



# **Vegetation Management Plan**

New Market Solar I – 65 MW Project

August 2020

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New Market Solar I – 65 MW Project  
Highland County, Ohio

August 2020

# Issue and revision record

Revision	Date	Originator	Checkout	Approver	Descriptor
V1	4/22/2020	J. Miner	4/28/2020	D. Gibbons	Initial draft
V2	5/21/2020	J. Miner	5/21/2020	J. Berkow	Draft for client review
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V4	6/19/2020	J. Miner	6/30/2020	J. Berkow	Final - revised
V5	8/24/2020	J. Miner	8/28/2020	J. Berkow	Final - revised

## Information class: Standard

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# Acronyms

BMPs	best management practices
GIS	geographic information system
Hecate	Hecate Energy Highland 4 LLC
lbs	pounds
MW	megawatts
NHD	National Hydrography Dataset
NLCD	National Land Cover Dataset
NWI	National Wetlands Inventory
ODNR	Ohio Department of Natural Resources
OHL	overhead transmission line
OPSB	Ohio Power Siting Board
OSU	Ohio State University
Plan	Vegetation Monitoring Plan
Project	New Market Solar I – 65 MW Project
SWCD	Soil and Water Conservation District
SWPPP	Stormwater Pollution Prevention Plan
TOY	time-of-year
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VMP	Vegetation Management Plan

# 1 Introduction and Purpose

## 1.1 Introduction

This Vegetation Management Plan (VMP or Plan) has been prepared for a proposed solar facility in accordance with Ohio Revised Code, Chapter 4906-4; Certificate Applications for Electric Generation Facilities, under the authority of the Ohio Power Siting Board (OPSB). Hecate Energy Highland 4 LLC (Hecate) proposes to construct their New Market Solar I – 65 MW Project (Project) in Highland County, Ohio. The New Market Solar I Project will be located on private parcels accounting for approximately 823 acres, of which approximately 602.6 acres would be developed for the 65 MW site. Additionally, the Project substations account for approximately 6.2 acres, and the overhead transmission lines (OHL) account for approximately 10.0 acres (refer to Figure 1 – Project Overview Map - USGS Topographic Quadrangle Map and Figure 2 – Project Overview Map – Aerial Imagery).

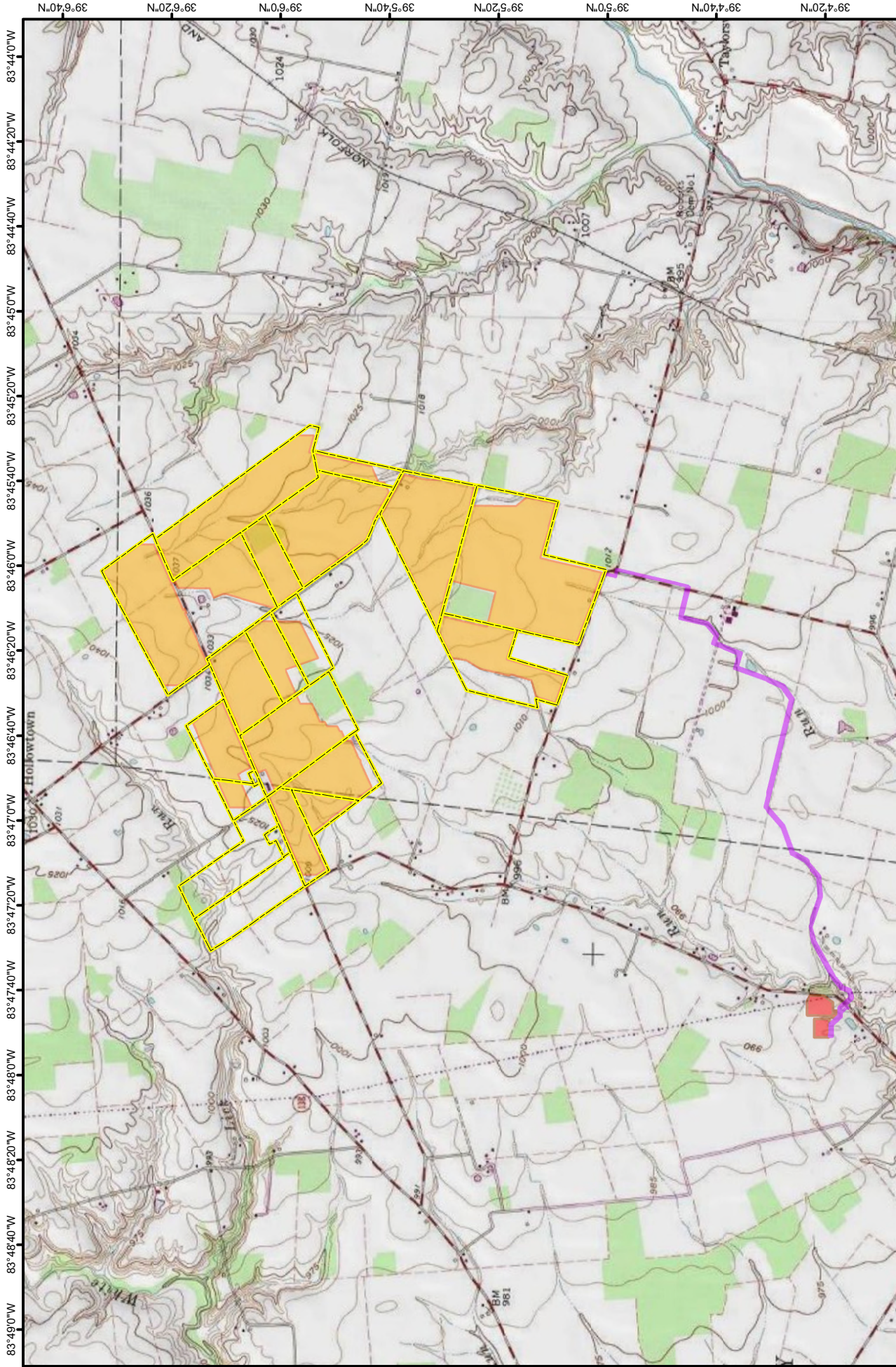
This Plan has been prepared for the 65 MW Project site located approximately 13.5 miles (21.7 kilometers) southwest of Hillsboro, in Highland County, Ohio. The 65 MW Project site is generally bounded by New Market Road to the north and Edwards Road to the south. The substation is located adjacent to Gath Road. The Project is accessed via New Market Road from its intersection with Landess Road, to State Route 138 or from Edwards Road from its intersection with Gath Road and State Route 321 (refer to Figure 1 – Project Overview Map - USGS Topographic Quadrangle Map and Figure 2 – Project Overview Map – Aerial Imagery).


## 1.2 Purpose and Intent

This VMP will describe vegetation management practices during the construction and operation phases of the Project. Training will be provided to contractors and subcontractors to ensure compliance with the contents and conditions of this Plan. The VMP has been developed to ensure the safe and reliable production and delivery of electrical power consistent with responsible land use and minimal impacts to the ecosystem in and around the Project site. It aims to serve as a tool in providing a consistent and predictable vegetation management strategy. The VMP includes four related elements of implementation:

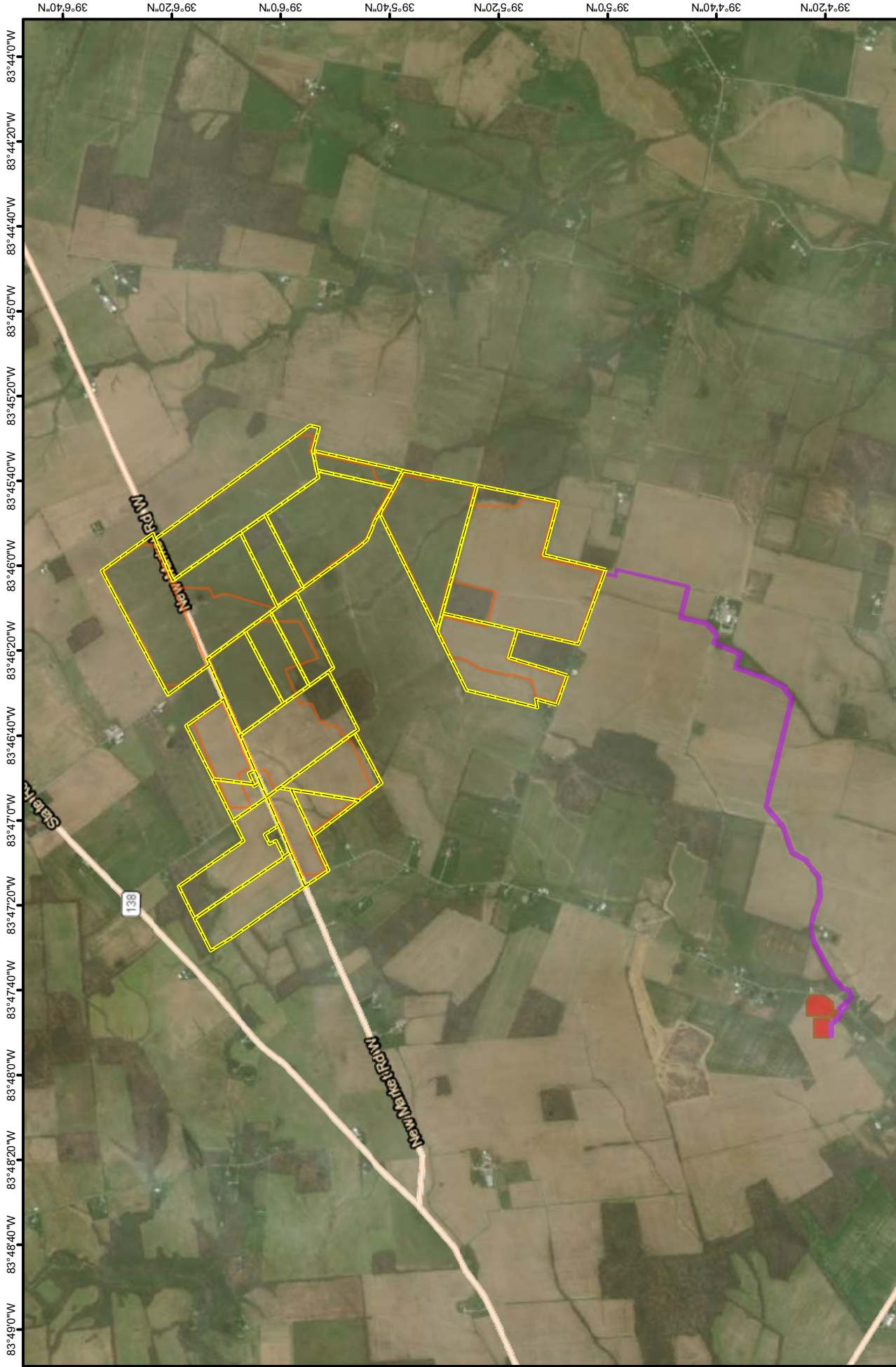
1. Existing Conditions – Identifies the existing site conditions, including current vegetation communities and land uses present on site, prior to construction.
2. Site Clearing – Describes appropriate clearing procedures, provides measures for the protection of trees, measures for clearing of woodlands and processing of wood products, if required, to prepare the Project site for construction.
3. Revegetation – Describes revegetation methods for the solar field and the managed periphery. Revegetation includes replanting areas disturbed during construction, both temporarily and permanently. Permanent revegetation will include installing visual mitigation and landscape screening, implementing native plants and pollinator-friendly species.
4. Maintenance – Describes mowing and other practices that will be used to maintain healthy vegetative cover at the Project site during operation of the facility. Describes strategies to control invasive plant and noxious weed species and describes monitoring and management methods during the operational phase of the Project.





<b>Notes:</b> Data Sources: Mott MacDonald USGS 1:24k Topo Quads		<b>Legend</b> <b>Project Site</b> 65 MW Substation OHL Parcel Boundary		<b>Hecate Energy Highland 4 LLC New Market Solar I - 65 MW Project</b> <b>Figure 1</b> Project Overview Map - Topographic Quadrangle Highland County, Ohio		 <b>ABSOLUTE SCALE:</b> 1:30,000 <b>REFERENCE SCALE:</b> 1 IN = 2,500 feet		<b>M M</b> MOTT MACDONALD 5295 S. Commerce Dr. Ste. 500 Salt Lake City, UT 84107 Ph: (801) 559-2716		Drawn By: JLM Date: 8/28/2020		Page: 1 of 1	
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**Notes:**  
Data Sources:  
Mott MacDonald  
ESRI World Imagery Layer  
(image acquired 4/13/2019)  
World Transportation Layer  
Ohio Power Siting Board Application  
New Market Solar Farm  
Hecate Energy Highland 4 LLC and  
Hecate Energy Highland 2, LLC  
Exhibit K: Vegetation Management Plan New Market Solar I

- Legend**
- Project Site**
  - 65 MW
  - Substation
  - OHL
  - Parcel Boundary

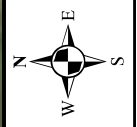
**Hecate Energy Highland 4 LLC  
New Market Solar I - 65 MW Project  
Figure 2  
Project Overview Map - Aerial Imagery**

Highland County, Ohio

0 1,250 2,500 5,000 Feet

**ABSOLUTE SCALE:**  
1:30,000

**REFERENCE SCALE:**  
1 IN = 2,500 feet



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## 2 Existing Vegetation Conditions

The site characterizations for the VMP were completed using a combination of existing information available from public sources including on-line databases, public literature and documents, and geographic information systems (GIS) data.

Land cover and land use types were categorized and reviewed using the United States Geological Survey (USGS) National Land Cover Database (NLCD). The following publicly available data sources were used to create the land cover map (Figure 3) and provide statistics for the existing conditions of the Project site:

- > ESRI ArcGIS™ World Imagery Layer: Imagery acquired 4/13/2019.
- > Google Earth™: Imagery acquired 4/25/2017 (Available at: <https://earth.google.com/>).
- > USGS NLCD: Dataset developed 2016 (available at: <https://www.mrlc.gov/data?f%5B0%5D=category%3Aland%20cover&f%5B1%5D=region%3Aconus>).
- > United States Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) (available at: <https://www.fws.gov/wetlands/Data/State-Downloads.html>)
- > USGS National Hydrography Dataset (NHD) (available at: <https://www.usgs.gov/core-science-systems/ngp/national-hydrography/access-national-hydrography-products>)

As shown on Figure 3, and summarized in Table 1, under existing conditions 97.7 percent of the approximately 618.8 acres within the Project sites (includes the proposed 65 MW site, substation, and OHL) is comprised of agricultural cultivated croplands. In addition to cultivated crops, approximately 2.3 percent (14.2 acres) is comprised of deciduous forests or woodlands.<sup>1</sup> For additional reference, Table 2 provides the summary of the USGS NLCD. The NLCD, using a 30-meter pixel resolution to categorize the existing land cover conditions of the Project site has identified approximately 96.1 percent of the site as Cultivated Crops, approximately 1.9 percent as Deciduous & Mixed Forests, approximately 1.3 percent as Developed – Open Space, and less than 1 percent as Hay/Pasture, Developed – Low Intensity, and Developed – Medium Intensity.

The Project site is located within the Eastern Corn Belt Plains Ecoregion which is generally characterized as having loamy and well-drained soils associated with rolling plains and local end moraines. The vegetation of the ecoregion was originally dominated by American beech (*Fagus grandifolia*), sugar maple (*Acer saccharum*) and American basswood (*Tilia americana*) forests; however, aerial photography interpretation and USGS NLCD mapping show this landscape has been significantly altered by farming practices allowing for other hardwood tree species such as locust (*Robinia* sp.), walnut (*Juglans* sp.), and oaks (*Quercus* spp.) to establish.

Predominant tree species found in the wooded areas and roadside/fenceline woodland plantings include oaks (*Quercus* spp.) and maples (*Acer* spp.). Understory plants are comprised mostly of young maple and oak saplings. Additionally, primary crops planted in annual rotations throughout this region include; soybean, wheat, alfalfa, and corn. Soil conditions within the Project site are generally characterized as loamy and well drained and the land is used heavily for row crop agriculture, resulting in strips or fragmented stands of old field growth, hedge rows, and forested/woodland areas. Invasive plants and other noxious weeds are likely to occur along the edges of roads, hedge rows, and cropland field edges. Noxious weeds and invasive plants that

<sup>1</sup> Based upon 2019 aerial imagery interpretation.

are common to this area and landuse type, and are therefore likely to occur within or near the Project site include; burdock (*Arctium lappa*), maretail (*Conyza canadensis*), Canada thistle (*Cirsium arvense*), Virginia creeper (*Parthenocissus quinquefolia*), poison ivy (*Toxicodendron radicans*), common dandelion (*Taraxacum officinale*), and johnsongrass (*Sorghum halepense*).

The Project site contains four drainage ditches, which are likely altered (i.e., straightened) former natural streams. Review of USGS NHD identifies two of these drainages as unnamed intermittent tributaries to East Fork of White Oak Creek, one as the intermittent Bell's Run, and one as an unnamed intermittent tributary to Flat Run. A review of the USFWS NWI dataset identifies all drainages as Riverine Intermittent waterbodies. No other wetlands or waterbodies have been mapped on the Project site according to the USGS NHD and USFWS NWI. Review of aerial imagery confirms presence of the NWI and NHD mapped drainage ditches and has identified unmapped drainage channels exist with the site. Aerial interpretation also identified several other drainage channels that will be avoided by Project design. No other wetlands or aquatic resources were identified within the Project site.

**Table 1. Existing Land Cover and Land Uses**

Site	Agricultural Cropland (acres)	Forest/Woodland (acres)	Rural Residential (acres)	Total (acres)
<b>65 MW</b>	588.4	14.2	0.0	602.6
<b>Substation</b>	6.2	0.0	0.0	6.2
<b>OHL</b>	10.0	<0.1	0.0	10.0
<b>Total Acres</b>	<b>604.6</b>	<b>14.2</b>	<b>0.0</b>	<b>618.8</b>
<b>Percent</b>	<b>97.7</b>	<b>2.3</b>	<b>0.0</b>	<b>100.0</b>

Source: Interpretation of ESRI World Imagery Layer, aerial imagery acquired 4/13/2019.

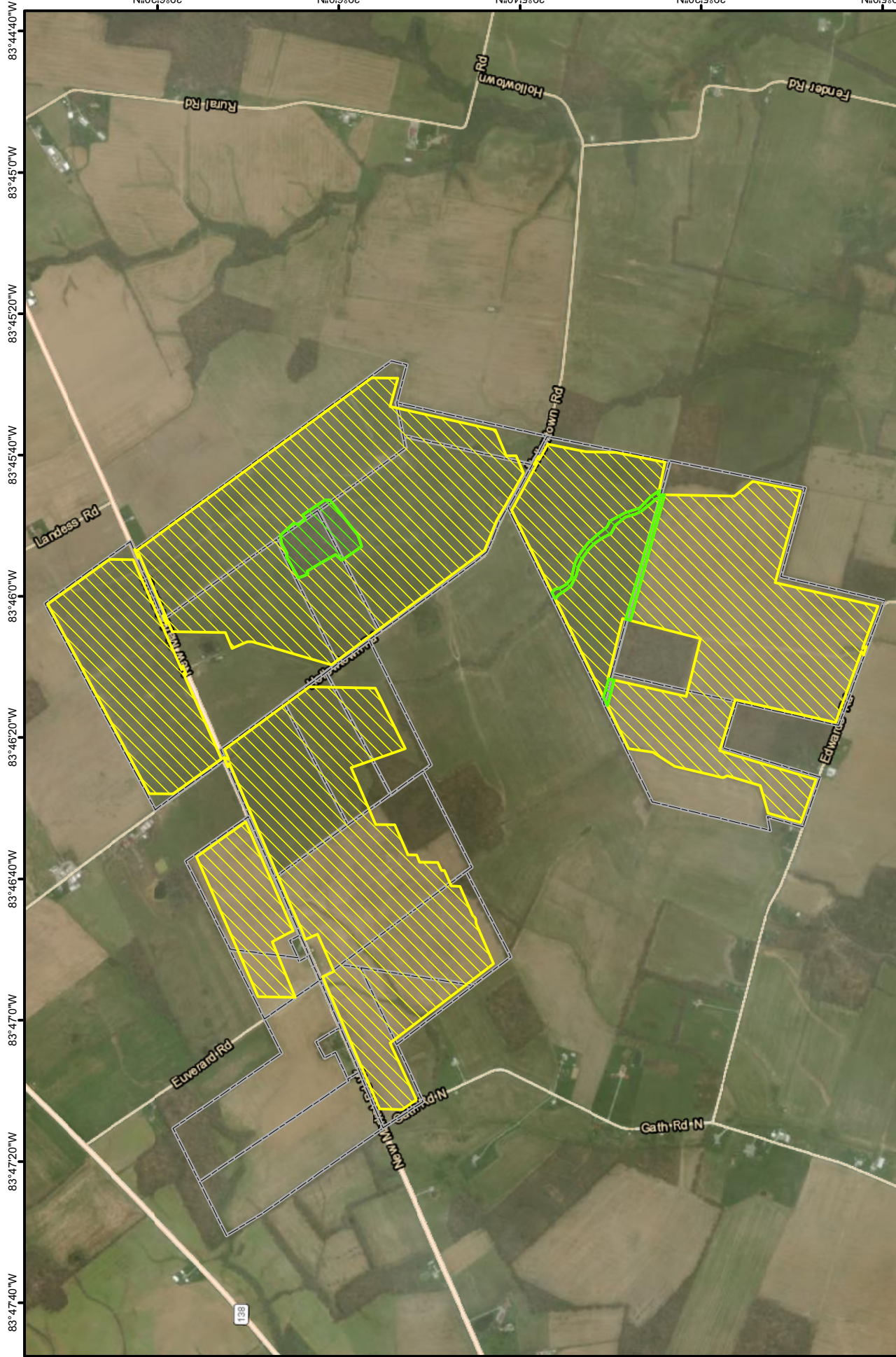
**Table 2. USGS National Land Cover Dataset**

Site	Cultivated Crops (acres)	Hay/Pasture (acres)	Deciduous & Mixed Forest (acres)	Woody Wetlands (acres)	Developed Open Space (acres)	Developed Low Intensity (acres)	Developed Medium Intensity (acres)	Total (acres)
<b>65 MW</b>	579.6	0.4	11.0	0.0	8.1	3.5	0.0	602.6
<b>Substation</b>	6.2	0.0	0.0	0.0	0.0	0.0	0.0	6.2
<b>OHL</b>	8.6	0.6	0.6	0.0	0.2	0.1	0.1	10.0
<b>Total Acres</b>	<b>594.4</b>	<b>1.0</b>	<b>11.6</b>	<b>0.0</b>	<b>8.3</b>	<b>3.6</b>	<b>0.1</b>	<b>618.8</b>
<b>Percent</b>	<b>96.1</b>	<b>0.1</b>	<b>1.9</b>	<b>0.0</b>	<b>1.3</b>	<b>0.6</b>	<b>&lt;0.1</b>	<b>100.0</b>

Source: USGS National Land Cover Dataset published 2016.

## 2.1 Protection of Sensitive Areas

No work will be conducted within delineated wetlands or watercourses. Intact patches of existing deciduous forest have been avoided through Project design. Forested areas, existing drainage systems, or other environmentally sensitive areas will be protected by staking the Project's limit of disturbance prior to construction.



**Notes:**  
Data Sources:  
Mott MacDonald  
ESRI World Imagery Layer  
(Image acquired 4/13/2019)

Ohio Power Siting Board Application  
New Market Solar Farm  
Hecate Energy Highland 4 LLC and  
Hecate Energy Highland 2, LLC  
Exhibit K - Vegetation Management Plan New Market Solar I

**Legend**

- Agricultural Cropland
- Forest/Woodland
- Rural Residential
- Parcel Boundary

**Hecate Energy Highland 4 LLC  
New Market Solar I - 65 MW Project  
Figure 3  
Existing Landuse and Land Cover Types**

Highland County, Ohio

0 750 1,500 3,000 Feet

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**ABSOLUTE SCALE:**  
1:18,000

**REFERENCE SCALE:**  
1 IN = 1,500 feet

**North Arrow**



### 3 Site Clearing

Prior to construction and before commencing clearing activities, the Project's limit of disturbance will be surveyed and staked in the field. This limit of disturbance will include the limit of tree clearing, the limit of stump grubbing and in areas where no clearing is required the limit of soil disturbance. Pre-construction surveys and subsequent control, if needed, for noxious and invasive weed infestations is recommended to minimize seed dispersal and spread of unwanted weed species. Control measures are further described in Section 5.1.

Site entrances will have anti-tracking pads installed at the construction entrance/exits and existing farm roads will be widened and hardened so that clearing, and construction equipment can be brought into the site. As will be detailed in the Project's Construction Stormwater Pollution Prevention Plan (SWPPP), temporary perimeter sediment controls and diversions will be installed concurrent with the progress of land clearing and grubbing activities.

In forested or wooded areas, heavy equipment operation will not be permitted to travel beyond the limits of grubbing. Tree harvesters may reach beyond the limit of grubbing to cut and retrieve trees or trees may be cut with chain saws and cabled to the limit of grubbing. Any necessary tree trimming, pruning, or felling activity will follow the seasonal clearing guidance provided by USFWS. Tree removal should only occur outside the primary nesting season for migratory birds, identified as March 1<sup>st</sup> through July 15<sup>th</sup> and outside the common roosting season for protected bat species which extends through September 30<sup>th</sup>. To comply with the time of year (TOY) tree clearing restrictions applied to protect migratory and/or state listed bird nestlings and maternity roosts for listed bat species, tree clearing should only occur between October 1<sup>st</sup> and April 30<sup>th</sup>. The Project will avoid potential impacts to listed bat species or nesting migratory and/or state listed bird species by avoiding any clearing of trees or branches greater than three inches in diameter between March 1<sup>st</sup> and September 30<sup>th</sup>. If tree clearing must occur within the TOY clearing restrictions, additional coordination with USFWS and/or Ohio Department of Natural Resources (ODNR) will occur prior to clearing, unless the tree/branch to be cleared is determined hazardous to human life or property. Prior to construction, if any tree clearing is required, the locations of all trees to be cleared will be mapped and included on final site plan drawings. After clearing limits are marked, individual trees within 10 feet of the clearing limit will be marked in the field for removal. Trees to be preserved within 10 feet of the clearing limit will receive tree protection. Tree clearing will be performed using whole tree harvesters, skidders, forwarders, and chain saws. Aerial lifts may be used to fell larger trees.

Note that TOY clearing restrictions also apply for mowing or grubbing of grassland areas such as field margins, filter strips, and grass waterway drainage ditches. USFWS guidance identifies that no mowing or grubbing between March 1<sup>st</sup> through July 15<sup>th</sup>. Note that spot spraying noxious weeds during this TOY restriction period is allowed.

As shown in the site plans, where the solar array, roadway, or other grading is proposed stumps will be grubbed using tracked excavators. In areas cleared to minimize shading, stumps will be left in place to minimize ground disturbance. It is anticipated that minimal tree clearing will be required, the Project site has been designed to avoid forested areas to the extent practicable. As such, all trees felled (stumps and tops) will be processed in a grinder to provide wood mulch for perimeter sediment control. This may be used to supplement the perimeter silt fence and compost filter socks that will be identified in the Project SWPPP.



## 4 Revegetation

To the extent possible, the Project will implement revegetation practices and landscaping measures including:

- > planting of temporary vegetation and long-term permanent vegetation,
- > planting of solar array groundcover and pollinator-specific groundcover, and
- > planting of landscape screening.

Revegetation of the Project site will be limited to the solar field and any other areas that have been disturbed during construction or that require invasive species control.

### 4.1 Temporary Vegetation

During construction and/or extensive maintenance activities, temporary stabilization practices must be implemented to reduce soil erosion during stormwater events and minimize damage to soils during intensive equipment traffic. BMPs to address these concerns, including use of temporary (annual) seed mixes and winter cover crops, will be outlined in the Project's SWPPP and will be implemented to ensure all land and water resources are protected during construction and operations.

In accordance with the General Permit for Construction Stormwater Discharges, temporary seeding is applicable to areas where an initial disturbance is followed by a period of inactivity greater than 14 days but less than one year, and not within 50 feet of a surface water of the state. If disturbance is within 50 feet of a surface water of the state, temporary seeding must be applied within two days of disturbance if the area will remain idle for more than 14 days. Soil stockpiles, diversion berms and temporary grading are examples of areas where this practice is used to control erosion until permanent stabilization is accomplished.

### 4.2 Long-term/Permanent Vegetation and Landscape Plan

#### 4.2.1 Landscape Visual Screening Plan

The visual mitigation and landscaping screening for each location identified in the final Project site plans will include plantings of two tree rows, spaced 10 feet apart. The primary vegetation buffer (i.e., planted closest to the project boundary) will consist of evergreen trees, specifically, Eastern red cedar (*Juniperus virginiana*) and Northern white cedar (*Thuja occidentalis*), unless otherwise agreed to by the landowner. The evergreen trees, when installed, will be six feet in height and balled and bur lapped root. The second row of trees will consist of deciduous trees, specifically, red maple (*Acer rubrum*), sugar maple (*Acer saccharum*), hackberry (*Celtis occidentalis*), red oak (*Quercus rubra*), or similar species. The deciduous trees, when installed, will be six to eight feet in height and balled and bur lapped root. Shrubs will be planted interspersed within the buffer and may be a combination of species such as arrowwood (*Viburnum dentatum*), blackhaw (*Viburnum prunifolium*), ninebark (*Physocarpus opulifolius*), forsythia (*Forsythia intermedia*), or similar species. The shrubs, when installed, will be one to four feet in height and balled and bur lapped root. This Plan has selected the prescribed species because they are native to this region and well suited to the environment, will provide sufficient screening based on height and spread, and will require minimal care. These, or substantially similar, visual buffers will be developed for

existing residences and along public roadways where mitigation against any potential views of the proposed solar arrays is required. A concept Landscape Plan is provided as Figure 4.

The existing conditions observed within the Project site are suitable for the plant species identified in this Plan. However, if site-specific conditions are not tolerable for species identified in this Plan substitutions are permissible for other native plants more suitable to the ground conditions at specific sites or within micro-habitat conditions. Examples may include substitutions for shade-tolerant or saturation-tolerant species.

#### 4.2.2 Permanent Vegetation

Permanent vegetation within the site and for disturbed areas caused during construction will be accomplished through seedbed preparation and seeding of appropriate seed mixes. The purpose of permanent seeding is to stabilize the soil with a stand of grass and/or legumes that will prevent damage from wind and/or water erosion and sedimentation. This type of vegetative control measure is applied when disturbed or erodible soils have been brought to final grade.

Factors that need to be considered in planting the permanent seed cover include the time of year at which the seed is applied, if topsoil is needed, the soil texture, final grade of the site, mulching, and the type of application. Seeding methods will be determined at time of application.

Permanent seed and mulch should be applied to all graded areas as soon as practicable after final grades are achieved and always within 14 days to comply with conditions in the General Permit for Construction Stormwater Discharges. If final grading is to be delayed for more than 14 days after land disturbance activities cease, temporary soil stabilization measures shall be applied in accordance with the General Permit for Construction Stormwater Discharges. Seed establishment should be inspected at least one week after application and will be monitored by the qualified Environmental Site Inspector.

#### 4.2.3 Solar Array Ground Cover Permanent Seeding

Within the solar array areas, a low-growing seed mix (Table 3) specifically created for the use under the arrays will be used as the long-term ground cover. This mix is comprised of warm and cool season grasses that do not typically exceed a height of two feet; eliminating any concerns for shading. A seed mix of shorter height grasses reduces mowing regimens. If practicable, the permanent seed mix may be drilled into the array layout prior to the installation of posts and later damaged areas repaired and over-seeded as construction progresses.

Also, by selecting low-growing flowering species for the pollinator-friendly ground cover (Table 4), natural seed dispersal of flowering plants will not impact mowing or maintenance activities if they become established within the solar array areas. A Concept Landscape Plan for the 35 MW Project Site (Figure 4) presents the approximate areas of the site that will be seeded with the Solar Array Seed Mix (Table 3), areas seeded with the Pollinator-friendly Seed Mix (Table 4) and illustrates the Visual Screening plantings. Table 5 presents the approximate acreage within the site for each seed mix application.

**Table 3. Proposed Solar Array Ground Cover Seed Mix**

Common Name	Botanical Name	Mix Concentration	Rate (lbs/acre)	Rate (lbs/1000)
Creeping red fescue	<i>Festuca rubra</i>	34%	20	0.46
Sheep fescue	<i>Festuca ovina</i>	33%		
Hard fescue 'Beacon'	<i>Festuca brevipila</i> 'Beacon'	10%		
Hard fescue 'Rhino'	<i>Festuca ovina</i> var. <i>duriuscula</i> 'Rhino'	5%		

Blue fescue 'Blue ray'	<i>Festuca ovina</i> var. <i>glauca</i> ( <i>Festuca glauca</i> ) 'Blue ray'	5%		
Kentucky bluegrass 'Argyle'	<i>Poa pratensis</i> 'Argyle'	5%		
Kentucky bluegrass	<i>Poa pratensis</i> 'Shamrock'	5%		
Autumn bentgrass	<i>Agrostis perennans</i>	3%		

#### 4.2.4 Pollinator-friendly Ground Cover Permanent Seeding

A pollinator-specific seed mix (Table 4) will be used in select areas to provide additional ecological benefit and enhance visual aesthetics of the Project. These select areas include, for example, along the fence line perimeters, access roads, and other places where pockets of space are created due to odd angles in the fence line perimeter and solar array configurations, or buffer areas (refer to the concept Landscape Plan, Figure 4). Since this seed mix is intended for areas away from panel arrays, the species selected can be allowed to grow taller than the ground cover maintained within the solar array. Proper raking, tilling, and finish grading techniques shall be performed prior to sowing the pollinator-specific seed mix. Some examples of pollinator-friendly species include purple coneflower (*Echinacea purpurea*), black-eyed Susan (*Rudbeckia hirta*), plains coreopsis (*Coreopsis tinctoria*), Ohio spiderwort (*Tradescantia ohioensis*), and zigzag aster (*Aster prenanthoides*). A native wildflower and grass seed mix appropriate for the northeast region of the United States is provided in Table 4. Depending on seed availability at the time of final vegetation seeding; appropriate native flowering plants may be substituted as needed.

**Table 4. Proposed Pollinator-friendly Ground Cover Seed Mix – Northeast Native Wildflower and Grass Seed Mix**

Common Name	Botanical Name	Mix Concentration	Rate (lbs/acre)	Rate (lbs/1,000ft <sup>2</sup> )
Little bluestem	<i>Schizachyrium scoparium</i>	40%	20	0.46
Sideoats grama	<i>Bouteloua curtipendula</i>	23.4%		
Cosmos	<i>Cosmos bipinnatus</i>	7.3%		
Lanceleaf coreopsis	<i>Coreopsis lanceolata</i>	3.5%		
Purple coneflower	<i>Echinacea purpurea</i>	3.5%		
Virginia wildrye	<i>Elymus virginicus</i>	3%		
Indiangrass	<i>Sorghastrum nutans</i>	2.5%		
Bigleaf lupine	<i>Lupinus polyphyllus</i>	2.2%		
Partridge pea	<i>Chamaecrista fasciculata</i>	2%		
Rocket larkspur	<i>Delphinium ajacis</i>	2%		
Black-eyed Susan	<i>Rudbeckia hirta</i>	2%		
Blanket flower	<i>Gaillardia aristata</i>	1.5%		
Wild senna	<i>Senna hebecarpa</i>	1%		
Tall white beardtongue	<i>Penstemon digitalis</i>	1%		
Shirley mix (Corn poppy)	<i>Papaver rhoeas</i>	0.60%		
Big bluestem	<i>Andropogon gerardii</i>	0.50%		
Canada wildrye	<i>Elymus canadensis</i>	0.50%		
Plains coreopsis	<i>Coreopsis tinctoria</i>	0.50%		
Blazing star	<i>Liatris spicata</i>	0.40%		
Common milkweed	<i>Asclepias syriaca</i>	0.40%		
Butterfly milkweed	<i>Asclepias tuberosa</i>	0.40%		

Golden Alexanders	<i>Zizia aurea</i>	0.30%		
Swamp milkweed	<i>Asclepias incarnata</i>	0.30%		
Wild bergamont	<i>Monarda fistulosa</i>	0.20%		
Appalachian beardtongue	<i>Penstemon laevigatus</i>	0.20%		
Maryland senna	<i>Senna marilandica</i>	0.20%		
Gray goldenrod	<i>Solidago nemoralis</i>	0.10%		
Ohio spiderwort	<i>Tradescantia ohiensis</i>	0.10%		
Smooth blue aster	<i>Aster laevis</i>	0.10%		
New England aster	<i>Aster novai-angliae</i>	0.10%		
Zigzag aster	<i>Aster prenanthoides</i>	0.10%		
Oxeye sunflower	<i>Heliopsis helianthoides</i>	0.10%		

**Table 5. Seed Mix Application Summary**

Site	Solar Array Seed Mix (acres)	Pollinator-Friendly Seed Mix (acres)	Unseeded Roads/Facilities/ Forested (acres)	Total (acres)
<b>65 MW</b>	409.7	139.8	53.1	602.6
<b>Substation</b>	0.0	0.0	6.2	6.2
<b>OHL</b>	0.0	10.0	0.0	10.0
<b>Total Acres</b>	<b>409.7</b>	<b>149.8</b>	<b>59.3</b>	<b>618.8</b>
<b>Percent</b>	<b>66.2</b>	<b>24.2</b>	<b>9.6</b>	<b>100.0</b>

Source: Concept Landscape Plan.

#### 4.2.5 Seed Providers

The contractor will be responsible for supplying the appropriate seed mixes in quantities sufficient for proper seed application. For reference, this Plan has identified potential seed suppliers for seed mixes identified within this Plan.

- > Ohio Prairie Nursery Seed: <https://www.opnseed.com/shop/seed-mixes-9478>
- > All Native Seed, LLC: <https://allnativeseed.com/crp-mixes-developed-by-fsa-nrcs/>
- > American Meadows: <https://www.americanmeadows.com/wildflower-seeds/wildflower-mix/midwest-pollinator-wildflower-seed-mix>
- > High Country Gardens: <https://www.highcountrygardens.com/wildflower-seeds/mixtures/midwest-native-wildflower-seed-mix>
- > Cardno Native Plant Nursery: <https://www.cardnonativeplantnursery.com/>

#### 4.2.6 Long-Term Vegetation and Landscaping Plan Requirements

The following actions or requirements are described to ensure success of the long-term ground covers or areas receiving visual screening pursuant to this Landscape Plan and shall be adhered to during site reclamation following construction or any significant maintenance activities requiring earth disturbance.

All labor, plants, approved seed mix, and materials shall be provided in quantities sufficient to complete any revegetation work necessary prior to implementation, and all trees/shrubs being used for revegetation efforts shall be acclimated by the supply nursery to the local hardiness zone (Zone 6a – Temperature -10 to -5 degrees Fahrenheit), be certified that the planting material has



been grown for a minimum of two years at the source, and obtained within 200 miles of the Project unless otherwise approved and agreed upon by the Project.

Plant material used for revegetation efforts within the Project site shall be guaranteed upon installation and any/all plants, trees, and shrubs shall be healthy and free of disease before, during, and after substantial completion and acceptance by the Project. Any dead or unhealthy plants shall be replaced following the guidelines and directives of guarantee(s) provided and agreed upon. Final acceptance of any revegetation efforts shall be made only if all plants meet the guarantee requirements including the maintenance directives put forth in this VMP and Landscape Plan. Any plantings that fail within the first year will be replaced.

Additionally, all tree/shrub planting locations should be coordinated with Project utilities. A site layout, grading and/or utility plan will be referenced to locate storm, sanitary, gas, electric, telephone and water lines whenever possible and care should always be exercised when digging in areas of potential conflict with underground or overhead utilities. The state one-call service will be contacted prior to conducting any excavations on site, including excavations for tree plantings.

The native topsoil of the Project site is anticipated to be sufficient to support the establishment of the permanent seed mixes identified in this Plan. If the local seed provider determines that topsoil samples are necessary to confirm proper seed selection, topsoil samples will be submitted to a certified testing laboratory to determine pH, fertility, organic content and mechanical composition prior to any planting or sowing of seed. Topsoil testing can be completed at a Regional Extension Office of the United States Department of Agriculture (USDA) or other qualified facility and the resulting amendment recommendations for good plant growth and proper soil acidity should be incorporated into the existing soil prior to any sowing of seed or planting that is to occur.

Following construction or maintenance activity, the disturbed areas will be brought to final grade and the seedbed prepared for seeding. Preparing the seedbed may involve mechanical decompaction of the native topsoil to a depth of four inches. Approved seeding methods include broadcast, drilling, corrugated roller, or band seeder.

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83°45'50"W

83°46'0"W

39°4'50"N

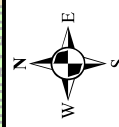
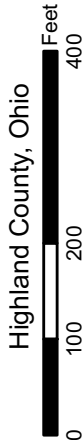


**Notes:**  
Data Sources:  
Mott MacDonald  
ESRI World Imagery Layer  
(acquired 4/13/2019)

- Legend**
- Seed Mix
    - Solar Array Seed Mix
    - Pollinator Seed Mix
    - Vegetative Buffer
  - Perimeter Fence
  - PV Array
  - Gravel Road
  - Dirt Road

# Hecate Energy Highland 4 LLC New Market Solar I - 65 MW Project

**Figure 4**  
Concept Landscape Plan



**M M**  
MOTT  
MACDONALD  
5295 S. Commerce Dr. Ste. 500  
Salt Lake City, UT 84107  
Ph: (801) 559-2716

Drawn By: JLM  
Date: 8/28/2020

## 5 Vegetation Maintenance

The implementation of a vegetation monitoring program and schedule combined with appropriate vegetation management practices can provide numerous benefits to the Project site and adjacent parcels, as well as minimize overall maintenance costs over the Project life. Proper monitoring and maintenance techniques will help enhance the overall vitality of the existing or planted native vegetation located within the Project site and limit the spread of unwanted, invasive, or noxious plant species in the site and to adjacent parcels.

Some maintenance activities, like tree protection, may occur during both construction and operation phases of the Project, while others, like monitoring for invasive weeds, begin as the long-term ground cover is being planted. Monitoring for invasive weeds and areas requiring vegetation maintenance (e.g., pruning of dead limbs creating a safety hazard) shall occur at a minimum in the spring and in the fall in the first two growing seasons following initial installation of the long-term ground cover. After the first two years, the vegetation within the Project site will be monitored on an as-needed basis.

This VMP provides directives for vegetation maintenance that will be perpetual activities throughout the Project life that may occur routinely, such as mowing, and that may occur only when specific conditions require management actions, such as controlling invasive weeds. This Plan provides directives for:

- > invasive weed control,
- > protection of woody vegetation, and
- > vegetation monitoring, maintenance and management.

### 5.1 Invasive Weed Control, Monitoring, and Management

The monitoring regime will include identifying the presence of invasive, noxious, or unwanted species and the extent of their occurrence. During the first two growing seasons following planting of the long-term ground cover, the Project is most vulnerable to invasive and/or noxious weed species infestations due to the recent soil disturbance from construction activities. Should any invasive species be identified within the Project site, the invasive species shall be removed according to methods most likely to be effective in controlling that species and, where necessary, supplementing its replacement with an approved planting or seed mix identified for the Project or an approved equal alternative option. Table 5 contains the Prohibited Noxious Weeds list identified by the Ohio State University (OSU) Extension to be used as a reference for which invasive and noxious plants may occur in the Project area.

#### 5.1.1 Chemical Controls: Herbicide Treatment

Chemical controls are necessary in management situations where topography, access, growth rate, species specific factors, worker safety, or environmental/social concerns limit the potential for control by physical or mechanical methods.

Applications of herbicide must be applied by a state-licensed professional. The selected applicators will be provided information regarding the invasive species present on-site and be requested to prepare a Control Plan to target the specific species and infected areas of the Project site. Hecate will review and approve the Control Plan prior to implementation. All state and federal

laws will be adhered to during the herbicide treatment process. Note that spot spraying for noxious weeds is allowed during the TOY restriction period of March 1<sup>st</sup> through July 15<sup>th</sup>, Ohio's primary nesting season.

Herbicide treatment may include foliar applications with sprayers, cut and treat, and stem injection. The Control Plan will include monitoring and reporting on the need to repeat herbicide treatment. Herbicides will be applied according to the product's label.

### 5.1.2 Manual Controls

Small populations of invasive plants may be pulled and disposed. Recurrence of small populations may be effectively managed through routine pulling or mowing. Mowing may be an effective method of controlling invasive broadleaf weeds that are present in the seed bank of farmed soils. Care should be taken to dispose of pulled, cut, and mown materials to minimize spread propagules across the Project site.

### 5.1.3 Monitoring for Invasive and Noxious Weeds

Monitoring for invasive and noxious plant species occurrences within the Project site will occur bi-annually, preferably in mid-spring and fall, for the first two years following installation of permanent vegetation and will continue on an as-needed basis following establishment of permanent vegetation. Control will be implemented when invasive or noxious weed species are detected. Monitoring of treated areas will continue on an as-needed basis.

**Table 6. Prohibited Noxious Weeds List Identified by OSU Extension**

Listing	Common Name	Botanical Name
A	Shatter cane	<i>Sorghum bicolor</i>
B	Russian thistle	<i>Salsola Kali</i> var. <i>tenuifolia</i>
C	Johnsongrass	<i>Sorghum halepense</i>
D	Wild parsnip	<i>Pastinaca sativa</i>
E	Grapevines <sup>1</sup>	<i>Vitis</i> spp.
F	Canada thistle	<i>Cirsium arvense</i>
G	Poison hemlock	<i>Conium maculatum</i>
H	Cressleaf groundsel	<i>Senecio glabellus</i>
I	Musk thistle	<i>Carduus nutans</i>
	Purple loosestrife	<i>Lythrum salicaria</i>
K	Mile-A-Minute Weed	<i>Polygonum perfoliatum</i>
L	Giant Hogweed	<i>Heracleum mantegazzianum</i>
M	Apple of Peru	<i>Nicandra physalodes</i>
N	Marestail	<i>Conyza canadensis</i>
O	Kochia	<i>Bassia scoparia</i>
P	Palmer amaranth	<i>Amaranthus palmeri</i>
Q	Kudzu	<i>Pueraria montana</i> var. <i>lobata</i>
R	Japanese knotweed	<i>Polygonum cuspidatum</i>
S	Yellow Groove Bamboo <sup>2</sup>	<i>Phyllostachys aureasculata</i>
T	Field bindweed	<i>Convolvulus arvensis</i>
U	Heart-podded hoary cress	<i>Lepidium draba</i> sub. <i>draba</i>
V	Hairy whitetop or ballcress	<i>Lepidium appelianum</i>



W	Perennial sowthistle	<i>Sonchus arvensis</i>
X	Russian knapweed	<i>Acroptilon repens</i>
Y	Leafy spurge	<i>Euphorbia esula</i>
Z	Hedge bindweed	<i>Calystegia sepium</i>
AA	Serrated tussock	<i>Nassella trichotoma</i>
BS	Columbus grass <i>Sorghum</i>	<i>x alnum</i>
CC	Musk thistle	<i>Carduus nutans</i>
OD	Forage Kochia	<i>Bassia prostrata</i>
EE	Water Hemp	<i>Amaranthus tuberculatus</i>

Source: OSU Extension, Chapter 901:5-37 Noxious Weeds. 901:5-37-01 Prohibited noxious weeds. Effective: 9/14/2018. Five-year review. Promulgated under 119.03. Statutory Authority: 901.10, 5579.04

**Notes:**

<sup>1</sup> When growing in groups of one hundred or more and not pruned, sprayed, cultivated, or otherwise maintained for two consecutive years.

<sup>2</sup> When the plant has spread from its original premise of planting and is not being maintained.

## 5.2 Protection of Woody Vegetation

Trees and shrubs, collectively referred to as woody vegetation, protection BMP's are utilized to protect their foliage crown and root zones from damage during construction and operation activities. Woody vegetation that will not be cleared during construction will be protected from disturbance throughout the construction period by installing a temporary fencing barrier around the perimeter of the root zone (estimated as the perimeter of the foliage crown) protecting this area from compaction, excavations, and/or damage to the plants physical structure. In addition to protecting individual tree and shrub species, the exclusionary fencing can also be used for larger areas of woody vegetation located within the limits of construction. These larger areas of vegetation may include existing wooded fence line edges, hedge rows, and shrubby growth areas such as old fields and successional growth that is to be preserved.

During operations, desirable woody vegetation (e.g., landscape visual barrier plantings and preserved existing wooded areas) will be provided temporary protection barrier fencing if operation activities have potential to harm woody vegetation through soil compaction, excavations, or physical damage. Maintenance crews will receive training informing them of the woody vegetation to be protected from harm during routine maintenance activities such as mowing.

## 5.3 Vegetation Monitoring, Maintenance, and Management

In accordance with the General Permit for Construction Stormwater Discharges, temporary and permanent vegetation stabilization measures will be monitored for effectiveness, deficiencies, and establishment. During construction, monitoring will occur routinely and will be described within the Project's SWPPP. During operations, vegetation monitoring will occur bi-annually for the first two years following construction, and then continue periodically on an as-needed basis. Vegetation and site monitoring and reporting will be part of the Project's Standard Operating Procedures developed to ensure the safe and reliable operation of the Project. Monitoring and reporting will identify invasive and noxious weed infestations, vegetative cover deficiencies, prescribe maintenance or control measures, and identify additional vegetation seeding or planting requirements.

Vegetation maintenance, primarily through mowing, will occur routinely and on a frequency dependent upon growing conditions and establishment of permanent ground covers. Specific maintenance operations identified for the Project site are described in the following sub-sections.

### 5.3.1 Permanent Groundcover Management

Mowing within the solar array area may be conducted by the owner's maintenance crew one or more times per year, depending on growing conditions. More frequent mowing may be required during the establishment of permanent ground cover to prevent weed species from flowering and producing seed. Frequent mowing favors grasses which grow from the base of the leaf and store a greater portion of their biomass below ground. The permanent grass seed mix identified in Table 3 has been selected to support low-growing grass species that are lawn or mat forming to provide low-maintenance permanent ground cover under the solar arrays. To prevent excessive soil compaction, mowing should only take place a day or more after a significant rainfall event.

Areas outside of the solar array security fence will be mowed infrequently to control regrowth. The vegetation outside of the security fence will be inspected each year and mowing frequency or selective removals will be carried out when necessary.

Following establishment of the permanent groundcovers and acceptance of the Project's Notice of Termination that will be provided within the SWPPP, the groundcover areas will be monitored routinely during mowing operations. Areas that have failed or show signs of acute stress will be inspected more thoroughly to determine cause of failure or stress. Soil samples and lab analysis may be necessary to determine cause and to prescribe appropriate soil amendments. Areas that have failed will require the seedbed to be prepared for seeding, including application of appropriate soil amendments, fertilizer, and possibly mechanical decompaction of the topsoil or importing topsoil accordingly. Areas that have failed (i.e., areas where vegetation cover no longer meets final stabilization requirements) will be reseeded and monitored until establishment.

### 5.3.2 Tree Trimming along Overhead Distribution Line

Tree trimming along the overhead distribution line is expected to occur periodically, on an as-needed basis, during operation of the Project. Trees near the overhead distribution line that have exceeded their height limitation will be trimmed or cut by chain saw as necessary. Additionally, dead limbs and limbs encroaching the overhead powerline right-of-way, will be pruned by chain saw on an as-needed basis. Tree trimming, pruning, and removals, if required, will be minimized and only occur to the extent necessary.

Any necessary tree trimming, pruning, or felling activity will follow the seasonal clearing guidance provided by USFWS. The Project will avoid potential impacts to listed bat species or nesting migratory and/or state listed bird species by avoiding any clearing of trees or branches greater than three (3) inches in diameter between March 1<sup>st</sup> and September 30<sup>th</sup>. If tree clearing or trimming must occur within the TOY clearing restriction period, additional coordination with USFWS and/or ODNR will occur prior to clearing or trimming activity, unless the tree/branch to be cleared is determined hazardous to human life or property. Prior to construction, if any tree clearing is required, the locations of all trees to be cleared will be mapped and included on final site plan drawings.

### 5.3.3 Vegetation Management within Existing Drainage Ditches

The Project site contains several existing drainage ditches that may be part of the drainage network managed by the Highland County Soil and Water Conservation District (SWCD). Under Ohio Revised Code, the responsibility for the maintenance and improvement of drains, ditches and watercourses, whether established county ditches or not, rests entirely upon the landowners affected and benefited. As such, Hecate will need to maintain the existing drainage ditches on site in a manner consistent with the SWCD and the current, pre-construction conditions. For development of this VMP, the Project contacted the SWCD requesting copy of their maintenance guidelines. At the time of this Plan, the SWCD did not have published maintenance guidelines.

SWCD personnel stated that maintenance of drainage ditches, including periodic mowing and invasive weed control, needs to be performed at a minimum to maintain the drainage ditch and associated filter strips in pre-construction condition or better.

Maintenance activities may include vegetation control (mowing, pulling or removal of invasive weeds) and the removal of obstructions such as silt bars, debris jams, and drift deposits. Noxious and invasive weed control along the turf filter strips and within the grass waterways will occur on an as-needed basis. If chemical controls are necessary, the herbicides will be applied by a licensed contractor.

Disturbances or ground cover deficiencies within the turf filter strips or within the grass waterways should be seeded with a mix of perennial ryegrass and turf-type fescues (Table 7).

**Table 7. Proposed Turf Filter Strip and Drainage Ditch Seed Mix**

Common Name	Botanical Name	Mix Concentration	Rate (lbs/acre)	Rate (lbs/1,000ft <sup>2</sup> )
Creeping red fescue	<i>Festuca rubra</i>	34%	40	0.92
Sheep fescue	<i>Festuca ovina</i>	33%		
Hard fescue 'Beacon'	<i>Festuca brevipila</i> 'Beacon'	13%		
Hard fescue 'Rhino'	<i>Festuca ovina</i> var. <i>duriuscula</i> 'Rhino'	10%		
Blue fescue 'Blue ray'	<i>Festuca ovina</i> var. <i>glauca</i> ( <i>Festuca glauca</i> ), 'Blue ray'	10%	25	0.57
Perennial ryegrass	<i>Lolium perenne</i>	100%		

*The remainder of this page intentionally left blank.*

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**Commission of Ohio Docketing Information System on**

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**in**

**Case No(s). 20-1288-EL-BGN**

Summary: Exhibit Application Exhibit K (Part 1) electronically filed by Ms. Karen A. Winters on behalf of Hecate Energy Highland 4 LLC