



Union Ridge Solar

Exhibit D

Vegetation Management Plan

**Case No. 20-1757-EL-BGN**

# Vegetation Management Plan

Union Ridge Solar

Harrison Township and Licking County

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## **I. Goals and Objectives**

Union Ridge Solar is a proposed 108-megawatt solar energy facility, owned by Leeward Renewable Energy, LLC which will occupy approximately 550 acres within the Harrison Township, in Licking County, Ohio (the Facility). This Vegetation Management Plan (the Plan) is developed to guide site preparation, vegetation installation, and long-term management of overall new vegetation on the Facility site of the project parcel boundaries, both within and outside of the facility fence line. The vegetation success will be achieved through best management practices, including proper initial installation, management of invasive species and noxious weeds, and the control of erosion and sedimentation. The Plan is developed to ensure establishment and maintenance of stable vegetative cover that facilitates efficient Facility operation, provides ecological benefits, and complies with all OPSB regulations and required permits.

The revegetation and mitigation strategy developed for the project site restores ecological function to the site subsequent to construction. The seed mixes specified in Appendix III are selected for their capability in supporting pollinator habitat, increasing species diversity, and provide visual mitigation. Ohio Pollinator Habitat Initiative (OPHI) guidelines to establish pollinator habitat were used to develop vegetation schemes. See Appendix IV for a suitability rating of the Facility vegetation plan by the Ohio Solar Site Pollinator Habitat Planning and Assessment Form.

Site conditions affecting vegetation cultivation are variable. The vegetation management plan is a dynamic document that will be evaluated and updated in response to changing environmental conditions.

## **II. Vegetation/Seed Installation**

The primary revegetation method to be used on site is seeding. Additionally, in selected locations, trees and shrubs will be installed for visual screening and ecological buffer restoration. The Facility will be revegetated following the installation of all solar panels and associated infrastructure. Objectives for plant species selection, establishment, and maintenance include: 1) maintain at least 80% vegetation cover of the species seeded and planted, 2) improve species diversity by installing and encouraging the development of native plant species, 3) minimize the presence of common noxious weed and invasive plant species, and 4) meet Facility operational criteria regarding limitation of mature vegetation height.

### **A. Vegetation/Seed Mix Selection**

Species selection for site revegetation was based on an evaluation of available state, regional and local resources, as well as a site inventory of natural and physical resources. Resources also used to guide species selection alternatives included Level III Ohio Eco-Region mapping, the Ohio Pollinator Habitat Initiative,

Natural Resources Conservation Service (NRCS) soil survey data, site topographic survey and GIS-mapping, and U.S. Fish and Wildlife Service National Wetlands Inventory (NWI) mapping.

### **Vegetation/Seed Mix Type**

The proposed vegetation establishment method is seeding. The seed mix to be utilized will be compatible for use within the solar panel arrays and all operational areas of the Facility site. Any proposed modifications or exceptions to the recommended seed mix shall be submitted by the Contractor in writing to the Owner. All exceptions must be authorized in writing in accordance with Plan procedures and prior to installation.

### **Seed Source and Certification**

Sourcing of all native and/or beneficial seed will be local; a reasonable effort should be made to procure seed stock of regionally local genetic provenance. Species shall be true to scientific name and in accordance with specified purity and germination requirements. The installer must provide seed manufacturer or supplier certification tags complying with state agriculture department labeling requirements. The installer must submit seed certification tags and seed manufacturer's state agriculture department growers' certification to Union Ridge Solar for review.

## **B. Soil Testing and Evaluation**

Soils will be tested prior to seeding by a certified lab to determine nutrient levels and soil chemistry, and to produce cultural recommendations for the establishment of naturalized vegetation.

It is anticipated that site construction operations will result in some degree of soil compaction on the Facility site. Following the completion of construction, perform in-place soil compaction measurements to assess the extent of soil density in areas designated for revegetation and to determine best practices for soil decompaction.

## **C. Seed Installation**

### **Installation Schedule**

Seed installation timing is dependent on the construction completion in any given area. If construction is completed in the spring, allow for seeding during the time the soil is frost-free and workable, generally April 15 through June 15. For spring or fall seeding, apply seed at the specified rate for the seed mix per

acre of pure live seed (PLS) with an added 20 to 30 pounds per acre of seasonally appropriate cereal grain or cover crop. Fall seeding period is September 1 through October 15. Dormant fall seeding may also be used when construction is completed outside of the optimal fall seeding schedule. Dormant seeding rates are increased for both the native and/or beneficial seed mix and the cover crop. Dormant seeding rate is double the standard application rate and may be modified to suit the seed mix. Re-seeding of mix and/or appropriate cover crop the following spring may be necessary to assure successful germination and establishment.

### **Soil preparation**

Soil decompaction, if found to be necessary, will be tailored to soil texture, soil moisture level, seasonal period, and specific site considerations such as avoidance of underground cables and utilities. Decompaction will be planned in coordination with vegetation establishment and management requirements. Decompaction efforts will limit surface soil disturbance, avoid damage to or homogenization of soil structure, and will be performed without causing further soil compaction.

Prior to seeding, surface soil will be scarified, as necessary, to incorporate a portion of the surface vegetation into the soil and to level uneven surfaces. The desired result is to roughen the soil surface to enhance soil contact with the seed without disturbing soil structure or enhancing germination of existing weed seeds in the soil. If seed will be installed through existing vegetation, that vegetation must be mown to the level of the root crown, assessed to determine a weed pressure rating and potentially treated multiple times with an herbicide two to three months before seeding operation.

### **Seeding**

Seeding will be accomplished using a calibrated mechanical seed drill or broadcast seeding equipment capable of metering seed of various size and weight. Hydroseed methods will not be used for native or naturalized-type seed mixes. A bulking agent may be used, as needed to create an even flow of seed. If broadcast seeding is used, light raking or rolling of the installed seed bed is needed to ensure good soil-seed contact.

## **D. Installation of Vegetative Buffers**

Trees and shrubs will be installed for the purpose of visually screening the project area and restoring ecological buffers to the project site. These materials will be planted in accordance with the screening design plans.

## Tree and Shrub Planting

Proper establishment is critical to attaining the survival and long-term health of the vegetative buffers. At the time of installation all underground utilities will be marked prior to digging, in order to assure safe installation and determine any areas where the presence of underground utilities may impact the intended landscape buffering layout.

Trees and shrubs (collectively referred to as trees) will be planted during the fall season or in the cycle of dormancy. For deciduous species, this period occurs between leaf drop in fall and bud break in spring. In the case of conifers and broadleaf evergreen species, trees will be installed during the optimal planting period, early spring or early fall. In preparing for planting, each tree pit will be sized a minimum of 2.5 times the size of the root ball, but no deeper than the original planting depth; trunk flare will be visible at finished grade. To prevent unnecessary stress and damage to the trees, installers will be directed to maneuver the tree by the root ball or container only, and never by the trunk. The root ball will be placed in the tree pit on undisturbed soil and installed plumb or straight from all viewpoints. The tree pit will be backfilled with native soil and amended as needed based on soil testing. Soil backfill will be applied gradually and watered in to remove air pockets. Tree staking will be used when the site is exposed to high winds, for evergreen trees, or to support bare-root trees. Stakes are only beneficial for a short period of time and will be removed the following growing season, after one calendar year has elapsed.

At the time of planting, the surface of the planting pit disturbed area will be mulched immediately to retain moisture and insulate tree roots from extreme temperatures. Acceptable mulch material may be leaf litter, clean straw, shredded bark, compost, or well-composted wood chips, spread evenly to a maximum depth of 3 inches. Mulching will be avoided within 3 inches of the root flare and piling mulch against the trunk or lower branches into a cone-shape will be avoided, as these practices cause decreased soil-gas exchange, bark tissue damage, and harbor pests and disease. Soil disturbance within the planting area that does not receive mulch will be seeded with the buffer seed mix. Over time, native herbaceous vegetation growth will cover the mulched tree pits.

Watering is necessary at planting time and during the establishment period to ensure survival and to improve growth rates. Immediately following planting, trees will be irrigated with 2-3 gallons of water per inch of caliper diameter, as measured from a height of approximately 6 inches from the ground, above the root flare. Water will be applied to the mulched areas over the root ball. Slow-release watering bags or temporary drip-irrigation systems may be used during the establishment period. During the first month following installation, trees

should receive the equivalent of one inch of rain per week by natural precipitation or by artificial irrigation. Generally, during the first year or establishment period, new trees may require up to 30 gallons, and shrubs up to 10 gallons, of total water per week. Supplemental watering may be required during prolonged periods of heat or drought conditions. Watering schedules will be adjusted to account for current environmental conditions such as recent rainfall, humidity, high winds, and cloud cover. Watering will occur early in the morning or after sundown to limit evaporation, sun scorch, and transplant shock.

### **Establishment Pruning**

Pruning will be performed only to remove faults such as dead, diseased, or damaged branches, or to improve structure where the interest of public safety is affected.

## **III. Vegetation Management**

Vegetation management is meant to adapt to the vegetation's maturation. Initial management will be more intensive in order to assure development and establishment of the preferred vegetation community. Subsequent management will focus on vegetation community maintenance, with regular inspection and evaluation. The following section outlines the cycle of vegetation management on the Facility site.

### **A. Vegetation Assessment Criteria**

Criteria used to describe the essential vegetation conditions include absolute cover and relative cover of species seeded and planted. Absolute cover describes the percentage of total vegetation coverage of the ground surface by any plant species, based on visual assessment within sample plots. Relative cover is the percentage of seeded and planted species' coverage relative to all species within the same plot. Essential vegetation coverage goals are discussed at subsection IV, A Basis and Goals for Vegetation Coverage. The coverage requirement for essential vegetation at full establishment is ninety-five percent.

### **B. Establishment Period**

Initial vegetation management is critical in establishing the desired plant community. Properly establishing vegetation on site will reduce the future intensity of management needed to maintain the community and keep invasive species at bay.

## **Early Establishment Period – Installation through Year 1**

Primary goals of the early establishment period are to cultivate healthy vegetation coverage and to limit weed growth or weed migration on the site. Once the designated seed cover crop and/or seed mix has germinated, periodic monitoring combined with mowing and proactive weed control methods will be used to ensure successful establishment of desired plants. Monitoring will be performed to identify and document where the removal of undesirable plants is needed and to evaluate where reseeding may be used to improve desirable species coverage. Methods used for controlling weeds, undesirable species growth and undesirable migration during the establishment period will include mowing and targeted herbicide use, per manufacturer instructions and in compliance with Ohio EPA regulations. Successful practices will be monitored and documented for use in guiding management operations during and following the establishment period. This documentation will support future refinement of the management plan.

Mowing timing and frequency will be guided by environmental factors, such as temperatures and rainfall amounts, and ground cover growth rates. However, the first mowing will take place before April 15, to prevent ground-nesting birds from using areas likely to be mowed. The first mowing is used to provide initial weed-suppression, and will be scheduled prior to new vegetation seed production, typically in June. This initial mowing will be performed to a height of 6 inches to 8 inches by a flail-type mower to mulch and retain vegetation debris. Vegetation may be removed as needed after cutting to prevent excessive buildup of thatch in selective areas where debris build-up may suppress plant establishment. Mowing practices will be prescribed as supported by establishment period monitoring. In the first growing season a second mowing will be required in the fall, after native and/or beneficial plants have finished blooming. Mowing will be performed to a height of 6 inches. Specialized mowing equipment will be used in array areas and similar limited spaces that are inaccessible to reach with standard large-scale mowing equipment. Equipment types may include closed-and side- or front-mount mowing decks, low-profile zero-turn mowers, and fully automated utility-scale autonomous mowing systems. Mowing equipment will be cleaned prior to and between uses to prevent the spread of undesirable seeds. Mowing and herbicide use may be employed more frequently during the first year to control undesirable plants.

## **Continued Establishment Period – Year 1 through Year 2**

The goals of the continued establishment period are to cultivate a mature stand of vegetation that meets the seed mix species diversity to minimize weed competition. Continued periodic monitoring will guide

maintenance practices and control measures. During the second growing season (April) if possible, the site will be mown to a minimum height of 6 inches to cut back previous season's growth and to stimulate new growth for preferred species. Four weeks after initial mowing the site will be evaluated to identify and document species for removal, identify bare areas in need of reseeding, and species diversity development. Areas of dense undesirable vegetation found to cover a substantial portion of the surface area of the new vegetation stand will be mown very short, to a height of 4 inches or less.

Vegetation management practices will become more targeted and precise during this period to support maturing vegetation and to significantly reduce weed and invasive species occurrences. Reseeding will be provided in bare ground areas and in sparse plant coverage areas to promote vegetation establishment. Perform reseeding within spring or fall seeding periods listed in subsection II, C Seed Installation. Bare ground areas will be lightly raked to remove thatch build up, overseeded by broadcast methods, and lightly tamped, raked or rolled to ensure seed contact with soil. Seeded areas will be mulched with straw, meadow-hay cut from the site, or a biodegradable blanket to retain moisture on the soil surface and to facilitate germination. Noxious weeds or invasive species found to persist after mowing will be spot treated with herbicide. Protective measures should be taken to prevent herbicide from drifting onto desired plants.

### **Post Establishment Period – Year 3 and Long-Term Maintenance**

By year three it is anticipated that vegetation will be well established with spot mowing and herbicide treatment used for control of noxious weeds or invasive species. Mowing will likely occur at a minimum of twice per year, performed typically early spring and late fall. Periodic monitoring and evaluation will continue as a basis for guiding maintenance practices and for future modifications to the management plan.

### **C. Controlling Invasive Species**

Management of invasive species will be responsive to changing conditions on the site. Monitoring once per month during the growing season (April-September) while the site is in the establishment phase during first two years, will be conducted to inform further maintenance practice, scheduling of maintenance, and appropriate mowing or herbicide specifications. The presence of weeds is expected to diminish as the site becomes established, but persistent noxious weeds and invasive species may require spot-treatment with herbicides in addition to mowing, to control spreading.

A record will be kept of weeds or invasive plants treated, areas of site treated with herbicide, the method and amount of product used, and the dates of application. Herbicide and pesticide use must be performed by

qualified, commercially licensed contractors in compliance with state requirements governing use, distribution, and record-keeping for all phases of vegetation management. This will allow the contractor and/or the Owner to evaluate the success of treatment and improve effectiveness of future applications.

#### **D. Controlling Competing Native Vegetation**

Seeds and root stock from many different species exist within the soil on site. Other species can also migrate into the site via seed dispersed by wind, animals, water flow, or by vegetative runners. Undesired vegetation should be removed via mowing, herbicide treatment, or hand pulling. A qualified contractor must be engaged to perform selective species control and removal work. Minimum contractor qualifications must include documented experience of similar work and trade- or professional-certifications specific to plant and vegetation management science.

#### **E. Controlling of Woody Growth**

Woody vegetation is generally capable of growing to heights that can create shade, which will not only interfere with the function of the solar panels, but also shade out the desired plant community. Except where established for screening purposes, woody vegetation will be removed and herbicide application applied. Where trunk size exceeds 0.5 inch in diameter, trunks will be cut 1 inch from grade and the stump will be treated with a systemic herbicide basal application.

#### **F. Ongoing Maintenance Standards and Practices**

The site will continue to require annual evaluation after establishment of desired vegetation is complete. To maintain the desired herbaceous vegetation community, the site must continue to be managed regularly. Mowing will be performed as needed to prevent shading of panels and provide access to facility driveways and supporting project infrastructure. The first mowing will likely take place before April 15, when most birds are expected to nest, to prevent nesting birds from using areas likely to be mowed. At a minimum, unless site conditions require otherwise, mowing will occur every other year in late fall or early spring. Mulching-type mow equipment will be used to limit thatch buildup that is detrimental to plant growth. Mulcher-shredder machines may be employed on a less frequent schedule to periodically cut, collect, and remove excess plant debris. These operations will be performed in late winter or early spring to allow recently dropped seeds to germinate more readily.

The mowing schedule will be cycled so the entire site will not be mowed at one time, to maintain general flora and fauna habitat, and specifically to support high-quality pollinator habitat, according to the Ohio Department

of Transportation's Statewide Roadside Pollinator Habitat Program Restoration Guidelines and Best Management Practices. Mowing will be staggered by a minimum of two weeks and limited to one-quarter or one-half of the site area, in order to leave vegetation standing for pollinator food and shelter during the growing season.

#### **G. Alternative Maintenance Strategies: Grazing**

Grazing may be utilized as an alternative management technique to limit the occurrence of undesirable woody and herbaceous plants, noxious weeds, and invasive species. While grazing is best utilized in grass-dominant forage areas, it can also assist with spot control of areas where undesirable species are dominating the landscape. Sheep are the preferred grazing livestock. Regardless of the livestock used, grazing management will require a detailed plan, including paddock layout plans, and routine observation and documentation.

Areas for grazing should be identified and mapped and should not occur where livestock will have access to a natural water feature or where the ground is perpetually wet and susceptible to erosion from trampling. Grazing should not occur on steep sites for similar concerns of eroding soils and exposing the bare ground to invasive or undesirable seed. The area selected will be divided into grazing units (an area of land that will support grazing animals for the forage season). According to the USDA-NRCS – Grazing Management Plan, each unit shall be fenced into 4 equal parts, preferably as close to square as possible to encourage even foraging. These parts will provide grazing rotation for one unit, with each of the 4 areas being grazed for one week in the 4-week rotation.

Each unit will require a water source. These sources should be mobile and provided towards the center of the paddock so as not to cause focused wear and die back around the trough, that would allow weeds to establish in bare areas in the site. Providing water every 600-800 feet encourages animals to keep moving instead of loitering around a single water source. If water cannot be provided towards the center of a paddock it should be located at the center of the fence line.

Typically grazing should not begin until vegetation has reached a minimum of 10 inches in height but should occur before vegetation reaches 18 inches. Remove livestock when vegetation reaches a uniform height of 6 inches. Assessment should be made at the end of each grazing week to determine if this uniformity is met or if additional mowing or grazing will be required to meet maintenance goals. If herbicides are needed to control an invasive infestation it should be timed appropriately as to not cause harm to the grazers. At the end of the grazing season, time should be allotted after last grazing and before killing frost to allow plants time for

regrowth and vigor. Throughout the grazing season the response of vegetation to grazing should be documented and strategies adjusted to meet goals of the management plan.

#### **H. Maintenance for Visual Mitigation Vegetation**

In addition to proper maintenance within the fence line of the array field, maintenance will also be required for plant materials installed for the purpose of visual mitigation along the periphery of the array. Herbaceous vegetation will be managed similarly to the array areas inside fence line. Woody vegetation, trees, and shrubs will require an independent maintenance schedule to ensure that the plantings become established and reach their intended size and form to meet the screening requirements.

#### **Monitoring for Pests and Disease**

Plant materials will be inspected seasonally for physical damage, insect infestation, fungus, or disease. Treatment plans will extend through the growing season. If pests or disease are observed to be present, a certified arborist will be engaged as necessary to develop a strategy to restore the health of the tree; adjacent vegetation will be monitored throughout treatment to ensure the identified problem is contained. Documentation will be kept of all treatments administered, including strategy, timing, and follow up needs. Replacement plantings for dead trees and shrubs will be made during the next growing season or the period optimal to each species to enhance survival. Diseased or damaged trees and shrubs will be evaluated and treated to alleviate the identified problem or removed and replaced when treatment is not a viable option.

#### **Fertilization, Pruning, and Replacement Protocol**

Continued monitoring and maintenance will improve the longevity of the plant materials and allow proper establishment of the natural vegetative buffers. Following the first year, fertilization will be conducted twice annually for two years with a slow-release fertilizer applied to the mulch area over the root ball. Regular pruning will be used to manage tree health, develop structure, reduce risk, and provide clearance to structures. Pruning for form will be consistent with each species' natural growth habit and be performed on an as-needed basis under the direction of a certified arborist. Trees with greater than fifty percent crown die-back will be evaluated for removal and replacement. When replacing trees or shrubs, they will be replaced with the same or functionally similar species of the same caliper and size as initially installed, in order to maintain the effectiveness of the visual screening.

#### **IV. Vegetation Quality Targets**

Evaluation is an important step in the maintenance of the Site's vegetation. Because each planting area has a unique ecology and each plant species has different requirements, it is important to review and document which species are thriving, or even dominating, and which are not. Evaluation also identifies which prescribed maintenance techniques have been most successful. Ongoing evaluation will help inform future management and assure a diverse, desirable plant community.

##### **A. Basis and Goals for Vegetation Coverage**

The scheduled target for the installation contractor is to have 80% vegetation coverage established by the end of the first growing season of the site development construction. In order to comply with Ohio EPA - NPDES permit requirements and the project stormwater pollution prevention plan (SWP3), all disturbed soil areas must be stabilized with at least 70% uniform perennial (permanent) vegetative coverage to achieve stabilization. Once permanent vegetation is fully established, approximately 36 months post installation, it is anticipated that the site will achieve 95% uniform vegetative cover. With establishment of the desired native and/or beneficial plant community, habitat will be created for local wildlife, pollinators, and other beneficial insects.

##### **B. Management Goals for Weeds, Invasive Plants, and Insects**

Invasive plant and insect species regulated prohibited by the State of Ohio (Appendices 1 & 2) and noxious weeds designated by the USDA NRCS will be controlled by a vigilant management and monitoring plan with the goal of maintaining full eradication status for these species on the site. Invasive and undesirable or weed plant species will be controlled by mowing or herbicide treatment at a frequency sufficient to prevent seed development or vegetative migration. Assessment and treatment of invasive species, including pest and weed infestations, will be administered through an integrated pest management plan developed during the establishment period as informed by successful establishment methods, as an amendment to the management plan. As a secondary goal, preferred plants, beneficial insects, and volunteer plant species that are integral to provide or to support habitat, will be protected. Care will be taken to protect preferred plants and to minimize negative effects on beneficial insects; this may be accomplished by using control methods that are not harmful to desirable plant and insect species.

## V. References

Ohio Department of Agriculture:

<https://agri.ohio.gov/wps/portal/gov/oda/divisions/plant-health/invasive-pests/invasive-plants>

Ohio Laws and Rules: Invasive Species List <http://codes.ohio.gov/oac/901%3A5-30>

Ohio Laws and Rules: Prohibited Noxious Weeds <http://codes.ohio.gov/oac/901%3A5-37>

Ohio Department of Transportation:

[https://www.davey.com/media/1619374/1\\_odot\\_statewide\\_roadside\\_pollinator\\_habitat\\_restoration\\_guide.pdf](https://www.davey.com/media/1619374/1_odot_statewide_roadside_pollinator_habitat_restoration_guide.pdf)

Ohio Pollinator Habitat Initiative

<http://www.ophi.info/home.html>

USDA Natural Resource Conservation Service: Ohio

<https://www.nrcs.usda.gov/wps/portal/nrcs/oh/home/>

USDA Web Soil Survey

<https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm>

United States Environmental Protection Agency: Level III Ecoregion of Ohio

<https://www.epa.gov/eco-research/ecoregion-download-files-state-region-5>

US Fish and Wildlife Service: National Wetlands Inventory

<https://www.fws.gov/wetlands/data/mapper.html>

Xerces Society: <https://www.xerces.org/sites/default/files/2018-05/15->

[025\\_02\\_XercesSoc\\_HabitatInstallGuide\\_Pennsylvania\\_ConservationCover327\\_web.pdf](https://www.xerces.org/sites/default/files/2018-05/15-025_02_XercesSoc_HabitatInstallGuide_Pennsylvania_ConservationCover327_web.pdf)

## APPENDIX I

### Ohio Invasive Plant Species

Identified by Ohio State Administrative Code and effective 2021. For a current list please use site referenced in Section V References, for Ohio Laws and Rules.

- (1) *Ailanthus altissima*, tree-of-heaven
- (2) *Alliaria petiolata*, garlic mustard
- (3) *Berberis vulgaris*, common barberry
- (4) *Butomus umbellatus*, flowering rush
- (5) *Celastrus orbiculatus*, oriental bittersweet
- (6) *Centaurea stoebe* ssp. *Micranthos*, spotted knapweed
- (7) *Dipsacus fullonum*, common teasel
- (8) *Dipsacus laciniatus*, cutleaf teasel
- (9) *Egeria densa* Brazilian, elodea
- (10) *Elaeagnus angustifolia*, Russian olive
- (11) *Elaeagnus umbellata*, autumn olive
- (12) *Epilobium hirsutum*; hairy willow herb
- (13) *Frangula alnus*, glossy buckthorn
- (14) *Heracleum mantegazzianum*, giant hogweed
- (15) *Hesperis matronlis*, dame's rocket
- (16) *Hydrilla verticillata*, hydrilla
- (17) *Hydrocharis morsus-ranae*, European frog-bit
- (18) *Lonicera japonica*, lapanese honeysuckle
- (19) *Lonicera maackii*, amur honeysuckle
- (20) *Lonicera morrowii*, Morrow's honeysuckle
- (21) *Lonicera tatarica*, tatarian honeysuckle
- (22) *Lythrum salicaria*, purple loosestrife
- (23) *Lythrum virgatum*, European wand loosestrife
- (24) *Microstegium vimineum*, Japanese stiltgrass
- (25) *Myriophyllum aquaticum*, parrotfeather
- (26) *Myriophyllum spicatum*, Eurasian water-milfoil
- (27) *Nymphoides peltata*, yellow floating heart
- (28) *Phragmites australis*, common reed
- (29) *Potamogeton crispus*, curly-leaved pondweed
- (30) *Pueraria montana* var. *lobata*, kudzu
- (31) *Ranunculus ficaria*, fig buttercup/lesser celandine
- (32) *Rhamnus cathartica*, European buckthorn
- (33) *Rosa multiflora*; multiflora rose
- (34) *Trapa natans*, water chestnut
- (35) *Typha angustifolia*, narrow-leaved cattail
- (36) *Typha x glauca*, hybrid cattail
- (37) *Vincetoxicum nigrum*, black dog-strangling vine, black swallowwort.

## APPENDIX II

### Prohibited Invasive Weeds

Identified by Ohio State Administrative Code and effective 2021. For a current list please use site referenced in Section V References, for Ohio Laws and Rules.

- (A) Shatter cane, *Sorghum bicolor*
- (B) Russian thistle, *Salsola kali* var. *tenuifolia*
- (C) Johnsongrass, *Sorghum halepense*
- (D) Wild parsnip, *Pastinaca sativa*
- (E) Grapevines, *Vitis* spp., when growing in groups of one hundred or more and not pruned, sprayed, cultivated, or otherwise maintained for two consecutive years
- (F) Canada thistle, *Cirsium arvense*
- (G) Poison hemlock, *Conium maculatum*.
- (H) Cressleaf groundsel, *Senecio glabellus*
- (I) Musk thistle, *Carduus nutans*
- (J) Purple loosestrife, *Lythrum salicaria*
- (K) Mile-A-Minute, Weed *Polygonum perfoliatum*
- (L) Giant Hogweed, *Heracleum mantegazzianum*
- (M) Apple of Peru, *Nicandra physalodes*
- (N) Marehail, *Conyza canadensis*
- (O) Kochia, *Bassia scoparia*
- (P) Palmer amaranth, *Amaranthus palmeri*
- (Q) Kudzu, *Pueraria montana* var. *lobata*
- (R) Japanese knotweed, *Polygonum cuspidatum*
- (S) Yellow Groove Bamboo, *Phyllostachys aureasculata*, when the plant has spread from its original premise of planting and is not being maintained
- (T) Field bindweed, *Convolvulus arvensis*
- (U) Heart-podded hoary cress, *Lepidium draba* sub. *draba*
- (V) Hairy whitetop or ballcress, *Lepidium appelianum*
- (W) Perennial sowthistle, *Sonchus arvensis*
- (X) Russian knapweed, *Acroptilon repens*
- (Y) Leafy spurge, *Euphorbia esula*
- (Z) Hedge bindweed, *Calystegia sepium*
- (AA) Serrated tussock, *Nassella trichotoma*
- (BB) Columbus grass, *Sorghum x almum*
- (CC) Musk thistle, *Carduus nutans*
- (DD) Forage Kochia, *Bassia prostrata*
- (EE) Water Hemp, *Amaranthus tuberculatus*

## APPENDIX III

### Facility Seed Mixes

#### A. Array Mix:

Botanical Name	Common Name	% by Weight
<i>Bouteloua curtipendula</i>	Side-Oats Grama	29.00
<i>Bouteloua gracilis</i>	Blue Grama	5.00
<i>Bromus kalmii</i>	Prairie Brome	4.00
<i>Elymus trachycaulus</i>	Slender Wheat Grass	6.00
<i>Koeleria macrantha</i>	Junegrass	1.00
<i>Schizachyrum scoparium</i>	Little Bluestem	22.00
<i>Sporobolus compositus</i>	Rough Dropseed	1.00
<i>Sporobolus heterolepis</i>	Prairie Dropseed	1.00
<i>Carex bicknelli</i>	Bicknell's Sedge	1.00
<b>Total Graminoids</b>		<b>70.00</b>
<i>Achillea millefolium</i>	Yarrow	0.15
<i>Agastache foeniculum</i>	Anise Hyssop	0.15
<i>Allium stailatum</i>	Prairie Onion	0.50
<i>Amorpha canescens</i>	Leadplant	2.00
<i>Asclepis syriaca</i>	Common Milkweed	1.50
<i>Asclepia tuberosa</i>	Butterfly Milkweed	1.25
<i>Chamaechrista fasciculata</i>	Partridge Pea	6.00
<i>Coreopsis palmata</i>	Prairie Coreopsis	0.15
<i>Dalea candida</i>	White Prairie Clover	4.00
<i>Calea purpurea</i>	Purple Prairie Clover	6.75
<i>Echinacea angustifolia</i>	Narrow-leaved Coneflower	0.25
<i>Helianthis pauciflorus</i>	Stiff Sunflower	0.25
<i>Lezpedeza paitata</i>	Roundhead Lespedeza	1.00
<i>Liatris aspera</i>	Rough Blazing Star	0.25
<i>Penstemon graniflorus</i>	Showy Penstemon	0.50
<i>Potentilla arguta</i>	Prairie Cinquefoil	0.15
<i>Ratibida columnifera</i>	Long-headed Coneflower	1.25
<i>Rudbecki hirta</i>	Black Eyed Susan	1.50
<i>Solidago nemoralis</i>	Gray Goldenrod	0.25
<i>Solidago rigida</i>	Stiff Goldenrod	0.40
<i>Symphyotrichum laeve</i>	Smooth Blue Aster	0.25
<i>Symphyotrichum oolentangiense</i>	Sky Blue Aster	0.60
<i>Tradescantia ohioensis</i>	Ohio Spiderwort	0.15
<i>Verbena stricta</i>	Hoary Vervain	0.50
<i>Zizia aptera</i>	Heart-leaf Golden Alexanders	0.25
<b>Total Forbs</b>		<b>30.00</b>
<b>TOTAL</b>		<b>100.00</b>

B. Buffer Area Mix:

Botanical Name	Common Name	% by Weight
<i>Schizachyrum scoparium</i>	Little Bluestem	39.700
<b>Total Graminoids</b>		<b>39.70</b>
<i>Chamaecrista fasciculata</i>	Partridge Pea	10.00
<i>Coreopsis lanceolata</i>	Lanceleaf Coreopsis	8.00
<i>Echinacea purpurea</i>	Purple Coneflower	8.00
<i>Heliopsis helianthoides</i>	Oxeye Sunflower	6.00
<i>Liatris spicata</i>	Marsh Blazing Star	3.00
<i>Penstemon digitalis</i>	Tall White Beardtongue	3.00
<i>Monarda fistulosa</i>	Wild Bergamot	2.60
<i>Geum canadense</i>	White Avens	2.10
<i>Zizia aurea</i>	Golden Alexanders	2.00
<i>Pycnanthemum tenuifolium</i>	Narrowleaf Mountainmint	1.60
<i>Asclepis syriaca</i>	Common Milkweed	1.50
<i>Asclepia tuberosa</i>	Butterfly Milkweed	1.50
<i>Agastache foeniculum</i>	Anise Hyssop	1.00
<i>Aster laevis</i>	Smooth Blue Aster	1.00
<i>Aster lateriflorus</i>	Calico Aster	1.00
<i>Lezpedeza paitata</i>	Roundhead Lespedeza	1.00
<i>Senna hebecarpa</i>	Wild Senna	1.00
<i>Tradescantia ohioensis</i>	Ohio Spiderwort	1.00
<i>Penstemon hirsutus</i>	Hairy Beardtongue	0.70
<i>Solidago juncea</i>	Early Goldenrod	0.70
<i>Solidago nemoralis</i>	Gray Goldenrod	0.70
<i>Eupatorium perfoliatum</i>	Boneset	0.50
<i>Rudbeckia fulgida var. fulgida</i>	Orange Coneflower	0.50
<i>Veronia noveboracensis</i>	New York Ironweed	0.50
<i>Scutellaria incana</i>	Hoary Skullcap	0.20
<i>Veronicastrum virginicum</i>	Culver's Root	0.20
<b>Total Forbs</b>		<b>60.30</b>
<b>TOTAL</b>		<b>100.00</b>

# APPENDIX IV

## Ohio Pollinator Habitat Initiative Assessment Form

### Ohio Solar Site Pollinator Habitat Planning and Assessment Form

<p>1. Percent of total site planted with native or beneficial introduced flowering plants.</p> <p><input type="checkbox"/> 25-50% 10 points</p> <p><input checked="" type="checkbox"/> 51-75% 20 points</p> <p><input type="checkbox"/> 76-100% 30 points</p> <p>2. Flowering plant diversity in site perimeter &amp; buffer area (species with more than 1% cover).</p> <p><input type="checkbox"/> 9-12 species 5 points</p> <p><input checked="" type="checkbox"/> 13-16 species 10 points</p> <p><input type="checkbox"/> 17-20 species 15 points</p> <p><input type="checkbox"/> 20+ species 20 points</p> <p><input type="checkbox"/> Site specific Milkweed included @2,000 pls/ac minimum 10 points</p> <p>* If no boxes were selected in questions 1 or 2 then your site does not meet criteria to be considered as an OPHI Solar Pollinator Habitat. However, OPHI can work with you on ways to increase the pollinator score of your site.</p> <p>3. Flowering plant seed mixes and plantings to be used. Native species local to the site are preferred; otherwise species native to Ohio are encouraged.</p> <p><input checked="" type="checkbox"/> Includes only native plant species 15 points</p> <p><input type="checkbox"/> Includes native and beneficial introduced plant species 10 points</p> <p><input type="checkbox"/> Includes only beneficial introduced plant species 5 points</p> <p>4. Flowering plant diversity in rows &amp; under solar array.</p> <p><input type="checkbox"/> 4-6 5 points</p> <p><input checked="" type="checkbox"/> 7+ 10 points</p> <p><input type="checkbox"/> Site specific Milkweed included @2,000 pls/ac minimum 10 points</p> <p>5. Seasons with at least 3 blooming species. Check all that apply.</p> <p><input checked="" type="checkbox"/> Spring (April – May) 5 points</p> <p><input checked="" type="checkbox"/> Summer (June – August) 5 points</p> <p><input checked="" type="checkbox"/> Fall (September – October) 5 points</p> <p>6. Available habitat components within ¼ mile of site. Check all that apply.</p> <p><input type="checkbox"/> Native grasses 2 points</p> <p><input checked="" type="checkbox"/> Trees and shrubs 2 points</p> <p><input checked="" type="checkbox"/> Forest edge habitat 2 points</p> <p><input type="checkbox"/> Cavity nesting sites 2 points</p> <p><input type="checkbox"/> Clean perennial water sources 2 points</p>	<p>7. Planned vegetative buffers adjacent to the solar site. Check all that apply.</p> <p><input checked="" type="checkbox"/> Site has planned buffer adjacent to solar site 5 points</p> <p><input checked="" type="checkbox"/> Buffer is at least 30 feet wide as measured from array fencing or edge of flower plantings 5 points</p> <p><input type="checkbox"/> Buffer is at least 50 feet wide as measured from array fencing or edge of flower plantings 10 points</p> <p><input checked="" type="checkbox"/> Buffer includes flowering Shrubs/trees and other shrubs/trees that provide food for wildlife 5 points</p> <p>8. Habitat site preparation prior to implementation.</p> <p><input checked="" type="checkbox"/> Measures taken to control weeds and invasive species prior to seeding/planting. 10 points</p> <p><input checked="" type="checkbox"/> Appropriate soil preparation done to reduce erosion and enhance germination/growth 5 points</p> <p><input type="checkbox"/> None -10 points</p> <p>9. Planned management practices for areas designated as part of the pollinator habitat site. Check all that apply.</p> <p><input checked="" type="checkbox"/> Detailed establishment and management plan developed for site 10 points</p> <p><input type="checkbox"/> Mowing Follows OPHI mowing schedule for monarchs each year 5 points</p> <p><input type="checkbox"/> Mowing is staggered over a 2 week period 5 points</p> <p><input type="checkbox"/> Signage indicating site is wildlife &amp; pollinator-friendly 5 points</p> <p><input type="checkbox"/> Creation of habitat features (e.g. boxes, pass-through tunnels, bee hotels) 5 points</p> <p><input type="checkbox"/> Long-term monitoring plan developed that includes re-certification as Solar Site Pollinator Habitat 10 points</p> <p>10. Insecticide risk. Check if applicable. Communication with adjacent landowners about the project and possible impacts of their insecticide use is critical</p> <p><input checked="" type="checkbox"/> Site is adjacent to land (within 120 ft.) where insecticides are used -20 points</p> <p><input type="checkbox"/> Planned on-site insecticide use (including pre-treated seeds/plants) -40 points</p> <p style="text-align: right;"><b>Total Points: 94</b></p> <p><b>Provides High Quality Pollinator Habitat &gt; 85</b></p> <p><b>Meets OPHI Solar Pollinator Habitat Standards 70-84</b></p> <p><b>Site Owner/Operator:</b> Leeward Renewable Energy Development, LLC</p> <p><b>Project Location:</b> Harrison Township, Licking County</p> <p><b>Project Size (acres):</b> 550 acres</p> <p><b>Planned Source of Seeds:</b> Ohio Prairie Nursery; Ernst Seeds</p> <p><b>Planned Seeding Date:</b> 09/30/2023</p> <p><b>Habitat &amp; Vegetation Consultant:</b> Environmental Design &amp; Research, DPC</p>
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Refer to [www.ophi.info](http://www.ophi.info) for more information regarding solar pollinator habitat development.

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Developed by the OPHI Solar Pollinator Program Advisory Team

