



Beckham Solar, LLC 5 MW Community Solar Facility

Prepared by: Beckham Solar, LLC
Livingston County Special Use Permit Application
June 13, 2023



Introduction

Beckham Solar, LLC, is a limited liability company wholly owned by Ironwood Renewables, LLC, a dedicated distributed generation solar developer with a focus on Illinois. The Applicant has meticulously prepared this application for a 5 MW solar energy facility in Livingston County, Illinois, which will be referred to as "Beckham Solar" or "the project."

We are honored to represent the property owner, Gary F. Kavanaugh, and are proud to have the financial backing and technical expertise of Ironwood Renewables, LLC, to ensure the project's success. Our team boasts a collective 35 years of experience in developing and financing solar projects.

The prospect of providing Livingston County with a long-term source of clean, sustainable energy is an exciting one, as is the opportunity to generate income for our landowner, offer ComEd customers the chance to subscribe to power at or below market rates, and increase the local tax base.

We have meticulously adhered to the requirements detailed in Chapter 56: Article VIII-B SOLAR FARMS of the Livingston County Code of Ordinances and the Livingston County Standards for Special Use to prepare this application. We respectfully submit information, exhibits, and materials that are incorporated into and form an integral part of the Application to comply with the Livingston County Special Use Permit Review and Approval Criteria.

We express our gratitude for your consideration and anticipate collaborating with you to bring the benefits of a solar energy facility to the area. Please do not hesitate to contact us if you require further information or assistance.

Keith A. Morel Jr

Best,
Keith Morel
504-493-3714
kmorel@ironwoodenergy.com
Ironwood Renewables, LLC



Project Overview

Project Name: Beckham Solar, LLC
Parcel Number: 04-04-35-200-003
Project Location: Adjacent to 22998 E 2800 N Road Odell, IL 60460
Coordinates: 41.028801, -88.493329
Project Size: 5 MWac
Acreage: 66.7
Zoning: A-1 Agricultural
Landowner: Gary F. Kavanaugh

Beckham Solar, LLC will comprise of rows of Photovoltaic (PV) cell modules mounted on posts anchored in the ground. This self-contained, low-impact development is anticipated to require minimal municipal services.

The proposed project will offer significant economic and energy benefits to Livingston County and will not have an adverse impact on public health, safety, or general welfare, nor will it affect the comfort and convenience of the public or surrounding neighborhood.

The chosen location for Beckham Solar, LLC, was determined based on several factors, including proximity to relevant electrical and road infrastructure, slope and direction of the land, interest from the landowner, and the current zoning district and surrounding uses. The proposed project will have minimal impact on surrounding properties, which are predominantly zoned A-1 for agricultural uses.

The project is expected to generate approximately 8 million kilo-watt hours (kWh) of energy annually, equivalent to powering approximately 1,100 single-family homes¹. With an estimated investment of \$7,000,000, Beckham Solar, LLC will create 24 local jobs during construction and increase property tax revenue significantly over the project's lifespan². As a dedicated partner of each community we work with, Ironwood Renewables is delighted to build a long-standing relationship with Livingston County.

¹ <https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator>

² <https://www.seia.org/research-resources/national-solar-jobs-census-2020>

Livingston County Zoning Ordinance

Sec. 56-646. – Design standards for solar farms

- a. *Foundations.* The manufacturer's engineer or another qualified engineer will certify that the foundation and design of the solar panels is within accepted professional standards, given local soil and climate conditions.
- b. *Other standards and codes.* All solar farms will be in compliance with any applicant local, state and federal regulatory standards, and the National Electric Code as amended.
- c. *Power and communication lines.* Power and communication lines running between banks of solar panels and to electric substations or interconnections with buildings shall be buried underground.
- d. *Minimum lot size.* The project is on a 144.709 acre lot which exceeds the minimum of 20 acres.
- e. *Height.* At maximum tilt, the panel height will be approximately 12 feet and therefore will not exceed the 20 foot maximum.
- f. *Setbacks.* The proposed project will comply with the outlined setback requirements.
- g. *Screening and fencing.* Systems equipment and structures will be fully enclosed and secured by a fence with a minimum height of eight feet. Knox boxes and keys will be provided at locked entrances for emergency personnel access.
- h. *Lighting.* There will be no lighting on the site.
- i. *Noise.* Noise levels will comply with the sound limitations set by the Illinois Pollution Control Board under 35III. Adm. Code Parts 900, 901, and 910. See Exhibit M
- j. *Installation and design.* Individual arrays/solar panels will be designed and located in order to prevent glare toward any inhabited buildings on adjacent properties as well as adjacent street rights-of-way.
- k. *Inspections.* The project understands and will comply with the requirement to have the facility inspected annually for three years, by an approved independent party, following the issuance of a permit to verify continued compliance with the zoning regulations. Thereafter inspections shall take place every three years, unless otherwise determined by the Livingston County Zoning Administrator.
- l. *Signage.* An appropriate warning sign will be provided at the entrance to the facility and along the perimeter to the solar farm project. The sign at the entrance to the facility will include a 24-hour emergency contact number.
- m. *Natural Resources.* The project will comply with and adhere to any recommendations from the Illinois Department of Natural Resources, the Illinois State Historic Preservation Office, and the Illinois Nature Preserve Commission. See Exhibit of EcoCat submission, United States Fish and Wildlife Service's Tool, SHPO
- n. *Biodiversity.* The project will maintain the designation of being a Pollinator Friendly Solar Site. See Exhibit D for this information.
- o. *Drain Tile Mapping.* Prior to the issuance of a building permit, the project will work with Huddleston McBride Land Drainage Co. to perform a subsurface drainage field tile survey.



Exhibits

Exhibit A: Livingston County Special Use Permit Application Form

Exhibit B: Solar Overview

Exhibit C: Construction Overview

Exhibit D: Operations/Maintenance Overview & Vegetation Management Plan/Weed & grass control

Exhibit E: Decommissioning Plan

Exhibit F: Site Plan

Exhibit G: IDNR EcoCat Consultation & SHPO

Exhibit H: Interconnection Request

Exhibit I: FEMA F.I.R.M & United States Fish and Wildlife Service Mapper

Exhibit J: Wetland Delineation

Exhibit K: Livingston County Soil Maps

Exhibit L: Method of Interconnection Overview

Exhibit M: Glare Study, Sound Study, & Equipment Specification Sheets



Exhibit A: Livingston County Special Use Permit Application Form

LIVINGSTON COUNTY REGIONAL PLANNING COMMISSION
LIVINGSTON COUNTY HISTORIC COURTHOUSE, 112 W. MADISON ST., PONTIAC, IL 61764

APPLICATION FOR SPECIAL USE – LIVINGSTON COUNTY ZONING ORDINANCE

Applicant
Name Beckham Solar, LLC
Address 128 Demanade Blvd., Ste. 200
Lafayette, LA 70503
Phone 337-889-3940

Property Owner(s)
Name Gary F. Kavanaugh
Address 876 Manchester Ct.
Wilmington, IL 60481
Phone 815-883-4221

(attach list if necessary)

For Office Use Only
Filed Date _____ Case No. SU-
Fee \$ 175.00
Receipt No. _____
Publication Cost _____
Receipt No. _____
Hearing Date _____
Decision Date _____ File Date _____
Approved _____ Denied _____

For Office Use Only

Legal description of property: See below

Street address: _____

Property interest of applicant: Lessee

Present Use: Agriculture Zoning District: A-1

A special use is requested to allow the property described above to be used as: Solar Farm

☒ Yes ☐ No A previous special use has not been requested with respect to the described property.

☐ Yes ☒ No A previous special use was requested with respect to the described property. Such previous special use request was made on _____, _____ and _____
Date Year Granted or Denied

Attachment No. 1 – Submit a map drawn to scale (as required by the Zoning Administrator) of the area included in the application and the abutting area within 200 feet (additional area may be required by the Zoning Administrator) showing the zoning classification; dimensions and use of all buildings and/or structures (existing and proposed); driveways; parking areas; right-of-way lines for streets and roads; easements; provision for surface drainage; proposals for sewage disposal systems; distance of building(s) and/or structure(s) from front, side and rear property lines; and distance of building(s) and/or structure(s) from center of public access road(s).

Additional Attachments – Submit additional attachments as required by the Zoning Administrator.

I (we) certify that all of the information presented above is true to the best of my (our) knowledge and belief.

Adrian Ortlieb

Applicant(s) Signature

May 30, 2023

Date

STATEMENT OF APPLICANT – OWNER STATUS

APPLICANT Beckham Solar, LLC

OWNERS - Ironwood Renewables, LLC

Individual (s)

Alter ego or representative of individual (s)
(List the name (s) and address (es) of the actual and true principal)

Corporation
(List the names and addresses of all officers and directors and identify by title; also list the names and addresses of all stockholders and shareholders owning an interest in excess of 20% of all outstanding stock)

Business or entity doing business under an assumed name
(List the names and addresses of all true and actual owners)

Ironwood Renewables, LLC
128 Demanade Blvd., Ste. 200
Lafayette, LA 70503
Authorized Agents: Adrian Ortlieb &
George Hovis Jr.

Partnership
(List the names and addresses of all partners)

Joint Venture
(List the names and addresses of all joint venturers)

Syndicate
(List the names and addresses of all syndicate members)

Unincorporated Voluntary Association
(List the names and addresses of all members)

LIST OF NAMES AND ADDRESSES REQUIRED ABOVE

Legal Description of Property

All that part of the North Half of Section 35, Township 30 North, Range 6 East of the Third Principal Meridian, Livingston County, Illinois, lying and being East of the right of way of the Bloomington, Pontiac and Joliet Railway Company, EXCEPT a strip of land along the South side thereof described as follows: Commencing at a point 46 rods West of the Southeast corner of the Northeast Quarter of said Section 35, and running thence North 15 feet, thence West 161 rods to the East line of said railroad right of way, thence Southwesterly along said railroad right of way 30 feet, thence East to the place of beginning, AND EXCEPTING one acre in the Northeast corner of said North Half of said Section 35 used for school purposes; Also the following described land to wit: Commencing at the Northeast corner of the Southeast Quarter of Section 35, running thence South 6 rods, thence West 46 rods, thence North 6 rods, thence East to the place of beginning, all situated in the County of Livingston and State of Illinois, containing 139.38 acres, more or less.

APPLICATION EXPLANATION

Project Name: Beckham Solar, LLC

Requested Zoning: Special Use

Explanation and description of request or project: See attached



Exhibit B: Solar Overview

Solar Technology

Beckham Solar, LLC is a state-of-the-art solar technology facility that harnesses the power of the sun through rows of Photovoltaic (PV) cell modules mounted on posts set in the ground. These modules are arranged in solar arrays mounted on a single axis tracking system, allowing them to efficiently follow the sun's trajectory throughout the day. With a maximum tilt height of no more than twelve (12) feet, the solar components strictly comply with the current edition of the National Electric Code and are UL Listed or equivalent, featuring an anti-reflective coating.

The facility's basic components include PV modules, inverters, combiner boxes, transformers, wires and conductor cables, a structural racking system for PV modules, an access road, and perimeter fencing. Solar electricity production comprises five crucial components: Electrical Power Generation, Combiner Boxes, Inverters, Transformers, and Utility Distribution. The latest photovoltaic modules are typically made from Crystalline Silicone (C-Si) and Thin Film (TF), which function as solid-state, inert crystals, encapsulated in layers of plastic and glass to prevent environmental damage.

Glare & Sound

Beckham Solar, LLC is designed to reduce reflection and potential hazardous glare. It produces minimal sound during the day and no noise overnight. See attachment M for noise study.

Environmental Impact

The project site has been assessed and found to have no adverse effects on environmental resources, with full compliance with federal, state, and local regulations. The facility has been approved by the Illinois Department of Natural Resources, ensuring it does not impact protected species or local residents' well-being.

Safety

Safety is paramount at Beckham Solar, LLC, with all components built according to required building and electrical codes, safety measures, and regulations. The facility will employ lock-out measures and safety warnings, with an 8' tall security perimeter fence per National Electrical Code regulations to prevent trespassing and vandalism. Access codes to the gate will be provided to the relevant authorities, including the Police Department, Fire Department, and emergency service providers.

Beckham Solar will continue to coordinate with all necessary Federal, State, and County agencies throughout the planning process, ensuring a safe and sustainable future for all.



Exhibit C: Construction Overview

Project Timeline

The construction of Beckham Solar is expected to span a period of 12-16 weeks, following standard solar construction procedures. Additionally, the utility will undertake engineering, procurement, and construction of the interconnection facilities, a process which will last 6-18 months in total, and conclude shortly before the solar farm's construction. Finally, the project will undergo a commissioning period lasting 2-3 weeks before it reaches commercial operation.

Finances and Labor:

Beckham Solar, LLC intends to invest an estimated \$7,000,000 into the project, which includes all expenses related to construction, materials, labor, and professional services. This cost projection is based on build cost assumptions. Ironwood Renewables will provide financial backing for the project in conjunction with tax equity and debt partners.

The project will benefit the local economy by approximately \$4,000,000, which will be spent on goods and services, labor, fuel and lodging, dining, and other consumer resources. Beckham Solar, LLC will generate roughly 24 local jobs during construction, provided that qualified local labor is available. Ironwood Renewables hires and collaborates with local subcontractors whenever feasible. Working with local contractors streamlines work on projects as they are most familiar with local practices and authorities.

Soil, Grading, and Vegetation:

Minimal grading is typically required for most sites, and the installation of an entire facility can usually be accomplished with minimal soil disturbance. Soil will only be removed from the site if necessary for remediation purposes. Structural frames will be driven into the ground, and steel beams will support PV modules. Inverters and transformers will be mounted on top of small concrete pads, which will be the only concrete utilized for the project. Native pollinators will be seeded in the project area.

Drain Tile

Ironwood Renewables is committed to preserving the integrity of existing drain tile conditions. Prior to construction, field tile will be surveyed, and any affected tiles will be repaired or replaced. The project plans to work with Huddleston McBride Land Drainage Company.

Traffic

During the construction period, a temporary and limited increase in vehicle traffic is expected, with approximately 2-15 personal cars and 1-10 trucks visiting the site per day.



Exhibit D: Operations and Maintenance Overview & Vegetation Management Plan

Equipment Maintenance

Following construction, the Beckham Solar project will be remotely monitored and require minimal maintenance, with an estimated 5-9 site visits per year. On-site personnel will not be required, and no sewer, water, or other services will be necessary.

Traffic Safety

The construction of Beckham Solar is not expected to have significant traffic impacts. The project will generate no more than one to three vehicle visits per quarter on average and will not pose significant risks to the surrounding road networks, local responders, or the Illinois Department of Transportation.

Vegetation Management Plan

Beckham Solar, LLC is dedicated to adhering to landscaping best practices that stabilize the soil and ensure long-term project success while promoting land health. See Vegetation Management Plan below.



Beckham Solar
Vegetation Management Plan
Prepared for Ironwood Renewables, LLC



June 2023

Table of Contents for Beckham Solar

Site Address, Owner, Vegetation Professionals	3
Site Description and General Overview	4
Vegetation Establishment and Management Overview	5
Site Preparation & Installation Procedures	6
Beckham Solar Pollinator Seed Mix	7
Recommended Vegetation Management Procedures, Agrivoltaics	8 – 9
Exhibit A – Soils Map	10
Exhibit B – Illinois Solar Habitat Friendly Planning Scorecard	11

Project Name: Beckham Solar

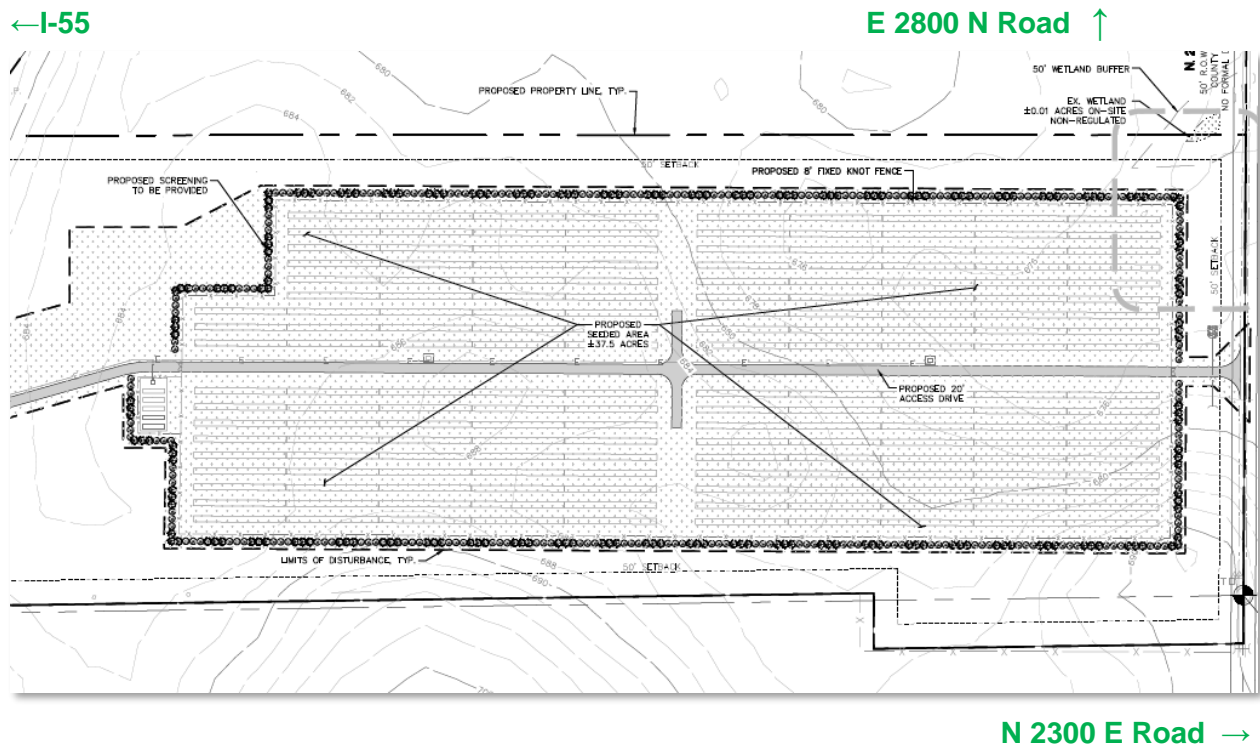
Array Location: N 2300 East Road @ E 2800 N Road
Nevada Township, Livingston County IL

Project Size: 31.4 acres inside the fence
39.4 acres limit of disturbance

Owner: Beckham Solar, LLC

Project Developer: Ironwood Renewables, LLC
Keith Morel, 337.889.3940
128 Demande Blvd, Ste 200
Lafayette, LA 70503

Vegetation Professionals: Natural Resource Services, Inc.
2885 Quail Road NE
Sauk Rapids, MN 56379
763-656-8587



Site Description and General Overview

The proposed Beckham Solar site is planned for proximately 42 acres in Nevada Township, Livingston County on land currently used for row crops. This site, when seeded with the proposed seed mix will achieve 112 points, exceeding the requirements for Illinois DNR Exceptional Pollinator Habitat.

The anticipated seeding area is 31.4 acres. This area is dominated by three soil types: Bryce silty clay (54%) Swygert silty clay loam (43%) and Clarence silty clay loam (20%). See Exhibit A for the soils map. These three soils are considered wet Glacial Drift Upland Prairie and range from poorly to somewhat poorly drained. They will readily support pollinator species.

Agricultural drain tile is not apparent within the site, and while there is a wetland to the northeast of the array, no wetlands have been noted inside the array.

A native pollinator seed mix is planned for the entire array and is selected for ecological appropriateness to the mesic to wet soil types and site conditions as well as the mature plant height, so as to not interfere with panel productivity by shading. The habitat provides low maintenance vegetation which won't require fertilizer, amended soils or irrigation on this site.

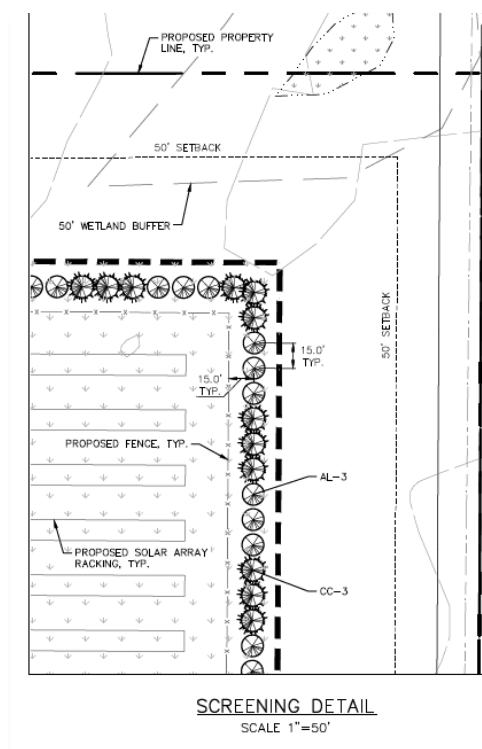
A cover crop should be seeded prior to construction. This cover crop will aid in soil stabilization throughout the construction period and help to suppress weed growth.

Subject to what is growing at the site prior to temporary seeding, an herbicide spray of glyphosate or similar across the site may be needed as part of overall site preparation. Agricultural fields very recently used for ag crops typically don't require this herbicide step unless a site was allowed to go fallow for more than a few months during the growing season.

After permanent seeding is completed, any necessary permanent erosion control measures will be installed.

Agrivoltaics is also planned for this site. When the vegetation has become established, it will be cut and baled as hay for use as forage, mulch and animal bedding. Additional information is located on page 9.

The Beckham Solar site is proposed to include a screen of 183 Cockspur Hawthorn and 183 Allegheny Serviceberry surrounding the entire array. See screening details at right.



Vegetation Establishment and Management Overview

Economical production of electricity is the foremost goal on solar sites. There is a parallel opportunity to provide critically important native pollinator friendly habitat throughout the array while capitalizing on the long-term, low maintenance needs of native vegetation. This site will also support agrivoltaics in the form of hay baling of mature native vegetation.

Establishing prairies and other native plant communities within the confines of solar sites provides a tremendous opportunity to restore ecosystems that have been severely degraded and eliminated across all areas of our country.

Native plants have profound root systems, many reaching 12 feet deep or greater into the soil. Melting snow and rainwater follows those roots into the ground, helping reduce water runoff and promote the drainage of standing water into the aquifer. Those deep roots also stabilize the soil, preventing erosion from rain and wind.

The native plants provide seeds for songbirds, cover for game birds and forage for insects. Many plant species are specialized host plants for butterflies and other native insects. An example of this is the milkweed species, as monarch butterflies only lay their eggs on one of the many varieties of milkweed.

The contribution to habitat restoration cannot be overstated given this acreage that will be positively impacted over the 30+ year lifespan of the project.



A Midwest solar site shown with three-year-old native pollinator friendly habitat.

Site Preparation

1. Inspection of the project area to assess site conditions and determine the need for any site prep mowing or spraying activities.
2. If necessary, an herbicide application will be completed using glyphosate (Round-up® or equivalent) as per manufacturer's directions in areas with actively growing vegetation. Allow a minimum of 10 days before disturbing the soil or completing seeding activities.
3. When perennial broadleaf vegetation is present a triclopyr herbicide will be added (Garlon 3A® or equivalent) as per manufacturer's directions. When a broadleaf herbicide is used allow a minimum of 30 days before disturbing the site or completing seeding.
4. Depending on the type and density of vegetation present (i.e., annual vs perennial) a complete site mowing might be advisable in lieu of an herbicide application. For instance, if the site is dominated by foxtail (an annual), mowing would be preferable to an herbicide application.

Seed Installation Procedures

1. An appropriate native pollinator seed mix such as the example included on the following page will be used, customized for the site, as needed.
2. Construction debris, garbage and building materials will be removed and/or staged outside the intended seeding areas.
3. Disk soil within the project area in preparation for seeding. Harrow or rake the soil to achieve the proper seedbed.
4. All native seed will be applied using a mechanical broadcast spreader or drill seeder.
5. A cover crop will be seeded along with the native species. A cover crop of oats would be used for late spring and summer seedings, winter wheat in the fall and early winter.
6. Harrowing will be completed after all grass and cover crop seeding is completed.
7. Following the harrowing, the wildflower seed will be spread using a mechanical broadcast spreader.
8. Areas inaccessible to equipment will be hand seeded.
9. After permanent seeding is complete, any necessary erosion control measures will be implemented.

Proposed Beckham Solar Native Pollinator Friendly Array Mix

Common Name	Scientific Name	% of Mix	Seeds/ft ²
Grasses			
Sideoats Grama	<i>Bouteloua curtipendula</i>	34.25%	9.4
Prairie Brome	<i>Bromus kalmii</i>	0.80%	0.3
Plains Oval Sedge	<i>Carex brevior</i>	2.80%	3.7
Bicknell's Sedge	<i>Carex bicknellii</i>	0.96%	0.8
Troublesome Sedge	<i>Carex molesta</i>	1.84%	2.1
Brown Fox Sedge	<i>Carex vulpinoidea</i>	2.00%	9.2
Silky Wild Rye	<i>Elymus villosus</i>	6.00%	1.5
	<i>Schizachyrium</i>		
Little Bluestem	<i>scoparium</i>	26.96%	18.6
Prairie Dropseed	<i>Sporobolus heterolepis</i>	0.40%	0.3
Forbs			
Common Yarrow	<i>Achillea millefolium</i>	0.44%	3.6
Nodding Onion	<i>Allium cernuum</i>	0.24%	0.1
Lead Plant	<i>Amorpha canescens</i>	1.33%	1.0
Canada Anemone	<i>Anemone canadensis</i>	0.04%	0.0
Wild Columbine	<i>Aquilegia canadensis</i>	0.04%	0.1
Common Milkweed	<i>Asclepias syriaca</i>	0.34%	0.1
Butterfly Milkweed	<i>Asclepias tuberosa</i>	0.32%	0.1
Canada Milkvetch	<i>Astragalus canadensis</i>	1.08%	0.8
Calico Aster	<i>Symphyotrichum lateriflorum</i>	0.04%	0.5
Partridge Pea	<i>Chamaecrista fasciculata</i>	3.11%	0.4
White Prairie Clover	<i>Dalea candida</i>	4.08%	3.6
Purple Prairie Clover	<i>Dalea purpurea</i>	6.02%	5.0
Cream Gentian	<i>Gentiana flavida</i>	0.04%	0.3
Prairie Blazing Star	<i>Liatris pycnostachya</i>	0.24%	0.1
	<i>Pycnanthemum</i>		
Virginia Mountain Mint	<i>virginianum</i>	0.09%	0.9
Prairie Wild Rose	<i>Rosa arkansana</i>	0.29%	0.0
Black-eyed Susan	<i>Rudbeckia hirta</i>	1.92%	8.1
Gray Goldenrod	<i>Solidago nemoralis</i>	0.04%	0.6
Ohio Goldenrod	<i>Solidago ohioensis</i>	0.04%	0.2
Sky Blue Aster	<i>Symphyotrichum oolentangiense</i>	0.16%	0.6
Ohio Spiderwort	<i>Tradescantia ohiensis</i>	0.24%	0.1
Hoary Vervain	<i>Verbena stricta</i>	1.44%	1.8
Golden Alexanders	<i>Zizia aurea</i>	2.40%	1.2

Seeding rate: 12.5 lbs/acre, (75 seeds/square foot)

Recommended Vegetation Management Procedures

Establishment Phase: Growing seasons 1, 2 and 3

Year 1: Complete site mowings to control annual/biennial weed canopy and prevent production of viable seed.

- 2-3 mowings are typical depending on soils, weather patterns and planting dates.
- Mowing to be done using specialized zero-radius mowers, orchard mowers and/or flail mowers
- Target mowing height of 4-6 inches.
- Reporting to designated contact following each visit including a recap of activities, site conditions and recommendations for future management.

Year 2: Complete site mowing to control annual/biennial weed canopy and prevent production of viable seed.

- 2 mowings likely in the late spring or early summer plus 1 Integrated Vegetation Management (IVM – description below) visit.
- Mowing to be done using specialized zero-radius mowers, orchard mowers and/or flail mowers
- Target mowing height of 4-6 inches.
- Integrated Vegetation Management (IVM) includes spot mowing, targeted herbicide application, hand pulling, weed whipping, etc. Spraying is done using tractor or ATV mounted sprayers or backpack sprayers.
- Reporting to designated contact following each visit including a recap of activities, site conditions and recommendations for future management.

Year 3: Integrated Vegetation Management (IVM)

- 3 site visits are typical depending on growth and weed populations.
- Includes spot mowing and targeted herbicide applications.
- Equipment used includes tractor and/or ATV mounted sprayers.
- Agrivoltaics would begin near the end of this growing season with the cutting and baling of standing, dormant vegetation. See additional details on page 9.
- Reporting to designated contact following each visit including a recap of activities, site conditions and recommendations for future management.

Development and Maturity, Years 4+

Years 4 +: Integrated Vegetation Management (IVM)

- Two site visits are typical depending on vegetation status.
- Includes spot mowing and targeted herbicide applications.
- Equipment used includes tractor and/or ATV mounted sprayers.
- Includes a complete site mowing once every 3 years to mulch up biomass and recycle nutrients. On years when a mowing occurs, only one IVM visit will most likely be necessary.
- Reporting to designated contact following each visit including a recap of activities, site conditions and recommendations for future management.
- Haying of the vegetation as appropriate and determined by the vegetation professionals.

Agrivoltaics

Agrivoltaics is the use of land for both agricultural and solar energy production. For Beckham Solar, agrivoltaics is planned in the form of haying of the native vegetation. Haying native vegetation grown on solar sites is a compatible agricultural solution as it provides a desirable ag crop according to IL State statute 505 ILCS 5/3.02.

This would be implemented in year 3 or later, after the native vegetation has matured and non-native/invasive weeds are largely under control. The haying would be done as a part of the integrated vegetation management of the site by helping to remove built up thatch on the site, allowing for reinvigorated growth of the native species. Haying frequency would likely be once per year or every other year, depending on the condition of the vegetation and at the advice of the vegetation professionals.

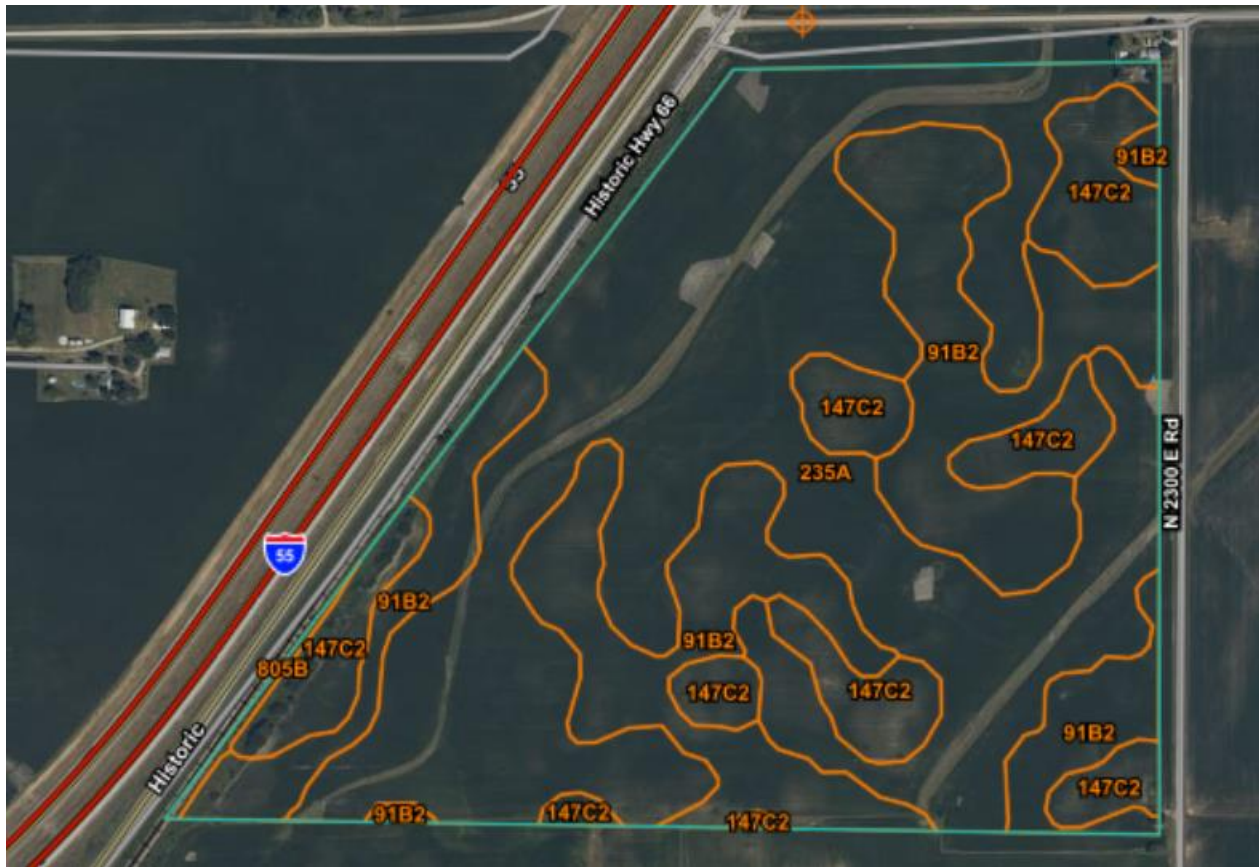
The hay bales produced could be used for livestock forage, bedding or as native mulch for erosion control purposes.

Monitoring

Consistent monitoring of the project is essential in order to evaluate vegetative establishment, weed presence and possible erosion concerns. This information helps determine which management technique to use, the proper timing of the implementation and whether or not any other remedial action is required.

Careful management of the project will be required to ensure that correct management techniques are implemented in the right areas at the right time.

Exhibit A – Soils Map: Proposed Beckham Solar Site



Livingston County, Illinois (IL105)			
Livingston County, Illinois (IL105)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
91B2	Swygert silty clay loam, 2 to 4 percent slopes, eroded	42.6	31.0%
147C2	Clarence silty clay loam, 4 to 6 percent slopes, eroded	20.3	14.8%
235A	Bryce silty clay, 0 to 2 percent slopes	73.9	53.8%
805B	Orthents, clayey, undulating	0.6	0.4%
Totals for Area of Interest		137.4	100.0%

Illinois Solar Site Pollinator Habitat Planning Form

Use this form as a draft before completing the Illinois Planned Pollinator Habitat on Solar Sites Scorecard online

In Between and Under Solar Panels

1. PLANNED PLANT DIVERSITY IN ROWS & UNDER SOLAR ARRAY (choose up to 2)
- ☐ 4-8 species +5 pts
 - ☒ 7 or More species +8 pts
 - ☒ All Native Species (minimum 4 species) +10 pts

Perimeter and Buffer Area

2. VEGETATIVE BUFFER PLANNED ADJACENT TO THE SOLAR SITE (choose all that apply)
- ☐ Buffer planned outside of array fencing +5 pts
 - ☐ Buffer is 30-49ft wide measured from array fencing +5 pts
 - ☐ Buffer is at least 50ft wide measured from array fencing +10 pts
 - ☐ Buffer has Native shrubs/trees that provide food for wildlife +5 pts
3. SEEDS USED FOR NATIVE PERIMETER & BUFFER AREAS (choose all that apply)
- ☒ Mixes are seeded using at least 20 seeds per square foot of Pure Live Seed or 40 Seeds per square foot on slopes > 5% +10 pts
 - ☐ All seeds are from a source within 150 miles of site +5 pts
 - ☐ At least 2% milkweed cover is planned to be established from seeds/plants +5 pts

4. PLANNED # OF NATIVE SPECIES IN SITE PERIMETER & BUFFER AREA (species with more than 1% cover)(choose 1)
- ☐ 5-10 species +2 pts
 - ☐ 10-15 species +5 pts
 - ☐ 16-20 species +10 pts
 - ☒ >20 species +15 pts

Exclude invasive and non-native plant species from total

5. PLANNED PERCENT OF PERIMETER & BUFFER AREA DOMINATED BY NATIVE PLANT SPECIES (choose 1)
- ☐ 26- 50 % +2 pts
 - ☐ 51-75 % +10 pts
 - ☒ More than 75% +15 pts

Whole Site

6. PLANNED PERCENT OF SITE VEGETATION COVER TO BE DOMINATED BY DESIRABLE WILDFLOWERS (choose 1)
- ☒ 26- 50 % +2 pts
 - ☐ 51-75 % +10 pts
 - ☐ More than 75% +15 pts



7. PLANNED SEASONS WITH AT LEAST THREE BLOOMING NATIVE SPECIES PRESENT (choose all that apply)
- ☒ Spring (April-May) +5 pts
 - ☒ Summer (June-August) +5 pts
 - ☒ Fall (September-October) +5 pts

8. HABITAT SITE PREPARATION PRIOR TO IMPLEMENTATION (choose all that apply)
- ☒ Soil preparation done to promote germination and reduce erosion as appropriate for the site. +10 pts
 - ☒ Measures taken to control weeds prior to seeding +10 pts
 - ☐ None -10 pts

9. AVAILABLE HABITAT COMPONENTS WITHIN 0.25 MILES (choose all that apply)
- ☒ Native bunch grass for bee nesting +2 pts
 - ☒ Native trees/shrubs for bee nesting +2 pts
 - ☐ Clean, perennial water sources +2 pts
 - ☐ Created habitat nesting features +2 pts

10. SITE PLANNING AND MANAGEMENT (choose all that apply)
- ☒ Detailed establishment and management plan developed +10 pts
 - ☒ Signage legible at forty or more feet stating "pollinator friendly solar habitat" +3 pts

11. INSECTICIDE RISK (choose all that apply)
- ☐ Planned on-site use of insecticide or pre-planting seed/plant treatment (excluding buildings/electrical boxes, etc.) -40 pts
 - ☐ Communication/registration with local chemical applicators or on www.fieldwatch.com to prevent drift +5 pts

Total Points: 112

Meets Preliminary Pollinator Standards - 85
Provides Exceptional Habitat - 110 and higher

Owner: Beckham Solar
Vegetation Consultant: Natural Resource Services
Project Location: N 2300 E Road, Odell IL
Project Size: 31.4 acres
Final Seeding Date: TBD fall 2024

This form is designed (with the help of the Solar Site Pollinator Guidelines found on IDNR's website) to guide owners or managers of solar sites to meet the requirements to be able to claim a site is pollinator friendly according to the "Pollinator Friendly Solar Site Act (525 ILCS 55)". This form is for company records only and does not grant the title of a Pollinator Friendly Solar Site until the "Illinois Planned Pollinator Habitat on Solar Sites Scorecard" is completed with a score of 85 or higher on IDNR's website. This preliminary recognition is good for 3yrs, after which the "Established Pollinator Habitat on Solar Sites Scorecard" will need to be completed every 5 years to maintain recognition as a Pollinator Friendly Solar Site.

Exhibit E: Decommissioning Plan

Beckham Solar, LLC has prepared this Decommissioning Plan (the “Plan”) for its proposed 8,900kW-DC/5,000 kW-AC solar photovoltaic farm (the “Facility”) to be constructed off North 2300 East Road, located in Nevada Township, Livingston County, IL (PIN 04-04-35-200-003). The Plan describes the process for decommissioning the Facility in accordance with applicable federal, state and local requirements. Decommissioning of the Facility shall be completed within six (6) months after operation of the Solar Farm stops being operational.

Facility Description

The Facility will consist of an 8,900kW-DC/5,000 kW-AC capacity solar power-generating array secured within a fixed knot farm fence surrounding the solar panels and equipment, accessed through a locked 20’ wide swing gate on the access road. The access road is accessed off N 2300E Rd. The Facility will include the following site features:

- An approximate 66-acre area of photovoltaic (PV) modules and mounting system;
- An approximate 32-acre area within the farm fence;
- Screw or driven piles supporting the PV modules;
- One (1) transformer (filled with biodegradable mineral oil) and two (2) inverters;
- 8-foot fixed knot farm security fence with no barbed wire;
- Approximately Six (6) aboveground wooden utility poles;
- Overhead wires at the poles need to interconnect to the ComEd grid;
- A gravel access drive; and
- A metal security gate at the entrance to the array area.
- Steel Storage Container (conforming with National Fire Protection Agency (NFPA 855) standards
- Battery cells, battery modules, battery racks
- A Battery Management System which constantly monitors the internal battery states and will automatically disconnect batteries if an issue is detected Energy Management System (EMS)
- Integrated HVAC systems which maintain all components at optimal temperatures
- Fire Suppression system capable of automatic detection and actuation to react and extinguish fires before they can develop

Decommissioning Plan

The Facility will be decommissioned by completing the following major steps: Dismantlement, Demolition, Disposal or Recycle; and Site Stabilization, as further described below.

Dismantlement, Demolition, and Disposal or Recycle

A significant portion of the components that comprise the Facility will include recyclable or re-saleable components, including copper, aluminum, galvanized steel, and modules. Due to their re-sale monetary value, these components will be dismantled, disassembled, and recycled rather than being demolished and disposed of. All materials associated with the solar farm shall be removed from the site and legally disposed of or recycled.

Following coordination with ComEd regarding timing and required procedures for disconnecting the Facility from the utility distribution network, all electrical connections to the system will be disconnected and all connections will be tested locally to confirm that no electric current is running through them before proceeding. All electrical connections to the PV modules will be severed at each module, and the modules will then be removed from their framework by cutting or dismantling the connections to the supports. Modules will be removed and sold to a purchaser or recycler. In the event of a total fracture of any modules, the interior materials are silicon-based and are not hazardous. Disposal of these materials at a landfill will be permissible.

The PV mounting system framework will be dismantled and recycled. The metal piles will be removed and recycled. All other associated structures will be demolished and removed from the site for recycling or disposal. This will include the site fence and gates, which will likely be reclaimed or recycled.

The driveway and all gravel areas will be removed. These areas will be restored to their original condition, which includes, ripping, re-topping with soil, and seeding. Concrete slabs will be crushed and disposed of off-site or recycled (reused off-site).

Aboveground utility poles owned by Beckham Solar, LLC will be completely removed and disposed of off-site in accordance with utility best practices. Any overhead wires will be removed from the Facility and will terminate at the utility-owned (ComEd) connections on east of the Bloomington, Pontiac and Joliet Railway Company's tracks. Coordination with ComEd personnel will be conducted to facilitate ComEd's removal of any utility owned equipment, poles and overhead wires located on the site.

A final site walkthrough will be conducted to remove debris and/or trash generated during the decommissioning process, and will include removal and proper disposal of any debris that may have been wind-blown to areas outside the immediate footprint of the facility being removed.



Sanitary facilities will be provided on-site for the workers performing the decommissioning of the Facility.

Deconstruction Plans and Financial Assurance

Per the Agricultural Impact Mitigation Agreement (AIMA) between The State Of Illinois Department of Agriculture and Beckham Solar, LLC. The facility owner shall file a copy of the signed AIMA to the County of Livingston at the time of the site development and/or building permit application. Financial assurance shall be provided to the county in accordance with the AIMA. Public Act (SB 2591).

Deconstruction of a Facility shall include the removal/disposition of all solar related equipment/facilities, including the following utilized for operation of the Facility and located on Landowner property:

1. Solar panels, cells and modules;
2. Solar panel mounts and racking, including any helical piles, ground screws, ballasts, or other anchoring systems;
3. Solar panel foundations, if used (to depth of 5 feet);

Plan Changes

Any changes to the operator of the SES will result in the submission of an updated decommissioning plan to Livingston County within 30 days. Any updates to this decommissioning plan will be submitted to the county every three years.



Atwell, L.L.C.
1250 East Diehl Road, Suite 300
(630) 577-0800

Project
Location
Site:
Parcel ID:
Date
Beckham Solar (Ironwood Renewables)
North 2300 East Road, Nevada Township, Livingston County
5.0 MWAC
04-04-35-200-003
6/5/2023

Preliminary Engineer's Opinion of Probable Decommissioning Cost for Beckham Solar (Ironwood Renewables) During First 5 Years of Operation

					Salvage Value based on 5-year projections				
Estimated Quantity	Unit	Unit Cost	Removal Cost	Material Weight (lbs.)	Material Recycle Value	Net Salvage	Net Cost	Notes	
<u>Erosion Control/Contractor Fees</u>									
Mobilization	1	LUMP SUM	\$10,000.00			\$0.00	\$10,000.00		
Electrical Disconnect	1	EACH	\$500.00			\$0.00	\$500.00		
Permitting (NPDES)	1	LUMP SUM	\$1,200.00			\$0.00	\$1,200.00		
Silt Fence	2,735	LF	\$6.00			\$0.00	\$16,410.00	Silt fence for access road removal	
Seeding	2.8	ACRES	\$800.00			\$0.00	\$2,240.00	Seeding access road removal only. Pollinator grass to remain.	
Sub-Total			\$30,350.00			\$0.00	\$30,350.00		
<u>Site Demolition</u>									
Remove Existing 15" CMP Culvert	95	LF	\$15.00			\$0.00	\$1,425.00		
Remove Existing Fence (8' High Farm Fence)	5,700	LF	\$3.85	31,920.00	\$0.09	\$2,872.80	\$19,072.20		
Remove Existing Gravel Mainteanance Road (12" depth)	2,750	CY	\$4.00			\$0.00	\$11,000.00		
Haul off for Existing Gravel Entrance (12" depth)	2,750	CY	\$10.00			\$0.00	\$27,500.00		
Sub-Total			\$61,870.00			\$2,872.80	\$58,997.20		
<u>Racking and Module Removal</u>									
Pile Removal	1,500	EACH	\$6.00		787,500.00	\$0.04	\$29,531.25	Assumes W10x35 I-beams at 15' long = 525 lbs. each @ \$0.0375/lbs.	
Assembly Removal	2,100	EACH	\$1.25		315,000.00	\$0.04	\$11,812.50	Assumes 150 lbs. each @ \$0.0375/lbs.)	
PV Module Removal	10,500	EACH	\$1.00			\$1,732,500.00	\$1,732,500.00	Assumes 75% of original value (\$220 original value)	
PV Module Haul Off	335	TON	\$45.00				\$0.00	\$15,075.00	
Sub-Total			\$37,200.00			\$1,773,843.75	(\$1,736,643.75)		
<u>Wiring Removal</u>									
Above Ground MV Cables (AL)	325	LF	\$0.45		95.28	\$0.45	\$42.88	\$103.37	
Utility Pole Removal	6	EACH	\$750.00				\$0.00	\$4,500.00	
Above ground wire removal (CU)	100,000	LF	\$0.10		25,472.62	\$1.80	\$45,850.71	Above ground copper wire.	
Below ground wire removal (AL)	2,500	LF	\$2.00		9,458.70	\$0.45	\$4,256.42	Underground aluminum wire	
Auxiliary Panel to Motors (CU)	500	LF	\$0.10		443.04	\$1.80	\$797.47	Above ground copper wire.	
Combiner Box Removal	4	EACH	\$60.00			\$80.00	\$320.00	(\$80.00)	
Sub-Total			\$19,936.25			\$51,267.47	(\$31,331.22)		
<u>Power Conditioning Equipment Removal</u>									
PCU Station (inverters, etc.)	50	EACH	\$400.00			\$281,250.00	\$281,250.00	Assumes 75% of original value (\$7,5000 original value)	
Scada Equipment	1	EACH	\$280.00			\$1,000.00	\$1,000.00	(\$720.00)	
Battery Energy Storage System	1	EACH	\$5,000.00			\$1,000.00	\$1,000.00	\$4,000.00	
Transformer	1	EACH	\$1,800.00			\$93,750.00	\$93,750.00	Assumes 75% of original value (\$125,000 original value)	
Sub-Total			\$27,080.00			\$377,000.00	(\$349,920.00)		
<u>Equipment Pad Removal</u>									
Remove Pad	2	EACH	\$500.00			\$0.00	\$1,000.00		
Sub-Total			\$1,000.00				\$1,000.00		
DECOMMISSIONING TOTAL			\$177,436.25			\$2,204,984.02	(\$2,027,547.77)		
DECOMMISSIONING TOTAL (120%)			\$212,923.50			\$2,204,984.02	(\$1,992,060.52)		

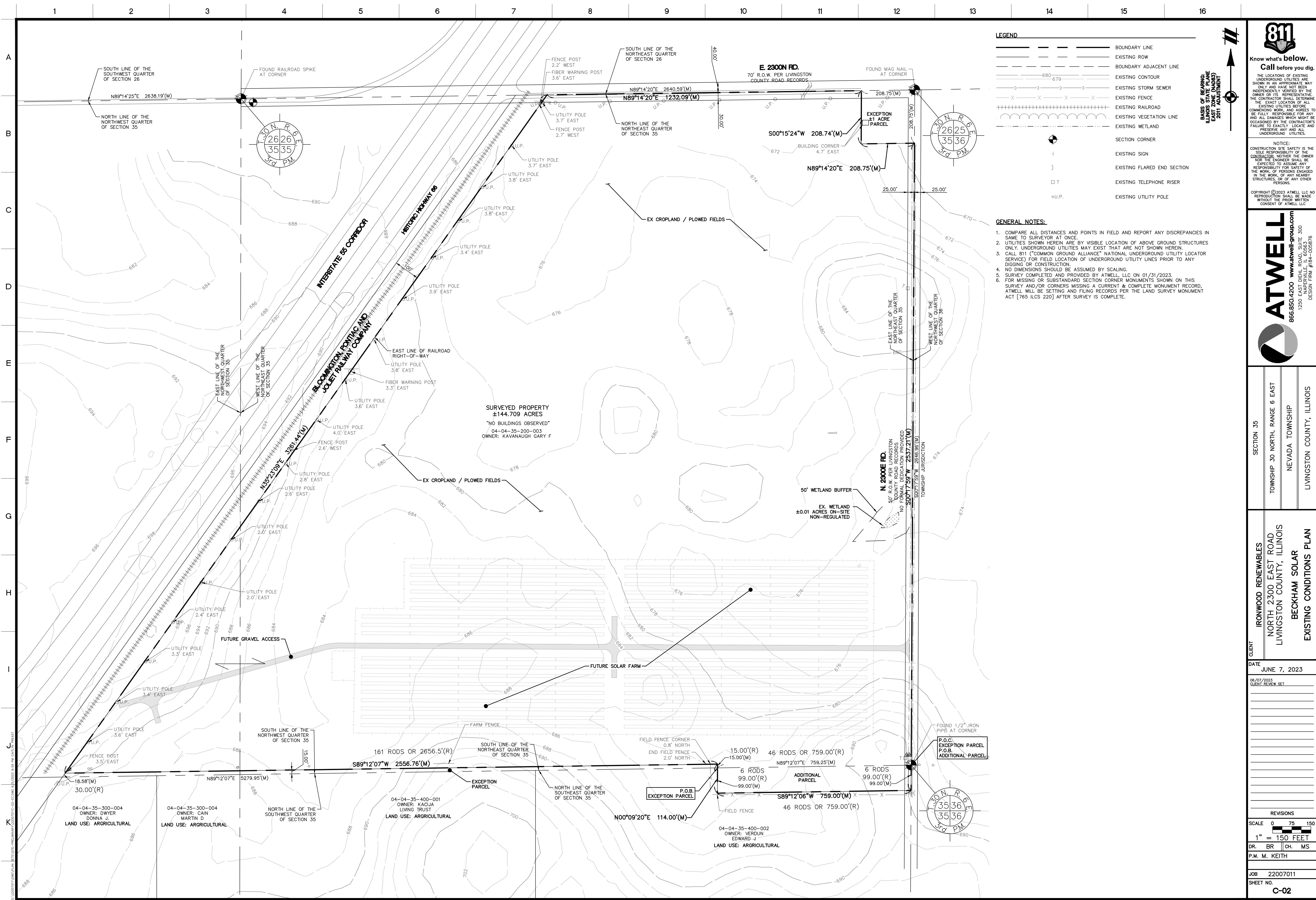
Assumptions:

1. Cost Estimate based on 5-year projections. Estimate to be redone in 5-years based on new fees at that time.
2. Cost Estimate is based on the Preliminary Site Plan (SUP) prepared for Ironwood Renewables dated 06-07-2023.
3. Refer to Decommissioning Plan for further information.

Note: This Engineer's Opinion of Probable Cost is made on the basis of Engineer's experience and qualifications using estimated quantities and represents Engineer's best judgment as an experienced and qualified professional Engineer generally familiar with the construction industry. However, since Engineer has no control over the cost of labor, materials, equipment, or services furnished by others, or over the Contractor's methods of determining prices, or over competitive bidding or market conditions, or over quantities of work actually performed, Engineer cannot and does not guarantee that proposals, bids, or actual construction cost will not vary from Opinions of Probable Construction Cost prepared by Engineer. This Opinion of Probable Construction Cost is limited to those items stated herein.




Exhibit F: Site Plan



- LEGEND**
- BOUNDARY LINE
 - EXISTING ROW
 - BOUNDARY ADJACENT LINE
 - EXISTING CONTOUR
 - EXISTING STORM SEWER
 - EXISTING FENCE
 - EXISTING RAILROAD
 - EXISTING VEGETATION LINE
 - EXISTING WETLAND
 - SECTION CORNER
 - EXISTING SIGN
 - EXISTING FLARED END SECTION
 - EXISTING TELEPHONE RISER
 - EXISTING UTILITY POLE

- GENERAL NOTES:**
- COMPARE ALL DISTANCES AND POINTS IN FIELD AND REPORT ANY DISCREPANCIES IN SAME TO SURVEYOR AT ONCE.
 - UTILITIES SHOWN HEREIN ARE BY VISIBLE LOCATION OF ABOVE GROUND STRUCTURES ONLY. UNDERGROUND UTILITIES MAY EXIST THAT ARE NOT SHOWN HEREIN.
 - CALL 811 ("COMMON GROUND ALLIANCE" NATIONAL UNDERGROUND UTILITY LOCATOR SERVICE) FOR FIELD LOCATION OF UNDERGROUND UTILITY LINES PRIOR TO ANY DIGGING OR CONSTRUCTION.
 - NO DIMENSIONS SHOULD BE ASSUMED BY SCALING.
 - SURVEY COMPLETED AND PROVIDED BY ATWELL, LLC ON 01/31/2023.
 - FOR MISSING OR SUBSTANDARD SECTION CORNER MONUMENTS SHOWN ON THIS SURVEY AND/OR CORNERS MISSING A CURRENT & COMPLETE MONUMENT RECORD, ATWELL WILL BE SETTING AND FILING RECORDS PER THE LAND SURVEY MONUMENT ACT [765 ILCS 220] AFTER SURVEY IS COMPLETE.




Know what's below.
Call before you dig.

THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE OWNER OR ITS REPRESENTATIVE. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK, AND AGREE TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCURRED BY THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES.

NOTICE:
CONSTRUCTION SITE SAFETY IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR. NEITHER THE OWNER NOR THE ENGINEER SHALL BE EXPECTED TO ASSUME ANY RESPONSIBILITY FOR SAFETY OF THE WORK OF PERSONS ENGAGED IN THE WORK, OF ANY NEARBY STRUCTURES, OR OF ANY OTHER PERSONS.

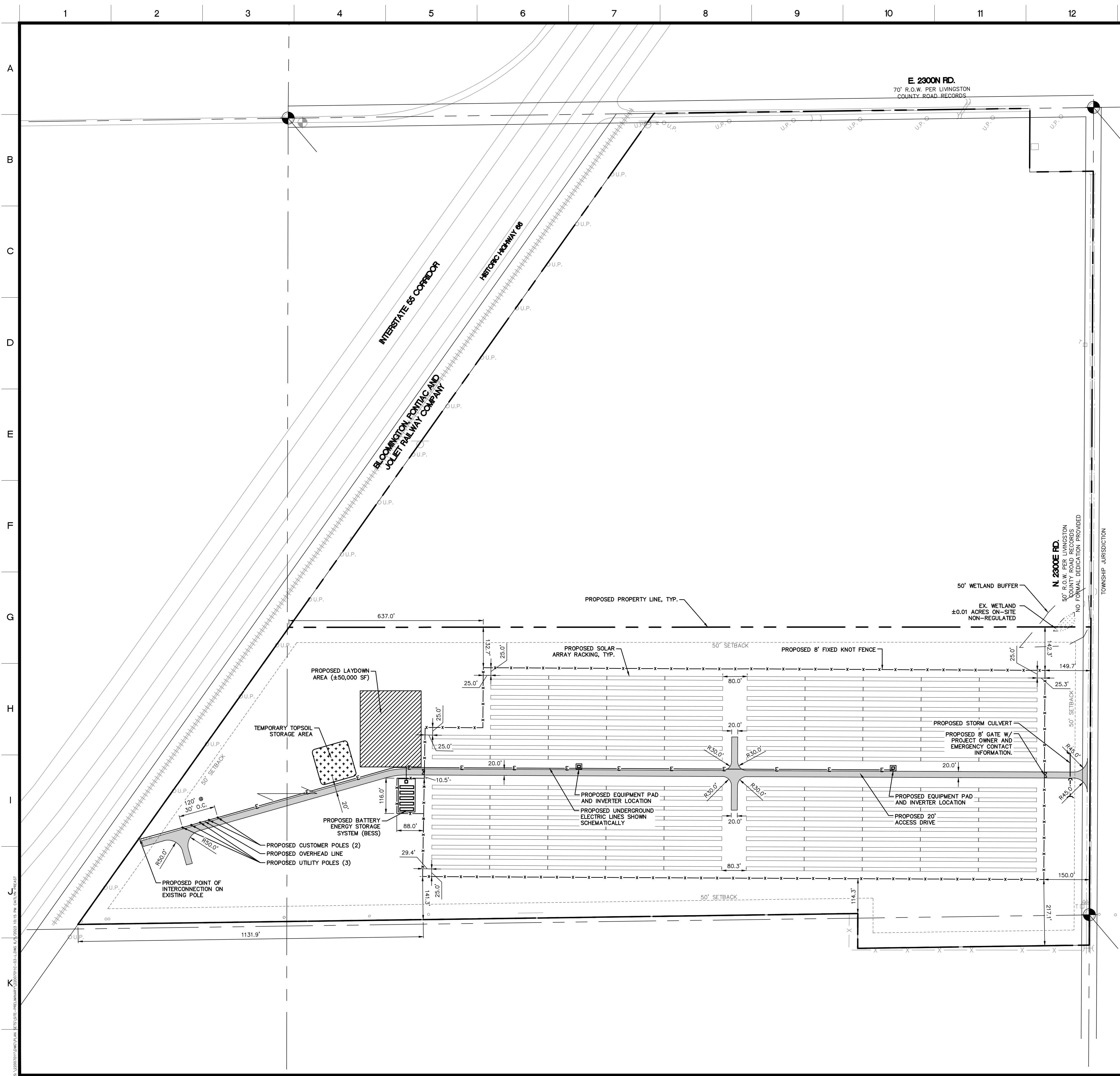
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866.850.4200 www.atwell-group.com
1250 EAST DEHL ROAD, SUITE 300
NAPERVILLE, IL 60563
DESIGN FIRM #84-005876

CLIENT	IRONWOOD RENEWABLES
DATE	JUNE 7, 2023
CLIENT REVIEW SET	06/07/2023
REVISIONS	0 75 150
SCALE	1" = 150 FEET
DR.	BR CH MS
P.M.	M. KEITH
JOB	22007011
SHEET NO.	C-02

CAD FILE: 22007011-02-EC.DWG



LEGEND

	BOUNDARY LINE
	EXISTING ROW
	BOUNDARY ADJACENT LINE
	BUILDING SETBACK LINE
	EXISTING FENCE
	PROPOSED FENCE
	EXISTING RAILROAD
	EXISTING VEGETATION LINE
	EXISTING WETLAND
	PROPOSED OVERHEAD ELECTRIC LINE
	PROPOSED UNDERGROUND ELECTRIC LINE
	EXISTING UTILITY POLE
	PROPOSED UTILITY POLE
	PROPOSED GRAVEL ACCESS DRIVE SEE DETAIL SHEET C-06

SITE DATA

EXISTING SITE AREA	144.7	ACRES
PROPOSED SITE AREA	66.7	ACRES
FENCE AREA	31.4	ACRES
LIMIT OF DISTURBANCE	39.4	ACRES
ZONING DISTRICT	A-1 AGRICULTURAL	
FLOOD ZONE	ZONE X PER FIRM MAP #17105C0125E DATED 12/18/2007	
PROPOSED USES:	COMMERCIAL SOLAR ENERGY BATTERY ENERGY STORAGE SYSTEM	
CAPACITY AC:	5.0	MW
CAPACITY DC:	10.02	MW
DC/AC RATIO:	2.0	
PV MODULES:		
MANUFACTURER:	JINKOSOLAR	
MODEL:	JMK400N-60HL4-V	
NAMEPLATE:	480 W	
QUANTITY:	20,880	
INVERTERS:		
MANUFACTURER:	SMA AMERICA	
MODEL:	SC 2930-UP-US	
NAMEPLATE:	2.5 MVA	
QUANTITY:	2	
ARRAY:		
MANUFACTURER:	TBD	
TYPE:	FIXED-4L	
AZIMUTH:	180°	
PITCH:	32°-10°	
GCR:	45%	
SETBACK:	REQUIRED	PROVIDED
FRONT (EAST)	50'	149.7'
SIDE (SOUTH)	50'	114.3'
SIDE (NORTH)	50'	132.7'
REAR (WEST)	50'	637.0'

Know what's below.
Call before you dig.

THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE OWNER OR ITS REPRESENTATIVE. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK, AND AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES.

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NAPEERVILLE, IL 60563
DESIGN FIRM #184-005876

SECTION 35	IRONWOOD RENEWABLES	BECKHAM SOLAR
	TOWNSHIP 30 NORTH, RANGE 6 EAST	SITE LAYOUT PLAN
	NEVADA TOWNSHIP	
	LIVINGSTON COUNTY, ILLINOIS	

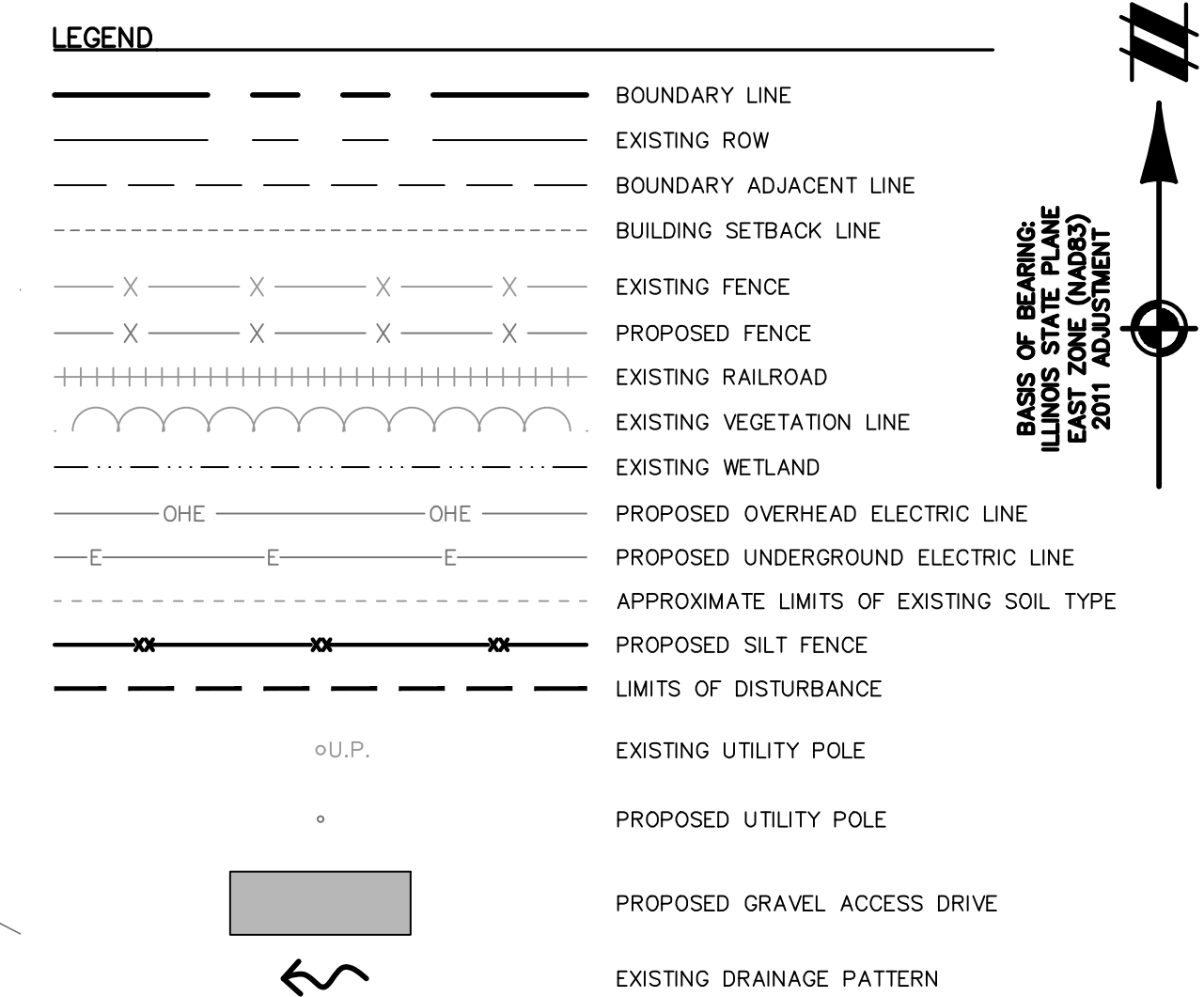
CLIENT

DATE
JUNE 7, 2023


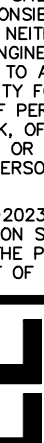
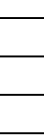
06/07/2023
CLIENT REVIEW SET

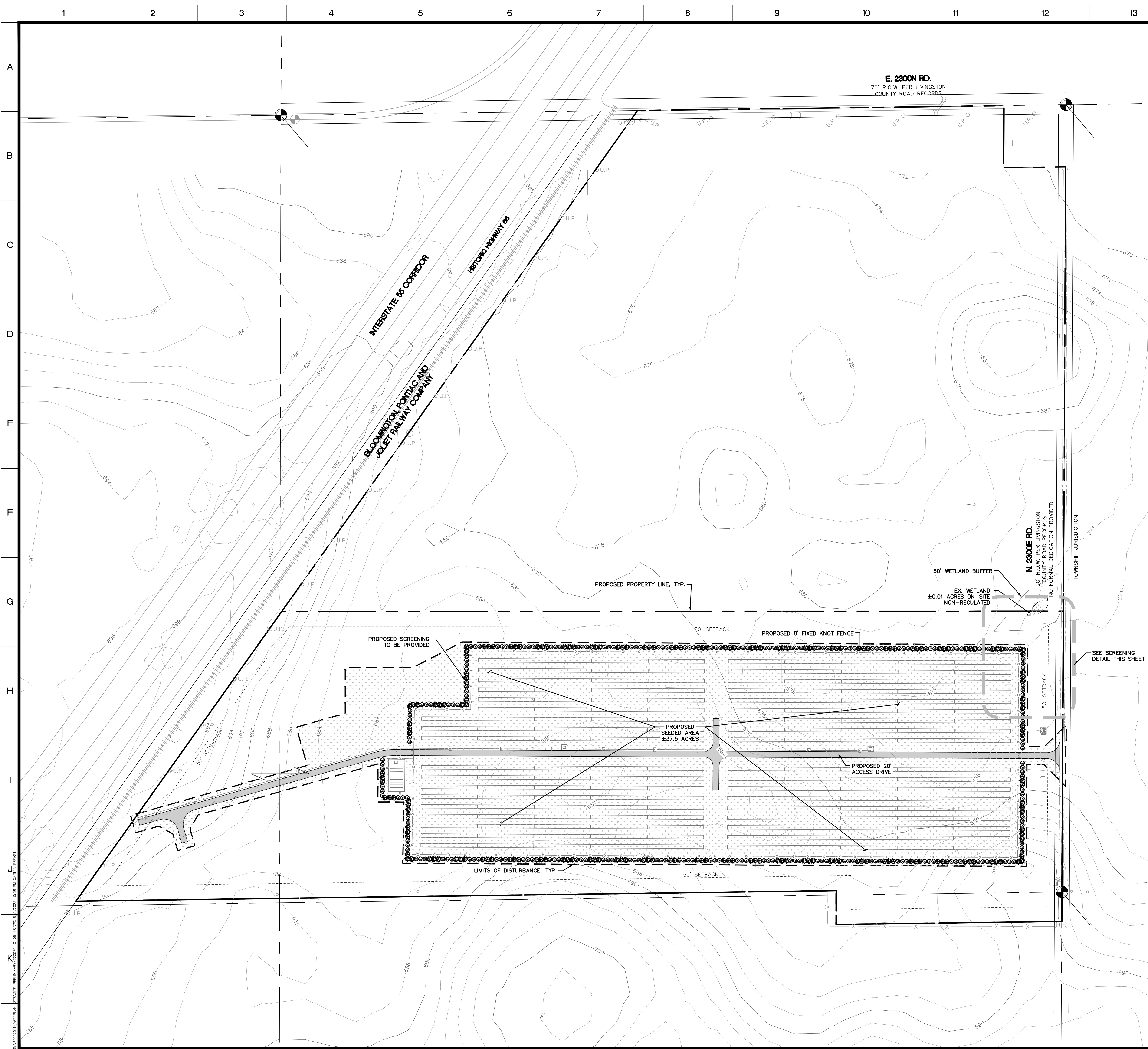
REVISIONS	
SCALE	0 75 150
1" = 150 FEET	
DR.	BR CH MS
P.M. M. KEITH	
JOB	22007011
SHEET NO.	C-03

CAD FILE: 22007011-C3-LDWG



1. ALL CUT OR FILL SLOPES SHALL BE 3:1 OR FLATTER UNLESS OTHERWISE NOTED. CONTRACTOR SHALL APPLY STABILIZATION FABRIC TO ALL SLOPES 4H:1V OR STEEPER. CONTRACTOR SHALL GRASS DISTURBED AREAS IN ACCORDANCE WITH STATE, LOCAL AND COUNTY SPECIFICATIONS, INCLUDING IN ACCORDANCE WITH THE N.P.D.E.S. GENERAL PERMIT, UNTIL A HEALTHY STAND OF GRASS IS OBTAINED
2. EXISTING GRADE CONTOUR INTERVALS SHOWN AT 1 FOOT INTERVALS.
3. PROPOSED GRADE CONTOUR INTERVALS SHOWN AT 1 FOOT INTERVALS.
4. ALL SPOT GRADES ALONG CURB LINE ARE FLOWLINE GRADES UNLESS OTHERWISE NOTED. ALL RIM ELEVATIONS ARE FLOWLINE ELEVATIONS.
5. ALL STORM SEWER AND UTILITY STRUCTURE RIMS SHALL BE FLUSH WITH PAVEMENT OR FINISHED GRADE.
6. THE CONTRACTOR SHALL ADHERE TO ALL TERMS & CONDITIONS AS OUTLINED IN THE GENERAL N.P.D.E.S. PERMIT FOR STORMWATER DISCHARGE ASSOCIATED WITH CONSTRUCTION ACTIVITIES.
7. IF DRAIN TILES ARE ENCOUNTERED WITHIN THE PROJECT AREA AND DAMAGED, THEY SHALL BE REROUTED OR REPAIRED.

 <p>Know what's below. Call before you dig.</p> <p>THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE OWNER OR ITS REPRESENTATIVE. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK, AND AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCURRED BY THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES.</p> <p>NOTICE: CONSTRUCTION SITE SAFETY IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR. NEITHER THE OWNER NOR THE ENGINEER SHALL BE EXPECTED TO ASSUME ANY RESPONSIBILITY FOR SAFETY OF THE WORK, OF PERSONS ENGAGED IN THE WORK, OF ANY NEARBY STRUCTURES, OR OF ANY OTHER PERSONS.</p> <p>COPYRIGHT © 2023 ATWELL LLC. NO REPRODUCTION SHALL BE MADE WITHOUT THE PRIOR WRITTEN CONSENT OF ATWELL LLC.</p>			
 <p>ATWELL 866.850.4200 www.atwell-group.com 1250 EAST DIEHL ROAD, SUITE 300 NAPERVILLE, IL 60563 DESIGN FIRM #184-00576</p>			
SECTION 35 TOWNSHIP 30 NORTH, RANGE 6 EAST		NEVADA TOWNSHIP LIVINGSTON COUNTY, ILLINOIS	
CLIENT IRONWOOD RENEWABLES NORTH 2300 EAST ROAD LIVINGSTON COUNTY, ILLINOIS		DATE JUNE 7, 2023	
BECKHAM SOLAR GRADING PLAN		REVISIONS	
SCALE  1" = 150 FEET		DR. BR. CH. MS. P.M. M. KEITH	
JOB 22007011		SHEET N.O.	
C-04			



LEGEND

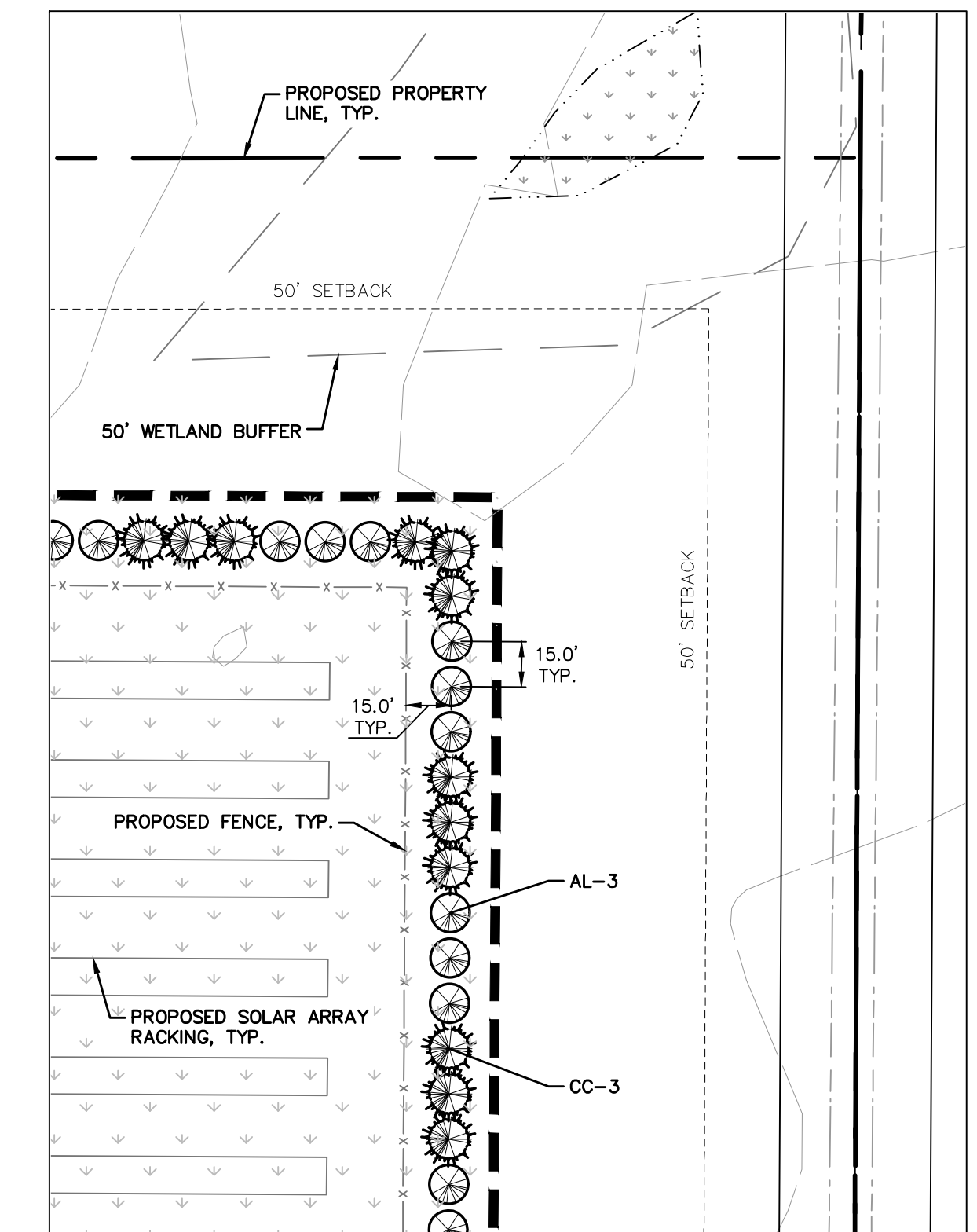
	BOUNDARY LINE
	EXISTING ROW
	BOUNDARY ADJACENT LINE
	BUILDING SETBACK LINE
	EXISTING FENCE
	PROPOSED FENCE
	EXISTING RAILROAD
	EXISTING VEGETATION LINE
	EXISTING WETLAND
	PROPOSED OVERHEAD ELECTRIC LINE
	PROPOSED UNDERGROUND ELECTRIC LINE
	LIMITS OF DISTURBANCE
	EXISTING UTILITY POLE
	PROPOSED UTILITY POLE
	PROPOSED EVERGREEN TREES
	PROPOSED GRAVEL ACCESS DRIVE
	PROPOSED NATIVE POLLINATOR FRIENDLY SEED MIX

PLANTING NOTES:

- ALL STOCKPILE AREAS SHALL BE LOCATED WITHIN LIMIT OF WORK LINE AND STABILIZED TO PREVENT EROSION.
- ALL DEBRIS GENERATED DURING SITE PREPARATION ACTIVITIES SHALL BE LEGALLY DISPOSED OF OFF SITE.
- PROVIDE CRIBBING AS NECESSARY TO PROTECT EXISTING UTILITY LINES DURING CONSTRUCTION.
- SEED ALL DISTURBED AREAS INCLUDING LAYDOWN AREAS. SEED SHALL BE: FRESH, CLEAN, AND SELECTED FROM THE PREVIOUS YEAR'S CROP; SHALL HAVE A MAXIMUM WEED SEED CONTENT OF 1% SHALL COMPLY WITH APPLICABLE FEDERAL AND STATE SEED LAWS; AND SHALL FURNISHED AND DELIVERED PREMIXED IN UNOPENED CONTAINERS. THE SEED MIX PROPORTIONS SHALL BE DETERMINED DURING FINAL ENGINEERING.
- PROPOSED SEED SHALL BE SITE-SPECIFIC POLLINATOR FRIENDLY MIX TO BE DESIGNED WITH FINAL ENGINEERING PLANS. AREAS WITHIN RIGHTS-OF-WAY SHALL BE SEEDED WITH A LOW-MAINTENANCE DOT MIX.
- PLANTING SEED SHALL BE SOWN IN SEASONAL CONDITIONS AS APPROPRIATE FOR GOOD SEED SURVIVAL, OR AT SUCH TIMES AS APPROVED BY THE OWNER.
- PROTECT NEWLY TOPSOILED, GRADED, AND/OR SEEDED AREAS FROM TRAFFIC AND EROSION. KEEP AREAS FREE OF TRASH AND DEBRIS RESULTING FROM LANDSCAPE CONTRACTOR OPERATIONS.
- REPAIR AND RE-ESTABLISH GRADES IN SETTLED, ERODED, AND RUTTED AREAS TO THE SPECIFIED GRADE AND TOLERANCES.
- 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.
- 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.
- THE LANDSCAPE CONTRACTOR SHALL CLEAN UP AND REMOVE ANY DEBRIS FROM THE SITE CAUSED BY THE LANDSCAPE CONTRACTOR.

PLANT SCHEDULE

KEY	QTY	BOTANICAL NAME	COMMON NAME	SIZE	REMARKS/SPEC.
CC	183	<i>Crataegus crusgali</i> var. <i>inermis</i>	Cockspur Hawthorn	1-1/2" cal.	B&B, Native, 4' Ht., Min
AL	188	<i>Amelanchier laevis</i>	Allegheny Serviceberry	1-1/2" cal.	B&B, Native, 4' Ht., Min



SCREENING DETAIL
SCALE 1"=50'

Know what's below.
Call before you dig.

THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE OWNER OR ITS REPRESENTATIVE. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK, AND AGREE TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES.

NOTICE:
CONSTRUCTION SITE SAFETY IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR. NEITHER THE OWNER NOR THE ENGINEER SHALL BE EXPECTED TO ASSUME ANY RESPONSIBILITY FOR SAFETY OF THE WORK OF PERSONS ENGAGED IN THE WORK, OF ANY NEARBY STRUCTURES, OR OF ANY OTHER PERSONS.

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ATWELL
866.850.4200 www.atwell-group.com
1250 EAST DIEHL ROAD, SUITE 300
NAPERVILLE, IL 60563
DESIGN FIRM #184-005876

SECTION 35

TOWNSHIP 30 NORTH, RANGE 6 EAST
NEVADA TOWNSHIP
LIVINGSTON COUNTY, ILLINOIS

CLIENT
IRONWOOD RENEWABLES
NORTH 2300 EAST ROAD
LIVINGSTON COUNTY, ILLINOIS
BECKHAM SOLAR
LANDSCAPING PLAN

DATE
JUNE 7, 2023

06/07/2023
CLIENT REVIEW SET

REVISIONS

SCALE	0	75	150
1" = 150 FEET			
DR.	BR	CH.	MS
P.M. M. KEITH			
JOB	22007011		
SHEET NO.	C-05		

CAD FILE: 22007011-05-US.DWG



Exhibit G: IDNR EcoCAT Consultation & SHPO



Illinois Department of Natural Resources

One Natural Resources Way Springfield, Illinois 62702-1271
www.dnr.illinois.gov

JB Pritzker, Governor
Colleen Callahan, Director

December 15, 2022

Austin Aigner
Atwell Group
1250 E. Diehl Road
Suite 300
Naperville, IL 60563

**RE: Beckham Solar
Consultation Program
EcoCAT Review #2307582
Livingston County**

Dear Mr. Aigner,

The Department has received your submission for this project for the purposes of consultation pursuant to the *Illinois Endangered Species Protection Act* [520 ILCS 10/11], the *Illinois Natural Areas Preservation Act* [525 ILCS 30/17], and Title 17 *Illinois Administrative Code* Part 1075.

The proposed action consists of developing a 5.0 MW solar energy facility on +/-234 acres of agricultural land in Livingston County, IL.

The Illinois Natural Heritage Database shows the following protected resources may be in the vicinity of the project location:

State Listed

Eryngium Stem Borer (*Papaipema eryngii*)

Due to the project scope and proximity to protected resources the Department recommends the following actions be taken to avoid adversely impacting listed species in the vicinity of the project:

Eryngium Stem Borer

- 1) The Department recommends surveying for and identifying populations of the species host plant, Rattlesnake Master (*Eryngium yuccafolium*), which are known to occur along the Route 66 corridor. Populations of 50 or more of the host plant should be flagged for avoidance.
 - a) Survey results and methods should be forwarded to the Department for review and concurrence.
 - b) Because the species will only be present in the immediate area of a population of 50 or greater host plants, a setback should be established from these populations to avoid future disturbance.

- 2) If areas containing host plant require mowing, the following specifications should be observed:
 - a) Mowing should be done between the dates of November 1st and April 15th.
 - b) Mowing deck should be set to a height of 12" to avoid disturbing duff layer.
 - c) Low impact/ non-compaction tires should be utilized on mowers.
- 3) If temporary or permanent lighting is required, the Department recommends the following lighting recommendation to minimize adverse effects to wildlife:
 - a) All lighting should be fully shielded fixtures that emit no light upward.
 - b) Only "warm-white" or filtered LEDs (CCT < 3,000 K; S/P ratio < 1.2) should be used to minimize blue emission.
 - c) Only light the exact space with the amount (lumens) needed to meet facility safety requirement.
 - d) If LEDs are to be used, avoid the temptation to over-light based on the higher luminous efficiency of LEDs.

Given the above recommendations are adopted the Department has determined that impacts to these protected resources are unlikely. The Department has determined impacts to other protected resources in the vicinity of the project location are also unlikely.

In accordance with 17 Ill. Adm. Code 1075.40(h), please notify the Department of your decision regarding these recommendations.

Consultation on the part of the Department is closed, unless the applicant desires additional information or advice related to this proposal. Consultation for Part 1075 is valid for two years unless new information becomes available which was not previously considered; the proposed action is modified; or additional species, essential habitat, or Natural Areas are identified in the vicinity. If the action has not been implemented within two years of the date of this letter, or any of the above listed conditions develop, a new consultation is necessary.

The natural resource review reflects the information existing in the Illinois Natural Heritage Database at the time of the project submittal and should not be regarded as a final statement on the project being considered, nor should it be a substitute for detailed site surveys or field surveys required for environmental assessments. If additional protected resources are unexpectedly encountered during the project's implementation, the applicant must comply with the applicable statutes and regulations.

This letter does not serve as permission to take any listed or endangered species. As a reminder, no take of an endangered species is permitted without an Incidental Take Authorization or the required permits. Anyone who takes a listed or endangered species without an Incidental Take Authorization or required permit may be subject to criminal and/or civil penalties pursuant to the *Illinois Endangered Species Act*, the *Fish and Aquatic Life Act*, the *Wildlife Code* and other applicable authority.

The Department also offers the following conservation measures be considered to help protect native wildlife and enhance natural areas in the project area:

If erosion control blanket is to be used, the Department also recommends that wildlife-friendly plastic-free blanket be used around wetlands and adjacent to natural areas, if not feasible to implement project wide, to prevent the entanglement of native wildlife.

The Department encourages all new and existing solar energy facilities to participate in the Pollinator Scorecard Program. More information can be found here:

<https://www2.illinois.gov/dnr/conservation/pollinatorscorecard/pages/default.aspx>

Please contact me with any questions about this review.

Sincerely,



Kyle Burkwald
Impact Assessment Section
Division of Real Estate Services and Consultation
Office of Realty & Capital Planning
Illinois Department of Natural Resources
One Natural Resources Way
Springfield, IL 62702
Kyle.Burkwald@Illinois.gov
Phone: (217) 785-4984



Illinois Department of Natural Resources

One Natural Resources Way Springfield, Illinois 62702-1271
www.dnr.illinois.gov

JB Pritzker, Governor
Colleen Callahan, Director

Livingston County
Livingston
SW of N. 2300 E Road & E. 2800 N Road, Section:35-Township:30N-Range:6E
Atwell-22007011, IEPA
New construction, solar development - Beckham Solar

PLEASE REFER TO:

SHPO LOG #006121322

December 28, 2022

Michael B. Keith
Atwell, LLC
1250 East Diehl Road, Suite 300
Naperville, IL 60563

SURVEY REQUEST

Dear Mr. Keith:

The Illinois State Historic Preservation Office is required by the Illinois State Agency Historic Resources Preservation Act (20 ILCS 3420, as amended, 17 IAC 4180) to review all state funded, permitted or licensed undertakings for their effect on cultural resources. We have received information indicating that the referenced project will, under the state law cited above, require comments from our office and our comments follow. Should you have any contrary information, please contact our office at the number below.

According to the information provided to us concerning your proposed project, apparently there is no federal involvement in your project. However, please note that the state law is less restrictive than the federal cultural resource laws concerning archaeology, therefore if your project will use federal loans or grants, need federal agency permits or federal property then your project must be reviewed by us under a slightly different procedure under the National Historic Preservation Act of 1966, as amended. Please notify us immediately if such is the case.

The project area has a high probability of containing significant prehistoric/historic archaeological resources. Accordingly, a Phase I archaeological reconnaissance survey to locate, identify, and record all archaeological resources within the project area will be required, in addition to the survey we will also need clear photographs of all structures in, or adjacent to, the current project area. This decision is based upon our understanding that there has not been any large scale disturbance of the ground surface (excluding agricultural activities) or major construction activity within the project area which would have destroyed existing cultural resources prior to your project. If the area has been disturbed, please contact our office with the appropriate written and/or photographic evidence. The area(s) that need(s) to be surveyed (within the zone that needs to be surveyed) include(s) all area(s) that will be developed as a result of the issuance of the state agency permit(s) or the granting of the state funds or loan guarantees that have prompted this review. Enclosed you will find an attachment briefly describing Phase I surveys and listing archaeological contracting services. A COPY OF OUR LETTER WITH THE SHPO LOG NUMBER SHOULD BE PROVIDED TO THE SELECTED PROFESSIONAL ARCHAEOLOGICAL CONTRACTOR TO ENSURE THAT THE SURVEY RESULTS ARE CONNECTED TO YOUR PROJECT PAPERWORK.

If you have further questions, please contact Jeff Kruchten, Chief Archaeologist at 217/785-1279 or Jeffery.kruchten@illinois.gov.

Sincerely,

Carey L. Mayer, AIA
Deputy State Historic Preservation Officer

Enclosure



Exhibit H: Interconnection Request

Application Details

Project Name Beckham Solar	Do you have an interconnection agreement for an existing DER facility at this premise? No	Phone Number 337-344-7381	City Livingston
Street Approx 41.029463, -88.497354	State Illinois	Zip 60460	Latitude 41.029463
Longitude -88.497354	Application Type Level 4	Intent of Generation Community Supply	Energy Source Solar
Electrical Supplier ComEd			

Customer Information

Customer Name Adrian Ortlieb	Phone Number 337-344-7381	Email adrian.ortlieb@ironwoode nergy.com	Street 128 Demanade Blvd. Ste. 200
City Lafayette	State Louisiana	Zip Code 70503	
Property Type Community Supply	Will this project be installed by customer? No		

Contractor Information

Equipment Contractor			
Equipment Contractor Equipment Contractor	Company Name Ironwood Renewables	Full Name Adrian Ortlieb	Email Address adrian.ortlieb@ironwoode nergy.com
Phone Number 337-344-7381	Street Address 128 Demanade Blvd. Ste. 200	City Lafayette	State Louisiana

Zip Code

70503

Electrical Contractor

Electrical Contractor

Company Name

Ironwood Renewables

Full Name

Adrian Ortlieb

Email Address

adrian.ortlieb@ironwoode
nergy.com

Phone Number

337-344-7381

Street Address

128 Demanade Blvd. Ste.
200

City

Lafayette

State

Louisiana

Zip Code

70503

Additional Level 4 Questions

1. Are you interested in having a
scoping meeting? (This meeting
may be waived if you and ComEd
both find it unnecessary.)

Yes

2. Do you want to combine the
feasibility and system impact study?
(This is recommended by ComEd.)

Accept Combined Study

Equipment Information

Inverter Information

What type of energy production
equipment does the system utilize?

Inverter

Inverter Manufacturer

SMA America

Other Inverter Model

SC-2930-S2-US

AC Rating

2500

AC Rating

2500

AC Rated Voltage

660

DC Rating

DC Rating

DC Circuit Voltage (Volts)

Is the inverter IEEE 1547 / UL 1741
lab certified?

Yes

Number of Inverters

2

Array Information

Tilt

35

Azimuth

180

DC Size in KW

Module Type

Standard

Array Type

Fixed Open Rack

System Limited Export Capacity

Do you intend to operate your equipment at a capacity less than total nameplate? (Non Net Export systems can only be submitted through a Level 3 Application.)

Yes

Select all control types that apply:	Limited Export Capacity	Control Power Setting	Control Power Time Delay
Limited Export Power Control Systems	5000		

Additional Details

Are you installing your own transformer?

No

Total System Size Information

Total Installed System Capacity	Unit for Total Installed System Capacity:	Total System Generation DC	Type of Service
5000.00	kW		Three Phases
Total Export Capacity	Estimated In Service Date		
5000			

Projects

Resources

Application Types & Statuses

Printable Applications

Interconnection & Net Metering FAQs

Contact Us:

✉ Interconnect@ComEd.com
☎ 630-576-8158

✉ NetMetering@ComEd.com
☎ 800-825-5436



Exhibit I: FEMA F.I.R.M & United States Fish and Wildlife Service Mapper

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources or of small size. The community map repository should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations (BFEs)** and/or **Floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or flood plain management.

Coastal Base Flood Elevations shown on this map apply only to landward of 0.0 North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or flood plain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic computations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

In the State of Illinois, any portion of a stream or watercourse that lies within the floodway fringe of a culvert (all shown) may have a state regulated floodway. The FIRM may not depict these state regulated floodways.

Floodways restricted by anthropogenic features such as bridges and culverts are drawn to reflect natural conditions and may not agree with the model computed widths listed in the Floodway Data table in the Flood Insurance Study report.

Multiple **topographic sources** may have been used in the delineation of Special Flood Hazard Areas. See Flood Insurance Study report for details on source resolution and geographic extent.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The projection used in the preparation of this map was Universal Transverse Mercator (UTM) zone 18. The horizontal datum was NAD 83, GRS80 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same vertical datum. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at www.ngs.noaa.gov or contact the National Geodetic Survey at the following address:

National Reference System Division
National Geodetic Survey, NOAA
Silver Spring Metro Center
1315 East-West Highway
Silver Spring, Maryland 20910
(301) 713-3191

To obtain current elevation, description, and/or location for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at (301) 713-3242, or visit its website at www.ngs.noaa.gov.

Base map information shown on this FIRM was provided in digital format by the United States Geological Survey. Digital orthophotography with a spatial resolution of 0.5 meter ground sample distance were photogrammetrically compiled from aerial photography acquired during the leaf-off period of spring 2005.

This map reflects more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The Special Flood Hazard Areas and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study report (which contains authoritative hydraulic data) may reflect stream channel conditions that differ from what is shown on this map.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

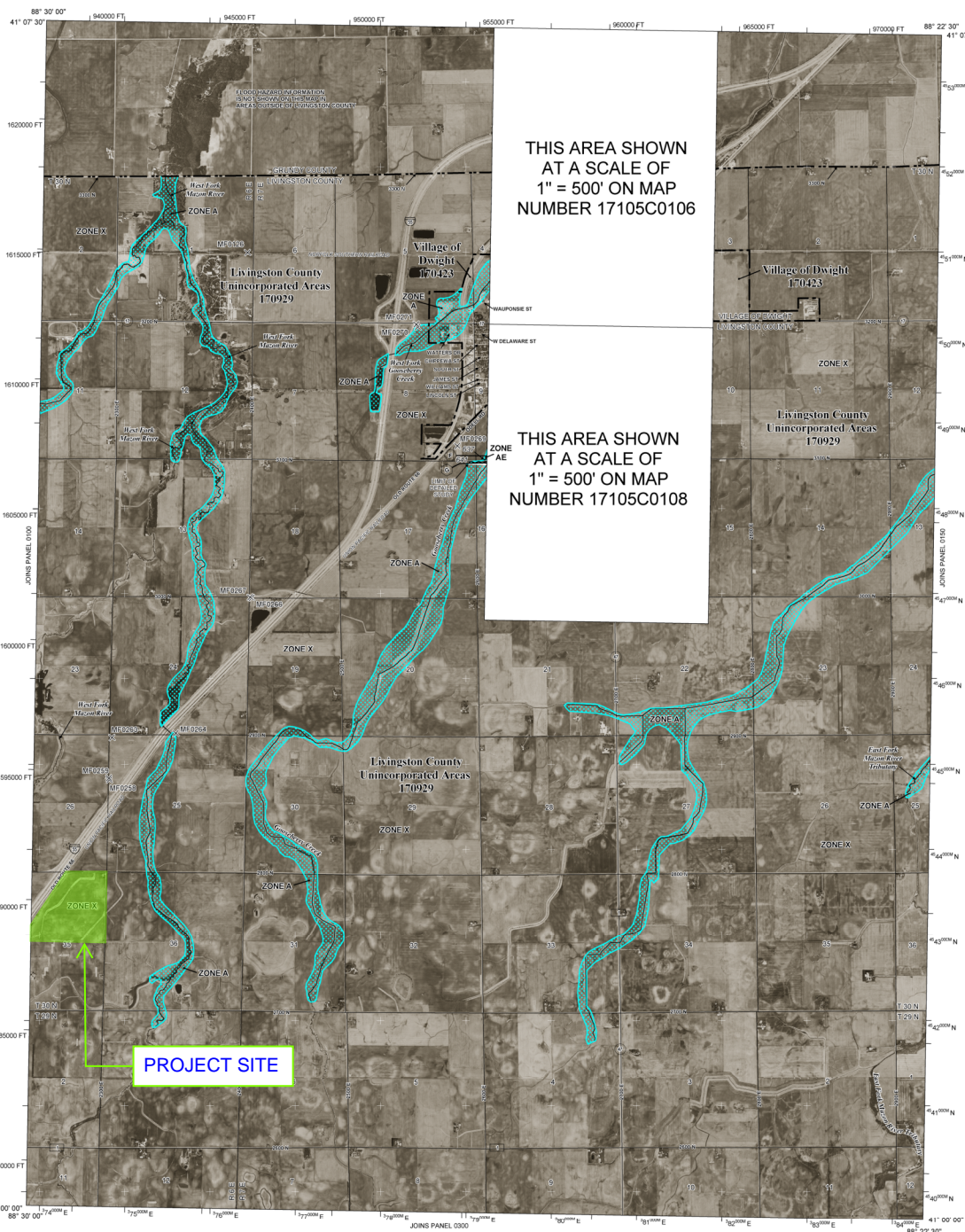
Contact the **FEMA Map Service Center** at 1-800-358-9616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study report, and/or digital version of this map. The FEMA Map Service Center may also be reached by fax at 1-800-358-9620 and its website at www.fema.gov.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call 1-877-FEMA-MAP (1-877-358-9627) or visit the FEMA website at www.fema.gov.

PANEL INDEX



Panel Not Printed



THIS AREA SHOWN
AT A SCALE OF
1" = 500' ON MAP
NUMBER 17105C0106

THIS AREA SHOWN
AT A SCALE OF
1" = 500' ON MAP
NUMBER 17105C0108

LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHA) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, AV, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

- ZONE A** No Base Flood Elevations determined.
- ZONE AE** Base Flood Elevations determined.
- ZONE AH** Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
- ZONE AO** Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of sheet flow flooding, depths are determined.
- ZONE AR** Special Flood Hazard Areas formerly protected from the 1% annual chance flood by a flood control system that was subsequently identified. Zone AR indicates that the flood hazard area is being returned to provide protection from the 1% annual chance or greater flood.
- ZONE AV** Areas for flood zone AV are areas that are protected by a Federal flood protection system under construction; no Base Flood Elevations determined.
- ZONE VE** Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel or a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with average areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

Areas determined to be outside the 0.2% annual chance floodplain. Areas in which flood hazards are underlined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPA)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

1% annual chance floodplain boundary

0.2% annual chance floodplain boundary

Floodway boundary

Zone D boundary

CBRS and OPA boundary

Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations; flood depths or flood velocities

Base Flood Elevation line and value; elevation in feet

Base Flood Elevation value where uniform within zone; elevation in feet

Referenced to the North American Vertical Datum of 1988

Cross section line

Transsect line

Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)

1000-foot grid tick; Illinois State Plane East Coordinate System, 3776 zone (NAD 83)

3776 zone (NAD 83) Transverse Mercator

Bench mark (see explanation in Notes to Users section of this FIRM panel)

MI S

River Mile

Refer to Map Repositories list on Map Index

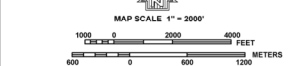
EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP

DECEMBER 18, 2007

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-658-6626.



NFIP

PANEL 0125E

FIRM

FLOOD INSURANCE RATE MAP

LIVINGSTON COUNTY, ILLINOIS

AND INCORPORATED AREAS

PANEL 125 OF 725

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

COMMUNITY	COMMUNITY NUMBER	PANEL	SUFFIX
DWIGHT, VILLAGE OF	170423	0125	E
LIVINGSTON COUNTY	170929	0125	E

Notice to User: The Map Number shown below should be used when obtaining insurance. The Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER 17105C0125E

EFFECTIVE DATE DECEMBER 18, 2007

Federal Emergency Management Agency



January 17, 2023

Wetlands

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland

- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond

- Lake
- Other
- Riverine

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.



Exhibit J: Wetland Delineation



ONE COMPANY.
INFINITE SOLUTIONS.

January 5, 2023

Mr. Hamilton Carrier
Ironwood Renewables
128 Demanade Blvd. Suite 200
Lafayette, LA 70503

Atwell, LLC Project No. 22007011

**Re: Wetland Determination/Delineation
Beckham Solar
Nevada Township, Illinois**

Mr. Carrier:

Ironwood Renewables (Client) contracted Atwell, LLC (Agent) to conduct a wetland delineation/determination and assessment for an approximately 65-acre parcel in Section 35 of Township 30 North, Range 06 East, Nevada Township, Livingston County, Illinois (hereinafter referred to as "site") to support a proposed solar development. The site is located approximately 0.32 miles south of the intersection of N 2300 E Road and E 2800 N Road, on the west side of N 2300 E Road. Refer to the enclosed *Site Location Map*.

The purpose of the wetland determination and delineation was to determine if wetlands, watercourses, and/or bodies of water are present on the site, and if so, if they fall under the jurisdiction of the U.S. Army Corps of Engineers (USACE).

Prior to the field survey, Atwell reviewed the following data for any ecological and environmental constraints: aerial photography, U.S. Geological Survey (USGS) 7.5-Minute Topographic Maps, U.S. Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI) Maps, Flood Insurance Rate Maps (FIRMs) provided by the Federal Emergency Management Agency (FEMA), and county soil data from the Natural Resources Conservation Service (NRCS).

The results of the wetland delineation site visit conducted December 8, 2022 are summarized below.

Site Setting and Characteristics

A review of aerial photography and a site visit were conducted to characterize the site and surrounding area. The surrounding landscape consisted largely of agricultural fields, paved and unpaved roads, single-family residential structures, and hedgerows.

Atwell, LLC Project No. 22007011

The site itself is an undeveloped agricultural field with two grassed upland swales, and a small wetland. Common herbaceous vegetation within uplands includes smooth brome (*Bromus inermis*), dandelion (*Taraxacum officinale*), red clover (*Trifolium pratense*), red fescue (*Festuca rubra*), Canadian thistle (*Cirsium arvense*), and grasses (*Poa spp.*).

Wetland Delineation

The wetland delineation was performed in accordance with the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest Region* (USACE 2010). The delineation of any wetland depends on three basic parameters: 1) the presence of hydrophytic vegetation (plants adapted to living in saturated soils), 2) hydric soils (distinctive soil types that develop under saturated conditions), and 3) wetland hydrology (the presence of water at or near the surface for a specific period of time). The above parameters are virtually always inter-related and present in wetland systems.

In Illinois, the USACE regulates the discharge of dredged or fill material into jurisdictional wetlands and waters of the U.S. under Section 404 of the Clean Water Act (CWA). Wetlands that are hydrologically connected or adjacent to traditional navigable waters of the U. S. are regulated under Section 404. If impacts are anticipated to federally jurisdictional waters or wetlands, then a Section 404 permit obtained through review from the USACE and a Section 401 permit after review from the Illinois Environmental Protection Agency (ILEPA) would be required.

Floodplains and floodways are regulated by the Illinois Department of Natural Resources (ILDNR). All construction activities in the floodways of streams (the channel and the adjacent portion of the floodplain that is needed to safely convey and store flood waters) in urban areas where the stream drainage area is one square mile or more or in rural areas where the stream drainage area is ten square miles or more must be permitted by the ILDNR prior to construction. If impacts are anticipated to floodplains along streams with a drainage area greater than 10 square miles, then a permit would also be required from the ILDNR.

Atwell did not complete a Floristic Quality Assessment (FQA) of the site wetlands, as this assessment is only required if a permit application is needed, and Atwell is assuming that all wetland impacts would be avoided as a result of the project.

Atwell conducted a wetland determination and delineation for the site on December 8, 2022 and identified one wetland (Wetland A1). Refer to the enclosed *Wetland Location Map* for information and locations of the on-site wetland. Refer to the *Photographic Log* for site conditions and physical characteristics at the time of inspection. Wetland Data Forms and the results of the USACE Antecedent Precipitation Tool are also included as attachments to this report.

Wetland A1 is a palustrine emergent (PEM) wetland located in the northeast corner of the site. Wetland hydrological indicators such as geomorphic position, drainage patterns, and FAC-Neutral test were present at the time of the site inspection. Wetland herbaceous species included reed canary grass (*Phalaris arundinacea*; FACW) and curly dock (*Rumex crispus*; FAC). These species range in wetland indicator status from Facultative (FAC) to Facultative Wetland (FACW),

indicating that these species can be found in or usually occur in wetlands. The soils present within the wetland were a silty clay that exhibited depleted dark surface, indicating hydric soils. Wetland A1 is a small depression that continues offsite to the north, but does not appear to have any connection to larger water resources. Therefore, Wetland A1 is not likely regulated by USACE.

According to the U.S. Department of Agriculture (USDA) NRCS Web Soil Survey, the soils contained within the site have been mapped as Swygert silty clay loam, 2 to 4 percent slopes (91B2), Clarence silty clay loam, 4 to 6 percent slopes (147C2), and Bryce silty clay, 0 to 2 percent slopes (235A). Some of the soil types are considered hydric. Hydric soils are conducive to the growth and regeneration of hydrophytic vegetation by their ability to hold water for extended periods of time (NRCS 2010).

FEMA FIRMs were reviewed to determine if portions of the site are mapped as floodplains, floodways, or other flood prone areas. These maps record the following data: 100-year (1% chance of annual flooding) and 500-year (0.2% annual chance of flooding) floodplains, the height of the base flood elevation, and the risk to premium areas developed across a floodplain. According to FEMA FIRM panel #17105C0125E, dated 12/18/2007, the site is defined as Zone X. Zone X indicates an Area of Minimal Flood Hazard. Therefore, regulated floodplains are likely not present within the site.

Conclusions and Recommendations

Based on the desktop review of online databases and a site visit, the site contains one wetland (Wetland A1). It is Atwell's professional opinion that the on-site wetland does not appear to meet the criteria of Section 404 under the CWA. Therefore, the wetland on site is likely not regulated by the USACE. According to FEMA FIRM panel #17105C0125E, dated 12/18/2007, the site is defined as Zone X, indicating an Area of Minimal Flood Hazard. Therefore, regulated floodplains are likely not present within the site.

Please note that natural resources-based field work conducted out of the growing season can create seasonal constraints. Atwell will use our professional judgement based on current field conditions and will coordinate field work with the Client prior to conducting potentially contestable field work. Atwell recommends that delineated wetland boundaries be reviewed during the growing season for accuracy.

A permit is required by the USACE for any proposed work (e.g., filling, dredging, construction, draining, and/or other development) that takes place within the boundaries of a regulated wetland, watercourse, lake, pond, or floodplain. Although most construction activities that take place outside of these boundaries do not require a permit, the USACE has the final authority on the extent of regulated wetlands, lakes, streams, ponds, and floodplains in the State of Illinois.

Mr. Hamilton Carrier
January 5, 2023
Page 4 of 5

We appreciate the opportunity to be of service to you on this project. Should you have any questions, please contact us at (248) 447-2000.

Sincerely,

ATWELL, LLC

A handwritten signature in blue ink, appearing to read 'David Nigro'.

David Nigro
Environmental Technician
Environmental Services Group

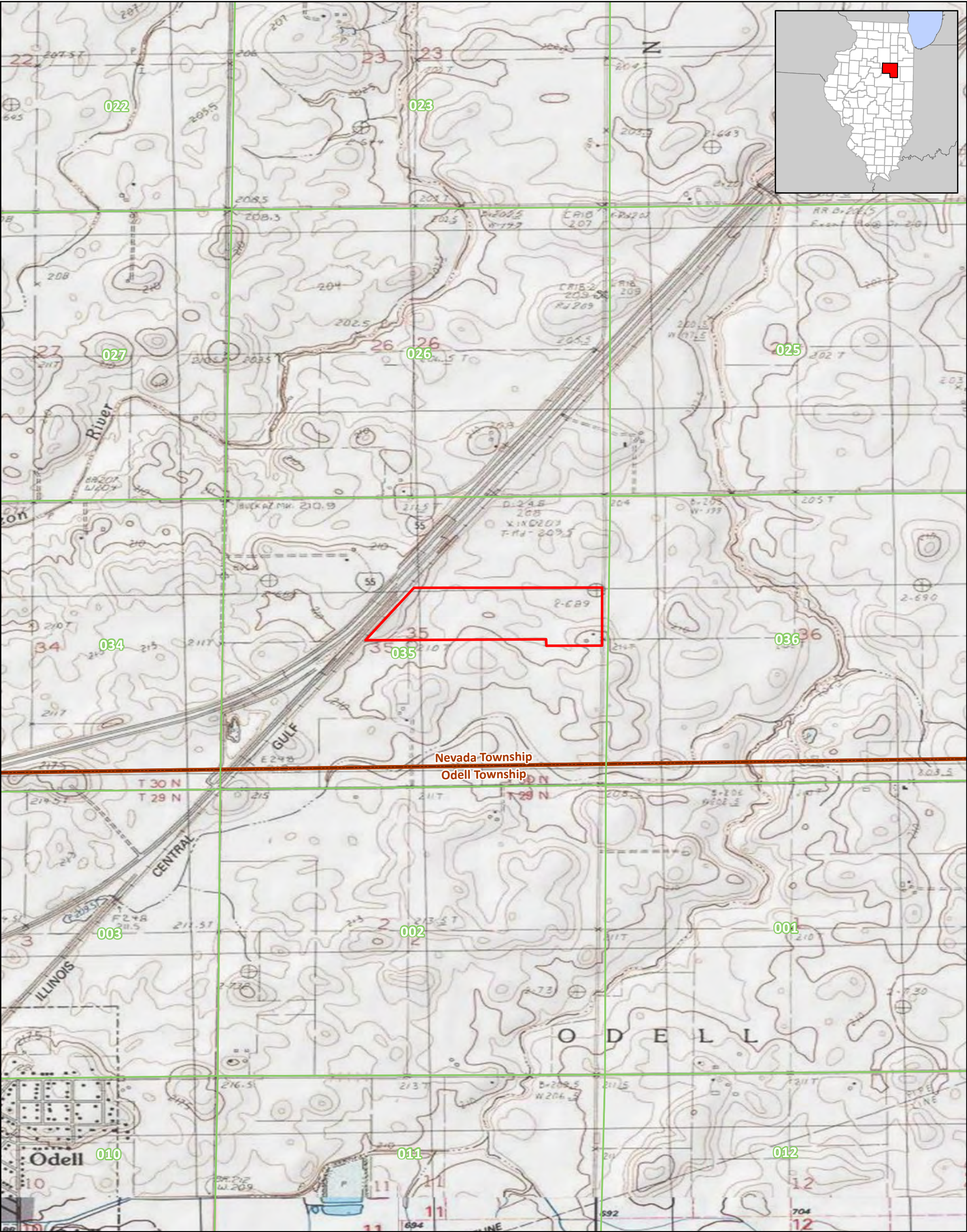
A handwritten signature in blue ink, appearing to read 'Pete Hill'.

Pete Hill
Project Manager
Environmental Services Group

Enclosures: Site Location Map
 Wetland Location Map
 Photographic Log
 Wetland Data Forms
 USACE Antecedent Precipitation Tool

REFERENCES

- NRCS, [Natural Resources Conservation Service]. 2010. "Field Indicators of Hydric Soils in the United States (Version 7.0)."
http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb1046970.pdf.
- USACE, [U.S. Army Corps of Engineers]. 2010. "Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest Region (Version 2.0). August." ERDC/EL TR-10-16. Vicksburg (MS): U.S. Army Engineer Research and Development Center.
<https://usace.contentdm.oclc.org/utils/getfile/collection/p266001coll1/id/7630>.



- Project Area (~65 acres)
- Section (PLSS)
- Township
- County

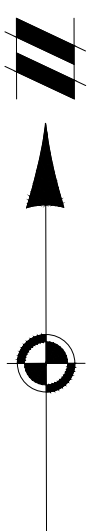
Source: USGS Topographic Quadrangles
DWIGHT (1983) ODELL (1983)



Ironwood Renewables
Beckham Project Area
December 16, 2022



Site Location Map
Sections 35 T30N R06E;
Nevada Township
Livingston County, IL



LEGEND

- ASSESSMENT AREA (± 65.86 ACRES)
- EXISTING WETLAND
- EXISTING DRAIN TILE

NOTE: THIS ILLUSTRATION IS AN APPROXIMATE DEPICTION OF THE WETLANDS THAT APPEAR TO BE LOCATED ON THE SUBJECT PROPERTY AS DELINEATED BY ATWELL ON DECEMBER 8TH, 2022. USACE HAS THE FINAL AUTHORITY ON THE EXTENT OF REGULATED WETLANDS, LAKES, AND STREAMS IN THE STATE OF ILLINOIS.

Know what's below.
Call before you dig.

THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE CONTRACTOR. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK, AND AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES.

NOTICE:
CONSTRUCTION SITE SAFETY IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR. NEITHER THE OWNER NOR THE ENGINEER SHALL BE EXPECTED TO ASSUME ANY RESPONSIBILITY FOR SAFETY OF THE WORK, OF PERSONS ENGAGED IN THE WORK, OF ANY NEARBY STRUCTURES, OR OF ANY OTHER PERSONS.

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866.850.4200 www.atwell-group.com
1250 EAST DIEHL ROAD, SUITE 300
NAPERVILLE, IL 60563
DESIGN FIRM #184-005876

SECTION 35	IRONWOOD RENEWABLES
TOWNSHIP 30 NORTH, RANGE 06 EAST	N 2300 E RD & E 2800 N RD LIVINGSTON, ILLINOIS 62058
NEVADA TOWNSHIP	BECKHAM SOLAR WETLAND LOCATION MAP
LIVINGSTON COUNTY, ILLINOIS	

CLIENT

DATE
DECEMBER 12, 2022

REVISIONS

SCALE	0	60	120
SCALE: 1"=120'			
DR.	MB	CH.	
P.M.	PH		
BOOK			
JOB	22007011		
SHEET NO.			

02

CAD FILE: 22007011-EGS.DWG

PHOTOGRAPHIC LOG

Ironwood Energy – Beckham Solar

December 8th, 2022 – Livingston County Illinois



Photo 1. A north facing view of the eastern boundary.



Photo 2. A southwest facing view of Wetland A1, a palustrine emergent (PEM) wetland on the northeast border of the site.



Photo 3. A north facing view of an upland swale near the northwest corner of site.



Photo 4. A southwest facing view of Old Route 66.



Photo 5. A northwest facing view of an agricultural field.

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Beckham City/County: Livingston County Sampling Date: 2022-12-08
 Applicant/Owner: Ironwood Solar State: Illinois Sampling Point: WL A1
 Investigator(s): David Nigro, Paul Barber Section, Township, Range: sec 35 T030N R006E
 Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave
 Slope (%): 0-2 Lat: 41.030502 Long: -88.490148 Datum: WGS84
 Soil Map Unit Name: Bryce silty clay, 0 to 2 percent slopes NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____
Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____	
Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	
Remarks: PEM wetland	

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: <u>30</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>1</u> (A) Total Number of Dominant Species Across All Strata: <u>1</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100.00</u> (A/B)
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	Prevalence Index worksheet: Total % Cover of: _____ Multiply by: _____ OBL species <u>0.00</u> x 1 = <u>0.00</u> FACW species <u>90.00</u> x 2 = <u>180.00</u> FAC species <u>2.00</u> x 3 = <u>6.00</u> FACU species <u>0.00</u> x 4 = <u>0.00</u> UPL species <u>0.00</u> x 5 = <u>0.00</u> Column Totals: <u>92.00</u> (A) <u>186.00</u> (B) Prevalence Index = B/A = <u>2.02</u>
<u>0</u> = Total Cover				
Sapling/Shrub Stratum (Plot size: <u>15</u>)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
<u>0</u> = Total Cover				Hydrophytic Vegetation Indicators: <input checked="" type="checkbox"/> 1 - Rapid Test for Hydrophytic Vegetation <input checked="" type="checkbox"/> 2 - Dominance Test is >50% <input checked="" type="checkbox"/> 3 - Prevalence Index is ≤3.0 ¹ ___ 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) ___ Problematic Hydrophytic Vegetation ¹ (Explain)
Herb Stratum (Plot size: <u>5</u>)				
1. <u>Phalaris arundinacea</u>	<u>85</u>	<u>Y</u>	<u>FACW</u>	
2. <u>Poa palustris</u>	<u>5</u>	<u>N</u>	<u>FACW</u>	
3. <u>Rumex crispus</u>	<u>2</u>	<u>N</u>	<u>FAC</u>	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
<u>92.0</u> = Total Cover				Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____ ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
Woody Vine Stratum (Plot size: <u>30</u>)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
<u>0</u> = Total Cover				
Remarks: (Include photo numbers here or on a separate sheet.)				

SOIL

Sampling Point: WL A1**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

Depth (inches)	Matrix		%	Redox Features				Texture	Remarks	
	Color (moist)			Color (moist)		%	Type ¹			Loc ²
0-8	10YR	2/2	98	10YR	5/6	2	C	M	CL	
8-18	10YR	7/2	90	10YR	5/6	10	C	M	CL	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.²Location: PL=Pore Lining, M=Matrix.**Hydric Soil Indicators:**

- ☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ 2 cm Muck (A10)
☒ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Sandy Mucky Mineral (S1)
☐ 5 cm Mucky Peat or Peat (S3)

- ☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Loamy Mucky Mineral (F1)
☐ Loamy Gleyed Matrix (F2)
☐ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

- ☐ Coast Prairie Redox (A16)
☐ Dark Surface (S7)
☐ Iron-Manganese Masses (F12)
☐ Very Shallow Dark Surface (TF12)
☐ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☒ No ☐

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
☐ High Water Table (A2)
☐ Saturation (A3)
☐ Water Marks (B1)
☐ Sediment Deposits (B2)
☐ Drift Deposits (B3)
☐ Algal Mat or Crust (B4)
☐ Iron Deposits (B5)
☐ Inundation Visible on Aerial Imagery (B7)
☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
☐ Aquatic Fauna (B13)
☐ True Aquatic Plants (B14)
☐ Hydrogen Sulfide Odor (C1)
☐ Oxidized Rhizospheres on Living Roots (C3)
☐ Presence of Reduced Iron (C4)
☐ Recent Iron Reduction in Tilled Soils (C6)
☐ Thin Muck Surface (C7)
☐ Gauge or Well Data (D9)
☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
☒ Drainage Patterns (B10)
☐ Dry-Season Water Table (C2)
☐ Crayfish Burrows (C8)
☐ Saturation Visible on Aerial Imagery (C9)
☐ Stunted or Stressed Plants (D1)
☐ Geomorphic Position (D2)
☒ FAC-Neutral Test (D5)

Field Observations:Surface Water Present? Yes ☐ No ☒ Depth (inches): _____Water Table Present? Yes ☐ No ☒ Depth (inches): _____Saturation Present? Yes ☐ No ☒ Depth (inches): _____
(includes capillary fringe)Wetland Hydrology Present? Yes ☒ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Beckham City/County: Livingston County Sampling Date: 2022-12-08
 Applicant/Owner: Ironwood Solar State: Illinois Sampling Point: Upland A1
 Investigator(s): David Nigro, Paul Barber Section, Township, Range: sec 35 T030N R006E
 Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave
 Slope (%): 0-2 Lat: 41.030502 Long: -88.490148 Datum: WGS84
 Soil Map Unit Name: Bryce silty clay, 0 to 2 percent slopes NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes _____ No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes _____ No <input checked="" type="checkbox"/>
Hydric Soil Present? Yes _____ No <input checked="" type="checkbox"/>	
Wetland Hydrology Present? Yes _____ No <input checked="" type="checkbox"/>	
Remarks:	

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: <u>30</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A) Total Number of Dominant Species Across All Strata: <u>1</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>0.00</u> (A/B)														
1. _____	_____	_____	_____															
2. _____	_____	_____	_____															
3. _____	_____	_____	_____															
4. _____	_____	_____	_____															
5. _____	_____	_____	_____	Prevalence Index worksheet: <table border="0"> <tr> <td>Total % Cover of:</td> <td>Multiply by:</td> </tr> <tr> <td>OBL species <u>0.00</u></td> <td>x 1 = <u>0.00</u></td> </tr> <tr> <td>FACW species <u>10.00</u></td> <td>x 2 = <u>20.00</u></td> </tr> <tr> <td>FAC species <u>0.00</u></td> <td>x 3 = <u>0.00</u></td> </tr> <tr> <td>FACU species <u>75.00</u></td> <td>x 4 = <u>300.00</u></td> </tr> <tr> <td>UPL species <u>0.00</u></td> <td>x 5 = <u>0.00</u></td> </tr> <tr> <td>Column Totals: <u>85.00</u> (A)</td> <td><u>320.00</u> (B)</td> </tr> </table> Prevalence Index = B/A = <u>3.76</u>	Total % Cover of:	Multiply by:	OBL species <u>0.00</u>	x 1 = <u>0.00</u>	FACW species <u>10.00</u>	x 2 = <u>20.00</u>	FAC species <u>0.00</u>	x 3 = <u>0.00</u>	FACU species <u>75.00</u>	x 4 = <u>300.00</u>	UPL species <u>0.00</u>	x 5 = <u>0.00</u>	Column Totals: <u>85.00</u> (A)	<u>320.00</u> (B)
Total % Cover of:	Multiply by:																	
OBL species <u>0.00</u>	x 1 = <u>0.00</u>																	
FACW species <u>10.00</u>	x 2 = <u>20.00</u>																	
FAC species <u>0.00</u>	x 3 = <u>0.00</u>																	
FACU species <u>75.00</u>	x 4 = <u>300.00</u>																	
UPL species <u>0.00</u>	x 5 = <u>0.00</u>																	
Column Totals: <u>85.00</u> (A)	<u>320.00</u> (B)																	
Sapling/Shrub Stratum (Plot size: <u>15</u>) 1. _____ 2. _____ 3. _____ 4. _____ 5. _____ _____ = Total Cover																		
Herb Stratum (Plot size: <u>5</u>) 1. <u>Bromus inermis</u> <u>70</u> <u>Y</u> <u>FACU</u> 2. <u>Poa palustris</u> <u>10</u> <u>N</u> <u>FACW</u> 3. <u>Taraxacum officinale</u> <u>3</u> <u>N</u> <u>FACU</u> 4. <u>Trifolium repens</u> <u>2</u> <u>N</u> <u>FACU</u> 5. _____ 6. _____ 7. _____ 8. _____ 9. _____ 10. _____ _____ = Total Cover																		
Woody Vine Stratum (Plot size: <u>30</u>) 1. _____ 2. _____ _____ = Total Cover																		
Remarks: (Include photo numbers here or on a separate sheet.)																		

SOIL

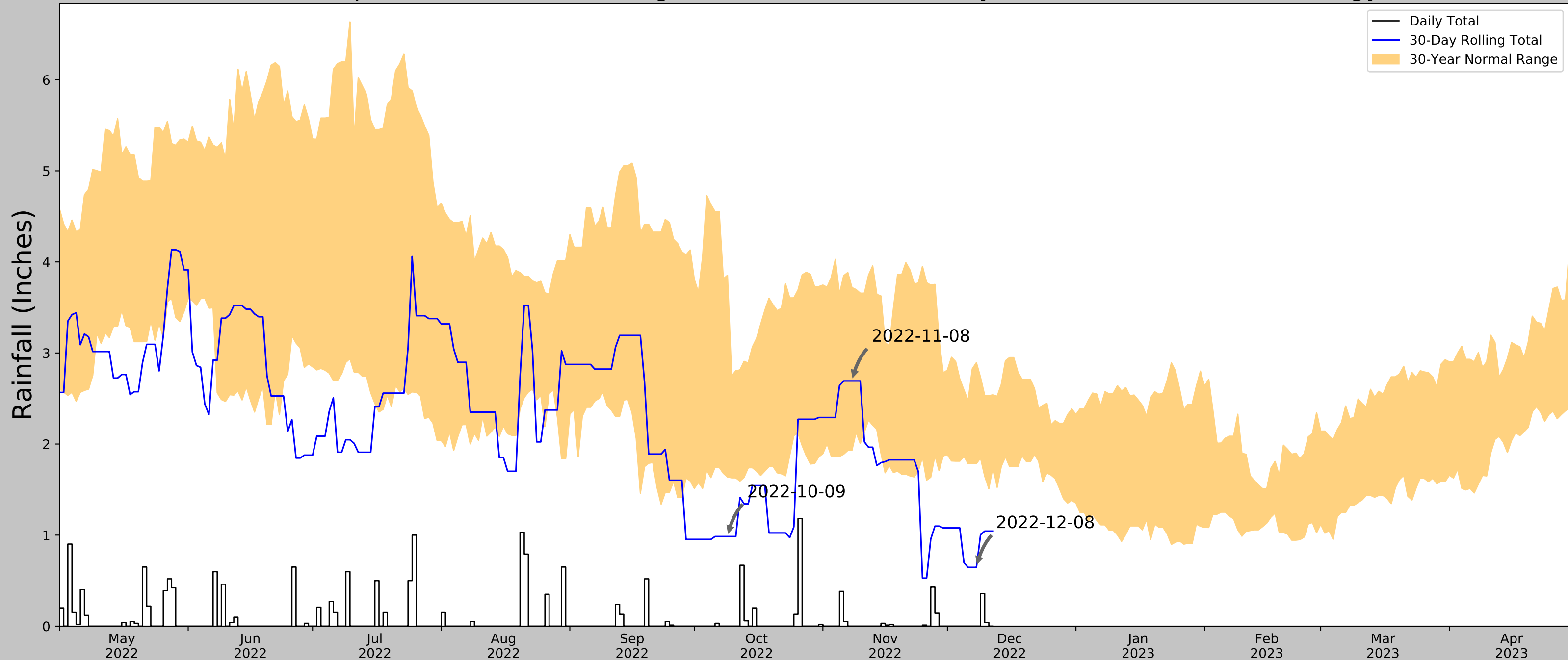
Sampling Point: WL C3_u

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)										
Depth (inches)	Matrix			Redox Features					Texture	Remarks
	Color (moist)		%	Color (moist)		%	Type ¹	Loc ²		
0-18	10YR	3/2	100	10YR	5/6		C	M	CL	
¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.						² Location: PL=Pore Lining, M=Matrix.				
Hydric Soil Indicators:						Indicators for Problematic Hydric Soils³:				
<input type="checkbox"/> Histosol (A1)			<input type="checkbox"/> Sandy Gleyed Matrix (S4)			<input type="checkbox"/> Coast Prairie Redox (A16)				
<input type="checkbox"/> Histic Epipedon (A2)			<input type="checkbox"/> Sandy Redox (S5)			<input type="checkbox"/> Dark Surface (S7)				
<input type="checkbox"/> Black Histic (A3)			<input type="checkbox"/> Stripped Matrix (S6)			<input type="checkbox"/> Iron-Manganese Masses (F12)				
<input type="checkbox"/> Hydrogen Sulfide (A4)			<input type="checkbox"/> Loamy Mucky Mineral (F1)			<input type="checkbox"/> Very Shallow Dark Surface (TF12)				
<input type="checkbox"/> Stratified Layers (A5)			<input type="checkbox"/> Loamy Gleyed Matrix (F2)			<input type="checkbox"/> Other (Explain in Remarks)				
<input type="checkbox"/> 2 cm Muck (A10)			<input type="checkbox"/> Depleted Matrix (F3)			³ Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.				
<input type="checkbox"/> Depleted Below Dark Surface (A11)			<input type="checkbox"/> Redox Dark Surface (F6)							
<input type="checkbox"/> Thick Dark Surface (A12)			<input type="checkbox"/> Depleted Dark Surface (F7)							
<input type="checkbox"/> Sandy Mucky Mineral (S1)			<input type="checkbox"/> Redox Depressions (F8)							
<input type="checkbox"/> 5 cm Mucky Peat or Peat (S3)										
Restrictive Layer (if observed):										
Type: _____						Hydric Soil Present? Yes _____ No <input checked="" type="checkbox"/>				
Depth (inches): _____										
Remarks:										

HYDROLOGY

Wetland Hydrology Indicators:			
Primary Indicators (minimum of one is required; check all that apply)		Secondary Indicators (minimum of two required)	
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)	
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Drainage Patterns (B10)	
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Dry-Season Water Table (C2)	
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Crayfish Burrows (C8)	
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)	
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Stunted or Stressed Plants (D1)	
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Geomorphic Position (D2)	
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> FAC-Neutral Test (D5)	
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Gauge or Well Data (D9)		
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	<input type="checkbox"/> Other (Explain in Remarks)		
Field Observations: Surface Water Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): _____ Water Table Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): _____ Saturation Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): _____ (includes capillary fringe)		Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:			
Remarks:			

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	41.029342, -88.495029
Observation Date	2022-12-08
Elevation (ft)	687.54
Drought Index (PDSI)	Mild drought (2022-11)
WebWIMP H ₂ O Balance	Wet Season

30 Days Ending	30 th %ile (in)	70 th %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2022-12-08	1.786221	2.893701	0.645669	Dry	1	3	3
2022-11-08	1.929528	3.718898	2.692913	Normal	2	2	4
2022-10-09	1.638189	3.853543	0.984252	Dry	1	1	1
Result							Drier than Normal - 8



Figure and tables made by the
Antecedent Precipitation Tool
Version 1.0

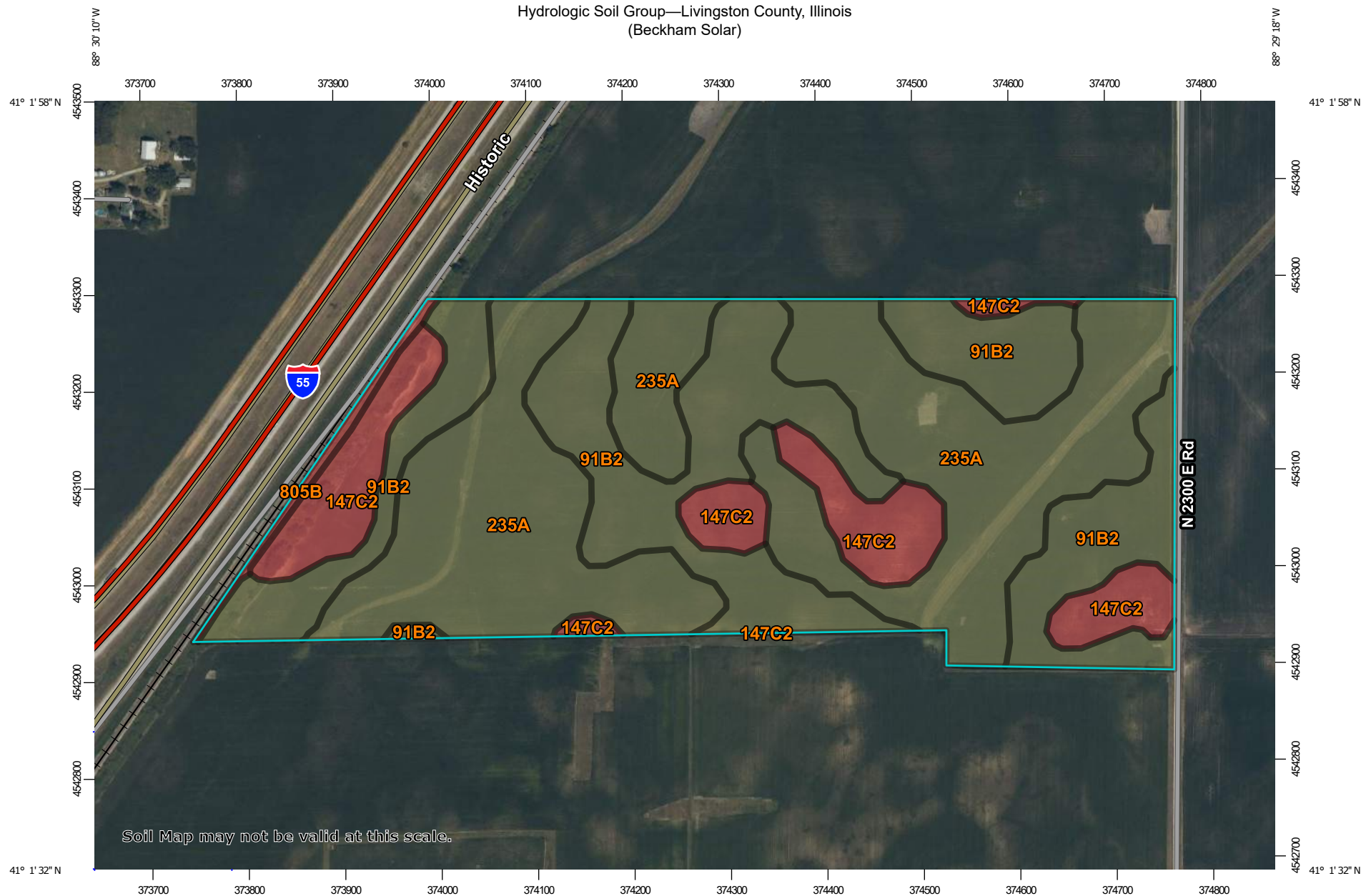
Written by Jason Deters
U.S. Army Corps of Engineers

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
DWIGHT	41.1072, -88.4111	627.953	6.932	59.587	3.532	11223	90
DWIGHT 4.1 NNW	41.1532, -88.4476	617.126	3.703	10.827	1.706	6	0
SOUTH WILMINGTON 0.3 WNW	41.1754, -88.2814	588.911	8.231	39.042	4.025	1	0
MAZON 0.5 ENE	41.2418, -88.4149	584.974	9.302	42.979	4.586	3	0
REDDICK 2 NE	41.1164, -88.2161	600.066	10.171	27.887	4.861	1	0
BRACEVILLE 0.5 SSE	41.217, -88.2633	582.021	10.801	45.932	5.357	1	0
MAZON 4.2 E	41.2482, -88.3439	558.071	10.35	69.882	5.381	3	0
BONFIELD 4.0 WSW	41.123, -88.1257	616.142	14.896	11.811	6.879	1	0
PONTIAC	40.8778, -88.6364	649.934	19.73	21.981	9.312	113	0
STREATOR 3 SE	41.0908, -88.8158	609.908	21.102	18.045	9.877	1	0

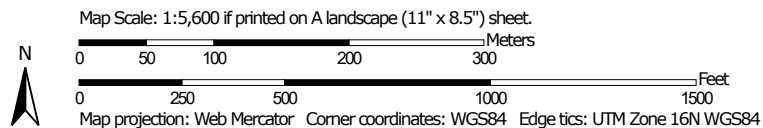


Exhibit K: Livingston County Soil Maps

Hydrologic Soil Group—Livingston County, Illinois (Beckham Solar)



Soil Map may not be valid at this scale.



**Natural Resources
Conservation Service**

Web Soil Survey
National Cooperative Soil Survey

1/22/2023
Page 1 of 4

MAP LEGEND

Area of Interest (AOI)









Area of Interest (AOI)

Soils

Soil Rating Polygons





-  A
-  A/D
-  B
-  B/D
-  C
-  C/D
-  D
-  Not rated or not available

Soil Rating Lines


-  A
-  A/D
-  B
-  B/D
-  C
-  C/D
-  D
-  Not rated or not available

Soil Rating Points






-  A
-  A/D
-  B
-  B/D

-  C
-  C/D
-  D
-  Not rated or not available


Water Features

-  Streams and Canals

Transportation

-  Rails
-  Interstate Highways
-  US Routes
-  Major Roads
-  Local Roads

Background

-  Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Livingston County, Illinois
Survey Area Data: Version 17, Aug 31, 2022

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Aug 3, 2019—Aug 24, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
91B2	Swygert silty clay loam, 2 to 4 percent slopes, eroded	C/D	28.9	36.5%
147C2	Clarence silty clay loam, 4 to 6 percent slopes, eroded	D	11.1	14.0%
235A	Bryce silty clay, 0 to 2 percent slopes	C/D	38.3	48.4%
805B	Orthents, clayey, undulating	D	0.8	1.0%
Totals for Area of Interest			79.2	100.0%

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher



Exhibit L: Method of Interconnection Overview

The solar farm's power is seamlessly interconnected to the local ComEd distribution level grid via a designated point of interconnection (POI) with the utility. The POI is comprised of a select number of pole-mounted devices that are utilized to both measure and provide essential disconnects to the power. From this point, the utility then efficiently routes the power throughout the local grid and directs it to a nearby substation.



Exhibit M: Glare Study, Sound Study, and Equipment Specification Sheets



Beckham Solar

Beckham

Created Jun 12, 2023
Updated Jun 13, 2023
Time-step 1 minute
Timezone offset UTC-6
Minimum sun altitude 0.0 deg
Site ID 92673.16307

Project type Advanced
Project status: active
Category 1 MW to 5 MW



Misc. Analysis Settings

DNI: **varies (1,000.0 W/m^2 peak)**
Ocular transmission coefficient: **0.5**
Pupil diameter: **0.002 m**
Eye focal length: **0.017 m**
Sun subtended angle: **9.3 mrad**

PV Analysis Methodology: **Version 2**
Enhanced subtended angle calculation: **On**

Summary of Results No glare predicted!

PV Name	Tilt	Orientation	"Green" Glare	"Yellow" Glare	Energy Produced
	deg	deg	min	min	kWh
Beckham Array Area	SA tracking	SA tracking	0	0	-

Component Data

PV Array(s)

Total PV footprint area: 35.2 acres


Name: Beckham Array Area
Footprint area: 35.2 acres
Axis tracking: Single-axis rotation
Backtracking: None
Tracking axis orientation: 180.0 deg
Tracking axis tilt: 15.0 deg
Tracking axis panel offset: 0.0 deg
Maximum tracking angle: 60.0 deg
Rated power: -
Panel material: Light textured glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 9.16 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	41.030584	-88.496191	681.44	12.00	693.44
2	41.029888	-88.496191	681.68	12.00	693.68
3	41.029872	-88.497329	685.91	12.00	697.91
4	41.028269	-88.497371	684.65	12.00	696.65
5	41.028350	-88.490355	687.01	12.00	699.01
6	41.030649	-88.490376	675.08	12.00	687.08



Route Receptor(s)


Name: 2800 N Rd
Route type Two-way
View angle: 50.0 deg



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Vertex	Latitude deg	Longitude deg	Ground elevation ft	Height above ground ft	Total elevation ft
1	41.035215	-88.494968	682.80	0.00	682.80
2	41.035502	-88.468656	669.10	0.00	669.10
3	41.035502	-88.468656	669.10	0.00	669.10
4	41.035469	-88.463399	665.76	0.00	665.76
5	41.035465	-88.464574	664.89	0.00	664.89


Name: E 2700 N RD
Route type Two-way
View angle: 50.0 deg



Google Imagery ©2023 Landsat / Copernicus, Maxar Technologies, USDA/FPAC/GEO

Vertex	Latitude deg	Longitude deg	Ground elevation ft	Height above ground ft	Total elevation ft
1	41.020459	-88.508742	700.64	4.50	705.14
2	41.020914	-88.472320	679.24	4.50	683.74


Name: I 55
Route type One-way
View angle: 50.0 deg



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Vertex	Latitude deg	Longitude deg	Ground elevation ft	Height above ground ft	Total elevation ft
1	41.025602	-88.506701	698.15	4.50	702.65
2	41.026427	-88.504941	696.50	4.50	701.00
3	41.028111	-88.502688	695.56	4.50	700.06
4	41.029989	-88.500778	697.24	4.50	701.74
5	41.037855	-88.493376	681.61	4.50	686.11
6	41.042597	-88.489020	670.31	4.50	674.81

Name: N 2300 E RD
Route type Two-way
View angle: 50.0 deg



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Vertex	Latitude deg	Longitude deg	Ground elevation ft	Height above ground ft	Total elevation ft
1	41.035247	-88.489694	666.78	4.50	671.28
2	41.018700	-88.489821	695.78	4.50	700.28

Name: Old Route 66
Route type Two-way
View angle: 50.0 deg



Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	ft	ft	ft
1	41.021866	-88.508029	697.49	4.50	701.99
2	41.042293	-88.488953	668.43	4.50	672.93


Discrete Observation Receptors

Number	Latitude	Longitude	Ground elevation	Height above ground	Total Elevation
	deg	deg	ft	ft	ft
OP 1	41.034893	-88.489994	675.02	10.00	685.02
OP 2	41.024366	-88.499423	703.78	10.00	713.78

Obstruction Components

Name: Obstruction 10

Upper edge height: 35.0 ft




GoogleImagery ©2023 Maxar Technologies, USDA/FPAC/GEO

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	41.035139	-88.490199	671.37
2	41.035057	-88.490203	671.72
3	41.035045	-88.489779	669.63
4	41.035182	-88.489823	667.94
5	41.035182	-88.490196	670.39
6	41.035139	-88.490199	671.37

Name: Obstruction 2

Upper edge height: 32.8 ft




GoogleImagery ©2023 Maxar Technologies, USDA/FPAC/GEO

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	41.027492	-88.501994	691.61
2	41.028236	-88.501168	692.36
3	41.031296	-88.498347	686.68
4	41.032693	-88.497199	679.50
5	41.032750	-88.497370	683.70
6	41.030314	-88.499613	697.06
7	41.027554	-88.502209	694.63
8	41.027492	-88.501994	691.61

Name: Obstruction 2

Upper edge height: 32.8 ft

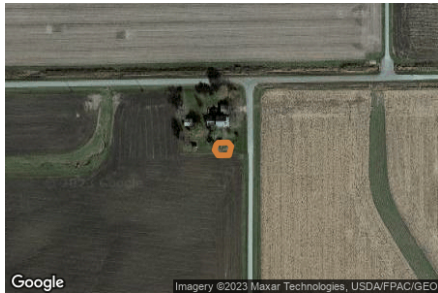


GoogleImagery ©2023 Maxar Technologies, USDA/FPAC/GEO

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	41.034709	-88.490402	673.02
2	41.034658	-88.490425	672.04
3	41.034641	-88.490308	672.26
4	41.034693	-88.490297	673.31
5	41.034709	-88.490402	673.02

Name: Obstruction 3

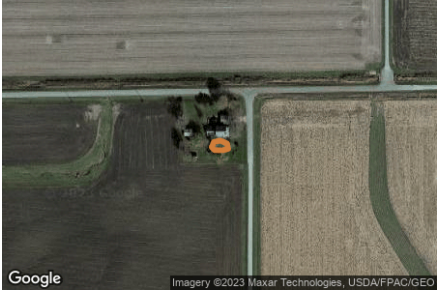
Upper edge height: 32.8 ft



GoogleImagery ©2023 Maxar Technologies, USDA/FPAC/GEO

Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	41.034695	-88.490066	671.75
2	41.034652	-88.490085	671.32
3	41.034606	-88.490046	670.09
4	41.034608	-88.489924	669.22
5	41.034683	-88.489899	669.78
6	41.034713	-88.489933	670.09
7	41.034711	-88.490047	671.41
8	41.034695	-88.490066	671.75

Name: Obstruction 4
Upper edge height: 17.0 ft



Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	41.034807	-88.490096	675.19
2	41.034763	-88.490120	673.84
3	41.034740	-88.490089	672.83
4	41.034737	-88.489998	671.01
5	41.034750	-88.489937	670.57
6	41.034793	-88.489950	672.16
7	41.034819	-88.490026	674.12
8	41.034807	-88.490096	675.19

Name: Obstruction 5
Upper edge height: 21.0 ft



Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	41.034832	-88.490302	675.63
2	41.034792	-88.490350	674.80
3	41.034743	-88.490314	674.12
4	41.034762	-88.490247	674.55
5	41.034787	-88.490202	675.44
6	41.034827	-88.490202	676.22
7	41.034853	-88.490223	676.15
8	41.034882	-88.490257	675.35
9	41.034881	-88.490293	674.91
10	41.034832	-88.490302	675.63

Name: Obstruction 6
Upper edge height: 32.8 ft



Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	41.028013	-88.489970	691.67
2	41.027954	-88.490043	691.17
3	41.027885	-88.490019	691.25
4	41.027877	-88.489901	692.51
5	41.027932	-88.489834	691.88
6	41.027978	-88.489860	692.26
7	41.028013	-88.489970	691.67

Name: Obstruction 7
Upper edge height: 32.8 ft



Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	41.027713	-88.490013	692.20
2	41.027671	-88.490086	690.68
3	41.027630	-88.490091	690.03
4	41.027626	-88.489994	691.48
5	41.027657	-88.489922	692.35
6	41.027693	-88.489887	692.42
7	41.027731	-88.489909	692.65
8	41.027731	-88.489986	692.36
9	41.027713	-88.490013	692.20

Name: Obstruction 8
Upper edge height: 32.8 ft



Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	41.033397	-88.496573	679.42
2	41.033376	-88.496455	678.27
3	41.034874	-88.495028	675.45
4	41.034902	-88.495114	676.16
5	41.033397	-88.496573	679.42

Name: Obstruction 9
Upper edge height: 30.0 ft



Vertex	Latitude	Longitude	Ground elevation
	deg	deg	ft
1	41.035129	-88.490464	668.48
2	41.034930	-88.490514	671.36
3	41.034895	-88.490417	672.98
4	41.034968	-88.490354	672.26
5	41.035038	-88.490407	671.04
6	41.035145	-88.490405	668.38
7	41.035144	-88.490468	668.33
8	41.035129	-88.490464	668.48

Summary of PV Glare Analysis

PV configuration and total predicted glare

PV Name	Tilt	Orientation	"Green" Glare	"Yellow" Glare	Energy Produced	Data File
	deg	deg	min	min	kWh	
Beckham Array Area	SA tracking	SA tracking	0	0	-	-

PV & Receptor Analysis Results

Results for each PV array and receptor

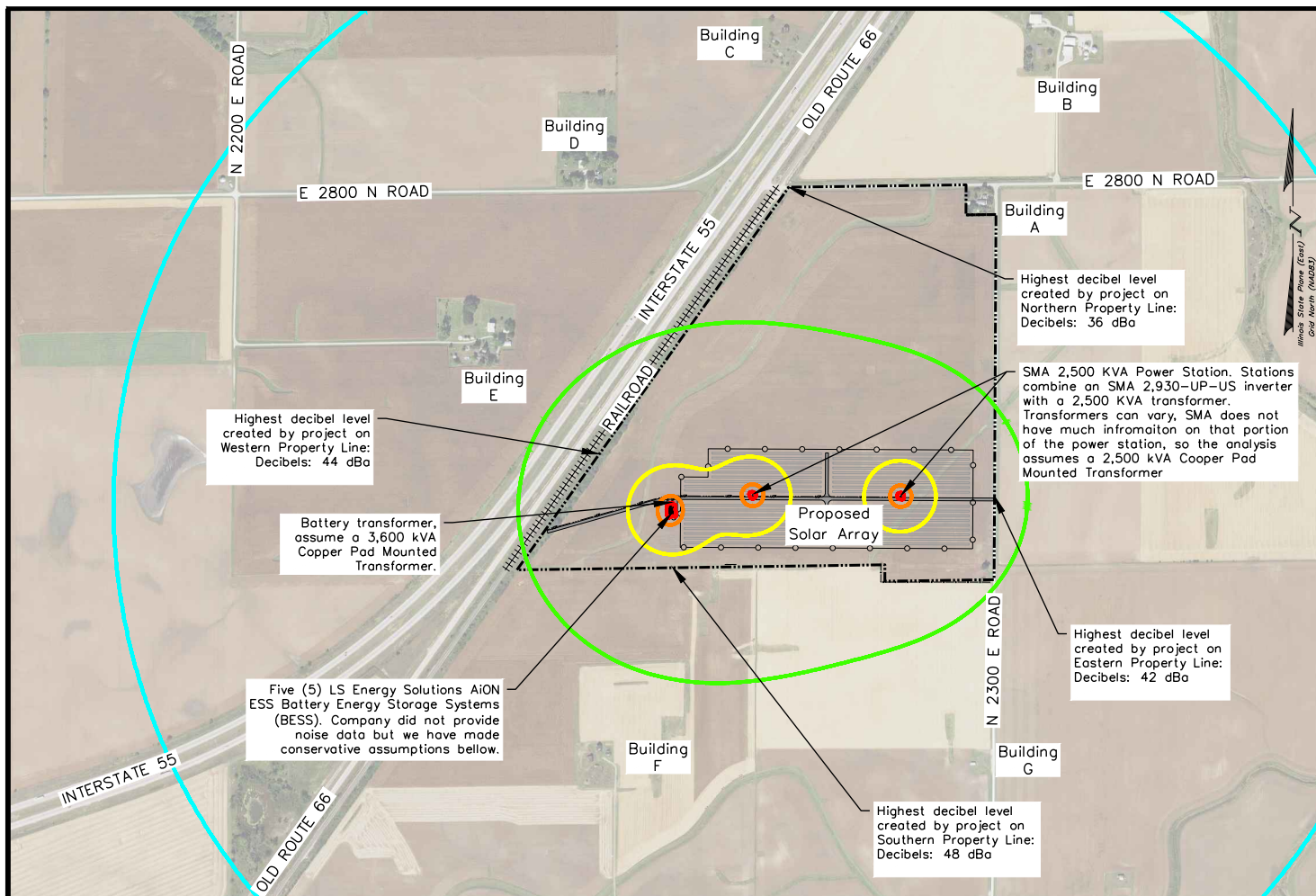
Beckham Array Area no glare found

Component	Green glare (min)	Yellow glare (min)
OP: OP 1	0	0
OP: OP 2	0	0
Route: 2800 N Rd	0	0
Route: E 2700 N RD	0	0
Route: I 55	0	0
Route: N 2300 E RD	0	0
Route: Old Route 66	0	0

No glare found

Assumptions

- Times associated with glare are denoted in Standard time. For Daylight Savings, add one hour.
- Glare analyses do not automatically account for physical obstructions between reflectors and receptors. This includes buildings, tree cover and geographic obstructions.
- Detailed system geometry is not rigorously simulated.
- The glare hazard determination relies on several approximations including observer eye characteristics, angle of view, and typical blink response time. Actual values and results may vary.
- The system output calculation is a DNI-based approximation that assumes clear, sunny skies year-round. It should not be used in place of more rigorous modeling methods.
- Several V1 calculations utilize the PV array centroid, rather than the actual glare spot location, due to algorithm limitations. This may affect results for large PV footprints. Additional analyses of array sub-sections can provide additional information on expected glare.
- The subtended source angle (glare spot size) is constrained by the PV array footprint size. Partitioning large arrays into smaller sections will reduce the maximum potential subtended angle, potentially impacting results if actual glare spots are larger than the sub-array size. Additional analyses of the combined area of adjacent sub-arrays can provide more information on potential glare hazards. (See previous point on related limitations.)
- Hazard zone boundaries shown in the Glare Hazard plot are an approximation and visual aid. Actual ocular impact outcomes encompass a continuous, not discrete, spectrum.
- Glare locations displayed on receptor plots are approximate. Actual glare-spot locations may differ.
- Refer to the **Help page** for detailed assumptions and limitations not listed here.

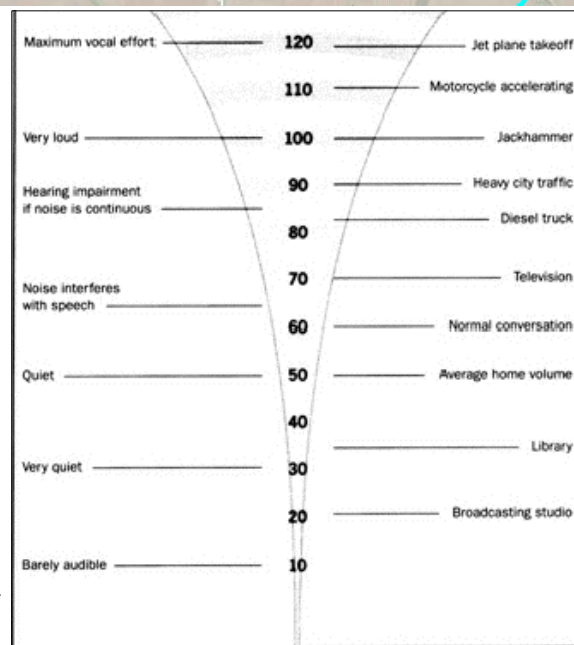


Notes:

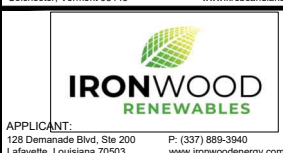
1. SMA specifies that the SMA 2,930-UP-US inverter creates less than 67 dBA at a distance of 10.0 meters from the unit, calculated the 3 meter value to be 77.5 dBA. For the SMA Power Station system a 2,500 kVA pad mounted transformer is also part of the unit, a Cooper pad mounted transformer was used for the sound analysis. Cooper specifies that the 2,500 kVA pad mounted transformer create sound level of 62 dBA, assumed 3 meters to be conservative. For the battery system a 3,600 kVA pad mounted transformer is needed, again we used Cooper for this sound analysis. Cooper specifies the 3,600 kVA pad mounted transformer create sound level of 64 dBA, assumed 3 meters to be conservative. Dynapower specifies that the battery inverters creates 80 dBA at a distance of one meter from the unit, calculated the 3 meter value to be 70.5 dBA. Codice specifies the HVAC units for the battery creates 67 dBA at a distance of one meter from the unit, calculated the 3 meter value to be 57.5 dBA. Dynapower specifies that the battery controller creates 60 dBA at a distance of one meter from the unit, calculated the 3 meter value to be 50.5 dBA. All the equipment was modeled to be producing the maximum noise level with all equipment running simultaneously.
2. Other decibel ranges were derived using the following distance damping equation [$L_2 = L_1 - 20 \log(d_1/d_2)$]. This damping equation was the only factor considered in decibel range attenuation estimates. Elevation, ambient noise, vegetation, proposed solar array and other structures which would further effect the attenuation of sound levels were not considered in this study. Sound levels depicted are for all (2) 2,500 Cooper Pad Mounted Transformers, (2) SMA 2,930-UP-US Central Inverters, (5) Dynapower battery inverters, (40) battery HVAC units, (5) Dynapower battery controllers, and the (1) 3,600 kVA Cooper Pad Mounted Transformer operating simultaneously at maximum noise level. See additional calculation information on Sound 2, Sound 3 and Sound 4.
3. Plans Sound 3 & Sound 4 run the calculations for nighttime operation. Site inverters make negligible noise when not loaded with power. For this calculation we assume they will make no noise. The site transformers and BESS equipment do still make noise at night, to be conservative the nighttime calculation models the transformers running at maximum noise.
4. Sound levels reported do not account for any background noise. Local background noise, including the noise from the interstate is likely to exceed sound created by project equipment.

Legend:

- +70 dBA range
- 60 dBA range
- 50 dBA range
- 40 dBA range
- 30 dBA range



Decibel Breakdown Compared to Everyday Noises



FULL OPERATION DAYTIME SOUND LEVEL PLAN

Basic Sound Level Estimates for Noise Producing Project Equipment

DRAWN BY:

GTD

CHECKED BY:

GTD

Project: Beckham Solar Project

Location: N 2300 E Road, Odell, Illinois

Source Data:

Chart found at

www.soundinstitute.com/article_detail.cfm/ID/95

Revision Date:

Plan ID:

Sound 1

Scale:

1" = 1,200'

Date:

06/05/23

Ironwood - Beckham Solar Project - N 2300 E Road, Odell, Illinois 60460 - DAYTIME

Sound Source #	Easting (feet)	Northing (feet)	Noise Level (dBa @ 3 Meters)
SMA 2,930-UP-US Central Inverter (2)	See Plan	See Plan	77.5
Cooper 2,500kVA Pad Mounted Trans. (2)	See Plan	See Plan	62.0
Cooper 3,600kVA Pad Mounted Trans. (1)	See Plan	See Plan	64.0
Dynapower Inverter (1-5)	See Plan	See Plan	70.5
Energy House HVAC Unit (1-40)	See Plan	See Plan	57.5
Dynapower Controller (1-5)	See Plan	See Plan	50.5
Formulas used for Calculations			
Adding of Noise Levels			
$L_T = 10 \times \log_{10} (10^{L_{1/10}} + 10^{L_{1/10}} + \dots + 10^{L_{n/10}})$			
Where:			
L_T = Total noise level of all equipment			
L_n = Noise level for each piece of equipment			
Noise Level Changes with Distance			
$L_b = L_a - 20 \times \log_{10} (D_b/D_a)$			
Where:			
L_b = Noise level at new distance			
L_a = Noise level at original distance			
D_b = New distance from source of noise			
D_a = Original distance from source of noise			
	1 meter	10 meter	3 meter
SMA 2,930-UP-US Central Inverter	-	67.0	77.5
Cooper 2,500kVA Pad Mounted Transformer	-	-	62.0
Cooper 3,600kVA Pad Mounted Transformer	-	-	64.0
Dynapower Inverter	80.0	-	70.5
Energy House HVAC Unit	67.0	-	57.5
Dynapower Controller	60.0	-	50.5
Points of Interest	Easting (feet)	Northing (feet)	Estimated Noise Level Based on Project Components (Sound Pressure, dBa)
Northern Property Line	939,683.27	1,591,070.22	36
Eastern Property Line	941,112.58	1,588,922.18	42
Southern Property Line	938,871.92	1,588,426.27	48
Western Property Line	938,365.99	1,589,215.97	44
Building A	940,971.28	1,590,939.53	35
Building B	941,388.73	1,591,964.52	32
Building C	939,654.77	1,592,134.91	32
Building D	938,386.86	1,591,101.81	35
Building E Closest residence to project	937,759.82	1,589,964.77	37
Building F	938,374.72	1,587,213.87	37
Building G	940,934.51	1,587,102.07	36

Points of Interest were chosen based on close proximity to the proposed project.



APPLICANT:
128 Demanade Blvd, Ste 200
Lafayette, Louisiana 70503
P: (337) 889-3940
www.ironwoodenergy.com

FULL OPERATION DAYTIME
SOUND LEVEL PLAN

Basic Sound Level Estimates for
Noise Producing Project Equipment

DRAWN BY:

GTD

CHECKED BY:

GTD

Project: Beckham Solar Project

Location: N 2300 E Road, Odell, Illinois

Source Data:

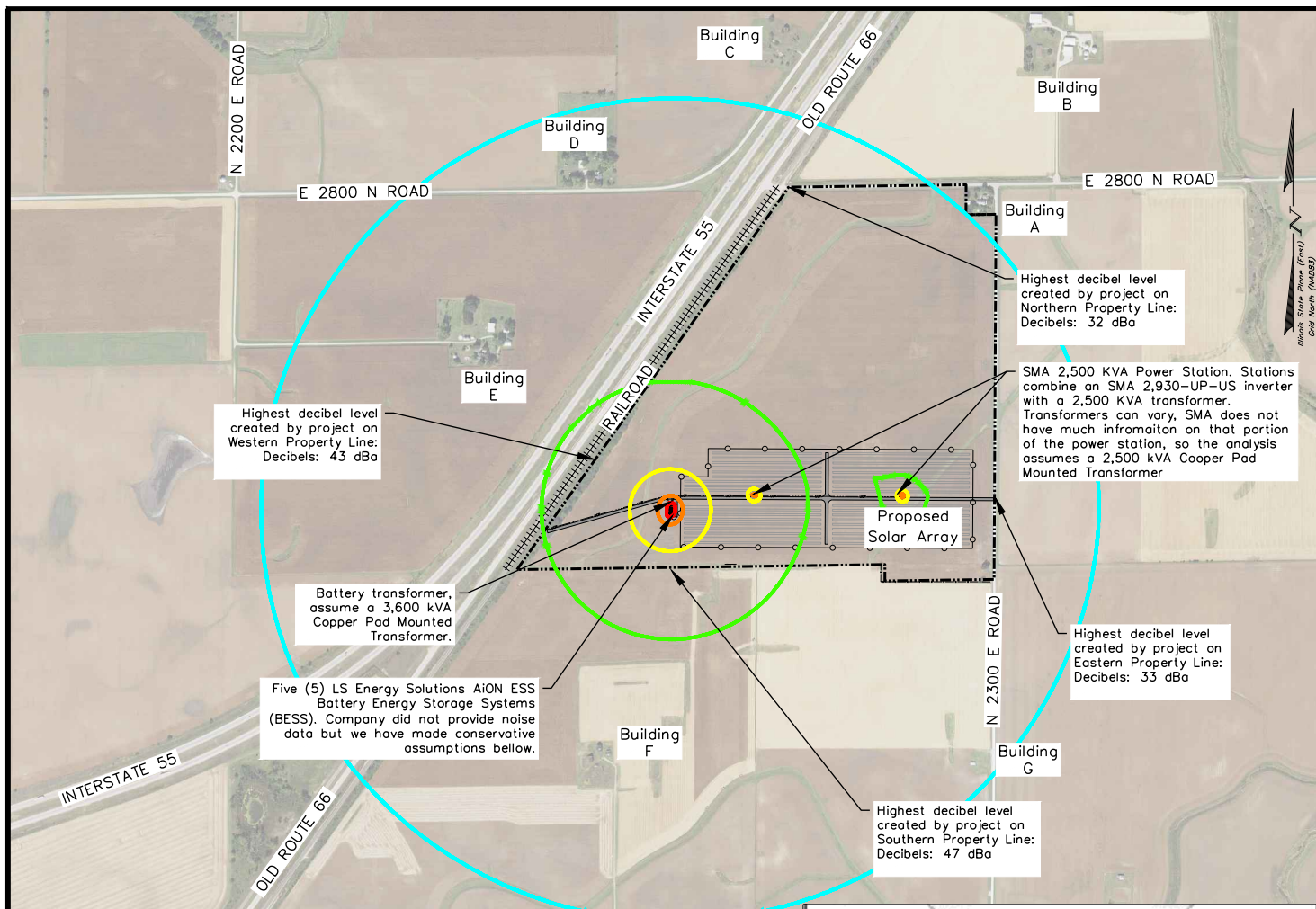
Revision Date:

Plan ID:

Sound 2

Scale:
N/A

Date:
06/05/23

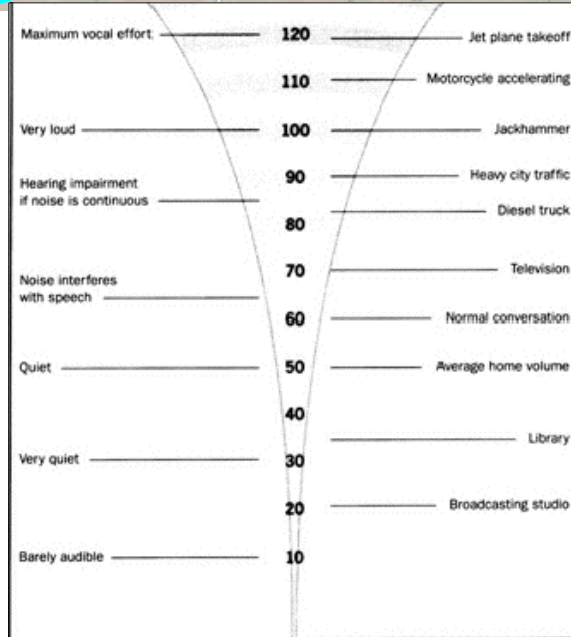


Notes:

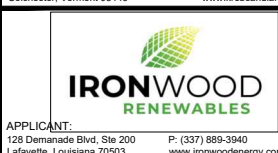
- For the SMA Power Station system a 2,500 kVA pad mounted transformer is also part of the unit, a Cooper pad mounted transformer was used for the sound analysis. Cooper specifies that the 2,500 kVA pad mounted transformer create sound level of 62 dBA, assumed 3 meters to be conservative. For the battery system a 3,600 kVA pad mounted transformer is needed, again we used Cooper for this sound analysis. Cooper specifies the 3,600 kVA pad mounted transformer create sound level of 64 dBA, assumed 3 meters to be conservative. Dynapower specifies that the battery inverters creates 80 dBA at a distance of one meter from the unit, calculated the 3 meter value to be 70.5 dBA. Codice specifies the HVAC units for the battery creates 67 dBA at a distance of one meter from the unit, calculated the 3 meter value to be 57.5 dBA. Dynapower specifies that the battery controller creates 60 dBA at a distance of one meter from the unit, calculated the 3 meter value to be 50.5 dBA. All the equipment was modeled to be producing the maximum noise level with all equipment running simultaneously.
- Other decibel ranges were derived using the following distance damping equation $[L2 = L1 - 20 \log(d1/d2)]$. This damping equation was the only factor considered in decibel range attenuation estimates. Elevation, ambient noise, vegetation, proposed solar array and other structures which would further effect the attenuation of sound levels were not considered in this study. Sound levels depicted are for all (2) 2,500 Cooper Pad Mounted Transformers, (5) Dynapower battery inverters, (40) battery HVAC units, (5) Dynapower battery controllers, and the (1) 3,600 kVA Cooper Pad Mounted Transformer operating simultaneously at maximum noise level.
- Sound levels reported do not account for any background noise. Local background noise, including the noise from the interstate is likely to exceed sound created by project equipment.

Legend:

- +70 dBA range
- 60 dBA range
- 50 dBA range
- 40 dBA range
- 30 dBA range



Decibel Breakdown Compared to Everyday Noises



NIGHTTIME OPERATION SOUND LEVEL PLAN

Basic Sound Level Estimates for Noise Producing Project Equipment

DRAWN BY:

GTD

CHECKED BY:

GTD

Project: Beckham Solar Project

Location: N 2300 E Road, Odell, Illinois

Source Data:

Chart found at
www.soundinstitute.com/article_detail.cfm/ID/95

Revision Date:

Plan ID:

Sound 3

Scale:

1" = 1,200'

Date:

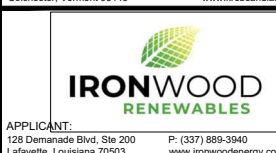
06/05/23

Ironwood - Beckham Solar Project - N 2300 E Road, Odell, Illinois 60460 - NIGHTTIME

Sound Source #	Easting (feet)	Northing (feet)	Noise Level (dBa @ 3 Meters)
Cooper 2,500 kVA Pad Mounted Trans. (2)	See Plan	See Plan	62.0
Cooper 3,600 kVA Pad Mounted Trans. (1)	See Plan	See Plan	64.0
Dynapower Inverter (1-5)	See Plan	See Plan	70.5
Energy House HVAC Unit (1-40)	See Plan	See Plan	57.5
Dynapower Controller (1-5)	See Plan	See Plan	50.5
Formulas used for Calculations			
Adding of Noise Levels			
$L_T = 10 \times \log_{10} (10^{L_1/10} + 10^{L_2/10} + \dots + 10^{L_n/10})$			
Where:			
L_T = Total noise level of all equipment			
L_n = Noise level for each piece of equipment			
Noise Level Changes with Distance			
$L_b = L_a - 20 \times \log_{10} (D_b/D_a)$			
Where:			
L_b = Noise level at new distance			
L_a = Noise level at original distance			
D_b = New distance from source of noise			
D_a = Original distance from source of noise			
	1 meter	10 meter	3 meter
Cooper 2,500 kVA Pad Mounted Transformer	-	-	62.0
Cooper 3,600 kVA Pad Mounted Transformer	-	-	64.0
Dynapower Inverter	80.0	-	70.5
Energy House HVAC Unit	67.0	-	57.5
Dynapower Controller	60.0	-	50.5
Points of Interest	Easting (feet)	Northing (feet)	Estimated Noise Level Based on Project Components (Sound Pressure, dBa)
Northern Property Line	939,683.27	1,591,070.22	32
Eastern Property Line	941,112.58	1,588,922.18	33
Southern Property Line	938,871.92	1,588,426.27	47
Western Property Line	938,365.99	1,589,215.97	43
Building A	940,971.28	1,590,939.53	30
Building B	941,388.73	1,591,964.52	27
Building C	939,654.77	1,592,134.91	29
Building D	938,386.86	1,591,101.81	32
Building E Closest residence to project	937,759.82	1,589,964.77	35
Building F	938,374.72	1,587,213.87	35
Building G	940,934.51	1,587,102.07	31

Points of Interest were chosen based on close proximity to the proposed project.

Site inverters make negligible noise when not loaded with power. For this calculation we assume they will make no noise.



NIGHTTIME OPERATION
SOUND LEVEL PLAN

Basic Sound Level Estimates for
Noise Producing Project Equipment

DRAWN BY:

GTD

CHECKED BY:

GTD

Project: Beckham Solar Project

Location: N 2300 E Road, Odell, Illinois

Source Data:

Revision Date:

Plan ID:

Sound 4

Scale:

N/A

Date:

06/05/23

SUNNY CENTRAL

2660 UP-US / 2800 UP-US / 2930 UP-US / 3060 UP-US



Efficient

- Up to 4 inverters can be transported in one standard shipping container
- Overdimensioning up to 150% is possible
- Full power at ambient temperatures of up to 35°C

Robust

- Intelligent air cooling system OptiCool for efficient cooling
- Suitable for outdoor use in all climatic ambient conditions worldwide

Flexible

- Conforms to all known grid requirements worldwide
- Q on demand
- Available as a single device or turnkey solution, including Medium Voltage Power Station

Easy to Use

- Improved DC connection area
- Connection area for customer equipment
- Integrated voltage support for internal and external loads

SUNNY CENTRAL

2660 UP-US / 2800 UP-US / 2930 UP-US / 3060 UP-US

The new Sunny Central: more power per cubic meter

With an output of up to 3060 kVA and system voltages of 1500 V DC, the SMA central inverter allows for more efficient system design and a reduction in specific costs for PV power plants. A separate voltage supply and additional space are available for the installation of customer equipment. True 1500 V technology and the intelligent cooling system OptiCool ensure smooth operation even in extreme ambient temperature as well as a long service life of 25 years.

SUNNY CENTRAL 2660 UP-US / 2800 UP-US

Technical data*	SC 2660 UP-US	SC 2800 UP-US
Input (DC)		
MPP voltage range V _{DC} (at 35 °C / at 50 °C)	880 to 1325 V / 1100 V	921 to 1325 V / 1100 V
Min. input voltage V _{DC, min} / Start voltage V _{DC, Start}	849 V / 1030 V	891 V / 1071 V
Max. input voltage V _{DC, max}	1500 V	
Max. input current I _{DC, max} / with DC coupling	3200 A / 4800 A	
Max. short-circuit current I _{DC, sc}	6400 A	
Number of DC inputs	24 double pole fused (32 single pole fused)	
Number of DC inputs with optional DC coupling of battery	18 double pole fused (36 single pole fused) for PV, 6 double pole fused for batteries	
Max. number of DC cables per DC input (for each polarity)	2 x 800 kcmil, 2 x 400 mm²	
Integrated zone monitoring	○	
Available PV fuse sizes (per input)	200 A, 250 A, 315 A, 350 A, 400 A, 450 A, 500 A	
Available DC-DC converter fuse size (per input)	750 A	
Output (AC)		
Nominal AC power at cos φ =1 (at 35 °C / at 50 °C)	2667 kVA / 2400 kVA	2800 kVA / 2520 kVA
Nominal AC power at cos φ =0.8 (at 35 °C / at 50 °C)	2134 kW / 1920 kW	2240 kW / 2016 kW
Nominal AC current I _{AC, nom} (at 35 °C / at 50 °C)	2566 A / 2309 A	
Max. total harmonic distortion	< 3% at nominal power	
Nominal AC voltage / nominal AC voltage range ^{1) 8)}	600 V / 480 V to 720 V	630 V / 504 V to 756 V
AC power frequency / range	50 Hz / 47 Hz to 53 Hz 60 Hz / 57 Hz to 63 Hz	
Min. short-circuit ratio at the AC terminals ⁹⁾	> 2	
Power factor at rated power / displacement power factor adjustable ^{8) 10)}	1 / 0.8 overexcited to 0.8 underexcited	
Efficiency		
Max. efficiency ²⁾ / European efficiency ²⁾ / CEC efficiency ³⁾	98.7%* / 98.6%* / 98.5%*	98.7%* / 98.6%* / 98.5%*
Protective Devices		
Input-side disconnection point	DC load break switch	
Output-side disconnection point	AC circuit breaker	
DC overvoltage protection	Surge arrester, type I	
AC overvoltage protection (optional)	Surge arrester, class I	
Lightning protection (according to IEC 62305-1)	Lightning Protection Level III	
Ground-fault monitoring / remote ground-fault monitoring	○ / ○	
Insulation monitoring	○	
Degree of protection	NEMA 3R	
General Data		
Dimensions (W / H / D)	2815 / 2318 / 1588 mm (110.8 / 91.3 / 62.5 inch)	
Weight	< 3400 kg / < 7500 lb	
Self-consumption (max. ⁴⁾ / partial load ⁵⁾ / average ⁶⁾	< 8100 W / < 1800 W / < 2000 W	
Self-consumption (standby)	< 370 W	
Internal auxiliary power supply	○ Integrated 8.4 kVA transformer	
Operating temperature range ⁸⁾	-25 °C to 60 °C / -13 °F to 140 °F	
Noise emission ⁷⁾	67.0 dB(A)*	
Temperature range (standby)	-40 °C to 60 °C / -40 °F to 140 °F	
Temperature range (storage)	-40 °C to 70 °C / -40 °F to 158 °F	
Max. permissible value for relative humidity (condensing / non-condensing)	95% to 100% (2 month/year) / 0% to 95%	
Maximum operating altitude above MSL ⁸⁾ 1000 m / 2000 m	● / ○ (earlier temperature-dependent derating)	
Fresh air consumption	6500 m³/h	
Features		
DC connection	Terminal lug on each input (without fuse)	
AC connection	With busbar system (three busbars, one per line conductor)	
Communication	Ethernet, Modbus Master, Modbus Slave	
Communication with SMA string monitor (transmission medium)	Modbus TCP / Ethernet (FO MM, Cat-5)	
Enclosure / roof color	RAL 9016 / RAL 7004	
Supply transformer for external loads	○ (2.5 kVA)	
Standards and directives complied with	UL 62109-1, UL 1741 (Chapter 31, CDR 61), UL 1741-SA, UL 1998, IEEE 1547, MIL-STD-810G	
EMC standards	FCC Part 15 Class A	
Quality standards and directives complied with	VDI/VDE 2862 page 2, DIN EN ISO 9001	
● Standard features ○ Optional * preliminary		

1) At nominal AC voltage, nominal AC power decreases in the same proportion

2) Efficiency measured without internal power supply

3) Efficiency measured with internal power supply

4) Self-consumption at rated operation

5) Self-consumption at < 75% P_n at 25 °C

6) Self-consumption averaged out from 5% to 100% P_n at 25 °C

7) Sound pressure level at a distance of 10 m

8) Values apply only to inverters. Permissible values for SMA MV solutions from SMA can be found in the corresponding data sheets.

9) A short-circuit ratio of < 2 requires a special approval from SMA

10) Depending on the DC voltage

SUNNY CENTRAL 2930 UP-US / 3060 UP-US

Technical data *	SC 2930 UP-US	SC 3060 UP-US
Input (DC)		
MPP voltage range V _{DC} (at 35 °C / at 50 °C)	962 to 1325 V / 1100 V	1003 to 1325 V / 1100 V
Min. input voltage V _{DC, min} / Start voltage V _{DC, Start}	934 V / 1112 V	976 V / 1153 V
Max. input voltage V _{DC, max}	1500 V	
Max. input current I _{DC, max} / with DC coupling	3200 A / 4800 A	
Max. short-circuit current I _{DC, sc}	6400 A	
Number of DC inputs	24 double pole fused (32 single pole fused)	
Number of DC inputs with optional DC coupling of battery	18 double pole fused (36 single pole fused) for PV, 6 double pole fused for batteries	
Max. number of DC cables per DC input (for each polarity)	2 x 800 kcmil, 2 x 400 mm²	
Integrated zone monitoring	○	
Available PV fuse sizes (per input)	200 A, 250 A, 315 A, 350 A, 400 A, 450 A, 500 A	
Available DC-DC converter fuse size (per input)	750 A	
Output (AC)		
Nominal AC power at cos φ = 1 (at 35 °C / at 50 °C)	2933 kVA / 2640 kVA	3067 kVA / 2760 kVA
Nominal AC power at cos φ =0.8 (at 35 °C / at 50 °C)	2346 kW / 2112 kW	2454 kW / 2208 kW
Nominal AC current I _{AC, nom} (at 35 °C / at 50 °C)	2566 A / 2309 A	
Max. total harmonic distortion	< 3% at nominal power	
Nominal AC voltage / nominal AC voltage range ^{1) 8)}	660 V / 528 V to 759 V	690 V / 552 V to 759 V
AC power frequency / range	50 Hz / 47 Hz to 53 Hz 60 Hz / 57 Hz to 63 Hz	
Min. short-circuit ratio at the AC terminals ⁹⁾	> 2	
Power factor at rated power / displacement power factor adjustable ^{8) 10)}	1 / 0.8 overexcited to 0.8 underexcited	
Efficiency		
Max. efficiency ²⁾ / European efficiency ²⁾ / CEC efficiency ³⁾	98.7%* / 98.6%* / 98.5%*	98.7%* / 98.6%* / 98.5%*
Protective Devices		
Input-side disconnection point	DC load break switch	
Output-side disconnection point	AC circuit breaker	
DC overvoltage protection	Surge arrester, type I	
AC overvoltage protection (optional)	Surge arrester, class I	
Lightning protection (according to IEC 62305-1)	Lightning Protection Level III	
Ground-fault monitoring / remote ground-fault monitoring	○ / ○	
Insulation monitoring	○	
Degree of protection	NEMA 3R	
General Data		
Dimensions (W / H / D)	2815 / 2318 / 1588 mm (110.8 / 91.3 / 62.5 inch)	
Weight	< 3400 kg / < 7500 lb	
Self-consumption (max. ⁴⁾ / partial load ⁵⁾ / average ⁶⁾	< 8100 W / < 1800 W / < 2000 W	
Self-consumption (standby)	< 370 W	
Internal auxiliary power supply	○ Integrated 8.4 kVA transformer	
Operating temperature range ⁸⁾	-25 °C to 60 °C / -13 °F to 140 °F	
Noise emission ⁷⁾	67.0 dB(A)*	
Temperature range (standby)	-40 °C to 60 °C / -40 °F to 140 °F	
Temperature range (storage)	-40 °C to 70 °C / -40 °F to 158 °F	
Max. permissible value for relative humidity (condensing / non-condensing)	95% to 100% (2 month/year) / 0% to 95%	
Maximum operating altitude above MSL ⁸⁾ 1000 m / 2000 m	● / ○ (earlier temperature-dependent derating)	
Fresh air consumption	6500 m³/h	
Features		
DC connection	Terminal lug on each input (without fuse)	
AC connection	With busbar system (three busbars, one per line conductor)	
Communication	Ethernet, Modbus Master, Modbus Slave	
Communication with SMA string monitor (transmission medium)	Modbus TCP / Ethernet (FO MM, Cat-5)	
Enclosure / roof color	RAL 9016 / RAL 7004	
Supply transformer for external loads	○ (2.5 kVA)	
Standards and directives complied with	UL 62109-1, UL 1741 (Chapter 31, CDR 6I), UL 1741-SA, UL 1998 IEEE 1547, MIL-STD-810G	
EMC standards	FCC Part 15 Class A	
Quality standards and directives complied with	VDI/VDE 2862 page 2, DIN EN ISO 9001	
● Standard features ○ Optional * preliminary		

1) At nominal AC voltage, nominal AC power decreases in the same proportion

2) Efficiency measured without internal power supply

3) Efficiency measured with internal power supply

4) Self-consumption at rated operation

5) Self-consumption at < 75% P_n at 25 °C

6) Self-consumption averaged out from 5% to 100% P_n at 25 °C

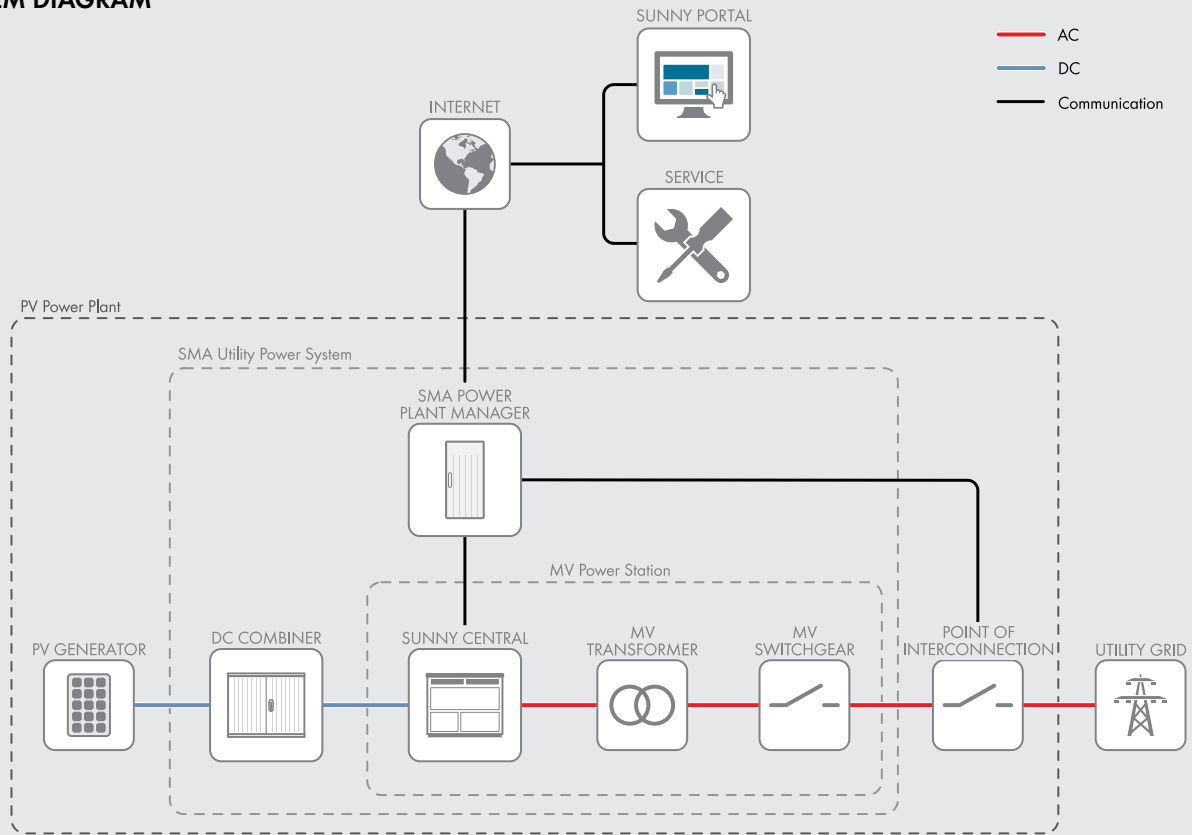
7) Sound pressure level at a distance of 10 m

8) Values apply only to inverters. Permissible values for SMA MV solutions from SMA can be found in the corresponding data sheets.

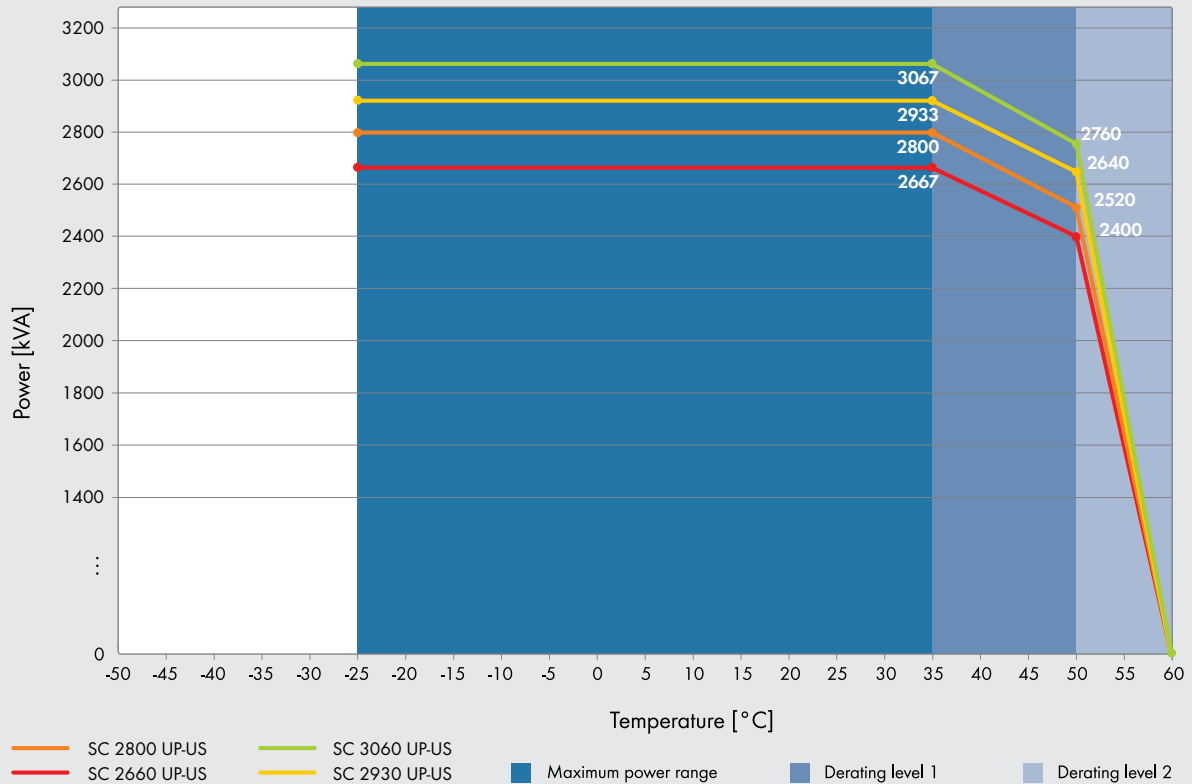
9) A short-circuit ratio of < 2 requires a special approval from SMA

10) Depending on the DC voltage

SYSTEM DIAGRAM



TEMPERATURE BEHAVIOR (at 1000 m)



SC2-XXXUPUSDSen-17 All products and services described and all technical data are subject to change, even for reasons of country-specific deviations, at any time without notice. SMA assumes no liability for typographical or other errors. For current information, please see www.SMA-Solar.com.

Three-phase pad-mounted PEAK™ transformer



General

Eaton's Cooper Power™ series PEAK™ transformers represent the next generation of transformer design, and with three distinct product offerings there is a PEAK transformer to fit your needs. The first PEAK transformer option is a 75 °C average winding rise (AWR) design that offers users a potentially smaller and lighter footprint than today's 65 °C AWR transformers. This design is ideal for applications with cost, weight, or dimensional constraints. The second PEAK transformer option is a 65/75 °C AWR design that offers users sustained overload capacity while maintaining IEEE Std C57.91™-2011 standard per unit life requirements. This design offers customers flexibility in transformer sizing by offering the ability to accommodate future load growth without oversizing relative to current load, or the ability to meet periods of peak demand without oversizing based on continuous load. The third PEAK transformer option is a 55/75 °C AWR design that provides up to 22% additional loading capacity when compared to traditional mineral oil-filled transformers.

With all PEAK product offerings utilizing thermally upgraded kraft paper and Envirotemp™ FR3™ dielectric fluid, PEAK transformers offer customers a solution that is fully compatible with the new IEEE® standard for transformers using high-temperature insulation systems, IEEE Std C57.154™-2012 standard. In addition, all PEAK transformers provide the high fire point and environmental benefits of Envirotemp™ FR3™ fluid. PEAK transformers are available in various designs and configurations to match almost every application.



Powering Business Worldwide

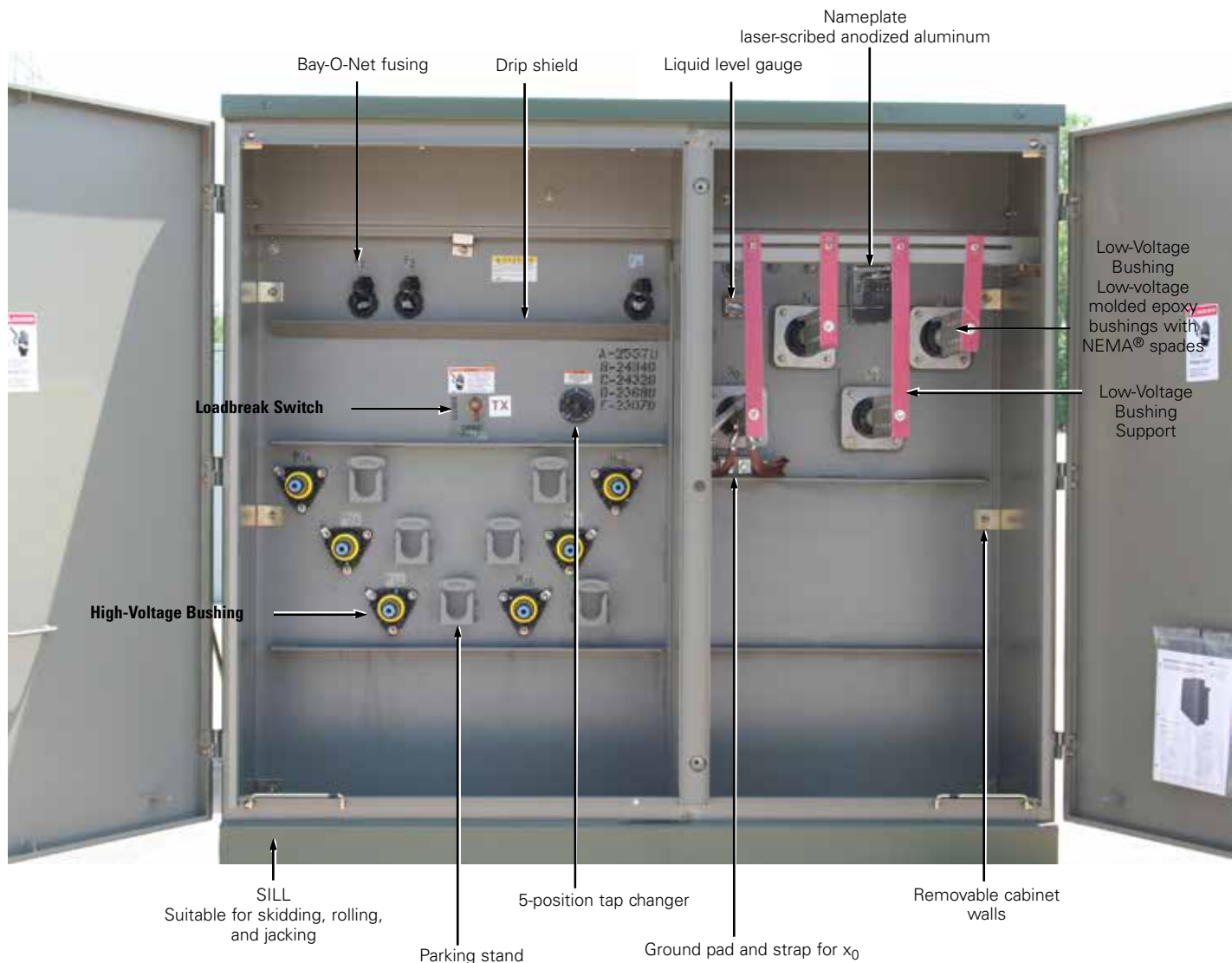


Figure 1. Three-phase pad-mounted PEAK transformer.

Table 1. Product scope

Type	Three-Phase, 50 or 60 Hz, 75 °C Rise and 65 °C/75 °C and 55/75 °C
Fluid Type	Only Envirotemp™ FR3™ fluid
Coil Configuration	2-winding or 4-winding or 3-winding (Low-High-Low), 3-winding (Low-Low-High)
Size	45 – 10,000 kVA
Primary Voltage	2,400 – 46,000 V
Secondary Voltage	208Y/120 V to 14,400 V
Specialty Designs	Inverter/Rectifier Bridge
	K-Factor (up to K-19)
	Solar/Wind Designs
	Differential Protection
	Seismic Applications (including OSHPD)
	Hardened Data Center
	UL® Listed & Label and Classified

Table 2. Three-Phase Ratings**Three-Phase 50 or 60 Hz**

kVA Available¹:
 45, 75, 112.5, 150, 225, 300, 500, 750, 1000, 1500, 2000, 2500, 3000, 3750, 5000, 7500, 10000

¹Transformers are available in the standard ratings and configurations shown or can be customized to meet specific needs.

Table 3. Impedance Voltage

Rating (kVA)	Low-voltage rating		
	≤ 600 V	2400 Δ through 4800 Δ	6900 Δ through 13800GY/7970 or 13800 Δ
45-75	2.70-5.75	2.70-5.75	2.70-5.75
112.5-300	3.10-5.75	3.10-5.75	3.10-5.75
500	4.35-5.75	4.35-5.75	4.35-5.75
750-2500	5.75	5.75	5.75
3750	5.75	5.75	6.00
5000		6.00	6.50

Note: The standard tolerance is ± 7.5%

Table 4. Audible Sound Levels

Self-Cooled, Two Winding kVA Rating	NEMA® TR-1 Average
	Decibels (dB)
45-500	56
501-700	57
701-1000	58
1001-1500	60
1501-2000	61
2001-2500	62
2501-3000	63
3001-4000	64
4001-5000	65
5001-6000	66
6001-7500	67
7501-10000	68

Table 5. Insulation Test Levels

KV Class	Induced Test 180 or 400 Hz 7200 Cycle	kV BIL Distribution	Applied Test 60 Hz (kV)
1.2	Twice Rated Voltage	30	10
2.5		45	15
5		60	19
8.7		75	26
15		95	34
25		125	40
34.5		150	50

Table 6. Temperature Rise Ratings 0-3300 Feet (0-1000 meters)

	Unit Rating (Temperature Rise Winding)
	75, 65/75, 55/75 °C
Ambient Temperature Max.	40 °C
Ambient Temperature 24 Hour Average	30 °C
Temperature Rise Hotspot	90 °C



Generation 4 Utility Scale Inverter

1,500 kVA/kW

3,000 kVA/kW

Revision: 8
Status: Preliminary

Date: March 10, 2020

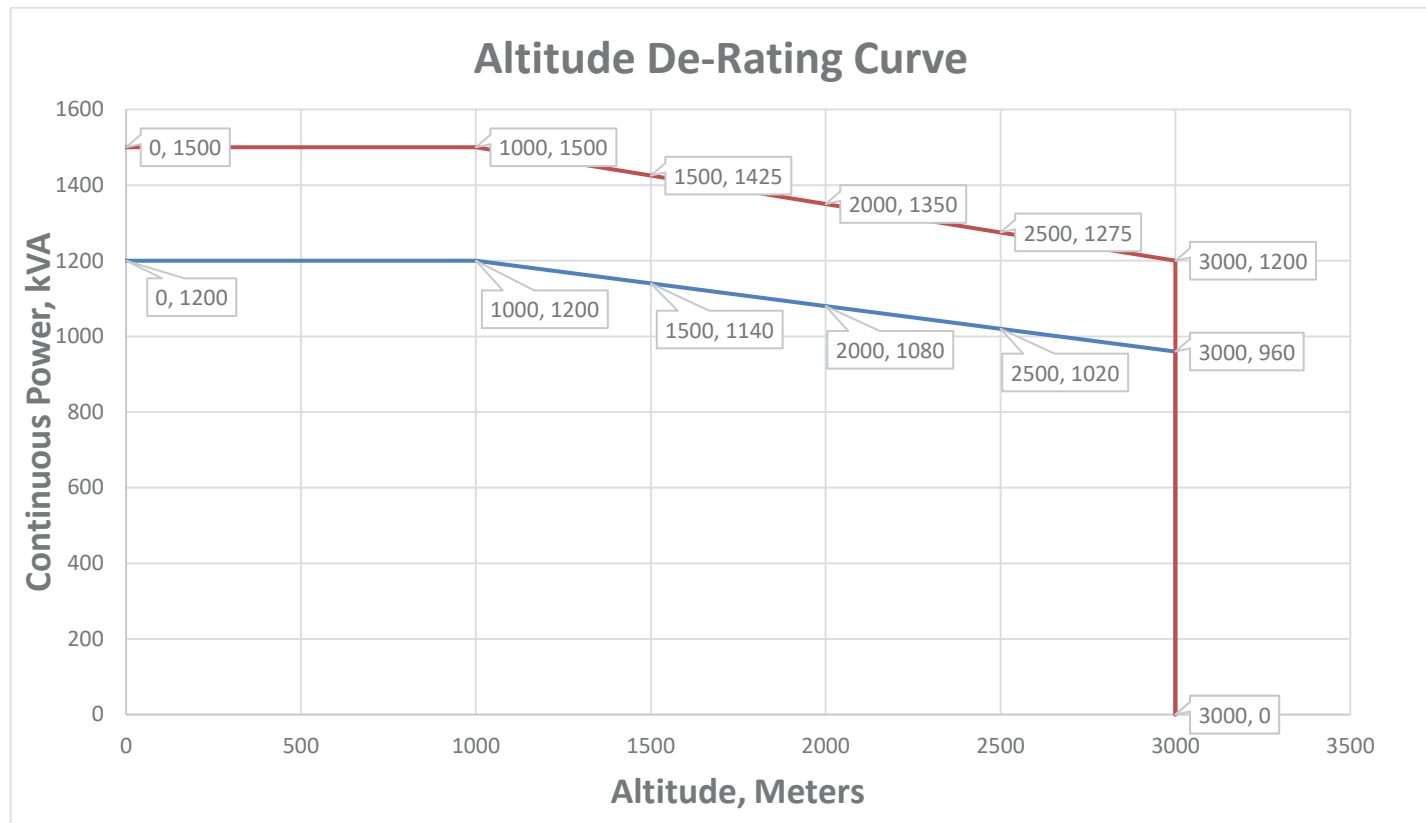


Figure 3: Altitude Derate Curve of the CPS-1500, values scale for CPS-3000

4.3 Mechanical

Color : White
 Noise : 80 dBA at 1 meter

Configuration	W x D x H (inches)	Weight (lbs)	Cable Entry – AC/DC	Enclosure Rating
CPS-1500 Indoor	55 x 33 x 82	3,080	Bottom Entry	Indoor UL 1 / IP-20
CPS-1500 Outdoor	118 x 96 x 102	7,920	Bottom Entry	Outdoor UL 3R/ IP 54
CPS-3000 Outdoor	118 x 96 x 102	11,000	Bottom Entry	Outdoor UL 3R/ IP 54

4.4 Cooling

The CPS is force-air cooled with high-volume cooling for the IGBT heat sinks and magnetics. Controls are segregated within the enclosure limiting the exposure of the controls to the external air.

4.5 PCS Disconnection/Protection

4.5.1 Grid Disconnect / AC Breaker

A main AC grid disconnect is provided in the form of an AC breaker for all models, allowing for grid isolation and AC grid over current protection. The AC breaker includes auxiliary contact set for breaker status feedback to the PCS main controller.

4.5.2 Battery Port Disconnect

A total DC disconnect is a provided as isolation means for the battery power port. This motor operated switch is included as part of the standard package.

4.5.3 Battery Port Total DC Fusing

Total battery port DC fusing is included.



CVO20



CODICE - CODE - ARTIKELNUMMER - CÒDIGO	M.U.	CVO20002208000		CVO20002618000		CVO20U12208000		CVO20U12038000		CVO20U12628000	
UL Listed		--		--		•		•		•	
Tensione nominale - Rated voltage - Nennspannung - Tensión nominal	V, ~	230, 1		230, 1		230,1		115,1		400,3 460,3	
Frequenza nominale - Nominal frequency - Nennfrequenz - Frecuencia nominal	Hz	50	60	50	60	50	60	60	50	60	60
Potenza frigorifera - Cooling capacity - Kühlleistung - Potencia frigorífica	L35L35 W	2100	2200	-	2200	-	2200	2200	-	2100	
Potenza frigorifera - Cooling capacity - Kühlleistung - Potencia frigorífica	L35L50 W	1750	1850	-	1850	-	1850	1850	-	1800	
Potenza assorbita - Power consumption - Leistungsaufnahme - Potencia absorbida	L35L50 W	1120	1240	-	1240	-	1240	1240	-	1200	
Corrente assorbita - Current consumption - Stromaufnahme - Corriente absorbida	CE, L35L35 A	4,8	5,5	4,8	5,5	4,8	5,5	-	2,5	2,7	
	UL, L45L55 A	-	-	6,3	-	6,3	13,64	-	3,62		
Corrente di avviamento - Start-up current - Anlaufstrom - Corriente de puesta en marcha	CE A	34		34		34		-	22		
Capacità di carico minima del circuito - Circuit minimum load capacity - Mindestbelastbarkeit des Kreislafs - Capacidad de carga minima del circuito	UL A	-	-	15	-	15	20	-	15		
Taratura del dispositivo di protezione - Protection device calibration - Kalibrierung der Schutzeinrichtung - Calibración del dispositivo de protección	CE A	10		10		10		-	6		
	UL A	-	-	15	-	15	25	-	15		
Temp. interne di funzionamento - Internal operating temp. - Interne Betriebstemperatur - Temp. internas de funcionamiento	min/max °C	+25 / +45		+25 / +45		+25 / +45		+25 / +45		+25 / +45	
Temp. esterne di funzionamento - External operating temp - Externe Betriebstemperatur - Temp. externas de funcionamiento	min/max °C	-20 / +55		-40 / +55		-40 / +55		-40 / +55		-40 / +55	
Grado di protezione circuito interno - Internal circuit protection rating - Schutzgrad interner Kreislaf - Grado de protección del circuito interno	CE IP	54		55		55		-	55		
	UL Type	-	-	4	-	4	4	-	4		
Pressione sonora esterna - External sound pressure - Externer Schalldruck - Presión sonora externa	dB(A)	66		66		66		66		66	
Altezza / Larghezza / Profondità - Height / Width / Depth - Höhe / Breite / Tiefe - Altura / Anchura / Profundidad	mm	999x412,5x286		999x412,5x286		999x412,5x286		999x412,5x286		999x412,5x286	
Peso - Weight - Gewicht - Peso	kg	48		48		48		48		48	

CVO40



CODICE - CODE - ARTIKELNUMMER - CÒDIGO	M.U.	CVO40002208000		CVO40002618000		CVO40U12208000		CVO40U12628000	
UL Listed		--		--		•		•	
Tensione nominale - Rated voltage - Nennspannung - Tensión nominal	V, ~	230,1		400,3 460,3		230,1		400,3 460,3	
Frequenza nominale - Nominal frequency - Nennfrequenz - Frecuencia nominal	Hz	50	60	50	60	50	60	50	60
Potenza frigorifera - Cooling capacity - Kühlleistung - Potencia frigorífica	L35L35 W	4000	4100	3950	4050	-	4100	-	4050
Potenza frigorifera - Cooling capacity - Kühlleistung - Potencia frigorífica	L35L50 W	3000	3300	2960	3260	-	3300	-	3260
Potenza assorbita - Power consumption - Leistungsaufnahme - Potencia absorbida	L35L50 W	1730	1950	1730	1950	-	1950	-	1950
Corrente assorbita - Current consumption - Stromaufnahme - Corriente absorbida	CE, L35L35 A	8,2	9,4	2,9	4	5,3	5,8	2,8	3,1
	UL, L45L55 A	-	-	-	-	8,3	-	5,96	
Corrente di avviamento - Start-up current - Anlaufstrom - Corriente de puesta en marcha	CE A	42		25		35		19	
Capacità di carico minima del circuito - Circuit minimum load capacity - Mindestbelastbarkeit des Kreislafs - Capacidad de carga minima del circuito	UL A	-	-	-	-	15	-	15	
Taratura del dispositivo di protezione - Protection device calibration - Kalibrierung der Schutzeinrichtung - Calibración del dispositivo de protección	CE A	16		8		12		8	
	UL A	-	-	-	-	15	-	15	
Temp. interne di funzionamento - Internal operating temp. - Interne Betriebstemperatur - Temp. internas de funcionamiento	min/max °C	+25 / +45		+25 / +45		+25 / +45		+25 / +45	
Temp. esterne di funzionamento - External operating temp - Externe Betriebstemperatur - Temp. externas de funcionamiento	min/max °C	-20 / +55		-20 / +55		-40 / +55		-40 / +55	
Grado di protezione circuito interno - Internal circuit protection rating - Schutzgrad interner Kreislaf - Grado de protección del circuito interno	CE IP	54		54		55		55	
	UL Type	-	-	-	-	4	-	4	
Pressione sonora esterna - External sound pressure - Externer Schalldruck - Presión sonora externa	dB(A)	67		67		67		67	
Altezza / Larghezza / Profondità - Height / Width / Depth - Höhe / Breite / Tiefe - Altura / Anchura / Profundidad	mm	1211x514x370		1211x514x370		1211x514x370		1211x514x370	
Peso - Weight - Gewicht - Peso	kg	80		85		80		85	