u>
Total for This Site	\$ 72,605.00

- Site assessment includes review of soil, existing vegetation, hydrology, etc.
- Includes cover crop seeded at time of native habitat seeding
- Assumes grading and rock picking by others
- Does not include construction garbage clean-up
- Seeding to be completed prior to drive shaft installation (if applicable).
- Assumes project is not subject to prevailing wages
- Does not include money for bonding



Overview of Vegetation Maintenance for Northern Cardinal Solar

Maintenance of a site plays a vital role in the eventual success of any native landscape installation, especially during the establishment period. The solar array is inspected annually in late April/early May, followed by maintenance necessary to encourage healthy native species while discouraging non-native/invasive species.

During the growing season of the first year, 2021, we recommend the site be inspected a minimum of two times.

1. During the germination year, it is important the entire project area is mowed to control annual weed development and to aid in the growth of the prairie seedlings by reducing shade competition and prevent weeds from setting seed. Optimum cutting height is typically 4 to 6 inches this first year. The mowing should be done using a flail mower or similar, finely mulching the clippings to prevent smothering of young plants.
2. In years following the first growing season, Integrated Vegetation Management (IVM) services are utilized to control annual, biennial and perennial weed species within the developing native landscape. Typical IVM services include spot herbicide spraying, spot mowing, and herbicide wicking. The equipment commonly used on solar sites this size are small tractors and ATVs mounted with the proper equipment.
3. We advise the following Solar Site Maintenance schedule for the first three full growing seasons as outlined on the following page.
4. Natural Resource Services, Inc. vegetation guarantee: If we have designed and installed the native seed mix and maintained the site for the following three growing seasons, we guarantee the site will have 70% native vegetative cover with 70% of initially seeded native species present.

Installation & Management Timelines: Northern Cardinal Solar

Year	Project Management Procedures
2020	Site to be seeded with temporary cover crop such as winter wheat at a rate of 25/lbs per acre prior to fall construction, if needed, to stabilize site soil. Temporary seeding done by others.
2021	Based on array construction timing, final seeding with approved native seed mixes plus a cover crop in winter of 2021 with 1/3 of site seeded in spring 2021. Seeding will follow installation of panels, final grading, and wiring but prior to driveshaft installation when possible. Following spring seeding in 2021, one site inspection mid-summer to determine acceptable germination rate, inspect for erosion; repair/reseed as needed. Two and possibly three mowing trips may be necessary determined by vegetation growth, local Champaign weather and virulence of invasive species. (2-3 site visits in 2021.) Project monitoring for erosion; repair/reseed as needed. AHJ reporting, as needed
2022	Annual spring site inspection to inspect vibrancy of vegetation. Summer site review to include complete site mowing, timing based on local site conditions. Additional visits as needed to include <i>Integrated Vegetation Management (IVM)</i> . Techniques utilized: Spot spraying, spot mowing, wicking, hand weeding and other methods used to control invasive species and weeds. (3-4 complete site visits) AHJ reporting as needed.
2023	Spring site inspection. IVM as defined in 2022, above. (3-4 complete site visits) AHJ reporting.
2024	Spring/early summer site inspection. IVM as defined in 2022. Project monitoring. (2-3 complete site visits)
2025	1 Spring Dormant Mowing to mulch biomass. IVM as defined in 2022, above. (1 to 2 complete site visits)

Years 6 - 25: Vegetation management during years 6-25 include annual spring site inspection followed by any necessary spot spraying or spot mowing, as needed. Complete site mowing using flail mower may be implemented every three years to replicate the effects of prescribed burning, more frequently if needed but not to exceed once per year, based on local site needs.

Equipment used for site vegetation management includes zero turn mowers, tractor mounted flail mowers, brush cutters/weed whips and UTVs mounted with customized spray equipment.

Vegetation Maintenance Fees for Northern Cardinal Solar Site

2021

Project Management	\$ (Included in installation)
Early summer site inspection	\$ 800.00
Mowing, \$5,900 per trip, 3 trips	<u>\$ 17,700.00</u>
Total	\$ 18,500.00

2022

Project management, annually	\$ 1,900.00
Site inspection, annually	\$ 800.00
Mobilization to site	\$ 1,435.00
Mowing, \$6,077 per trip, 4 trips	\$24,308.00
Spot spray if needed, single trip	<u>\$ 11,200.00*</u>
Total	\$ 28,443.00 to \$39,643.00

*Spot spray only if needed

2023

Project management, annually	\$ 1,900.00
Site Inspection	\$ 825.00
Mobilization to site	\$ 1,435.00
2 Mowing trips, \$6,259 per trip	\$ 12,518.00
2 Spot spray trips, 11,750 per trip	<u>\$ 23,500.00</u>
Total	\$ 40,178.00

2024

Project management	\$ 1,900.00
Site inspection	\$ 850.00
Mobilization to site	\$ 1,500.00
1 mowing*	\$ 6,446.00
1 spot spray*	<u>\$ 12,102.00</u>
Total	\$ 22,798.00

* Mowing and/or spot spraying only as determined necessary at spring site inspection.

Scope of Work to be Performed:

- 2021, three mowing trips, possibly a fourth weather dependent
- Years two through three will require a combination of 1 to 2 mowings plus 1-2 spot spray trips
- Maintenance mowings include inspection and vibrancy and health of native habitat, site appearance and reporting of any observed damaged equipment or panels
- Maintenance mowings do not include trimming around exterior fence.
- Trimming includes around inverter and cable boxes but not fine trimming.
- Quote does not include reseeding due to action of others; does not include garbage cleanup.
- Pre- and Post- site visit photos and written report emailed to your assigns.