



Photo courtesy of Shannon Kulseth

VEGETATIVE SCREENING MANAGEMENT PLAN Rochelle II SOLAR PROJECT

Prepared for
City of Rochelle
420 North 6th St.
Rochelle, IL 61068

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1 Project Description

1.1 Permit and Project Timeline

The Rochelle II Solar Project (Project) is located northeast of the City of Rochelle (City) within Ogle County, Illinois. Rochelle Solar, LLC is currently petitioning the City to annex the site into the City and is requesting a rezoning of the site and approval of a Special Use Permit to allow the construction and operation of the proposed Project. The Project will include the installation of photovoltaic (PV) modules, inverters, an underground electrical collection system and associated facilities that will provide up to 20 megawatts (MW) of renewable energy to the local electric grid. The Project will also include construction of security and privacy fencing, vegetative visual screening buffers, temporary parking and construction laydown areas, and internal access roads.

As requested by the City, this Vegetative Screening Management Plan should set forth measures to maintain the vegetative visual screening buffers, which includes minimizing the disturbance and removal of vegetation, preventing the introduction of noxious weeds and invasive species, and replanting disturbed areas, consistent with safe and reliable Project operation.

1.2 Conceptual Elements of a Commercial Solar Facility

Vegetation cover within a commercial solar facility is managed for surface stability, compliance with state and local noxious weed regulations, and operational requirements. The following sections describe typical site management areas, delineated to support vegetation cover.

1.2.1 Operations Area

The Operations Area comprises the solar facility infrastructure, primarily the linear arrays of photovoltaic (PV) panels. Panel blocks are mounted on metal racks installed on a series of posts. Each panel block contains internal access drives and electrical utilities to support the array and one to four inverters, depending on the size of the panel block. Inverters are installed adjacent to the panel blocks on an inverter skid or concrete pad. The maximum array height is approximately 10 feet, when tilted to 45°. Chip and seal coated access roads in the Operations Areas will be a minimum of 16 feet wide, and the facility driveway entrance will be paved and 24 feet wide.

The balance of the infrastructure components includes electrical cables, conduit, electrical cabinets, switchgears, step-up transformers, supervisory control and data acquisition (i.e., SCADA) systems, and metering equipment. Most of these components are found within the Operations Area.

Operations Area soils are usually heavily disturbed during Project construction, and most existing vegetation is removed. These areas are then reseeded during site reclamation. Rochelle Solar, LLC plans to work with local experts and support local businesses to the best of its ability to reseed site. Vegetation is managed for Project operations goals. Of utmost priority here is a

stable vegetation cover that does not impede efficient electrical energy production.

1.2.2 Internal Vegetation Management Area

These management areas are outside of the Operations Area but inside the site security fenceline. Other than access roads, these areas do not support Project infrastructure. Vegetation Management Areas include equipment storage facilities and topsoil or spoil piles.

Soils within these areas are usually disturbed during Project construction, and most existing vegetation is removed. These areas are then reseeded during site reclamation. Vegetation management in these areas is focused on implementing Project goals.

1.2.3 Security Fenceline

A security fenceline surrounds the Project site. To meet the National Electrical Safety Code for electrical installations, the fences are six-foot-tall chain-link fence topped by a one-foot extension of barbed wire.

Vegetation on either side of the security fence is managed for noxious weeds and physical impingements to the integrity of the fence, such as encroaching tree limbs.

1.2.4 External Buffer Area

The External Buffer Area comprises the Project area outside of the security fence. This Project includes landscape plantings for screening purposes. In general, these areas are not heavily disturbed during Project construction; therefore, they can support vegetation that was in place at Project inception.

1.3 Facility Surface Cover

Surface covers for commercial solar facilities include a range of options. Construction and operation of each facility must be considered in the design choice, in terms of erosion and weed control, photovoltaic panel shading, and wildfire risk.

Commonly used surface treatments include:

- i. Bare ground with gravel. Bare ground treatments remove all vegetation from within the Operations Areas. This is achieved by clearing and grubbing soil and roots, topsoil stripping and removal, land grading and leveling, and soil compaction and sterilization in preparation for herbicide-action removal of all vegetation. The ground surface is then covered with gravel (Beatty et. al. 2017; Macknick et al. 2013). Maintenance in these areas requires annual herbicide treatments to remove volunteer weeds and other vegetation, and dust suppression with water treatments (Macknick et al.

2013).

ii. Turf grass. Warm- or cool-season turf grasses are seeded as a mono-culture vegetation cover for solar facilities in locations with sufficient annual precipitation to support such vegetation without irrigation. This is achieved by clearing and grubbing soil and roots, topsoil stripping and storage, land grading, leveling, and tilling with reapplied topsoil prior to seeding. Turf grass covers require maintenance practices similar to a golf course or public park, including fertilizing; mowing and/or livestock grazing, to reduce vegetation height and fire risk; and weed control (Frank 2018).

iii. Mowed pasture grass. Pasture grasses such as smooth brome or timothy are established as solar facility surface treatments in much the same way as turf grasses. Maintenance includes mowing and/or grazing to reduce height and fire risk. Weed control may also be required.

Solar energy production facility installation and operation practices can render large expanses of land unusable as wildlife habitat or long-term agricultural land (Macknick et al. 2013). As the industry has matured and developed, native vegetation as a surface cover has been advanced to manage site operations and revegetation goals. For instance, the National Renewable Energy Laboratory (NREL) is involved in numerous studies and demonstrations, including ongoing trials at three of the Aurora sites that Enel owns and operates: Atwater, Chisago, and Eastwood. This Aurora-NREL collaboration is designed to provide data on revegetation design and management of midwestern commercial solar facilities.

Numerous studies have identified key benefits of using native vegetation as surface cover, including:

- I. Lower maintenance inputs. Because most native plant species are adapted to the local environment and have deep root systems, they do not require watering or pesticides. Native plant communities generally require mowing no more than twice a year (North Carolina Pollinator Conservation Alliance 2018; The Nature Conservancy of North Carolina 2018; Day 2018). Established native vegetation also eliminates the need for dust suppression (Macknick et al. 2013).
- II. Increase in biodiversity. Using native plant communities (vs. single- or few-species plantings or sterilized bare ground) greatly increases the biodiversity within the boundaries of a solar site. A larger number of native plant species provides wildlife (including mammals, birds, reptiles, amphibians, and invertebrates) cover, food (e.g., fruit, mast, pollen), and breeding habitat (The Nature Conservancy of North Carolina 2018). Pollinating insects roam beyond solar installations to agricultural fields, where they help increase production. Native plantings offer refuge for declining species (e.g., monarch butterflies and rusty-patched bumblebees) and help control stormwater and erosion (Frank 2018; DNR 2019).
- III. Water quality protection. With appropriate implementation, perennial vegetation surface covers have been shown to reduce surface runoff and minimize surface erosion

(Day 2018). Native vegetation covers can attenuate stormwater flow, as the heterogeneous, complex root systems capture and absorb precipitation (The Nature Conservancy of North Carolina 2018).

- IV. Increases soil health. Compared to turf grass, or bare ground, native vegetation is found to increase soil health over time (The Nature Conservancy of North Carolina 2018). Site preparation before seeding begins reversing the impacts of construction compaction. Application of stored site topsoil reintroduces local soil organisms (fungi, bacteria, and invertebrates) back into the establishing communities (Beatty et al. 2017). These soil conditions create a positive feedback with the roots of seeded native species.

1.4 Operations and Maintenance

The expected service life of the Rochelle II Solar Project site is 25 to 30 years, although this may be extended with appropriate approvals from regulatory agencies. Operations are staged from off-site facilities. All required parking, receiving/loading occurs in the Operations Area at the site.

Operations maintenance activities include the following:

- I. Equipment inspection of site infrastructure equipment occurs at regular intervals, including PV panels, inverter, transformer and electrical panels, electrical check, noise check, and cable and wiring.
- II. Performance monitoring of Project sites comprise weekly or monthly download of performance data including energy produced, alarms, faults, etc.
- III. Facility maintenance includes road and vegetation cover maintenance, fence and gate inspection, lighting system checks, and PV panel washing, as necessary

2 Vegetative Screening Management Plan

2.1 Introduction and Goals of Plan

This Vegetative Screening Management Plan carries forward the original permittee's commitment to using vegetative buffers to aesthetically screen the project from neighbors, roads, and future developments in the area. The goal of the Rochelle II Solar Project Vegetative Screening Management Plan is to summarize the management actions and potential best management practices, implemented under adaptive management decisions, to achieve vegetative visual screening buffers.

The following sections address management actions and best management practices integrated into Project construction, as well as those to be carried- forward into Project operations.

2.2 Management Actions and Best Management Practices

2.2.1 Landscape Screening Plantings Management

Landscape plantings, intended to screen adjacent landowners, roadways, and existing developments from site facilities are comprised of evergreen trees and deciduous shrubs installed around the Rochelle II Solar Project, see Appendix B for additional detail on proposed plantings. Appendix A depicts the Vegetative Screening Renderings for the Rochelle II Solar Project and Appendix B is an excerpt of the Planting Notes provided in the Rochelle II Solar Landscaping Plan. As depicted in Appendix A, the Project perimeter will include a tiered planting approach, where trees, shrubs, and flowers will be planted within the vegetative buffer to generate an effective and aesthetically appealing visual screen. Between the plantings, pasture grasses will be incorporated as ground cover, which will contribute to visual screening along the bottom portion of the vegetative buffer while also offering visual consistency with surrounding uses near the Project. The following areas of the Project perimeter will include a double vegetative buffer to further increase vegetation density for screening purposes: along the north side of the Project adjacent to Twombly Rd, the northeast corner surrounding the neighboring residence, and the entire southern boundary to screen from Flagg Road and the possible extension of Flagg Road to the east. The east and west boundaries will include a single vegetative buffer. Details regarding placement of trees and shrubs within these buffers are explained in Appendix B.

To maintain the expectations set forth in Appendix A and B, the following management practices will be deployed:

1. Landscape plantings will be monitored and maintained as needed throughout the life of the Project
2. Dead or dying trees/shrubs identified during site monitoring will be repaired or replaced during appropriate planting conditions as needed.
3. The pasture grass between plantings will be managed to maintain a pleasing aesthetic.
4. Invasive and weedy species will be treated with appropriate herbicides or mechanical control measures as needed based on the species.

2.2.2 External Buffer Area

The External Buffer Area along the southwest corner of site, outside of the landscaping screening, will require little active vegetation management, see Appendix A- Viewpoint #1. Rochelle Solar, LLC will not develop this portion of the site as it is within a flood zone. Uncultivated areas grow and develop naturally. This includes numerous wetland and wet meadow areas. Spot mowing may be performed to treat specific areas. If invasive or weedy species need to be targeted, they will be treated in a prescriptive manner to meet the needs and goals of this Vegetative Screening Management Plan.

2.2.3 Security Fenceline

In addition to the vegetative buffer screening, privacy fencing will be incorporated along the

north side of the site and around the east side of the property adjacent to the neighboring landowner. This proposed privacy fencing will include dark green slats within the 6-foot chain link fence to provide an additional method for further screening the site from neighbors and Twombly Road. To ensure the effectiveness of the privacy fence, it will be maintained throughout the life of the Project as follows:

1. Damages to the privacy fence is repaired or replaced in a timely manner. If damages impact the security of the site, the fence will be immediately repaired to maintain safety.
2. Proactive vegetation management to prevent possible damages to the privacy fence from leaning trees or other potential hazards.

2.3 Monitoring Program

Vegetation cover monitoring of the Rochelle II Solar Project will be conducted and reported annually by the Enel Green Power (or otherwise current owner) Project Agriculture Monitor. Vegetation monitoring results will be logged internally via an annual monitoring report. The annual report contents are described below.

This vegetative screening monitoring program comprises two main components:

1. Quantitative vegetative count to ensure dead or damaged, and removed plantings have been adequately replanted.
2. Qualitative monitoring of location-specific management issues, including noxious weed/invasive species populations, localized surface erosion issues or other disruption of established vegetation, and operations surface impacts.

Descriptive classifications of each vegetation type will include an assessment of plant community health and an assessment of observable trends in plant community dynamics in terms of the goal of this Vegetative Screening Management Plan.

Results of the qualitative monitoring will be summarized and illustrated with representative photos as needed. Specific areas of interest will be removed from consideration as respective issues are resolved.

References

Beatty B, Macknick J, McCall J, Braus G. 2017. Native vegetation performance under a solar PV array at the National Wind Technology Center. National Renewable Energy Laboratory. Available: <https://www.nrel.gov/docs/fy17osti/66218.pdf>. Accessed January 2020. Accessed February 2020.

Day M. 2018. Land use planning for large-scale solar. Alliance for Sustainable Energy, LLC. Available: <https://www.nrel.gov/docs/fy19osti/72470.pdf>. Accessed February 2020.

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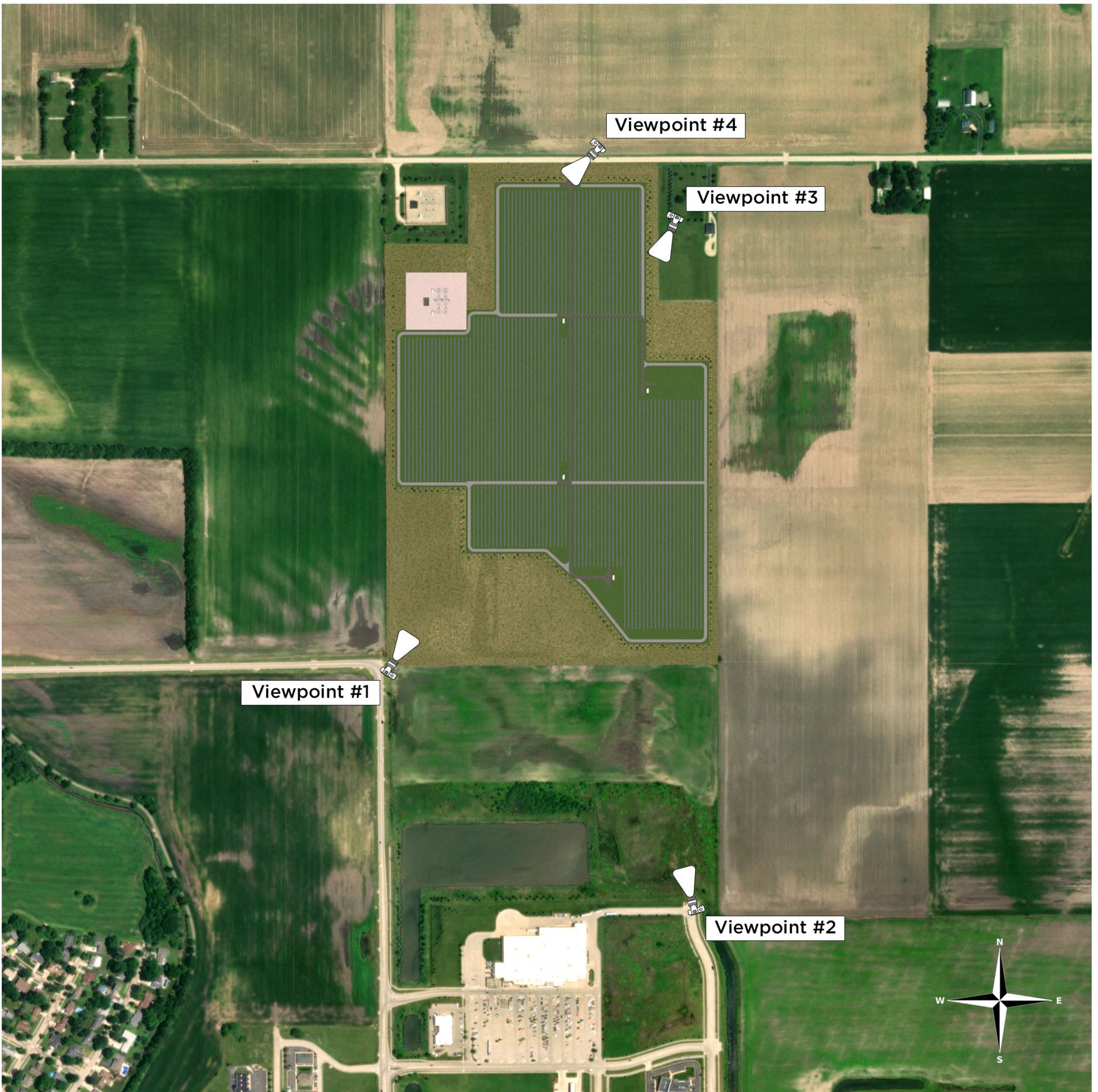
The Nature Conservancy in North Carolina. 2018. Principles of low impact solar siting and design. Available: https://www.conservationgateway.org/ConservationByGeography/NorthAmerica/UnitedStates/edc/Documents/ED_TNCNCPrinciplesofSolarSitingandDesignJan2019.pdf. Accessed February 2020.

Appendix A

Visual Renderings of the Rochelle II Solar Vegetative Screen

Appendix B

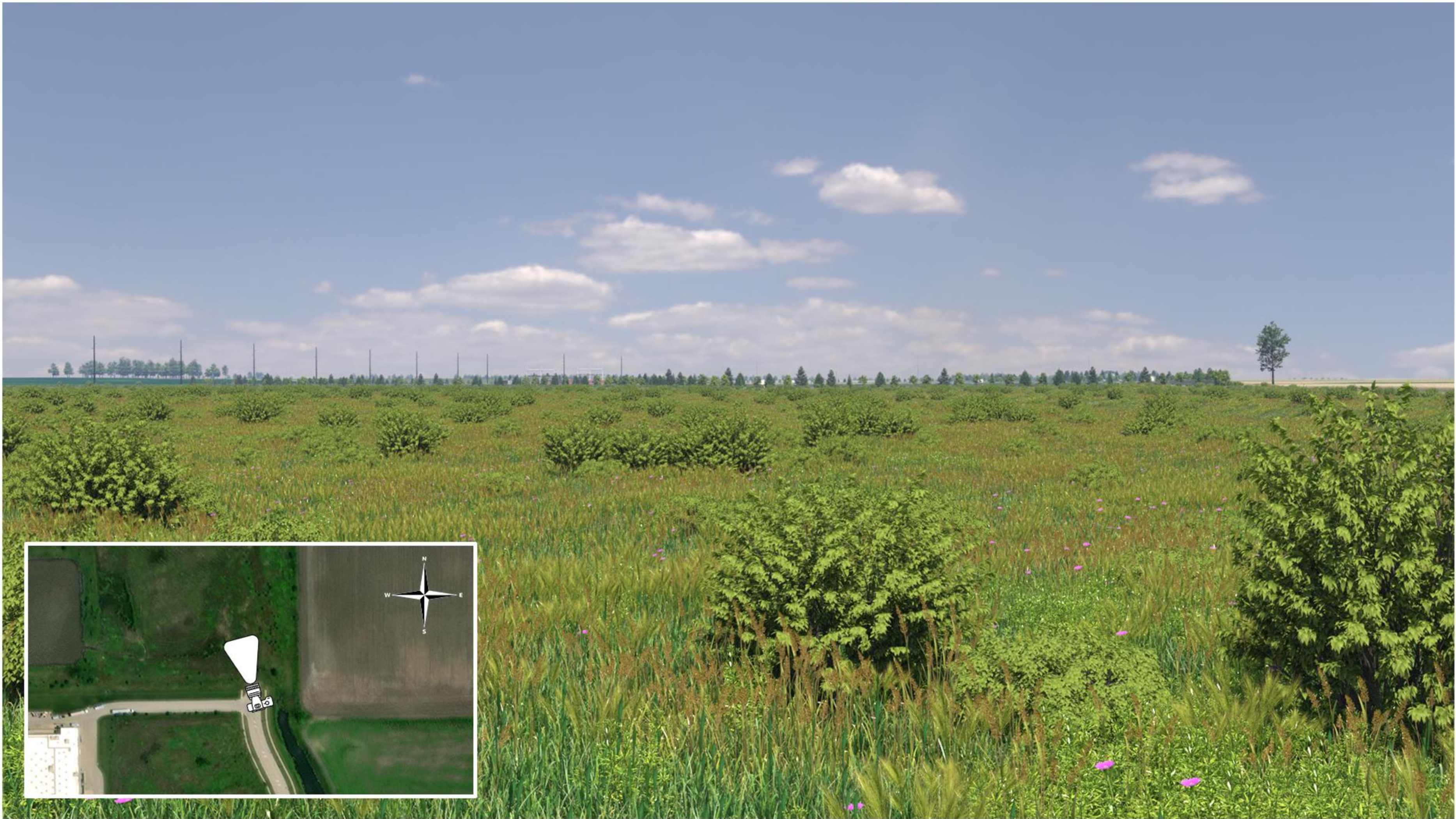
Excerpt of Planting Details indicated on the Rochelle II Solar Landscaping Plan prepared by Atwell, LLC





Rochelle II Solar Site - Viewpoint #1
From Corner of Flagg Road and Caron Road Looking Northwest



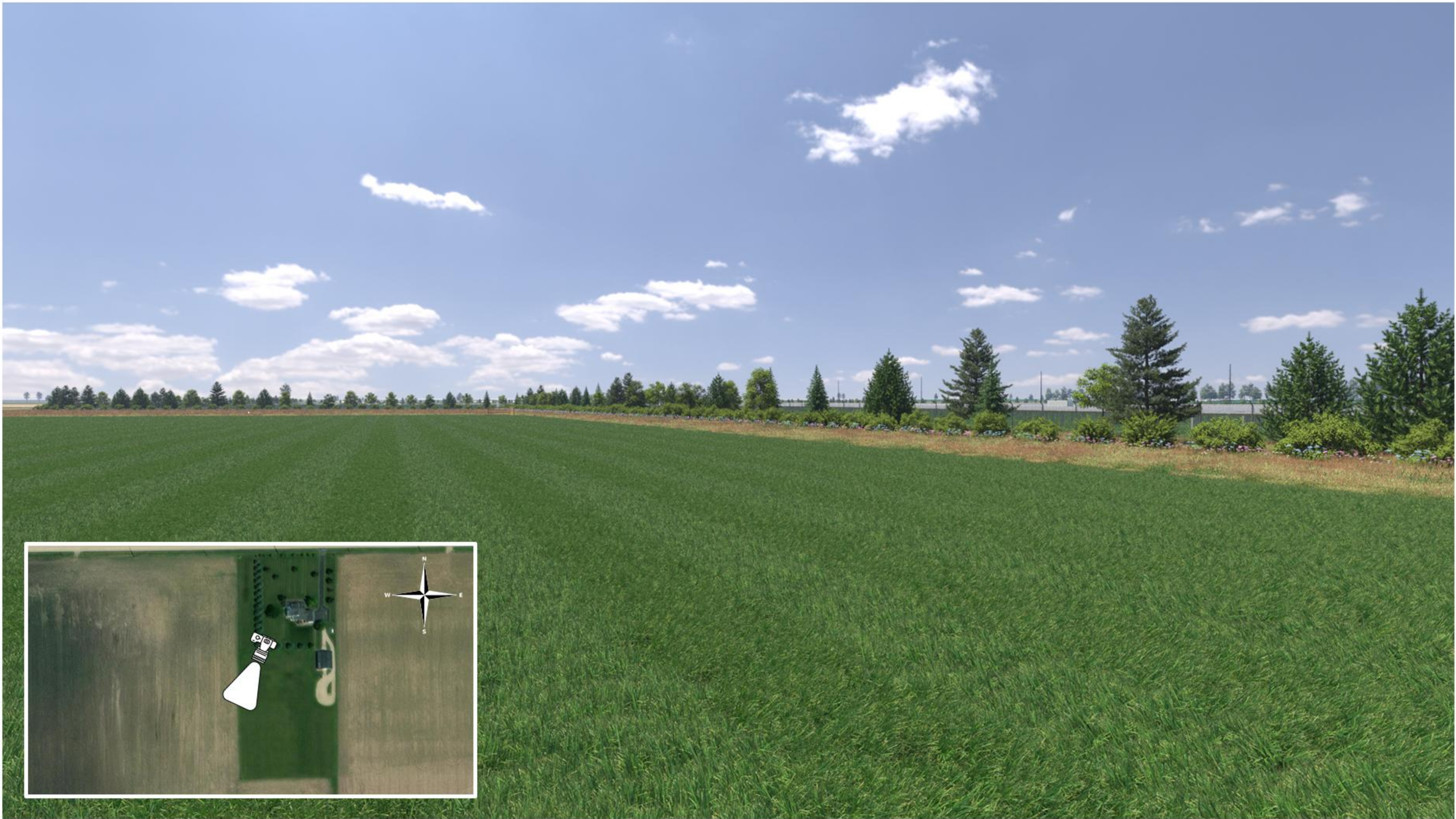


Rochelle II Solar Site - Viewpoint #2

From North Pointe Street Looking Northwest

1898 CO.
PART OF BURNS & MCDONNELL

enel
Green Power



Rochelle II Solar Site - Viewpoint #3

From Neighboring Property Looking Southwest





Rochelle II Solar Site - Viewpoint #4
From East Twombly Road Looking Southwest



Rochelle II Solar Project
Vegetative Screening Management Plan

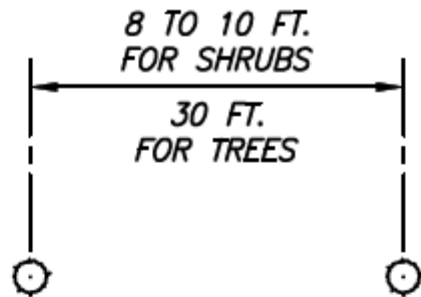
PLANTING NOTES

1. ALL STOCKPILE AREAS SHALL BE LOCATED WITHIN LIMIT OF WORK LINE AND STABILIZED TO PREVENT EROSION.
2. ALL DEBRIS GENERATED DURING SITE PREPARATION ACTIVITIES SHALL BE LEGALLY DISPOSED OF OFF SITE.
3. PROVIDE CRIBBING AS NECESSARY TO PROTECT EXISTING UTILITY LINES DURING CONSTRUCTION.
4. PLANTING SEED SHALL BE SOWN IN SEASONAL CONDITIONS AS APPROPRIATE FOR GOOD SEED SURVIVAL, OR AT SUCH TIMES AS APPROVED BY THE OWNER.
5. PROTECT NEWLY TOPSOILED, GRADED AND/OR SEEDED AREAS FROM TRAFFIC AND EROSION. KEEP AREAS FREE OF TRASH AND DEBRIS RESULTING FROM LANDSCAPE CONTRACTOR OPERATIONS.
6. REPAIR AND RE-ESTABLISH GRADES IN SETTLED, ERODED AND RUTTED AREAS TO THE SPECIFIED GRADE AND TOLERANCES.
7. ALL PLANT MATERIAL SHALL CONFORM TO THE MINIMUM GUIDELINES ESTABLISHED BY THE AMERICAN STANDARD FOR NURSERY STOCK PUBLISHED BY THE AMERICAN NURSERY AND LANDSCAPE ASSOCIATION.
8. ANY PROPOSED SUBSTITUTIONS OF PLANT MATERIAL SHALL BE MADE WITH MATERIAL EQUIVALENT TO THE DESIRED MATERIAL IN OVERALL FORM, HEIGHT, BRANCHING HABIT, FLOWER, LEAF, COLOR, FRUIT AND CULTURE. PROPOSED SUBSTITUTIONS WILL ONLY BE CONSIDERED IF SUBMITTED WITH ENUMERATED REASONS WHY SUBSTITUTIONS ARE PROPOSED.
9. THE LANDSCAPE CONTRACTOR SHALL CLEAN UP AND REMOVE ANY DEBRIS FROM THE SITE CAUSED BY THE LANDSCAPE CONTRACTOR.
10. THIS PROJECT SHALL COMPLY WITH THE REQUIREMENTS AND PERFORMANCE STANDARDS IDENTIFIED BY THE CITY OF ROCHELLE PLANNING AND DEVELOPMENT STANDARDS FOR SOLAR FARMS. A VARIANCE FROM BERMING REQUIREMENTS IS BEING REQUESTED, SO NO BERMS ARE BEING SHOWN ON LANDSCAPING PLAN.
11. REVEGETATION OF THE SOLAR ARRAY SHALL BE COMPLETED PER AN APPROVED VEGETATION PLAN OR LANDSCAPE PLAN PREPARED SPECIFICALLY FOR THE PROJECT SITE.
12. VEGETATIVE COVER. ALL AREAS OCCUPIED BY THE SOLAR FARM THAT ARE NOT UTILIZED FOR ACCESS TO OPERATE AND MAINTAIN THE SOLAR FARM SHALL BE PLANTED AND MAINTAINED WITH NATIVE GRASSES AND/OR OTHER VEGETATION FOR THE PURPOSE OF SOIL STABILIZATION OR OTHER METHOD AS RECOMMENDED BY THE PLANNING & ZONING COMMISSION AND/OR CITY COUNCIL.

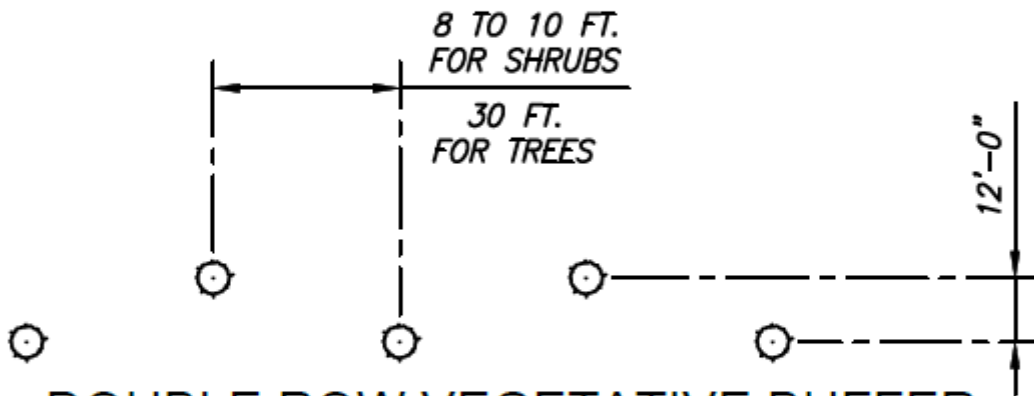
THE SOLAR FARM OWNER/OPERATOR SHALL PROVIDE FOR WEED CONTROL IN A MANNER THAT PREVENTS THE SPREAD OF WEEDS ONTO AGRICULTURAL LAND AFFECTED BY THE CONSTRUCTION, OPERATION OR DECOMMISSION OF THE SOLAR FARM. SPRAYING SHALL BE DONE BY A PESTICIDE APPLICATOR THAT IS APPROPRIATELY LICENSED IN THE STATE OF ILLINOIS.

THE REQUIRED FENCE SURROUNDING THE SOLAR FARM SHALL BE MAINTAINED TO PREVENT THE GROWTH OF WOOD VEGETATION WITHIN AND ALONG THE FENCE.

PLANTING LEGEND			
Common Name	Species Name	Height (feet)	Deciduous/ Evergreen
Shrubs			
Ninebark	<i>Physocarpus opulifolius</i>	8	Deciduous
Silky dogwood	<i>Cornus amomum</i>	8	Deciduous
Winterberry	<i>Ilex verticillata</i>	8	Deciduous
Black-haw	<i>Viburnum prunifolium</i>	15	Deciduous
Southern arrowwood	<i>Viburnum dentatum</i>	8	Deciduous
Inkberry	<i>Ilex glabra</i>	8	Evergreen
Trees			
Black Gum	<i>Nyssa sylvatica</i>	50	Deciduous
Swamp white oak	<i>Quercus bicolor</i>	60	Deciduous
Shingle oak	<i>Quercus imbricaria</i>	60	Deciduous
Lacebark elm	<i>Ulmus parvifolia</i>	50	Deciduous
Eastern white cedar	<i>Thuja occidentalis</i>	20-40	Evergreen
Eastern white pine	<i>Pinus strobus</i>	80	Evergreen
Eastern hemlock	<i>Tsuga canadensis</i>	70	Evergreen



SINGLE ROW VEGETATIVE BUFFER
NOT TO SCALE



DOUBLE ROW VEGETATIVE BUFFER
NOT TO SCALE

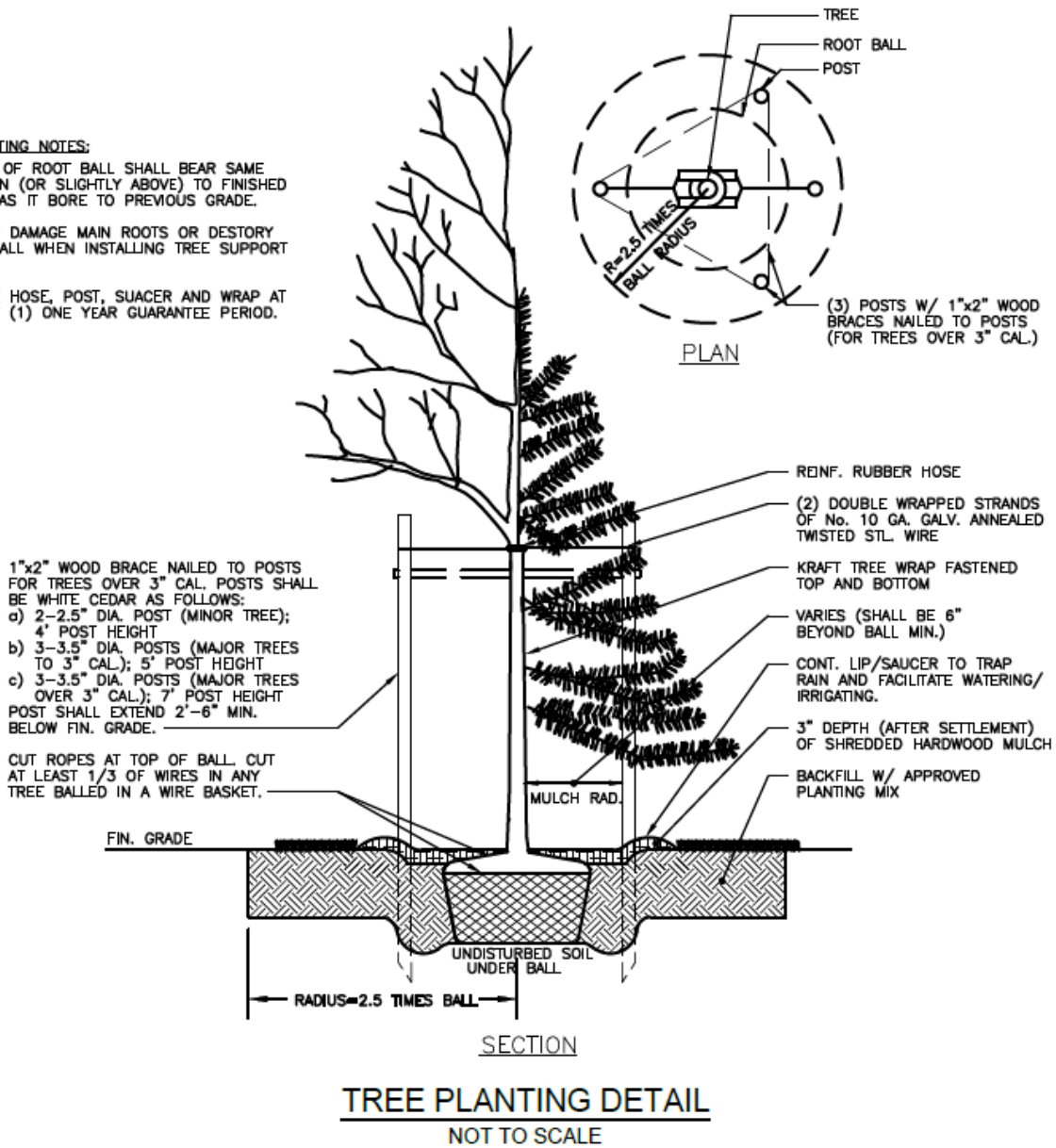
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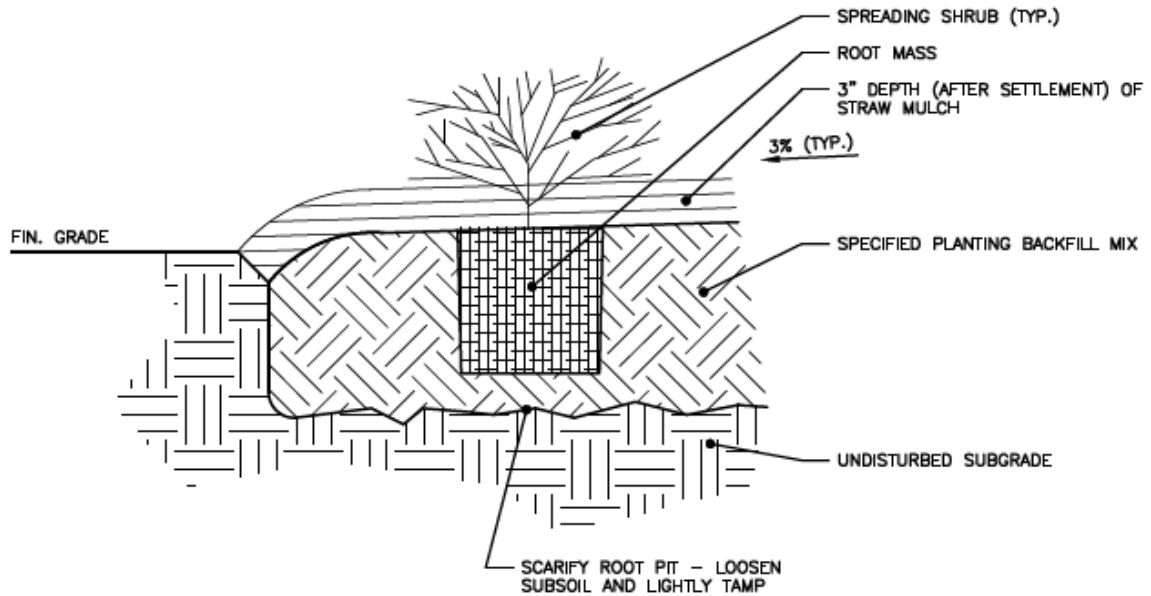
1. THE LANDSCAPED BUFFER WILL BE COMPRISED OF TREES AND SHRUBS. TREES (2-INCH MIN. CALIPER @ PLANTING) WILL BE SPACED AT 30' INTERVALS, UNLESS NOTED OTHERWISE. AT LEAST 50% OF THE LENGTH OF THE LANDSCAPED BUFFER WILL BE PLANTED WITH SHRUBS (MINIMUM HEIGHT OF FOUR FEET @ PLANTING).
2. ESTIMATED TOTAL OF 370 TREES, 760 SHRUBS, AND 6,800 FLOWER (NOT SHOWN) TO BE INCLUDED IN LANDSCAPED BUFFER.

Rochelle II Solar Project
 Vegetative Screening Management Plan

TREE PLANTING NOTES:

1. CROWN OF ROOT BALL SHALL BEAR SAME RELATION (OR SLIGHTLY ABOVE) TO FINISHED GRADE AS IT BORE TO PREVIOUS GRADE.
2. DO NOT DAMAGE MAIN ROOTS OR DESTROY ROOT BALL WHEN INSTALLING TREE SUPPORT POSTS.
3. REMOVE HOSE, POST, SAUCER AND WRAP AT END OF (1) ONE YEAR GUARANTEE PERIOD.





NOTES:

1. CROWN OF ROOT MASS TO BE SLIGHTLY ABOVE FINISHED GRADE.
2. FOR BARE ROOT SHRUBS: THIN BRANCHES AND FOLIAGE (ALL END TIPS) BY 1/3 RETAINING NORMAL PLANT SHAPE (BARE ROOT PLANTS ONLY).
3. FOR CONTAINER SHRUBS: REMOVE POT, CHECK ROOT SYSTEM. IF THERE ARE ANY SIGNS OF BEING ROOT BOUND, SLASH ROOT MASS (WITH A SHARP KNIFE) VERTICALLY IN 4 EQUIDISTANT LOCATIONS.
4. FOR BALLED AND BURLAPPED SHRUBS: REMOVE COLLAR ROPES AND TOP 1/3 OF BURLAP. CROWN OR SLOPE ALL SHRUB BEDS TO ASSURE A MIN. PITCH OF 3%.

SHRUB PLANTING DETAIL
NOT TO SCALE