Staff Report

Jefferson County Board of Zoning Appeals Meeting

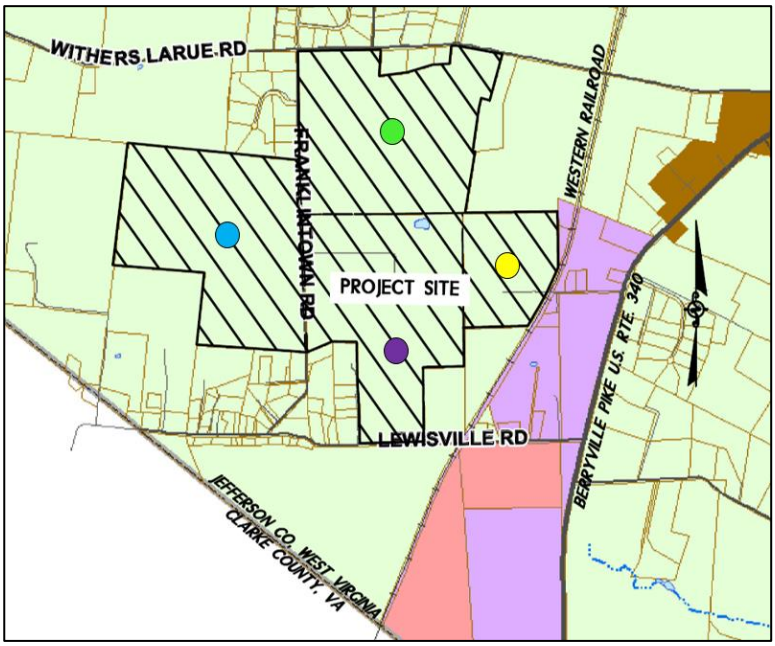
August 22, 2024

24-4-CUP Franklintown Farm Solar Project Conditional Use Permit Request

Item #1 Request for a Conditional Use Permit to operate a Solar Energy Facility, as defined in Article 2 of the Zoning Ordinance. Project Name: Franklintown Farm Solar Project. The proposal consists of constructing an 80-megawatt solar energy facility on 502 acres. The project consists of row of solar modules, a new substation to connect the solar facility to the existing overhead electrical transmission line, and a 20MW Battery Energy Storage System (BESS). The Project also includes internal access roads, commercial entrance(s), security fencing, a buffer screen, and stormwater management.

Applicant:	Franklintown Farm LLC / Attn: Ashley Smith, P.E. Enel North America, Inc.	
Consultant	Potesta & Associates, Inc. / Attn: Joe Knechtel	
Property Owner	**Property Location**	**Map Reference**
Mark D. Stolipher	2998 Withers Larue Rd, Summit Point, WV Parcel ID: 06001900080004; Parcel/Project Size: 146.84 ac	
	322 & 288 Scooter Ln, Charles Town, WV Parcel ID: 06001900160000; Parcel/Project Size: 50 ac	
	261 Berry Hill Farm Ln, Summit Point, WV Parcel ID: 06001900070000; Parcel/Project Size: 150.31 ac	
Michael Paul Chapman, Trustees	651 & 653 Franklintown Rd, Summit Point, WV Parcel ID: 06001900060000; Parcel/Project Size: 154.16 ac	

All of the subject parcels are zoned Rural.



Current Applications:	08/22/24: Board of Zoning Appeals Meeting Conditional Use Permit Public Hearing 09/10/24: Planning Commission Meeting Concept Plan Workshop (File #24-2-SP)
Site Visit Conducted:	Site visit was not conducted.

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Summary of Request and Purpose of Ordinance Requirements

Article 2 defines *Solar Energy Facility* as:

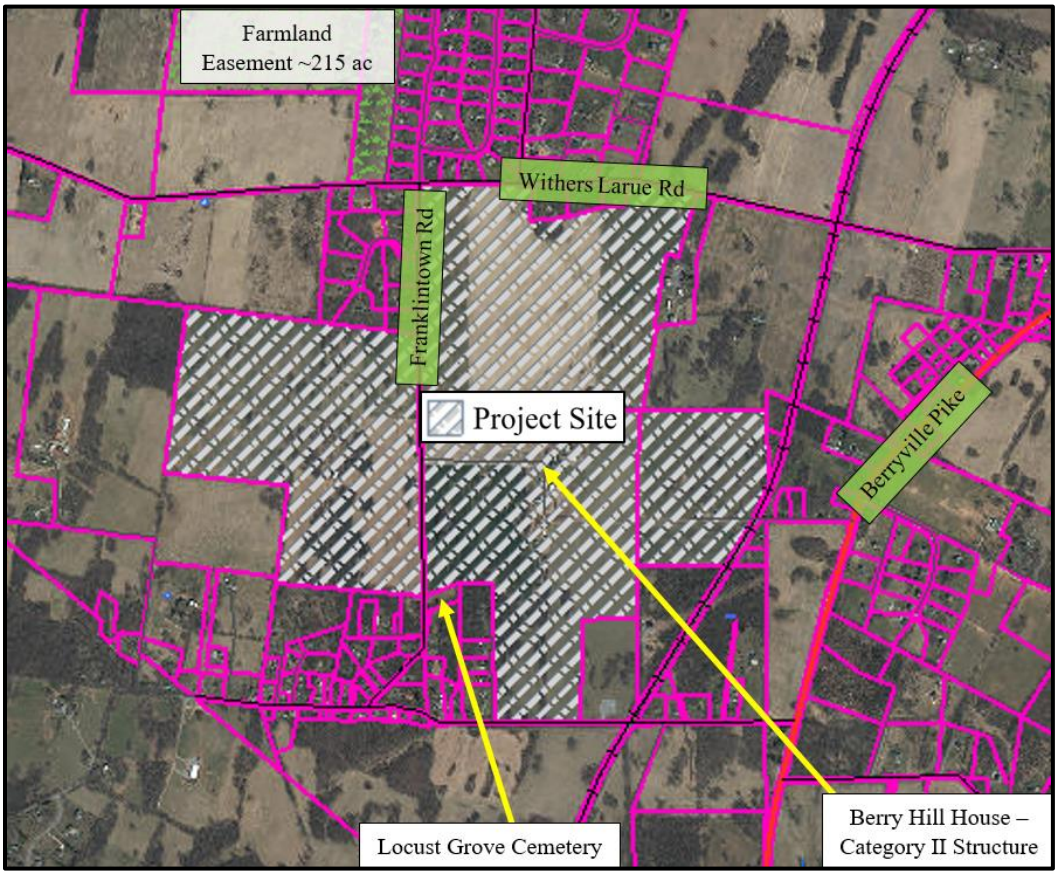
> "A facility that generates electricity from sunlight by utilization of photovoltaic (PV) technology and distributes the generated electrical power. On-site components of the facility may include solar panels and other accessory components including, without limitation, Essential Utility Equipment, transformers, inverters, cabling, electrical lines, substations, and other improvements necessary to support generation, collection, storage, and transmission of electrical power."

The entire project area is located outside of the Urban Growth Boundary (UGB) and Preferred Growth Area (PGA). As such, the proposal requires evaluation by the Board of Zoning Appeals for compliance with the Conditional Use Permit criteria outlined in Section 6.3, as well as the criteria listed in Section 8.20.

Property Description

The project area will occur over four separate contiguous parcels, comprised of a total of 502 acres. The properties are currently used for agricultural purposes.

The property designated as 261 Berry Hill Farm Lane contains a Category II Historic Structure – Berry Hill House. Pursuant to Section 3.4D of the Zoning Ordinance, Category II sites are classified as important by the Jefferson County Historic Landmarks Commission and include sites that may be National Register eligible. Sites in this category may have been altered or changed to such a degree that they no longer retain the same level of integrity as the original condition.



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Conditional Use Permit Process

The applicant has provided information summarizing how the proposed project will comply with the criteria outlined in Sections 6.3 and 8.20 of the Zoning Ordinance. Per Section 8.20A.2.b, the project decommissioning plan and bond shall be in accordance with the WV Department of Environmental Protection, pursuant to WV State Code §22-32-1, et. sec. or its successor. The applicant acknowledged the decommissioning requirements in their application.

Section 6.3 of the Zoning Ordinance states:

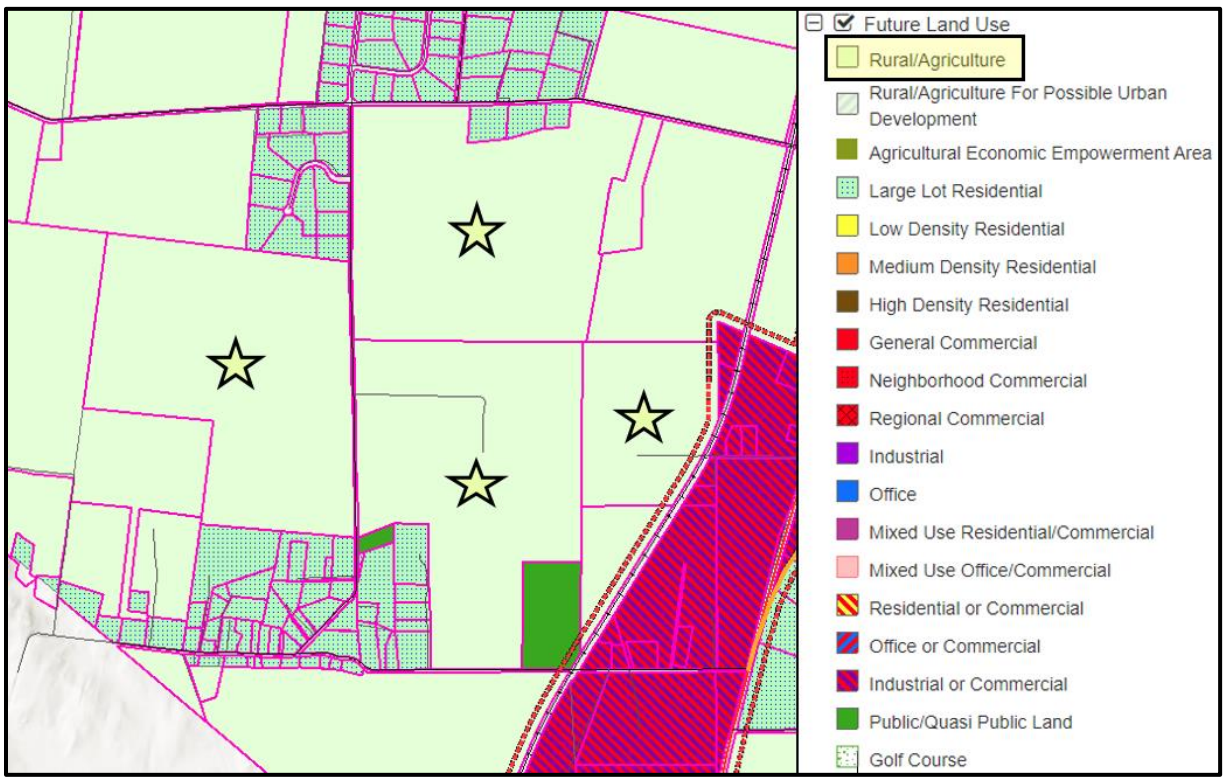
"The Board of Zoning Appeals shall have the authority over the issuance or denial of a conditional use permit for uses listed as "Conditional Uses (CU)" in each zoning district. The Board shall have the authority to impose such reasonable conditions and restrictions as are directly related to and incidental to the proposed conditional use permit:

A. The Board shall consider each Conditional Use Permit request that is filed in accordance with this Ordinance and the procedural requirements of the Board of Zoning Appeals. The Board may require reasonable conditions or special requirements which allows for the proper integration of the proposed uses into the community and are directly related to and incidental to the proposed conditional use permit. The following General Standards shall be considered by the Board in approving or denying the CUP:"

1. The proposed use is compatible with the goals of the adopted Comprehensive Plan. (Sec. 6.3A.1)

The applicant has addressed this criteria on Page 4 of their application packet.

The subject parcels are shown as "Rural/Agricultural" on the Envision Jefferson 2035 Comprehensive Plan's Future Land Use Guide (see exhibit below) and are located outside of the Charles Town Urban Growth Boundary.



The Plan supports allowing non-residential uses in the Rural zoning district to process via the Conditional Use Permit process (see excerpts below). In March 2017, the Zoning Ordinance was amended to update the Conditional Use Permit process in accordance with the recommendations of the adopted Comprehensive Plan.

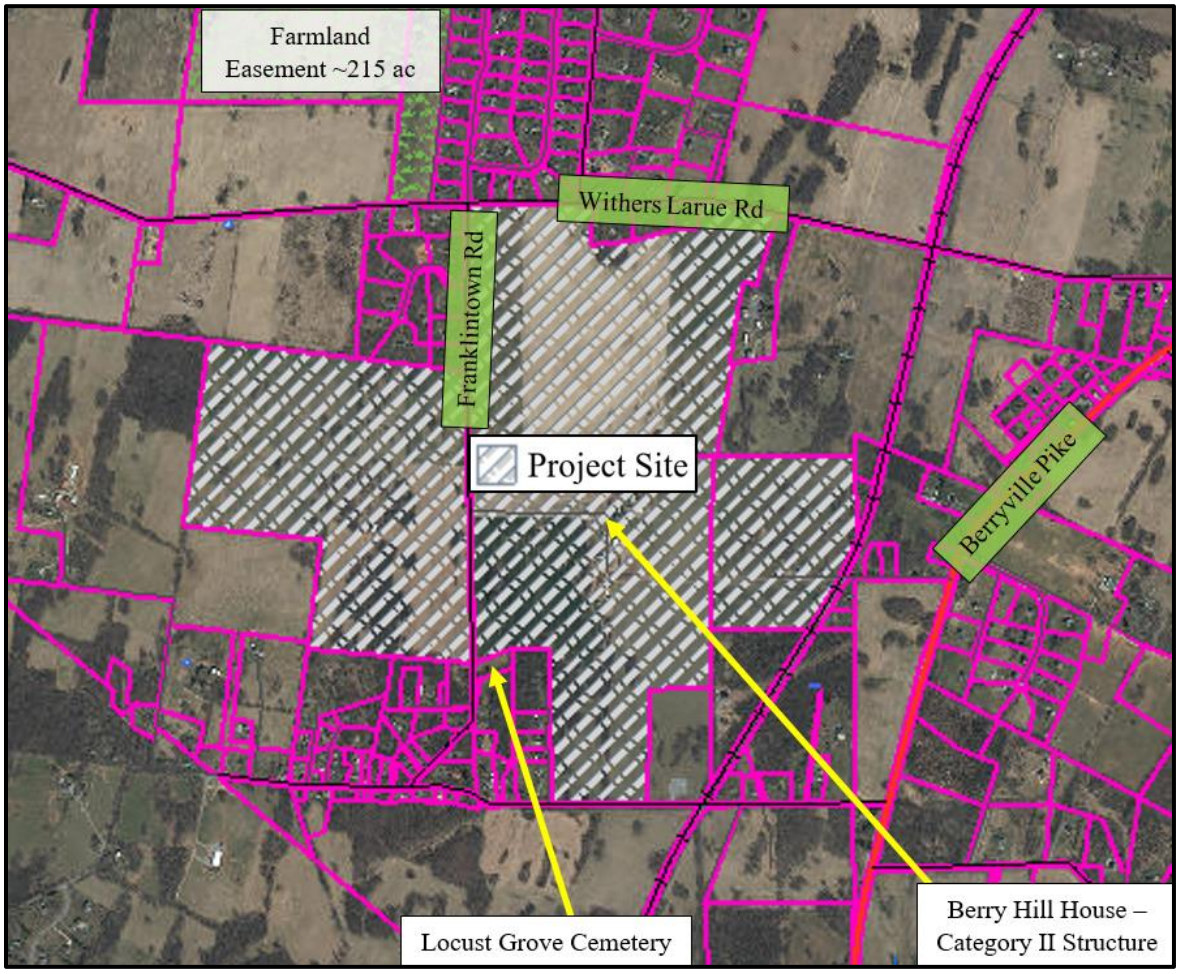
The Plan also includes several references to encourage the creation of and the use of renewable energy sources. In April 2022, the County Commission amended the Plan to clarify and state that solar energy facilities are allowed to process via the conditional use permit process when located in areas outside of an Urban Growth Boundary and Preferred Growth Area (see Infrastructure and Technology Recommendation 8 on Page 93 of the amended Plan – listed below). The Zoning Ordinance was subsequently amended on June 16, 2022 to adopt Section 8.20 with provisions to process Solar Energy Facilities.

Excerpts from the Envision Jefferson 2035 Comprehensive Plan

> …This Plan further recommends amending the Zoning Ordinance to eliminate the LESA point system and to develop procedures that would allow the use of a more traditional CUP process in the Rural District for non-residential uses. This CUP process should require a public hearing before the Board of Zoning Appeals to determine if the use is compatible in scale and intensity with the rural environment and poses no threat to public health, safety, and welfare." (Page 36, Rural Land Use)
>
> Amend the Zoning Ordinance to eliminate the Land Evaluation Site Assessment (LESA) system and to modify the Conditional Use Permit (CUP) process in the Rural Zoning District, which would be used for compatible non-residential development only." (Page 39, Recommendation #4.b – Rural Land Use Planning Recommendations (Goal 2))
>
> This Plan recommends that the use of the CUP in the Rural District be limited to non-residential uses not permitted in the Rural District which are compatible in scale and intensity with the rural environment and that pose no threat to public health, safety, and welfare." (Page 74, Rural Economic Activities)
>
> Recommendation 5: Amend the Zoning and Land Development Ordinance to permit additional non-residential rurally compatible uses.
>
> Recommendation 5b: Amend local land use regulations to permit non-agriculturally related commercial uses by the Conditional Use Permit (CUP) process in the Rural zone if the use is agriculturally and rurally compatible in scale and intensity, poses no threat to public health, safety, and welfare, and if the use helps to preserve farmland and open space and continue agricultural operations. (Page 77, Agricultural and Rural Economy Recommendations (Goal 8))"
>
> Recommendation 8: Encourage public entities to utilize alternative and renewable energy sources for a variety of needs, specifically Solar Energy Facilities in areas inside of the Urban Growth Boundary and the Preferred Growth Area as a Principal Permitted Use, and outside of the Urban Growth Boundary and the Preferred Growth Area, by the Conditional Use Process. (*amended by action of the County Commission 04-05-22 and affirmed by the Planning Commission on 04-12-22.)*
>
> Recommendation 8.a Enable the construction of renewable energy generation facilities by residents and businesses.

2. **The proposed use is compatible in intensity and scale with the existing and potential land uses on the adjoining and confronting properties, and poses no threat to public health, safety and welfare. (Sec. 6.3A.2)**

   The applicant has addressed this criteria on Pages 5-7 of their application packet.



3. **The proposed site development shall be such that the use will not hinder nor discourage the appropriate development and use of adjacent land and buildings. (Sec. 6.3A.3)**

   The applicant has addressed this criteria on page 7 of their application packet.

4. **Neighborhood character and surrounding property values shall be safeguarded by requiring implementation of the landscaping buffer requirements found in Appendix B and Section 4.11 of this Ordinance. (Sec. 6.3A.4)**

   The applicant has addressed this criteria on Pages 7 & 8 of their application packet and within the Site Information notes on the Concept Plan.

   The applicant shall comply with the buffer requirements established in Section 8.20 of the Zoning Ordinance. The Concept Plan exhibit reflects compliance with the landscape buffer requirements.

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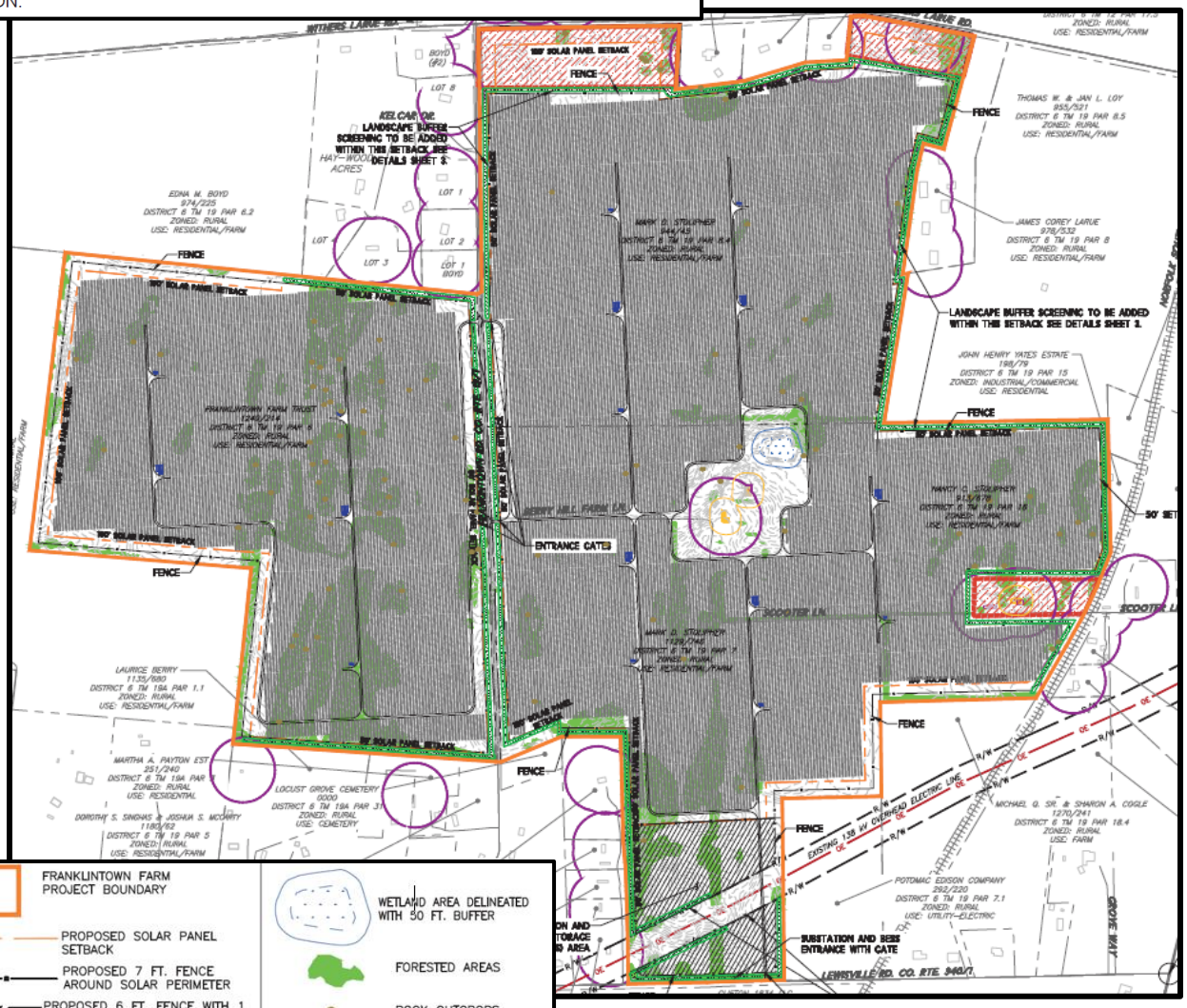
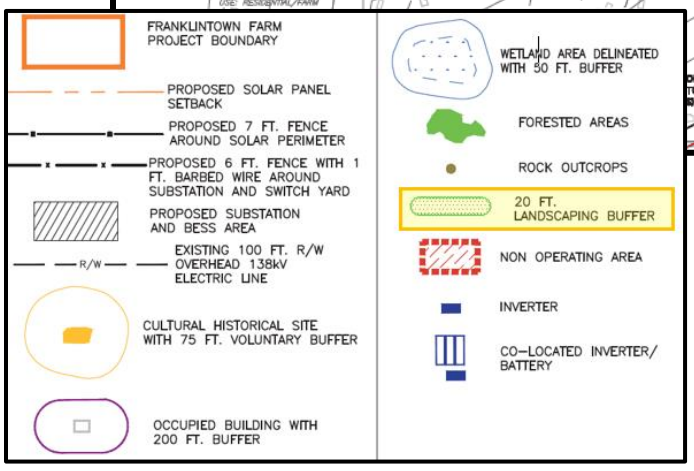
SETBACKS:
(1) SOLAR PANELS ARE SETBACK A MINIMUM OF 50' FROM ALL PROPERTY LINES THAT ABUT A RESIDENTIAL USE AND INCLUDE A 20' PLANTED BUFFER WITHIN THE SETBACK.
(2) SOLAR PANELS ARE SETBACK A MINIMUM OF 100' FROM ALL PROPERTY LINES THAT ABUT AN AGRICULTURAL USE AND DO NOT INCLUDE A PLANTED BUFFER.
(3) THE FENCE LINE WILL BE SETBACK 100' FROM THE LOCUST GROVE CEMETERY AND WILL INCLUDE A PLANTED BUFFER. GPR WILL BE PERFORMED PRIOR TO CONSTRUCTION TO CONFIRM ANY UNMARKED GRAVES.
(4) NO ACCESSORY COMPONENTS ARE LOCATED WITHIN 25 FEET OF THE FRONT, SIDE, REAR SETBACK FROM ALL EXTERNAL PROPERTY LINES.

BUFFERS
(1) NO PROPOSED SOLAR OR ACCESSORY STRUCTURE WILL BE LOCATED WITHIN THE 100 FOOT SETBACK SHOWN HEREON, OR 200 FEET FROM NEIGHBORING RESIDENCE, CATEGORY 1 HISTORIC RESOURCE, INSTITUTION FOR HUMAN CARE, CHURCH, OR SIMILAR USE OR STRUCTURE, WITHOUT A LANDSCAPE BUFFER.
(2) LANDSCAPE BUFFER SCREENING ARE PROPOSED WITHIN THE SETBACKS AS SHOWN HEREON.

Excerpt from Concept Plan Site Information Notes (left)





Excerpt from Concept Plan – Site Sketch (above)

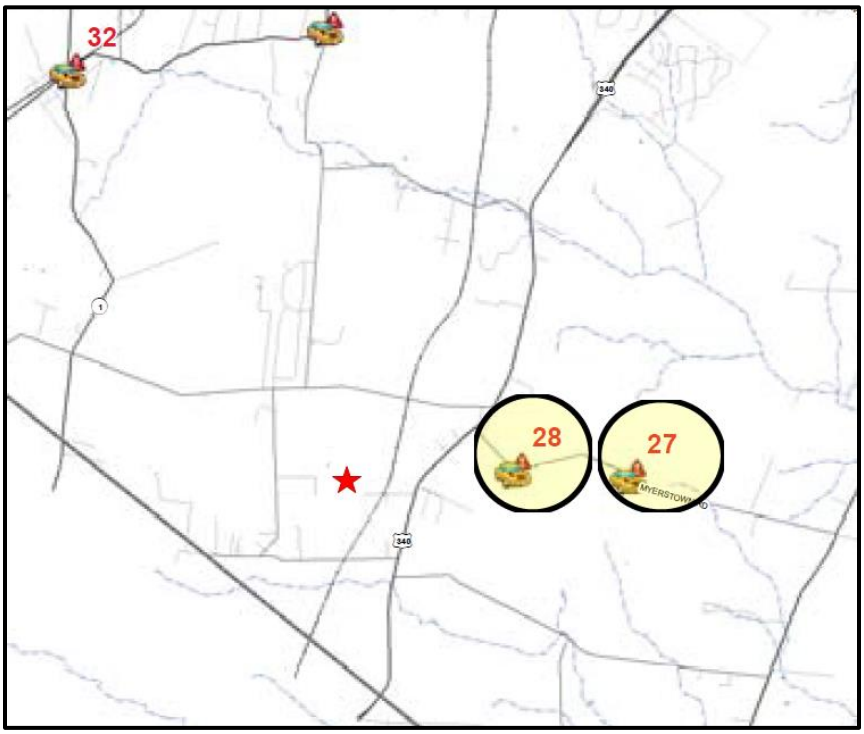
Symbol Key (left)

5. **Commercial and Industrial Uses shall be in conformance with Section 8.9 of this Ordinance. (Sec. 6.3A.5)**

   As part of the Conditional Use Permit application, the applicant was informed of this criteria and shall comply with this standard. The applicant acknowledged and stated they will comply with this requirement on page 8 of their application packet & Note #13 on the Concept Plan.

6. **For properties in the Rural zoning district, roadway adequacy shall be assessed by the Comprehensive Plan's Highway Road Classification Map. (Sec. 6.3A.6)**

   The applicant provided trip generation data on Pages 8 & 9 of their application packet. The facility, once operational, is anticipated to generate 2-3 vehicle trips per day.



The applicant represented that the closest highway problem area is within a one mile radius of the project (see Problem Area #28, noted on Highway Problem Areas Map exhibit below). The proposed access points for the project do not utilize the roadways identified as problem areas.

Problem Area #27 = Meyerstown Road – one mile east of US 340. Problem = two 90-degree turns.

Problem Area #28 = Meyerstown Road – ½ mile east of US 340. Problem = 90 degree turn.

7. **Historic Landmarks Commission's Findings related to the proposed land use. (Sec. 6.3A.7)**

   The applicant addressed this criteria on Page 9 of their application packet.

   The project site includes the property located at 261 Berry Hill Farm Lane. The County's GIS data reflects that this house is a Category II Historic Structure identified by the Historic Landmarks Commission. The Concept Plan depicts a voluntary 75' buffer around Berry Hill House / Category II structure, which is located within a 200'occupied structure buffer. Setback Note #3 on the Concept Plan states "The fence line will be setback 100' from the Locust Grove Cemetery and will include a planted buffer. GPR will be performed prior to construction to confirm any unmarked graves."

   **GPR = Ground Penetrating Radar*

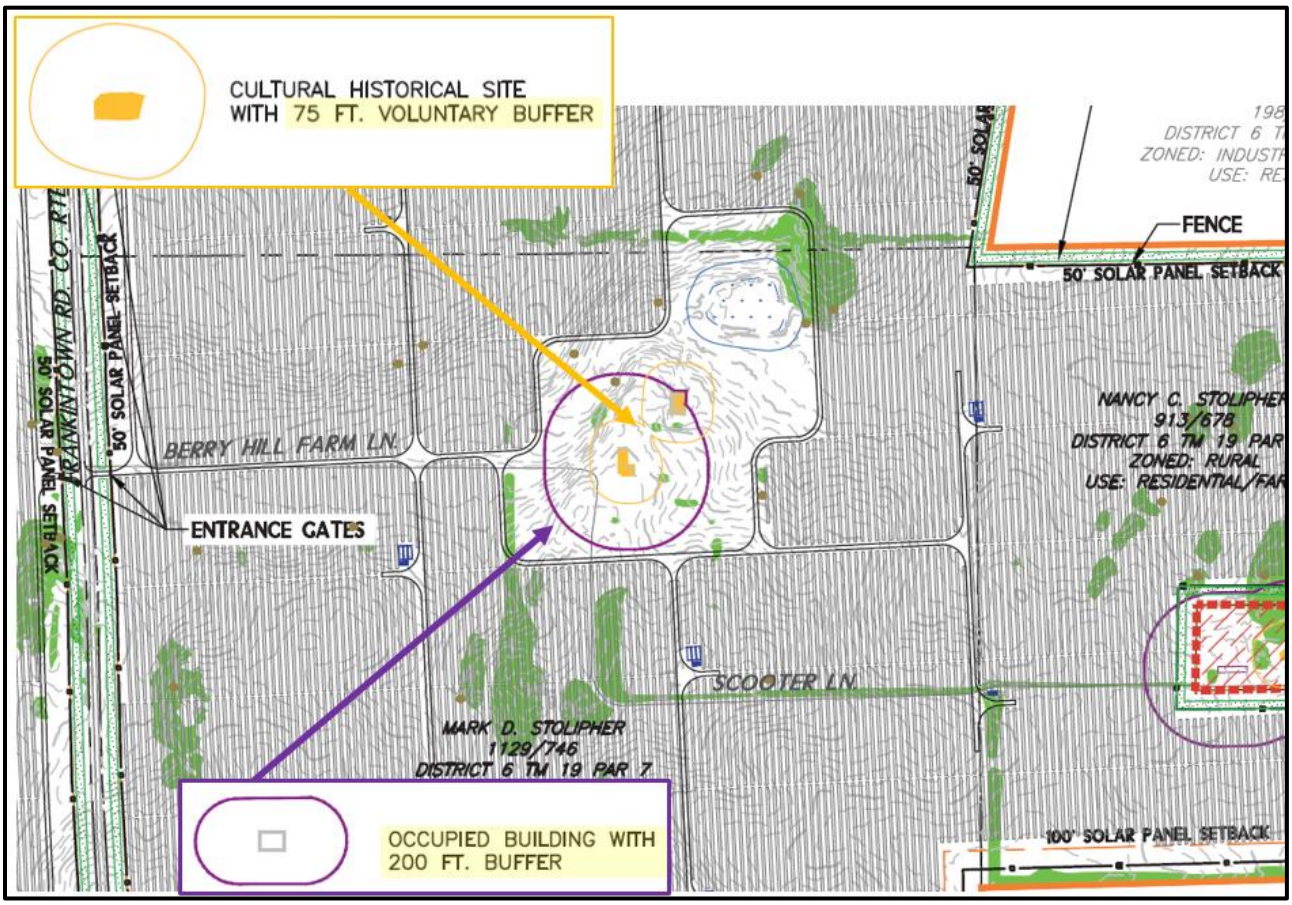
   Section 3.4D.4.b of the Zoning Ordinance defines Category II resources as follows:

   > *These sites are classified as important. This category includes Jefferson County Landmarks, historic sites that may have been altered or changed to such a degree that they no longer retain the same level of integrity as the original condition.*

The Ordinance states that the Historic Landmarks Commission may make reasonable recommendation to the Board of Zoning Appeals on the suitability of a proposed non-residential use for the building seeking a Conditional Use Permit and may include the following findings:

a. Compatibility of the proposed use with the historic structure;
b. Any modifications to the building's façade is consistent and compatible with the building's architecture, style, and massing; and
c. Proposed parking and other activities are suitably located so as to preserve the historic character.

As part of the Concept Plan process, the Historic Landmarks Commission was notified of the proposed project. Staff also verbally confirmed with the HLC on 08/07/2024 that they received notice of the project and had been in contact with the applicant. The HLC verbally represented that they were satisfied with the buffer proposals for the Berry Hill House and efforts to ensure protection of the existing cemetery. To date, no written comments were received from the HLC.



8. Any signs associated with the proposed Conditional Use shall be reviewed by the Board in accordance with Section 10.6. (Sec. 6.3A.8)

Section 8.20 of the Zoning Ordinance states that no signage or advertising is permitted on the solar energy facility, other than an identifying sign at the entrance of the facility, which shall be approved administratively in accordance with Article 10.

Attachments:

1. **Section 6.3 of the Zoning Ordinance**
2. **Section 8.9 of the Zoning Ordinance**
3. **Section 8.20 of the Zoning Ordinance**
4. **Appendix C of the Zoning Ordinance**

Section 6.2 Variances[32]

The Board of Zoning Appeals shall consider requests for variances from the terms of the Ordinance.[23]

A. The Board shall approve a variance request if the Board finds that a variance:

1. Will not adversely affect the public health, safety or welfare, or the rights of adjacent property owners or residents;
2. Arises from special conditions or attributes which pertain to the property for which a variance is sought and which were not created by the person seeking the variance;
3. Would eliminate an unnecessary hardship and permit a reasonable use of the land; and
4. Will allow the intent of the Zoning and Land Development Ordinance to be observed and substantial justice done.[17, 21]

B. The owner or authorized representative of the owner of the property which is the subject of a variance request shall complete and sign forms provided for this purpose by the Board, and shall pay the associated fees. The variance request shall be filed with the Board in the Office of Planning and Zoning.

C. Notification for a variance must be conducted according to the requirements of Section 6.1B.

D. A public hearing must be conducted according to the requirements of Section 6.1C and such hearing may be continued according to the requirements of Section 6.1D.

Section 6.3 Conditional Use Permit[32]

The Board of Zoning Appeals shall have the authority over the issuance or denial of a conditional use permit for uses listed as "Conditional Uses (CU)" in each zoning district. The Board shall have the authority to impose such reasonable conditions and restrictions as are directly related to and incidental to the proposed conditional use permit:[2, 32]

A. The Board shall consider each Conditional Use Permit request that is filed in accordance with this Ordinance and the procedural requirements of the Board of Zoning Appeals. The Board may require reasonable conditions or special requirements which allows for the proper integration of the proposed uses into the community and are directly related to and incidental to the proposed conditional use permit. The following General Standards shall be considered in approving or denying the CUP:

1. The proposed use is compatible with the goals of the adopted Comprehensive Plan.
2. The proposed use is compatible in intensity and scale with the existing and potential land uses on the adjoining and confronting properties, and poses no threat to public health, safety and welfare.
3. The proposed site development shall be such that the use will not hinder nor discourage the appropriate development and use of adjacent land and buildings.
4. Neighborhood character and surrounding property values shall be safeguarded by requiring implementation of the landscaping buffer requirements found in Appendix B and Section 4.11 of this Ordinance.
5. Commercial and Industrial Uses shall be in conformance with Section 8.9 of this Ordinance.
6. For properties in the Rural zoning district, roadway adequacy shall be assessed by the Comprehensive Plan's Highway Road Classification Map. If a rural parcel is not shown as commercial on the Future Land Use Guide or does not front on a Principal Arterial, Minor Arterial, or Major Collector road (as identified in the Comprehensive Plan), the applicant shall submit trip generation data, including Average Daily and Peak Hour trips, for the BZA to review

in conjunction with the Highway Problem Areas Map when determining roadway adequacy for the proposed use.

7. For Historic Sites, the Historic Landmarks Commission, with the property owner's consent, may visit the property to review the proposed land development plan and use for sites designated as Category I or II. The Historic Landmarks Commission may make reasonable recommendation to the Board of Zoning Appeals on the suitability of a proposed multi-family dwelling or non-residential use for the building seeking a Conditional Use Permit. The Historic Landmarks Commission's recommendations may include the following findings:[35]

   a. Compatibility of the proposed use with the historic structure;

   b. Any modifications to the building's façade is consistent and compatible with the building's architecture, style, and massing; and

   c. Proposed parking and other activities are suitably located so as to preserve the historic character.

   The Board of Zoning Appeals may consider these findings and if determined appropriate, may require compliance with some or all of the Historic Landmarks Commission's recommendations as a condition of approval.

8. Any signs associated with the proposed Conditional Use shall be reviewed by the Board in accordance with Section 10.6.[36]

B. The owner or authorized representative of the owner of the property for which the Conditional Use Permit is being requested shall complete and sign forms provided for this purpose by the Board, and shall pay the associated fees. The Conditional Use Permit request shall be filed with the Board at the Office of Planning and Zoning.

C. Staff will notify the adjacent and confronting property owners of the date, time, and location of the Public Hearing by registered mail. Notification for a Conditional Use Permit must be conducted according to the requirements of Section 6.1B.

D. A public hearing must be conducted according to the requirements of Section 6.1C and such hearing may be continued according to the requirements of Section 6.1D.

E. If there are no negative public comments received by the Board, the Board shall issue the Conditional Use Permit but may require reasonable conditions.

Section 6.4 Seasonal Uses[5, 7, 32]

Seasonal uses must be approved by the Board of Zoning Appeals pursuant to a public hearing according to the requirements of Section 6.1C. Newspaper notification requirements of Section 6.1B apply. Seasonal uses cannot be approved for longer than one year at a time.[17, 21, 23]

Section 6.5 Special Exception Permit[26, 32, 36]

A. Special Exception uses listed in this section may be approved by the Board of Zoning Appeals subject to a public hearing in accordance with the following.

   1. The public hearing is subject to the notification requirements of Section 6.1B.

   2. The public hearing shall be conducted according to the requirements of Section 6.1C.

   3. Such hearing may be continued according to the requirements of Section 6.1D.

B. Standards for Hunting, Shooting and Fishing Clubs[20]

1. 75 foot setback for all structures and parking.
2. 150 yard setback for all shooting facilities.
3. Height
   a. As is for conversion or reconstruction that does not exceed 135 percent of the original footprint of existing structures
   b. 35 feet for new structures
4. Landscaping requirements of this Ordinance apply, with the following exception:
   a. Perimeter landscaping shall be as approved by staff in order to preserve existing vegetation.
5. Minimum of 150 acres under common ownership.

C. Special Exceptions for Hunting, Shooting and Fishing Clubs[20]

1. Limits exceeding requirements outlined above can be increased with Board of Zoning Appeals approval provided that the Board of Zoning Appeals find that the increase is compatible with the neighborhood after taking into consideration neighborhood character, traffic, and buffering. Such decision shall be rendered after a public hearing as outlined in the Board of Zoning Appeals Rules of Procedure.

Section 8.9 Industrial and Commercial Uses[23]

A. Industrial and commercial uses in all districts shall comply with the following standards:

1. Noise

All noise shall be muffled so as not to be objectionable due to intermitting, beat frequency, or shrillness. Noise levels shall not exceed the following sound levels dB(A). The sound-pressure level shall be measured at the property line with a sound level meter.

Sound Measured In	DAY 7 AM - 6 PM	NIGHT 6 PM - 7 AM
Adjoining Agricultural or Residential Growth District	60 dB(A)	50 dB(A)
Residential Uses in R-LI-C District	65 dB(A)	55 dB(A)
Commercial Uses	70 dB(A)	60 dB(A)
Light Industrial Uses adjacent to noise source	85 dB(A)	80 dB(A)

The following sources of noise are exempt:

a. Transportation vehicles not under the control of the industrial use.

b. Occasionally used safety signals, warning devices and emergency pressure relief valves.

c. Temporary construction activity between 7:00 a.m. and 7:00 p.m.

2. Odor

No operation shall result in the creation of odors of such intensity and character as to be detrimental to the health and welfare or the public or which interferes with the comfort of the public. Odor thresholds shall be in accordance with ASTM d139-57 “Standard Method for Measurement of Odor in Atmospheres (Dilution Method)” or its equivalent.

Odorous material released from any operation or activity shall not exceed the odor threshold concentration beyond the state line, measured either at ground level or habitable elevation.

3. Smoke

No smoke, dust, fumes, or particulate matter shall be perceptible at any lot line. Further, the regulations and standards governing the control of air pollution shall be the same as those adopted by the State of West Virginia.

For the purpose of grading the density or equivalent capacity of smoke, the Ringelmann Chart as published by the United States Bureau of Mines shall be used.

The emission of smoke darker than Ringelmann No. 1 from any chimney, stack, vent, opening, or combustion process is prohibited.

The total emission rate of dust and particulate matter from all vents, stacks, chimneys, flues or other opening or any process, operation, or activity except solid waste incinerators within the boundaries of any lot, will not exceed the levels set forth below.

Particulate matter emission from materials or products subject to becoming wind borne will be kept to a minimum by paving, sodding, oiling, wetting, covering or other means, such as to render the surface wind resistant. Such sources include vacant lots, unpaved roads, yards and storage piles or bulk material such as coal, sand, cinders, slag, sulfur, etc.

4. Ambient Air Quality Standard

Particulate Matter

Suspended

Annual Arithmetic Mean ug/m		65
24-hour Maximum b, ug/m		140

Settleable

Annual Arithmetic Average, mg/cm/	/month	0.35
Monthly Maximum		0.7

5. Vibration

No vibration shall be produced which is transmitted through the ground and is discernible without the aid of instruments at any point beyond the lot line nor shall any vibration produced exceed 0.002g peak measured at or beyond the lot line using either seismic or electronic vibration-measuring equipment.

6. Glare and Heat

No direct or sky-reflected glare, whether from floodlights or from high temperature processes, such as combustion or welding or otherwise, so as to be visible at the lot line, shall be permitted. There shall be no emission or transmission of heat or heated air so as to be discernable at the lot line.

7. Toxic Matter

The ambient air quality standards for the State of West Virginia shall be the guide to the release of airborne toxic materials across lot lines. Where toxic materials are not listed in the ambient air quality standards of the State, the release of such materials shall be in accordance with the fractional quantities permitted below, of those toxic materials currently listed in the threshold limit values adopted by the American Conference of Governmental Industrial Hygienists.

Unless otherwise stated, the measurement of toxic matter shall be at ground level or habitable elevation, and shall be the average of any twenty-four (24) hours sampling period.

The release of airborne toxic matter will not exceed one-thirteenth of the threshold limit value across lot lines.

Such materials shall include but are not limited to: all primary explosives such as lead azide, lead styphnate, fulminates and tetracene; all high explosives such as TNT, RDX, HMX, PETN, and picric acid; propellants and components thereof, such as dry derivatives; pyrotechnics and fireworks such as acetylates, tetrazoles, and ozonides; unstable oxidizing agents such as perchloric acid, perchlorates, and hydrogen peroxide in concentration greater than thirty-five (35) per cent; and nuclear fuels, fissionable materials and products, and reactor elements such as Uranium 235 and Plutonium 239.

The storage, utilization or manufacture of materials or products which decompose by detonation is prohibited.

8. Fire Hazards

The storage, utilization or manufacture of solid materials which are active to intense burning shall be conducted within spaces having fire resistive construction of no less than two (2) hours and protected with an automatic fire extinguishing system.

The total capacity of flammable liquids and gasses shall not exceed those quantities permitted in the following Table for each of the industrial districts:

CAPACITY	STORAGE
Liquids	60,000 gallons
Gasses	
- Above ground	150,000 SCF
- Below ground	300,000 SCF

SCF - Standard Cubic Feet at sixty (60) degrees Fahrenheit and 29.92 inches Mercury.[1]

The following setback requirements will apply to the location of any container which holds flammable liquids or gasses:

Container Setback from Lot Lines

Water Capacity per Container (Gallons)	Containers Underground (Feet)	Above Ground Containers (Feet)	Between Above Ground Containers (Feet)
0 to 2,000	25	25	3
2,000 to 30,000	50	50	5
30,000 to 60,000	50	75	
In excess of 60,000	75	100	¼ the sum of diameters of adjacent containers

9. Frontage Road

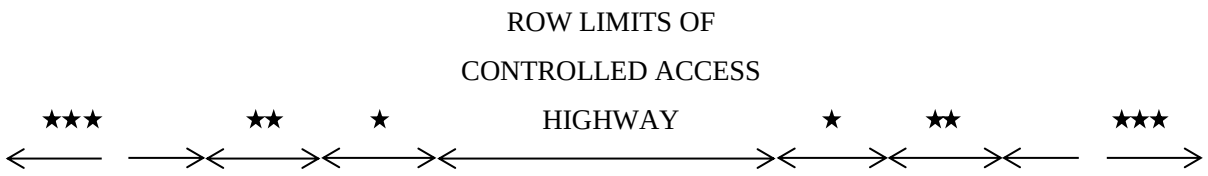
Easements or fee simple dedications will be provided along all limited access highways at the site plan or subdivision phases. Said easement/dedication shall not exceed 60 feet in width. The width may vary but must be adequate for extension, continuation or establishment of a minimum 20' wide paved frontage road.

10. Landscape Buffer

All commercial and industrial developments shall comply with Section 4.11 unless otherwise specified in this Ordinance.[27]

A fifty (50) foot wide landscape buffer strip will be provided along all limited access highways. Said buffer shall be adjacent to the frontage road. In the case where existing roads not adjacent to controlled access highway serve as frontage road the landscape buffer may be placed against the highway right-of-way.

All front setbacks (building and parking lot) are to be measured from the landscape buffer. (See diagram)



★ Maximum 60' easement or dedication for frontage road
★★ 50' landscaped buffer strip
★★★ Setbacks

This provision shall also apply to any ramps or access roads connecting to a controlled access highway within ½ mile of a controlled access highway.[5]

Section 8.10 Model Homes/Sales Offices[23]

Model homes with a staffed sales office for sales exclusively within the residential subdivision in which they are located are permitted provided that they are contained on the first lot on either or both sides of any road/right-of-way that enters the subdivision; provided also that they are so designated on the preliminary and final plats during the subdivision process.

Model homes with a staffed sales office in any other location within the subdivision must be approved or denied by the Board of Zoning Appeals after a public hearing advertised for 15 days.[17, 21]

Model homes without staffed sales offices are permitted internally within the subdivision.[12]

Section 8.11 Petroleum Products Refining or Storage[23]

Petroleum refining or storage (above ground in tanks) requires adherence to all state and federal laws, as well as National Fire Underwriters Codes.

Section 8.12 West Virginia Legal Fireworks[23]

Sales of fireworks are permitted in the Industrial-Commercial, Residential-Light Industrial-Commercial, General Commercial, Highway Commercial, Highway Commercial, Light Industrial, and Major Industrial zoning districts provided all other restrictions such as setbacks and the requirements of the Jefferson County Subdivision and Land Development Regulations are met.[8, 27]

Section 8.13 Dormitory[23]

A dormitory shall be located on the same property or campus as the use it is intended to serve. A dormitory shall not offer accommodations to the general public or to persons who are visiting the property or campus primarily for the purpose of being a spectator at a sporting event or other gathering held at the facility. A dormitory may include one common kitchen or dining facility and common gathering rooms for social purposes for use only by its temporary occupants.

Section 8.14 Special Event Facilities[39]

The purpose of this sections is to create a process by which a property owner in the Rural, Residential Growth, and Village zoning districts may establish a Special Event Facility. A Special Event Facility in any other zoning district may process in accordance with Appendix C.

B. Setback Standards to operate a Nature Center and Preserve:

Enclosed structures over 250 square feet that are solely for the purpose of housing animals shall be setback 50 feet.

All structures and motorized trails shall meet commercial setbacks of 25 feet with the exception that accessory structures under 250 square feet that are associated with the maintenance of the land use shall be setback ten feet.

All non-motorized trails and non-amplified outdoor activity areas shall meet a minimum ten foot setback. Motorized vehicles associated with the maintenance of the land use are permitted within the non-motorized trails.

C. Landscaping Standards to operate a Nature Center and Preserve:

In lieu of this Ordinance's landscaping standards, a ten foot woodland preservation buffer shall be required along the perimeter of the land use. This ten foot buffer is not required along the interior property lines of the land use. There shall be no clearing or cutting within the buffer with the exception of removing dead, dying, and/or diseased trees. The woodland preservation buffer may be used for passive recreation such as pedestrian, bike, or equestrian trails provided that:

1. No trees, shrubs, hedges, or walls are removed.
2. Not more that 20% of the width of the buffer is impervious surface.
3. The total width of the buffer area is maintained.

D. Noise Standards to operate a Nature Center and Preserve:

This land use is restricted to the noise standards of Section 8.9A.1 of this Ordinance. The Residential Growth District measurement shall apply when the use is adjacent to a lot that contains a residence, or is zoned Rural or Residential Growth.

Section 8.19 Crematorium[37]

A. Crematorium, Livestock

A Livestock Crematorium shall process as a Conditional Use Permit in all zoning districts other than Rural, unless such use is determined by the Zoning Administrator to be accessory to an active agricultural use.

B. Crematorium, Pet

A Pet Crematorium shall process as a Principal Permitted or Conditional Use in zones as designated in Appendix C. In the Rural Zoning District, a Pet Crematorium may process utilizing the Site Plan Exemption for the Rural District.

Section 8.20 Solar Energy Facilities[43]

Solar Energy Facilities shall process as a Principal Permitted Use in areas inside of the Urban Growth Boundary and the Preferred Growth Area as delineated on the Future Land Use Guide in the Comprehensive Plan. Solar Energy Facilities shall process as a Conditional Use in areas outside of the Urban Growth Boundary (UGB) and Preferred Growth Area (PGA).

All projects shall process a Concept Plan in accordance with the requirements listed below under Subsection B. For projects that require processing a Conditional Use Permit, a Concept Plan shall process subsequent to the Board of Zoning Appeals approval.

For projects that will occur across parcels located both inside and outside the County's UGB/PGA areas, an applicant may choose to process in two phases, with the first phase addressing the parcels located within the UGB/PGA areas as a Principal Permitted Use and the second phase processing a Conditional Use Permit to allow the Board to evaluate compatibility of the second the phase outside of the UGB/PGA areas. Should the Board issue a Conditional Use Permit, a Concept Plan shall process and shall include an exhibit depicting the full-buildout of the entire Solar Energy Facility project.

A Pre-Proposal Conference is recommended for all solar projects, pursuant to the Jefferson County Subdivision and Land Development Regulations.

A. Process for Solar Energy Facilities as a Conditional Use

1. Projects which will occur on properties located outside of the UGB/PGA areas as delineated on the Future Land Use Guide shall process a Conditional Use in accordance with Article 6.
2. In addition to the criteria established in Article 6, the following exhibits shall be included with the Conditional Use Permit application for the Board's evaluation:
    a. Submit a sketch depicting the location of the proposed project and delineate the distance of the panels from the external property lines.
    b. Submit a brief description of the timeline of the lease or operating plan, and an overview of the plan for removal of the solar energy facility. The decommissioning plan and bond shall be in accordance with the West Virginia Department of Environmental Protection (WVDEP), pursuant to WV State Code §22-32-1, et. sec. or its successor.
3. Should the Board issue a Conditional Use Permit, the applicant shall proceed with application for a Concept Plan, pursuant to the criteria listed below under subsection B.

B. Process for Solar Energy Facilities as a Principal Permitted Use

1. A Concept Plan, pursuant to the Minor Site Development Concept Plan standards established in the Jefferson County Subdivision and Land Development Regulations is required; except that after the Planning Commission direction is given, the next steps are Application for a Zoning Certificate and Building Permit. In addition to the Concept Plan requirements outlined in the Subdivision Regulations, the Concept Plan shall also include the following criteria:
    a. Property or Properties Location;
    b. Access Points;
    c. Anticipated location of all proposed components of the Solar Energy Facility. Each proposed solar panel is not required to be shown on the Concept Plan, if compliance with setbacks can be established by what is depicted on the Concept Plan; and
    d. Landscaping, Buffering, Ground Cover Plan, and Fencing. The landscaping plan shall include a note stating, "It will be the responsibility of the landowner to replace any trees, shrubs, or vegetation that die."

    If the project is to be completed in phases, the Concept Plan shall reflect phasing of the project.
2. Decommissioning Outline
    a. A narrative outlining the decommissioning of the Solar Energy Facility shall be included with the Concept Plan. This narrative shall include a description of the timeline of the lease or operating plan, and a general plan for removal of the Solar Energy Facility.

b. The company shall provide to the Department of Engineering, Planning, and Zoning proof of application for a decommissioning plan and bond when such application is filed with the WVDEP as required by WV State Code §22-32-1, et. sec. or its successor.

c. Staff shall be notified by certified mail at least 60 days in advance of the intended decommissioning of the Solar Energy Facility. Staff will place the notice on the next regularly scheduled Planning Commission meeting under "non-actionable correspondence".

d. Failure of the Lessee or Property Owner to meet and/or comply with the decommissioning plan as approved by the WVDEP may result in legal action pursuant to Article 3, Section 3.3 of this Ordinance and/or any applicable State Law.

C. Setbacks, Landscaping, and Buffer Standards for a Solar Energy Facility

1. Multiple adjacent properties under the same ownership or lease by the same company shall be considered one property for the purpose of these regulations. Internal boundary lines on adjacent properties under the same ownership or lease by the same company are not subject to the setbacks or buffer requirements provided below.

2. Setbacks

a. Solar Panels

i. Front, Side, and Rear Setbacks shall be 100 feet from all external/perimeter property lines and from the edge of the State ROW or Easement of any State Road.

ii. The above referenced setback may be decreased to 50 feet provided it includes a six foot high opaque buffer within the setback area comprised of two rows of evergreen trees that are six feet tall at the time of planting or a solid fence. Alternatively, a 50 foot strip of existing, mature woodlands may be allowed in lieu of a planted buffer or fence if documentation is submitted documenting how the existing mature woodlands complies with the required buffer standard.

iii. Solar panels and accessory components may be located on a common side or rear lot line of contiguous property owned by the same entity.

b. Accessory components, excluding solar panels and underground utilities.

i. Front, side, and rear setbacks shall be 25 feet from all external/perimeter property lines and from the edge of the State ROW or Easement of any State Road.

3. Landscaping and Buffer Standards

a. Solar Panels that are located within 200 feet of any residence, Category 1 Historic Resource, Institution for Human Care, Church, or similar use or structure as determined by the Zoning Administrator, shall provide a 20 foot wide buffer along common property lines. The buffer shall be provided anywhere within the 200 foot radius from the structures/uses herein and is not required to be provided along the entire length of the common property line.

b. The buffer screen may be either vegetative or opaque fencing and may be placed anywhere within the buffer area. No structures, materials, or vehicular parking shall be permitted within the side and rear yard buffers. Existing, natural vegetation may be used in lieu of a planted buffer if documentation is submitted to the Zoning Administrator verifying how the existing natural vegetation complies with the required buffer standard.

c. Accessory Components (excluding solar panels) that are located within 200 feet of any residence, Category 1 Historic Resource, Institution for Human Care, Church, or similar use as determined by the Zoning Administrator, shall comply with the commercial provisions of

Section 4.11, with the exception that the Zoning Administrator can allow the use of existing, natural vegetation as appropriate to achieve the intent of the required buffering.

4. Security and Access

    a. A security fence with secured gates shall be erected around the operating areas of the Solar Energy Facility with a minimum height of six feet and a maximum height of ten feet.

        i. Arrangements shall be made with the appropriate Fire Department for Access. A letter documenting approval of access from the Fire Department shall be provided with the Zoning Certificate application. The Fire Department shall respond within 15 days of the date of the letter. If no response is provided, the Fire Department shall be deemed by this Ordinance to have approved the access.

        ii. Upon three business days' notice by the Department of Engineering, Planning, and Zoning, access shall be provided to Staff.

D. A Zoning Certificate based on an approved Concept Plan is required prior to initiating any use regarding Solar Energy Facilities.

In addition to the standards found in Section 8.20, any Zoning Certificate regarding Solar Energy Facilities shall be issued conditioned on all other State Regulations and approvals being granted, including, but not limited to, the WV Public Service Commission, WVDEP applicable NPDES Permits and Decommissioning Bonds, Fire Marshal approval, Building Permits through the Department of Engineering, Planning, and Zoning, and approval of the Stormwater Management Report pursuant to the Jefferson County Stormwater Management Ordinance.

E. Stormwater Management

Stormwater Management shall be required in accordance with the Jefferson County Stormwater Management Ordinance. Solar Energy Facilities may be exempt from providing stormwater management if the conditions for granting exemption under Article I.D.2.h of the Stormwater Management Ordinance are satisfied.

F. General Requirements

1. Design, construction, and installation of the Solar Energy Facility shall conform to applicable industry standards, including those of the American National Standards Institute (ANSI), Underwriters Laboratories (UL), the American Society for Testing and Materials (ASTM) or other similar certifying organizations and shall comply with the West Virginia Fire and Building Codes, including compliance with the Jefferson County Building Code.
2. Prior to commencing the transmission of electricity, the Solar Energy Facility shall provide documentation evidencing an interconnection agreement or similar agreement with the applicable public utility or approved entity in accordance with applicable law.
3. Generation of electrical power shall be limited to photovoltaic panels, provided that any on-site buildings may utilize integrated photovoltaic building materials.
4. Solvents necessary for the cleaning of the Solar Panels shall be biodegradable.
5. Internal wiring, excluding that which is on or between the Solar Arrays, connected to substations or between Solar Panels, shall be located underground, except where necessary to mitigate impact to environmental and/or terrain features.
6. Onsight lighting shall be the minimum necessary for security and onsite management and maintenance and shall comply with the standards outlined in the Subdivision Regulations.

7. Photovoltaic Panels shall use antireflective glass that is designed to absorb rather than reflect light.
8. Ground Cover comprised of natural vegetation is required. Ground cover that uses native or naturalized perennial vegetation and that provides foraging habitat that is beneficial for songbirds, gamebirds, and pollinators is encouraged but not required.
9. Collocation of other agricultural activities such as small market hand-picked crops, grazing, and apiary activities are permitted and encouraged.
10. No signage or advertising is permitted on the Solar Energy Facility other than an identifying sign at the entrance of the Facility that shall be approved by the Zoning Administrator in accordance with Article 10. All other signage must be approved by Special Exception by the Board of Zoning Appeals.
11. Solar Energy Facilities shall comply with Article 8, Section 8.9 of this Ordinance.
12. The Solar Energy Facility Use is not considered abandoned until such time it is Decommissioned.
13. Damaged or unusable panels shall be repaired, replaced, or removed within 60 days from discovery of damage; provided, however, longer periods may be approved by the County Engineer due to extenuating circumstances.

Land Use	NC	GC	HC	LI	MI	PND[1]	OC	R	RG	RLIC	IC	V	Additional Standards
Commercial Uses continued													**Sec. 8.9**
Restaurant, Fast Food, Drive-Through[40]	NP	P	P	P	CU	CU	P	CU	CU	P	P	CU	
Restaurant, Fast Food, Limited	P	P	P	P	CU	P	P	CU	CU	P	P	CU	
Retail Sales and Services, General	NP	P	P	P	NP	P	NP	CU	CU	P	P	CU	
Retail Sales Limited	P	P	P	P	NP	P	P	CU	CU	P	P	CU	
Retail Store, Large	NP	CU	P	CU	NP	CU	NP	CU	CU	CU	CU	CU	
Shipping and Mailing Services	P	P	P	P	CU	P	P	CU	CU	P	P	CU	
Short Term Rental[41]	CU	NP	NP	NP	NP	P	NP	P	P	P	NP	P	Sec. 8.16
Solar Energy Facility[43]	NP	See Section 8.20				NP	NP	See Section 8.20				NP	Sec. 8.20
Special Event Facility	P	P	P	P	NP	P	P	CU	CU	P	P	CU	Sec. 8.14
Storage, Commercial	NP	P	P	P	CU	P	NP	CU	CU	P	P	CU	
Veterinary Services	P	P	P	P	CU	P	P	P	CU	P	P	CU	
Wireless Telecommunications Facilities	P	P	P	P	P	P	P	P	P	P	P	P	Art. 4B
Agricultural Uses*													
Agricultural Uses, as defined in Article 2	P	P	P	P	P	P	P	P	P	P	P	P	
Agricultural Repair Center	NP	P	P	P	P	P	P	P	CU	P	P	NP	
Agricultural Tourism	P	P	P	P	P	P	P	P	P	P	P	P	
Crematorium, Livestock[37]	CU	CU	CU	CU	CU	CU	CU	P	CU	CU	CU	CU	Sec. 8.19
Farm Brewery	P	P	P	P	P	P	P	P	P	P	P	P	Sec. 8.5
Farm Winery or Distillery	P	P	P	P	P	P	P	P	P	P	P	P	Sec. 8.5
Farm Market	P	P	P	P	P	P	P	P	P	P	P	P	Sec. 8.6
Farmer's Market	P	P	P	NP	NP	P	NP	P	CU	P	NP	CU	Sec. 8.6
Farm Vacation Enterprise	P	P	P	P	P	P	P	P	P	P	P	P	
Feed and/or Farm Supply Center	CU	P	P	P	P	P	P	P	CU	P	P	NP	
Horticultural Nurseries and Commercial Greenhouses	P	P	P	P	P	P	P	P	CU	P	P	NP	
Landscaping Business	P	P	P	P	P	P	P	P	CU	P	P	NP	
Rental of Existing Farm Building for Commercial Storage Structure must have existed for 5 years	NP	P	P	P	P	P	P	P	CU	P	P	NP	
Special Event Facility, Agricultural	P	P	P	P	P	P	P	P	P	P	P	P	Sec. 8.14
Accessory Uses													
Accessory Uses	P	P	P	P	P	P	P	P	P	P	P	P	

NC Neighborhood Commercial
GC General Commercial
HC Highway Commercial
LI Light Industrial
MI Major Industrial
PND Planned Neighborhood Development
OC Office / Commercial Mixed-Use
R Rural
RG Residential Growth District
RLIC Residential-Light Industrial-Commercial District
IC Industrial-Commercial District
V Village District

P Permitted Uses
NP Not Permitted Uses
CU Conditional Uses (subject to requirements of district and/or other requirements of this Ordinance)
** Accessory Use to a planned residential community, if permitted pursuant to Section 5.4 and processed as a CU
[1] The Planning Commission may amend the permitted uses for a development in the PND District per Article 5.
[2] Approval process is per the Salvage Yard Ordinance.

Franklintown Farm Solar Project

Pre-Construction Acoustical Assessment

PREPARED FOR
Franklintown Farm Solar, LLC

DATE
August 9, 2024

REFERENCE
0744173

CONTENTS

LIST OF TABLES

ACRONYMS AND ABBREVIATIONS

dBA	A-weighted decibels
EEI	Edison Electric Institute
ERM	Environmental Resources Management, Inc.
ISO	International Organization for Standardization
MVA	Mega-volt Ampere
MW	Megawatts

1. INTRODUCTION

1.1 Scope of Report

On behalf of Franklintown Farm Solar, LLC (Client), Environmental Resources Management, Inc. (ERM) completed a pre-construction noise assessment of the proposed Franklintown Farm Solar Project (Project). The Project will include an 80 MW solar energy facility with 20 MW battery energy storage system (BESS) and will consist of approximately 147,000 photovoltaic modules located on approximately 499 acres in Jefferson County, West Virginia. The primary noise generating sources associated with the Project include the solar inverters, solar transformers, and substation transformer. Figure 1 in Appendix A presents an overview of the Project, including the location of the Project sources in relation to other Project facilities and the surrounding properties.

ERM completed an acoustical modeling analysis to evaluate whether the contribution of operational noise from the Project would comply with the Jefferson County zoning ordinance pertaining to allowable noise levels from industrial and commercial uses. This report presents the results of ERM's acoustical analysis of the Project.

1.2 General Information on Noise

Noise is typically measured on the A-weighted scale (dBA). The A-weighting scale has been shown to provide a good correlation with the human response to sound and is the most widely used descriptor for community noise assessments (Harris, 1991). The faintest sound that can be heard by a healthy ear is about 0 dBA, while an uncomfortably loud sound is about 120 dBA. In order to provide a frame of reference, some common sound levels are listed below.

- Pile Driver at 100 feet 90 to 100 dBA
- Chainsaw at 30 feet 90 dBA
- Truck at 100 feet 85 dBA
- Noisy Urban Environment 75 dBA
- Lawn Mower at 100 feet 65 dBA
- Average Speech 60 dBA
- Average Office 50 dBA
- Rural Residential During the Day 40 dBA
- Quiet Suburban nighttime 35 dBA
- Soft Whisper at 15 feet 30 dBA

2. NOISE REGULATIONS

The Jefferson County Zoning and Land Development Ordinance includes regulations applicable to solar energy systems and requires that solar energy systems comply with the noise requirements provided in Section 8.9 – A.1 of the ordinance. The noise requirement states that industrial and

commercial uses in Jefferson County shall comply with specific noise limits when measured at the Project property line. The most restrictive limit applies to adjoining agricultural or residential growth district zones, with noise limits of 60 dBA during the day (7 am to 6 pm) and 50 dBA at night (6 pm to 7 am). For residential uses in Light Industrial zoned properties, less restrictive limits of 65 dBA during the day and 55 dBA at night apply. Construction noise is exempt from the ordinance provided that it occurs between the hours of 7:00 a.m. and 7:00p.m.

The area surrounding the Project site is zoned mainly rural, where the most restrictive 50 dBA at night limit applies. A residential/light industrial zone, where the nighttime limit is 55 dBA, is located on the southeastern side of the Project site. The zones are depicted in Figure 1 of Appendix A.

No State of West Virginia noise standards applicable to the Project were identified.

3. ACOUSTICAL MODELING

3.1 Methodology

ERM performed computer modeling to calculate noise levels that will be generated during Project operation and used the commercially available CadnaA model developed by DataKustik GmBH (2006) for the analysis. The software has the ability to account for spreading losses, ground and atmospheric effects, shielding from barriers and buildings, and reflections from surfaces. The software is standards-based. ERM used the International Organization for Standardization (ISO) 9613 standard for air absorption and other noise propagation calculations (ISO 1996). ERM took credit for a partially acoustically absorptive ground surface (0.5 setting in the model). A setting of "0" corresponds to an acoustically reflective surface, such as pavement or water, while a setting of 1.0 corresponds to loose soils and grassy surfaces. ERM included the existing topographic features in the area.

The noise model allowed for the quantification of noise levels from multiple sources, based on the sound characteristics (overall level, frequency data etc.) emitted from each source to calculate the expected noise levels from Project operations at the Project property line and surrounding areas.

Modeling was conducted to develop noise contour maps that demonstrate noise levels throughout the Project area. A summary of the equipment sources included in the noise modeling assessment, their locations, and their height above grade are provided in Table 1. Table 2 provides the noise emissions data and the derivation for each source.

Table 1. Equipment Source Listing

Source	Number of Each	Source Height Above Grade (feet)
Solar Inverters	72[a]	6
3.5 MVA Auxiliary Transformer	18	10
Substation 89 MVA Transformer	1	10

[a] There are 18 inverter blocks that each contain 4 inverters for a total of 72 inverters. Each inverter block contains one 3.5 MVA transformer.

Table 2. Noise Emissions Derivation for Project Sources

Equipment	Noise Emissions Data	Data Source
Solar Inverters	71 dBA at 50 feet	TMEIC [a]
3.5 MVA Auxiliary Transformer	47 dBA at 50 feet	EEI [b]
Substation 98 MVA Transformer	65 dBA at 50 feet	EEI [b]

[a.] TMEIC Solar Ware Ninja Model PVU-0840GR. Data are for one inverter block (4 inverters).
[b.] Emissions data developed utilizing the methodology found in Edison Electric Institute's "Electric Power Plan Environmental Noise Guide" based on maximum transformer MVA rating.

3.2 Noise Model Results

The noise modeling results are presented as noise contours in Figure 2 of Appendix A. Noise contours are presented herein rather than results at discrete receptor points in order to demonstrate the modeled Project noise levels at any location along the Project property line, which is where the Jefferson County noise ordinance limits of 50 dBA for adjacent residential zones and 55 dBA for residential for adjacent Light Industrial zones are applicable.

A review of Figure 2 reveals that modeled Project noise levels are demonstrated to be in compliance with the ordinance. The 50 dBA noise contour, which represents the most restrictive nighttime limit for residentially zoned areas, remains inside the Project boundary.

The noise levels presented herein are for daytime conditions when all Project sources are operating at full load conditions. Lower noise levels will occur during nighttime hours when the solar inverters are not operating.

4. CONCLUSION

This report presents the results of the acoustical assessment ERM conducted for the Franklintown Farm Solar Project in Jefferson County, West Virginia. The assessment included a detailed noise model of the major facility noise generating equipment operating under full load conditions and a comparison to the noise regulations within the Jefferson County Zoning and Land Development ordinance.

The operational noise assessment revealed that Project-generated noise levels would be in compliance with the applicable noise regulations for the Rural and Residential in Light Industrial zoned parcels around the Project site. Operational Project noise levels were shown to be less than 50 dBA at all locations on the Project property line, with 50 dBA being the most restrictive limit within the zoning ordinance. Notably, lower noise levels than those presented in this report will occur during nighttime hours when the solar inverters are not operating.

5. REFERENCES

DataKustik GmbH. 2006. Computer Aided Noise Abatement Model CadnaA. Munich, Germany.

Edison Electric Institute. 1994. Electric Power Plant Environmental Noise Guide. Prepared by Bolt, Beranek and Newman, Inc., Cambridge, Massachusetts.

Harris, 1991. Handbook of Acoustical Measurements and Noise Control, Third Edition (McGraw-Hill, Inc., 1991).

ISO, 1996. International Organization for Standardization. Standard ISO 9613-2 Acoustics – Attenuation of Sound During Propagation Outdoors, Part 2 General Method of Calculation. Geneva, Switzerland.

Jefferson County Planning Commission. 2022. Jefferson County Zoning and Land Development Ordinance, Section 8.9 – A.1, Amended June 16, 2022. Jefferson County, West Virginia.

TMEIC Corporation. 2020. Sound Level Report – Ninja.

APPENDIX A FIGURES

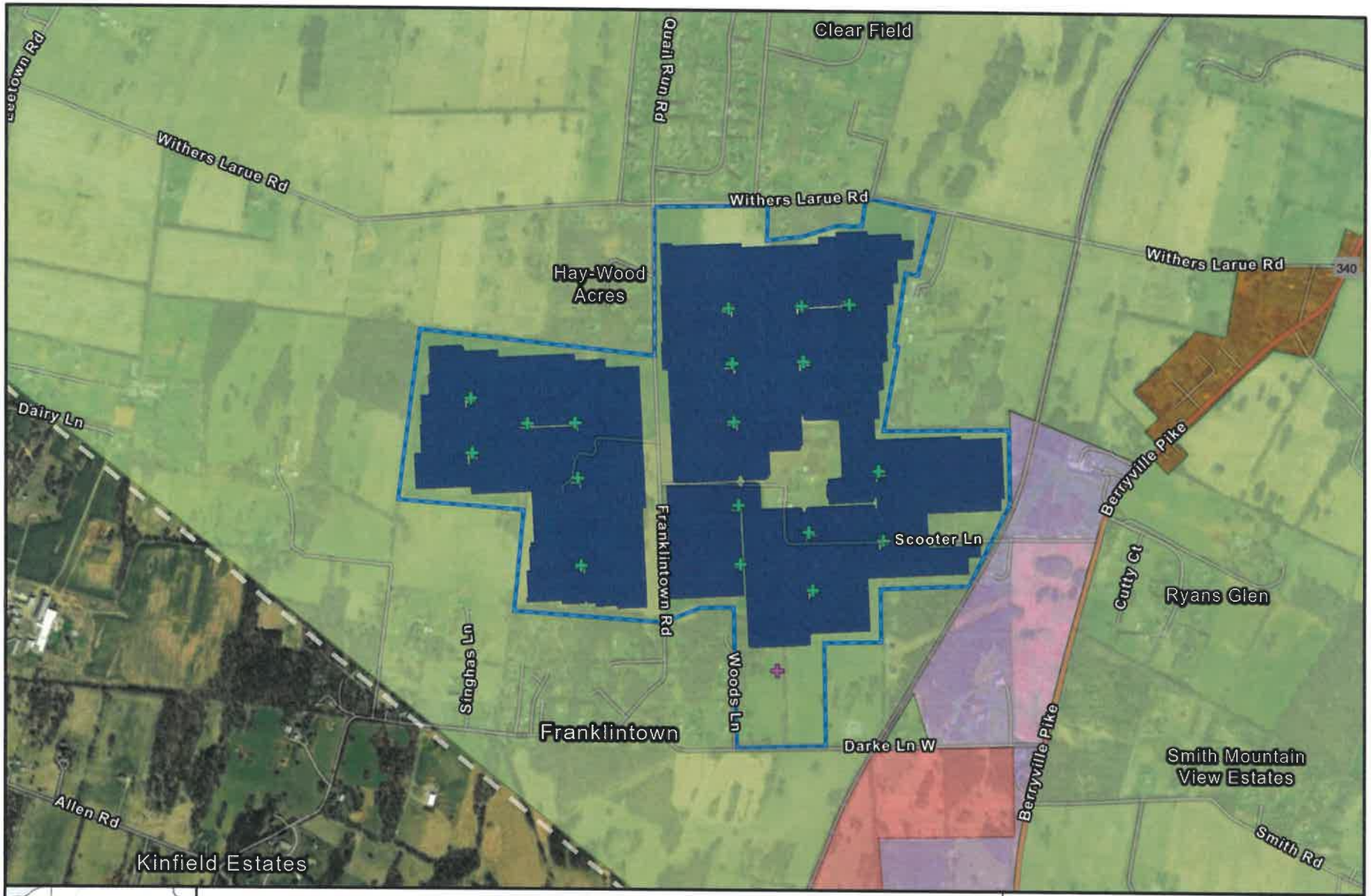


Figure 1
Project Area
Franklintown Farm Solar Project
Franklintown Farm Solar, LLC
Jefferson County, West Virginia

ERM

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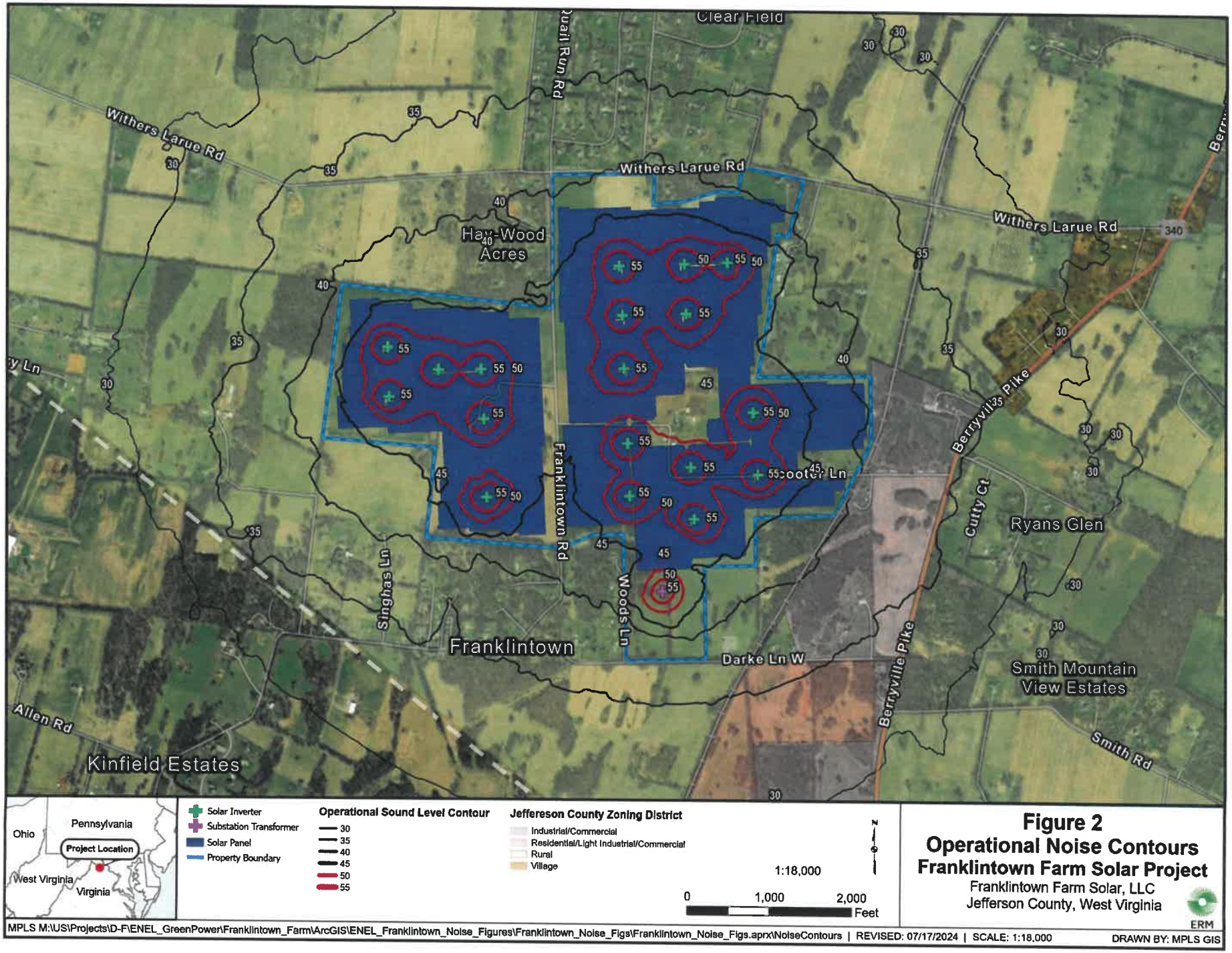

Figure 2
Operational Noise Contours
Franklintown Farm Solar Project
Franklintown Farm Solar, LLC
Jefferson County, West Virginia

ERM

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www.kirklandappraisals.com

October 26, 2023

Mr. Sam Judd
Enel North America, Inc.
16105 W 113th Street, Suite 105
Lenexa, KS 66219

RE: Franklintown Solar, Withers Larue Road, Franklintown, Jefferson County, WV

Mr. Judd

At your request, I have considered the impact of an 80 MW solar farm with a 20 MW battery energy storage system (BESS) proposed to be constructed on a portion of a 501.31-acre assemblage of land off Withers Larue Road, Franklintown, Jefferson County, West Virginia. Specifically, I have been asked to give my professional opinion on whether the proposed solar farm will have any impact on adjoining property value and whether "the location and character of the use, if developed according to the plan as submitted and approved, will be in harmony with the area in which it is to be located."

To form an opinion on these issues, I have researched and visited existing and proposed solar farms in states adjoining West Virginia as I found no existing utility scale solar farms in West Virginia. I have also researched articles through the Appraisal Institute and other studies, and discussed the likely impact with other real estate professionals. I have not been asked to assign any value to any specific property.

This letter is a limited report of a real property appraisal consulting assignment. My client is Enel North America, Inc, represented to me by Mr. Sam Judd. My findings support the Application. The effective date of this consultation is October 26, 2023.

Conclusion

The adjoining properties are well set back from the proposed solar panels and supplemental vegetation is proposed to enhance the areas where the existing trees do not currently provide a proper screen. The closest non-participating home will be a minimum of 200 feet from the nearest panel.

The matched pair analysis shows no impact on home values due to abutting or adjoining a solar farm as well as no impact to abutting or adjacent vacant residential or agricultural land where the solar farm is properly screened and buffered. The criteria that typically correlates with downward adjustments on property values such as noise, odor, and traffic all indicate that a solar farm is a compatible use for rural/residential transition areas and that it would function in a harmonious manner with this area.

Data from the university studies, broker commentary, and other appraisal studies support a finding of no impact on property value adjoining a solar farm with proper setbacks and landscaped buffers.

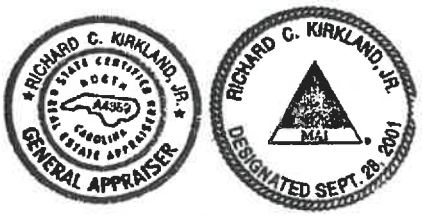
Very similar solar farms in very similar areas have been found by hundreds of towns and counties not to have a substantial negative effect to abutting or adjoining properties, and many of those findings of no impact have been upheld by appellate courts. Similar solar farms have been approved with adjoining agricultural uses, schools, churches, and residential developments.

*Submitted by applicant on 08-22-2024

Based on the data and analysis in this report, it is my professional opinion that the solar farm proposed at the subject property will have no impact on the value of adjoining or abutting properties and that the proposed use is in harmony with the area in which it is located. I note that some of the positive implications of a solar farm that have been expressed by people living next to solar farms include protection from future development of residential developments or other more intrusive uses, reduced dust, odor and chemicals from former farming operations, protection from light pollution at night, it is quiet, and there is minimal traffic.

If you have any questions please contact me.

Sincerely,



Richard C. Kirkland, Jr., MAI
NC Certified General Appraiser A4359
WV Temporary Appraisal Permit TEMP23-113

Table of Contents

I. Proposed Project and Adjoining Uses

Proposed Use Description

This 80 MW solar farm with a 20 MW battery energy storage system (BESS) is proposed to be constructed on a portion of a 501.31-acre assemblage of land off Withers Larue Road, Franklintown, Jefferson County, West Virginia.

Adjoining Properties

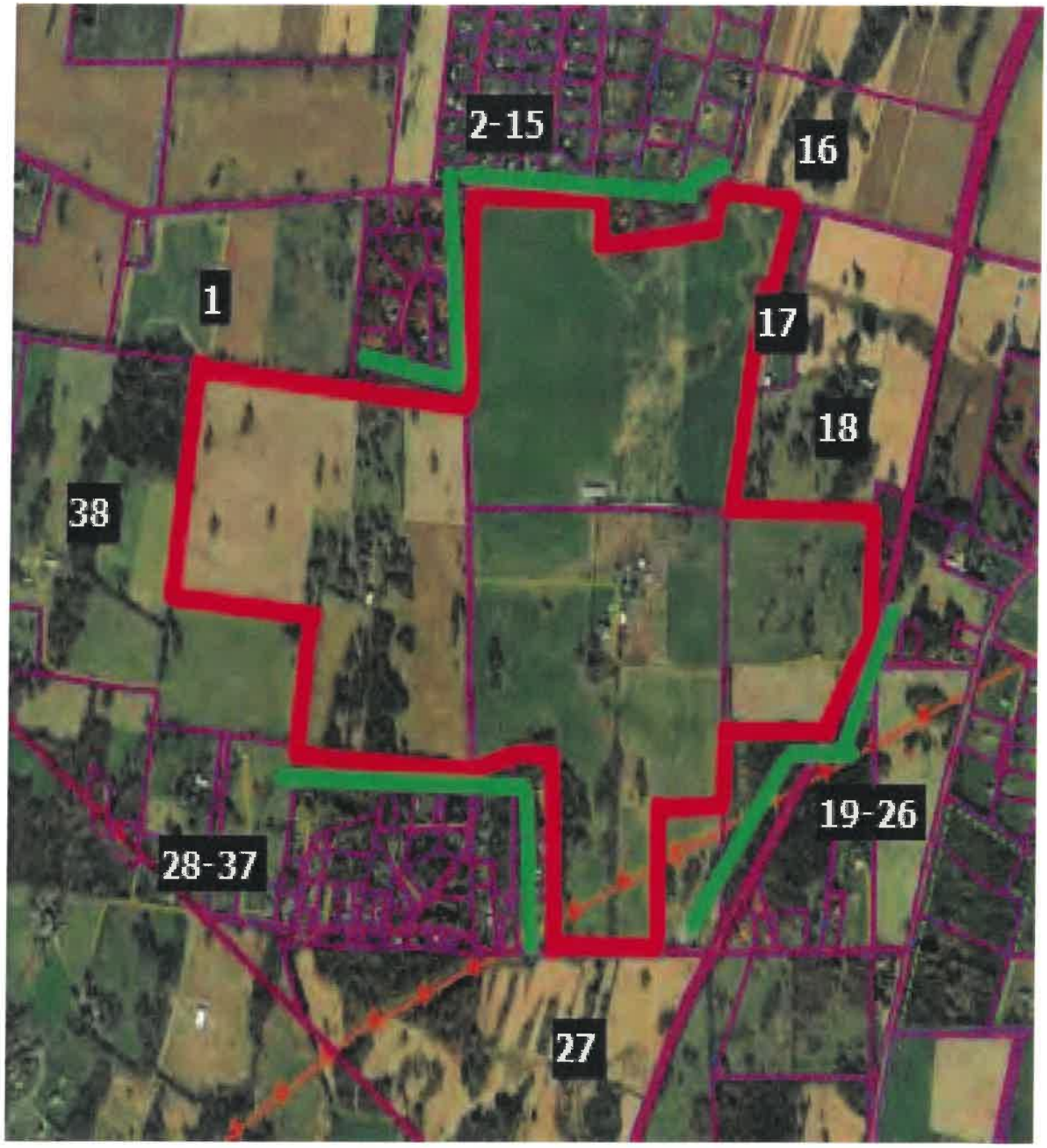
I have considered adjoining uses and included a map to identify each parcel's location. The siteplan was not complete as of the time of this analysis but the minimum setback from an adjoining residential use is 200 feet. The actual distance from adjoining homes will likely vary significantly and will trend to greater than that amount, but could be as close as 200 feet.

Adjoining land is primarily a mix of residential and agricultural uses, which is very typical of solar farm sites.

The breakdown of those uses by acreage and number of parcels is summarized below.

Adjoining Use Breakdown

	Acreage	**Parcels**
Residential	22.44%	80.95%
Agricultural	42.86%	7.14%
Agri/Res	32.31%	7.14%
Commercial	2.19%	2.38%
Cemetery	0.21%	2.38%
Total	**100.00%**	**100.00%**


2-15
16
1
17
18
38
19-26
28-37
27

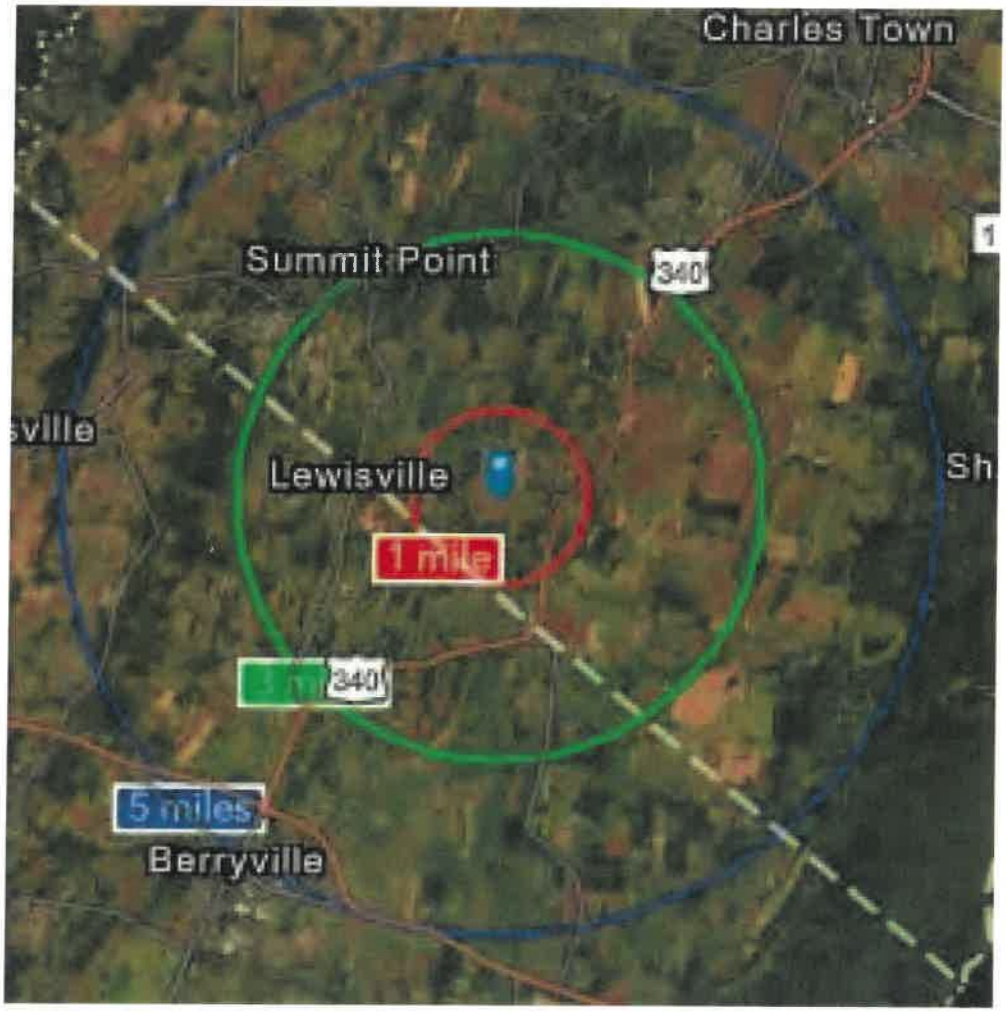
Surrounding Uses

#	MAP ID	Owner	GIS Data Acres	Present Use	Adjoin Acres	Adjoin Parcels
1	06 1800060002000	Boyd	118.81	Agricultural	16.69%	2.38%
2	06 1800060010000	Terango	2.95	Residential	0.41%	2.38%
3	06 1800060009000	Hawthrone	3.75	Residential	0.53%	2.38%
4	06 1800060003000	McKee	2.01	Residential	0.28%	2.38%
5	06 1800060004000	Brewer	2.04	Residential	0.29%	2.38%
6	06 1800060007000	Sokel	3.03	Residential	0.43%	2.38%
7	06 1800060014000	Hawthrone	3.26	Residential	0.46%	2.38%
8	06 1800060016000	Schneidner	3.28	Residential	0.46%	2.38%
9	06 12A0001000000	Gallahan	1.49	Residential	0.21%	2.38%
10	06 12A0001000000	Youngblood	1.70	Residential	0.24%	2.38%
11	06 12A0032000000	Ferro	1.32	Residential	0.18%	2.38%
12	06 12A0031000000	Milleson	1.65	Residential	0.23%	2.38%
13	06 12A0030000000	Albert	2.39	Residential	0.34%	2.38%
14	06 1200020016000	Moreno	2.65	Residential	0.37%	2.38%
15	06 1200020020000	Lamp	3.49	Residential	0.49%	2.38%
16	06 1900080002000	Helenski	2.87	Residential	0.40%	2.38%
17	06 1900080001000	Mancuso	1.59	Residential	0.22%	2.38%
18	06 1200020020000	Fitzwater	10.88	Residential	1.53%	2.38%
19	06 1200020002000	Thather	10.88	Residential	1.53%	2.38%
20	06 1200170005000	Rutherford	49.14	Agricultural	6.90%	2.38%
21	06 1900080000000	Larue	10.07	Residential	1.41%	2.38%
22	06 1900080005000	Loy	74.23	Agri/Res	10.43%	2.38%
23	06 1900140000000	Taylor	2.16	Residential	0.30%	2.38%
24	06 1900150000000	Yates	1.33	Residential	0.19%	2.38%
25	06 1900130000000	Chapman	17.55	Residential	2.47%	2.38%
26	06 1900170000000	Richards	1.03	Residential	0.14%	2.38%
27	06 1900170001000	Jenkins	1.33	Residential	0.19%	2.38%
28	06 1900180002000	Grove	28.23	Agri/Res	3.97%	2.38%
29	06 1900180004000	Cogle	17.09	Residential	2.40%	2.38%
30	06 1900070001000	Potomac	15.57	Utility	2.19%	2.38%
31	06 2900010000000	Clifton 1834	137.10	Agricultural	19.26%	2.38%
32	06 19A0036000000	Twyman	3.08	Residential	0.43%	2.38%
33	06 19A0036000100	Curry	0.92	Residential	0.13%	2.38%
34	06 19A0032000000	Stolipher	1.55	Residential	0.22%	2.38%
35	06 19A0035000000	Stolipher	1.51	Residential	0.21%	2.38%
36	06 19A0033000000	Yates	5.36	Residential	0.75%	2.38%
37	06 19A0031000000	Locust Grove	1.47	Cementery	0.21%	2.38%
38	06 19A0037000000	Stolipher	2.00	Residential	0.28%	2.38%
39	06 19A0003000000	Payton	8.00	Residential	1.12%	2.38%
40	06 19A0001000100	Berry	11.02	Residential	1.55%	2.38%
41	06 1900050000000	McCarty	14.53	Residential	2.04%	2.38%
42	06 1900020000000	Luttrell	127.52	Agri/Res	17.92%	2.38%
		Total	**711.800**		**100.00%**	**100.00%**

II. Demographics

I have pulled the following demographics for a 1-mile, 3-mile and 5-mile radius around the proposed solar farm project.

I note that the census projects a decline in population within the 1 and 3-mile radii indicated in the coming years.



Housing Profile

201-299 Berry Hill Farm Ln
201-299 Berry Hill Farm Ln, Summit Point, West Virginia, 25446
Ring: 1 mile radius

Prepared by Esri

Population		Households	
2010 Total Population	417	2023 Median Household Income	$152,819
2020 Total Population	406	2028 Median Household Income	$159,960
2023 Total Population	394	2023-2028 Annual Rate	0.92%
2028 Total Population	379		
2023-2028 Annual Rate	-0.77%		

	Census 2010		2023		2028	
Housing Units by Occupancy Status and Tenure	**Number**	**Percent**	**Number**	**Percent**	**Number**	**Percent**
Total Housing Units	174	100.0%	174	100.0%	174	100.0%
Occupied	175	100.6%	168	96.6%	163	93.7%
Owner	140	80.5%	127	73.0%	123	70.7%
Renter	35	20.1%	41	23.6%	40	23.0%
Vacant	0	0.0%	6	3.4%	10	5.7%

	2023		2028	
Owner Occupied Housing Units by Value	**Number**	**Percent**	**Number**	**Percent**
Total	129	100.0%	124	100.0%
<$50,000	5	3.9%	2	1.6%
$50,000-$99,999	1	0.8%	0	0.0%
$100,000-$149,999	3	2.3%	1	0.8%
$150,000-$199,999	5	3.9%	3	2.4%
$200,000-$249,999	3	2.3%	2	1.6%
$250,000-$299,999	3	2.3%	2	1.6%
$300,000-$399,999	80	62.0%	86	69.4%
$400,000-$499,999	21	16.3%	22	17.7%
$500,000-$749,999	8	6.2%	6	4.8%
$750,000-$999,999	0	0.0%	0	0.0%
$1,000,000-$1,499,999	0	0.0%	0	0.0%
$1,500,000-$1,999,999	0	0.0%	0	0.0%
$2,000,000+	0	0.0%	0	0.0%
Median Value	$355,625		$360,465	
Average Value	$351,938		$366,532	

Census 2010 Housing Units	**Number**	**Percent**
Total	174	100.0%
In Urbanized Areas	0	0.0%
In Urban Clusters	0	0.0%
Rural Housing Units	174	100.0%

Data Note: Persons of Hispanic Origin may be of any race.
Source: Esri forecasts for 2023 and 2028. U.S. Census Bureau 2010 decennial Census data converted by Esri into 2020 geography.

October 19, 2023

Housing Profile

201-299 Berry Hill Farm Ln
201-299 Berry Hill Farm Ln, Summit Point, West Virginia, 25446
Ring: 3 mile radius

Prepared by Esri

Population		Households	
2010 Total Population	1,945	2023 Median Household Income	$123,074
2020 Total Population	1,942	2028 Median Household Income	$138,912
2023 Total Population	1,939	2023-2028 Annual Rate	2.45%
2028 Total Population	1,904		
2023-2028 Annual Rate	-0.36%		

	Census 2010		2023		2028	
Housing Units by Occupancy Status and Tenure	**Number**	**Percent**	**Number**	**Percent**	**Number**	**Percent**
Total Housing Units	747	100.0%	760	100.0%	763	100.0%
Occupied	721	96.5%	722	95.0%	718	94.1%
Owner	594	79.5%	576	75.8%	574	75.2%
Renter	127	17.0%	146	19.2%	144	18.9%
Vacant	27	3.6%	38	5.0%	46	6.0%

	2023		2028	
Owner Occupied Housing Units by Value	**Number**	**Percent**	**Number**	**Percent**
Total	576	100.0%	572	100.0%
<$50,000	12	2.1%	5	0.9%
$50,000-$99,999	2	0.3%	0	0.0%
$100,000-$149,999	8	1.4%	3	0.5%
$150,000-$199,999	21	3.6%	11	1.9%
$200,000-$249,999	27	4.7%	18	3.1%
$250,000-$299,999	41	7.1%	36	6.3%
$300,000-$399,999	279	48.4%	303	53.0%
$400,000-$499,999	112	19.4%	117	20.5%
$500,000-$749,999	62	10.8%	66	11.5%
$750,000-$999,999	5	0.9%	5	0.9%
$1,000,000-$1,499,999	7	1.2%	8	1.4%
$1,500,000-$1,999,999	0	0.0%	0	0.0%
$2,000,000+	0	0.0%	0	0.0%
Median Value	$363,441		$370,297	
Average Value	$386,111		$403,322	

Census 2010 Housing Units	**Number**	**Percent**
Total	747	100.0%
In Urbanized Areas	0	0.0%
In Urban Clusters	9	1.2%
Rural Housing Units	739	98.9%

Data Note: Persons of Hispanic Origin may be of any race.
Source: Esri forecasts for 2023 and 2028. U.S. Census Bureau 2010 decennial Census data converted by Esri into 2020 geography.

October 19, 2023

Housing Profile

201-299 Berry Hill Farm Ln
201-299 Berry Hill Farm Ln, Summit Point, West Virginia, 25446
Ring: 5 mile radius

Prepared by Esri

Population		Households	
2010 Total Population	10,155	2023 Median Household Income	$106,175
2020 Total Population	10,967	2028 Median Household Income	$113,728
2023 Total Population	11,339	2023-2028 Annual Rate	1.38%
2028 Total Population	13,851		
2023-2028 Annual Rate	4.08%		

	Census 2010		2023		2028	
Housing Units by Occupancy Status and Tenure	**Number**	**Percent**	**Number**	**Percent**	**Number**	**Percent**
Total Housing Units	3,955	100.0%	4,378	100.0%	5,307	100.0%
Occupied	3,686	93.2%	4,127	94.3%	4,976	93.8%
Owner	2,945	74.5%	3,307	75.5%	4,149	78.2%
Renter	741	18.7%	820	18.7%	827	15.6%
Vacant	272	6.9%	251	5.7%	331	6.2%

	2023		2028	
Owner Occupied Housing Units by Value	**Number**	**Percent**	**Number**	**Percent**
Total	3,306	100.0%	4,150	100.0%
<$50,000	39	1.2%	25	0.6%
$50,000-$99,999	19	0.6%	16	0.4%
$100,000-$149,999	58	1.8%	43	1.0%
$150,000-$199,999	122	3.7%	107	2.6%
$200,000-$249,999	270	8.2%	241	5.8%
$250,000-$299,999	430	13.0%	491	11.8%
$300,000-$399,999	1,224	37.0%	1,746	42.1%
$400,000-$499,999	510	15.4%	675	16.3%
$500,000-$749,999	460	13.9%	585	14.1%
$750,000-$999,999	118	3.6%	151	3.6%
$1,000,000-$1,499,999	53	1.6%	66	1.6%
$1,500,000-$1,999,999	1	0.0%	1	0.0%
$2,000,000+	2	0.1%	3	0.1%
Median Value	$358,415		$365,979	
Average Value	$402,647		$414,163	

Census 2010 Housing Units	**Number**	**Percent**
Total	3,955	100.0%
In Urbanized Areas	0	0.0%
In Urban Clusters	1,693	42.8%
Rural Housing Units	2,262	57.2%

Data Note: Persons of Hispanic Origin may be of any race.
Source: Esri forecasts for 2023 and 2028. U.S. Census Bureau 2010 decennial Census data converted by Esri into 2020 geography.

October 19, 2023

III. Methodology and Discussion of Issues

Standards and Methodology

I conducted this analysis using the standards and practices established by the Appraisal Institute and that conform to the Uniform Standards of Professional Appraisal Practice. The analyses and methodologies contained in this report are accepted by all major lending institutions, and they are used in West Virginia and across the country as the industry standard by certified appraisers conducting appraisals, market analyses, or impact studies and are considered adequate to form an opinion of the impact of a land use on neighboring properties. These standards and practices have also been accepted by the courts at the trial and appellate levels and by federal courts throughout the country as adequate to reach conclusions about the likely impact a use will have on adjoining or abutting properties.

The aforementioned standards compare property uses in the same market and generally within the same calendar year so that fluctuating markets do not alter study results. Although these standards do not require a linear study that examines adjoining property values before and after a new use (e.g. a solar farm) is developed, some of these studies do in fact employ this type of analysis. Comparative studies, as used in this report, are considered an industry standard.

The type of analysis employed is a Matched Pair Analysis or Paired Sales Analysis. This methodology is outlined in **The Appraisal of Real Estate**, Twelfth Edition by the Appraisal Institute pages 438-439. It is further detailed in **Real Estate Damages**, Third Edition, pages 33-36 by Randall Bell PhD, MAI. Paired sales analysis is used to support adjustments in appraisal work for factors ranging from the impact of having a garage, golf course view, or additional bedrooms. It is an appropriate methodology for addressing the question of impact of an adjoining solar farm. The paired sales analysis is based on the theory that when two properties are in all other respects equivalent, a single difference can be measured to indicate the difference in price between them. Dr. Bell describes it as comparing a test area to control areas. In the example provided by Dr. Bell he shows five paired sales in the test area compared to 1 to 3 sales in the control areas to determine a difference. I have used 3 sales in the control areas in my analysis for each sale developed into a matched pair.

Determining what is an External Obsolescence

An external obsolescence is a use of property that, because of its characteristics, might have a negative impact on the value of adjacent or nearby properties because of identifiable impacts. Determining whether a use would be considered an external obsolescence requires a study that isolates that use, eliminates any other causing factors, and then studies the sales of nearby versus distant comparable properties. The presence of one or a combination of key factors does not mean the use will be an external obsolescence, but a combination of these factors tend to be present when market data reflects that a use is an external obsolescence.

External obsolescence is evaluated by appraisers based on several factors. These factors include but are not limited to:

1) Traffic. Solar Farms are not traffic generators.

2) Odor. Solar farms do not produce odor.

3) Noise. Solar farms generate no noise concerns. A wide range of noise studies that have been completed have found them consistent with agricultural and residential areas. The noise is even less at night.

4) Environmental. Solar farms do not produce toxic or hazardous waste. Grass is maintained underneath the panels so there is minimal impervious surface area.

5) Appearance/Viewshed. This is the one area that potentially applies to solar farms. However, solar farms are generally required to provide significant setbacks and landscaping buffers to address that concern. Furthermore, any consideration of appearance of viewshed impacts has to be considered in comparison with currently allowed uses on that site. For example if a residential subdivision is already an allowed use, the question becomes in what way does the appearance impact adjoining property owners above and beyond the appearance of that allowed subdivision or other similar allowed uses.

6) Other factors. I have observed and studied many solar farms and have never observed any characteristic about such facilities that prevents or impedes neighbors from fully using their homes or farms or businesses for the use intended.

Market Imperfection

Throughout this analysis, I have specifically considered the influence of market imperfection on data analysis. Market imperfection is the term that refers to the fact that unlike a can of soup at the supermarket or in your online shopping cart, real estate cannot be comparison shopped for the best price and purchased at the best price for that same identical product. Real estate products are always similar and never identical. Even two adjacent lots that are identical in almost every way, have a slight difference in location. Once those lots are developed with homes, the number of differences begin to multiply, whether it is size of the home, landscaping, layout, age of interior upfit, quality of interior upfit, quality of maintenance and so on.

Neoclassical economics indicates a perfectly competitive market as having the following: A large number of buyers and sellers (no one person dominates the market), no barriers or transaction costs, homogeneous product, and perfect information about the product and pricing. Real estate is clearly not homogeneous. The number of buyers and sellers for a particular product in a particular location is limited by geography, financing, and the limited time period within a property is listed. There are significant barriers that limit the liquidity in terms of time, costs and financing. Finally, information on real estate is often incomplete or partial – especially at the time that offers are made and prices set, which is prior to appraisals and home inspections. So real estate is very imperfect based on this definition and the impact of this are readily apparent in the real estate market.

What appear to be near-identical homes that are in the same subdivision will often sell with slight variations in price. When multiple appraisers approach the same property, there is often a slight variation among all of those conclusions of value, due to differences in comparables used or analysis of those comparables. This is common and happens all of the time. In fact, within each appraisal, after making adjustments to the comparables, the appraiser will typically have a range of values that are supported that often vary more than +/-5% from the median or average adjusted value.

Based on this understanding of market imperfection, it is important to note that very minor differences in value within an impact study do not necessarily indicate either a negative or positive impact. When the impacts measured fall within that +/-5%, I consider this to be within typical market variation/imperfection. Therefore it may be that there is a negative or positive impact identified if the impact is within that range, but given that it is indistinguishable from what amounts to the background noise or static within the real estate data, I do not consider indications of +/-5% to support a finding of a negative or positive impact.

Impacts greater than that range are however, considered to be strong indications of impacts that fall outside of typical market imperfection. I have used this as a guideline while considering the impacts identified within this report.

Relative Solar Farm Sizes

Solar farms have been increasing in size in recent years. Much of the data collected is from existing, older solar farms of smaller size, but there are numerous examples of sales adjoining 75 to 80 MW facilities that show a similar trend as the smaller solar farms. This is understandable given that the primary concern relative to a solar farm is the appearance or view of the solar farm, which is typically addressed through setbacks and landscaping buffers. The relevance of data from smaller solar farms to larger solar farms is due to the primary question being one of appearance. If the solar farm is properly screened, then little of the solar farm would be seen from adjoining property regardless of how many acres are involved.

Larger solar farms are often set up in sections where any adjoining owner would only be able to see a small section of the project even if there were no landscaping screen. Once a landscaping screen is in place, the primary view is effectively the same whether you are adjoining a 5 MW, 20 MW or 100 MW facility.

I have split out the data for the matched pairs adjoining larger solar farms only to illustrate the similarities later in this report. I note that I have matched pairs adjoining solar farms up to 500 MWs in size showing no impact on property value.

Steps Involved in the Analysis

The paired sales analysis employed in this report follows the following process:

1. Identify sales of property adjoining existing solar farms.
2. Compare those sales to similar property that does not adjoin an existing solar farm.
3. Confirmation of sales are noted in the analysis write ups.
4. Distances from the homes to panels are included as a measure of the setbacks.
5. Topographic differences across the solar farms themselves are likewise noted along with demographic data for comparing similar areas.

There are a number of Sale/Resale comparables included in the write ups, but most of the data shown is for sales of homes after a solar farm has been announced (where noted) or after a solar farm has been constructed.

IV. Research on Solar Farms

A. Appraisal Market Studies

I have also considered a number of impact studies completed by other appraisers as detailed below.

CohnReznick – Property Value Impact Study: Adjacent Property Values Solar Impact Study: A Study of Eight Existing Solar Facilities

Patricia McGarr, MAI, CRE, FRICS, CRA and Andrew R. Lines, MAI with CohnReznick completed an impact study for a proposed solar farm in Cheboygan County, Michigan completed on June 10, 2020. I am familiar with this study as well as a number of similar such studies completed by CohnReznick. I have not included all of these studies but I submit this one as representative of those studies.

This study addresses impacts on value from eight different solar farms in Michigan, Minnesota, Indiana, Illinois, Virginia and North Carolina. These solar farms are 19.6 MW, 100 MW, 11.9 MW, 23 MW, 71 MW, 61 MW, 40 MW, and 19 MW for a range from 11.9 MW to 100 MW with an average of 31 MW and a median of 31.5 MW. They analyzed a total of 24 adjoining property sales in the Test Area and 81 comparable sales in the Control Area over a five-year period.

The conclusion of this study is that there is no evidence of any negative impact on adjoining property values based on sales prices, conditions of sales, overall marketability, potential for new development or rate of appreciation.

Christian P. Kaila & Associates – Property Impact Analysis – Proposed Solar Power Plant Guthrie Road, Stuarts Draft, Augusta County, Virginia

Christian P. Kaila, MAI, SRA and George J. Finley, MAI developed an impact study as referenced above dated June 16, 2020. This was for a proposed 83 MW facility on 886 acres.

Mr. Kaila interviewed appraisers who had conducted studies and reviewed university studies and discussed the comparable impacts of other development that was allowed in the area for a comparative analysis of other impacts that could impact viewshed based on existing allowed uses for the site. He also discussed in detail the various other impacts that could cause a negative impact and how solar farms do not have such characteristics.

Mr. Kaila also interviewed County Planners and Real Estate Assessor's in eight different Virginia counties with none of the assessor's identifying any negative impacts observed for existing solar projects.

Mr. Kaila concludes on a finding of no impact on property values adjoining the indicated solar farm.

Fred Beck, MAI, CCIM – Impact Analysis in Lincoln County 2013

Mr. Fred Beck, MAI, CCIM completed an impact analysis in 2013 for a proposed solar farm that concluded on a negative impact on value. That report relied on a single cancelled contract for an adjoining parcel where the contracted buyers indicated that the solar farm was the reason for the cancellation. It also relied on the activities of an assessment impact that was applied in a nearby county.

Mr. Beck was interviewed as part of the Christian Kalia study noted above. From that I quote "Mr. Beck concluded on no effect on moderate priced homes, and only a 5% change in his limited research of higher priced homes. His one sale that fell through is hardly a reliable sample. It also was misleading on Mr. Beck's part to report the lower re-assessments since the primary cause of the

re-assesments were based on the County Official, who lived adjacent to the solar farm, appeal to the assessor for reductions with his own home." In that Clay County Case study the noted lack of lot sales after announcement of the solar farm also coincided with the recession in 2008/2009 and lack of lot sales effectively defined that area during that time. I contacted the Clay County Assessor who indicated that there is no set downward adjustment for properties adjoining solar farms in the county at this time.

I further note, that I was present at the hearing where Mr. Beck presented these findings and the predominance of his argument before the Lincoln County Board of Commissioner's was based on the one cancelled sale as well as a matched pair analysis of high-end homes adjoining a four-story call center. He hypothesized that a similar impact from that example could be compared to being adjacent solar farm without explaining the significant difference in view, setbacks, landscaping, traffic, light, and noise. Furthermore, Mr. Beck did have matched pairs adjoining a solar farm in his study that he put in the back of his report and then ignored as they showed no impact on property value.

Also noted in the Christian Kalia interview notes is a response from Mr. Beck indicating that in his opinion "the homes were higher priced homes and had full view of the solar farm." Based on a description of screening so that "the solar farm would not be in full view to adjoining property owners. Mr. Beck said in that case, he would not see any drop in property value."

NorthStar Appraisal Company – Impact Analysis for Nichomus Run Solar, Pilesgrove, NJ, September 16, 2020

Mr. William J. Sapio, MAI with NorthStar Appraisal Company considered a matched pair analysis for the potential impact on adjoining property values to this proposed 150 MW solar farm. Mr. Sapio considered sales activity in a subdivision known as Point of Woods in South Brunswick Township and identified two recent new homes that were constructed and sold adjoining a 13 MW solar farm and compared them to similar homes in that subdivision that did not adjoin the solar farm. These homes sold in the $1,290,450 to $1,336,613 price range and these homes were roughly 200 feet from the closest solar panel.

Based on this analysis, he concluded that the adjoining solar farm had no impact on adjoining property value.

Mary McClinton Clay, MAI – McCracken County Solar Project Value Impact Report, July 10, 2021

Ms. Mary Clay, MAI reviewed a report by Kirkland Appraisals in this case and also provided a differing opinion of impact. She cites a number of other appraisal studies and interestingly finds fault with heavily researched opinions, while praising the results of poorly researched studies that found the opposing view.

Her analysis includes details from solar farms that show no impact on value, but she dismisses those.

She cites the University of Texas study noted later in this report, but she cites only isolated portions of that study to conclude the opposite of what that study specifically concludes.

She cites the University of Rhode Island study noted alter in this report, but specifically excludes the conclusion of that study that in rural areas they found no impact on property value.

She cites lot sales near Spotsylvania Solar without confirming the purchase prices with brokers as indicative of market impact and has made no attempt to compare lot prices that are contemporaneous. In her 5 lot sales that she identifies, all of the lot prices decline with time from 2015 through 2019. This includes the 3 lot sales prior to the approval of the solar farm. The lot sales she cites showing a drop are all related to the original developer of that subdivision 20+ years

ago liquidating all of their lots in that time period and shows significant drops on all of the lots due to it being a liquidation value. More recent lot sales show lot prices over $100,000 with the most recent land sale adjoining the solar farm having sold in December of 2021 for $140,000. I spoke with Chris Kalia, MAI out of VA about these lot sales and he confirmed along with two other appraisers in that market that he connected me with that the lot sales Ms. Clay identified were all related to that liquidation and not related to the solar farm. All three appraisers agreed that they had seen no negative impacts from Spotsylvania Solar and that lot prices among builders and home owners were going up and home prices in the neighborhood were likewise going up. Additional analysis on Spotsylvania Solar is shown later in this report with a new section of homes and new price points significantly higher than historical sales in this subdivision.

She considers data at McBride Place Solar Farm and does a sale/resale analysis based on Zillow Home Value Index, which is not a reliable indication for appreciation in the market. She then adjusted her initial sales prior to the solar farm over 7 years to determine what she believes the home should have appreciated by and then compares that to an actual sale. She has run no tests or any analysis to show that the appreciation rates she is using are consistent with the market but more importantly she has not attempted to confirm any of these sales with market participants. I have spoken with brokers active in the sales that she cites and they have all indicated that the solar farm was not a negative factor in marketing or selling those homes.

She has considered lot sales at Sunshine Farms in Grandy, NC. She indicates that the lots next to the solar farm are selling for less than lots not near the solar farm, but she is actually using lot sales next to the solar farm prior to the solar farm being approved. She also ignores recent home sales adjoining this solar farm after it was built that show no impact on property value.

She also notes a couple of situations where solar developers have purchased adjoining homes and resold them or where a neighbor agreement was paid as proof of a negative impact on property value. Given that there are over 2,500 solar farms in the USA as of 2018 according to the U.S. Energy Information Administration and there are only a handful of such examples, this is clearly not an industry standard but a business decision. Furthermore, solar developers are not in the business of flipping homes and are in a position very similar to a bank that acquires a home as OREO (Other Real Estate Owned), where homes are frequently sold at discounted prices, not because of any drop in value, but because they are not a typically motivated seller. Market value requires an analysis of a typically motivated buyer and seller. So these are not good indicators of market value impacts.

The comments throughout this study are heavy in adjectives, avoids stating facts contrary to the conclusion and shows a strong selection bias.

Kevin T. Meeks, MAI – Corcoran Solar Impact Study, Minnesota, 2017

Mr. Kevin Meeks, MAI reviewed a report by Kirkland Appraisals in this case and also provided additional research on the topic with additional paired sales. The sales he considered are well presented and show that they were confirmed by third parties and all of the broker commentary is aligned with the conclusion that the adjoining solar farms considered had no impact on the adjoining home values.

Mr. Meeks also researched a 100 MW project in Chisago County, known as North Star Solar Garden in MN. He interviewed local appraisers and a broker who was actively marketing homes adjoining that solar farm to likewise support a finding of no impact on property value.

John Keefe, Chisago County Assessor, Chisago County Minnesota Assessor's Office, 2017

This study was completed by the Chisago County Minnesota Assessor's Office on property prices adjacent to and in close vicinity of a 1,000-acre North Star solar farm in Minnesota. The study concluded that the North Star solar farm had "no adverse impact" on property values. Mr. Keefe further stated that, "It seems conclusive that valuation has not suffered."

Tim Connelly, MAI – Solar Impact Study of Proposed Solar Facility, New Mexico, 2023

This study is a detailed review of an Impact Study completed by Kirkland Appraisals, LLC for Rancho Viejo Solar. It goes through all of the analysis and confirms the applicability and reliability of the methods and conclusions. Mr. Connelly, MAI concurs that "the proposed solar project will not have a negative impact on market value, marketability, or enjoyment of property in the immediate vicinity of the proposed project."

Donald Fisher, ARA, 2021

Donald Fisher has completed a number of studies on solar farms and was quoted in February 15, 2021 stating, "Most of the locations were in either suburban or rural areas, and all of those studies found either a neutral impact or, ironically, a positive impact, where values on properties after the installation of solar farms went up higher than time trends."

Jennifer N. Pitts, MAI - Study of Residential Market Trends Surrounding Six Utility-Scale Solar Projects in Texas, 2023

This study was completed by Real Property Analytics with Ms. Pitts along with Erin M. Kiella, PhD, and Chris Yost-Bremm, PhD. This analysis considered these solar farms through different stages of the market from announcement of the project, during construction, and after construction. They found no indication of a negative impact on sales price, the ratio of sales price to listing price, or the number of Days on Market. They also researched individual sales and interviewed local brokers who confirmed that market participants were knowledgeable of the solar projects and did not result in a negative impact on sales price or marketing time.

Conclusion of Impact Studies

Of the ten studies noted eight included actual sales data to derive an opinion of no impact on value. The two studies to conclude on a negative impact includes the Fred Beck study based on no actual sales data, and he has since indicated that with landscaping screens he would not conclude on a negative impact. The other study by Mary Clay shows improper adjustments for time, a lack of confirmation of sales comparables, and exclusion of data that does not support her initial position.

I have relied on these studies as additional support for the findings in this impact analysis.

B. Articles

I have also considered a number of articles on this subject as well as conclusions and analysis as noted below.

Farm Journal Guest Editor, March 22, 2021 – Solar's Impact on Rural Property Values

Andy Ames, ASFMRA (American Society of Farm Managers and Rural Appraisers) published this article that includes a discussion of his survey of appraisers and studies on the question of property value related to solar farms. He discusses the university studies that I have cited as well as Patricia McGarr, MAI.

He also discusses the findings of Donald A. Fisher, ARA, who served six years at the Chair of the ASFMRA's National Appraisal Review Committee. He is also the Executive Vice President of the CNY Pomeroy Appraiser and has conducted several market studies on solar farms and property impact. He is quoted in the article as saying, "Most of the locations were in either suburban or rural areas, and all of those studies found either a neutral impact, or ironically, a positive impact, where values on properties after installation of solar farms went up higher than time trends."

Howard Halderman, AFM, President and CEO of Halderman Real Estate and Farm Management attended the ASFMRA solar talk hosted by the Indiana Chapter of the ASFMRA and he concludes that other rural properties would likely see no impact and farmers and landowners shown even consider possible benefits. "In some cases, farmers who rent land to a solar company will insure the viability of their farming operation for a longer time period. This makes them better long-term tenants or land buyers so one can argue that higher rents and land values will follow due to the positive impact the solar leases offer."

More recently in August 2022, Donald Fisher, ARA, MAI and myself led a webinar on this topic for the ASFMRA discussing the issues, the university studies and specific examples of solar farms having no impact on adjoining property values.

National Renewable Energy Laboratory – Top Five Large-Scale Solar Myths, February 3, 2016

Megan Day reports form NREL regarding a number of concerns neighbors often express. Myth #4 regarding property value impacts addresses specifically the numerous studies on wind farms that show no impact on property value and that solar farms have a significantly reduced visual impact from wind farms. She highlights that the appearance can be addressed through mitigation measures to reduce visual impacts of solar farms through vegetative screening. Such mitigations are not available to wind farms given the height of the windmills and again, those studies show no impact on value adjoining wind farms.

North Carolina State University: NC Clean Energy Technology Center White Paper: Balancing Agricultural Productivity with Ground-Based Solar Photovoltaic (PV) Development (Version 2), May 2019

Tommy Cleveland and David Sarkisian wrote a white paper for NCSU NC Clean Energy Technology Center regarding the potential impacts to agricultural productivity from a solar farm use. I have interviewed Tommy Cleveland on numerous occasions and I have also heard him speak on these issues at length as well. He addresses many of the common questions regarding how solar farms work and a detailed explanation of how solar farms do not cause significant impacts on the soils, erosion and other such concerns. This is a heavily researched paper with the references included.

North Carolina State University: NC Clean Energy Technology Center White Paper: Health and Safety Impacts of Solar Photovoltaics, May 2017

Tommy Cleveland wrote a white paper for NCSU NC Clean Energy Technology Center regarding the health and safety impacts to address common questions and concerns related to solar farms. This is a heavily researched white paper addressing questions ranging from EMFs, fire safety, as well as vegetation control and the breakdown of how a solar farm works.

C. Broker Commentary

In the process of working up the matched pairs used later in this report, I have collected comments from brokers who have actually sold homes adjoining solar farms indicating that the solar farm had no impact on the marketing, timing, or sales price for the adjoining homes. I have comments from brokers noted within the solar farm write ups of this report including brokers from Kentucky, Virginia, Tennessee, and North Carolina. I have additional commentary from other states including New Jersey and Michigan that provide the same conclusion.

V. University Studies

I have also considered the following studies completed by four different universities related to solar farms and impacts on property values.

A. University of Texas at Austin, May 2018

An Exploration of Property-Value Impacts Near Utility-Scale Solar Installations

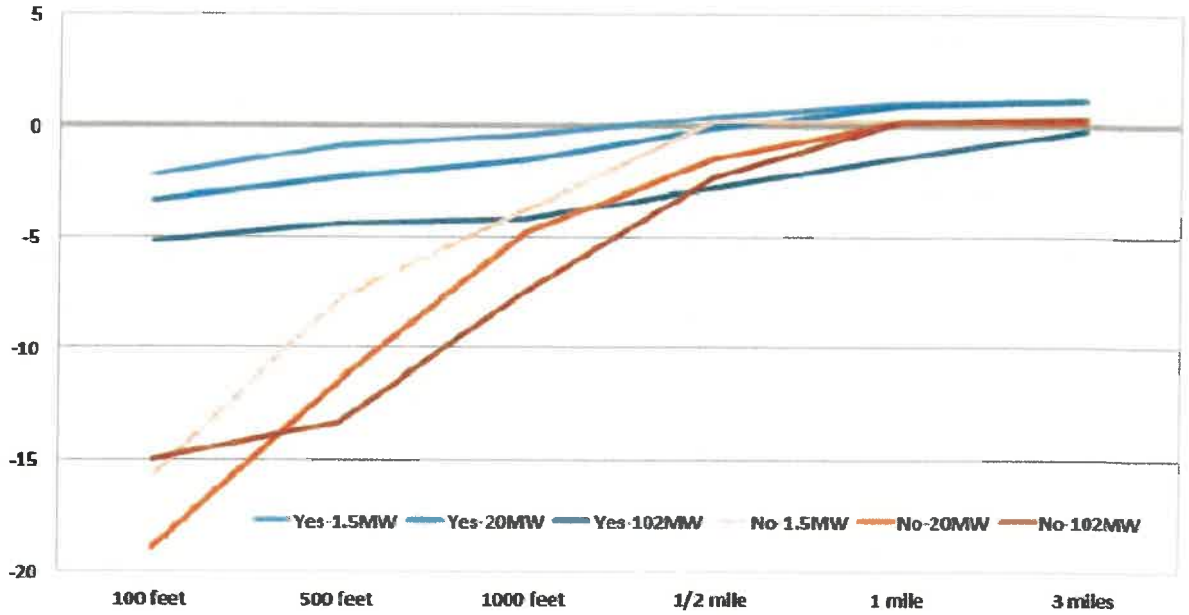
This study considers solar farms from two angles. First it looks at where solar farms are being located and concludes that they are being located primarily in low density residential areas where there are fewer homes than in urban or suburban areas.

The second part is more applicable in that they conducted a survey of appraisers/assessors on their opinions of the possible impacts of proximity to a solar farm. They consider the question in terms of size of the adjoining solar farm and how close the adjoining home is to the solar farm. I am very familiar with this part of the study as I was interviewed by the researchers multiple times as they were developing this. One very important question that they ask within the survey is very illustrative. They asked if the appraiser being surveyed had ever appraised a property next to a solar farm. There is a very noticeable divide in the answers provided by appraisers who have experience appraising property next to a solar farm versus appraisers who self-identify as having no experience or knowledge related to that use.

On Page 16 of that study they have a chart showing the responses from appraisers related to proximity to a facility and size of the facility, but they separate the answers as shown below with appraisers with experience in appraising properties next to a solar farm shown in blue and those inexperienced shown in brown. Even within 100 feet of a 102 MW facility the response from experienced appraisers were -5% at most on impact. While inexperienced appraisers came up with significantly higher impacts. This chart clearly shows that an uninformed response widely diverges from the sales data available on this subject.

Chart B.2 - Estimates of Property Value Impacts (%) by Size of Facility, Distance, & Respondent Type

Have you assessed a home near a utility-scale solar installation?



Furthermore, the question cited above does not consider any mitigating factors such as landscaping buffers or screens which would presumably reduce the minor impacts noted by experienced appraisers on this subject.

The conclusion of the researchers is shown on Page 23 indicated that "Results from our survey of residential home assessors show that the majority of respondents believe that proximity to a solar installation has either no impact or a positive impact on home values."

This analysis supports the conclusion of this report that the data supports no impact on adjoining property values. The only impact suggested by this study is -5% if a home was within 100 feet of a 100 MW solar farm with little to no landscaping screening. The proposed project has a landscaping screening, is much further setback than 100 feet from adjoining homes, and is less than 100 MW.

B. University of Rhode Island, September 2020

Property Value Impacts of Commercial-Scale Solar Energy in Massachusetts and Rhode Island

The University of Rhode Island published a study entitled **Property Value Impacts of Commercial-Scale Solar Energy in Massachusetts and Rhode Island** on September 29, 2020 with lead researchers being Vasundhara Gaur and Corey Lang. I have read that study and interviewed Mr. Corey Lang related to that study. This study is often cited by opponents of solar farms but the findings of that study have some very specific caveats according to the report itself as well as Mr. Lang from the interview.

While that study does state in the Abstract that they found depreciation of homes within 1-mile of a solar farm, that impact is limited to non-rural locations. On Pages 16-18 of that study under Section 5.3 Heterogeneity in treatment effect they indicate that the impact that they found was limited to non-rural locations with the impact in rural locations effectively being zero. For the study they defined "rural" as a municipality/township with less than 850 population per square mile.

They further tested the robustness of that finding and even in areas up to 2,000 population per square mile they found no statistically significant data to suggest a negative impact. They have not specifically defined a point at which they found negative impacts to begin, as the sensitivity study stopped checking at the 2,000-population per square mile.

Where they did find negative impacts was in high population density areas that was largely a factor of running the study in Massachusetts and Rhode Island which the study specifically cites as being the 2nd and 3rd most population dense states in the USA. Mr. Lang in conversation as well as in recorded presentations has indicated that the impact in these heavily populated areas may reflect a loss in value due to the scarce greenery in those areas and not specifically related to the solar farm itself. In other words, any development of that site might have a similar impact on property value.

Based on this study I have checked the population for the Kabletown Division of Jefferson County, which has a population of 12,139 population for 2023 based on HomeTownLocator using Census Data and a total area of 45.46 square miles. This indicates a population density of 267 people per square mile which puts this well below the threshold indicated by the Rhode Island Study.

I therefore conclude that the Rhode Island Study supports the indication of no impact on adjoining properties for the proposed solar farm project.

Kabletown District Data & Demographics (As of July 1, 2023)

POPULATION	
Total Population	12,139 (100%)
Population in Households	12,057 (99.3%)
Population in Families	10,462 (86.2%)
Population in Group Quarters[1]	82 (0.7%)
Population Density	267
Diversity Index[2]	47

HOUSING	
Total HU (Housing Units)	4,536 (100%)
Owner Occupied HU	3,500 (77.2%)
Renter Occupied HU	781 (17.2%)
Vacant Housing Units	255 (5.6%)
Median Home Value	$327,621
Average Home Value	$343,550
Housing Affordability Index[3]	144

INCOME	
Median Household Income	$111,108
Average Household Income	$141,485
% of Income for Mortgage[4]	18%
Per Capita Income	$49,907
Wealth Index[5]	148

HOUSEHOLDS	
Total Households	4,281
Average Household Size	2.82000000000
Family Households	3,211
Average Family Size	3

C. *Georgia Institute of Technology, October 2020*

Utility-Scale Solar Farms and Agricultural Land Values

This study was completed by Nino Abashidze as Post-Doctoral Research Associate of Health Economics and Analytics Labe (HEAL), School of Economics, Georgia Institute of Technology. This research was started at North Carolina State University and analyzes properties near 451 utility-scale ground-mount solar installations in NC that generate at least 1 MW of electric power. A total of 1,676 land sales within 5-miles of solar farms were considered in the analysis.

This analysis concludes on Page 21 of the study "Although there are no direct effects of solar farms on nearby agricultural land values, we do find evidence that suggests construction of a solar farm may create a small, positive, option -value for land owners that is capitalized into land prices. Specifically, after construction of a nearby solar farm, we find that agricultural land that is also located near transmission infrastructure may increase modestly in value."

This study supports a finding of no impact on adjoining agricultural property values and in some cases could support a modest increase in value.

D. *Master's Thesis: ECU by Zachary Dickerson July 2018*

A Solar Farm in *My* Backyard? Resident Perspectives of Utility-Scale Solar in Eastern North Carolina

This study was completed as part of a Master of Science in Geography Master's Thesis by Zachary Dickerson in July 2018. This study sets out to address three questions:

1. Are there different aspects that affect resident satisfaction regarding solar farms?
2. Are there variations in satisfaction for residents among different geographic settings, e.g. neighborhoods adjacent to the solar farms or distances from the solar farms?
3. How can insight from both the utility and planning sectors, combined with knowledge gained from residents, fill gaps in communication and policy writing in regard to solar farms?

This was done through survey and interview with adjacent and nearby neighbors of existing solar farms. The positive to neutral comments regarding the solar farms were significantly higher than negative. The researcher specifically indicates on Page 46 "The results show that respondents generally do not believe the solar farms pose a threat to their property values."

The most negative comments regarding the solar farms were about the lack of information about the approval process and the solar farm project prior to construction.

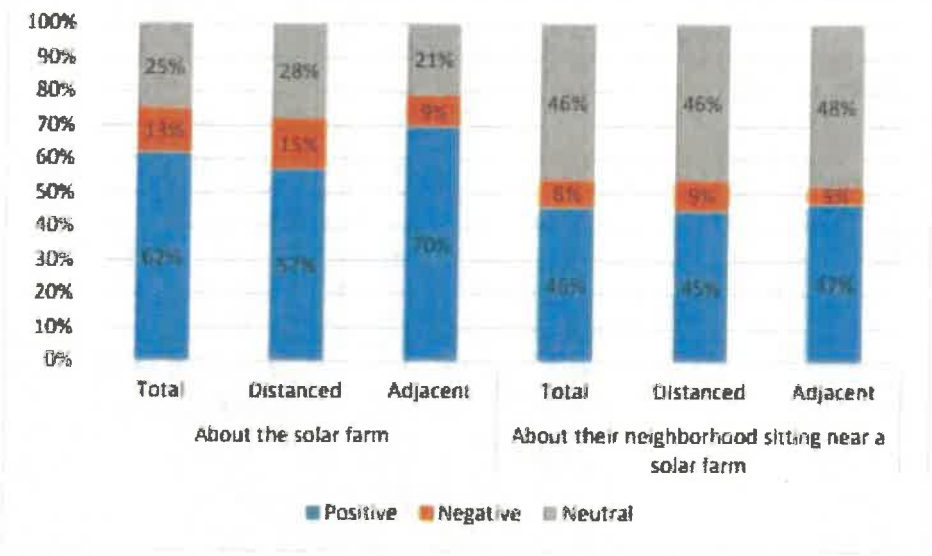
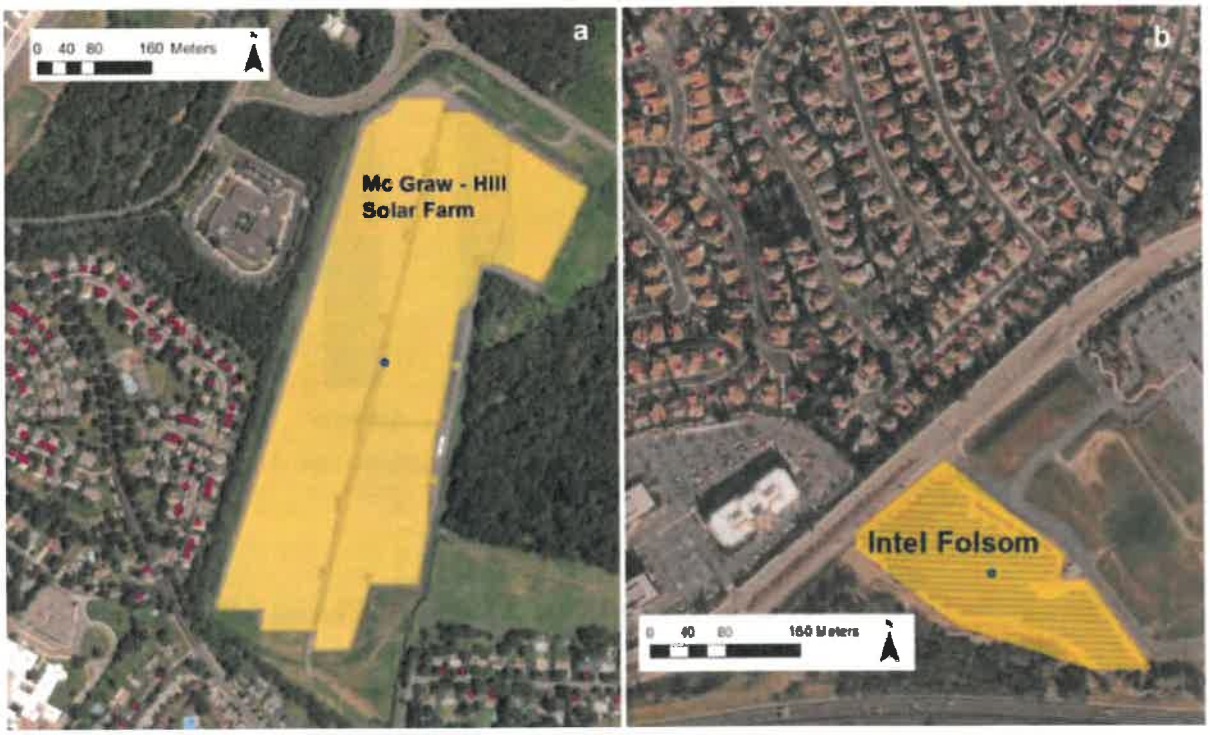


Figure 11: Residents' positive/negative word choices by geographic setting for both questions

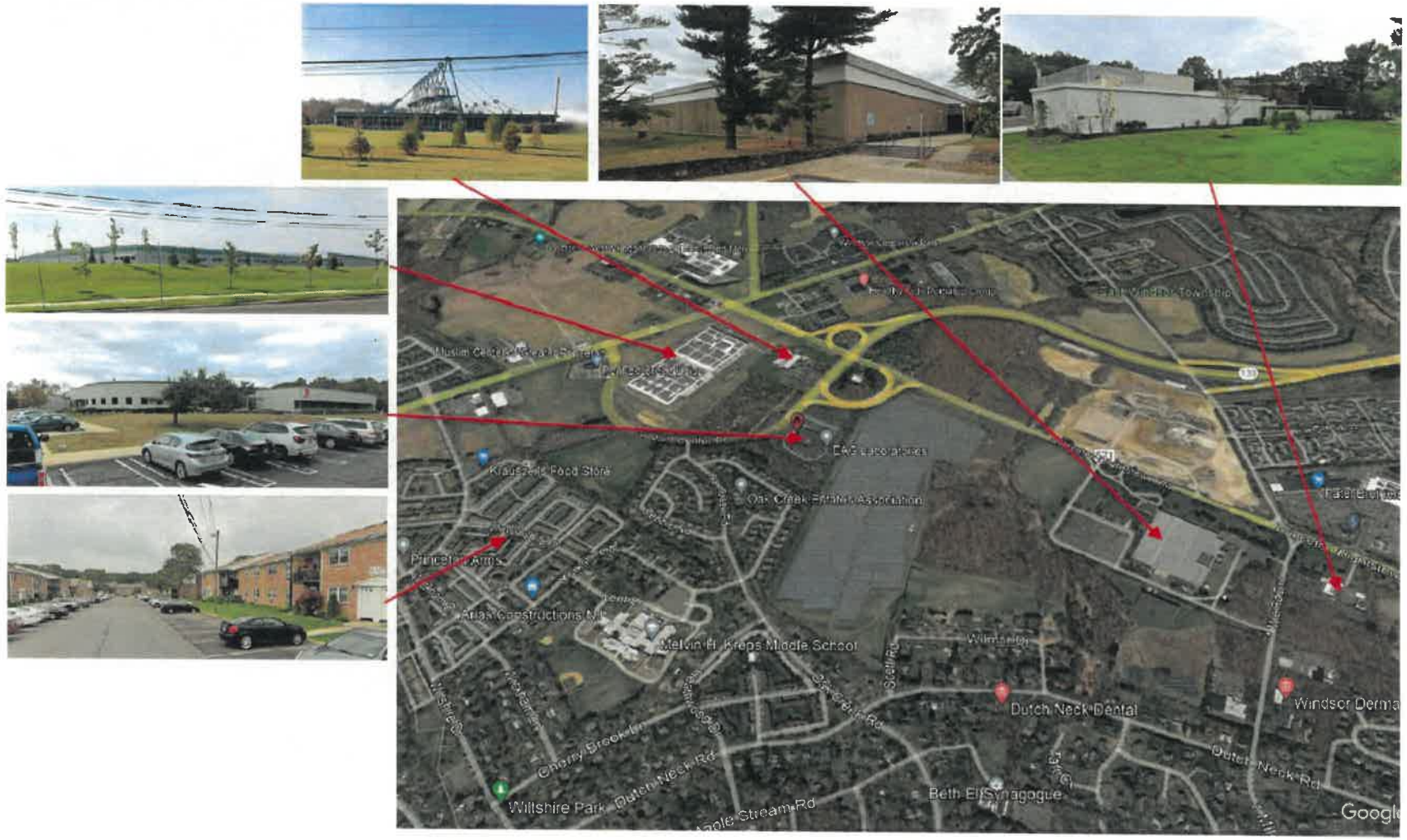
E. Lawrence Berkeley National Lab, March 2023

Shedding light on large-scale solar impacts: An analysis of property values and proximity to photovoltaics across six U.S. states

This study was completed by researchers including Salma Elmallah, Ben Hoen, K. Sydny Fujita, Dana Robson, and Eric Brunner. This analysis considers home sales before and after solar farms were installed within a 1-mile radius and compared them to home sales before and after the solar farms at a 2-4 mile radius. The conclusion found a 1.5% impact within 1 mile of a solar farm as compared to homes 2-4 miles from solar farms. This is the largest study of this kind on solar and addresses a number of issues, but also does not address a number of items that could potentially skew these results. First of all, the study found no impact in the three states with the most solar farm activity and only found impacts in smaller sets of data. The data does not in any way discuss actual visibility of solar farms or address existing vegetation screens. This lack of addressing this is highlighted by the fact that they suggest in the abstract that vegetative shading may be needed to address possible impacts. Another notable issue is the fact that they do not address other possible impacts within the radii being considered. This lack of consideration is well illustrated within the study on Figure A.1 where they show satellite images of McGraw Hill Solar Farm in NJ and Intel Folsom in CA. The Folsom image clearly shows large highways separating the solar farm from nearby housing, but with tower office buildings located closer to the housing being considered. In no place do they address the presence of these towers that essentially block those homes from the solar farm in some places. An excerpt of Fig. A.1. is shown below.



For each of these locations, I have panned out a little further on Google Earth to show the areas illustrated to more accurately reflect the general area. For the McGraw Hill Solar Farm you can see there is a large distribution warehouse to the west along with a large offices and other industrial uses. Further to the west is a large/older apartment complex (Princeton Arms). To the east there are more large industrial buildings. However, it is even more notable that 1.67 miles away to the west is Cranbury Golf Club. Given how this analysis was set up, these homes around the industrial buildings are being compared to homes within this country club to help establish impacts from the solar farm. Even considering the idea that each set is compared to itself before and after the solar farm, it is not a reasonable supposition that homes in each area would appreciate at the same rates even if no solar farm was included. Furthermore the site where the solar farm is located an all of the surrounding uses not improved with residential housing to the south is zoned Research Office (RO) which allows for: manufacturing, preparation, processing or fabrication of products, with all activities and product storage taking place within a completely enclosed building, scientific or research laboratories, warehousing, computer centers, pharmaceutical operations, office buildings, industrial office parks among others. Homes adjoining such a district would likely have impacts and influences not seen in areas zoned and surrounded by zoning strictly for residential uses.


Princeton Arms
Melvin H. Kreps Middle School
Dutch Neck Dental
Windsor Derma
Cherry Brook Dr
Dutch Neck Rd
Wiltshire Park
Beth El Synagogue
Maple Stream Rd
Google


COVENTRY AT NATOMA STATION
NATOMA STATION
Intel - FMZ
Redfin | Sacramento Real Estate Agents

On the Intel Folsom map I have shown the images of two of the Intel Campus buildings, but there are roughly 8 such buildings on that site with additional solar panels installed in the parking lot as shown in that image. I included two photos that show the nearby housing having clear and close views of adjoining office parking lots. This illustrates that the homes in that 1-mile radius are significantly more impacted by the adjoining office buildings than a solar farm located distantly that are not within the viewshed of those homes. Also, this solar farm is located on land adjoining the Intel Campus on a tract that is zoned M-1 PD, which is a Light Industrial/Manufacturing zoning. Furthermore, the street view at the solar farm shows not only the divided four-lane highway that separates the office buildings and homes from the solar farm, but also shows that there is no landscaping buffer at this location. All of these factors are ignored by this study. Below is another image of the Folsom Solar at the corner of Iron Point Road and Intel West Driveway which shows just how close and how unscreened this project is.

Compare that image from the McGraw Hill Street view facing south from County Rte 571. There is a distant view and much of the project is hidden by a mix of berms and landscaping. The analysis makes no distinction between these projects.

The third issue with this study is that it identifies impacts following development in areas where they note that "more adverse home price impacts might be found where LSPVPS (large-scale photovoltaic project) displace green space (consistent with results that show higher property values

near green space." The problem with this statement is that it assumes that the greenspace is somehow guaranteed in these areas, when in fact, they could just as readily be developed as a residential subdivision and have the same impacts. They have made no effort to differentiate loss of greenspace through other development purposes such as schools, subdivisions, or other uses versus the impact of solar farms. In other words, they may have simply identified the impact of all forms of development on property value. This would in fact be consistent with the comments in the Rhode Island study where the researchers noted that the loss of greenspace in the highly urban areas was likely due to the loss of greenspace in particular and not due to the addition of solar panels.

Despite these three shortcomings in the analysis – the lack of differentiating landscape screening, the lack of consideration of other uses within the area that could be impacting property values, and the lack of consideration of alternative development impacts – the study still only found impacts between 0 and 5% with a conclusion of 1.5% within a 1-mile radius. As discussed later in this report, real estate is an imperfect market and real estate transactions typically sell for much wider variability than 5% even where there are no external factors operating on property value.

I therefore conclude that the minor impacts noted in this study support a finding of no impact on property value. Most appraisals show a variation between the highest and lowest comparable sale that is substantially greater than 1.5% and this measured impact for all its flaws would just be lost in the static of normal real estate transactions.

F. Masters Thesis: Loyola University Chicago by Simeng Hao May 2023

Assessing Property Value Impacts Near Utility-Scale Solar in the Midwest

This study considered 70 utility-scale facilities built in the Midwest from 2009 to 2022 using data from the Lawrence Berkley National Laboratory. Using the difference-in-differences, method he found that proximity to solar projects increased property values by 0.5% to 2.0%.

Included in this study is a summary of seven other studies including many of those noted above that considered a total of 3,296 projects with results ranging from 1.7% decline in value to no impact. Only 2 of the studies identified found negative results that ranged from 0.82% to 1.7% impact on property value, while the other five studies found no consistent negative impact.

Given that 5 of the 7 studies identified show no negative impact and the analysis by Mr. Hao shows a positive relationship up to 2%, I consider this analysis to support my conclusions on no impact on property value. While statistical studies note impacts of +/- 2%, as noted earlier in this report, market imperfection is generally greater than that rate and supports a conclusion of no impact. Essentially, while the statistical studies are showing minor variation, applying that to any one particular property whether plus or minus, would be unsupportable given that market imperfection is greater than that purported adjustment.

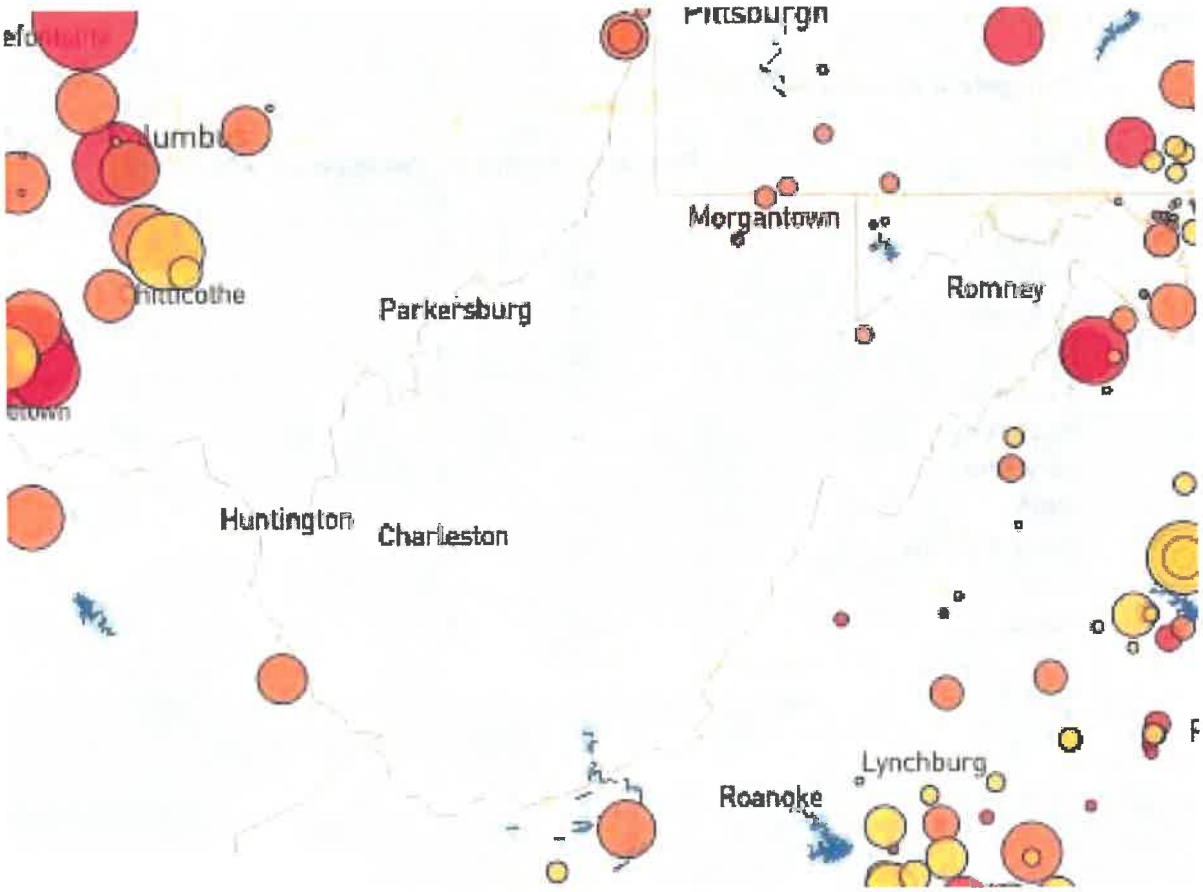
VI. Assessor Surveys

While there are no utility scale solar farms in West Virginia that I have identified, I have completed surveys in a number of states of Assessors and how they handle properties next to solar farms. I have shown the breakdown of those responses below. I have not had any assessor indicate a negative adjustment due to adjacency to a solar farm in any state. These responses total 188 with 170 definitively indicating no negative adjustments are made to adjoining property values, 18 providing no response to the question, and 0 indicating that they do address a negative impact on adjoining property value.

Summary of Assessor Surveys				
State	**Responses**	**No Impact**	**Yes Impact**	**No Comment**
North Carolina	39	39		
Virginia	16	16		
Indiana	31	31		
Colorado	15	7		8
Georgia	33	33		
Kentucky	10	6		4
Mississippi	4	2		2
New Mexico	5	5		
Ohio	24	20		4
South Carolina	11	11		
Totals	188	170		18

VII. Summary of Solar Projects in and around West Virginia

I have researched the solar projects in West Virginia. I identified the solar farms through the Solar Energy Industries Association (SEIA) Major Projects List and found just three solar farms currently in development in West Virginia and none that are currently built. Other search methods similarly showed no utility scale solar in West Virginia for analysis, which leaves me with focusing on impacts of solar projects in adjoining states as well as throughout the Southeast.



I have considered a list of 182 solar farms from my files that are either existing or under development that have been researched at one point or another in my work files. This list is shown on the following pages to illustrate typical sizes, acreages involved, and mix of adjoining uses.

I note that I excluded solar farms from Maryland as most of those were located on the far side of Maryland near the coast.

Solar # Name	State	County	City	MW	Total Acres	Used Acres	Avg. Dist to home	Closest Home	Adjoining Use by Acre			
									Res	Agri	Ag/Res	Com
115 Buckingham I	VA	Buckingham	Cumberland	19.8	481.2		N/A	N/A	8%	73%	18%	0%
121 Scott	VA	Powhatan	Powhatan	20	898.4		1,421	730	29%	28%	44%	0%
204 Walker-Correctional	VA	New Kent	Barhamsville	20	484.7		516	103	13%	68%	20%	0%
205 Sappony	VA	Sussex	Stony Creek	20	322.7				2%	98%	0%	0%
216 Beetle	VA	Southampton	Boykins	40	422.2		1,169	310	0%	10%	90%	0%
222 Grasshopper	VA	Mecklenburg	Chase City	80	946.3				6%	87%	5%	1%
226 Belcher/Desper	VA	Louisa	Louisa	88	1238			150	19%	53%	28%	0%
228 Bluestone Farm	VA	Mecklenburg	Chase City	4.99	332.5				0%	100%	0%	0%
257 Nokesville	VA	Prince William	Nokesville		331				12%	49%	17%	23%
261 Buckingham II	VA	Buckingham	Buckingham	19.8	460.1				6%	79%	15%	0%
262 Mount Jackson	VA	Shenandoah	Mount Jackson	15.65	652.5				21%	51%	14%	13%
263 Gloucester	VA	Gloucester	Gloucester	20	203.6		508	190	17%	55%	28%	0%
267 Scott II	VA	Powhatan	Powhatan		701				41%	25%	34%	0%
270 TWE Myrtle	VA	Suffolk	Suffolk	15	259	120	1,115	150	34%	48%	17%	0%
272 Churchview	VA	Middlesex	Church View	20	567.9				9%	64%	27%	0%
303 Turner	VA	Henrico	Henrico	20	463.1		N/A	N/A	21%	37%	0%	42%
311 Sunnybrook Farm	VA	Halifax	Scottsburg		527.9	340	N/A	N/A	15%	59%	26%	0%
312 Powell Creek	VA	Halifax	Alton		513		N/A	N/A	7%	71%	22%	0%
339 Crystal Hill	VA	Halifax	Crystal Hill		628.7	218	1,570	140	6%	41%	35%	18%
353 Amazon East	VA	Accomack	Oak Hall	80	1000		645	135	8%	75%	17%	0%
354 Alton Post	VA	Halifax	Alton		502		749	100	2%	58%	40%	0%
357 Water Strider	VA	Halifax	Nathalie		1134	960	821	250	7%	55%	38%	0%
363 Remington	VA	Fauquier	Remington	20	277.2	125	2,755	1,280	10%	41%	31%	18%
364 Greenwood	VA	Culpepper	Stevensburg	100	2267	1800	788	200	8%	62%	29%	0%
366 Culpeper Sr	VA	Culpeper	Culpeper		12.53		N/A	N/A	15%	0%	86%	0%
369 Cherrydale	VA	Northampton	Kendall Grove	20	180.2		N/A	N/A	5%	0%	92%	3%
370 Clarke	VA	Clarke	White Post	10	234.8		N/A	N/A	14%	39%	46%	1%
371 Bedford	VA	Bedford	Bedford	3	101	20	N/A	N/A	8%	0%	66%	26%
372 Woodland,VA	VA	Isle of Wight	Smithfield	19.7	211.1		606	190	9%	0%	91%	0%
373 Whitehouse	VA	Louisa	Louisa	20	499.5		1,195	110	24%	55%	18%	4%
406 Foxhound	VA	Halifax	Clover	91	1312		885	185	5%	61%	17%	18%
483 Essex Solar Center	VA	Essex	Center Cross	20	106.1		693	360	3%	70%	27%	0%
484 Southampton	VA	Southampton	Newsoms	100	3244		-	-	3%	78%	17%	3%
494 Walnut	VA	King and Queen	Shacklefords	110	1700	1173	641	165	14%	72%	13%	1%
496 Piney Creek	VA	Halifax	Clover	80	776.2	422	523	195	15%	62%	24%	0%
500 Rappahannock	VA	Lancaster	White Stone	2	184	25	831	560	30%	0%	70%	0%
510 UVA Puller	VA	Middlesex	Topping	15	120	120	1,095	185	59%	32%	0%	10%
516 Dogwood	VA	Page	Stanley	20	360.7	110	2,207	225	12%	22%	65%	0%
518 Fountain Creek	VA	Greensville	Emporia	80	798.3	595	862	300	6%	23%	71%	0%
557 Winterpock 1	VA	Chesterfield	Chesterfield		518	308	2,106	350	4%	78%	18%	0%
559 Wood Brothers	VA	Middlesex	Hartfield	5	60.61	38.67	878	205	12%	86%	0%	2%
577 Windsor	VA	Isle of Wight	Windsor	85	760.9	760.9	459	160	8%	71%	21%	0%
579 Spotsylvania	VA	Spotsylvania	Paytes	500	6412	3500			9%	52%	11%	27%
586 Sweet Sue	VA	King William	Aylett	77	1262	576	1,617	680	7%	68%	25%	0%
591 Warwick	VA	Prince George	Disputanta	26.5	1090	564.5	555	115	12%	67%	21%	0%
610 Bowling Green	KY	Warren	Bowling Green	2	17.36	17.36	720	720	1%	64%	0%	36%
611 Cooperative Solar I	KY	Clark	Winchester	8.5	181.5	63	2,110	2,040	0%	96%	3%	0%
612 Walton 2	KY	Kenton	Walton	2	58.03	58.03	891	120	21%	0%	60%	19%
613 Crittenden	KY	Grant	Crittenden	2.7	181.7	34.1	1,035	345	22%	27%	51%	0%
617 Glover Creek	KY	Metcalfe	Summer Shade	55	968.2	322.4	1,731	375	6%	25%	69%	0%
618 Turkey Creek	KY	Garrard	Lancaster	50	752.8	297.1	976	240	8%	36%	51%	5%
621 Loblolly	VA	Surry	Spring Grove	150	2182	1000	1,860	110	7%	62%	31%	0%
622 Woodridge	VA	Albemarle	Scottsville	138	2261	1000	1,106	215	9%	63%	28%	0%
624 Reams	VA	Dinwiddie	Dinwiddie	5	64.1	37.8	873	270	28%	40%	32%	0%
633 Brunswick	VA	Greensville	Emporia	150.2	2076	1387	1,091	240	4%	85%	11%	0%
642 Belcher 3	VA	Louisa	Louisa		749.4	658.6	598	180	14%	71%	14%	1%
649 Endless Caverns	VA	Rockingham	New Market	31.5	355	323.6	624	190	15%	27%	51%	7%
656 Mount Olive Creek	KY	Russell	Russell Springs		526	420.8	759	150	24%	28%	47%	0%
657 Horseshoe Bend	KY	Greene	Greensburg	60	585.7	395	1,140	285	8%	51%	41%	0%
658 Flat Run	KY	Taylor	Campbellsville	55	518.9	518.9	540	220	11%	70%	18%	0%
659 Cooperative Shelby	KY	Shelby	Simpsonville	2.1	35	35			6%	11%	32%	52%

Solar # Name	State	County	City	MW	Total Acres	Used Acres	Avg. Dist to home	Closest Home	Adjoining Use by Acre Res	Agri	Ag/Res	Com
660 E.W. Brown	KY	Mercer	Harrodsburg	10	50	50	1,026	565	3%	44%	29%	25%
664 Watlington	VA	Halifax	South Boston	20	240.1	137	536	215	24%	48%	28%	0%
665 Northern Bobwhite	KY	Marion	Lebanon	121	1540	1281	1,162	200	5%	38%	56%	0%
672 Spout Spring	VA	Appomattox	Appomattox	60	881.1	673.4	836	335	16%	30%	46%	8%
695 Madison	KY	Madison	Richmond	100	1357	1357	575	90	17%	51%	32%	0%
696 Fleming	KY	Fleming	Elizaville	188	2350	2350	1,036	175	12%	37%	50%	0%
699 Mercer County	KY	Mercer	Harrodsburg	175	1828	1500	1,413	230	5%	33%	62%	0%
700 Ashwood	KY	Lyon	Fredonia	86	1538	1538	785	170	4%	46%	23%	27%
703 Lily Pond	VA	Dinwiddie	Carson	80	1107	600	628	110	13%	75%	12%	0%
704 Midway	VA	Albemarle	Batesville	8	136	90	858	340	20%	46%	34%	0%
716 Horus	KY	Simpson	Franklin	74.36	592.1	547.6	551	110	4%	46%	47%	3%
717 Meade County	KY	Meade	Big Spring		2087	830	-	-	5%	76%	19%	0%
720 Fleming 1	KY	Fleming	Flemingburgs	98	764.5	598.6	585	150	3%	48%	49%	0%
721 McCracken	KY	McCracken	Grahamville-Heath		883	752	1,076	380	1%	14%	14%	71%
722 Henderson KY	KY	Henderson	Henderson		1113	725.1	1,395	180	14%	57%	28%	1%
731 DG Amp Piqua	OH	Miami	Piqua	12.6	86.14	86.14	268	125	8%	16%	58%	18%
732 Celina	OH	Mercer	Celina	5	35.78	35.78	598	205	9%	19%	59%	13%
733 Campbell Soup	OH	Henry	Napoleon	10	62.46	62.46	286	160	4%	53%	0%	43%
734 DG Amp Bowling	OH	Wood	Bowling Green	20	237.2	166	1,240	1,240	1%	99%	0%	0%
736 Pleasant Prairie	OH	Franklin	Galloway	250	2271	2054	618	300	15%	38%	20%	26%
737 Hardin	OH	Hardin	Roundhead	300	1717	1717	484	300	5%	85%	9%	0%
738 Yellowood	OH	Clinton	Lynchburg	300	4802	4330	918	300	6%	73%	21%	0%
739 Cadence	OH	Union	Marysville	275	9654	7823	1,091	300	11%	75%	13%	2%
749 Martin	VA	Goochland	Richmond	5	114.2	114.2	1,491	470	7%	54%	39%	0%
750 Palmer	VA	Fluvanna	Zion Crossroads	5	57	41	525	165	31%	55%	0%	14%
752 Hollyfield	VA	King William	Manquin	17	779.9	113.7	4,242	700	3%	80%	17%	0%
755 Danville	VA	Pittsylvania	Danville	6	72.08	72.08	616	135	22%	63%	15%	0%
756 Martin Trail	VA	Halifax	Clover	6	43	37	254	115	6%	13%	81%	0%
757 Route 360	VA	Halifax	Clover	5.65	110	40	1,957	1,275	6%	18%	76%	0%
768 Bullhead	OH	Hillsdale	Jonesville	2	156.5	16	1,591	1,224	19%	57%	24%	1%
769 Cavalier	VA	Surry/Isle of Wight	Elberon	240	5050	3323	1,231	215	2%	78%	20%	0%
770 Bluebird KY	KY	Harrison	Cynthia	90	1866	1345	1,975	350	2%	23%	75%	0%
771 Martin	KY	Martin	Threeforks	100	4122		4,029	1,450	5%	94%	2%	0%
772 Riverstone	VA	Buckingham	Arvonia	149.5	1939	1193	814	355	4%	90%	6%	0%
773 Sunfish	VA	Orange	Culpeper	80	1132	679.5	1,121	120	4%	13%	38%	44%
776 West Lake	VA	Franklin	Harrisburg	20	592.8	592.8	3,280	1,260	11%	18%	49%	22%
777 Aditya	VA	Louisa	Louisa	11	94.67	60	614	350	15%	85%	0%	0%
781 Waller	VA	Lancaster	Burgess		1400	1400	880	125	28%	72%	0%	0%
783 Rhudes Creek	KY	Hardin	Cecilia	100	1078	1078	1,007	305	8%	62%	30%	0%
794 Russelville	KY	Logan	Russelville	173	1612	1612	1,058	250	4%	51%	45%	0%
795 Harris Staunton	VA	Halifax	South Boston	47	697	697	352	185	3%	89%	8%	0%
796 Blue Moon	KY	Harrison	Cynthiana	74.9	949.9	949.9	1,545	250	6%	55%	39%	0%
803 Hickory	VA	Chesterfield	Chesterfield	4.7	95.21	22	1,286	325	8%	22%	70%	0%
804 Hardin KY	KY	Hardin	Elizabethtown	85	877.7	877.7	1,056	470	8%	37%	55%	0%
805 PA Solar Park	PA	Carbon	Nesquehoning	20	258.2	258.2			7%	92%	0%	1%
806 Lebanon, PA	PA	Lebanon	Annville	75	973.4	9735	625	65	8%	17%	75%	0%
807 White Tail (Nittany)	PA	Franklin	Mowersville	13.5	134.8	134.8	468	140	2%	73%	24%	0%
808 Stonefield	KY	Hardin	Elizabethtown	120	902.2	902.2	1,780	300	1%	47%	52%	0%
809 Mountain Brook	VA	Franklin	Wirtz	20	258.2	258.2	466	300	24%	21%	54%	1%
810 White Tail 2	PA	Franklin	St. Thomas	20	292.7	292.7			1%	75%	24%	0%
811 Randolph	VA	Charlotte	Randolph	800	19000	5800			12%	62%	24%	3%
812 Prince Edward	VA	Prince Edward		25	369.2	369.2	1,275	660	0%	55%	45%	0%
813 Redbud	VA	Frederick	Winchester	30	263	263	529	150	29%	55%	17%	0%
826 Dover Sun Park	PA	York	Dover	75	893.1	893.1	580	105	27%	34%	35%	4%
827 G Morris	PA	Dauphin	Gratz	17	178.9	178.9	402	130	18%	27%	48%	6%
828 Cepheus	OH	Defiance	Sherwood	68	685	405	634	180	13%	64%	22%	0%
829 OFW	VA	Shenandoah	Mount Jackson	20	126.6	126.6	504	110	6%	57%	31%	6%
830 Fountain Point	OH	Logan	West Mansfield		3851	3851	695	235	8%	78%	13%	1%
831 Knight	VA	Rockingham	Shenandoah	70	461.6	461.6	833	240	0%	100%	0%	0%
833 Dayton Wayland	VA	Rockingham	Dayton	4	50.7	50.7	684	100	45%	53%	2%	0%
834 Firefly	VA	Pittsylvania			3143	3143	-	200	12%	73%	15%	0%

Solar # Name	State	County	City	MW	Total Acres	Used Acres	Avg. Dist to home	Closest Home	Adjoining Use by Acre Res	Agri	Ag/Res	Com
835 Hardin 2	OH	Hardin	McGuffey	150	1524	1524	523	220	6%	91%	1%	1%
854 Reeve	VA	Prince Edward	Pamplin	5	164.7	164.7	2,232	1,195	7%	71%	22%	0%
855 Pine Grove	KY	Madison	Bybee	50	475	475	1,207	155	15%	31%	54%	0%
857 Telesto	KY	Hardin	Elizabethtown	110	1180	1180	941	500	15%	58%	27%	0%
858 360 Solar Center	VA	Chesterfield	Moseley	100	2000	410	2,036	235	1%	97%	2%	0%
859 Hummingbird	KY	Fleming	Flemingsburg	200	3115	3115	885	290	5%	37%	58%	0%
864 Purdy	VA	Greensville	Purdy	65	596	596	825	250	5%	66%	29%	0%
865 Clover Creek	VA	Halifax	Clover	90	1472	1472	1,691	310	10%	89%	1%	0%
868 Keeneland	KY	Barren	Glasgow	38	613	613	906	105	6%	46%	48%	0%
870 Pineside	VA	Buckingham	Scottsville	74.9	2242	2242	2,484	500	22%	51%	27%	0%
872 Rosalind	VA	Greensville	Emporia	160	1795	1795	654	500	8%	86%	7%	0%
876 Chestnut, OH	OH	Marion	Marion	68	548	512	641	175	11%	73%	17%	0%
879 Wheelhouse	VA	Lunenburg	Victoria	912.5	60	60	2,071	900	7%	41%	51%	0%
880 Elam	VA	Prince Edward	Pamplin	138.9	3	3	1,066	425	22%	66%	12%	0%
881 Helios	VA	Pulaski	Pulaski	11.45	141.76	141.8	734	225	48%	28%	24%	0%
882 Enon	VA	Stafford	Stafford	3	36.76	36.76	289	120	37%	63%	0%	0%
885 Amelia	VA	Princess Amelia	Amelia Court	10	347	202.4	2,473	1,650	4%	2%	94%	0%
886 Fulton	OH	Fulton	Fayette	200	1703	1703	1,175	210	7%	68%	25%	0%
887 Richwood	OH	Union	Richwood	300	2171	2171	1,491	310	15%	70%	15%	0%
891 Elizabethtown	PA	Lancaster	Elizabethtown	2	32.18	32.18	406	155	18%	82%	0%	0%
893 Dogwood KY	KY	Christian	Hopkinsville	125	1565	1565	1,628	350	8%	61%	31%	0%
894 Montour	PA	Columbia	Grovainia	25.5	407.21	407.2	795	180	24%	28%	48%	0%
895 Liberty	PA	Montour	Mooresburg	15.65	300.46	300.5	1,099	240	18%	18%	64%	0%
900 Land of Promise	VA	Chesapeake	Chesapeake	5	134.66	134.7	1,338	785	44%	48%	8%	0%
901 Pocaty	VA	Chesapeake	Chesapeake	2	27.22	27.22	632	445	21%	79%	0%	0%
902 Granite Hill	PA	Adams	Hunterstown	70	849.72	849.7	1,086	125	4%	21%	76%	0%
903 Snowdrop	PA	Crawford	Edinboro	20	401.5	401.5	593	185	28%	54%	17%	2%
904 Sycamore Trail	PA	Crawford	Cambridge Sprngs	20	182.91	182.9	579	235	22%	28%	51%	0%
905 Ragland	KY	McCracken	Paducah	125	4158	4158	1,162	225	9%	83%	7%	0%
936 Willow	VA	Franklin	Rocky Mount	12	149	149	543	230	33%	58%	9%	0%
937 Carver	VA	Isle of Wight	Windsor	71	1584.6	1585	857	130	5%	50%	45%	0%
938 Alameda	VA	Fauquier	Bealeton	70	810	810	626	160	14%	47%	23%	16%
939 White Oak	VA	Fluvanna	Kidds Store	43	434.7	347	724	400	7%	63%	30%	0%
940 Plank Road	VA	Cumberland	Farmville	10	143.96	144	798	100	21%	69%	0%	11%
941 Skyline	VA	Rockingham	Keezletown	73	733	733	596	155	10%	41%	48%	0%
946 Bellefontaine	OH	Logan	Bellefontaine	48	204.36	204.4	455	280	29%	70%	0%	1%
947 Arvonia	VA	Buckingham	Arvonia	79.8	1065.3	595.1	754	285	18%	63%	18%	0%
951 Fork Union	VA	Fluvanna	West Bottom	116	781.54	781.5	745	390	13%	68%	5%	14%
955 Piney River	VA	Amherst	Piney River	50	431	431	985	350	9%	18%	62%	11%
958 Clover Creek KY	KY	Breckinridge	Hardinsburg	200	3908	3908	1,777	300	6%	64%	19%	11%
965 Cranberry Hollow	PA	Montgomery	Skippack	150	1717.3	1717	917	200	51%	26%	8%	15%
967 Augusta	VA	Augusta	Lyndhurst	100	1536.7	1537	585	280	10%	70%	13%	7%
968 Swallotail	VA	Fluvanna	West Bottom	16	241.28	241.3	480	285	13%	68%	19%	0%
972 Moonlight	VA	Isle of Wight	Smithfield	44	236.75	236.8	382	165	5%	92%	3%	0%
973 Mantle Rock	KY	Livingston	Hampton	65	562	562	1,836	360	1%	25%	74%	0%
974 Confroy	VA	Halifax	Halifax	5	226.91	226.9	2,171	1,125	25%	35%	40%	0%
977 Wood Duck	KY	Barren	Glasgow	100	2259.4	1127	1,297	280	6%	35%	59%	0%
980 Fisherville	VA	Augusta	Fisherville	2	24.09	24.09	617	115	28%	72%	0%	0%
982 Solomons Creek	VA	Powhatan	Powhatan	5	152.9	152.9	1,274	300	67%	13%	17%	3%
989 Banjo Creek	KY	Graves	Mayfield	120	1270	1270	824	180	21%	56%	23%	0%
990 Perrin Creek	VA	Halifax	South Boston	3	86.25	86.25	1,232	640	20%	47%	33%	0%
992 Song Sparrow	KY	Ballard	Paducah	104	661	661	767	235	5%	79%	16%	0%
994 Arthofer	PA	Northampton	Mooresburg	2.5	10.48	10.48	250	120	47%	53%	0%	0%
997 Gage	KY	Balard	La Center	240	1748	1748	704	150	4%	65%	31%	0%
999 Sinai	VA	Halifax	South Boston	9.9	104.93	43.8	546	220	25%	29%	0%	47%
1001 Effort	PA	Monroe	Effort		453.41	453.4	473	120	37%	22%	41%	0%
1004 Bealeton	VA	Fauquier	Bealeton	14	161.69	161.7	1,171	230	3%	33%	24%	40%
1010 Caledon	VA	King George	Berthaville	22	1331.3	1331	4,668	585	7%	90%	4%	0%
1013 Wilson	PA	Erie	Wattsburg	80	946.16	946.2	1,420	230	10%	68%	20%	2%
1022 Frontier	KY	Washington, Marion	Springfield	120	921.72	921.7	2,050	275	3%	26%	71%	0%

			MW	Total Acres	Used Acres	Avg. Dist to home	Closest Home	Adjoining Use by Acre Res	Agri	Ag/Res	Com
Solar Farms	182	**Average**	76.0	1045	895	1069	331	13%	53%	30%	5%
		Median	45.5	565	462	862	230	9%	55%	24%	0%
		High	912.5	19000	9735	4668	2040	67%	100%	94%	71%
		Low	2.0	3	3	250	65	0%	0%	0%	0%

VIII. Market Analysis of the Impact on Value from Solar Farms

I have researched hundreds of solar farms in numerous states to determine the impact of these facilities on the value of adjoining properties. This research has primarily been in North Carolina, but I have also conducted market impact analyses in Virginia, South Carolina, Tennessee, Texas, Oregon, Mississippi, Maryland, New York, California, Missouri, Florida, Montana, Georgia, Kentucky, and New Jersey.

I have derived a breakdown of the adjoining uses to show where solar farms are located. A summary showing the results of compiling that data over hundreds of solar farms is shown later in the Scope of Research section of this report.

I also consider whether the properties adjoining a solar farm in one location have characteristics similar to the properties abutting or adjoining the proposed site so that I can make an assessment of market impact on each proposed site. Notably, in most cases solar farms are placed in areas very similar to the site in question, which is surrounded by low density residential and agricultural uses. In my over 1,000 studies, I have found a striking repetition of that same typical adjoining property use mix in over 90% of the solar farms I have looked at. Matched pair results in multiple states are strikingly similar, and all indicate that solar farms – which generate very little traffic, and do not generate noise, dust or have other harmful effects – do not negatively impact the value of adjoining or abutting properties.

Most of the solar farms that I have looked at are only a few years old and have not been in place long enough for home or land sales to occur next to them for me to analyze. There is nothing unusual about this given the relatively rural locations of most of the solar farms where home and land sales occur much less frequently than they do in urban and suburban areas and the number of adjoining homes is relatively small. However, there are a growing number of projects that are 10 years old with sales and resales of homes adjoining solar farms that provide a growing body of data on this subject.

I review the solar farms that I have looked at periodically to see if there are any new sales. If there is a sale, thenI have to be sure it is not an inhouse sale or to a related family member. A great many of the rural sales that I find are from one family member to another, which makes analysis impossible given that these are not "arm's length" transactions. There are also numerous examples of sales that are "arm's length" but are still not usable due to other factors such as adjoining significant negative factors such as a coal fired plant or at a landfill or prison. I have looked at homes that require a driveway crossing a railroad spur, homes in close proximity to large industrial uses, as well as homes adjoining large state parks, or homes that are over 100 years old with multiple renovations. Such sales are not usable as they have multiple factors impacting the value that are tangled together. You cannot isolate the impact of the coal fired plant, the industrial building, or the railroad unless you are comparing that sale to a similar property with similar impacts. Matched pair analysis requires that you isolate properties that only have one differential to test for, which is why the type of sales noted above is not appropriate for analysis.

After my review of all sales and elimination of the family transactions and those sales with multiple differentials, I am left with the matched pairs shown in this report to analyze. I do have additional matched pair data in other areas of the United States that were not included in this report due to being located in states less comparable to West Virginia than those shown. The only other sales that I have eliminated from the analysis are home sales under $100,000, which there have not been many such examples, but at that price range it is difficult to identify any impacts through matched pair analysis. I have not cherry picked the data to include just the sales that support one direction in value, but I have included all of them both positive and negative with a preponderance of the evidence supporting no impact to mild positive impacts.

A. Data from States Adjoining West Virginia

1. Matched Pair – Crittenden Solar, Crittenden, Grant County, KY

This solar farm was built in December 2017 on a 181.70-acre tract but utilizing only 34.10 acres. This is a 2.7 MW facility with residential subdivisions to the north and south.

I have identified five home sales to the north of this solar farm on Clairborne Drive and one home sale to the south on Eagle Ridge Drive since the completion of this solar farm. The home sale on Eagle Drive is for a $75,000 home and all of the homes along that street are similar in size and price range. According to local broker Steve Glacken with Cutler Real Estate these are the lowest price range/style home in the market. I have not analyzed that sale as it would unlikely provide significant data to other homes in the area.

Mr. Glacken has been selling lots at the west end of Clairborne for new home construction. He indicated in 2020 that the solar farm near the entrance of the development has been a complete non-factor and none of the home sales are showing any concern over the solar farm. Most of the homes are in the $250,000 to $280,000 price range. The vacant residential lots are being marketed for $28,000 to $29,000. The landscaping buffer is considered light, but the rolling terrain allows for distant views of the panels from the adjoining homes along Clairborne Drive.

The first home considered is a bit of an anomaly for this subdivision in that it is the only manufactured home that was allowed in the community. It sold on January 3, 2019. I compared that sale to three other manufactured home sales in the area making minor adjustments as shown on the next page to account for the differences. After all other factors are considered the adjustments show a -1% to +13% impact due to the adjacency of the solar farm. The best indicator is 1250 Cason, which shows a 3% impact. A 3% impact is within the normal static of real estate transactions and therefore not considered indicative of a positive impact on the property, but it strongly supports an indication of no negative impact.

Adjoining Residential Sales After Solar Farm Approved

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
	Adjoins	250 Claiborne	0.96	1/3/2019	$120,000	2000	2,016	$59.52	3/2	Drive	Manuf	
	Not	1250 Cason	1.40	4/18/2018	$95,000	1994	1,500	$63.33	3/2	2-Det	Manuf	Carport
	Not	410 Reeves	1.02	11/27/2018	$80,000	2000	1,456	$54.95	3/2	Drive	Manuf	
	Not	315 N Fork	1.09	5/4/2019	$107,000	1992	1,792	$59.71	3/2	Drive	Manuf	

Adjustments

Solar	Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
Adjoins	250 Claiborne								$120,000			373
Not	1250 Cason	$2,081		$2,850	$26,144		-$5,000	-$5,000	$116,075	3%		
Not	410 Reeves	$249		$0	$24,615				$104,865	13%		
Not	315 N Fork	-$1,091		$4,280	$10,700				$120,889	-1%		
											5%	

I also looked at three other home sales on this street as shown below. These are stick-built homes and show a higher price range.

Adjoining Residential Sales After Solar Farm Approved

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
	Adjoins	300 Claiborne	1.08	9/20/2018	$212,720	2003	1,568	$135.66	3/3	2-Car	Ranch	Brick
	Not	460 Claiborne	0.31	1/3/2019	$229,000	2007	1,446	$158.37	3/2	2-Car	Ranch	Brick
	Not	2160 Sherman	1.46	6/1/2019	$265,000	2005	1,735	$152.74	3/3	2-Car	Ranch	Brick
	Not	215 Lexington	1.00	7/27/2018	$231,200	2000	1,590	$145.41	5/4	2-Car	Ranch	Brick

Adjustments

Solar	Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
Adjoins	300 Claiborne								$213,000			488
Not	460 Claiborne	-$2,026		-$4,580	$15,457	$5,000			$242,850	-14%		
Not	2160 Sherman	-$5,672		-$2,650	-$20,406				$236,272	-11%		
Not	215 Lexington	$1,072		$3,468	-$2,559	-$5,000			$228,180	-7%		
											-11%	

This set of matched pairs shows a minor negative impact for this property. I was unable to confirm the sales price or conditions of this sale. The best indication of value is based on 215 Lexington, which required the least adjusting and supports a -7% impact.

Adjoining Residential Sales After Solar Farm Approved

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
	Adjoins	350 Claiborne	1.00	7/20/2018	$245,000	2002	1,688	$145.14	3/3	2-Car	Ranch	Brick
	Not	460 Claiborne	0.31	1/3/2019	$229,000	2007	1,446	$158.37	3/2	2-Car	Ranch	Brick
	Not	2160 Sherman	1.46	6/1/2019	$265,000	2005	1,735	$152.74	3/3	2-Car	R/FBsmt	Brick
	Not	215 Lexington	1.00	7/27/2018	$231,200	2000	1,590	$145.41	5/4	2-Car	Ranch	Brick

Adjustments

Solar	Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
Adjoins	350 Claiborne								$245,000			720
Not	460 Claiborne	-$3,223		-$5,725	$30,660	$5,000			$255,712	-4%		
Not	2160 Sherman	-$7,057		-$3,975	-$5,743				$248,225	-1%		
Not	215 Lexington	-$136		$2,312	$11,400	-$5,000			$239,776	2%		
											-1%	

The following photograph shows the light landscaping buffer and the distant view of panels that was included as part of the marketing package for this property. The panels are visible somewhat on the left and somewhat through the trees in the center of the photograph. The first photograph is from the home, with the second photograph showing the view near the rear of the lot.

This set of matched pairs shows a no negative impact for this property. The range of adjusted impacts is -4% to +2%. The best indication is -1%, which as described above is within the typical market static and supports no impact on adjoining property value.

Adjoining Residential Sales After Solar Farm Approved

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
	Adjoins	370 Claiborne	1.06	8/22/2019	$273,000	2005	1,570	$173.89	4/3	2-Car	2-Story	Brick
	Not	2160 Sherman	1.46	6/1/2019	$265,000	2005	1,735	$152.74	3/3	2-Car	R/FBsmt	Brick
	Not	2290 Dry	1.53	5/2/2019	$239,400	1988	1,400	$171.00	3/2.5	2-Car	R/FBsmt	Brick
	Not	125 Lexington	1.20	4/17/2018	$240,000	2001	1,569	$152.96	3/3	2-Car	Split	Brick

Adjustments

Solar	Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
Adjoins	370 Claiborne								$273,000			930
Not	2160 Sherman	$1,831		$0	-$20,161				$246,670	10%		
Not	2290 Dry	$2,260		$20,349	$23,256	$2,500			$287,765	-5%		
Not	125 Lexington	$9,951		$4,800					$254,751	7%		
											4%	

This set of matched pairs shows a general positive impact for this property. The range of adjusted impacts is -5% to +10%. The best indication is +7%. I typically consider measurements of +/-5% to be within the typical variation in real estate transactions. This indication is higher than that and suggests a positive relationship.

The photograph from the listing shows panels visible between the home and the trampoline shown in the picture.

Adjoining Residential Sales After Solar Farm Approved

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
Adjoins	330 Claiborne	1.00	12/10/2019	$282,500	2003	1,768	$159.79	3/3	2-Car	Ranch	Brick/pool
Not	895 Osborne	1.70	9/16/2019	$249,900	2002	1,705	$146.57	3/2	2-Car	Ranch	Brick/pool
Not	2160 Sherman	1.46	6/1/2019	$265,000	2005	1,735	$152.74	3/3	2-Car	R/FBsmt	Brick
Not	215 Lexington	1.00	7/27/2018	$231,200	2000	1,590	$145.41	5/4	2-Car	Ranch	Brick

Solar	Address	Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
Adjoins	330 Claiborne								$282,500			665
Not	895 Osborne	$1,790		$1,250	$7,387	$5,000		$0	$265,327	6%		
Not	2160 Sherman	$4,288		-$2,650	$4,032			$20,000	$290,670	-3%		
Not	215 Lexington	$9,761		$3,468	$20,706	-$5,000		$20,000	$280,135	1%		
											1%	

This set of matched pairs shows a general positive impact for this property. The range of adjusted impacts is -3% to +6%. The best indication is +6%. I typically consider measurements of +/-5% to be within the typical variation in real estate transactions. This indication is higher than that and suggests a positive relationship. The landscaping buffer on these is considered light with a fair visibility of the panels from most of these comparables and only thin landscaping buffers separating the homes from the solar panels.

I also looked at four sales that were during a rapid increase in home values around 2021, which required significant time adjustments based on the FHFA Housing Price Index. Sales in this time frame are less reliable for impact considerations as the peak buyer demand allowed for homes to sell with less worry over typical issues such as repairs.

The home at 250 Claiborne Drive sold with no impact from the solar farm according to the buyer's broker Lisa Ann Lay with Keller Williams Realty Service. As noted earlier, this is the only manufactured home in the community and is a bit of an anomaly. There was an impact on this sale due to an appraisal that came in low likely related to the manufactured nature of the home. Ms. Lay indicated that there was significant back and forth between both brokers and the appraiser to address the low appraisal, but ultimately, the buyers had to pay $20,000 out of pocket to cover the difference in appraised value and the purchase price. The low appraisal was not attributed to the solar farm, but the difficulty in finding comparable sales and likely the manufactured housing.

Adjoining Residential Sales After Solar Farm Built

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
Adjoins	250 Claiborne	1.05	1/5/2022	$210,000	2002	1,592	$131.91	4/2	Drive	Ranch	Manuf
Not	255 Spillman	0.64	3/4/2022	$166,000	1991	1,196	$138.80	3/1	Drive	Ranch	Remodel
Not	546 Waterworks	0.28	4/29/2021	$179,500	2007	1,046	$171.61	4/2	Drive	Ranch	3/4 Fin B
Not	240 Shawnee	1.18	6/7/2021	$180,000	1977	1,352	$133.14	3/2	Gar	Ranch	N/A

Solar	Address	Time	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
Adjoins	250 Claiborne							$210,000			365
Not	255 Spillman	-$379	$9,130	$43,971	$10,000		-$20,000	$208,722	1%		
Not	546 Waterworks	$1,772	-$4,488	$74,958			-$67,313	$184,429	12%		
Not	240 Shawnee	$1,501	$22,500	$25,562		-$10,000		$219,563	-5%		
										3%	

The photograph of the rear view from the listing is shown below.

The home at 260 Claiborne Drive sold with no impact from the solar farm according to the buyer's broker Jim Dalton with Ashcraft Real Estate Services. He noted that there was significant wood rot and a heavy smoker smell about the house, but even that had no impact on the price due to high demand in the market.

Adjoining Residential Sales After Solar Farm Built

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
Adjoins	260 Claiborne	1.00	10/13/2021	$175,000	2001	1,456	$120.19	3/2	Drive	Ranch	N/A
Not	355 Oakwood	0.58	10/27/2020	$186,000	2002	1,088	$170.96	3/2	Gar	Ranch	3/4 Fin B
Not	30 Ellen Kay	0.50	1/30/2020	$183,000	1988	1,950	$93.85	3/2	Gar	2-Story	N/A
Not	546 Waterworks	0.28	4/29/2021	$179,500	2007	1,046	$171.61	4/2	Drive	Ranch	3/4 Fin B

Solar	Address	Time	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
Adjoins	260 Claiborne							$175,000			390
Not	355 Oakwood	$18,339	-$930	$50,329		-$10,000	-$69,750	$173,988	1%		
Not	30 Ellen Kay	$31,974	$11,895	-$37,088		-$10,000		$179,781	-3%		
Not	546 Waterworks	$8,420	-$5,385	$56,287			-$67,313	$171,510	2%		
										0%	

The photograph of the rear view from the listing is shown below.

These next two were brick and with unfinished basements which made them easier to compare and therefore more reliable. For 300 Claiborne I considered the sale of a home across the street that did not back up to the solar farm and it adjusted to well below the range of the other comparables. I have included it, but would not rely on that which means this next comparable strongly supports a range of 0 to +3% and not up to +19%.

djoining Residential Sales After Solar Farm Built

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
Adjoins	300 Claiborne	0.89	12/18/2021	$290,000	2002	1,568	$184.95	3/3	2-Car	Br Rnch	Bsmt
Not	405 Claiborne	0.41	2/1/2022	$267,750	2004	1,787	$149.83	3/2	2-Car	Br Rnch	Bsmt
Not	39 Pinhook	0.68	3/31/2022	$299,000	1992	1,680	$177.98	3/2	2-Car	Br Rnch	Bsmt
Not	5 Pinhook	0.70	4/7/2022	$309,900	1992	1,680	$184.46	3/2	2-Car	Br Rnch	Bsmt

Solar	Address	Time	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
Adjoins	300 Claiborne							$290,000			570
Not	405 Claiborne	-$3,384	-$2,678	-$26,251				$235,437	19%		
Not	39 Pinhook	-$8,651	$14,950	-$15,947				$289,352	0%		
Not	5 Pinhook	-$9,576	$15,495	-$16,528				$299,291	-3%		
										5%	

The photograph of the rear view from the listing is shown below.

This same home, 300 Claiborne sold again on October 14, 2022 for $332,000, or $42,000 higher or 15% higher than it had just 10 months earlier. The FHFA Home Price Index indicates an 8.3% increase over that time for the overall market, suggesting that this home is actually increasing in value faster than other properties in the area. An updated photo from the 2022 listing is shown below.

The home at 410 Claiborne included an inground pool with significant landscaping around it that was a challenge. Furthermore, two of the comparables had finished basements. I made no adjustment for the pool on those two comparables and considered the two factors to cancel out

Adjoining Residential Sales After Solar Farm Built

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
Adjoins	410 Claiborne	0.31	2/10/2021	$275,000	2006	1,595	$172.41	3/2	2-Car	Br Rnch	Bsmt/Pool
Not	114 Austin	1.40	12/23/2020	$248,000	1994	1,650	$150.30	3/2	2-Car	Br Rnch	Bsmt
Not	125 Liza	0.29	6/25/2021	$315,000	2005	1,913	$164.66	4/3	2-Car	Br Rnch	Ktchn Bsmt
Not	130 Hannahs	0.42	2/9/2021	$295,000	2007	1,918	$153.81	3/3	2-Car	Br Rnch	Fin Bsmt

Solar	Address	Time	YB	GLA	BR/BA	Park	Other	Total	% Diff	Avg % Diff	Distance
Adjoins	410 Claiborne							$275,000			1080
Not	114 Austin	$3,413	$14,880	-$6,613			$20,000	$279,680	-2%		
Not	125 Liza	-$11,945	$1,575	-$41,890	-$10,000			$252,740	8%		
Not	130 Hannahs	$83	-$1,475	-$39,743	-$10,000			$243,864	11%		
										6%	

The nine matched pairs considered in this analysis includes five that show no impact on value, one that shows a negative impact on value, and three that show a positive impact. The negative indication supported by one matched pair is -7% and the positive impacts are +6% and +7%. The two neutral indications show impacts of -5% to +5%. The average indicated impact is +2% when all nine of these indicators are blended.

Furthermore, the comments of the local real estate brokers strongly support the data that shows no negative impact on value due to the proximity to the solar farm.

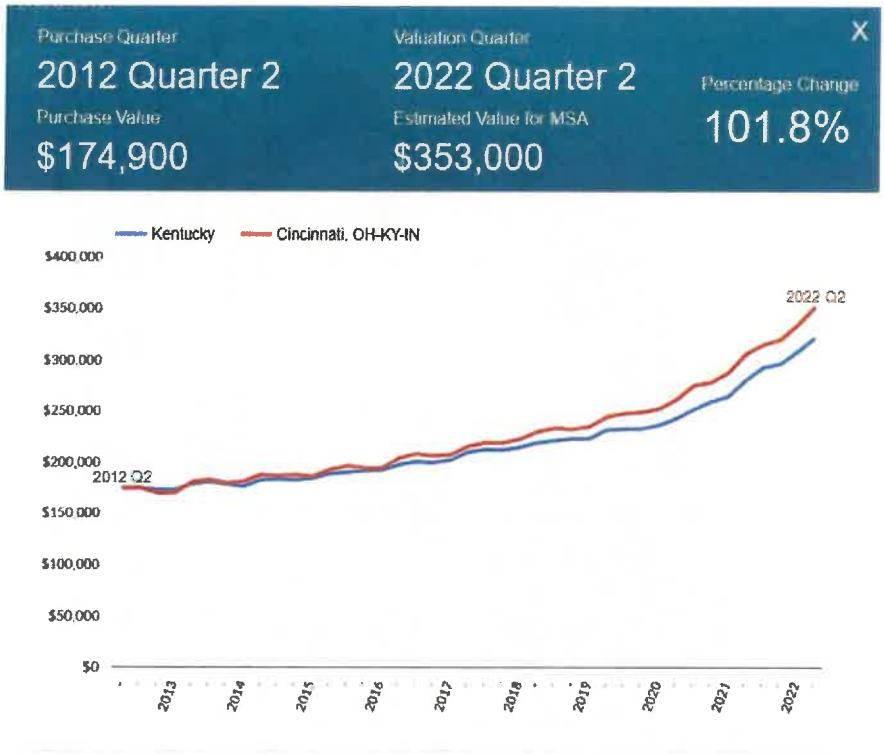
2. Matched Pair – Walton 2, Walton, Kenton County, KY

This project was built in 2017 on 58.03 acres for a 2 MW project with the closest home 120 feet from the closest panel.

The home located on Parcel 1 (783 Jones Road, Walton, KY) in the map above sold on May 4, 2022 for $346,000. This home is 410 feet from the nearest solar panel. I have considered a Sale/Resale analysis of this home as it previously sold on May 7, 2012 for $174,900. This analysis compares that 2012 purchase price and uses the FHFA House Price Index Calculator to identify what real estate values in the area have been appreciating at to determine where it was expected to appreciate to. I have then compared that to the actual sales price to determine if there is any impact attributable to the addition of the solar farm.

As can be seen on the calculator form, the expected value for $174,900 home sold in 2nd quarter 2012 would be $353,000 for 2nd quarter 2022. This is within 2% of the actual sales price and supports a finding of no impact on property value.

I have not attempted a paired sales analysis with other sales, as this property also has the nearby recycling and car lot that would be a potential factor in comparing to other sales. But based on aerial imagery, these same car lots were present in 2012 and therefore has no additional impact when comparing this home sale to itself.


Purchase Quarter
2012 Quarter 2
Purchase Value
$174,900
Valuation Quarter
2022 Quarter 2
Estimated Value for MSA
$353,000
Percentage Change
101.8%
X
Kentucky
Cincinnati, OH-KY-IN
$400,000
$350,000
$300,000
$250,000
$200,000
$150,000
$100,000
$50,000
$0
2012 Q2
2022 Q2
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022

3. Matched Pair – Clarke County Solar, Double Tollgate Road, White Post, Clarke County, VA

This project is a 20 MW facility located on a 234-acre tract that was built in 2017.

I have considered a recent sale or Parcel 3. The home on this parcel is 1,230 feet from the closest panel as measured in the second map from Google Earth, which shows the solar farm under construction.

I've compared this home sale to a number of similar rural homes on similar parcels as shown below. I have used multiple sales that bracket the subject property in terms of sale date, year built, gross living area, bedrooms and bathrooms. Bracketing the parameters insures that all factors are well balanced out in the adjustments. The trend for these sales shows a positive value for the adjacency to the solar farm.

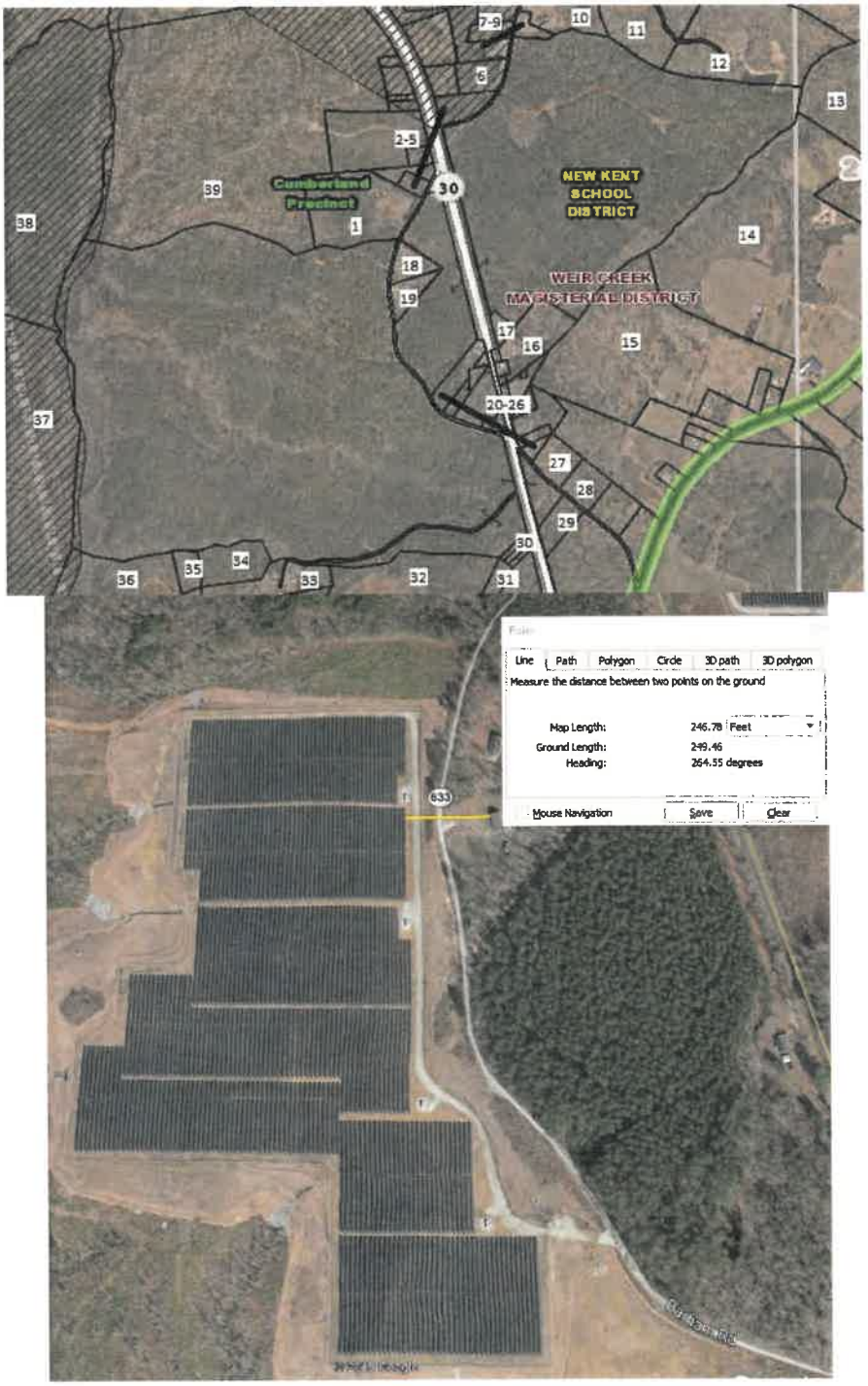
Adjoining Residential Sales After Solar Farm Approved

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
Adjoins	833 Nations Spr	5.13	1/9/2017	$295,000	1979	1,392	$211.93	3/2	Det Gar	Ranch	Unfin bsmt
Not	85 Ashby	5.09	9/11/2017	$315,000	1982	2,333	$135.02	3/2	2 Gar	Ranch	
Not	541 Old Kitchen	5.07	9/9/2018	$370,000	1986	3,157	$117.20	4/4	2 Gar	2 story	
Not	4174 Rockland	5.06	1/2/2017	$300,000	1990	1,688	$177.73	3/2	3 Gar	2 story	
Not	400 Sugar Hill	1.00	6/7/2018	$180,000	1975	1,008	$178.57	3/1	Drive	Ranch	

Adjoining Residential Sales After Solar Farm Approved					Adjoining Sales Adjusted								
Solar	Address	Acres	Date Sold	Sales Price	Time	Acres	YB	GLA	BR/BA	Park	Other	Total	% Diff
Adjoins	833 Nations Spr	5.13	1/9/2017	$295,000								$295,000	
Not	85 Ashby	5.09	9/11/2017	$315,000	-$6,300		-$6,615	-$38,116		-$7,000	$15,000	$271,969	8%
Not	541 Old Kitchen	5.07	9/9/2018	$370,000	-$18,500		-$18,130	-$62,057		-$7,000	$15,000	$279,313	5%
Not	4174 Rockland	5.06	1/2/2017	$300,000			-$23,100	-$15,782		-$12,000	$15,000	$264,118	10%
Not	400 Sugar Hill	1.00	6/7/2018	$180,000	-$9,000	$43,000	$5,040	$20,571	$10,000	$3,000	$15,000	$267,611	9%
												Average	8%

The landscaping screen is primarily a newly planted buffer with a row of existing trees being maintained near the northern boundary and considered light.

4. Matched Pair – Walker-Correctional Solar, Barham Road, Barhamsville, New Kent County, VA



This project was built in 2017 and located on 484.65 acres for a 20 MW with the closest home at 110 feet from the closest solar panel with an average distance of 500 feet.

I considered the recent sale identified on the map above as Parcel 19, which is directly across the street and based on the map shown on the following page is 250 feet from the closest panel. A limited buffering remains along the road with natural growth being encouraged, but currently the

panels are visible from the road. Alex Uminski, SRA with MGMiller Valuations in Richmond VA confirmed this sale with the buying and selling broker. The selling broker indicated that the solar farm was not a negative influence on this sale and in fact the buyer noticed the solar farm and then discovered the listing. The privacy being afforded by the solar farm was considered a benefit by the buyer. I used a matched pair analysis with a similar sale nearby as shown below and found no negative impact on the sales price. Property actually closed for more than the asking price. The landscaping buffer is considered light.

Adjoining Residential Sales After Solar Farm Approved

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
Adjoins	5241 Barham	2.65	10/18/2018	$264,000	2007	1,660	$159.04	3/2	Drive	Ranch	Modular
Not	17950 New Kent	5.00	9/5/2018	$290,000	1987	1,756	$165.15	3/2.5	3 Gar	Ranch	
Not	9252 Ordinary	4.00	6/13/2019	$277,000	2001	1,610	$172.05	3/2	1.5-Gar	Ranch	
Not	2416 W Miller	1.04	9/24/2018	$299,000	1999	1,864	$160.41	3/2.5	Gar	Ranch	

Adjoining Sales Adjusted

Solar	Address	Time	Ac/Loc	YB	GLA	BR/BA	Park	Other	Total	% Diff	Dist
Adjoins	5241 Barham								$264,000		250
Not	17950 New Kent		-$8,000	$29,000	-$4,756	-$5,000	-$20,000	-$15,000	$266,244	-1%	
Not	9252 Ordinary	-$8,310	-$8,000	$8,310	$2,581		-$10,000	-$15,000	$246,581	7%	
Not	2416 W Miller		$8,000	$11,960	-$9,817	-$5,000	-$10,000	-$15,000	$279,143	-6%	
								Average Diff		0%	

I also spoke with Patrick W. McCrerey of Virginia Estates who was marketing a property that sold at 5300 Barham Road adjoining the Walker-Correctional Solar Farm. He indicated that this property was unique with a home built in 1882 and heavily renovated and updated on 16.02 acres. The solar farm was through the woods and couldn't be seen by this property and it had no impact on marketing this property. This home sold on April 26, 2017 for $358,000. I did not set up any matched pairs for this property as it was such a unique property that any such comparison would be difficult to rely on. The broker's comments do support the assertion that the adjoining solar farm had no impact on value. The home in this case was 510 feet from the closest panel.

5. Matched Pair – Sappony Solar, Stony Creek, Sussex County, VA

This project is a 30 MW facility located on a 322.68-acre tract that was built in the fourth quarter of 2017.

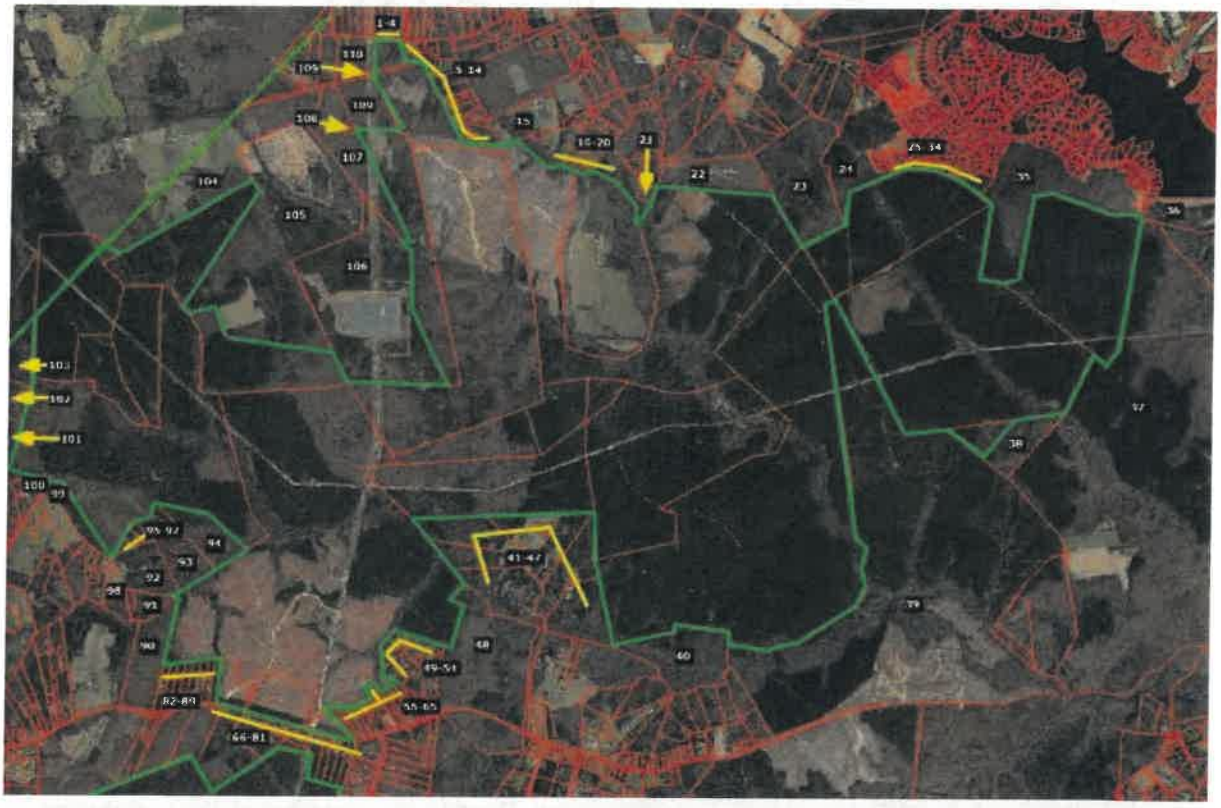
I have considered the 2018 sale of Parcel 17 as shown below. From Parcel 17 the retained trees and setbacks are a light to medium landscaped buffer.

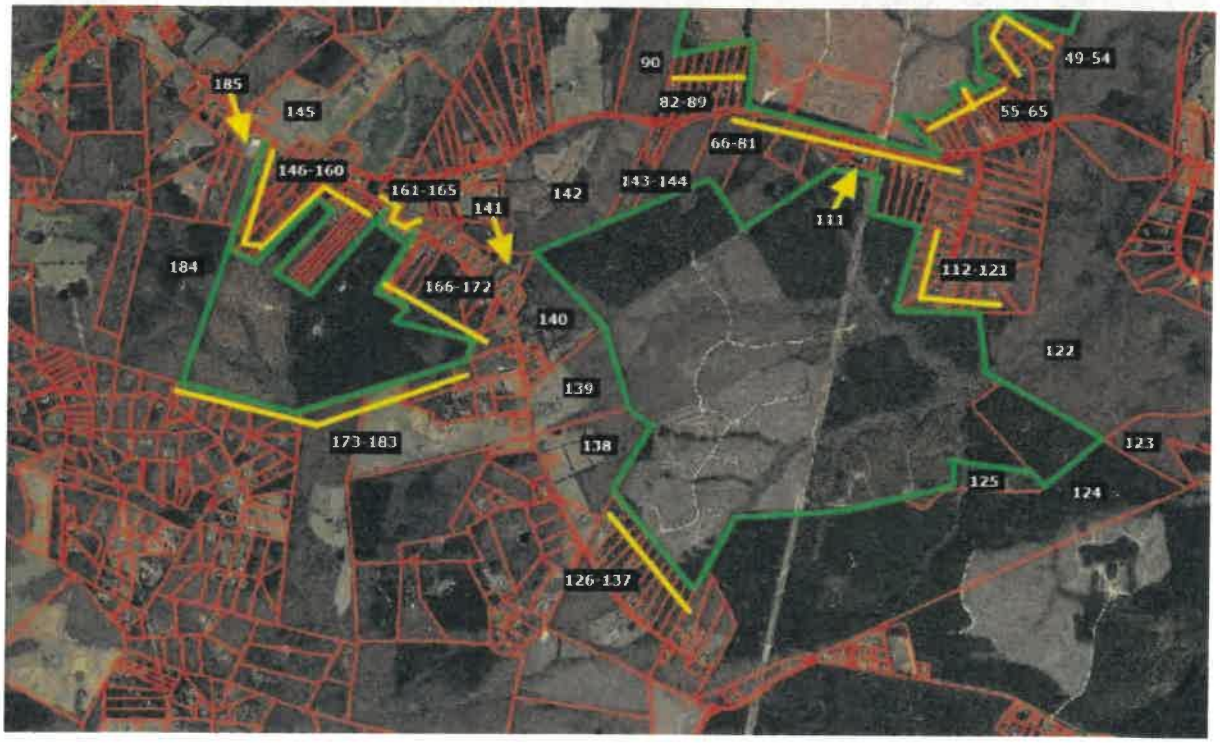
Adjoining Residential Sales After Solar Farm Approved

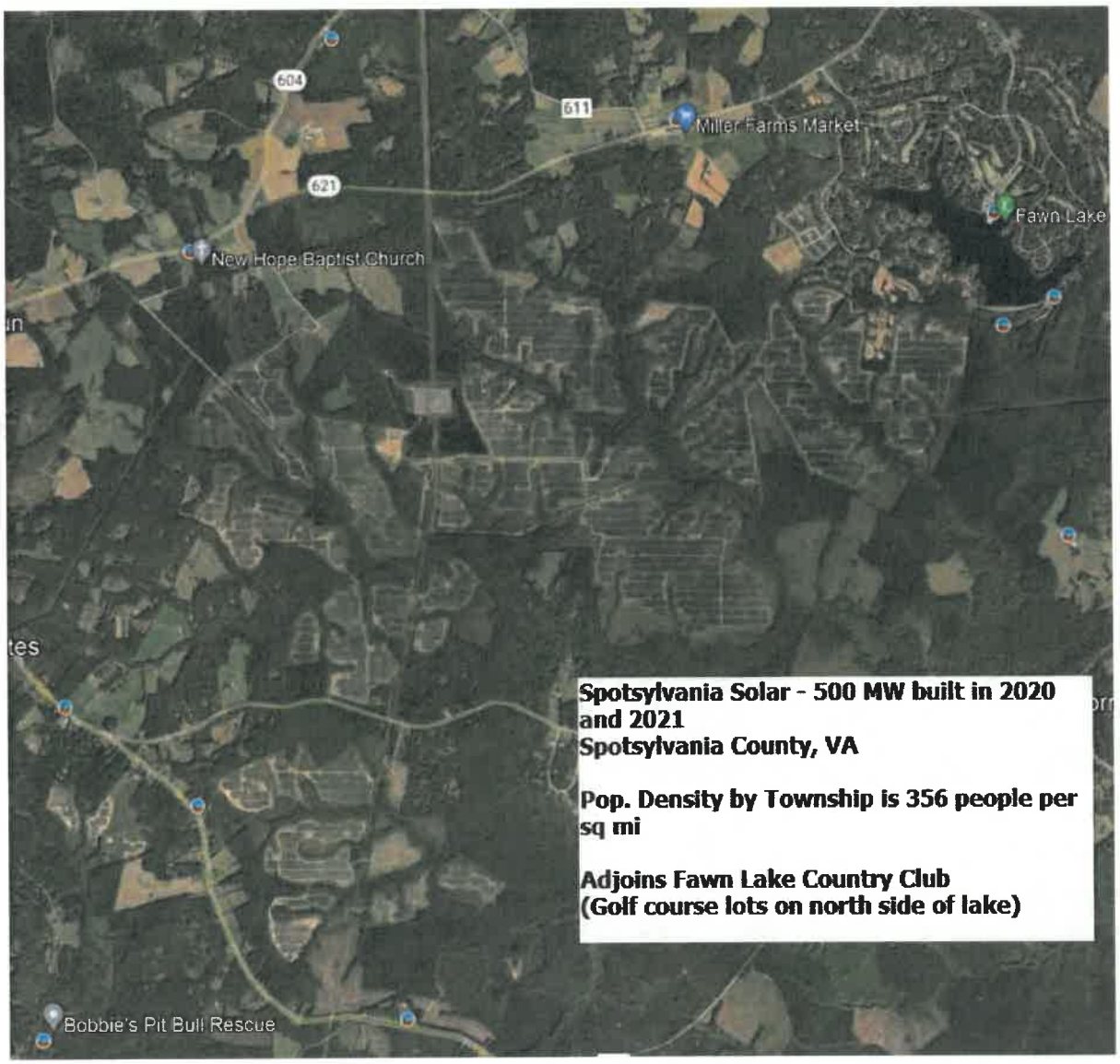
Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GLA	BR/BA	Park	Style	Other
	Adjoins	12511 Palestine	6.00	7/31/2018	$128,400	2013	1,900	$67.58	4/2.5	Open	Manuf	
	Not	15698 Concord	3.92	7/31/2018	$150,000	2010	2,310	$64.94	4/2	Open	Manuf	Fence
	Not	23209 Sussex	1.03	7/7/2020	$95,000	2005	1,675	$56.72	3/2	Det Crpt	Manuf	
	Not	6494 Rocky Br	4.07	11/8/2018	$100,000	2004	1,405	$71.17	3/2	Open	Manuf	

Adjoining Sales Adjusted									Avg	
Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	% Diff	Distance
							$128,400			1425
$0		$2,250	-$21,299	$5,000			$135,951	-6%		
-$5,660	$13,000	$3,800	$10,209	$5,000	$1,500		$122,849	4%		
-$843		$4,500	$28,185				$131,842	-3%		
									-1%	

6. Matched Pair – Spotsylvania Solar, Paytes, Spotsylvania County, VA







This solar farm is being built in four phases with the area known as Site C having completed construction in November 2020 after the entire project was approved in April 2019. Site C, also known as Pleinmont 1 Solar, includes 99.6 MW located in the southeast corner of the project and shown on the maps above with adjoining parcels 111 through 144. The entire Spotsylvania project totals 617 MW on 3500 acres out of a parent tract assemblage of 6,412 acres.

I have identified three adjoining home sales that occurred during construction and development of the site in 2020.

The first is located on the north side of Site A on Orange Plank Road. The second is located on Nottoway Lane just north of Caparthin Road on the south side of Site A and east of Site C. The third is located on Post Oak Road for a home that backs up to Site C that sold in September 2020 near the completion of construction for Site C.

Spotsylvania Solar Farm

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
Adjoins	12901 Orng Plnk	5.20	8/27/2020	$319,900	1984	1,714	$186.64	3/2	Drive	1.5	Un Bsmt
Not	8353 Gold Dale	3.00	1/27/2021	$415,000	2004	2,064	$201.07	3/2	3 Gar	Ranch	
Not	6488 Southfork	7.26	9/9/2020	$375,000	2017	1,680	$223.21	3/2	2 Gar	1.5	Barn/Patio
Not	12717 Flintlock	0.47	12/2/2020	$290,000	1990	1,592	$182.16	3/2.5	Det Gar	Ranch	

Adjoining Sales Adjusted

Address	Time	Ac/Loc	YB	GLA	BR/BA	Park	Other	Total	% Diff	Dist
12901 Orng Plnk								$319,900		1270
8353 Gold Dale	-$5,219	$20,000	-$41,500	-$56,298		-$20,000		$311,983	2%	
6488 Southfork	-$401	-$20,000	-$61,875	$6,071		-$15,000		$283,796	11%	
12717 Flintlock	-$2,312	$40,000	-$8,700	$17,779	-$5,000	-$5,000		$326,767	-2%	
							Average Diff		4%	

I contacted Keith Snider to confirm this sale. This is considered to have a medium landscaping screen.

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
Adjoins	9641 Nottoway	11.00	5/12/2020	$449,900	2004	3,186	$141.21	4/2.5	Garage	2-Story	Un Bsmt
Not	26123 Lafayette	1.00	8/3/2020	$390,000	2006	3,142	$124.12	3/3.5	Gar/DtG	2-Story	
Not	11626 Forest	5.00	8/10/2020	$489,900	2017	3,350	$146.24	4/3.5	2 Gar	2-Story	
Not	10304 Pny Brnch	6.00	7/27/2020	$485,000	1998	3,076	$157.67	4/4	2Gar/Dt2	Ranch	Fn Bsmt

Adjoining Sales Adjusted

Address	Time	Ac/Loc	YB	GLA	BR/BA	Park	Other	Total	% Diff	Dist
9641 Nottoway								$449,900		1950
26123 Lafayette	-$2,661	$45,000	-$3,900	$4,369	-$10,000	-$5,000		$417,809	7%	
11626 Forest	-$3,624		-$31,844	-$19,187		-$5,000		$430,246	4%	
10304 Pny Brnch	-$3,030		$14,550	$13,875	-$15,000	-$15,000	-$10,000	$470,396	-5%	
							Average Diff		2%	

I contacted Annette Roberts with ReMax about this transaction. This is considered to have a medium landscaping screen.

Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GBA	BR/BA	Park	Style	Other
Adjoins	13353 Post Oak	5.20	9/21/2020	$300,000	1992	2,400	$125.00	4/3	Drive	2-Story	Fn Bsmt
Not	9609 Logan Hgt	5.86	7/4/2019	$330,000	2004	2,352	$140.31	3/2	2Gar	2-Story	
Not	12810 Catharpian	6.18	1/30/2020	$280,000	2008	2,240	$125.00	4/2.5	Drive	2-Story	Bsmt/Nd Pnt
Not	10725 Rbrt Lee	5.01	10/26/2020	$295,000	1995	2,166	$136.20	4/3	Gar	2-Story	Fn Bsmt

Adjoining Sales Adjusted

Address	Time	Ac/Loc	YB	GLA	BR/BA	Park	Other	Total	% Diff	Dist
13353 Post Oak								$300,000		1171
9609 Logan Hgt	$12,070		-$19,800	$5,388		-$15,000	$15,000	$327,658	-9%	
12810 Catharpian	$5,408		-$22,400	$16,000	$5,000		$15,000	$299,008	0%	
10725 Rbrt Lee	-$849		-$4,425	$25,496		-$10,000		$305,222	-2%	
							Average Diff		-4%	

I contacted Joy Pearson with CTI Real Estate about this transaction. This is considered to have a heavy landscaping screen.

All three of these homes are well set back from the solar panels at distances over 1,000 feet and are well screened from the project. All three show no indication of any impact on property value.

There are a couple of recent lot sales located along Southview Court that have sold since the solar farm was approved. The most recent lot sales include 11700 Southview Court that sold on December 29, 2021 for $140,000 for a 0.76-acre lot. This property was on the market for less than 2 months before closing within 6% of the asking price. This lot sold earlier in September 2019 for $55,000 based on a liquidation sale from NTS to an investor.

A similar 0.68-acre lot at 11507 Stonewood Court within the same subdivision located away from the solar farm sold on March 9, 2021 for $109,000. This lot sold for 18% over the asking price within 1 month of listing suggesting that this was priced too low. Adjusting this lot value upward by 12% for very strong growth in the market over 2021, the adjusted indicated value is $122,080 for this lot. This is still showing a 15% premium for the lot backing up to the solar farm.

The lot at 11009 Southview Court sold on August 5, 2019 for $65,000, which is significantly lower than the more recent sales. This lot was sold by NTS the original developer of this subdivision, who was in the process of liquidating lots in this subdivision with multiple lot sales in this time period throughout the subdivision being sold at discounted prices. The home was later improved by the buyer with a home built in 2020 with 2,430 square feet ranch, 3.5 bathrooms, with a full basement, and a current assessed value of $492,300.

I spoke with Chris Kalia, MAI, Mark Doherty, local real estate investor, and Alex Doherty, broker, who are all three familiar with this subdivision and activity in this neighborhood. All three indicated that there was a deep sell off of lots in the neighborhood by NTS at discounted prices under $100,000 each. Those lots since that time are being sold for up to $140,000. The prices paid for the lots below $100,000 were liquidation values and not indicative of market value. Homes are being built in the neighborhood on those lots with home prices ranging from $600,000 to $800,000 with no sign of impact on pricing due to the solar farm according to all three sources.

Fawn Lake Lot Sales

Parcel	Solar?	Address	Acres	Sale Date	Sale Price	Ad. For Time	% Diff
A	Adjoins	11700 Southview Ct	0.76	12/29/2021	$140,000		
1	1 parcel away	11603 Southview Ct	0.44	3/31/2022	$140,000	$141,960	-1.4%
2	Not adjoin	11507 Stonewood Ct	0.68	3/9/2021	$109,000	$118,374	15.4%
3	Not adjoin	11312 Westgate Wy	0.83	10/15/2020	$125,000	$142,000	-1.4%
4	Not adjoin	11409 Darkstone Pl	0.589	9/23/2021	$118,000	$118,000	15.7%

Average	7.1%
Median	7.0%

Least Adjusted	15.7%
2nd Least Adjusted	-1.4%
(Parcel 1 off solar farm)	

Time Adjustments are based on the FHFA Housing Price Index

7. Matched Pair – Whitehorn Solar, Gretna, Pittsylvania County, VA

This project was built in 2021 for a solar project with 50 MW. Adjoining uses are residential and agricultural. There was a sale located at 1120 Taylors Mill Road that sold on December 20, 2021, which is about the time the solar farm was completed. This sold for $224,000 for 2.02 acres with a 2,079 s.f. mobile home on it that was built in 2010. The property was listed for $224,000 and sold for that same price within two months (went under contract almost exactly 30 days from listing). This sales price works out to $108 per square foot. This home is 255 feet from the nearest panel.

I have compared this sale to an August 20, 2020 sale at 1000 Long Branch Drive that included 5.10 acres with a 1,980 s.f. mobile home that was built in 1993 and sold for $162,000, or $81.82 per square foot. Adjusting this upward for significant growth between this sale date and December 2021 relied on data provided by the FHFA House Pricing Index, which indicates that for homes in the Roanoke, VA MSA would be expected to appreciate from $162,000 to $191,000 over that period of time. Using $191,000 as the effective value as of the date of comparison, the indicated value of this sale works out to $96.46 per square foot. Adjusting this upward by 17% for the difference in year built, but downward by 5% for the much larger lot size at this comparable, I derive an adjusted indication of value of $213,920, or $108 per square foot.

This indicates no impact on value attributable to the new solar farm located across from the home on Taylors Mill Road.

8. Matched Pair – Altavista Solar, Altavista, Campbell County, VA

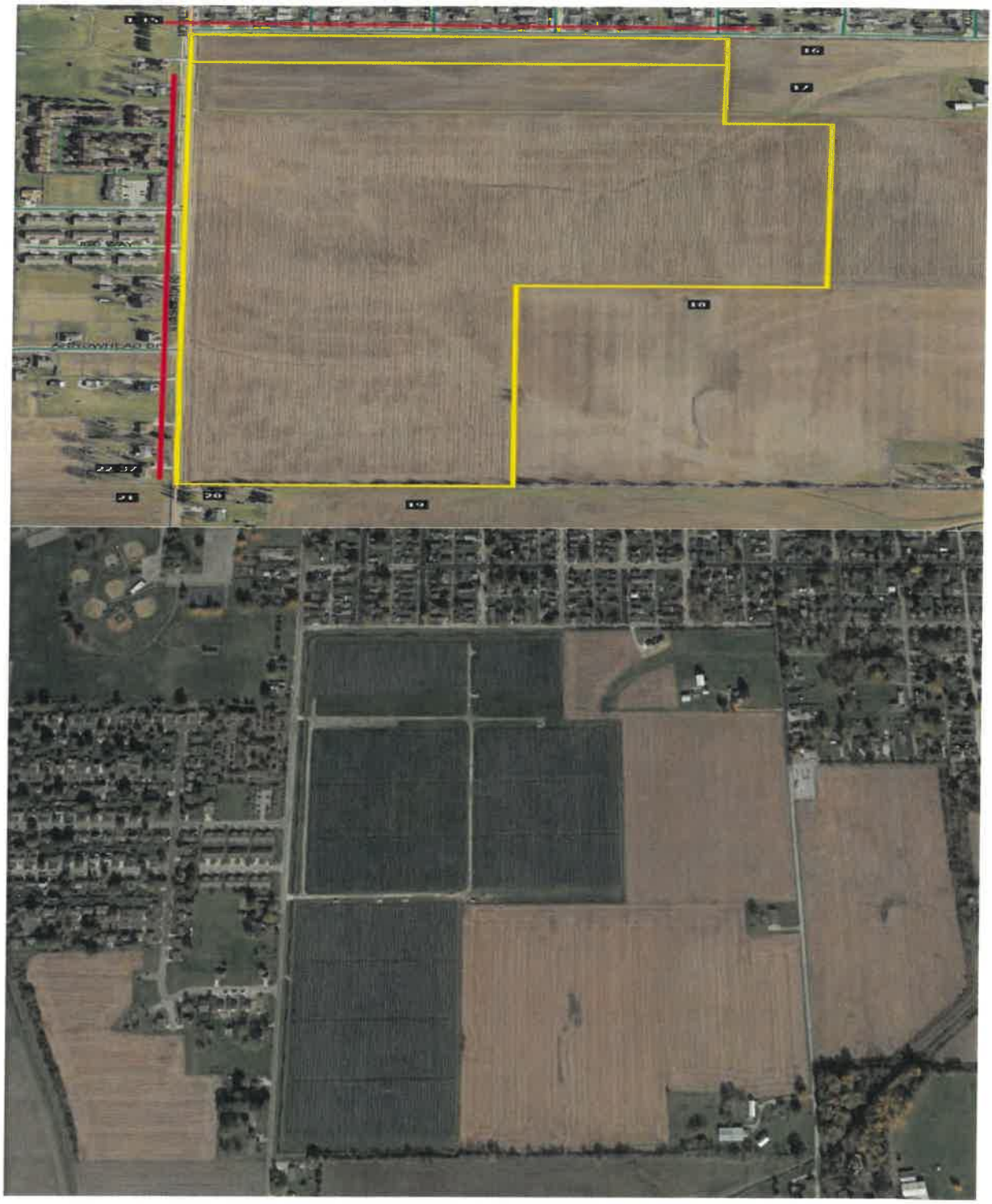
This project was mostly built in 2021 with final construction finished in 2022. This is an 80 MW facility on 720 acres just north of Roanoke River and west of Altavista. Adjoining uses are residential and agricultural.

I have done a Sale/Resale analysis of 3211 Leesville Road which is approximately 540 feet from the nearest solar panel. There was an existing row of trees between this home and the panels that was supplemented with additional screening for a narrow landscaped buffer between the home and the solar panels.

This home sold in December 2018 for $72,500 for this 1,451 s.f. home built in 1940 with a number of additional outbuildings on 3.35 acres. This was before any announcement of a solar farm. This home sold again on March 28, 2022 for $124,048 after the solar farm was constructed. This shows a 71% increase in value on this property since 2018. There was significant growth in the market between these dates and to accurately reflect that I have considered the FHFA House Price Index that is specific for the Lynchburg area of Virginia (the closest regional category), which shows an expected increase in home values over that same time period of 33.8%, which would suggest a normal growth in value up to $97,000. The home sold for significantly more than this which certainly does not support a finding of a negative impact and in fact suggests a significant positive impact. However, I was not able to discuss this sale with the broker and it is possible that the home also was renovated between 2018 and 2022, which may account for that additional increase in value. Still give that the home increased in value so significantly over the initial amount there is no sign of any negative impact due to the solar farm adjacency.

Similarly, I looked at 3026 Bishop Creek Road that is approximately 600 feet from the nearest solar panel. This home sold on July 16, 2019 for $120,000, which was before construction of the solar farm. This home sold again on February 23, 2022 for $150,000. This shows a 25% increase in value over that time period. Using the same FHFA House Price Index Calculator, the expected increase in value was 29.2% for an indicated expected value of $155,000. This is within 3% of the actual closed price, which supports a finding of no impact from the solar farm. This home has a dense wooded area between it and the adjoining solar farm.

9. Matched Pair – DG Amp Piqua, Piqua, Miami County, OH



This project is located on the southeast corner of Manier Street and N Washington Road, Piqua, OH. There are a number of nearby homes to the north, south and west of this solar farm.

I considered one adjoining sale and one nearby sale (one parcel off) that happened since the project was built in 2019. I did not consider the sale of a home located at Parcel 20 that happened in that time period as that property was marketed with damaged floors in the kitchen and bathroom, rusted baseboard heaters and generally was sold in an As-Is condition that makes it difficult to compare to move-in ready homes. I also did not consider some sales to the north that sold for prices significantly under $100,000. The homes in that community includes a wide range of smaller, older homes that have been selling for prices ranging from $25,000 to $80,000. I have not been tracking home sales under $100,000 as homes in that price range are less susceptible to external factors.

The adjoining sale at 6060 N Washington is a brick range fronting on a main road. I did not adjust the comparables for that factor despite the subdivision exposure on those comparables was superior. I considered the difference in lot size to be balancing factors. If I adjusted further for that main road frontage, then it would actually show a positive impact for adjoining the solar farm.

Adjoining Residential Sales After Solar Farm Approved

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GLA	BR/BA	Park	Style	Other
22	Adjoins	6060 N Washington	0.80	10/30/2019	$119,500	1961	1,404	$85.11	3/1	2 Gar	Br Rnch	Updates
	Not	1523 Amesbury	0.25	5/7/2020	$119,900	1973	1,316	$91.11	3/2	Gar	Br Rnch	Updates
	Not	1609 Haverhill	0.17	10/17/2019	$114,900	1974	1,531	$75.05	3/1	Gar	Br Rnch	Updates
	Not	1511 Sweetbriar	0.17	8/6/2020	$123,000	1972	1,373	$89.58	4/2	Gar	Br Rnch	Updates

Adjoining Sales Adjusted									Avg	
Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	% Diff	Distance
							$119,500			155
-$1,920		-$7,194	$6,414	-$5,000	$7,500	$0	$119,700	0%		
$126		-$7,469	-$7,625		$7,500	$0	$107,432	10%		
-$2,913		-$6,765	$2,222	-$5,000	$7,500	$0	$118,044	1%		
									4%	

I also considered a home fronting on Plymouth Avenue which is one lot to the west of the solar farm with a rear view towards the solar farm. After adjustments this set of matched pairs shows no impact on the value of the property due to proximity to the solar farm.

Adjoining Residential Sales After Solar Farm Approved

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GLA	BR/BA	Park	Style	Other
	Nearby	1011 Plymouth	0.21	2/24/2020	$113,000	1973	1,373	$82.30	4/2	Gar	1.5 Stry	Fnce/Shd
	Not	1630 Haverhill	0.32	8/18/2019	$94,900	1973	1,373	$69.12	4/2	Gar	1.5 Stry	N/A
	Not	1720 Williams	0.17	12/4/2019	$119,900	1968	1,682	$71.28	4/1	2Gar	1.5 Br	Fnce/Shd
	Not	1710 Cambridge	0.17	1/22/2018	$116,000	1968	1,648	$70.39	4/2	Det 2	1.5 Br	Fnce/Shd

Adjoining Sales Adjusted									Avg	
Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	% Diff	Distance
							$113,000			585
$1,519		$0	$0			$10,000	$106,419	6%		
$829		$2,998	-$17,621	$5,000			$111,105	2%		
$7,459		$2,900	-$15,485				$110,873	2%		
									3%	

I considered a home located at 6010 N Washington that sold on August 3, 2021. This property was sold with significant upgrades that made it more challenging to compare, but I focused on similar older brick ranches with updates in the analysis. The comparables suggest an enhancement to this property due to proximity from the solar farm, but it is more likely that the upgrades at the subject were superior. Still this strongly supports a finding of no impact on the value of the property due to proximity to the solar farm.

Adjoining Residential Sales After Solar Farm Built

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GLA	BR/BA	Park	Style	Other
24	Adjoins	6010 N Washington	0.80	8/3/2021	$176,900	1961	1,448	$122.17	4/2	2 Gar	Br Ranch	Updates
	Not	1244 Severs	0.19	10/29/2021	$149,900	1962	1,392	$107.69	3/2	Gar	Br Ranch	Updates
	Not	1515 Amesbury	0.19	5/5/2022	$156,500	1973	1,275	$122.75	3/2	2 Gar	Br Ranch	Updates
	Not	1834 Wilshire	0.21	12/3/2021	$168,900	1979	1,265	$133.52	3/2	2 Gar	Br Ranch	Updates

Adjoining Sales Adjusted									Avg	
Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	% Diff	Distance
							$176,900			155
-$1,099		-$750	$4,221		$7,000		$159,273	10%		
-$3,627		-$9,390	$16,988				$160,471	9%		
-$1,736		-$14,357	$19,547				$172,354	3%		
									7%	

I considered a home located at 6240 N Washington that sold on October 15, 2021. The paired sale located at 532 Wilson included a sunroom that I did not adjust for. The -4% impact from that sale is related to that property having a superior sunroom and not related to proximity to the solar farm. The other two comparables strongly support that assertion as well as a finding of no impact on the value of the property due to proximity to the solar farm.

Adjoining Residential Sales After Solar Farm Built

Parcel	Solar	Address	Acres	Date Sold	Sales Price	Built	GBA	$/GLA	BR/BA	Park	Style	Other
	Adjoins	6240 N Washington	1.40	10/15/2021	$155,000	1962	1,582	$97.98	2/1	Det 3	Ranch	
	Not	1408 Brooks	0.13	8/20/2021	$105,000	1957	1,344	$78.13	3/1	Drive	Ranch	
	Not	532 Wilson	0.14	7/29/2021	$159,900	1948	1,710	$93.51	3/2	Det Gar	Ranch	Sunroom
	Not	424 Pinewood	0.17	5/20/2022	$151,000	1960	1,548	$97.55	4/2	Gar	Ranch	

Adjoining Sales Adjusted									Avg	
Time	Site	YB	GLA	BR/BA	Park	Other	Total	% Diff	% Diff	Distance
							$155,000			160
$496		$2,625	$13,016		$15,000		$136,136	12%		
$1,051		$11,193	-$9,575	-$10,000	$8,000		$160,569	-4%		
-$2,761		-$2,265	$2,653	-$10,000	$7,000		$145,627	6%		
									5%	

Based on these four matched pairs, the data at this solar farm supports a finding of no impact on property value due to the proximity of the solar farm for homes as close as 155 feet.

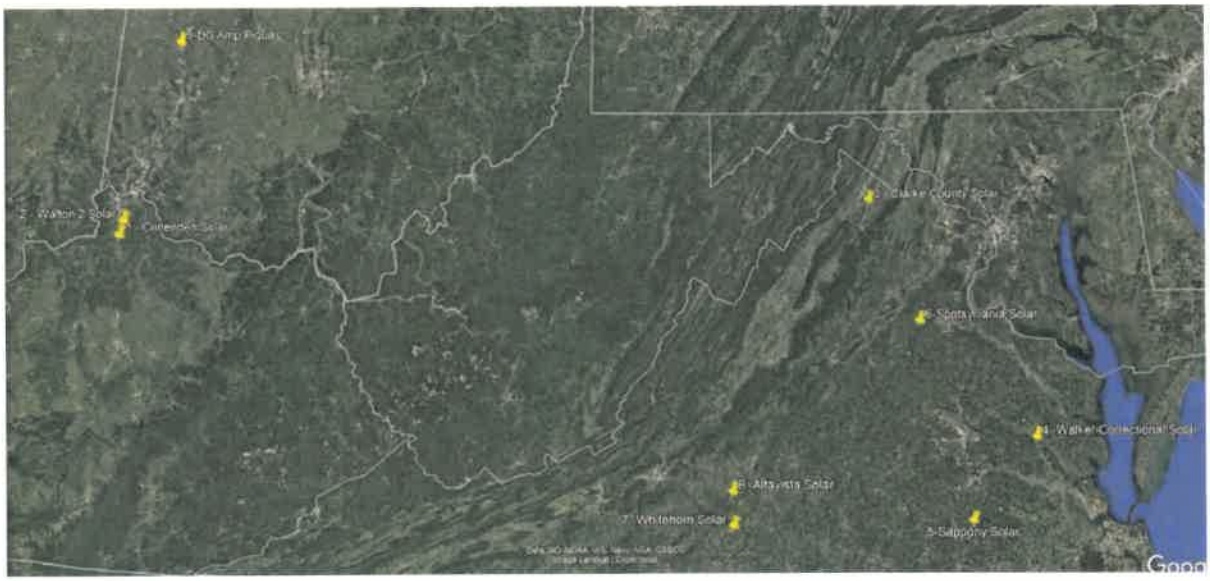
I also identified three new construction home sales on Arrowhead Drive that sold in 2022. I have reached out to the builder regarding those homes, but these homes sold between $250,000 and $275,000 each and were located within 350 feet of the solar farm. These sales show that the presence of the solar farm is not inhibiting new home construction in proximity to the solar farm.

Conclusion

The solar farm matched pairs shown above have similar characteristics to each other in terms of population, but with several outliers showing solar farms in far more urban areas. The median income for the population within 1 mile of a solar farm among this subset of matched pairs is $60,198 with a median housing unit value of $277,717. Most of the comparables are under $300,000 in the home price, with $483,333 being the high end of the set, though I have matched pairs in other states over $1,600,000 in price adjoining large solar farms. The predominate adjoining uses are residential and agricultural. These figures are in line with the larger set of solar farms that I have looked at with the predominant adjoining uses being residential and agricultural and similar to the solar farm breakdown shown for West Virginia and adjoining states as well as the proposed subject property.

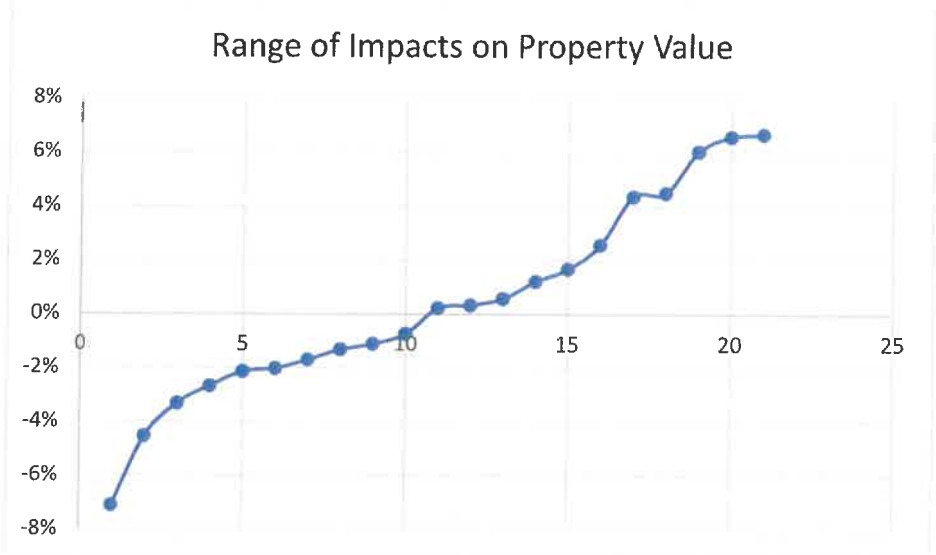
Based on the similarity of adjoining uses and demographic data between these sites and the subject property, I consider it reasonable to compare these sites to the subject property.

Matched Pair Summary						Adj. Uses By Acreage				1 mile Radius (2010-2022 Data)		
	Name	City	State	Acres	MW	Topo Shift	Res	Ag	Ag/Res	Com/Ind	Population	Med. Income	Avg. Housing Unit
1	Crittenden	Crittenden	KY	34	2.70	40	22%	51%	27%	0%	1,419	$60,198	$178,643
2	Walton 2	Walton	KY	58	2.00	90	21%	0%	60%	19%	880	$81,709	$277,717
3	Clarke Cnty	White Post	VA	234	20.00	70	14%	39%	46%	1%	578	$81,022	$374,453
4	Walker	Barhamsville	VA	485	20.00	N/A	12%	68%	20%	0%	203	$80,773	$320,076
5	Sappony	Stony Crk	VA	322	20.00	N/A	2%	98%	0%	0%	74	$51,410	$155,208
6	Spotysivania	Paytes	VA	3,500	500.00	160	37%	52%	11%	0%	74	$120,861	$483,333
7	Whitehorn	Gretna	VA	N/A	50.00	N/A	N/A	N/A	N/A	N/A	166	$43,179	$168,750
8	Altavista	Altavista	VA	720	80.00	N/A	N/A	N/A	N/A	N/A	7	$50,000	$341,667
9	DG Amp Piqua	Piqua	OH	86	12.60	2	26%	16%	58%	0%	6,735	$38,919	$96,555
	Average			680	78.59	72	19%	46%	32%	3%	1,126	$67,563	$266,267
	Median			278	20.00	70	21%	51%	27%	0%	203	$60,198	$277,717
	High			3,500	500.00	160	37%	98%	60%	19%	6,735	$120,861	$483,333
	Low			34	2.00	2	2%	0%	0%	0%	7	$38,919	$96,555



On the following page is a summary of the 21 matched pairs for all of the solar farms noted above. They show a pattern of results from -7% to +7%. The average impacts is 0% and the median impact is 0%.

As can be seen in the chart of those results below, most of the data points are between -2% and +5%. This variability is common with real estate and consistent with market imperfection. I therefore conclude that these results strongly support an indication of no impact on property value due to the adjacent solar farm.



Residential Dwelling Matched Pairs Adjoining Solar Farms

Pair	Solar Farm	City	State	Area	MW	Approx Distance	Tax ID/Address	Sale Date	Sale Price	Adj. Price	% Diff	Notes
1	DG Amp	Piqua	OH	Suburban	12.6	155	6060 N Washington	Oct-19	$119,500			
							1511 Sweetbriar	Aug-20	$123,000	$118,044	1%	
2	DG Amp	Piqua	OH	Suburban	12.6	585	1011 Plymouth	Feb-20	$113,000			
							1720 Williams	Dec-19	$119,900	$111,105	2%	
3	DG Amp	Piqua	OH	Suburban	12.6	155	6010 N Washington	Aug-21	$176,900			
							1834 Wilshire	Dec-21	$168,900	$172,354	3%	
4	DG Amp	Piqua	OH	Suburban	12.6	160	6240 N Washington	Oct-21	$155,000			
							424 Pinewood	May-22	$151,000	$145,627	6%	
5	Spotsylvania	Paytes	VA	Rural	617	1270	12901 Orange Plnk	Aug-20	$319,900			Medium
							12717 Flintlock	Dec-20	$290,000	$326,767	-2%	
6	Spotsylvania	Paytes	VA	Rural	617	1950	9641 Nottoway	May-20	$449,900			Medium
							11626 Forest	Aug-20	$489,900	$430,246	4%	
7	Spotsylvania	Paytes	VA	Rural	617	1171	13353 Post Oak	Sep-20	$300,000			Heavy
							12810 Catharpin	Jan-20	$280,000	$299,008	0%	
8	Walker	Barhamsville	VA	Rural	20	250	5241 Barham	Oct-18	$264,000			Light
							9252 Ordinary	Jun-19	$277,000	$246,581	7%	
9	Clarke Cnty	White Post	VA	Rural	20	1230	833 Nations Spr	Aug-19	$385,000			Light
							2393 Old Chapel	Aug-20	$330,000	$389,286	-1%	
10	Sappony	Stony Creek	VA	Rural	20	1425	12511 Palestine	Jul-18	$128,400			Medium
							6494 Rocky Branch	Nov-18	$100,000	$131,842	-3%	
11	Crittenden	Crittenden	KY	Suburban	2.7	373	250 Claiborne	Jan-19	$120,000			
							315 N Fork	May-19	$107,000	$120,889	-1%	
12	Crittenden	Crittenden	KY	Suburban	2.7	488	300 Claiborne	Sep-18	$213,000			
							1795 Bay Valley	Dec-17	$231,200	$228,180	-7%	
13	Crittenden	Crittenden	KY	Suburban	2.7	720	350 Claiborne	Jul-18	$245,000			
							2160 Sherman	Jun-19	$265,000	$248,225	-1%	
14	Crittenden	Crittenden	KY	Suburban	2.7	930	370 Claiborne	Aug-19	$273,000			
							125 Lexington	Apr-18	$240,000	$254,751	7%	
15	Crittenden	Crittenden	KY	Suburban	2.7	365	250 Claiborne	Jan-22	$210,000			Light
							240 Shawnee	Jun-21	$166,000	$219,563	-5%	
16	Crittenden	Crittenden	KY	Suburban	2.7	390	260 Claiborne	Oct-21	$175,000			Light
							355 Oakwood	Oct-20	$186,000	$173,988	1%	
17	Crittenden	Crittenden	KY	Suburban	2.7	570	300 Claiborne	Dec-21	$290,000			Light
							39 Pinhook	Mar-22	$299,000	$289,352	0%	
18	Crittenden	Crittenden	KY	Suburban	2.7	1080	410 Claiborne	Feb-21	$275,000			Light
							114 Austin	Dec-20	$248,000	$279,680	-2%	
19	Walton 2	Walton	KY	Suburban	2	410	783 Jones	May-22	$346,000			Light
							783 Jones	May-12	$174,900	$353,000	-2%	
20	Whitehorn	Gretna	VA	Rural	50	255	1120 Taylors Mill	Dec-21	$224,000			Light
							100 Long Branch	Aug-20	$162,000	$213,920	5%	
21	Altavista	Altavista	VA	Rural	80	600	3026 Bishop Crk	Feb-22	$150,000			Heavy
							3026 Bishop Crk	Jul-19	$120,000	$155,000	-3%	

	MW	Avg. Distance
Average	100.71	692
Median	12.60	570
High	617.00	1,950
Low	2.00	155

	% Dif
Average	0%
Median	0%
High	7%
Low	-7%

B. Southeastern USA Data – Over 5 MW

Conclusion – SouthEast Over 5 MW

Southeast USA Over 5 MW
Matched Pair Summary

							Adj. Uses By Acreage				1 mile Radius (2010-2022 Data)			
	Name	City	State	Acres	MW	Topo Shift	Res	Ag	Ag/Res	Com/Ind	Pop.	Med. Income	Avg. Housing Unit	Veg. Buffer
1	AM Best	Goldsboro	NC	38	5.00	2	38%	0%	23%	39%	1,523	$37,358	$148,375	Light
2	Mulberry	Selmer	TN	160	5.00	60	13%	73%	10%	3%	467	$40,936	$171,746	Lt to Med
3	Leonard	Hughesville	MD	47	5.00	20	18%	75%	0%	6%	525	$106,550	$350,000	Light
4	Gastonia SC	Gastonia	NC	35	5.00	48	33%	0%	23%	44%	4,689	$35,057	$126,562	Light
5	Summit	Moyock	NC	2,034	80.00	4	4%	0%	94%	2%	382	$79,114	$281,731	Light
6	Tracy	Bailey	NC	50	5.00	10	29%	0%	71%	0%	312	$43,940	$99,219	Heavy
7	Manatee	Parrish	FL	1,180	75.00	20	2%	97%	1%	0%	48	$75,000	$291,667	Heavy
8	McBride	Midland	NC	627	75.00	140	12%	10%	78%	0%	398	$63,678	$256,306	Lt to Med
9	Mariposa	Stanley	NC	36	5.00	96	48%	0%	52%	0%	1,716	$36,439	$137,884	Light
10	Clarke Cnty	White Post	VA	234	20.00	70	14%	39%	46%	1%	578	$81,022	$374,453	Light
11	Candace	Princeton	NC	54	5.00	22	76%	24%	0%	0%	448	$51,002	$107,171	Medium
12	Walker	Barhamsville	VA	485	20.00	N/A	12%	68%	20%	0%	203	$80,773	$320,076	Light
13	Innov 46	Hope Mills	NC	532	78.50	0	17%	83%	0%	0%	2,247	$58,688	$183,435	Light
14	Innov 42	Fayetteville	NC	414	71.00	0	41%	59%	0%	0%	568	$60,037	$276,347	Light
15	Sunfish	Willow Spring	NC	50	6.40	30	35%	35%	30%	0%	1,515	$63,652	$253,138	Light
16	Sappony	Stony Crk	VA	322	20.00	N/A	2%	98%	0%	0%	74	$51,410	$155,208	Light
17	Camden Dam	Camden	NC	50	5.00	0	17%	72%	11%	0%	403	$84,426	$230,288	Light
18	Grandy	Grandy	NC	121	20.00	10	55%	24%	0%	21%	949	$50,355	$231,408	Light
19	Champion	Pelion	SC	100	10.00	N/A	4%	70%	8%	18%	1,336	$46,867	$171,939	Light
20	Barefoot Bay	Barefoot Bay	FL	504	74.50	0	11%	87%	0%	3%	2,446	$36,737	$143,320	Lt to Med
21	Miami-Dade	Miami	FL	347	74.50	0	26%	74%	0%	0%	127	$90,909	$403,571	Light
22	Spotyslvania	Paytes	VA	3,500	617.00	160	37%	52%	11%	0%	74	$120,861	$483,333	Md to Hvy
23	Whitehorn	Gretna	VA	N/A	50.00	N/A	N/A	N/A	N/A	N/A	166	$43,179	$168,750	None to Lt
24	Altavista	Altavista	VA	720	80.00	N/A	N/A	N/A	N/A	N/A	7	$50,000	$341,667	Light
	Average			506	58.83	36	25%	47%	22%	6%	883	$62,000	$237,816	
	Median			234	20.00	20	18%	56%	11%	0%	458	$55,049	$230,848	
	High			3,500	617.00	160	76%	98%	94%	44%	4,689	$120,861	$483,333	
	Low			35	5.00	0	2%	0%	0%	0%	7	$35,057	$99,219	

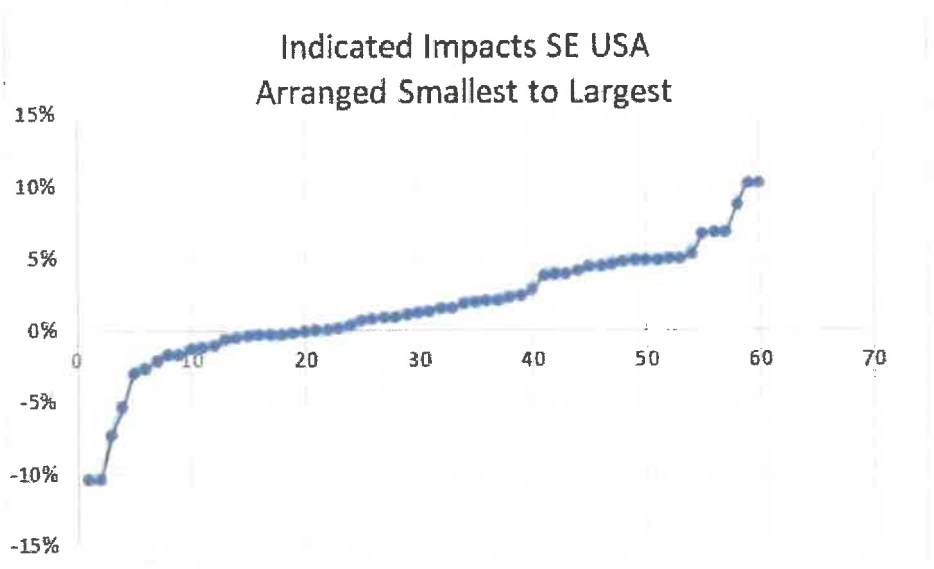
The solar farm matched pairs pulled from the solar farms shown above have similar characteristics to each other in terms of population, but with several outliers showing solar farms in more urban areas. The median income for the population within 1 mile of a solar farm is $55,049 with a median housing unit value of $230,848. Most of the comparables are under $300,000 in the home price, with $483,333 being the high end of the set, though I have matched pairs in multiple states over $1,600,000 adjoining solar farms. The adjoining uses show that residential and agricultural uses are the predominant adjoining uses. These figures are in line with the larger set of solar farms that I have looked at with the predominant adjoining uses being residential and agricultural and similar to the solar farm breakdown shown for Virginia and adjoining states as well as the proposed subject property.

Based on the similarity of adjoining uses and demographic data between these sites and the subject property, I consider it reasonable to compare these sites to the subject property.

I have pulled 56 matched pairs from the above referenced solar farms to provide the following summary of home sale matched pairs and land sales next to solar farms. The summary shows that the range of differences is from -10% to +10% with an average of +1% and median of +1%. This means that the average and median impact is for a slight positive impact due to adjacency to a solar farm. However, this +1 to rate is within the typical variability I would expect from real estate. I therefore conclude that this data shows no negative or positive impact due to adjacency to a solar farm.

While the range is seemingly wide, the graph below clearly shows that the vast majority of the data falls between -5% and +5% and most of those are clearly in the 0 to +5% range. This data strongly supports an indication of no impact on adjoining residential uses to a solar farm.

I therefore conclude that these matched pairs support a finding of no impact on value at the subject property for the proposed project, which as proposed will include a landscaped buffer to screen adjoining residential properties.



C. *Summary of National Data on Solar Farms*

I have worked in over 20 states related to solar farms and I have been tracking matched pairs in most of those states. On the following pages I provide a brief summary of those findings showing 38 solar farms over 5 MW studied with each one providing matched pair data supporting the findings of this report.

The solar farms summary is shown below with a summary of the matched pair data shown on the following page.

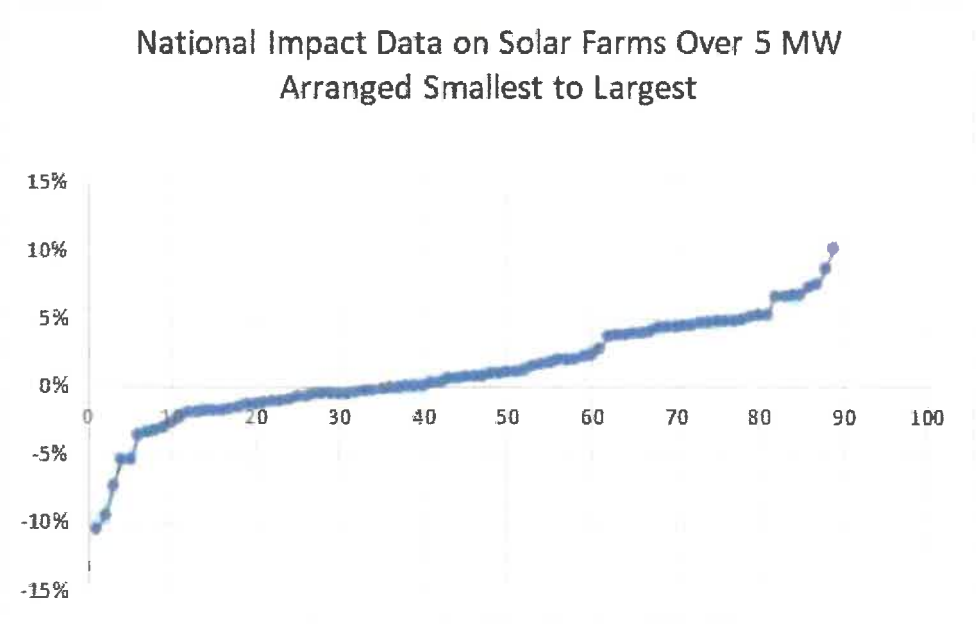
Matched Pair Summary

							Adj. Uses By Acreage				1 mile Radius (2020 Data)			
	Name	City	State	Acres	MW	Topo Shift	Res	Ag	Ag/Res	Com/Ind	Population	Med. Income	Avg. Housing Unit	Veg. Buffer
1	AM Best	Goldsboro	NC	38	5.00	2	38%	0%	23%	39%	1,523	$37,358	$148,375	Light
2	Mulberry	Selmer	TN	160	5.00	60	13%	73%	10%	3%	467	$40,936	$171,746	Lt to Med
3	Leonard	Hughesville	MD	47	5.00	20	18%	75%	0%	6%	525	$106,550	$350,000	Light
4	Gastonia SC	Gastonia	NC	35	5.00	48	33%	0%	23%	44%	4,689	$35,057	$126,562	Light
5	Summit	Moyock	NC	2,034	80.00	4	4%	0%	94%	2%	382	$79,114	$281,731	Light
6	Tracy	Bailey	NC	50	5.00	10	29%	0%	71%	0%	312	$43,940	$99,219	Heavy
7	Manatee	Parrish	FL	1,180	75.00	20	2%	97%	1%	0%	48	$75,000	$291,667	Heavy
8	McBride	Midland	NC	627	75.00	140	12%	10%	78%	0%	398	$63,678	$256,306	Lt to Med
9	Grand Ridge	Streator	IL	160	20.00	1	8%	87%	5%	0%	96	$70,158	$187,037	Light
10	Dominion	Indianapolis	IN	134	8.60	20	3%	97%	0%	0%	3,774	$61,115	$167,515	Light
11	Mariposa	Stanley	NC	36	5.00	96	48%	0%	52%	0%	1,716	$36,439	$137,884	Light
12	Clarke Cnty	White Post	VA	234	20.00	70	14%	39%	46%	1%	578	$81,022	$374,453	Light
13	Flemington	Flemington	NJ	120	9.36	N/A	13%	50%	28%	8%	3,477	$105,714	$444,696	Lt to Med
14	Frenchtown	Frenchtown	NJ	139	7.90	N/A	37%	35%	29%	0%	457	$111,562	$515,399	Light
15	McGraw	East Windsor	NJ	95	14.00	N/A	27%	44%	0%	29%	7,684	$78,417	$362,428	Light
16	Tinton Falls	Tinton Falls	NJ	100	16.00	N/A	98%	0%	0%	2%	4,667	$92,346	$343,492	Light
17	Simon	Social Circle	GA	237	30.00	71	1%	63%	36%	0%	203	$76,155	$269,922	Medium
18	Candace	Princeton	NC	54	5.00	22	76%	24%	0%	0%	448	$51,002	$107,171	Medium
19	Walker	Barhamsville	VA	485	20.00	N/A	12%	68%	20%	0%	203	$80,773	$320,076	Light
20	Innov 46	Hope Mills	NC	532	78.50	0	17%	83%	0%	0%	2,247	$58,688	$183,435	Light
21	Innov 42	Fayetteville	NC	414	71.00	0	41%	59%	0%	0%	568	$60,037	$276,347	Light
22	Demille	Lapeer	MI	160	28.40	10	10%	68%	0%	22%	2,010	$47,208	$187,214	Light
23	Turrill	Lapeer	MI	230	19.60	10	75%	59%	0%	25%	2,390	$46,839	$110,361	Light
24	Sunfish	Willow Spring	NC	50	6.40	30	35%	35%	30%	0%	1,515	$63,652	$253,138	Light
25	Picture Rocks	Tucson	AZ	182	20.00	N/A	6%	88%	6%	0%	102	$81,081	$280,172	None
26	Avra Valley	Tucson	AZ	246	25.00	N/A	3%	94%	3%	0%	85	$80,997	$292,308	None
27	Sappony	Stony Crk	VA	322	20.00	N/A	2%	98%	0%	0%	74	$51,410	$155,208	Medium
28	Camden Dam	Camden	NC	50	5.00	0	17%	72%	11%	0%	403	$84,426	$230,288	Light
29	Grandy	Grandy	NC	121	20.00	10	55%	24%	0%	21%	949	$50,355	$231,408	Light
30	Champion	Pelion	SC	100	10.00	N/A	4%	70%	8%	18%	1,336	$46,867	$171,939	Light
31	Eddy II	Eddy	TX	93	10.00	N/A	15%	25%	58%	2%	551	$59,627	$139,088	Light
32	Somerset	Somerset	TX	128	10.60	N/A	5%	95%	0%	0%	1,293	$41,574	$135,490	Light
33	DG Amp Piqua	Piqua	OH	86	12.60	2	26%	16%	58%	0%	6,735	$38,919	$96,555	Light
34	Barefoot Bay	Barefoot Bay	FL	504	74.50	0	11%	87%	0%	3%	2,446	$36,737	$143,320	Lt to Med
35	Miami-Dade	Miami	FL	347	74.50	0	26%	74%	0%	0%	127	$90,909	$403,571	Light
36	Spotyslvania	Paytes	VA	3,500	500.00	160	37%	52%	11%	0%	74	$120,861	$483,333	Med to Hvy
37	Whitehorn	Gretna	VA	N/A	50.00	N/A	N/A	N/A	N/A	N/A	166	$43,179	$168,750	None to Lt
38	Altavista	Altavista	VA	720	80.00	N/A	N/A	N/A	N/A	N/A	7	$50,000	$341,667	Light
39	Hattiesburg	Hattiesburg	MS	400	50.00	N/A	10%	85%	5%	0%	1,065	$28,545	$129,921	Med
	Average			372	40.43	32	24%	53%	19%	6%	1,431	$64,314	$240,236	
	Median			160	20.00	10	15%	59%	6%	0%	551	$60,037	$230,288	
	High			3,500	500.00	160	98%	98%	94%	44%	7,684	$120,861	$515,399	
	Low			35	5.00	0	1%	0%	0%	0%	7	$28,545	$96,555	

From these 39 solar farms, I have derived 89 matched pairs. The matched pairs show no negative impact at distances as close as 105 feet between a solar panel and the nearest point on a home. The range of impacts is -10% to +10% with an average and median of +1%.

	MW	Avg. Distance		% Dif
Average	48.43	569	**Average**	1%
Median	16.00	400	**Median**	1%
High	617.00	2,020	**High**	10%
Low	5.00	145	**Low**	-10%

While the range is broad, the two charts below show the data points in range from lowest to highest. There is only 3 data points out of 89 that show a negative impact. The rest support either a finding of no impact or 9 of the data points suggest a positive impact due to adjacency to a solar farm. As discussed earlier in this report, I consider this data to strongly support a finding of no impact on value as most of the findings are within typical market variation and even within that, most are mildly positive findings.



Distance Between Homes and Panels

D. Larger Solar Farms

I have also considered larger solar farms to address impacts related to larger projects. Projects have been increasing in size and most of the projects between 100 and 1000 MW are newer with little time for adjoining sales. I have included a breakdown of solar farms with 20 MW to 80 MW facilities with one 500 MW facility.

Matched Pair Summary - @20 MW And Larger

							Adj. Uses By Acreage				1 mile Radius (2010-2020 Data)		
	Name	City	State	Acres	MW	Topo Shift	Res	Ag	Ag/Res	Com/Ind	Population	Med. Income	Avg. Housing Unit
1	Summit	Moyock	NC	2,034	80.00	4	4%	0%	94%	2%	382	$79,114	$281,731
2	Manatee	Parrish	FL	1,180	75.00	20	2%	97%	1%	0%	48	$75,000	$291,667
3	McBride	Midland	NC	627	75.00	140	12%	10%	78%	0%	398	$63,678	$256,306
4	Grand Ridge	Streator	IL	160	20.00	1	8%	87%	5%	0%	96	$70,158	$187,037
5	Clarke Cnty	White Post	VA	234	20.00	70	14%	39%	46%	1%	578	$81,022	$374,453
6	Simon	Social Circle	GA	237	30.00	71	1%	63%	36%	0%	203	$76,155	$269,922
7	Walker	Barhamsville	VA	485	20.00	N/A	12%	68%	20%	0%	203	$80,773	$320,076
8	Innov 46	Hope Mills	NC	532	78.50	0	17%	83%	0%	0%	2,247	$58,688	$183,435
9	Innov 42	Fayetteville	NC	414	71.00	0	41%	59%	0%	0%	568	$60,037	$276,347
10	Demille	Lapeer	MI	160	28.40	10	10%	68%	0%	22%	2,010	$47,208	$187,214
11	Turrill	Lapeer	MI	230	19.60	10	75%	59%	0%	25%	2,390	$46,839	$110,361
12	Picure Rocks	Tucson	AZ	182	20.00	N/A	6%	88%	6%	0%	102	$81,081	$280,172
13	Avra Valley	Tucson	AZ	246	25.00	N/A	3%	94%	3%	0%	85	$80,997	$292,308
14	Sappony	Stony Crk	VA	322	20.00	N/A	2%	98%	0%	0%	74	$51,410	$155,208
15	Grandy	Grandy	NC	121	20.00	10	55%	24%	0%	21%	949	$50,355	$231,408
16	Barefoot Bay	Barefoot Bay	FL	504	74.50	0	11%	87%	0%	3%	2,446	$36,737	$143,320
17	Miami-Dade	Miami	FL	347	74.50	0	26%	74%	0%	0%	127	$90,909	$403,571
18	Spotyslvania	Paytes	VA	3,500	500.00	160	37%	52%	11%	0%	74	$120,861	$483,333
19	Whitehorn	Gretna	VA	N/A	50.00	N/A	N/A	N/A	N/A	N/A	166	$43,179	$168,750
20	Altavista	Altavista	VA	720	80.00	N/A	N/A	N/A	N/A	N/A	7	$50,000	$341,667
	Average			644	69.08		19%	64%	17%	4%	658	$67,210	$261,914
	Median			347	40.00		12%	68%	2%	0%	203	$66,918	$273,135
	High			3,500	500.00		75%	98%	94%	25%	2,446	$120,861	$483,333
	Low			121	19.60		1%	0%	0%	0%	7	$36,737	$110,361

The breakdown of adjoining uses, population density, median income and housing prices for these projects are very similar to those of the larger set. The matched pairs for each of these were considered earlier and support a finding of no negative impact on the adjoining home values.

I have included a breakdown of solar farms with 50 MW to 617 MW facilities adjoining.

Matched Pair Summary - @50 MW And Larger

							Adj. Uses By Acreage				1 mile Radius (2010-2020 Data)		
	Name	City	State	Acres	MW	Topo Shift	Res	Ag	Ag/Res	Com/Ind	Population	Med. Income	Avg. Housing Unit
1	Summit	Moyock	NC	2,034	80.00	4	4%	0%	94%	2%	382	$79,114	$281,731
2	Manatee	Parrish	FL	1,180	75.00	20	2%	97%	1%	0%	48	$75,000	$291,667
3	McBride	Midland	NC	627	75.00	140	12%	10%	78%	0%	398	$63,678	$256,306
4	Innov 46	Hope Mills	NC	532	78.50	0	17%	83%	0%	0%	2,247	$58,688	$183,435
5	Innov 42	Fayetteville	NC	414	71.00	0	41%	59%	0%	0%	568	$60,037	$276,347
6	Barefoot Bay	Barefoot Bay	FL	504	74.50	0	11%	87%	0%	3%	2,446	$36,737	$143,320
7	Miami-Dade	Miami	FL	347	74.50	0	26%	74%	0%	0%	127	$90,909	$403,571
8	Spotyslvania	Paytes	VA	3,500	500.00	160	37%	52%	11%	0%	74	$120,861	$483,333
9	Whitehorn	Gretna	VA	N/A	50.00	N/A	N/A	N/A	N/A	N/A	166	$43,179	$168,750
10	Altavista	Altavista	VA	720	80.00	N/A	N/A	N/A	N/A	N/A	7	$50,000	$341,667
	Average			1,095	115.85		19%	58%	23%	1%	646	$67,820	$283,013
	Median			627	75.00		15%	67%	0%	0%	274	$61,858	$279,039
	High			3,500	500.00		41%	97%	94%	3%	2,446	$120,861	$483,333
	Low			347	50.00		2%	0%	0%	0%	7	$36,737	$143,320

The breakdown of adjoining uses, population density, median income and housing prices for these projects are very similar to those of the larger set. The matched pairs for each of these were considered earlier and support a finding of no negative impact on the adjoining home values.

The data for these larger solar farms is shown in the SE USA and the National data breakdowns with similar landscaping, setbacks and range of impacts that fall mostly in the +/-5% range as can be seen earlier in this report.

Below I show a summary of 238 projects ranging in size from 50 MW up to 1,000 MW with an average size of 119.7 MW and a median of 80 MW. The average closest distance for an adjoining home is 365 feet, while the median distance is 220 feet. The closest distance is 50 feet. The mix of adjoining uses is similar with most of the adjoining uses remaining residential or agricultural in nature. This is the list of solar farms that I have researched for possible matched pairs and not a complete list of larger solar farms in those states.

Total Number of Solar Farms Researched Over 50 MW	238								
						Adjoining Use by Acre			
	Output (MW)	**Total Acres**	**Used Acres**	**Avg. Dist to home**	**Closest Home**	**Res**	**Agri**	**Agri/Res**	**Com**
Average	119.7	1521.4	1223.3	1092	365	10%	68%	18%	4%
Median	80.0	987.3	805.5	845	220	7%	72%	12%	0%
High	1000.0	19000.0	9735.4	6835	6810	98%	100%	100%	70%
Low	50.0	3.0	3.0	241	50	0%	0%	0%	0%

IX. Distance Between Homes and Panels

I have measured distances at matched pairs as close as 105 feet between panel and home to show no impact on value. This measurement goes from the closest point on the home to the closest solar panel. This is a strong indication that at this distance there is no impact on adjoining homes.

However, in tracking other approved solar farms across Kentucky, North Carolina and other states, I have found that it is common for there to be homes within 100 to 150 feet of solar panels. Given the visual barriers in the form of privacy fencing or landscaping, there is no sign of negative impact.

I have also tracked a number of locations where solar panels are between 50 and 100 feet of single-family homes. In these cases the landscaping is typically a double row of more mature evergreens at time of planting. There are many examples of solar farms with one or two homes closer than 100-feet, but most of the adjoining homes are further than that distance.

X. Topography

As shown on the summary charts for the solar farms, I have been identifying the topographic shifts across the solar farms considered. Differences in topography can impact visibility of the panels, though typically this results in distant views of panels as opposed to up close views. The topography noted for solar farms showing no impact on adjoining home values range from as much as 160-foot shifts across the project. Given that appearance is the only factor of concern and that distance plus landscape buffering typically addresses up close views, this leaves a number of potentially distant views of panels. I specifically note that in Crittenden in KY there are distant views of panels from the adjoining homes that showed no impact on value.

General rolling terrain with some distant solar panel views are showing no impact on adjoining property value.

XI. Scope of Research

I have researched over 1,000 solar farms and sites on which solar farms are existing and proposed in Kentucky, Illinois, Tennessee, North Carolina, Virginia as well as other states to determine what uses are typically found in proximity with a solar farm. The data I have collected and provide in this report strongly supports the assertion that solar farms are having no negative consequences on adjoining agricultural and residential values.

Beyond these references, I have quantified the adjoining uses for a number of solar farm comparables to derive a breakdown of the adjoining uses for each solar farm. The chart below shows the breakdown of adjoining or abutting uses by total acreage.

Percentage By Adjoining Acreage

	Res	Ag	Res/AG	Comm	Ind	Avg Home	Closest Home	All Res Uses	All Comm Uses
Average	19%	53%	20%	2%	6%	887	344	91%	8%
Median	11%	56%	11%	0%	0%	708	218	100%	0%
High	100%	100%	100%	93%	98%	5,210	4,670	100%	98%
Low	0%	0%	0%	0%	0%	90	25	0%	0%

Res = Residential, Ag = Agriculture, Com = Commercial

Total Solar Farms Considered: 705

I have also included a breakdown of each solar farm by number of adjoining parcels to the solar farm rather than based on adjoining acreage. Using both factors provides a more complete picture of the neighboring properties.

Percentage By Number of Parcels Adjoining

	Res	Ag	Res/AG	Comm	Ind	Avg Home	Closest Home	All Res Uses	All Comm Uses
Average	61%	24%	9%	2%	4%	887	344	93%	6%
Median	65%	19%	5%	0%	0%	708	218	100%	0%
High	100%	100%	100%	60%	78%	5,210	4,670	105%	78%
Low	0%	0%	0%	0%	0%	90	25	0%	0%

Res = Residential, Ag = Agriculture, Com = Commercial

Total Solar Farms Considered: 705

Both of the above charts show a marked residential and agricultural adjoining use for most solar farms. Every single solar farm considered included an adjoining residential or residential/agricultural use.

XII. Specific Factors Related To Impacts on Value

I have completed a number of Impact Studies related to a variety of uses and I have found that the most common areas for impact on adjoining values typically follow a hierarchy with descending levels of potential impact. I will discuss each of these categories and how they relate to a solar farm.

1. Hazardous material
2. Odor
3. Noise
4. Traffic
5. Stigma
6. Appearance

1. Hazardous material

A solar farm presents no potential hazardous waste byproduct as part of normal operation. Any fertilizer, weed control, vehicular traffic, or construction will be significantly less than typically applied in a residential development and especially most agricultural uses.

The various solar farms that I have inspected and identified in the addenda have no known environmental impacts associated with the development and operation.

2. Odor

The various solar farms that I have inspected produced no odor.

3. Noise

Whether discussing passive fixed solar panels, or single-axis trackers, there is no negative impact associated with noise from a solar farm. The transformer has a hum similar to an HVAC that can only be heard in close proximity and the buffers on the property are sufficient to make emitted sounds effectively inaudible from the adjoining properties. A wide variety of noise studies have been conducted on solar farms to illustrate compatibility between solar properties and nearby residential uses. The noise factor is even less at night.

The various solar farms that I have inspected were inaudible from the roadways.

4. Traffic

The solar farm will have no onsite employee's or staff. The site requires only minimal maintenance. Relative to other potential uses of the site (such as a residential subdivision), the additional traffic generated by a solar farm use on this site is insignificant.

5. Stigma

There is no stigma associated with solar farms and solar farms and people generally respond favorably towards such a use. While an individual may express concerns about proximity to a solar farm, there is no specific stigma associated with a solar farm. Stigma generally refers to things such as adult establishments, prisons, rehabilitation facilities, and so forth.

Solar panels have no associated stigma and in smaller collections are found in yards and roofs in many residential communities. Solar farms are adjoining elementary, middle and high schools as well as churches and subdivisions. I note that one of the solar farms in this report not only adjoins

a church, but is actually located on land owned by the church. Solar panels on a roof are often cited as an enhancement to the property in marketing brochures.

I see no basis for an impact from stigma due to a solar farm.

6. Appearance

I note that larger solar farms using fixed or tracking panels are a passive use of the land that is in keeping with a rural/residential area. As shown below, solar farms are comparable to larger greenhouses. This is not surprising given that a greenhouse is essentially another method for collecting passive solar energy. The greenhouse use is well received in residential/rural areas and has a similar visual impact as a solar farm.

The solar panels are all less than 15 feet high, which means that the visual impact of the solar panels will be similar in height to a typical greenhouse and lower than a single-story residential dwelling. Were the subject property developed with single family housing, that development would have a much greater visual impact on the surrounding area given that a two-story home with attic could be three to four times as high as these proposed panels.

Whenever you consider the impact of a proposed project on viewshed or what the adjoining owners may see from their property it is important to distinguish whether or not they have a protected viewshed or not. Enhancements for scenic vistas are often measured when considering properties that adjoin preserved open space and parks. However, adjoining land with a preferred view today conveys no guarantee that the property will continue in the current use. Any consideration of the impact of the appearance requires a consideration of the wide variety of other uses a property already has the right to be put to, which for solar farms often includes subdivision development, agricultural business buildings such as poultry, or large greenhouses and the like.

Dr. Randall Bell, MAI, PhD, and author of the book **Real Estate Damages**, Third Edition, on Page 146 "Views of bodies of water, city lights, natural settings, parks, golf courses, and other amenities are considered desirable features, particularly for residential properties." Dr. Bell continues on Page

147 that "View amenities may or may not be protected by law or regulation. It is sometimes argued that views have value only if they are protected by a view easement, a zoning ordinance, or covenants, conditions, and restrictions (CC&Rs), although such protections are relatively uncommon as a practical matter. The market often assigns significant value to desirable views irrespective of whether or not such views are protected by law."

Dr. Bell concludes that a view enhances adjacent property, even if the adjacent property has no legal right to that view. He then discusses a "borrowed" view where a home may enjoy a good view of vacant land or property beyond with a reasonable expectation that the view might be partly or completely obstructed upon development of the adjoining land. He follows that with "This same concept applies to potentially undesirable views of a new development when the development conforms to applicable zoning and other regulations. Arguing value diminution in such cases is difficult, since the possible development of the offending property should have been known." In other words, if there is an allowable development on the site then arguing value diminution with such a development would be difficult. This further extends to developing the site with alternative uses that are less impactful on the view than currently allowed uses.

This gets back to the point that if a property has development rights and could currently be developed in such a way that removes the viewshed such as a residential subdivision, then a less intrusive use such as a solar farm that is easily screened by landscaping would not have a greater impact on the viewshed of any perceived value adjoining properties claim for viewshed. Essentially, if there are more impactful uses currently allowed, then how can you claim damages for a less impactful use.

7. Conclusion on Specific Factors

On the basis of the factors described above, it is my professional opinion that the proposed solar farm will not negatively impact adjoining property values. The only category of impact of note is appearance, which is addressed through setbacks and landscaping buffers. The matched pair data supports that conclusion.

XIII. Conclusion

The matched pair analysis shows no negative impact in home values due to abutting or adjoining a solar farm as well as no impact to abutting or adjacent vacant residential or agricultural land. The proposed setbacks are further than those measured showing no impact for similar price ranges of homes and for areas with similar demographics to the subject area. The criteria that typically correlates with downward adjustments on property values such as noise, odor, and traffic all support a finding of no impact on property value. Similar paired sales showed no impact from adjoining battery storage facilities.

Very similar solar farms in very similar areas have been found by hundreds of towns and counties not to have a substantial injury to abutting or adjoining properties, and many of those findings of no impact have been upheld by appellate courts. Similar solar farms have been approved adjoining agricultural uses, schools, churches, and residential developments.

I have found no difference in the mix of adjoining uses or proximity to adjoining homes based on the size of a solar farm and I have found no significant difference in the matched pair data adjoining larger solar farms versus smaller solar farms. The data in the Southeast is consistent with the larger set of data that I have nationally, as is the more specific data located in and around West Virginia.

Based on the data and analysis in this report, it is my professional opinion that the solar farm proposed at the subject property will have no negative impact on the value of adjoining or abutting property. I note that some of the positive implications of a solar farm that have been expressed by people living next to solar farms include protection from future development of residential developments or other more intrusive uses, reduced dust, odor and chemicals from former farming operations, protection from light pollution at night, it's quiet, and there is no traffic.

XIV. Battery Energy Storage System (BESS)

The closest home to the BESS will be determined later, but would remain at least 200 feet from the nearest home.

I considered the following battery storage facilities in a variety of states for a comparison of similar battery energy storage systems (BESS) in proximity to residential uses. I have also searched these areas for recent sales to see if there is any impact on property values near these battery storage facilities, which will be addressed in the following section.

The primary use of this larger set is to show compatibility of BESS and residential uses as well as showing typical setbacks between these uses. These measured distances are from the closest point on the home to the closest piece of equipment. Where I have N/A, the facility does not have an aerial image that I can use to measure that distance. These distances were measured using GoogleEarth.

Summary of Battery Data

#	Name	City/State	Acres	Capacity	Distance from Closest Home	Average Distance Adjoining Home
1	Ozone Park	Queens, NY	0.35	3 MW	30	203
2	Pomona	Rockland, NY	28.5	N/A	270	1196
3	Asheville	Asheville, NC	12.36	9 MW	130	452
4	East Hampton	E. Hampton, NY	17.58	5 MW	470	733
5	Diablo	Concord, CA	11.45	200 MW	320	361
6	Prospect	W. Columbia, TX	2.3	10 MW	400	400
7	Brazoria	Brazoria, TX	17.58	9.95 MW	130	438
8	Gambit	Angleton, TX	6.24	100 MW	215	243
9	Churchtown	Pennsville, NJ	3.13	10 MW	N/A	N/A
10	West Chicago	Chicago, IL	5	19.8 MW	430	450
11	McHenry	McHenry, IL	2.75	19.8 MW	260	283
12	Plumstead	Hornerstown, NJ	14.39	19.8 MW	155	943
13	Vista	Vista, CA	0.88	40 MW	130	172
14	Chisholm	Ft Worth, TX	21.74	200 MW	840	875
15	Port Lavaca	Prt Lavaca, TX	1.44	9.9 MW	N/A	N/A
16	Magnolia	Houston, TX	0.87	9.95 MW	180	190
				Average	283	496
				Median	238	419
				High	840	1,196
				Low	30	172

A. BESS Paired Sales Analysis/Market Research

I considered the following battery storage facilities in a variety of states where I was able to identify adjoining residential home sales. These home sales were then compared to similar homes in the area that sold in the same time frame but were not in proximity to the BESS. This is called a paired sales analysis and I have used this to determine if there is any impact that could be attributed to the adjacency/proximity to the BESS.

1 - Ozone Park Batteries

This system is located on 99th Street in Jamaica, Queens, New York. The below image shows the battery pack parcel outlined in red with a bowling alley to the north, a school to the south and homes to the east and west as well as a church to the west. Based on aerial imagery, this site was installed in early to mid-2018.

The two closest structures are the school at 65 feet and a church at 30 feet from the batteries. The nearby homes are on the opposing blocks, but the proximity to the school does illustrate a high confidence in public safety related to the battery facility and acceptance within that community.

Surrounding Uses

#	Address	GIS Data Acres	Present Use	Adjoin Acres	Adjoin Parcels	Distance (ft) Home/Battery
1	98-18 Rockaway	0.76	Bowling	11.69%	6.67%	N/A
2		0.95	Office	14.62%	6.67%	N/A
3	10735 100th St	0.06	Residential	0.92%	6.67%	245
4	10737 100th St	0.06	Residential	0.92%	6.67%	260
5	10739 100th St	0.06	Residential	0.92%	6.67%	275
6	10741 100th St	0.06	Residential	0.92%	6.67%	290
7	10743 100th St	0.06	Residential	0.92%	6.67%	305
8	10915 98th St	3.74	School	57.54%	6.67%	65
9		0.27	School	4.15%	6.67%	N/A
10	10656 98th St	0.06	Residential	0.92%	6.67%	200
11	10654 98th St	0.06	Residential	0.92%	6.67%	195
12	10650 98th St	0.06	Residential	0.92%	6.67%	190
13	10646 98th St	0.06	Residential	0.92%	6.67%	190
14	10636 98th St	0.06	Residential	0.92%	6.67%	195
15	10645 (8th St	0.18	Church	2.77%	6.67%	30
	Total	**6.500**		**100.00%**	**100.00%**	203
					Min	30

The closest recent home sale is 10726 101st Street that sold on October 9, 2018, after the battery storage facility was installed. This home is 345 feet from the closest battery and has a very obstructed view of that area based on the shrubs around the battery storage site as well as a strip of landscape greenery between the two sites. The sales price was $600,000 for this 3 BR/1.5 BA home that was built in 1930 on a 0.06-acre site.

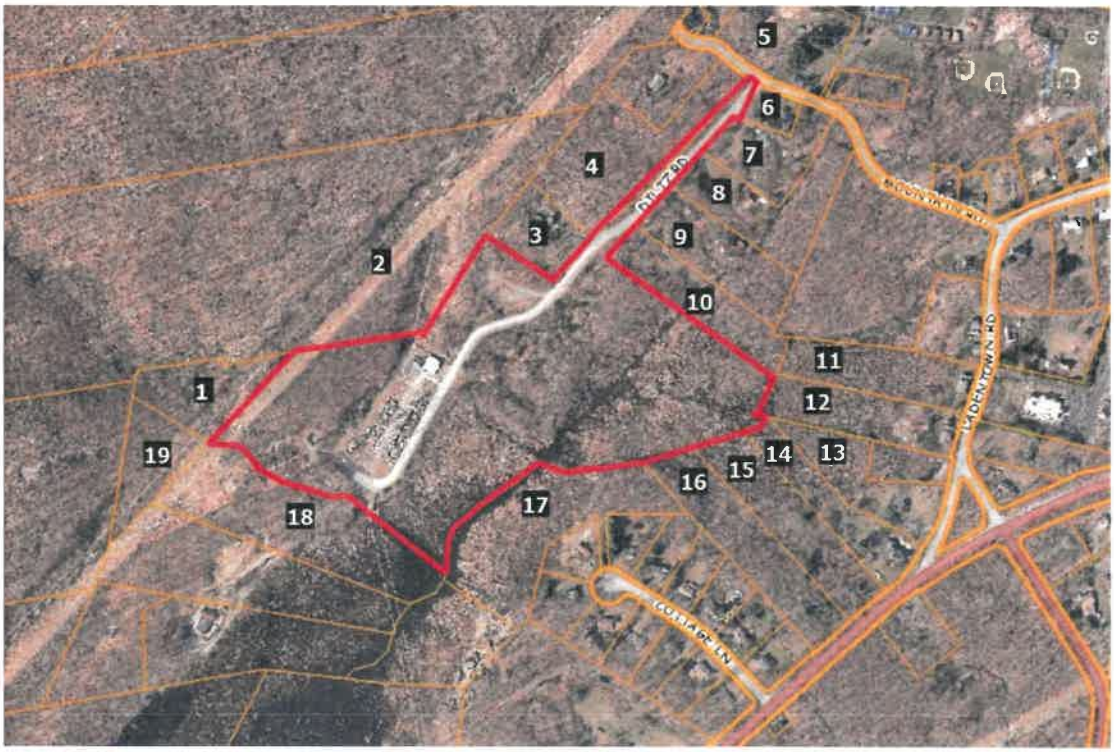
I compared this to a similar home built in 1930 in the same style and same size that sold at 10762 101st Street on October 9, 2018 for $590,000. This home is just down the street but further from the battery storage system and sold on the same day for $10,000 less. The proximity to the battery does not correlate to value impact in this instance as the home further away sold for less. This second home is across the street from the three-story John Adams High School which likely accounts for the lower price for this second property compared to the first which was adjacent to the same school, but not across from the building itself.

The matched pairs support a finding of no impact on value due to proximity to the battery system.

2 - Pomona Batteries

This battery storage system is located at 23 Diltz Road, Pomona, Rockland, New York. This location is more remote than the other system with greater distances separating homes from batteries, but all of the adjoining uses are residential or park. This battery site is located at the end of a road for estate-like homes on large acreage adjoining or in close proximity to Harriman State Park. There are some sales on Dritz Road adjoining the battery site and none of the broker statements identify that as a concern. But given the park, the Mahwah River exposure it is difficult to use these sales for matched pairs as there are too many unique factors and matched pairs require one unique factor.

Still, the site shows harmonious use in connection with residential uses. The closest identified home is 270 feet.



3 - Asheville Energy Storage System

This 9 MW battery storage system is located on a parcel with a substation built in 2020 (substation was bult much earlier). This facility has significant residential development around it but no recent sales to consider.

There is a nearby home sale that is located on Tax Parcel 8047 (just below the identifier for Parcel 9). This home is 550 feet from the nearest battery equipment and most of that distance is heavily

wooded. This home has a street address of 95 Forest Lake Drive, Asheville, NC and it sold on April 26, 2022 for $510,000 for this 4 BR/3 BA ranch with 1,931 square feet including the daylight basement area. The home also has a 2 car garage. I did not attempt a paired sale as this home has no visibility of the BESS despite the proximity and arguably has a better view with less screening to the substation, which is also closer to the home.

Similarly, new homes are being built to the south on Rangley Drive with prices ranging from $431,000 to $566,000. These homes include those that back up to the Parcels 11 through 14 in the adjacent parcel map.

4 – East Hampton Energy Storage System

This 5 MW battery storage system is located on a parcel with a substation and a natural gas peaker plant. This makes it difficult to use for analysis given the multiple uses on this parcel, but I have included a visual of homes in the general area that have sold recently for reference. There is significant wooded acreage separating this BESS and nearby homes.

5 – Diablo Energy Storage System

This 200 MW battery storage system is located on a parcel with significant adjacency to industrial uses and residential uses. For these reasons it would be difficult to measure impacts due to the other adjoining industrial uses that might also have an impact. Given that most of the adjoining uses are industrial, I have not dug further on this one.

6 – Prospect Energy Storage System

This 10 MW battery storage system is located on a parcel adjoining a large substation in Brazoria, TX. The only adjoining home is 400 feet away. This home has not sold since the BESS was completed in 2019. Furthermore, this home has an unobstructed view of the substation which would make it a difficult home for impact analysis.

7 – Brazoria Energy Storage System

This 9.95 MW battery storage system is located on a parcel adjoining multiple homes within 150 feet of the battery equipment. There have been no recent sales since this was built in 2020.

8 - Gambit Energy Storage

This 102.4 MW battery storage system is located off W. Live Oak Street, Angleton, Texas. This is a new facility and placed online in June 2021. This system is a good location as there are no other externalities adjoining it to potentially impact the analysis. The substation associated with this is located to the east along N. Walker Street.

While I cannot do any analysis of impact from the most recent adjoining sales as they all occurred before this site was built, but the adjoining homes to the north are selling with new homes ranging from $400,000 to $600,000.

The most recent adjoining home sale to the west was 852 Marshall Road that sold on April 5, 2021 and presumably they were aware of the battery storage facility as it would have been under construction at the time of sale. This brick ranch with 3 BR, 1 BA with 1,220 s.f. of gross living area and built in 1980 on 0.40 acres sold for $165,000, or $135 per s.f.

I have compared that sale to 521 Catalpa Street that sold on September 11, 2020 for $155,000 for a 3 BR, 2 BA brick ranch with 1,220 s.f. built in 1973 with a single car garage. Adjusting this price upward by 9% for growth in the market for time, 3.5% for difference in age, downward by $6,000 for the additional bathroom, and $4,000 for the garage, the adjusted indicated value of this home is $164,375, which is right in line with 852 Marshall Road and supports a finding of no impact on property value.

I have also compared that sale to 521 W Mimosa Street that sold on February 26, 2021 for $150,000 for this brick ranch with 3 BR, 1.5 BA with 1,194 s.f. built in 1976. Adjusting this sale upward by 4% for growth in the market over time, upward 2% for difference in age, and downward by $5,000 for the additional half bathroom, I derive an adjusted indication of $154,000. This is 7%

less than the home price at 852 Marshall Road which suggests an enhancement due to proximity to the battery storage system.

I have also compared this sale to 1164 Thomas Drive that sold on May 20, 2020 for $187,000 for this brick ranch with 2-car garage, 3 BR, 2 BA with 1,259 s.f. and built in 1998. Adjusting this upward by 13% for growth over time, downward by 9% for difference in age of construction, downward by $8,000 for the garage, downward $6,000 for the additional bathroom, I derive an indicated value of $180,480. This is a 9% difference suggesting a negative impact on property value. However, this comparable required the largest amount of adjustments and is not considered as heavily as the other two comparables. This home is 18 years newer and with better bathroom situation as a 1-bathroom house is a significant issue for most buyers.

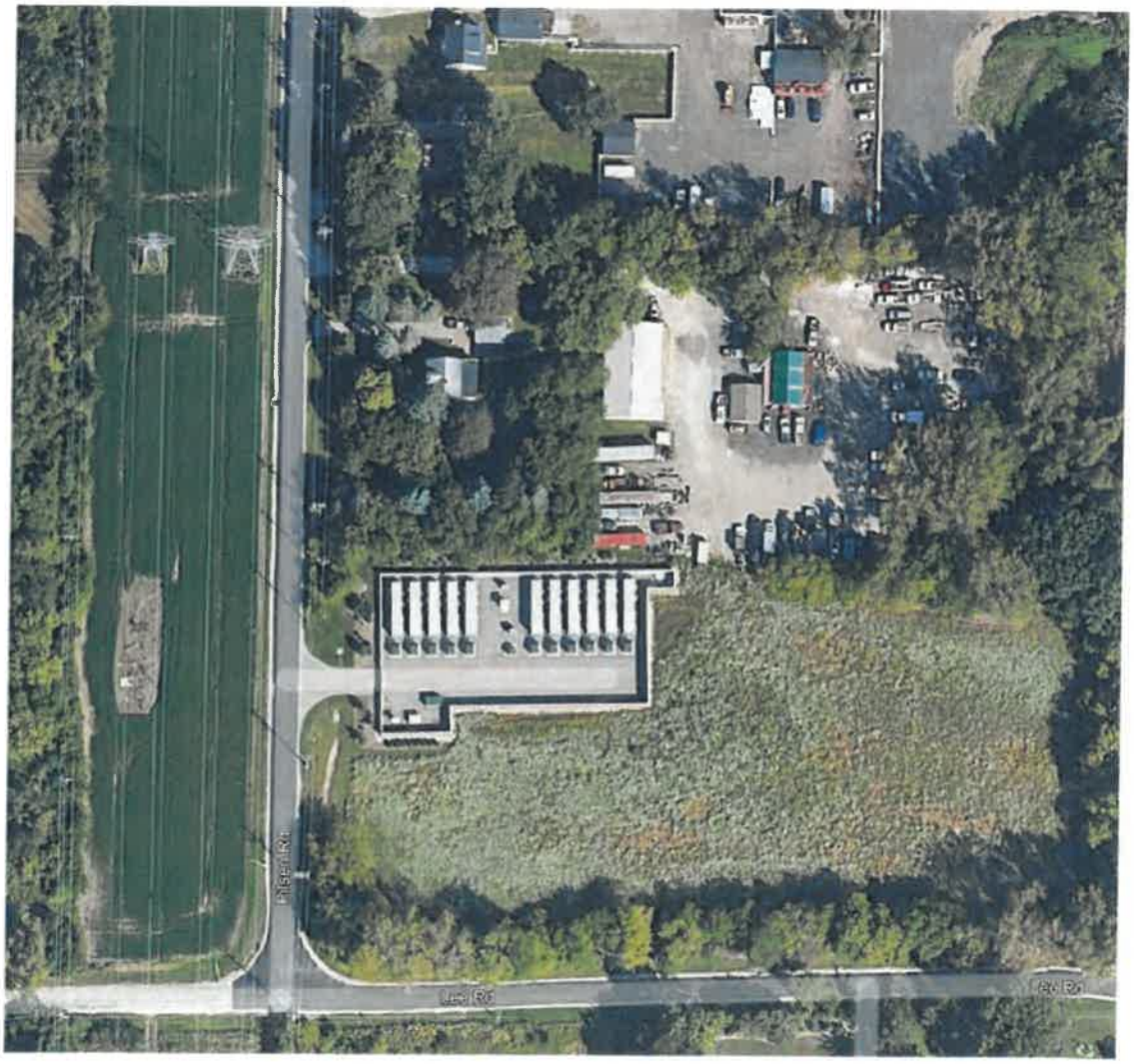
The second comparable considered required the least adjustment and suggests a positive impact on property value. The median indication is the first comparable which shows no impact on property value. Given this data set I conclude that the best indication from these matched pairs supports a finding of no impact on property value. The home at 852 Marshall is 180 feet from the project outline shown.

9 - Churchtown Battery Storage

This 10 MW battery storage system is located off N. Broadway, Pennsville, NJ. The aerial imagery does not show this system yet so I was not able to determine distances to adjoining homes or identify any adjoining homes. Given the large substation, adjoining baseball fields and religious facilities this would be a challenging site for an impact analysis in any case.

10 - West Chicago Battery Storage

This 19.8 MW battery storage system is located off Pilsen Road, Chicago, Illinois. This facility has condominium and single family housing to the north and single family housing nearby to the south, but also adjoining an outdoor storage area and a large powerline easement. I was not able to do any analysis on this site as there have been no recent sales identified.



11 - McHenry Battery Storage

This 19.8 MW battery storage system is located off Illinois Highway 31, McHenry, Illinois that was built around 2016. This is facility fronts on the highway but has rear adjacency to a number of houses.

There were two recent home sales along W. High Street, but they effectively adjoin the small commercial use between the battery storage facility. That complication makes it difficult to determine if the commercial use was the impact or if the commercial use buffered any impact making any finding off of analysis suspect and uncertain.

I have however considered the recent sale of 209 N Dale Avenue that adjoins the battery storage site and is 290 feet from the nearest equipment.

That home sold on June 30, 2021 for $265,000 for a vinyl-siding ranch with 3 BR, 2.5 BA, built in 1960 with a gross living area of 1,437 square feet, or $184.41 per s.f. The property has 5 attached garage spaces. As identified in the listing the home was completely renovated with stainless steel appliances and granite countertops. This was listed by Lynda Steidinger with Berkshire Hathaway HomeServices Starck Real Estate and the buyers agent was Ivette Rodriguez Anderson with Keller Williams.

The home directly across the street, 208 N Dale Avenue, sold on June 16, 2021 for $275,000 for a cedar siding and stone ranch with 3 BR, 2.5 BA, built in 1961, with a gross living area of 1,446 s.f., or $190.18 per s.f. This home also has 1,101 square feet of finished basement space that is currently used as an office but could be an additional bedroom. This home also has been updated and includes stainless steel appliances and granite counter tops.

The size difference is nominal and the additional 3-car garage bays at the 209 N Dale is considered to be balanced by the finished basement space at 208 N Dale, though the finished office space is somewhat superior to garage space. But balancing those two factors out the difference in price per square foot is 3%. This is considered negligible and attributable to the slightly superior finished basement space and not any impact relative to the battery storage facility.

I also looked at 3802 Clover Avenue, which is two blocks to the north. This stone and siding ranch with 3 BR, 2 BA, built in 1956, with a gross living area of 1,200 s.f. sold on October 21, 2021 for $231,000 or $192.50 per s.f. The property has been updated with a new kitchen and a new bay window and includes a partially finished basement with an additional bathroom in it and the total basement area is an additional 1,200 s.f. This is the smallest home in the neighborhood that I found and it further illustrates that the price per square foot typically goes up as the size goes down. Adjusting this gross sale price upward by $36,498 for the smaller size based on 80% of the price per square foot for this purchase, I derive an adjusted sales price to compare to the subject property of $267,498. I consider the basement to balance out the extra garage space at the subject. This indicates a difference of 1% from the purchase price of the 209 N Dale Avenue, which is attributable to the 4 months difference in time. I consider this comparable to further support a finding of no impact on value.

While I haven't written up the other sales in the neighborhood there are numerous recent home sales ranging from $172,000 to $306,000, but most of these homes are also over 2,000 square feet in size. The subject property sold for more per square foot than most of these other sales partly due to the smaller overall size, partly due to the significant renovations, and partly due to the additional garage space. Still, this shows that the 209 N Dale Avenue sale is not being impacted by the battery storage facility and has in fact been updated above what is typical for the neighborhood, though given the similar updates at 208 N Dale Avenue, this may be the trend for the area.

The two sales compared to the 209 N Dale Avenue sale supports a finding of no impact on property value due to the battery storage facility.

12 - Plumsted Energy Storage

This 19.8 MW battery storage system is located on Monmouth Road, Cream Ridge, New Jersey. There is only one adjoining home as shown in the image to the south, but it is located just 148 feet from the nearest piece of equipment and 96 feet from the fence line. There were existing trees, but they were supplemented with a 12-foot wooden privacy fence with smaller evergreens between the fence and property line. The privacy fence at this location is oversized as the battery units include HVAC units on top of the battery pods that extend the height of the units greater than required at the subject property. The road frontage was not landscaped and chainlink fencing was used on the rest of the property.

The adjoining home at 797 Monmouth Road has not sold recently and no further analysis is possible at this site.

13 - Vista Energy Storage System

This 40 MW battery storage system is located off Olive Avenue, Vista, California. This facility has significant commercial development around it but also housing to the south as close as 115 feet from the closest equipment as shown in the aerial map below.

14 - Chisholm Grid Energy Storage

This 200 MW battery storage system is located at 9400 Asphalt Drive, Fort Worth, Texas. This is a new facility and in close proximity to those homes near the substation.

The property to the west of the BESS is an asphalt plant with a lot of vacant land separating the homes from the active plant. Still this complicates any analysis of this from an impact analysis standpoint. I therefore have not attempted to do so.

15 – Port Lavaca BESS

This 9.9 MW battery storage system is located in Port Lavaca, Texas. It was built in 2020 and is entirely surrounded by agricultural and utility uses. I have not attempted any impact analysis on this facility.

16 - BRP Magnolia BESS

This 9.95 MW battery storage system is located off Floyd Road, League City, near Houston, Texas. There have not been any adjoining home sales since it was built so no analysis is currently possible. The adjoining homes are between 180 and 200 feet from the BESS equipment.

Summary

I was able to complete paired sales analysis on three of these situations with data coming from Ozone Park in NY, Gambit in TX and McHenry in IL.

The paired sales analysis identifies no impact on adjoining properties based on actual home sales adjoining similar projects.

Most of the situations identified showed homes closer to a BESS than the sales identified. But I can only measure for impacts once a home has sold.

The sales data supports a finding of no impact on property value for homes ranging from 180 to 345 feet from the nearest equipment. The proposed project has no home closer than 200 feet, which is sufficient to protect property value as shown by these comparables.

XV. Conclusion

The matched pair analysis shows no negative impact in home values due to abutting or adjoining a solar farm as well as no impact to abutting or adjacent vacant residential or agricultural land. The criteria that typically correlates with downward adjustments on property values such as noise, odor, and traffic all support a finding of no impact on property value.

Very similar solar farms in very similar areas have been found by hundreds of towns and counties not to have a substantial injury to abutting or adjoining properties, and many of those findings of no impact have been upheld by appellate courts. Similar solar farms have been approved adjoining agricultural uses, schools, churches, and residential developments.

I have found no difference in the mix of adjoining uses or proximity to adjoining homes based on the size of a solar farm and I have found no significant difference in the matched pair data adjoining larger solar farms versus smaller solar farms. The data in the Southeast is consistent with the larger set of data that I have nationally, as is the more specific data located in and around North Carolina.

Based on the data and analysis in this report, it is my professional opinion that the solar farm proposed at the subject property will have no negative impact on the value of adjoining or abutting property. I note that some of the positive implications of a solar farm that have been expressed by people living next to solar farms include protection from future development of residential developments or other more intrusive uses, reduced dust, odor and chemicals from former farming operations, protection from light pollution at night, it is quiet, and there is no traffic.

The BESS component will be at least 200 feet from nearby homes and sufficient to protect adjoining property value, which therefore also supports a finding of no impact on property value.

XVI. Certification

I certify that, to the best of my knowledge and belief:

1. The statements of fact contained in this report are true and correct;

2. The reported analyses, opinions, and conclusions are limited only by the reported assumptions and limiting conditions, and are my personal, unbiased professional analyses, opinions, and conclusions;

3. I have no present or prospective interest in the property that is the subject of this report and no personal interest with respect to the parties involved;

4. I have no bias with respect to the property that is the subject of this report or to the parties involved with this assignment;

5. My engagement in this assignment was not contingent upon developing or reporting predetermined results;

6. My compensation for completing this assignment is not contingent upon the development or reporting of a predetermined value or direction in value that favors the cause of the client, the amount of the value opinion, the attainment of a stipulated result, or the occurrence of a subsequent event directly related to the intended use of the appraisal;

7. The reported analyses, opinions, and conclusions were developed, and this report has been prepared, in conformity with the requirements of the Code of Professional Ethics and Standards of Professional Appraisal Practice of the Appraisal Institute;

8. My analyses, opinions and conclusions were developed, and this report has been prepared, in conformity with the Uniform Standards of Professional Appraisal Practice.

9. The use of this report is subject to the requirements of the Appraisal Institute relating to review by its duly authorized representatives;

10. I have not made a personal inspection of the property that is the subject of this report, and;

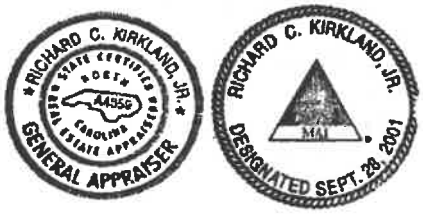
11. No one provided significant real property appraisal assistance to the person signing this certification.

12. As of the date of this report I have completed the continuing education program for Designated Members of the Appraisal Institute;

13. I have not performed services, regarding the property that is the subject of this report within the three-year period immediately preceding acceptance of this assignment.

Disclosure of the contents of this appraisal report is governed by the bylaws and regulations of the Appraisal Institute and the National Association of Realtors.

Neither all nor any part of the contents of this appraisal report shall be disseminated to the public through advertising media, public relations media, news media, or any other public means of communications without the prior written consent and approval of the undersigned.



Richard C. Kirkland, Jr., MAI
State Certified General Appraiser

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Professional Experience

Kirkland Appraisals, LLC, Raleigh, N.C. Commercial appraiser	2003 – Present
Hester & Company, Raleigh, N.C. Commercial appraiser	1996 – 2003

Professional Affiliations

MAI (Member, Appraisal Institute) designation #11796	2001
NC State Certified General Appraiser # A4359	1999
VA State Certified General Appraiser # 4001017291	
SC State Certified General Appraiser # 6209	
KY State Certified General Appraiser # 5522	
TN State Certified General Appraiser # 6240	
FL State Certified General Appraiser # RZ3950	
GA State Certified General Appraiser # 321885	
MI State Certified General Appraiser # 1201076620	
PA State Certified General Appraiser # GA004598	
OH State Certified General Appraiser # 2021008689	
IN State Certified General Appraiser # CG42100052	
IL State Certified General Appraiser # 553.002633	
LA State Certified General Appraiser # APR.05049-CGA	

Education

Bachelor of Arts in English, University of North Carolina, Chapel Hill	1993

Continuing Education

Appraisal of Industrial and Flex Buildings	2023
Commercial Land Valuation	2023
Fair Housing, Bias and Discrimination	2023
Pennsylvania State Mandated Law for Appraisers	2023
What NOT to Do (NCDOT Course)	2023
The Income Approach – A Scope of Work Decision	2023
Valuation of Residential Solar	2022
Introduction to Commercial Appraisal Review	2022
Residential Property Measurement and ANSI	2022
Business Practices and Ethics	2022
Uniform Standards of Professional Appraisal Practice Update	2022
Sexual Harassment Prevention Training	2021
Appraisal of Land Subject to Ground Leases	2021
Michigan Appraisal Law	2020
Uniform Standards of Professional Appraisal Practice Update	2020
Uniform Appraisal Standards for Federal Land Acquisitions (Yellow Book)	2019

The Cost Approach	2019
Income Approach Case Studies for Commercial Appraisers	2018
Introduction to Expert Witness Testimony for Appraisers	2018
Appraising Small Apartment Properties	2018
Florida Appraisal Laws and Regulations	2018
Uniform Standards of Professional Appraisal Practice Update	2018
Appraisal of REO and Foreclosure Properties	2017
Appraisal of Self Storage Facilities	2017
Land and Site Valuation	2017
NCDOT Appraisal Principles and Procedures	2017
Uniform Standards of Professional Appraisal Practice Update	2016
Forecasting Revenue	2015
Wind Turbine Effect on Value	2015
Supervisor/Trainee Class	2015
Business Practices and Ethics	2014
Subdivision Valuation	2014
Uniform Standards of Professional Appraisal Practice Update	2014
Introduction to Vineyard and Winery Valuation	2013
Appraising Rural Residential Properties	2012
Uniform Standards of Professional Appraisal Practice Update	2012
Supervisors/Trainees	2011
Rates and Ratios: Making sense of GIMs, OARs, and DCFs	2011
Advanced Internet Search Strategies	2011
Analyzing Distressed Real Estate	2011
Uniform Standards of Professional Appraisal Practice Update	2011
Business Practices and Ethics	2011
Appraisal Curriculum Overview (2 Days – General)	2009
Appraisal Review - General	2009
Uniform Standards of Professional Appraisal Practice Update	2008
Subdivision Valuation: A Comprehensive Guide	2008
Office Building Valuation: A Contemporary Perspective	2008
Valuation of Detrimental Conditions in Real Estate	2007
The Appraisal of Small Subdivisions	2007
Uniform Standards of Professional Appraisal Practice Update	2006
Evaluating Commercial Construction	2005
Conservation Easements	2005
Uniform Standards of Professional Appraisal Practice Update	2004
Condemnation Appraising	2004
Land Valuation Adjustment Procedures	2004
Supporting Capitalization Rates	2004
Uniform Standards of Professional Appraisal Practice, C	2002
Wells and Septic Systems and Wastewater Irrigation Systems	2002
Appraisals 2002	2002
Analyzing Commercial Lease Clauses	2002
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Preparation for Litigation	2000
Appraisal of Nonconforming Uses	2000
Advanced Applications	2000
Highest and Best Use and Market Analysis	1999
Advanced Sales Comparison and Cost Approaches	1999
Advanced Income Capitalization	1998
Valuation of Detrimental Conditions in Real Estate	1999
Report Writing and Valuation Analysis	1999
Property Tax Values and Appeals	1997
Uniform Standards of Professional Appraisal Practice, A & B	1997
Basic Income Capitalization	1996

Franklintown Farm Solar Project

Franklintown Farm, LLC

Jefferson County, West Virginia

Glare Analysis

August 12, 2024

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Summary

Franklintown Farm, LLC is proposing to construct photovoltaic (PV) arrays in Jefferson County, West Virginia (*Figure 1*). On behalf of Franklintown Farm, LLC, Capitol Airspace performed an independent glare analysis utilizing ForgeSolar's GlareGauge toolset to identify the potential for glare impacts. Specifically, this analysis considered the potential for glare impacts on High View Farm Airport (61VA) approaches, as well as nearby residences, roadways, and railroads.

The results of this analysis indicate that there are no predicted glare occurrences for High View Farm Airport (61VA) approaches as a result of the proposed single-axis tracking PV arrays. Additionally, it should be noted that the current FAA policy no longer considers the potential for glare impacts on aircraft approach paths resulting from off-airport PV projects. Since High View Farm (61VA) does not have an air traffic control tower (ATCT), an assessment of potential glare impacts on ATCT personnel was not required.

The results of this analysis predict green glare occurrences for a nearby roadway as a result of the proposed single-axis tracking PV panel array. These results are based on the application of FAA glare standards in the absence of non-aviation regulatory guidelines.

Figure 1: Franklintown Farm Solar project PV panel area (gray) with GlareGauge sub-array assessment areas (purple outlines)

Methodology

In cooperation with the Department of Energy (DOE), the FAA developed and validated the Sandia National Laboratories Solar Glare Hazard Analysis Tool (SGHAT), now licensed through ForgeSolar as GlareGauge. ForgeSolar has enhanced GlareGauge for glare hazard analysis beyond the aviation environment. These enhancements include a route module for analyzing roadways as well as an observation point (OP) module for analyzing residences. However, it should be noted that GlareGauge does not automatically account for physical obstructions between reflectors and receptors.

GlareGauge analyzes the potential for glare over the entire calendar year in one-minute intervals from when the sun rises above the horizon until the sun sets below the horizon. The glare hazard determination relies on several approximations including observer eye characteristics, angle of view, and typical blink response time. When GlareGuage identifies glare, the associated ocular impact is quantified into three categories based on the retinal irradiance and subtended angle (size/distance) of the glare source. These three categories are Green – low potential for after-image, Yellow – potential for after-image, and Red – potential for retinal burn (***Figure 2***).

The FAA policy for *Review of Solar Energy System Projects on Federally Obligated Airports* requires that proposed on-airport solar projects will not result in ocular impacts (no glare of any category) on the airport's ATCT cab. Although not required, the FAA encourages that off-airport solar energy systems in proximity to airports with ATCTs are assessed for potential ocular impact.

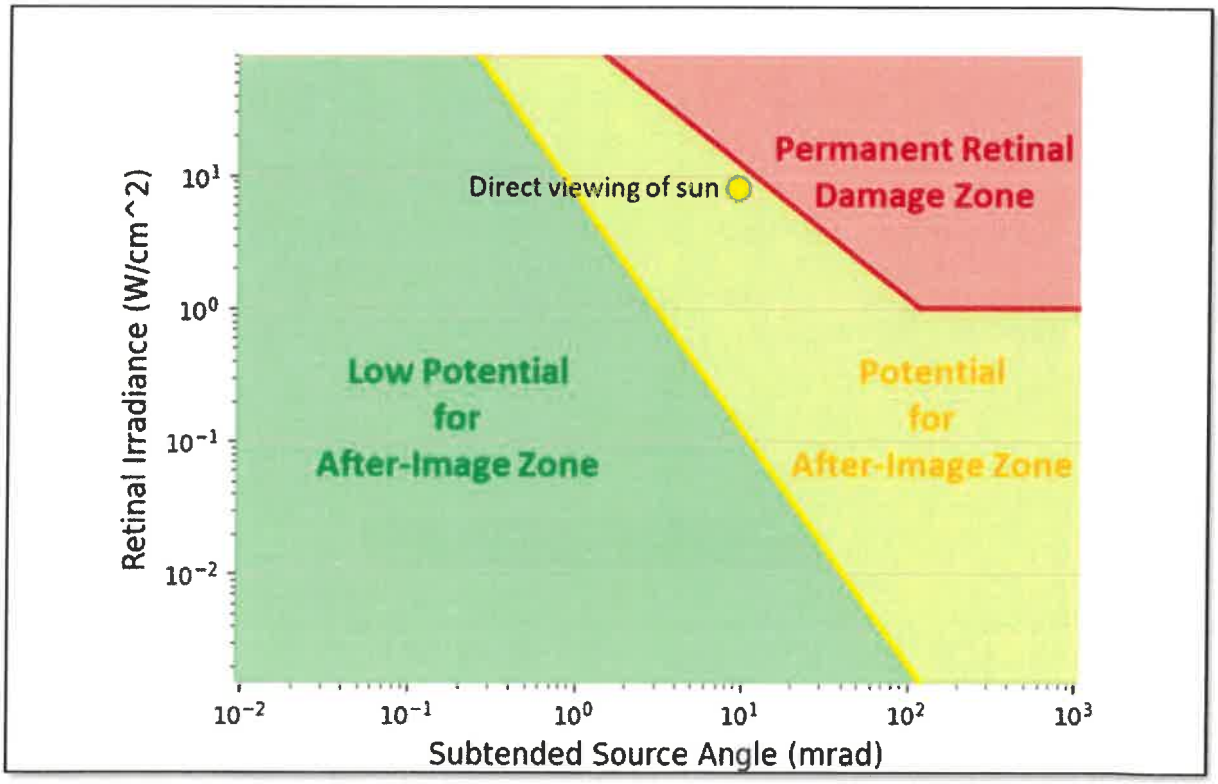

Figure 2: GlareGauge glare hazard plot depicting ocular impact as a function of retinal irradiance and subtended source angle

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Data

Capitol Airspace conducted this analysis in accordance with industry best practices and, as appropriate, the FAA policy for *Review of Solar Energy System Projects on Federally Obligated Airports (86 FR 25801)*. This included the assessment of impact upon low-level ground receptors (e.g., houses and roads) within one-half statute mile of the study area, as well as airport approach paths within five statute miles of the study area. Aerial imagery was used to determine observation point receptor locations in collaboration with Franklintown Farm, LLC. The USGS 1/3 arc-second Digital Elevation Model (DEM) was used to determine observation point ground elevations.

PV array specifications (***Table 1***) as well as location and height information were provided by Franklintown Farm, LLC. Based on this data, the single-axis tracking arrays will rotate to track the sun through the range of rotation determined by the maximum tracking angle. When the sun's position is outside the range of rotation, the single-axis tracking arrays will use a slope-aware shade backtracking strategy to reduce row-to-row shading (***Figure 3***). Backtracking will begin and end at a 10-degree resting angle as defined by the Resting Angle/Backtracking Limit parameter.

Runway end coordinates, elevations, threshold crossing heights (TCH), and visual glidepath angles (VGPA) were obtained from the FAA National Flight Data Center (NFDC) National Airspace System Resource (NASR) dataset. When the NASR dataset did not contain this data, or contained erroneous data, aerial imagery, the United States Geological Survey (USGS) 1/3 arc-second Digital Elevation Model (DEM), and the FAA approved default settings (TCH: 50 feet, VGPA: 3.00°) were used.

Table 1: Franklintown Farm Solar project PV array specifications

Parameter	Value
Rotation Axis Height	6 feet
Axis Tracking	Single-axis rotation
Tracking Axis Orientation	180°
Max Tracking Angle	±55°
Backtracking Strategy	Shade-slope
Resting Angle/Backtracking Limit	10°
Ground Coverage Ratio (GCR)	0.46
Panel Material	Smooth, With Anti-Reflection Coating

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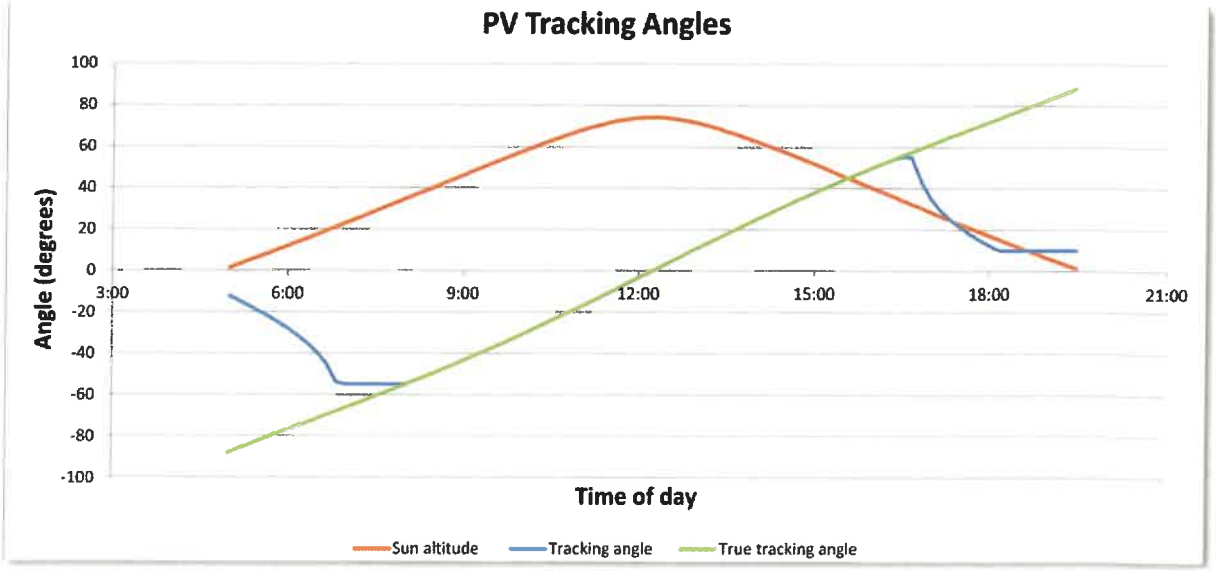

Figure 3: Sample PV panel tracking angle plot for June 21st

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Results

High View Farm Airport (61VA)

GlareGauge assessed the potential for glare occurrences along two approach path receptors (hashed black lines, *Figure 4*). Each approach path was assessed using a pilot restricted view with a vertical view restriction of 30 degrees downward and an azimuthal view restriction of 50 degrees left and right (100-degree total field-of-view). The GlareGauge results do not predict glare occurrences for any approach paths as a result of single-axis tracking PV arrays.

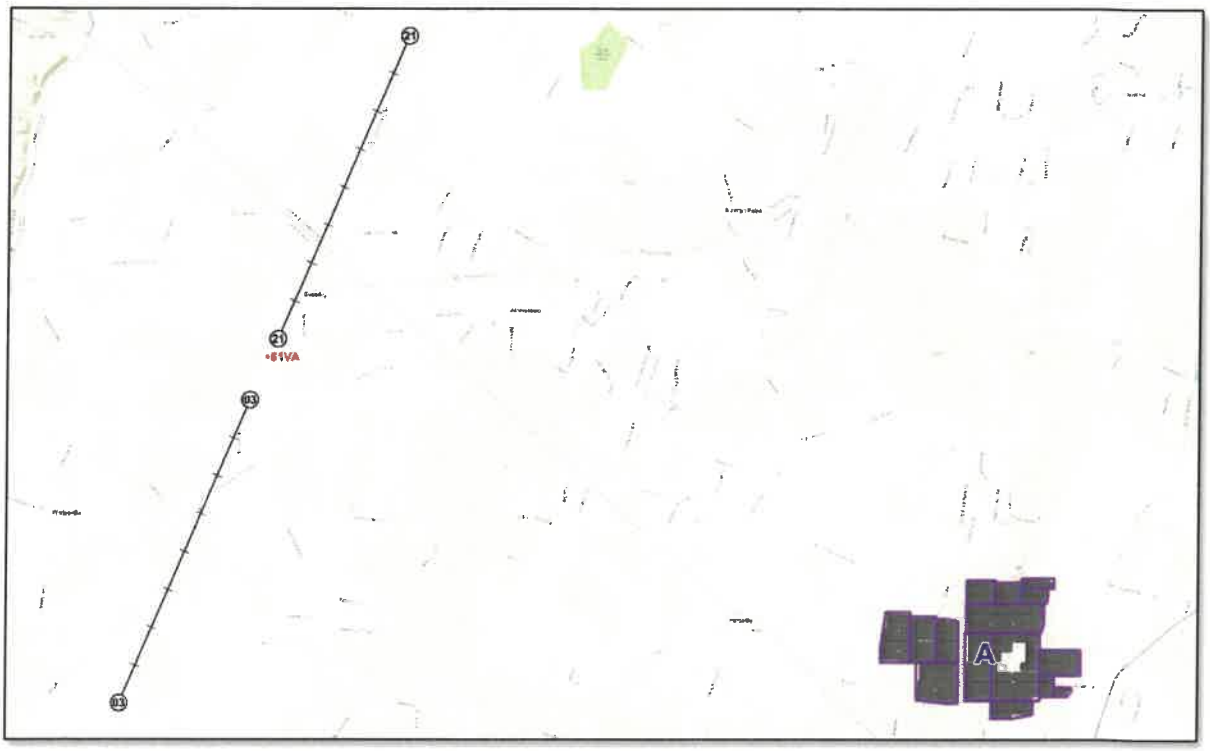

Figure 4: High View Farm Airport (61VA) approach paths (hashed black lines) in proximity to the Franklintown Farm Solar project

Runway 03

The GlareGauge results do not predict glare occurrences along the approach path.

Runway 21[1]

The GlareGauge results do not predict glare occurrences along the approach path.

[1] High View Farm Airport (61VA) contains erroneous runway end location placement provided in NASR for Runway 21. Therefore, Capitol Airspace corrected and assessed this flight path using aerial imagery.

Observation Points

GlareGauge assessed the potential for glare occurrences at 208 discrete observation point receptors (black points, *Figure 5*). Each observation point was assessed at an eight-foot first story viewing height and a 16-foot second story viewing height. The GlareGauge results do not predict glare occurrences for any of the 208 observation points at either viewing height as a result of single-axis tracking PV arrays.

Figure 5: Discrete observation point receptors (black points) in proximity to the Franklintown Farm Solar project

Routes

GlareGauge assessed the potential for glare occurrences along 24 route receptors. Each of the 23 roadways (dashed black lines, *Figure 6*) was assessed at a four-foot car viewing height and an eight-foot truck viewing height. The railroad (hashed black line, *Figure 6*) was assessed at a 12-foot locomotive cab viewing height. The GlareGauge results do not predict glare occurrences for 23 of the 24 route receptors, including the railroad, as a result of single-axis tracking PV arrays.

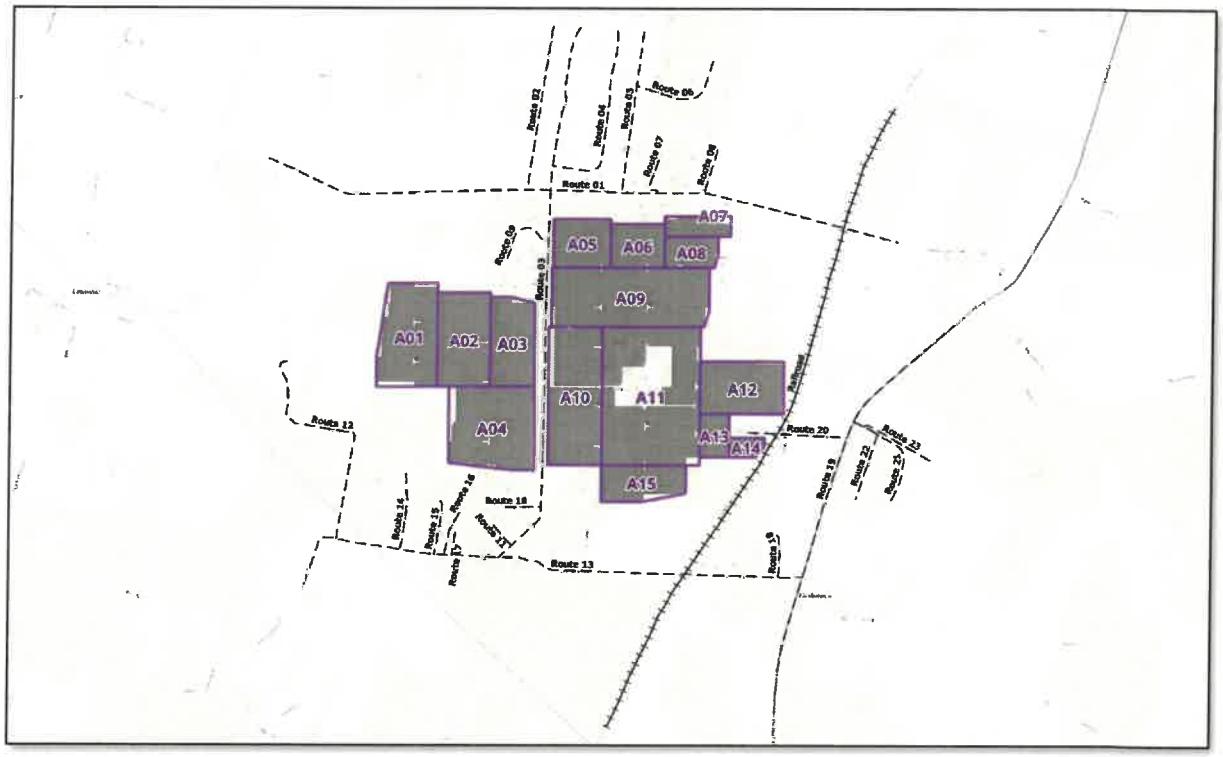

Figure 6: Route receptors (dashed and hashed black lines) in proximity to Franklintown Farm Solar project

The GlareGauge results predict brief green glare occurrences for one of the 24 route receptors in the morning and afternoon from November to January (*Table 2* & *Figure 8*). Specifically, green glare would emanate from sub-array A04 (faded green area, *Figure 7*). Green glare is associated with a low potential for temporary after-image. These results are based on the application of FAA glare standards in the absence of non-aviation regulatory guidelines.

It is important to note that the glare resulting from the proposed single-axis tracking arrays occurs during late-afternoon backtracking when the sun altitude is no greater than 25 degrees above the horizon. Capitol Airspace conducted additional analysis to determine the backtracking limit that would eliminate the identified glare occurrences. The results of the mitigation analysis determined that no backtracking limit would completely eliminate the predicted green glare occurrences.

Table 2: Predicted glare occurrences for route receptors in proximity to the Franklintown Farm Solar project

Receptor	Glare	Date		Monthly Frequency	Time (HH:MM)		Daily Duration (Minutes)	
		Start	End		Earliest	Latest	Longest	Average
Route 01	None	-	-	-	-	-	-	-
Route 02	None	-	-	-	-	-	-	-
Route 03	Green	26-Nov	14-Jan	Contiguous	10:19	16:29	40	25
Route 04	None	-	-	-	-	-	-	-
Route 05	None	-	-	-	-	-	-	-
Route 06	None	-	-	-	-	-	-	-
Route 07	None	-	-	-	-	-	-	-
Route 08	None	-	-	-	-	-	-	-
Route 09	None	-	-	-	-	-	-	-
Route 10	None	-	-	-	-	-	-	-
Route 11	None	-	-	-	-	-	-	-
Route 12	None	-	-	-	-	-	-	-
Route 13	None	-	-	-	-	-	-	-
Route 14	None	-	-	-	-	-	-	-
Route 15	None	-	-	-	-	-	-	-
Route 16	None	-	-	-	-	-	-	-
Route 17	None	-	-	-	-	-	-	-
Route 18	None	-	-	-	-	-	-	-
Route 19	None	-	-	-	-	-	-	-
Route 20	None	-	-	-	-	-	-	-
Route 21	None	-	-	-	-	-	-	-
Route 22	None	-	-	-	-	-	-	-
Route 23	None	-	-	-	-	-	-	-
Railroad	None	-	-	-	-	-	-	-

Figure 7: Route 03 with segments receiving glare (green lines) from Sub-Array A04

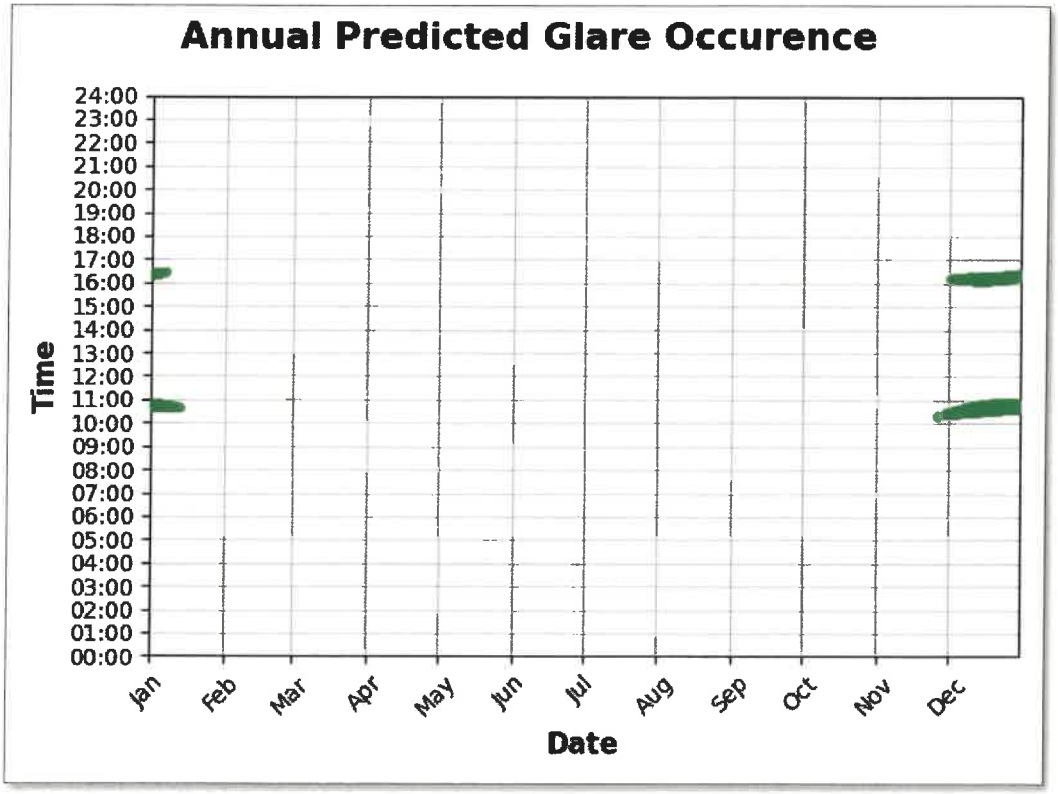

Figure 8: Annual predicted glare occurrence plot for Route 03

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Conclusion

Capitol Airspace performed a glare analysis utilizing ForgeSolar's GlareGauge toolset to identify the potential for glare impacts resulting from the proposed Franklintown Farm Solar project. Specifically, this analysis considered the potential for glare impacts on High View Farm Airport (61VA) approaches. This analysis also considered the potential for glare impacts on low-level receptors like residences, roadways, and railroads in proximity to the proposed arrays.

Aircraft Approaches

GlareGauge does not predict glare occurrences for aircraft approaching High View Farm Airport (61VA). Additionally, it should be noted that the current FAA policy no longer considers the potential for glare impacts on aircraft approach paths resulting from off-airport PV projects. Since High View Farm Airport (61VA) does not have an ATCT, an assessment of potential glare impacts on ATCT personnel was not required.

Low-Level Receptors

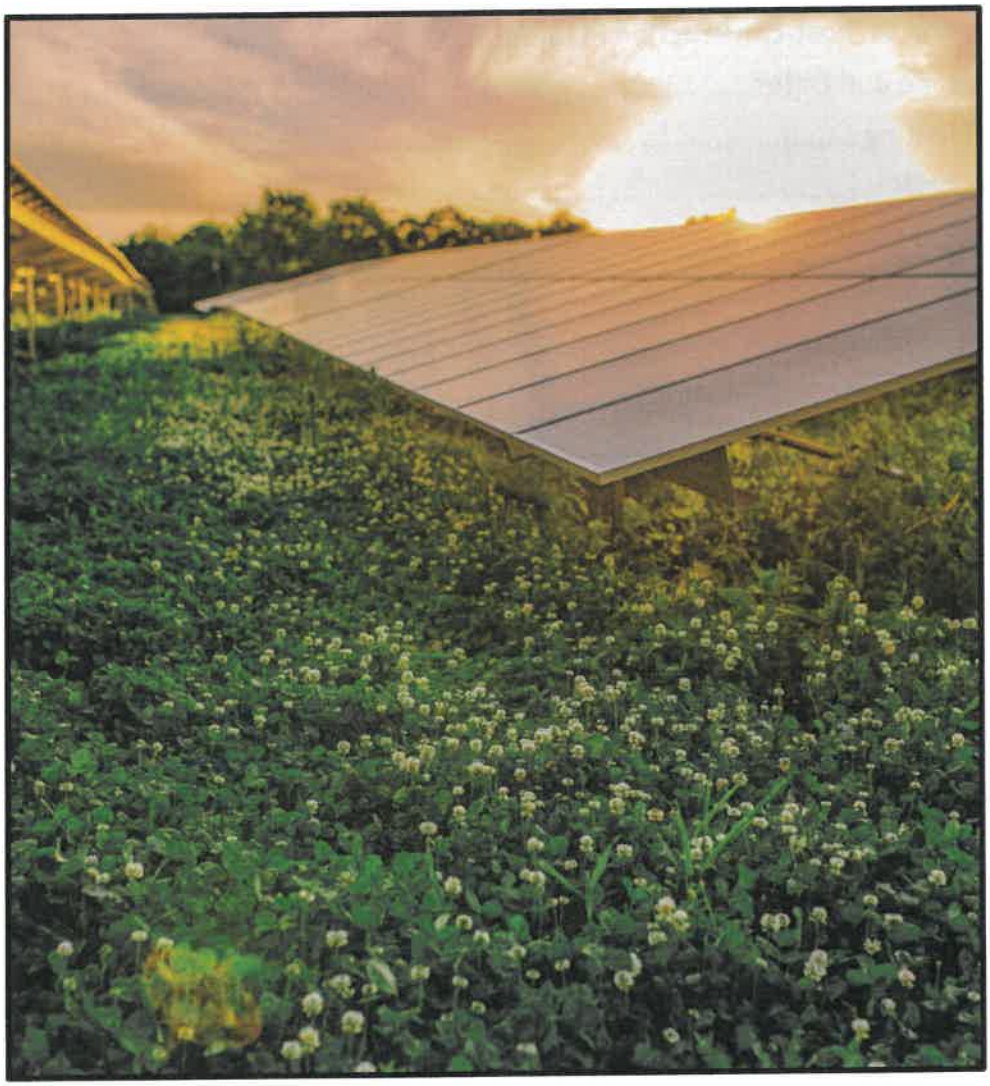
GlareGauge predicts green glare occurrences for a nearby residence and roadways from November to January. The glare resulting from the proposed single-axis tracking array occurs during morning and afternoon backtracking when sun altitude angles are no greater than 25 degrees above the horizon. Capitol Airspace conducted additional analysis to determine the backtracking limit that would eliminate the identified glare occurrences. The results of the mitigation analysis determined that no backtracking limit would completely eliminate the predicted green glare occurrences.

These results are based on the application of FAA glare standards in the absence of non-aviation regulatory guidelines. As noted in the methodology, this glare analysis does not consider vegetation, fencing, or other natural obstructions. This glare analysis takes the most conservative approach in assessing the possibility of glare occurrences.

The GlareGauge component data used to conduct this analysis is available upon request. If you have any questions regarding the findings in this analysis, please contact ***Rick Coles*** or ***Travis Harrison*** at (703) 256-2485.

Franklintown Solar

Vegetation Management Plan



CONSERVATION BLUEPRINT

RECEIVED
AUG 2 2 2024
JEFFERSON COUNTY PLANNING
ZONING & ENGINEERING

Developed by Conservation Blueprint, LLC.
for Franklintown Solar LLC

Prepared: April 2024
Revised: August 2024

* Submitted by applicant on 08-22-2024

Table of Contents

Introduction

Franklintown Solar LLC (Franklintown) is developing a solar energy facility that is planned to cover approximately 461 acres in Jefferson County, West Virginia and generate up to 80 megawatts of energy. The solar facility is being built with a typical minimum lower panel height between the ground and the leading edge of the panel of 20". Franklintown has developed this Vegetation Management Plan (VMP) to guide the activities of site preparation, installation of prescribed seed mixtures, management and control of invasive species and noxious weeds and the overall management of the established vegetation on the site.

The primary goal of this plan is to provide detailed guidance on how to establish a final vegetative cover that works with project operations, increases the benefits of plant diversity on the site, controls erosion and runoff, controls invasive plant species on the site and works with long-term management and maintenance on the site. In addition, Franklintown is working with The Bee and Butterfly Habitat Fund (BBHF) to enroll this site into their Solar Synergy program (SolarSynergy - BEE AND BUTTERFLY HABITAT FUND (beeandbutterflyfund.org). This program is designed to incorporate pollinator heath and habitat benefits into the site's vegetation management as well as document climate change attributes like carbon sequestration changes on the site over time.

This plan addresses the proposed revegetation and vegetation management within the project boundary of Franklintown. This plan provides guidance on the existing site conditions, site preparation methods, seed mixtures, planting methods and maintenance recommendations to meet the vegetation goals over the 35-year lifespan of the Franklintown Solar facility.

This document is intended to apply adaptive management practices, implement Integrated Vegetation Management approaches, and serve as a working document. Updates and revisions will be made as new information is obtained with respect to the vegetation management, site characteristics and availability of management practices at the time of procurement of services. The successful establishment and management of vegetation that produces pollinator health and habitat benefits requires a specific plan that incorporates several fundamental steps for the site preparation, planting, seed mixture design and future management of the planting.

One of the most important aspects of the Franklintown Vegetation Management Plan and its guidance is to ensure the invasive, early successional plant species that will show up on the site are controlled quickly and not allowed to become established. There are five primary tools available for site managers to control invasive, early successional plant species. Those tools and how they are to be implemented are described in detail in this plan and are a combination of:

1. The timing and frequency of mechanical and/or herbicide weed control.
2. Establishing cover crops with an allelopathic nature.
3. The timing and planting method of final vegetative cover establishment.
4. The application of management activities to the final vegetative cover planting.
5. Site monitoring by a vegetation expert on a scheduled basis to identify vegetative needs and their proposed solutions.

Vegetation Installation Plan

1. Crop Herbicide Residual Affect Review.

For areas of the project that were cropped in the past 2 years, it is critical that the herbicide use history for that entire period be obtained and reviewed prior to the planting of the project seed mixtures. Because some herbicides likely used on the site to produce both Corn and Soybeans can remain active in the soil for as long as 18 to 24 months, the past herbicide use needs to be considered to ensure that a potential herbicide residual affect period will not negatively impact the establishment of the project seed mixtures or individual components of the seed mixture.

The vegetation installation company installing the vegetative cover on Franklintown will have soil suitability tests conducted on the site to determine if there is an herbicide residual on the site and to assess the soil's nutrient availability. Soil tests will be conducted by a qualified agronomic laboratory. All tests will be completed before seed mixtures are scheduled for planting and with enough lead time to develop alternative strategies and/or seed mixtures if an herbicide residual effect is identified.

If a past crop herbicide use on the site is listed as having a residual affect that would negatively impact the germination and growth of any of the seed mixture components, a cover crop mixture will be designed by a vegetation management specialist and established to bridge the herbicide residual affect period.

2. Site Preparation Activities

Proper site preparation is the single, most important factor that will determine both the initial establishment and the long-term success of the final vegetative cover planting. All site preparation activities will be conducted in a manner to maintain compliance with the Storm Water Pollution Prevention Plan (SWPPP).

Areas of the project that are in existing grassland vegetation and have not had that cover removed or terminated because of grading activities, agricultural crop production, tree removal or site construction will have that vegetation maintained on the site as the final vegetative cover.

The areas of the project identified for planting the Solar Array Area and Buffer Area Seed Mixtures have all had, or will have, a significant portion of the existing vegetation on the sites removed and controlled through the agricultural practices, tree removal or grading activities conducted on them. These locations will very likely have invasive, early successional plant species (weeds) start showing up on them as soon as agricultural crops and their herbicide applications are concluded, or the grading activities have removed the existing vegetation.

Some of the conditions that need to be achieved for proper site preparation include:

- A planting surface that is free of stones, soil clods, large roots, branches, construction materials or other materials that may negatively affect the planting and seedling development.
- Soils with sufficient pore space in them to permit the root development and penetration of seedlings. This is important both for the establishment of the seed mixture as well as the ability of the site to percolate moisture into and through the soil in the future.
- Soil compaction rates of 200 pounds per square inch or less.
- Adequate nutrients (N, P and K) for seed germination and seedling growth.
- Fine-grained soil materials that can maintain and hold soil moisture and nutrients.
- Site civil design and construction must achieve adequate drainage to prevent ponding or saturated soils. Stormwater management features operating as designed.
- The final seed bed should be characterized by a loose, firm, and smooth soil that will aid in seed to soil contact required for a successful final vegetative cover planting and establishment.

Step 1: Areas of the project that are growing agricultural crops in 2025 prior to Franklintown construction should be encouraged to have their final agricultural crop be planted to soybeans. Planting the areas of the site that are in agricultural production to soybeans prior to the establishment of the final vegetative cover produces several significant benefits:

- The soybean crop will naturally fix nitrogen from the atmosphere into the soil that will be a boost to the growth and establishment of the final vegetative cover planting.
- This crop will not produce the furrows or extensive crop residue that will be found in fields that were planted to corn. This can help reduce the amount of additional tillage activities needed to prepare the site for planting.
- This crop and the amount of residue associated with it would allow for the site to be broadcast seeded during the winter if that is the planting option that is selected.
- There is a significantly reduced likelihood of soybean crops producing an adverse and long-term herbicide residual effect compared to high likelihood of an adverse and long-term herbicide residual effect with corn and other agricultural crops.

Step 2: Prior to planting the final vegetative cover seed mixtures, apply two tillage activities to the locations of the project that were formerly agricultural fields. Tillage activities are applied to former crop fields to level out the crop rows (furrows), reduce crop residue that were the result of agricultural activities and/or terminate any existing weed growth that has started on the site. Crop rows and furrows will likely be common on agricultural fields that were formerly planted to corn. The first tillage application should be a vertical tillage to remove the rows in the field but should not be conducted deeper than 3". Tillage activities that are conducted deeper than 3" will disrupt the soil structure making the site slower to dry out following rain events and more susceptible to ruts and compaction during the construction process. The second tillage application should be applied with a field finisher. The preferred timeline for tillage application should be as early in the spring as field conditions will allow.

Step 3: Following the completion of tillage or grading activities, the solar array area seed mixture or the cover crop seed mixture should be planted within 48 hours. Failure to plant the seed mixture as soon as possible following the tillage or grading activities allows the soil to dry out and decreases the value of the seed bed for seed germination.

Step 4: If the planting of the final vegetative cover or the cover crop is not able to be completed within 48 hours of final tillage, the site shall be monitored for the emergence of weeds. If the timeline of activities on the project has allowed volunteer plants to develop and show up on the site, a Glyphosate herbicide application will be applied to eliminate those plants from the seed bed.

A Glyphosate application will eliminate winter annual and/or early spring plant growth that will be highly competitive to a newly established final vegetative cover. Existing vegetation will be terminated with a Glyphosate herbicide application. Glyphosate herbicide application will be applied in the following manner:

- Apply a Glyphosate herbicide application at a rate of 2 quarts/acre.
- Herbicide should be applied while air temperatures are between 60° and 85°F.
- Herbicide should be applied when relative humidity is less than 80%.
- Herbicide should be applied with no more than 10 gallons of solution (herbicide plus water) per acre and include Ammonium Sulfate (AMS) at a rate of 17 pounds/100 gallons of water.
- Herbicide should be applied on a sunny or mostly sunny time of the day.
- Herbicide should not be applied within 2 hours of sunrise or sunset.
- Apply in manner where the herbicide makes contact with the still green and growing vegetation.

All herbicide applications used on the project shall be EPA-registered at that time of application, shall be applied by a current West Virginia licensed applicator, and shall only be applied in accordance with the label recommendations, applicable law, and landowner requirements.

Herbicide applications will not be required in areas of the project where the existing vegetation is being maintained on the site like rights-of-way, ditches, former pastures where grading activities did not occur, etc. Those areas will typically not need to be established with a new seeding of the array area seed mixture or a cover crop.

Site preparation activities that include tillage, grading, de-compacting soils, and other instances of soil disturbance will ultimately stimulate the germination of weed seeds that have remained dormant in the soil bank, sometimes for decades. If the site is planted with the solar array area seed mixture or a cover crop seed mix within 48 hours of soil disturbance, the negative effects from weed seed stimulation and growth can be reduced or mitigated.

In most cases, these seeds will be represented by invasive, weedy plant species that often come with an allelopathic effect that is detrimental to the establishment of a final vegetative cover. Having a plant(s) with an allelopathic nature refers to:

> *The beneficial or harmful effects of one plant on another plant by the release of chemicals from plant parts by leaching, root exudation, volatilization, residue decomposition and other processes in both natural and agricultural systems.* (Allelopathy - Wikipedia)

Challenging plant species known to occur on the site include kochia, ragweed, bindweed, mare's tail, pigweed, and other weedy plant species. These plant species can be difficult to control and produce significant management issues for the project into the future.

In all cases, these volunteer plant species should be controlled and removed from the site as soon, as completely and as quickly as possible. The worst-case scenario would be to have these species to appear on the site, be allowed to grow and produce the following problems:

- Becoming competitive with a newly established final vegetative cover.
- Be allowed to grow to the point of producing an allelopathic effect on the planted and newly established final vegetative cover.
- Produce a viable seed creating a situation that negatively affects both the establishment of the final vegetative cover for the project and produce significant, costly management issues going forward.

If these volunteer plant species are allowed to grow and expand without early and timely management activities being applied, they may jeopardize the successful establishment of the final vegetative cover.

3. Pre-construction vs. Post-construction Planting Strategies

Option 1: Pre-Construction Final Vegetative Cover Establishment

Establishment of a final vegetative cover in a pre-construction fashion is preferred and will be determined based on how much of the site will be graded and how much of the site will need to be replanted based on construction activities. Establishing the final cover pre-construction offers several key advantages that include:

- Not needing to establish and subsequently manage and/or terminate a cover crop.
- Being able to complete all the necessary site preparation activities more effectively.
- Being able to plant the entire site with a no-till grass drill that will increase the seed germination rate and shorten the timeline needed to achieve fully established vegetation. This technique will produce the best results for a well-established final vegetative cover.
- Eliminating the outcome where the final vegetative cover is established differently under the solar panels vs. in the alley rows.

- Establishing the final cover in a manner that will allow for more effective and complete weed control and management.

In general, pre-construction establishment of the cover is a cost-effective option when 30% or less of the site will be graded or have the final vegetative cover destroyed through construction activities.

Option 2: Post-Construction Final Vegetative Cover Establishment

If the decision is made to establish the final vegetative cover during or following construction, the site will be prepared following the Site Preparation Activities listed in this VMP and then established to a cover crop as early in the growing season as possible. The cover crop will provide soil stabilization and weed suppression throughout the construction period until a timeline and condition has been reached to plant the final vegetative cover. A cover crop on the site will be established using one of the cover crop options listed in Appendix E. The final vegetative cover will be established following construction on the site following the planting timelines and techniques listed (Appendix C).

Soil compaction greater than 200 pounds per square inch produces a negative planting environment by compressing soil particles together and reducing the pore space between those particles. Compacted soil does not have the pore spaces for newly germinated seeds to allow for root expansion and growth as well a reduced rate in water infiltration and drainage. Any soil compaction rates that exceed 200 pounds per square inch will negatively affect seed germination, plant growth and overall seeding establishment success and will require soil decompaction activities.

Prior to planting a seed mixture, the entity installing the final vegetative cover should test the level of soil compaction on the site. Any areas where the soil has been compacted by construction or agricultural activities that exceed 200 pounds per square inch will need to be de-compacted prior to replacing the topsoil and/or preparing the site for planting. For shallow decompaction, a disk may be used with a minimum of two passes. For deeper, more significant compaction, a winged subsoiler or straight ripper shank should be used followed by a disk with a minimum of two passes. Following soil decompaction efforts, the vegetation contractor will review the site to determine if additional soil decompaction efforts are necessary.

4. Planting Timeline and Dates

The available planting window for seed mixtures is determined by two primary factors: soil temperature and the available moisture both at the time of planting and for the next 80 days. In all cases, the final vegetative cover planting should begin within 48 hours following grading and other site preparation activities. Planting activities that occur more than 48 hours following soil disturbance activities increase the opportunity for significant weed competition on the site and/or drying out of soil moisture.

Solar Array Seed Mix: The approved seed mixture (Appendix A) can be planted following these timelines:

- Average Freeze Dates for Jefferson County, West Virginia: Please note these important dates that have been used for determining planting window availability (Interactive map: average date of last spring freeze across the United States | NOAA Climate.gov and Frost and Freeze Information (weather.gov):
  1. Average last freeze date in the spring is April 20th.
  2. Average first freeze date in the fall is November 1st.

- Any plantings that occur during the listed time periods using an air seeder, broadcast seeding or hydroseeder will require a minimum of 70 days and up to 140 days to germinate and develop seedling growth and secondary roots mature enough to survive the rigors of heat, drought and/or freezing (Appendix C).

  This is a longer period than would be observed if the same seed mixture were planted with a grass drill (a minimum of 55 days and up to 85 days) as the seed to soil contact conditions and access to moisture are highly variable. During this period, the seed germination and seedling growth is highly susceptible to impacts and delays from heat, lack of moisture and/or termination due to freezing.

- Planting may be completed using an air seeder, hydroseeder or no-till grass drill in the winter and spring between the time in the fall when the soil temperatures reach 50° F or less and May 31st. The goal of a spring planting should be to complete the planting as early in this timeline as possible. The seed mixture will be planted following the site preparation and cover crop options outlined in the Site Preparation and planting for seed mixture section of the Vegetation Management Plan.

- Planting may be completed using a broadcast seeding operation in the winter and spring between the time in the fall when the soil temperatures reach 50° F or less and April 30th. The seed mixture will be planted following the site preparation and cover crop options outlined in the Site Preparation and planting for seed mixture section of the VMP.

- Planting may be completed using an air seeder or hydroseeder in the late summer/early fall between the dates of August 1st and August 23rd. The goal of a fall planting should be to complete the planting as early in this timeline as possible. The seed mixture will be planted following the site preparation options outlined in the Site Preparation and cover crop section of the VMP.

- Planting may be completed using a no-till grass drill in the late summer/early fall between the dates of August 1st and September 7th. The goal of a fall planting should be to complete the planting as early in this timeline as possible. The seed mixture will be planted following the site preparation options outlined in the Site Preparation and cover crop section of the VMP.

  Planting outside of the listed planting window dates may make the newly establishing plants become highly susceptible to termination due to freezing. With an average first freeze date of November 1st, the latest date an air seeder or hydroseeder planting should be used during the growing season is August 23rd (70 days before the average first freeze) and the latest date a drill seeding should be used during the growing season is September 7th (55 Days to average first freeze) (Appendix C).

Array Area Seed Mix: Available Planting Dates by Planting Method

Planting Method	Spring		Late Summer		Winter - Dormant Seeding	
	Start Date	End Date	Start Date	End Date	Start Date	End Date
No-till Drill	February 15th	May 31st	August 1st	September 7th	Soil Temp @ 50° F or less	Until the Soil is Frozen
Hydro-seeder	February 15th	May 31st	August 1st	August 23rd	Soil Temp @ 50° F or less	February 15th
Air-seeder	February 15th	May 31st	August 1st	August 23rd	Soil Temp @ 50° F or less	February 15th
Broadcast seeding	February 1st	April 30th	N/A	N/A	Soil Temp @ 50° F or less	February 1st

Buffer Array Seed Mix: The approved seed mixture (Appendix B) can be planted following these timelines:

- Average Freeze Dates for Jefferson County, West Virginia: Please note these important dates that have been used for determining planting window availability (Interactive map: average date of last spring freeze across the United States | NOAA Climate.gov and Frost and Freeze Information (weather.gov):
  1. Average last freeze date in the spring is April 20th.
  2. Average first freeze date in the fall is November 1st.

- Any plantings that occur during the listed time periods using an air seeder, broadcast seeding or hydroseeder will require a minimum of 70 days and up to 140 days to germinate and develop seedling growth and secondary roots mature enough to survive the rigors of heat, drought and/or freezing (Appendix C).

  This is a longer period than would be observed if the same seed mixture were planted with a drill (a minimum of 55 days and up to 85 days) as the seed to soil contact conditions and access to moisture are highly variable. During this period, the seed germination and seedling growth is highly susceptible to impacts and delays from heat, lack of moisture and/or termination due to freezing.

- Planting may be completed using an air seeder, hydroseeder or no-till grass drill in the winter and spring between the time the soil temperatures reach 50° F or less and May 31st. The goal of a spring planting should be to complete the planting as early in this timeline as possible. The seed mixture will be planted following the site preparation and cover crop options outlined in the Site Preparation and planting for seed mixture section of the Vegetation Management Plan.

- Planting may be completed using a broadcast seeding operation in the winter and spring between the time the soil temperatures reach 50° F or less and April 30th. The seed mixture will be planted following the site preparation and cover crop options outlined in the Site Preparation and planting for seed mixture section of the VMP.

Buffer Area Seed Mix: Available Planting Dates by Planting Method

Planting Method	Spring		Late Summer		Winter - Dormant Seeding	
	Start Date	End Date	Start Date	End Date	Start Date	End Date
No-till Drill	February 15th	May 31st	N/A	N/A	Soil Temp @ 50° F or less	Until the Soil is Frozen
Hydro-seeder	February 15th	May 31st	N/A	N/A	Soil Temp @ 50° F or less	February 15th
Air-seeder	February 15th	May 31st	N/A	N/A	Soil Temp @ 50° F or less	February 15th
Broadcast seeding	February 1st	April 30th	N/A	N/A	Soil Temp @ 50° F or less	February 1st

5. Cover Crop Planting

For areas of the project being planted to the Solar Array Area and Buffer Area Seed Mixtures that were: 1) Formerly in agricultural crops, 2) Where the existing vegetation has been terminated, removed, or altered during construction or 3) Site preparation activities disturbed existing vegetation will be required to establish a cover crop if there is a timeline to bridge between when:

A) The vegetation has been removed and/or terminated and the start of an available listed planting timeline window for the final vegetative cover.

B) The start of the growing season and the establishment of the final vegetative cover following construction.

Cover crops will be seeded on these areas to comply with the project SWPPP using one of the cover crop options listed (Appendix E). Cover crops will be established using a broadcast seeding, air seeding, hydroseeding or no-till drill method. The preferred establishment technique will be to plant the cover crop using a no-till drill.

The primary role of a cover crop is to suppress weed competition and growth. For this reason, it is critically important that a cover crop seed mixture be used that has significant allelopathic attributes. Having a plant(s) with an allelopathic nature refers to:

The beneficial or harmful effects of one plant on another plant by the release of chemicals from plant parts by leaching, root exudation, volatilization, residue decomposition and other processes in both natural and agricultural systems. (Allelopathy - Wikipedia)

In this case, the cover crop selected should have the ability to produce an allelopathic effect and help to diminish the germination and growth of weed species seeds that are on the site. While many often view a cover crops role as soil stabilization and erosion control, the most important role for a cover crop on this project is weed growth suppression.

6. Planting Methods

All plant materials must be installed as outlined, at the correct time and as described in this Vegetation Management Plan. Any exceptions or changes to the installation must be approved by Franklintown and the contractor shall receive authorization in writing for any changes or deviations prior to the start of work.

The vegetation contractor will review the site and determine which planting method will produce the best final vegetative cover outcome. Depending on the seed mixture being planted and the listed available timelines for planting, seed mixtures may be planted using an air seeder, hydroseeder, no-till grass drill and/or by broadcast seeding. Seed mixtures that are being planted into a cover crop or other existing vegetation must be planted using a no-till grass drill unless that existing vegetation has been terminated and had the thatch removed to allow for sufficient seed to soil contact.

Air Seeder or Hydroseeder: For plantings that are established using an air seeder or hydroseeder, it is critically important that the site is prepared to provide a high ratio of seed to soil contact. If the seed being sown is blocked by existing or residual vegetation and does not contact the soil, it will not germinate and grow.

Additional considerations:

- The seed mixture and any inert material must all be thoroughly mixed at the time of planting.
- A cultipacker must be used on the site following seeding to ensure the area has a firm seed bed and increased seed to soil contact to produce greater seed germination rates.
- Because this is a more specialized version of broadcast seeding a seed mixture and not placing the seed into the ground as would be accomplished with a drill, seeding rates using this method must be increased by 30% from the rates listed with the seed mixture in Appendix A and B. Increased seeding rates are being required to account for seed loss due to environmental conditions and/or animal damage.

No-till Grass Drill: Establishing the final vegetative cover using a no-till grass drill is the most preferred planting method. For plantings that are established using a no-till grass drill, it is critically important to ensure that seeds are not planted too deep. The ideal planting depth for any seed is 2x the diameter of the seed. For the seed mixtures designed for the Franklintown project, the appropriate planting depth for the seed mixture is 1/8" to 1/4" and not any deeper.

A no-till grass drill is a piece of equipment that is designed to insert and/or place the seed into the soil and then cover the seed with a press wheel or a cultipacker. Using a piece of equipment described as an agricultural "seeder" does not constitute the use of a 'no-till grass drill' for the purposes of this vegetation management plan. The use of a "seeder" will be considered a broadcast seeding application that is followed with a cultipacker and would require a 30% increase in the seed mixture planting rate.

- For an example of a No-till Grass Drill, please view: FLEXII Series Grass Drill - TRUAX Company, Inc.
- For an example of an agricultural seeder, please view: Agricultural Seeders - Landoll

Broadcast Seeding: A broadcast seeding is the least preferred planting method of all the planting options listed in this VMP. This planting method is the most susceptible to weather fluctuations and limitations, will take the longest time to germinate and establish, requires a 30% increased seeding rate, and offers the most restricted set of planting window timeline options.

For plantings using a broadcast seeding method, it is critically important that the site be prepared to provide a high ratio of Seed to Soil contact. If the seed being broadcast does not contact the soil, it will not germinate and grow.

Additional considerations for broadcast seeding:

- On sites where significant soil disturbance has occurred prior to, or during, the planting process, a cultipacker must be used on the site following broadcast seeding to help ensure the area has a firm seed bed and increased seed to soil contact and seed germination rates.
- The seed mixture and any inert material must all be thoroughly mixed at the time of planting.
- Seed mixture seeding rates must be increased when broadcast seeding methods (ex: Hydro seeding, Air seeder, broadcaster, agricultural seeder, etc.) are being used to account for seed loss due to environmental conditions and/or animal damage. Broadcast seeding rates must be increased by 30%.
- Under optimal temperature and moisture conditions, the general timeline to establishment of the solar array area seed mixture based on planting technique applied:

Final Vegetative Cover Considerations	No-till Drill	Broadcast Seeding
Seed Germination Timeline	15 to 25 days	30 to 70 days
Minimum Timeline Needed for Seedling Growth & Maturity	40 to 60 days	40 to 70 days
Total Time Needed to Reach Minimal Establishment	**55 to 85 days**	**70 to 140 days**

7. Solar Array Area Seed Mixtures

Seed mixtures were designed to meet some very specific Franklintown and BBHF project objectives (Appendix G). These species have been reviewed and are commercially available at the time of the vegetation management plan development. The final seed mixture design and bid to be used on Franklintown will be provided following these seed mixture design components:

- Following the Solar Synergy program agreement between Franklintown and the BBHF, the solar array seed mixture will be sourced and obtained through the BBHF.
- Seed mixtures will exclude the use of Tier 1 and Tier 2 species from the list of Invasive Plant Species of West Virginia (Appendix F).
- The species included in the seed mixture shall be true to the scientific name as specified in the mixture listed in Appendix A and B. Seed mixture components will be listed by both common name and scientific name in the bidding and procurement process.
- All seed lots obtained for planting on the Franklintown project must be originally sourced from production fields within the United States of America (USA). No seed sources may be obtained that were sourced from outside of the USA.

- The seed mixture was designed and will be provided for Franklintown based on Pure Live Seed (PLS) Pounds/acre seeding rates and their corresponding seeds/ft^2 seeding rates (Appendix A).
- Seed mixtures designed and/or provided based on bulk pounds/acre will not be accepted.
- Seed lots used on the site must have a current test date that is less than 6 months old and document both the purity and germination rates of each and every individual component in the seed mixture. A single seed test that has been applied to the seed mixture will not be accepted.
- The seed tag generated for all seed mixtures procured for use on the site will contain the following information for each component of the seed mixture: Species Name, Lot Number, Purity, Germination Rate, Bulk pounds, PLS pounds, Percent of overall mixture, Test Date, Weed Seeds, Planting Rate per Acre, and Origin of the Seed (Appendix D).
- Seed mixture components must comply with the seed laws of the state the seed is being established in.
- No alterations have been made to the final seed mixture design. Any substitutions or changes to the seed mixtures must be approved by Franklintown in writing prior to approval and/or installation.
- The accepted seed mixture design being bid on and acquired will be reviewed and approved by a vegetation management specialist to ensure the listed seed mixture design requirements are correctly being met and have not been adjusted.

The Solar Array seed mixture was designed to include clover (*Trifolium* sp.) species to be able to withstand future mowing activities, provide significant regrowth opportunities, deliver soil health benefits, and produce significant pollinator health and habitat benefits (Appendix K). These species are regularly used in agricultural practices that include haying activities that remove the vegetation throughout the growing season.

An additional key consideration to the inclusion of clover or other native legume species in the array area seed mixture is their ability to naturally fix nitrogen. Several of the grass and forb species components of the array area seed mixture require a significant amount of nitrogen to be maintained successfully on the site each year. The inclusion of clover and other legume species in the seed mixture is a critical component that will produce significant long-term benefits to the grass establishment, growth, and longevity on the site.

In addition to the areas of the site inside the project fence that are currently identified for establishing a Solar Array Area seed mixture, there may be additional locations outside the project fence that will be established to a vegetative cover. In the event the projects' final location and design creates small or oddly shaped fields outside the fence, Franklintown may work with the adjoining landowners to establish a final vegetative cover seed mixture in locations they prefer to have returned or established to this vegetative cover.

8. Buffer Area Seed Mixtures

A Buffer Area seed mixture has been developed to enhance and expand the pollinator health and habitat benefits associated with the Franklintown project in cooperation with the BBHF and the Solar Synergy program. Prior to planting the Buffer Area Seed Mix, any established cover crop will be terminated with either a Glyphosate herbicide or mowing application. The application of Glyphosate herbicide will be applied following the guidelines listed on page 6 of this VMP.

The final seed mixture design will be provided following these seed mixture design components:

- Following the Solar Synergy program agreement between Franklintown and the BBHF, the buffer area seed mixture will be provided at no cost or at a discounted rate through the BBHF.
- The seed mixture will exclude the use of Tier 1 and Tier 2 species from the list of Invasive Plant Species of West Virginia (Appendix F).
- The species included in the seed mixture shall be true to the scientific name as specified in the mixture listed in Appendix B. Seed mixture components will be listed by both common name and scientific name in the bidding and procurement process.
- All seed lots obtained for planting on the Franklintown project must be originally sourced from production fields within the United States of America (USA). No seed sources may be obtained that were sourced from outside of the USA.
- The seed mixture was designed and will be provided for Franklintown based on Pure Live Seed (PLS) Pounds/acre seeding rates and their corresponding seeds/ft^2 seeding rates (Appendix B). Seed mixtures designed and/or provided based on bulk pounds/acre will not be accepted.
- Seed mixture components must comply with the seed laws of the state the seed is being established in.
- No alterations have been made to the final seed mixture design. Any substitutions or changes to the seed mixtures must be approved by Franklintown in writing prior to approval and/or installation.
- The accepted seed mixture design being bid and acquired will be reviewed and approved by a vegetation management specialist to ensure the listed seed mixture design requirements are correctly being met and have not been adjusted.

Within 7 to 10 days of the termination of the cover crop, the Buffer Area Seed Mix will be planted using one of the approved planting methods and within an approved planting timeline (Appendix C). The contractor installing the seed mixture will select a time during the available window based on construction activities.

9. Seed Storage Considerations

Once the solar array and/or buffer area seed mixtures has been delivered to the Franklintown site and are being stored pending planting, it is critically important that the seed be maintained and held in a manner that protects the seed germination rates and viability. Grass and forb seeds are easily degraded by environmental conditions, sometimes within a very short period. The primary environmental influences that can quickly degrade the germination rate of a seed lot are air temperature and relative humidity (Principles and practices of seed storage : Justice, Oren L : Free Download, Borrow, and Streaming : Internet Archive).

While seed lots are being maintained on site, their storage should be conducted based on "*The Rule of 100*". The Rule of 100 is a guide that monitors and notes the conditions when seed germination is susceptible to being degraded. In this rule, when the values for the air temperature (^{o}F) are added to the Relative Humidity (% Relative Humidity) are added together and they exceed the value of 100, seed germination is negatively affected. As an example, if seed were stored in a location with a daily ambient air temperature that reaches 80 ^{o}F and a Relative Humidity that reaches 50%, those environmental factors would produce a score of 130 and be in a condition where seed degradation is likely to occur. Increased rates of Relative Humidity have the greatest negative impact on seed viability and can be of significant concern if seed lots are held on site through the summer period. The higher the Rule of 100 score, the faster the seed degradation will occur.

Seed viability on the site should be maintained by following these key factors:

- Make sure to obtain the original seed lots from a seed vendor that has stored their seed lots in a climate-controlled environment.
- Arrange to have seed lots delivered to Franklintown solar in allotments and as close to the actual planting date and schedule as possible. Seed orders should be able to be placed and delivered in allotments that reduce the need to store large amounts of seed on the site. An example would be to have allotments of 200 acres worth of seed mixtures delivered to the site on a weekly basis during the planting time period.
- Make sure to obtain original seed lots that have a current test date that is less than 6 months old and are documenting both the purity and germination rates of each and every individual component in the seed mixture (Appendix D). A single seed test that has been applied to the seed mixture will not be accepted.
- Purchase seed lots that are younger (more current) and not part of a seed lot that has been stored for multiple years. Seed lots that are multiple years old may have a current test showing acceptable germination rates but are more susceptible to germination degradation.
- If seed lots need to be maintained on site for an extended period, they need to be stored in a climate-controlled environment.

10. Vegetation Contractor Qualifications

Contractors that are responsible for the implementation and delivery of the vegetation management plan will be knowledgeable of the tasks, procedures and practices that are outlined in the VMP (see page 27 for additional detailed qualification requirements). The contractor will use equipment to deliver the VMP that is of the appropriate size and function to work within the array area of the project. The individual plant species used to design the Franklintown seed mixtures all have a high likelihood of successful establishment when the guidance and requirements of this VMP are followed.

Vegetation Management Plan

A vegetation management specialist will determine the management options and implementation plans as the Franklintown project moves forward in the future. These plans will be implemented to ensure that a final vegetative cover is in place for the life of the project, is providing pollinator health and habitat benefits and is being managed to ensure the vegetation is compatible with the objectives of safe and reliable power generation.

All vegetative cover established on the Franklintown site will require regular, planned management activities. The following guidelines are intended to provide a plan during the establishment phase of the final vegetative cover. A vegetation management specialist will be used to provide guidance in the future that is based on what is occurring on the site during each growing season. That guidance will be designed and applied based on how the vegetative cover is moving through natural successional changes, weather conditions, weed competition, response to grazing activities and site conditions.

- **Establishment Management: Year 1**

  The management activities in Year 1 should be focused on controlling the competitive, invasive and/or noxious weed components of a newly established planting. When management activities and their timelines are strictly adhered to in Year 1, it can both increase the pace at which the final vegetative cover becomes fully established and significantly decrease the amount and intensity of Operation & Maintenance activities that need to occur in the future on the site.

  Mowing: Mowing activities that follow the planting of the final vegetative cover in the first growing season are extremely critical. The timing, frequency and height of those mowing activities often determine the success or failure of a planting and/or the length of time required for the planting to be determined a success.

  Conduct all mowing activities to ensure that the volunteer plant species that show up on the project location in the first growing season are not allowed to mature, flower and/or produce viable seeds. If weed control management efforts fail to be conducted or are late in being applied, the success of the final vegetative cover establishment will be in danger of failing and require re-planting activities.

Photographic examples of the Solar Array Area seed mixture establishment have been included in this VMP to provide additional management guidance and examples. Images are provided at the 2-month post planting stage (Appendix H) and the 4-month post planting stage (Appendix I). In the 2-month post planting example, the designed solar array seed mixture is beginning to germinate and grow, but it is also showing the competition that is also starting from volunteer weed species on the site. This photographic example demonstrates the moment in time when mowing activities need to begin to be applied to the new planting to control the volunteer weed species while they are young and vulnerable to the listed management activities.

When mowing activities are applied in an early, timely and regular manner, the final vegetative cover can begin to outcompete the volunteer weed species (Appendix I) and transition to a fully established vegetative cover in year 2 (Appendix J). When planted in the spring, it is likely the established vegetative cover will require 3 mowing events to control volunteer weed growth and establishment during the first growing season. Failure to apply early, timely and regular management to plantings in the first growing season leads to situations where the volunteer weeds become more and more challenging to control. Mow early and mow often in the first growing season.

Mowing activities during the first growing season should be conducted at a height of 4" to 6" above the ground. Mowing activities that are conducted at a lower height may damage the final vegetative cover as it is working to become established. When mowing activities are applied at the correct time, frequency and height, another advantage is that those mowing activities do not create a mulch that can serve to smother and inhibit the final vegetative cover as it is working to become established.

If vegetation has been allowed to reach a height of >20 inches prior to mowing, then mowing activities will be conducted with a flail-type mower to reduce the amount of mulch that will be deposited on young seedlings and fragile plant growth.

Mowing activities should not be conducted when soil is saturated to prevent soil compaction on the site. Management activities that create soil compaction can result in seed establishment failure, the establishment of invasive or noxious weeds, rutting on the site and/or creating water infiltration issues that lead to ponding on the site.

- **Establishment Management: Years 2 to 3**

  Mowing: The timing and frequency of mowing during the 2nd and 3rd years of establishment should be evaluated and recommended by a vegetation management specialist familiar with the establishment and management of pollinator habitat.

  Mowing activities should be conducted in the following manner:

  - Use of a flail-type mower to prevent the build-up of a thatch that could negatively affect the establishment and growth of the installed seed mixture.
  - Conduct all mowing activities with a mowing height of 8 to 12 inches tall.

- Conduct mowing activities prior to the vegetation getting tall enough (>20 inches) that a mowing activity would create a vegetative mulch that can smoother the included plant seedlings that are being established.
- In year 2, a total of 1-2 mowing, if necessary, will be conducted. In years 3 and beyond, mowing activities will be conducted when management of the Solar Array or Buffer Area seed mixtures requires it to control weed growth and density on the site. In general, this will likely range from 0-2 mowing activities per year.
- The vegetation contractor should consider spot mowing to treat just those areas that are exhibiting aggressive, invasive, or noxious weed competition on the site.
- Conduct mowing activities to ensure that volunteer plant species that show up on the project location in the first few years of establishment (years 2-3) are not allowed to mature, flower and/or produce viable seeds.
- The pollinator value of seed mixture plantings can be maximized by conducting mowing activities at the proper height, proper timeline and later in the growing season. This will allow plants to produce the nectar and pollen resources that pollinators feed on as well as help redistribute ripened seed throughout the pollinator planting.

Mowing activities that are performed throughout the life of the project should be conducted in a manner to consider and protect ground nesting bird activities during the primary nesting season. For mowing activities completed between May 1st and August 31st, staff conducting mowing activities at the site should be trained to identify and protect avian ground nests.

During the early, initial years of the final vegetative cover establishment, mowing a site during the growing season can aid in the establishment of the cover if competition is present from undesirable and/or volunteer plant species. Mowing activity and frequency are determined based on the abundance and growth height of undesirable and/or volunteer plant species that show up in the planting. A review of the site should be conducted by a vegetation management specialist prior to mowing. A pollinator habitat tip video that outlines and demonstrates this technique can be viewed at: https://youtu.be/ind8BaWzotc

Mowing Schedule for Site Management

Year	June	July	August
Growing Season 1	Mow at 4" to 6" tall	Mow at 4" to 6" tall	Mow at 4" to 6" tall
Growing Season 2	Mow at 8" to 12" tall	Mow at 8" to 12" tall	No Mow
Growing Season 3	Mowing based on Vegetation Specialist review	Mowing based on Vegetation Specialist review	Mowing based on Vegetation Specialist review

Herbicide Use:

If undesirable or invasive plant species show up during the year of establishment, it is important to address their control and removal as soon as possible. It is critically important that undesirable or invasive species are not allowed to mature enough to produce viable seeds. Depending on the plant species to be addressed, a plan of control is best accomplished through a combination of spot mowing, spot use of herbicides or both.

If the undesirable or invasive plant species are forb-based plants (broad leaved plants), the use of a non-selective herbicides like Glyphosate or broad-leaf herbicides (e.g., 2,4-D, Garlon, etc.) can be used on an individual plants or on a spot treatment basis. Care should be taken to limit the herbicide application to the specific plant species trying to be eliminated as the herbicide will also eliminate components of the final vegetative cover plant species and other actively growing vegetation it is applied to.

For the management and control of undesirable, volunteer grasses like Crabgrass (*Digitaria* spp.) or Foxtail (*Alopecurus* spp.) species, a specific herbicide application can be applied. The recommended herbicide application would be to use Frequency® in either a pre-emergent or post-emergent application that follows the label. Several key considerations about the use of herbicide include:

- Can be used in either a pre-emergent or post-emergent fashion, but pre-emergent is probably the most effective.
- If the clovers species in the planting are taller than 3", the herbicide application should stunt the white Dutch clover, but not eliminate it.
- If used as a post-emergent application, the herbicide requires the use of an adjuvant with it for effective control.
- Most of the grasses in the Franklintown Array Area seed mixture are listed as being tolerant to the herbicide.
- There is a limit of 4 ounces/acre/treatment. Total of 16 ounces/acre/year

For spot treatment of invasive grasses, Clethodim and/or a non-selective herbicide like Glyphosate can be used. Non-selective herbicides will terminate both grasses and broad-leaved plants that are actively growing and should be applied very carefully.

All herbicide applications used on the project shall be EPA-registered at that time of application, shall be applied by a current West Virginia licensed applicator and shall only be applied in accordance with the label recommendations, applicable law and landowner requirements.

Replanting of Non-established Areas: In the event that a portion of the project has experienced poor or non-establishment, the first step will be to determine the reason for the poor or non-establishment of the final vegetative cover. Reasons for poor or non-establishment and their remediation can include:

- If the reason for poor or non-establishment is related to either site preparation or existing vegetation competition, those issues will be addressed and controlled. The area will be replanted following the planting instructions listed in this VMP.
- If the reason is related to soil conditions or soil compaction, the area will be remediated to ensure a successful planting and replanted following the planting instructions listed.
- If the reason is related to weather, the area will be replanted when the appropriate weather conditions are obtained following the planting instructions listed. Care should be taken to replant as early in the available planting timeline as possible.
- If the reason for poor establishment is related to seed lots being stored on the site outside of the 'Rule of 100' environmental conditions and the seed germination rate was degraded, replacement seed lots will need to be acquired and replanted. See 'Rule of 100' description on page 17.
- If the reason for poor establishment was planting the seed mixture outside of the listed planting window options (Appendix C), replacement seed lots will need to be acquired and established using the correct methods during the correct available dates.
- In all cases, original planting and/or replanting should be conducted in the earliest possible portion of the available timeline listed for planting dates. Because most replanting activities will likely be conducted using broadcast seedings, please review and consider the significant limitations associated with broadcast seeding listed in this VMP, especially the number of days needed to reach a minimally established stand and the requirement for an increased planting rate (Appendix C).

Areas described as non-established include locations that are bare soil. These locations are important to be reviewed and addressed by the vegetation contractor as soon as possible as they are susceptible to erosion and the introduction of aggressive, invasive and/or noxious weeds. Franklintown may coordinate with a vegetation management specialist to determine the best course of action to identify and apply appropriate remediation activities.

Maintenance and Management

The control or elimination of undesired or invasive plant species should be addressed with a combination of management tools that could include mowing and/or herbicide use and apply Integrated Vegetation Management (IVM) approaches. Other management tools like prescribed fire, grazing with cattle and disking that are often used on habitat or conservation projects will not be available or recommended for use on this site.

Where high quality pollinator resources and pollinator benefits are a project objective, there really are no projects or options where you can plant the pollinator seed mixture, walk away without a specific future management plan and have pollinator benefits continue into the future. Natural succession will move the plant community through a cycle where it eventually becomes dominated by grasses and the pollinator forb species component drops out with time. To maintain pollinator benefits, a specific management plan should be developed by a vegetation management specialist to guide the specific future management activities on the areas supporting pollinator health and habitat. Future management options include:

Mowing: Mowing vegetation growing under solar panels may be necessary to maintain safe and reliable power generation. Mowing can also be a pollinator-friendly management technique that can help maintain the diversity and vigor of a pollinator planting when the timing, height and frequency of the mowing are considered, controlled, and follow a specific plan. An example of the effective use of mowing in a pollinator planting can be viewed at: https://youtu.be/ind8BaWzotc

If pollinator health and habitat benefits are a priority for the project, the timing and frequency of mowing as a management and site maintenance activity should be evaluated and recommended by a vegetation management specialist familiar with the establishment and management of pollinator habitat. In addition, the timing of mowing activities to consider monarch butterfly needs is an example of one important consideration.

Naturalized Forb Species: The Solar Array seed mixture was designed and planted using clover (*Trifolium* sp.) species to be able to withstand future mowing activities along with a significant list of other project objectives and needs (Appendix K). These species are regularly used in agricultural practices that include haying activities that remove the vegetation throughout the growing season. An additional key consideration to the inclusion of clover in the array area seed mixture is its ability to fix nitrogen from the atmosphere and store it in the soil. Several of the grass species components of the array area seed mixture require a significant and annual amount of nitrogen to be maintained successfully on the site.

Mowing Height: All mowing activities related to establishment and future management should be completed with a mowing height of 8 to 12 inches above ground. This will allow the biannual and perennial plant species to continue developing and continue in the pollinator planting.

Herbicide Use: If grass competition in the project advances to the point where the grasses are outcompeting the forbs, herbicide application should be considered. The application of a grass-selected herbicide containing Clethodim 2E (e.g.: Arrow ® or Select ®) can be applied following label instructions to decrease grass competition. This will allow the pollinator plant species the opportunity maintain or regain the abundance they had in the planting during the early years of establishment. A pollinator habitat tip video that outlines and demonstrates this technique can be viewed at: https://youtu.be/0CiZT3P4Wb4

All herbicide applications used on the project shall be EPA-registered at that time of application, shall be applied by a current West Virginia licensed applicator, and shall only be applied in accordance with the label recommendations, applicable law and landowner requirements.

Spot Spraying and Spot Mowing: When undesirable or invasive plant species begin to occur on a project, it is important to address their control and removal as soon as possible. Depending on the plant species to be addressed, a plan of control is best accomplished through a combination of spot mowing, spot use herbicides or both. In all cases, volunteer and undesirable plants are always easier to control or eliminate when they are addressed with an herbicide and/or mowing application when they first appear on the site and are young, short, newly growing plants. Waiting until a plant matures to apply the control mechanism will decrease the effectiveness of either the herbicide application or mowing activity.

If the plant species are grass-based plants, the use of grass-selected herbicide can generally be used on a broader range without negatively impacting the pollinator plant species. If the undesirable or invasive plant species are forb-based plants, the use of a non-selective herbicide like Glyphosate can be used on an individual plant or spot treatment basis. Care should be taken to limit the herbicide application to the specific plant species trying to be eliminated as the herbicide will also eliminate the pollinator plant species.

Vegetation Quality Targets

1. Overall Target

The seed mixture listed, and the vegetation management guidelines provided in this VMP are designed to result in an established, stable vegetative cover that is compatible with safe and reliable electricity production, is beneficial to pollinator health and resources and works to deliver significant soil health benefits. When the site preparation guidelines are followed and the seed mixtures are properly planted, the site should become stable, well established, and able to be discharged. The permits and regulations for this project may impose additional requirements on the final performance and establishment of the vegetative plantings.

2. Established Seed Mixture Targets

By the conclusion of the first full growing season, at least 80% of the site shall be vegetated. To discharge the SWPPP permit for the project, at least 70% of the site must be covered with uniform perennial vegetation. By the conclusion of the third full growing season, at least 95% of the site shall be vegetated and at least 90% of the site must be covered with a uniform perennial vegetation. The seed mixtures designed for this project and the management plan, and activities listed are designed to ensure the proper site preparation activities have been performed to increase the seeding, germination and growth of the plants selected for inclusion in the seed mixtures.

3. Undesirable, Invasive and/or Noxious Weed Targets

All solar power sites will experience undesirable, invasive and/or noxious weed species that appear on their site. These species will show up on the site because of the seeds that are found on site and have remained dormant in the seed bank, often for decades. This is especially true of sites that were formerly in agricultural crop production. Once the herbicide regime being applied to agricultural crop production fields is removed, those species tend to show up early in the growing season and grow aggressively. In addition, they tend to be prolific seed producers and are often allelopathic (see detailed definition Appendix E).

All of the noxious and/or invasive plants that are prohibited in the state (Appendix F) shall be treated with an herbicide application and/or mowed at a frequency that is sufficient to prevent the plant from producing seeds and remove the plant from the project location over time. A focus will be placed on identification and control of any Tier 1 and Tier 2 species that are identified on the site.

It will be important that any noxious and/or invasive plants that occur on the site are identified and controlled as quickly as possible. A vegetation management specialist should be consulted to help determine control methods and options. If Undesirable, Invasive or Noxious weed species develop on the site, they will likely occur during the first two years following the initial planting. This will be the most critical timeframe during which frequent site reviews should be conducted by individuals able to identify individual undesirable, invasive and noxious plant species. The site should be monitored by a vegetation management specialist for both the

establishment of the seed mixtures and the presence of plants that need to be controlled and removed from the site.

4. Monitoring of the site

Site evaluations should be completed by a qualified and approved vegetation management specialist. Site evaluations should be completed every 6 to 8 weeks during the growing season in year 1 and year 2 of planting establishment. Once the array area seed mixtures are fully established, the site monitoring can be conducted one time per year during the growing season to evaluate the site for undesirable, invasive and/or noxious weed presence, future management recommendations and identification of sites in need of replanting.

This document is intended to apply adaptive management practices and serve as a working document. Updates and revisions will be made as new information is obtained with respect to the vegetation management, site characteristics and availability of management practices at the time of procurement of services.

Considerations for Companies Bidding on Installation Services

Franklintown has committed to installing a final vegetative cover that produces pollinator health and habitat benefits. Franklintown has developed this Vegetation Management Plan (VMP) to guide the activities of site preparation, installation of prescribed seed mixtures, management and control of invasive species and noxious weeds and the overall management of the established vegetation on the site that will also support those pollinator health and habitat outcomes.

Some of the factors that should be considered when bidding on the Franklintown Solar project include:

1. Obtain the described seed mixture listed in Appendix A and B. All seed mixtures must adhere to the specifications outlined and described in this plan. Species shall be true to the scientific name as specified in the seed mixtures in Appendix A. All seed lots obtained for planting on the Franklintown project must be originally sourced from the United States of America. Any substitutions or changes to the seed mixtures must be approved by Franklintown prior to installation.

2. Full completion of site preparation activities. Proper site preparation is the single, most important factor that will determine both the initial establishment and long-term success of the final vegetative cover planting. Activities will include addressing any soil compaction issues on the site, termination of existing vegetation, determination of the need for using a cover crop on the site and review of previous herbicide use on the site.

3. Seed Mixture Planting. The available planting window for the Franklintown solar seed mixture is determined by two primary factors: soil temperature and the available moisture at both the time of planting and for the next 80 days. Establish the final vegetative cover using one of the approved planting methods during one of the listed available planting timeline windows listed.

4. Seed Mixture Planting Depth. The ideal planting depth for any seed is 2x the diameter of the seed. For the seed mixture designed for the Franklintown Solar project, the appropriate planting depth for the seed mixture is 1/8" and not any deeper.

The expectation is that the final vegetative cover will be fully established after a 3-year period. This does not mean that the final cover is not well-established sooner than a 3-year period, but several species included in the seed mixture become established and produce floral resources over a longer period of time. A successful outcome will be determined by following the guidelines listed in this VMP and the management that occurs in the first 3 years of the project.

Appendix A

Conservation Blueprint

Franklintown Solar - Array Area Seed Mix

20" Vegetative Height Restriction

Species	Scientific Name	PLS lbs per acre	Seeds per sq ft	% of Mixture	Bloom Period	Pollinator Value
Autumn Bentgrass	*Agrostis perennans*	0.300	55.10	8.91%	–	–
Fine Fescue Blend for Solar Projects	*Festuca spp.*	30.000	344.35	55.66%	–	–
Path Rush	*Juncus tenuis*	0.200	73.46	11.87%	–	–
Alsike Clover	*Trifolium hybridum*	2.000	31.24	5.05%	2	5
Birdsfoot Trefoil	*Lotus corniculatus*	3.000	25.47	4.12%	2	5
Ladino or White Clover	*Trifolium repens*	3.000	49.03	7.92%	2	5
White Dutch Clover	*Trifolium repens*	2.000	40.02	6.47%	2	5
	Grasses Total:	30.500	472.911	76.44%		
	Wildflower/Forb/Legume Total:	10.000	145.758	23.56%		
	Filler Total:	0.000	0.000	0.00%		
	Total Mixture:	**40.500**	**618.669**	**100.00%**		

Bloom Period	Wildflowers Used in Mixture	% PLS Seeding Rate of Mix
1 = April to May	0	0.00%
2 = June to July	4	23.56%
3 = August to October	0	0.00%
Total :	4	

5.00	Pollinator Value (0-5)

The Pollinator value score is determined based on a combination of factors described below. A score greater than 4.0 indicates the mixture is designed for great pollinator value.

Bid Cost Per Acre:	
Date of Bid:	
Bid Expiration:	

The Pollinator Value Score is determined based on a combination of factors that include:

The pollen and/or nectar value of the plant species.
The ability of the plant species to establish and persist in pollinator seeding mixtures.
Bee Integrated Program research results of pollinator pollen analysis.
Unique pollinator biological life histories of the plant species.
The total bloom period length of the plant species.
The occurence in early bloom periods (Bloom Period 1) that are hard to challenging to provide resources for.
The commercial availability of the species for use in seeding mixtures.
Value of the plant species pollen and nectar to commercial beekeepers.
USGS Pollinator Library tool: **https://www.npwrc.usgs.gov/pollinator/home**
The Ecoregional Revegetation Application tool: **http://www.nativerevegetation.org/era/**
Botanical and beekeeping reference materials that list the pollinator value of species.
Field observations of floral resource use by pollinator species.

Note: The seed mixture listed and its planting rate are for drill seeding planting methods. Planting rates for Air Seeder, Hydroseeding and Broadcast seeding methods must be increased by 30% (see page 13 and 14 of this plan).

Appendix B

Conservation Blueprint

Franklintown Solar - Buffer Area Seed Mixture

No Vegetative Height Restrictions

Species	Scientific Name	PLS lbs per acre	Seeds per sq ft	% of Mixture	Bloom Period	Pollinator Value
Autumn Bentgrass	*Agrostis perennans*	0.065	11.94	19.29%	--	--
Canada Wildrye	*Elymus canadensis*	0.850	2.22	3.60%	--	--
Little Bluestem	*Schizachyrium scoparium*	0.500	2.76	4.46%	--	--
Path Rush	*Juncus tenuis*	0.035	12.86	20.78%	--	--
American Germander	*Teucrium canadense*	0.010	0.22	0.36%	2	4
Blackeyed Susan	*Rudbeckia hirta*	0.100	3.62	5.85%	2	1
Blanketflower - *G. pulchella*	*Gaillardia pulchella*	0.100	0.43	0.69%	1	4
Blue Vervain	*Verbena hastata*	0.030	1.04	1.67%	2	5
Brown-eyed Susan	*Rudbeckia triloba*	0.050	0.62	1.01%	2	1
Butterfly Milkweed	*Asclepias tuberosa*	0.060	0.10	0.16%	2	5
Canada Goldenrod	*Solidago canadensis*	0.005	0.81	1.31%	2	5
Canada Milkvetch	*Astragalus canadensis*	0.100	0.62	1.00%	2	4
Common Evening Primrose	*Oenothera biennis*	0.030	0.95	1.53%	2	4
Common Milkweed	*Asclepias syriaca*	0.050	0.09	0.15%	2	5
Culver's Root	*Veronicastrum virginicum*	0.001	0.28	0.45%	3	4
Cup Plant	*Silphium perfoliatum*	0.050	0.07	0.12%	2	5
Dotted Mint	*Monarda punctata*	0.020	0.68	1.09%	2	4
False or Oxeye Sunflower	*Heliopsis helianthoides*	0.150	0.36	0.58%	2	5
Foxglove Beardstongue	*Penstemon digitalis*	0.060	0.55	0.89%	1	5
Golden Alexander	*Zizia aurea*	0.100	0.40	0.65%	1	5
Gray Goldenrod	*Solidago nemoralis*	0.010	0.23	0.37%	3	4
Hairy Beardstongue	*Penstemon hirsutus*	0.008	0.73	1.18%	1	5
Heal All	*Prunella vulgaris*	0.030	0.45	0.72%	1	4
Heath Aster	*Symphyotrichum ericoides*	0.006	0.69	1.12%	3	5
Illinois Bundleflower	*Desmanthus illinoensis*	0.300	0.59	0.95%	2	5
Lanceleaf Coreopsis	*Coreopsis lanceolata*	0.200	1.01	1.64%	2	4
Late or Giant Goldenrod, Native Source	*Solidago gigantea*	0.005	0.87	1.40%	3	5
New England Aster	*Symphyotrichum novae-angliae*	0.025	0.61	0.98%	3	5
New Jersey Tea	*Ceanothus americanus*	0.030	0.08	0.12%	2	4
Nodding Pink Onion	*Allium cernuum*	0.035	0.10	0.16%	2	4
Oats	*Avena sativa*	10.000	4.45	7.20%	--	--
Obedience Plant	*Physostegia virginiana*	0.050	0.20	0.33%	3	4
Ohio Spiderwort	*Tradescantia ohiensis*	0.020	0.06	0.09%	1	4
Pale Purple Coneflower	*Echinacea pallida*	0.100	0.24	0.39%	2	5
Plains Coreopsis	*Coreopsis tinctoria*	0.040	2.96	4.78%	2	2
Purple Coneflower	*Echinacea purpurea*	0.200	0.53	0.86%	2	5
Roundhead Lespedeza	*Lespedeza capitata*	0.070	0.28	0.45%	3	4
Seed Box	*Ludwigia alternifolia*	0.001	0.48	0.77%	3	3
Showy Partridgepea	*Chamaecrista fasciculata*	0.400	0.60	0.96%	2	5
Smooth Blue Aster	*Symphyotrichum laeve*	0.020	0.47	0.75%	3	5
Stiff Goldenrod	*Solidago rigida*	0.035	0.54	0.87%	3	5
Swamp Milkweed	*Asclepias incarnata*	0.020	0.07	0.11%	2	5
Tall Boneset	*Eupatorium altissimum*	0.025	0.46	0.74%	3	4
Virginia Mountain Mint	*Pycnanthemum virginianum*	0.005	0.18	0.30%	2	4
Western Yarrow	*Achillea millefolium*	0.050	3.27	5.29%	1	2
Wild Bergamot	*Monarda fistulosa*	0.030	0.88	1.42%	2	5
Wild Quinine	*Parthenium integrifolium*	0.050	0.13	0.21%	2	2
Wild Senna	*Senna hebecarpa*	0.200	0.10	0.17%	2	2
Rice Hulls - Filler for low planting rate mixtures		4.000	0.00	0.00%	--	--
	Grasses Total:	1.450	29.780	48.13%		
	Wildflower/Forb/Legume Total:	12.881	32.094	51.87%		
	Filler Total:	4.000	0.000	0.00%		
	Total Mixture:	**18.331**	**61.875**	**100.00%**		

Bloom Period	Wildflowers Used in Mixture	% PLS Seeding Rate of Mix
1 = April to May	7	9.52%
2 = June to July	25	26.90%

4.12	Pollinator Value (0-5)
The Pollinator value score is determined based on	

Species	Scientific Name	PLS lbs per acre	Seeds per sq ft	% of Mixture	Bloom Period	Pollinator Value
3 = August to October	11	8.24%		*a combination of factors described below. A score greater than 4.0 indicates the mixture is designed for great pollinator value.*		
Total :	43					

The Pollinator Value Score is determined based on a combination of factors that include:

The pollen and/or nectar value of the plant species.
The ability of the plant species to establish and persist in pollinator seeding mixtures.
Bee Integrated Program research results of pollinator pollen analysis.
Unique pollinator biological life histories of the plant species.
The total bloom period length of the plant species.
The occurence in early bloom periods (Bloom Period 1) that are hard to challenging to provide resources for.
The commercial availability of the species for use in seeding mixtures.
Value of the plant species pollen and nectar to commercial beekeepers.
USGS Pollinator Library tool: **https://www.npwrc.usgs.gov/pollinator/home**
The Ecoregional Revegetation Application tool: **http://www.nativerevegetation.org/era/**
Botanical and beekeeping reference materials that list the pollinator value of species.
Field observations of floral resource use by pollinator species.

Note: The seed mixture listed and its planting rate are for drill seeding planting methods. Planting rates for Air Seeder, Hydroseeding and Broadcast seeding methods must be increased by 30% (see page 13 and 14 of this plan).

Appendix C

The available planting dates for Franklintown are determined by a combination of the planting method selected and the predicted environmental conditions over the next 55 to 140 days. Planting seed mixtures outside of the timelines listed for each seed mixture will significantly reduce the likelihood of a full and successful vegetative establishment and will increase the likelihood of weed competition and the sites needing to be reseeded due to poor or non-establishment.

Array Area Seed Mix: Available Planting Dates by Planting Method

Planting Method	Spring		Late Summer		Winter - Dormant Seeding	
	Start Date	End Date	Start Date	End Date	Start Date	End Date
No-till Drill	February 15th	May 31st	August 1st	September 7th	Soil Temp @ 50° F or less	Until the Soil is Frozen
Hydro-seeder	February 15th	May 31st	August 1st	August 23rd	Soil Temp @ 50° F or less	February 15th
Air-seeder	February 15th	May 31st	August 1st	August 23rd	Soil Temp @ 50° F or less	February 15th
Broadcast seeding	February 1st	April 30th	N/A	N/A	Soil Temp @ 50° F or less	February 1st

Buffer Area Seed Mix: Available Planting Dates by Planting Method

Planting Method	Spring		Late Summer		Winter - Dormant Seeding	
	Start Date	End Date	Start Date	End Date	Start Date	End Date
No-till Drill	February 15th	May 31st	N/A	N/A	Soil Temp @ 50° F or less	Until the Soil is Frozen
Hydro-seeder	February 15th	May 31st	N/A	N/A	Soil Temp @ 50° F or less	February 15th
Air-seeder	February 15th	May 31st	N/A	N/A	Soil Temp @ 50° F or less	February 15th
Broadcast seeding	February 1st	April 30th	N/A	N/A	Soil Temp @ 50° F or less	February 1st

Time Needed for Array Area Seed Mixture to Reach Seedling Maturity by Planting Method

Final Vegetative Cover Considerations	No-till Drill	Broadcast Seeding
Seed Germination Timeline	15 to 25 days	30 to 70 days
Minimum Timeline Needed for Seedling Growth & Maturity	40 to 60 days	40 to 70 days
Total Time Needed to Reach Minimal Establishment	**55 to 85 days**	**70 to 140 days**

Time Needed for Buffer Area Seed Mixture to Reach Seedling Maturity by Planting Method

Final Vegetative Cover Considerations	No-till Drill	Broadcast Seeding
Seed Germination Timeline	15 to 60 days	30 to 70 days
Minimum Timeline Needed for Seedling Growth & Maturity	60 to 100 days	70 to 110 days
Total Time Needed to Reach Minimal Establishment	**75 to 160 days**	**100 to 180 days**

Appendix D

Sample Seed Tag with Required Information

CUSTOMER NAME: Any Example Solar Project
LOT NUMBER: 73700
PROJECT NAME: Solar Array Mix

ACRES: 250

SEEDING RATE/ACRE: 100.99

SPECIES	LOT NUMBER	% MIX	ACTUAL PURITY	GERM	HARD/ DORMANT	TOTAL VIABLE	ORIGIN	BULK LBS	PLS LBS
Empire Birdsfoot Trefoil	BV52	0.23	98.68	62	22	84	CAN	0.11	0.095
Empire Birdsfoot Trefoil	BV52	2.72	98.68	62	22	84	CAN	1.38	1.143
Marco Polo White Clover	L17520227WC	0.84	98.96	63	27	90	OR	0.42	0.377
Marco Polo White Clover	L17520227WC	3.01	98.96	63	27	90	OR	1.52	1.356
Dixie Crimson Clover	W822CC221	2.13	99.63	87	6	93	OR	1.07	0.990
Horizon White Proso Millet	2368-TOTE	0.34	99.42	96	0	96	SD	0.17	0.165
Horizon White Proso Millet	2368-TOTE	5.36	99.42	96	0	96	SD	2.69	2.671
Certified Horizon White Proso Millet	VD22WPM1-50	9.45	99.65	98	0	98	SD	4.74	4.632
Certified Horizon White Proso Millet	VD22WPM1-50	10.23	99.65	98	0	98	SD	5.13	5.010
Variety Not Stated Blanketflower	BF211234	0.56	95.35	75	14	89	OR	0.29	0.248
IA Native Gray Goldenrod	200393	0.01	96.56	49	23	72	IA	0.00	0.003
IA Native Gray Goldenrod	220324	0.09	99.63	41	58	99	IA	0.05	0.046
Eagle Western Yarrow	NBSBP20EAG1	0.15	91.16	97	0	97	WA	0.08	0.074
Variety Not Stated Bahiagrass	HSC2233C	12.13	49.00	80	0	80	FL	12.38	4.862
Variety Not Stated Bermudagrass	892180HC	7.13	48.00	86	0	86	CA	7.43	3.030
PA Native Path Rush	JUNTEN0120HW	0.11	93.56	0	93	93	PA	0.06	0.052
PA Native Path Rush	JUNTEN0120HW	0.42	93.56	0	93	93	PA	0.23	0.196
Solar Array Brand Fescue Mix		11.80	48.20	83.94	0	83.94	OR	12.24	4.951

OTHER CROP SEED:	0.11		
INERT MATTER:	33.18	50.00	29.790
WEED SEEDS:	0.01		
TEST DATE:	03/03/23		
NOXIOUS-WEED SEEDS:	NONE FOUND	PLS FACTOR:	0.5958
NET WEIGHT:	50.00 BULK POUNDS		
TOTAL PLS:	29.79 PURE LIVE SEED POUNDS		

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THE SELLER DISCLAIMS ANY AND ALL WARRANTIES ASSOCIATED WITH ITS SEED INCLUDING, BUT NOT LIMITED TO, EXPRESS OR IMPLIED WARRANTIES, WARRANTIES OF MERCHANTABILITY, OR FITNESS FOR A PARTICULAR PURPOSE. LIABILITY FOR DAMAGES IS LIMITED TO THE PURCHASE PRICE OF THE SEED. THIS IS AN EXCLUSIVE REMEDY AND THE SELLER WILL NOT BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES.

Any Example Solar Project
Solar Array Mix
250 Acres - Lot # 73700

Appendix E

Cover Crop Seed Mixture Options

Seed mixture options to be established on those locations calling for the use of a cover crop to provide soil stability and weed suppression during construction activities:

Spring: March to May

- Oats planted at a rate of 90 pounds/acre ..... (40.08 seeds/ft^2)
- Annual Rye at 5 lbs. + Crimson Clover at 10 lbs. + Oats at 25 lbs./acre .....(60.44 seed/ft^2)
- Annual Ryegrass at 10 lbs. + Oats at 30 lbs./acre ..... (52.11 seeds/ft^2)

These seed mixtures will germinate and grow when adequate moisture is present and soil temperatures are 50^0 F or warmer.

Summer: June to August

- German Millet at a rate of 20 lbs./acre .....(82.64 seed/ft^2)

Fall & Winter: September to February

- Planting Cereal Rye at a rate of 100 lbs./acre.....(41.32 seed/ft^2)

This seed mixture will require termination prior to planting the final vegetative cover.

The primary role of a cover crop is to suppress weed competition and growth. For this reason, it is critically important that a cover crop seed mixture be used that has significant allelopathic attributes. Having a plant(s) with an allelopathic nature refers to:

The beneficial or harmful effects of one plant on another plant by the release of chemicals from plant parts by leaching, root exudation, volatilization, residue decomposition and other processes in both natural and agricultural systems. (Allelopathy - Wikipedia)

Appendix F

West Virginia Invasive Plant List

WEST VIRGINIA DNR

Invasive Plant Species of West Virginia
WVDNR Natural Heritage Program, P.O. Box 67, Elkins, WV 26241
Version Mar 2009

Invasiveness ranking

1 Highly invasive species exhibit the most invasive tendencies in natural areas and native plant habitats. They may disrupt ecosystem processes and cause major alterations in plant community composition and structure. They establish readily in natural systems and spread rapidly.

2

Moderately invasive species may have minor influence on ecosystem processes, alter plant community composition, and affect community structure in at least one layer. They may become dominant in the understory layer without threatening all species found in the community. These species usually require a minor disturbance to become established.

3

Occasionally invasive species generally do not affect ecosystem processes but may alter plant community composition by outcompeting one or more native plant species. They often establish in severely disturbed areas. The disturbance may be natural or human origin, such as icestorm damage, windthrow, or road construction. These species spread slowly or not at all from disturbed sites.

Threat	Scientific Name	Common Name
1	*Acer platanoides*	Norway Maple
1	*Ailanthus altissima*	Tree-Of-Heaven
1	*Alliaria petiolata*	Garlic Mustard
1	*Arthraxon hispidus*	Small Carpgrass
1	*Berberis thunbergii*	Japanese Barberry
1	*Bromus tectorum*	Cheatgrass
1	*Celastrus orbiculata*	Asian Bittersweet
1	*Centaurea stoebe ssp. micranthos*	Spotted Knapweed
1	*Coronilla varia*	Purple Crown-Vetch
1	*Dioscorea oppositifolia*	Chinese Yam
1	*Elaeagnus umbellata var. parvifolia*	Autumn Olive
1	*Euonymus alata*	Winged Euonymus, Winged Spindletree
1	*Euonymus fortunei*	Winter Creeper
1	*Hydrilla verticillata*	Hydrilla
1	*Iris pseudacorus*	Yellow Iris
1	*Lespedeza cuneata*	Chinese Bushclover
1	*Ligustrum vulgare*	European Privet
1	*Lonicera japonica*	Japanese Honeysuckle
1	*Lonicera maackii*	Amur Honeysuckle
1	*Lonicera morrowii*	Morrow's Honeysuckle
1	*Lonicera tatarica*	Tatarian Honeysuckle
1	*Lythrum salicaria*	Purple Loosestrife
1	*Microstegium vimineum*	Japanese Stiltgrass
1	*Phalaris arundinacea*	Reed Canarygrass
1	*Phellodendron japonicum*	Cork Tree
1	*Phragmites australis*	Common Reed
1	*Polygonum cuspidatum*	Japanese Knotweed
1	*Polygonum perfoliatum*	Asiatic Tearthumb
1	*Pueraria montana var. lobata*	Kudzu
1	*Pyrus calleryana*	Bradford Pear
1	*Rosa multiflora*	Multiflora Rose
1	*Rubus phoenicolasius*	Wine Raspberry
1	*Schedonorus phoenix*	Tall Fescue
1	*Schedonorus pratensis*	Meadow Fescue

Threat	Scientific Name	Common Name
1	***Sorghum halepense***	**Johnson Grass**
1	***Vinca minor***	**Lesser Periwinkle**
2	*Aegopodium podagraria*	Bishop's Goutweed
2	*Akebia quinata*	Fiveleaf Akebia
2	*Ampelopsis brevipedunculata*	Amur Peppervine
2	*Arctium minus*	Lesser Burdock
2	*Barbarea vulgaris*	Garden Yellow-Rocket
2	*Bromus commutatus*	Meadow Brome
2	*Bromus inermis ssp. inermis var. inermis*	Smooth Bromegrass
2	*Bromus japonicus*	Japanese Brome
2	*Bromus secalinus*	Rye Brome
2	*Bromus sterilis*	Poverty Brome
2	*Carduus nutans ssp. macrolepis*	Nodding Plumeless-Thistle
2	*Centaurea nigrescens*	Wocheiner Knapweed
2	*Chelidonium majus var. majus*	Celandine
2	*Cirsium arvense*	Canada Thistle
2	*Cirsium vulgare*	Bull Thistle
2	*Conium maculatum*	Poison-Hemlock
2	*Cynoglossum officinale*	Gypsy-Flower
2	*Daucus carota*	Queen Anne's-Lace
2	*Dipsacus fullonum*	Fuller's Teasel
2	*Dipsacus laciniatus*	Laciniate Wild Teasel
2	*Duchesnea indica*	Indian-Strawberry
2	*Echium vulgare*	Viper's Bugloss, Bluethistle, Bluedevil
2	*Elaeagnus angustifolia*	Russian-Olive
2	*Frangula alnus*	Glossy False Buckthorn
2	*Glechoma hederacea*	Ground-Ivy
2	*Hesperis matronalis*	Mother-Of-The-Evening
2	*Hieracium caespitosum*	Meadow Hawkweed
2	*Holcus lanatus*	Common Velvetgrass
2	*Hypericum perforatum*	Common St. John's-Wort
2	*Hypochaeris radicata*	Hairy Cat's-Ear
2	*Lespedeza bicolor*	Japanese Bushclover
2	*Leucanthemum vulgare*	Oxeye Daisy
2	*Ligustrum obtusifolium*	Border privet
2	*Linaria vulgaris*	Butter-And-Eggs
2	*Lolium perenne ssp. multiflorum*	Perennial Ryegrass
2	*Lonicera ×bella*	Bell's Honeysuckle
2	*Lonicera standishii*	Standish's Honeysuckle
2	*Lysimachia nummularia*	Creeping Jenny
2	*Melilotus officinalis*	Sweetclover
2	*Myriophyllum aquaticum*	Parrot's-Feather
2	*Myriophyllum spicatum*	Eurasian Water-Milfoil
2	*Ornithogalum nutans*	Drooping Star Of Bethlehem
2	*Ornithogalum umbellatum*	Star Of Bethlehem
2	*Pastinaca sativa*	Parsnip
2	*Paulownia tomentosa*	Princess-Tree
2	*Perilla frutescens*	Beefsteak Plant
2	*Poa compressa*	Canada Bluegrass
2	*Poa pratensis ssp. pratensis*	Kentucky Bluegrass
2	*Poa trivialis*	Rough Bluegrass
2	*Polygonum caespitosum var. longisetum*	Oriental Lady's-Thumb
2	*Polygonum sachalinense*	Giant Knotweed
2	*Potamogeton crispus*	Curly Pondweed
2	*Ranunculus ficaria var. bulbifera*	Lesser Celandine
2	*Rhamnus cathartica*	Common Buckthorn

Threat	Scientific Name	Common Name
2	*Rorippa nasturtium-aquaticum*	Watercress
2	*Rumex acetosella*	Common Sheep Sorrel
2	*Sedum sarmentosum*	Stonecrop
2	*Spiraea japonica var. fortunei*	Japanese Spiraea
2	*Stellaria media*	Common Chickweed
2	*Stellaria media ssp. media*	Common Chickweed
2	*Stellaria media ssp. pallida*	Common Chickweed
2	*Ulmus pumila*	Siberian Elm
2	*Verbascum thapsus*	Great Mullein
3	*Achillea millefolium var. occidentalis*	Western Yarrow
3	*Acinos arvensis*	Mother-Of-Thyme, Basil-Thyme
3	*Agrostemma githago*	Corn Cockle
3	*Agrostis canina*	Velvet Bent Grass
3	*Agrostis capillaris*	Colonial Bentgrass
3	*Agrostis gigantea*	Giant Bentgrass
3	*Agrostis stolonifera*	Creeping Bentgrass
3	*Ajuga reptans*	Blue Bugle
3	*Albizia julibrissin*	Silktree
3	*Allium vineale ssp. vineale*	Wild Garlic, Crow Garlic
3	*Alternanthera philoxeroides*	Alligator weed
3	*Anthoxanthum odoratum ssp. odoratum*	Sweet Vernal Grass
3	*Arrhenatherum elatius*	Tall Oatgrass
3	*Arrhenatherum elatius var. elatius*	Tall Oat-Grass
3	*Artemisia annua*	Annual Wormwood
3	*Artemisia vulgaris var. vulgaris*	Common Mugwort
3	*Arundo donax*	Giant Reed
3	*Berberis vulgaris*	European Barberry
3	*Broussonetia papyrifera*	Paper-Mulberry
3	*Buglossoides arvensis*	Corn Gromwell
3	*Cardamine impatiens*	Bittercress
3	*Carduus acanthoides*	Spiny Plumeless-Thistle
3	*Carduus crispus*	Curled Thistle
3	*Centaurea cyanus*	Garden Cornflower
3	*Centaurea jacea*	Brown Knapweed
3	*Centaurea nigra*	Black Knapweed, Spanish-Buttos
3	*Centaurea solstitialis*	Yellow Starthistle
3	*Cerastium fontanum ssp. vulgare*	Common Mouse-Ear Chickweed
3	*Cerastium glomeratum*	Sticky Mouse-Ear Chickweed
3	*Chenopodium album var. album*	Lamb's Quarters
3	*Chenopodium ambrosioides var. ambrosioides*	Mexican Tea
3	*Cichorium intybus*	Chicory, Blue Sailors
3	*Commelina communis*	Asiatic Dayflower
3	*Commelina communis var. communis*	Asiatic Day-Flower
3	*Convolvulus arvensis*	Field Bindweed
3	*Cosmos bipinnatus*	Common Cosmos
3	*Cruciata pedemontana*	Piedmont Bedstraw
3	*Cynodon dactylon*	Bermuda Grass
3	*Dactylis glomerata ssp. glomerata*	Orchard Grass
3	*Datura stramonium*	Jimson Weed
3	*Dianthus armeria*	Deptford-Pink
3	*Egeria densa*	Brazilian water-weed
3	*Eleusine indica*	Goose Grass, Yard Grass
3	*Elymus repens*	Creeping Wild Rye
3	*Epilobium hirsutum*	Hairy Willow-Herb
3	*Eragrostis cilianensis*	Stinkgrass
3	*Eragrostis curvula*	Weeping Lovegrass

Threat	Scientific Name	Common Name
3	*Euphorbia esula var. esula*	Leafy Spurge
3	*Euphorbia lathyris*	Caper Spurge, Mole Plant, Wolf's-Milk
3	*Foeniculum vulgare*	Sweet Fennel
3	*Galium mollugo*	False Baby's-Breath
3	*Hedera helix*	English Ivy
3	*Hemerocallis fulva*	Common Day Lily
3	*Hemerocallis lilioasphodelus*	Yellow Day Lily
3	*Hibiscus syriacus*	Rose-Of-Sharon, Shrubby Althea
3	*Hieracium ×floribundum*	Smooth Hawkweed
3	*Hieracium aurantiacum*	Devil's Paintbrush
3	*Hieracium pilosella var. pilosella*	Mouse-Ear Hawkweed
3	*Hieracium piloselloides*	Tall Hawkweed
3	*Humulus japonicus*	Japanese Hop
3	*Ipomoea coccinea*	Red Morning-Glory
3	*Ipomoea hederacea*	Ivy-Leaved Morning-Glory
3	*Ipomoea purpurea*	Morning-Glory
3	*Kummerowia stipulacea*	Korean Bushclover
3	*Kummerowia striata*	Japanese-Clover
3	*Lactuca saligna*	Willow Lettuce
3	*Lamium amplexicaule*	Henbit
3	*Lamium purpureum var. purpureum*	Purple Dead-Nettle
3	*Lapsana communis*	Nipplewort
3	*Leonurus cardiaca ssp. cardiaca*	Motherwort
3	*Lepidium campestre*	Cream-Anther Field Pepperwort
3	*Lepidium densiflorum var. densiflorum*	Dense Peppergrass
3	*Lepidium perfoliatum*	Clasping Pepperwort
3	*Lepidium ruderale*	Stinking Pepperweed
3	*Ligustrum sinense*	Chinese privet
3	*Lonicera fragrantissima*	Sweet Breath Of Spring
3	*Lotus corniculatus*	Garden Bird's-Foot-Trefoil
3	*Malva moschata*	Musk Mallow
3	*Malva neglecta*	Common Mallow
3	*Malva sylvestris*	High Mallow
3	*Malva verticillata*	Whorled Mallow, Curled Mallow
3	*Marrubium vulgare*	White Horehound
3	*Medicago lupulina*	Black Medic
3	*Mentha ?×verticillata*	Whorled Mint
3	*Mentha ×gracilis*	Small-Leaved Mint
3	*Mentha ×piperita*	Peppermint
3	*Mentha ×rotundifolia*	Roundleaf Mint
3	*Mentha aquatica*	Water Mint
3	*Mentha spicata*	Spearmint
3	*Microthlaspi perfoliatum*	Perfoliate Pennycress
3	*Miscanthus sinensis*	Chinese Silver Grass
3	*Morus alba*	White Mulberry
3	*Murdannia keisak*	Aneilema
3	*Muscari botryoides*	Grape Hyacinth
3	*Myosoton aquaticum*	Giant Chickweed
3	*Najas minor*	Brittle Waternymph
3	*Nepeta cataria*	Catnip
3	*Papaver dubium*	Scarlet Poppy
3	*Pennisetum glaucum*	Pearl-Millet
3	*Phalaris canariensis*	Canary Grass
3	*Phleum pratense*	Timothy
3	*Phyllostachys aureosulcata*	Golden Bamboo
3	*Phyllostachys nigra*	Black Bamboo

Threat	Scientific Name	Common Name
3	*Picea abies*	Norway Spruce
3	*Poa annua*	Annual Bluegrass
3	*Polygonum aviculare*	Yard Knotweed
3	*Polygonum convolvulus var. convolvulus*	Black Bindweed
3	*Polygonum orientale*	Prince's Feather
3	*Polygonum persicaria*	Spotted Lady's-Thumb
3	*Populus alba*	White Poplar
3	*Potentilla recta*	Sulphur Cinquefoil
3	*Prunella vulgaris*	Common Self-Heal
3	*Prunus avium*	Sweet Cherry
3	*Prunus mahaleb*	Perfumed Cherry
3	*Ranunculus acris var. acris*	Tall Buttercup, Meadow Buttercup
3	*Ranunculus arvensis*	Corn Crowfoot
3	*Ranunculus bulbosus*	Bulbous Buttercup
3	*Ranunculus flammula var. filiformis*	Greater Creeping Spearwort
3	*Ranunculus repens*	Creeping Buttercup
3	*Ranunculus sardous*	Hairy Buttercup
3	*Raphanus raphanistrum*	Wild Radish
3	*Rhodotypos scandens*	Jetbead, White Kerria
3	*Rorippa sylvestris*	Creeping Yellowcress
3	*Rosa canina*	Dog Rose
3	*Rosa eglanteria*	Sweetbrier
3	*Rubus illecebrosus*	Strawberry-Raspberry
3	*Rumex crispus ssp. crispus*	Curly Dock
3	*Salix alba*	White Willow
3	*Saponaria officinalis*	Bouncing-Bet
3	*Senecio vulgaris*	Common Groundsel
3	*Senna obtusifolia*	Coffeeweed
3	*Setaria faberi*	Giant Foxtail-Grass
3	*Setaria italica*	Foxtail Millet
3	*Setaria verticillata*	Bristly Foxtail
3	*Setaria viridis var. viridis*	Green Foxtail
3	*Silene latifolia ssp. alba*	White Campion
3	*Sisymbrium altissimum*	Tall Hedge-Mustard
3	*Sisymbrium officinale*	Hedge Mustard
3	*Solanum dulcamara var. dulcamara*	Bittersweet
3	*Sonchus arvensis ssp. uliginosus*	Field Sowthistle
3	*Sonchus asper ssp. asper*	Spiny Sow Thistle
3	*Sonchus oleraceus*	Common Sowthistle
3	*Stellaria graminea*	Lesser Stitchwort
3	*Torilis arvensis ssp. arvensis*	Hedge Parsley
3	*Tragopogon dubius*	Meadow Goat's-Beard
3	*Trapa natans*	Water chestnut
3	*Trifolium arvense*	Rabbit-Foot Clover
3	*Trifolium aureum*	Yellow Hop Clover
3	*Trifolium campestre*	Low Hop Clover
3	*Trifolium dubium*	Small Hop Clover
3	*Trifolium hybridum*	Alsike Clover
3	*Trifolium incarnatum*	Crimson Clover
3	*Trifolium pratense*	Red Clover
3	*Trifolium repens*	White Clover
3	*Trifolium resupinatum*	Reversed Clover
3	*Tussilago farfara*	Colt's-Foot
3	*Typha ×glauca*	Cattail
3	*Urtica dioica ssp. dioica*	Stinging Nettle
3	*Veronica arvensis*	Corn Speedwell

Threat	Scientific Name	Common Name
3	*Veronica beccabunga*	European Brooklime
3	*Veronica chamaedrys*	Bird's-Eye Speedwell
3	*Veronica filiformis*	Filiform Speedwell
3	*Veronica hederifolia*	Ivyleaf Speedwell
3	*Veronica longifolia*	Long-Leaved Speedwell
3	*Veronica officinalis var. officinalis*	Common Speedwell, Gypsyweed
3	*Veronica persica var. persica*	Bird's Eye Speedwell
3	*Veronica polita*	Field Speedwell
3	*Veronica serpyllifolia ssp. serpyllifolia*	Thyme-Leaved Speedwell
3	*Viburnum opulus var. opulus*	Guelder-Rose
3	*Vicia cracca ssp. cracca*	Vetch
3	*Vicia grandiflora*	Large-Flowered Vetch
3	*Vicia hirsuta*	Vetch
3	*Vicia sativa ssp. nigra*	Common Vetch
3	*Vicia sativa ssp. sativa*	Spring Vetch
3	*Vicia sepium var. sepium*	Bush Vetch
3	*Vicia tetrasperma*	Four-Seeded Vetch
3	*Vicia villosa ssp. varia*	Hairy-Fruit Vetch
3	*Vicia villosa ssp. villosa*	Hairy Vetch
3	*Wisteria floribunda*	Japanese Wisteria
3	*Wisteria sinensis*	Chinese Wisteria
3	*Xanthium spinosum*	Spiny Cocklebur

Appendix G

Solar/Pollinator-friendly Seed Mixture Design Objectives For Franklintown Solar

The seed mixtures recommended for this solar project have been designed considering a wide range of co-equal, critically important and diverse set of objectives. While it is very challenging to meet each of the objectives listed in this summary, it can be accomplished with a very careful and thoughtful consideration of how these objectives are met and delivered. If a seed mixture design does not consider each of these objectives, it will very likely fail to deliver on one or more of the important objectives of the project.

Project Objectives Considered for Array Area Seed Mixture Design

1. **Vegetative Height Restrictions**. Increasingly, utility-scale solar projects are being designed with a lower panel height of 20" to 22" above the ground. Under those situations, a seed mixture established within the array area should be designed to have a maximum growth height of 18" to 20". While this objective produces significant constraints on how a seed mixture is designed, it is a critically important consideration that affects future Operations & Maintenance efforts, budget and the efficiency of the energy production on the site.

2. **Pollinator Value:** One of the key objectives of this site is to provide significant pollinator health and habitat benefits for a wide range of pollinating insects, birds, and mammals. The plant species used in the seed mixture designs for this site have a documented high pollinator value, extend their pollinator benefits over an entire growing season, and are designed to benefit a wide range of pollinator species.

3. **Carbon Sequestration Benefits:** The project goal of sequestering carbon from the atmosphere is a key component of the seed mixture design and function. Using plant species in seed mixtures like clover (*Trifolium* spp.) that are known to sequester carbon at higher rates and produce lignin can help meet these current and future objectives. The opportunity to 'bank carbon credits' is a potential vehicle by which the project can help meet sustainability, greenhouse gas emission and carbon neutral goals.

4. **Ease of Establishment**: In order to meet the requirements of a Conditional Use Permit (CUP) and/or Stormwater Pollution Prevention Plan (SWPPP), it is important that seed mixtures be designed to establish quickly. If a seed mixture were designed with a focus solely on use of native wildflowers or warm-season grass species, it would take an extended period of time for the site to reach full establishment. For this reason, the use of cover crops and/or plant species that establish quickly are being used in seed mixture designs.

5. **Response to Future Mowing Activities**: Once established, the seed mixture designed for use within the array area will likely experience mowing activities applied to manage and control weed growth on the site. It is critically important to select plant species in the seed mixture that can withstand the mowing pressure and persist on the site for 20 to 30 years. Unfortunately, most native wildflower and/or warm-season grass species cannot withstand the mowing pressure at a rate of 2x per year and would disappear from the planting within just a few years. In addition, native wildflower species that can withstand mowing pressure and meet the vegetative height restrictions of the project usually have significant commercial availability limitations.

6. **Cost-effectiveness of the Seed Mixtures**: For large, utility-scale projects, it is important that the cost of pollinator-friendly seed mixtures be presented in a cost-effective design and seeding rate. With careful consideration, the seed mixture for this site was designed to meet those cost objectives. Often, seed mixtures that emphasize the exclusive use of native grasses and wildflower species produce seed mixture that exceed project budgets and range from $600 to $2,000/acre because of the limited ability to access native wildflower species that meet all the rest of the objectives in this summary such as maximum growing height and ability to withstand periodic mowing.

7. **Seeding Rates:** For seed mixtures created and required to be used on the project are designed using a PLS seeds/ft^2 seeding rate of between 525 and 700 seeds/ft^2. This is a seeding rate that is significantly higher than would be designed and used on most conservation program plantings. The increased seeding rates are required to consider project and stand establishment factors like broadcast seeding, poor initial site preparation, planting outside of recommended timelines, initial weed competition, etc.

8. **Commercial Availability**: The size of utility-scale projects and the number of projects scheduled for completion in the next few years are placing a significant demand on the seed industry to have enough supply available to fill the demand for seed. If a seed mixture is designed using species that are not commercially available or are in a limited supply, it will significantly increase the cost of seed mixtures and place limitations on the ability to acquire those seed mixtures.

9. **Longevity and Ability to Persist in Plantings:** Most solar energy projects are leased for a minimum of 20 to 35 years. As such, it is important to select plant species with a documented ability to persist in plantings with minimal and limited future management. Most native wildflower and warm-season grass species require some form of regular, annual management activities to be maintained in a planting. Since some of the tools that would regularly be used to maintain this plant diversity (prescribed fire, cattle grazing, interseeding, etc.) are not an option on solar projects, plant species must be selected that are dominate and/or aggressive enough to be maintained with the limited options of mowing and/or herbicide application.

10. **Adaptation to the Geography and Site Conditions**: Seed mixtures should be designed to include plant species that are known to occur in the project area and perform well on the site's soil conditions (sandy, loamy, clay, etc.). This will help ensure a higher likelihood of successful establishment of the seed mixture planted. The resource used to document adaptation to the project's location is *The Biota of North America Program* (2014 BONAP North American Plant Atlas).

11. **Tolerance to Partial Shading**: Plant species (both grasses and forbs) that are known to tolerate and perform well in partial shading or areas with less than full sunlight is required in the Array Area seeding mixture. The use of Fescue and White Dutch Clover in array areas seed mixtures are known to perform well under those conditions and meet all the other listed set of objectives in this summary.

12. **Mixtures Designed Using PLS Seeds/ft^2 Calculations**: In order to design a seed mixture that considers the seeding rates, cost and quality of the seed lots used in a mixture, every seed mixture must be bid, acquired and planted using a seed calculator that applies PLS seeds/ft^2 technology. Seed mixtures should not be designed or used that are based on the number of pounds of seed/per acre. Using the more antiquated methods of pounds/acre will result in higher costing seed mixtures, potentially obtaining seed mixtures with lower performance and creating a project with a slower to establish final vegetative cover.

13. **Erosion Control Attributes**: Seed mixtures should be designed to establish quickly and provide extensive root growth in the top portion of the soil horizon. This will produce an increased ability to hold soil, prevent erosion and limit weeds on the site, especially during the establishment phase of the project. Seed mixtures that are being planted in the spring should consider the inclusion of Oats as a nurse crop to aid in establishment and protect newly establishing plantings during hot and dry summer months.

14. **Soil Health Benefits**: Seed mixtures that perform with increased soil health benefits, extended root depths, nitrogen-fixing capabilities and enhanced water percolation attributes will produce both short-term and long-term benefits that will benefit the site for many years to come.

15. **Fire Danger Considerations**: Seed mixtures designs that contain species that exceed a vegetative height of >22" tall at maturity and/or that have a warm-season growth cycle will have a higher danger of being susceptible to fire. The seed mixtures recommended for use within the solar array area of the project have been selected based on their low vegetative height at maturity and their cool-season growth cycle ability to have active, 'green' growth throughout the entire growing season.

16. **Albedo Affects**: As solar panel efficiencies increase and their overall costs decrease, more and more solar energy projects are being constructed with bi-facial panel designs. To increase the energy produced in a bi-facial panel design project, including plant species with documented, increased Albedo affects like white Dutch clover (*Trifolium repens*) will increase the projects overall efficiency and energy production.

17. **Grazing Considerations**: If grazing is a consideration for the future O&M activities on a solar project, the seed mixture should be designed to include species that provide grazing value and are able to maintain pollinator health and habitat benefits under grazing activities. The ability to deliver both pollinator health benefits with grazing activities is very challenging and the site should apply and follow a Grazing Management Plan. Grazing activities will need to be delivered in a plan that implements grazing paddocks, rotational grazing and refugee areas of the project on an annual basis.

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Appendix H

July

A Solar Array Area seed mixture showing broadcast seeding establishment just 2 months after being planted. This photo represents the time when mowing should be applied as management activity in year 1. The volunteer weed species present in this image include: Mare's Tail, Giant Ragweed, Pigweed, Curl Dock, Dandelion and Velvet Leaf.

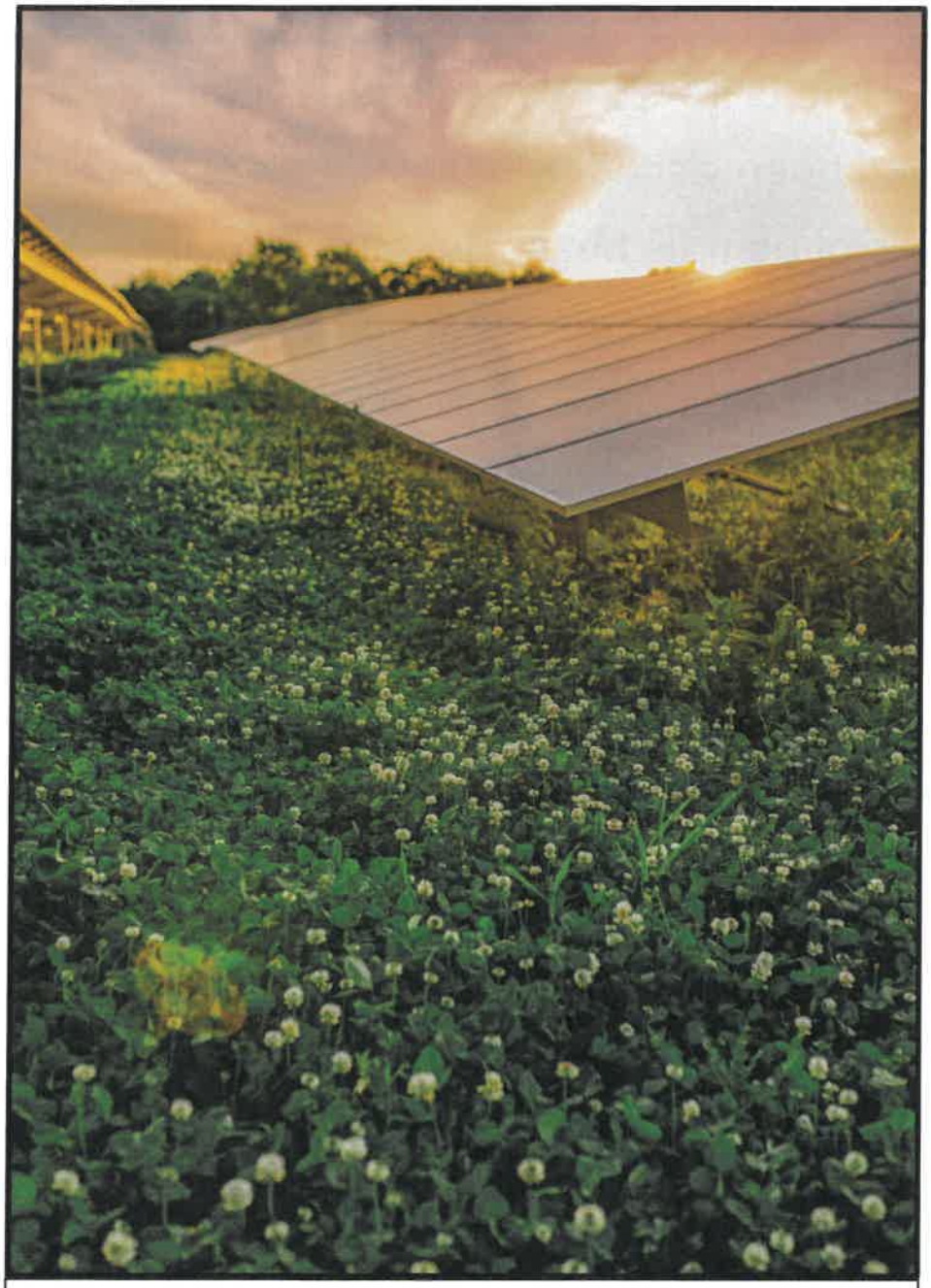
If allowed to grow without management activities being applied, these weed species will quickly outcompete the array area seed mix, being to bring allelopathic impacts to the planting and threaten the overall success of the final vegetative cover.

Appendix I

November

A Solar Array Area seed mixture showing no-till drill planting establishment just 4 months after being planted. This area was planted pre-construction and has had two mowing activities applied to it in the first growing season. This stand is well on its way to outcompeting volunteer weed species, providing key pollinator benefits and becoming fully established. In the future, this solar array area seed mixture will need minimal management activities applied to it and should not grow taller than the lower panel height.

Appendix J



June

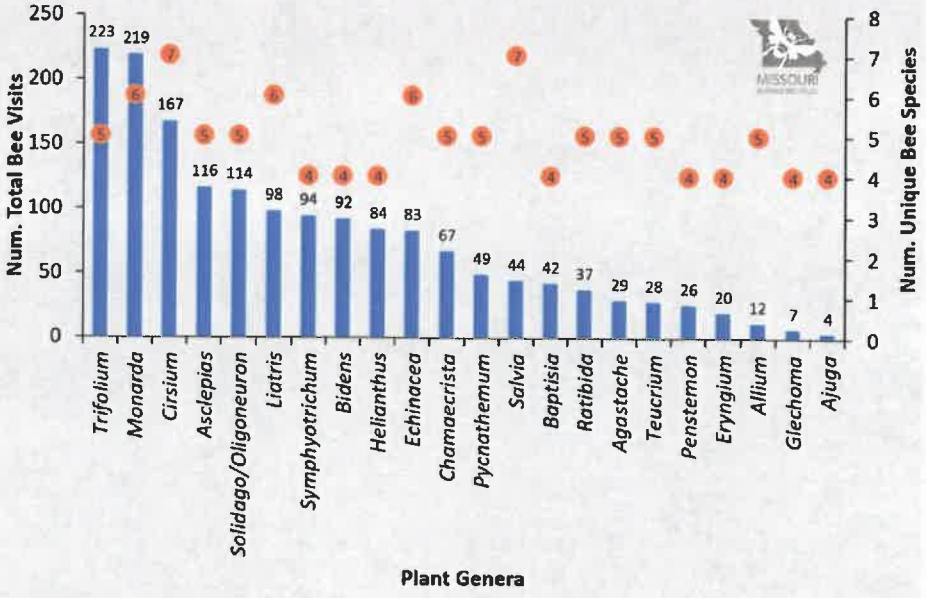
A Solar Array Area seed mixture showing broadcast seeding establishment in its second year after being planted. This area was planted pre-construction and had three mowing activities applied to it in the first growing season. This stand is fully established and will need minimal management activities applied to it going forward.

Appendix K

On the charts below, we've listed all plant genera that had been visited by at least 4 different species of bumble bees. The blue bar represents the number of bumble bee visits to each genus, while the orange dot represent the number of bumble bee species that visited each genus.

1

2



Support Solar Energy in Jefferson County!

Action petitioned for:	We, the undersigned, are residents of Jefferson County who urge our leaders to support the development of solar energy in Jefferson County. We oppose burdensome regulations and county government action that would prevent solar development. We support solar because of the jobs, economic growth, revenue generated for the county, the rights of private property owners, and the many other benefits that come with solar.

Printed Name	Signature	Address	Phone Number
Jennifer Burton	Jen Burton	138 Meadow Farm Dr Shep WV	607 341-5137
Robert Smith		24 Ryan Way Shepherdstown WV	304-314-4288
Jenn Grell		23 Ryan Way Shepherdstown WV	912-687-9666
Katrina Bushko		11 Ryan Way Shep	301-524-5836
Angela Wilt		45 Ryan Ct. 25443	304-240-7652
Kristina Rodriguez		21 Ryan Ct Shep	304 886 2844
Jennifer Ivy	Jennifer Ivy	26 Ryan Ct Shep 25443	
[illegible]	Elizabeth Held	20 Pheasant District	
Gladys Gbenle		22 Pheasant Ridge	301-595-6517
[illegible]		26 " "	304 283 5403
Gina Mentus		25 Pheasant Ridge Ct	
Debra Hoffmaster	Debra A Hoffmaster	53 Pheasant Ridge Ct	304-595-3205

*Submitted during public comment 08-22-2024

Support Solar Energy in Jefferson County!

Action petitioned for:	We, the undersigned, are residents of Jefferson County who urge our leaders to support the development of solar energy in Jefferson County. We oppose burdensome regulations and county government action that would prevent solar development. We support solar because of the jobs, economic growth, revenue generated for the county, the rights of private property owners, and the many other benefits that come with solar.

Printed Name	Signature	Address	Phone Number
Nicholas Constantine	N Cte	549 Lord Fairfax St Charlestown WV	301-712-5542
Rebecca Metz	Rebecca Metz	491 Lord Fairfax St C T WV	678-355-7400
Jana Miller	Jana Miller	491 Lord Fairfax St CT WV 25414	678-457-4444
Drew Smart	Drew Smart	485 Lord Fairfax St Charles Town WV 25414	3048858786
Carsima Wells	Carsima Wells	467 Lord Fairfax St Charles Town WV 25414	202-258-9689
Grey Wells	Grey Wells	467 Lord Fairfax St Charles Town WV 25414	202-258-9689
Kevin Deer	Kevin Deer	453 Lord Fairfax St. Charles Town WV 25414	
Emma Bewley	Emma Bewley	415 Lord Fairfax St. Charles Town WV	
Rodney Yaley	Rodney Yaley	164 CHADWICK CHARLES TOWN WV 25414	
Megan Mitchell	Megan Mitchell	178 Chadwick drive Charles Town WV	
Mirela Beline	Mirela Beline	192 Chadwick Dr	705 989 4527
Marguerite McCauley	Marguerite McCauley	205 Chadwick Dr	

Support Solar Energy in Jefferson County!

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Printed Name	Signature	Address	Phone Number
JOHN LiTCOS		58 Davis St Charles Town WV	
Angel Cain		18 DAVIS St. CTWV	
Blake Pindell		10 Davis St CT WV	
FOZia Lazaro		25 Battlefield Dr WV	
XIAM Lazaro		25 Battlefield Dr	
TYLER HESPLER		51 BATTLEFIELD DR	
Melissa Lane	Melane	414 Lordfair St	
RUTH BENITES	Ruth Benites	106 SILERLEAF DR	
Allison Pyles		62 Silverleaf dr	304-82[illegible]-2515
Tim Tew	Tim	74 Payne St	
Nicole Cuban	Nicole Cuban	96 Payne st	
Laurie Saunders	Laurie Saunders	48 Deerbrook Dr	703 727 2518

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Printed Name	Signature	Address	Phone Number
Vicki Robinson	Vicki Robinson	803 Morrison St. Ct. WV	
Christine Fontaine de Senvellon	[illegible]	87 Nathaniel Dr	
Marcia Fisher	Marcia Fisher	37 Nathaniel Dr.	910-431-7268
Deborah Mayard	Deb	176 Ranson Estates Cl	703-635-4695
GEORGE FRENCH	[illegible]	152 Ranson Est. CR	301-424-287
Eva French	Eva French	152 Ranson Estate Cr	24062C-5432
[illegible]	Victoria Hymes	124 Ranson Estates.	
Gabriela Martinez	Gabriela Martinez	118 Ranson Est. Circle.	(681) 532-29-54
Ellen Mitchell	[illegible]	107 Ranson est Cir	(240) 783-6211
Annette Faulon	[illegible]	309 E 4th Ave #3 Ranson WV 25438	———
MARY C CARPEN	Mary C Carpen	212 E 4th Ave Ranson WVa	
Ruth A Campbell	Ruth A. Campbell	307 Deer Mountain Dr	

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Printed Name	Signature	Address	Phone Number
[illegible]	[signature]	218 Braddock St.	843 991 9658
Sherrill Hymes	[signature]	206 Braddock St	304-457-7993
Cheri Plummer	[signature]	194 Braddock St	803-318-9507
Deanna Thomas	[signature]	182 Braddock St	571-271-9849
Beryl Garner	[signature]	170 Braddock St.	585-230-0400
[redacted]	[redacted]	[redacted]	
Sara Perrotts	[signature]	98 Burnlea Rd	
Gary Craigw	[signature]	118 Burnlea Rd	202-360-3875
Karen Hawbaker	Karen Hawbaker	67 Bullskin St	704-245-3541
Kelly Stout	Kelly Stout	159 Colston Rd	—
Ken Nord	Kenneth R Nord	79 Davis St	
Jerome Nugent	[signature]	100 Davis St	304-596-1278

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Printed Name	Signature	Address	Phone Number
GARY RAUM		113 Tribeca DR	307-5[illegible]2304
Ray Anderson		35 TRIBECA DR	202 957 5453
Pat Maxwell		18 Courier Dr	757-575-9911
Rick Schuh		34 Courier Dr	504-528-4582
MARK TIMMONS		196 COURIER DR.	304-820-8609
LINDA JOHNSEN		236 COURIER DR	304-582-6270
Mary Velasco		241 Courier Dr	954 790 3545
Marcus Ballard		211 Courier Dr	336-516-7788
Chris Atkins		234 Okanagan Dr	301-514-5525
David Bichel		181 Madden Square Dr	304-876-6062
Jean Anne Pugh		216 Madden Sq Dr	[illegible]
Kristina Thatcher		154 Madden Farm Dr	304-616-0204

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Printed Name	Signature	Address	Phone Number
Howard Kuan		197 Chadwick Dr	484-961-1818
Suresh Suryawanshi		163 Chadwick Dr.	703-530-0364
Pragati Suryawanshi		163 Chadwick Dr.	703-530-0364
Tammy Crocco		50 High Hopes Dr	703 398-3772
Linda Brooks		66 High Hopes DR	
Mary Addie		70 High Hopes Way	240-315-7410
Reid Borden		74 High Hopes Way	
Amanda Novick		78 High Hopes Way	
Sheri Leonard		55 Strathaven Dr	540-454-7873
Nikki Dodd		62 Tribury Dr	661-314-4545
Maryam Yaghoubi		188 Tribury Dr	571-348-8817
Sergio Fernandez		147 Tribury Dr	7049076065

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Printed Name	Signature	Address	Phone Number
Edward Graham	Edward Graham	605 Eagle Ave Charles Town	
Burke C. Bake		295 Craighill Drive Charles Town	
Antonio Barne		457 Craighill Dr Charles Town	
Doug Keefer		432 Craighill Dr CT, WV	
Justin Nottingham		318 E Liberty St CT WV	
Jeremiah Chambers		5 Matthew Ct Inwood	
Jenna Nottingham		318 E. Liberty St. CT, WV	
Tim Whitt		311 E. Liberty St. CT WV	
Steve Hann		415 S Church St	
Richard Schroyer		602 South Church St	304-886-0131
Stephen Gilmanson	STEPHEN GILMANSON	533 S. CHURCH ST.	304-725-2826
Sarah Phelps		619 S. Church St	240-409-3186

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Printed Name	Signature	Address	Phone Number
Christin Starr		619 S. Church St	443-388-0677
Sarah Weir		460 Applejack, Harpers Ferry	304-261-9533
Judy	Judy Hoekman	600 South Street	307-725-0779
Debra Coffman	Debra Coffman	556 Brooke St.	304 725-2497
Patrick Blanc		543 Morison st	304-268-4845
Linda Blanc	Linda Blanc	543 Morison St.	304-268-4846
Kelly Bambury	Kelly Bambury	523 brooke st	681 258 0960
James Fine		524 Brooke Street	304-261-0080
JEFF CHUMLEY		205 S. SAMUEL ST.	301-520-7209
JUSTIN BAER		527 S. SAMUEL ST	304 283 6556
ANTHONY TRAYER		94 Edgar Dr	(304) 725-6578
DAVID RAMSBURG	David Ramsburg	203 BEAUREGARD BLVD	

600 S. Church St.

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Printed Name	Signature	Address	Phone Number
Denver Beckner		637 Maddox Farm Dr.	301-754-2552
Joe Yates		207 W. Wash. St. Shepherdstown	304-676-8056
Dolores W. Gregg	Dolores W. Gregg	209 W. Washington St. Shepherdstown	202-550-6964
Mary Lee Vanderembur	Marylee Vanderembur	67 C Edward Lane	330-831-5773
Robert Berryman		35 Lee Brown Circle	—
Shawn Swiadek		39 Lee Brown Circle	
Elizabeth Egan		39 Lee Brown Cir.	
Trevor Brown		45 Lee Brown Cir	
Steven Peterson		147 Monumental Dr	
Spencer Walch		147 Cave Quarter Dr	304-279-9324
Lorraine Vecchio		118 Cave Quarter Dr	
Heather Blaszinsky		53 Cave Quarter Dr.	304-820-9458

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Printed Name	Signature	Address	Phone Number
JOSEPH CAMPBELL		307 Deer Mt. Drive Harpers Ferry WV 25425	
TIM SCOTT		520 DEER MTN DR HARPERS FERRY, WV 25425	
Barb Johnson	BARB JOHNSON	594 Deer Mountain DR Harpers Ferry WV 25425	
Ruth Dixon	Ruth Dixon	655 Deer Mt Drive	
Richard Davidson		171 CHATFIELD DR SHEPHERDSTOWN, WV 25443	
Matt Seidler		143 Chatfield Road	
Peggy Mecklin	Peggy Mecklin	207 Chatfield Dr Shepherdstown	
Judy Ford	Judy Ford	160 Chatfield Shep	
CHARLES FORD		160 CHATFIELD DR.	
Pamela Lockard		33 Exeter Ct Shep.	
JAMES L LOCKARD		33 EXETER CT. Shepherdstown WV	
Ashley Ashbaugh		98 Exeter Court 25443	

Jan - Feb

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Printed Name	Signature	Address	Phone Number
Marie Galperin	Marie Galperin	132 C. Edward Ln CT	—
Phyllis Forsyth	Phyllis Forsyth	119 C Edward Ln CT	—
Brian Kyoshek	Brian Kyoshek	219 Crosswinds Dr	—
James Magee	James Magee	197 Crosswinds Dr	—
Renee Julye	Renee Julye	84 crosswinds Dr Julye CT	
George Broadrick	George Broadrick	36 Southwinds Dr	—
Tamara Thompson	Tamara Thompson	36 Gusty Ct	681-358-0055
Sharon Galus	Sharon Galus	113 Gentle Breeze Ln	304 350 0949
Amanda Marquez	Amanda Marquez	29 Gentle Breeze Ln	(304) 3694307
Richard A. Zigler	Richard A. Zigler	1083 Roper North Fork Road Charlestown WV	304 283 6799
Irene McDaniel	Irene McDaniel	54 Eagle Ave CT	304-724-7503
Courtney Downing	Courtney Downing	605 Eagle Ave	

***A

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Printed Name	Signature	Address	Phone Number
		249 Maddox Farm Dr	—
		295 Maddox Farm	
Patricia Lein		302 Maddox Farm Dr.	
[redacted]		398 Maddox Farm Dr.	
JAMES CHAFFIN		421 MADDOX FARM DR.	
George Spiding		448 Maddox Farm Dr	—
Britton Puller		464 Maddox Farm Dr.	304-995-2507
Amanda Storer	Amanda Mr. Storer	565 Maddox Farm Dr.	304-886-3435
Jessi Bu		593 Maddox Farm	
Greg Sage		604 Maddox Farm Dr	
John Lear		611 Maddox Farm Dr	
Kristi Lear	Kristin M Lear	611 Maddox Farm Dr	

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Printed Name	Signature	Address	Phone Number
R. Douglas Perks		114 Devon Way Stenx	304-876-2616
Meghan Perks		115 Devon Way	304-261-5892
Vernon Hunter		7 Devon Way	304-283-9735
Deborah A Hammond	Deborah A Hammond	155 Ashley Dr Shepherdstown	304-876-6047
		229 Hunter Dr	3/4 2708091
Mark Matthews		164 Ashley Dr	501 500 5187
John K. Holliday	John K Holliday	60 Chatfield Dr 25443	304-876-1534

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Printed Name	Signature	Address	Phone Number
Z [illegible] Proctor	[signature]	406 N. Forrest St	
[illegible] Smith	[signature]	505 N. Marshall ST	
[illegible]	[signature]	303 E 11th Ave Ramsey	
[illegible]	[signature]	503 N Reynolds St	
[illegible]	[signature]	409 N. Preston St.	
[illegible]	[signature]	406 E 10th Ave Ramsey	
[illegible] Kolonich	[signature]	135 shallow creek Dr.	
[illegible]	[signature]	184 Sparkling Brook RD	
Kevin Trigger	[signature]	99 Sparkling Brook Rd.	
Rebecca Hamilton	[signature]	88 Sparkling Brook Rd	
KERRY SCOTT	[signature]	168 OVER BROOK RD	
[illegible]	[signature]	[illegible]	

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kcorey11@gmail

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Printed Name	Signature	Address	~~Phone Number~~
Phillip Truiett		39 Sawgrass Drive 25414	
Michael Sing		258 Pebble Beach Dr.	
Tyler Mattei		63 Pebble Beach Dr	
Danielle Malo		30 Pebble Beach Cir	
April Isemann		105 Pebble Beach Cir	
Mathew Black		94 Braddock St	
Peter Giffin		216 Calmes St	
MATTHEW DELACOSTA		321 CALMES ST	
Jelan Hamm		332 Bullskin St	
Antony Mwangi		215 Bullskin St	
Ryan Carr		187 Aris St	
Paul Emmett		559 Lord Fairfax St Charles Town	

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Printed Name	Signature	Address	~~Phone Number~~
Nick Constantine		549 Lord Fairfax St.	
Duncan King		515 Lord Fairfax St	
Danielle Flemiy		63 Silverleaf Dr	
Maylin Peacock		444 Lord Fairfax	
Austin Jenkins	Austin Jenkins	183 Chadwick Dr	
Bethany Amdan		177 Battlefield	*
Jackie Jones	Jackie Jones	161 Battlefield Dr	
Michael Cravalho		522 Prospect Hill Blvd	
Judy Golden		597 prospect Hill Blvd	
Clara Golden	Clara Golden	" " "	
Rhiannon Ehles		132 Eldon Dr.	

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Printed Name	Signature	Address	~~Phone Number~~
Mike Siles		1217 More st	
Brianna Lu		299 Palomino Pl	
J. Bryan Stott		458 Thoroughbred Dr	
Vanessa Kline		729 Thoroughbred Dr.	
Andrew Long		446 Thumper Dr.	
Allison McCauley	Allison McCauley	117 Peter Rabbit Dr	
Frank Bethke		48 Peter Rabbit Dr	
David McMasters	David McMasters	271 Thumper Drive	
Joan Mellen		134 2nd St.	
Connie Lackey	Connie Lackey	147 Robelei DR	
Courtney Ebbert	Courtney	32 Three Sisters	
Makayla Cox	Makayla Cox	67 McCoy Ln	

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Printed Name	Signature	Address	~~Phone Number~~
Rebecca Bradford		52 Dunlap Dr Charles Town WV 25414	
David Bradford		" "	
CLAUDE CYR		289 Hughs RD C.T.	
Zach Gagon		155 Hughs Road CT	
Helen Bauer	Helen Bauer	143 Bovlin Rd	
Christine McBride		130 Belevedere	
Ronald Rodgers		351 "	
Asif		187 DUNLAP DR CHARLES TOWN 25414	
Nicholas Rumm		16 Dunlap Drive Charles Town	
Conner Perkins		" "	
Robert Alley		48 Dunlap Drive Charles Town	
MARIA ALVAREZ		92 DUNLAP DR CHARLES TOWN	

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Printed Name	Signature	Address	~~Phone Number~~
Robert Bauer	Robert Bauer	27 Bugs Ct Ranson	
Daniel McVicar	Daniel McVicar	29 Sunlite Drive.	
Lee Anne McVicar	Lee Anne McVicar	29 Sunlite Drive	
Cecelia Stollemyer	Cecelia Stollemyer	75 Packett Dr.	
[illegible]	[illegible]	1425 Savannah dr	
Larry Tolson	C. Larry Tolson	1486 Tuscarora	
[illegible]	[illegible]	1013 [illegible] Dr	
Susan M. Thompson	Susan M. Thompson	167 Packett Drive	
Erin Murnaw	E Murnaw	3166 Turnberry Dr.	
Fontaine Smith	[illegible]	471 Turnberry dr.	
Georgina Torres	Georgina Torres	361 Sawgrass Dr.	
Cesar Reyes	C. [illegible]	121 Sawgrass Dr.	

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Printed Name	Signature	Address	~~Phone Number~~
Susan Kenney		238 Mountain Laurel Blvd Ranson, WV 25438	
Sarah Joyslin		224 Mountain Laurel Blvd Ranson WV 25438	
Nathalie Perla		146 Watercourse dr Ranson WV 25438	
Sarah Capriolo		20 Battle Lane Ranson, WV 25438	
Tracy Herbert		88 Rex Drive Ranson	
Rebecca Beaver		865 Oak Lee Dr	
Chan [illegible]		188 McGregor Dr	
Kathleen Haefler		15 Rex Dr Ranson	
Anne Haefler		15 Rex Drive Ranson	
Regina Clark-Brateman		28 Rex Dr Ranson	
David Keiling		98 Rex Dr. Ranson	
Eric Wright		188 Thompson Drive	

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Printed Name	Signature	Address	Phone Number
John Phillips		1349 Steed St	304-470-9402
Nancy Green		1308 Foal St	478 246 5445
Cleo-Green		1308 Foal St	478 246 8654
Bintey Sanyang		7705727953	1340 Foal St
Bethany Davis		1330 Destrier	703 727 5982
Michael Everett		51 Fuzzy Tail	571-991-0873
Robert Glenn		13 Fuzzy Tail	321-313-7010
Ryan James		460 Thumper Dr	717-389-5728
Vanessa James		460 Thumper Dr	717-389-2119
Austin Tierney		504 Thumper	304 433 5231
DCiocon		516 Thumper	443 536 6932
Ray Barnes		584 Thumper Dr	703-819-7345

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Printed Name	Signature	Address	~~Phone Number~~
Kim Strange		27 Bruce Drive Charles Town	
Kathryn Espinola		49 Bruce Drive	
Jerry Chavalas		35 Holmes Drive	
Vanessa Walters		17 Snowberry St.	
Damon Jasper		206 Braddock st	
Austin Richardson		45 Burnlea Rd.	
David Manker		156 Calmer St.	
Scott McMonagle		95 Bulls High S	
Dante Pacella		327 Prospect Hill	
Jen Pacella		327 Prospect Hill Blvd	
Chiara Pacella		327 Prospect Hill Blvd	
Doris N. Starks	Doris N. Starks	318 Bullskin St.	

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Printed Name	Signature	Address	Phone Number
Kim Wilson	Kimberly Wilson	Kearneysville, WV 84 Woodbury Drive	304-582-5344
MARK WILSON		" " " "	" " "
Michael Bradbury		240 Lone Oak Rd Ranson WV 25438	304-596-3631
Chris Schwarz		1251 Maeest Ranson	304-270-8298
~~Yasmin Ibrahim~~		~~1256 Steed St Ranson WV-25438~~	~~(304) 995-9518~~
Margaret E. Barnes	Margaret E Barnes	588 Thumper Dr Ranson 25438	703-919-0093
Megan Echols		613 Thumper Dr 25438	304-365-0530
STEPHEN C. DOLL	Stephen C. Doll	432 Thumper Dr.	304-692-4848
Christian Wolfe		67 Cecily way	516-270-5561
Jessica Simpkins		104 Declaration Dr	786 536-7263
Jim Patterson		601 Declaration Dr	301-821-0903
Sheron Thornton		681 Declaration Dr	304-279-1424

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Printed Name	Signature	Address	~~Phone Number~~
Nicholas Regan	Nick Regan	185 Battlefield Dr	
William Wilkinson		7 CHADWICK	
DAN DARTIS		53 SILVER	
JERALENE TETRO		71 Suburban	
Heather Morgan	Heather Morgan	1234 N Fairfax Blvd	
Julie Vizcarra		1346 N. Fairfax Blvd.	
John Ford	JOHN FORD	1215 STEED ST	
Raquel Ventura		1220 Steed ST.	
Cory Cuthbertson	Cory Cuthbertson	1238 Steed St.	
Jennifer Backus	Backus	1236 Steed St.	
CORINNE Houlton		1331 MARA ST.	
Alex Moser		1245 Mara PA	

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Printed Name	Signature	Address	~~Phone Number~~ →
[illegible]	[illegible]	17 Robinson Way Charles Town WV	
[illegible]	[illegible]	80 [illegible]	
[illegible]	[illegible]	191 Jenny Lind	
DAVID LIPPERT	[illegible]	283 Jenny Lind Trl	
Addison Huber	[illegible]	538 Elk Branch Dr	N/A
A Shakespeare	[illegible]	70 Jenny Lind dr	N/A
Greg Young	[illegible]	72 Bay Ct	N/A
Erin Funk	[illegible]	56 Turnberry Dr	
[illegible]	[illegible]	62 [illegible]	
[illegible]	[illegible]	Turnberry Dr.	—

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Printed Name	Signature	Address	Phone Number
[illegible]	[illegible]	357 Lookout MT Ct	
Meghan Jacobs Clark	[illegible]	397 Lookout Mountain Ct.	
Mary Frank	[illegible]	424 General Braddock Drive	
Tim Turner	[illegible]	23 General Rodney Ct Harpers Ferry WV 25425	
Susan Alexander	Susan Alexander	637 Gen. Early Dr.	
Jacob Campbell	[illegible]	72 General Nesbitt	
Joshua Mckenzie	[illegible]	12 Colonel Miles Ct	
Mackenzie Culp	Mackenzie Culp	227 Gap View Blvd	
Elizabeth VanAlstine	[illegible]	140 Gap View Blvd	
Carmen Laughinghouse	[illegible]	16 Gen. McLaws Ct.	
William DeRocher	William DeRocher	112 Louis Bond Ln	
Patricia	Patricia M. DeRocher	112 Louis Bond Ln	

William DeRocher

Support Solar Energy in Jefferson County!

Action petitioned for:	We, the undersigned, are residents of Jefferson County who urge our leaders to support the development of solar energy in Jefferson County. We oppose burdensome regulations and county government action that would prevent solar development. We support solar because of the jobs, economic growth, revenue generated for the county, the rights of private property owners, and the many other benefits that come with solar.

Printed Name	Signature	Address	~~Phone Number~~
Nancy Shaw	Nancy Shaw	153 Revolutary Rd	Charles Town, WV
Crystal Sukstorf		57 Number Dr	Kearneysville
Kailyn Castellan	Kailyn Lee	314 Cirrus Way	Kearneysville
Sarah Deslauriers	Sarah Deslauriers	289 Chickamauga Dr.	Harpers Ferry, WV
Lynne Fry	Lynne Fry	344 Chickamauga Dr.	Harpers Ferry, WV
Damon Peyton		401 Chickamauga Dr	HF, WV 25425
Marc Nadeau		446 Chickamauga DR	HF, WV 25425
Darby Sinclair		958 Chickamauga	HF, WV 25425
Michael Tramontano		157 Lookout Mt Ct	HF, WV, 25425
William Fillgrove		216 Lookout MT CT	HF 25425
Antoinette Small		289 Lookout Mt Ct	HF 25425
Steve Morris		383 Lookout Mt Ct	6034389209

August 22, 2024

Jefferson County Board of Zoning Appeals
200 East Washington Street
Charles Town, WV

Members of the Board of Zoning Appeals:

I am a Jefferson County resident in favor of solar projects like the proposed Franklintown Farm Solar Project. In addition to being an important source of renewable energy that helps to mitigate the effects of climate change and supplement fossil fuel energy sources, solar projects offer a major opportunity for our county's farmers.

Owning and operating farmland is becoming increasingly expensive. Many farmers face financial insecurity and immense debt due to circumstances out of their control, like weather, crop prices, and rising operational costs.

Utilizing solar as a tool to preserve agricultural land while still allowing farmers to earn an income off the production from those parcels is an incredible dual-use model. Contrary to popular belief, the farmland beneath the panels is enhanced over the two- to three-decade life of the project -- not destroyed. There is no loss of agricultural land. In fact, this also protects the land from being sold and turned into permanent residential or commercial developments.

Farming families must be allowed to diversify their income and stabilize their financial situations by participating in opportunities like solar projects. In Jefferson County, we used to pride ourselves on valuing farmers as the backbone of this community. How can we turn our backs on them now?

Sincerely,

Carla Gould

56 High Hopes Way
Charles Town, WV

August 2024

Jefferson County Board of Zoning Appeals
200 East Washington Street
Charles Town, West Virginia

To the Board of Zoning Appeals:

I write to you today as a Jefferson County resident in favor of the Franklintown Farm Solar Project. Most importantly, I am in favor of protecting our county's landowners' rights. Although many in Jefferson County have opinions on what should be done with the area's farmlands, there are only a select few who are burdened with owning and maintaining these lands. Solar projects like this one can be a vital resource for farms, providing both financial stability and land preservation.

A farmer's income comes to him at the mercy of fluctuating crop prices, unpredictable weather, and ever rising operational costs. Running a farm is an extraordinarily expensive endeavor. By leasing part of their land for solar energy, landowners can guarantee a reliable source of income, helping to stabilize their income and offset these economic pressures for 20-30 years. This model is bound to help many farmers not have to sell off any of their acreage and keep farmland both in production and in the family.

The landowners are not even the only ones who benefit. The greater County community benefits through the creation of a new revenue stream without the extra burden on public utilities, services, and roadways. Families with children should be especially pleased that the school district benefits from this project.

In Jefferson County, we claim to value and protect our farmers. Now, we must support them by allowing for the opportunity to use their land to provide a reliable review stream, enable land preservation, and offer financial incentives for the whole community. I urge you to approve this project.

Sincerely,

491 Lord Fairfax

August 22, 2024

Jefferson County Board of Zoning Appeals
200 East Washington Street
Charles Town, WV

Dear Jefferson County Board of Zoning Appeals,

I am a Jefferson County resident writing to express my strong support for the proposed Franklintown Farm Solar project. This project represents an important step towards a more sustainable and renewable energy future, and I believe that it will bring numerous benefits to our community.

The development of large-scale solar projects is a critical component of our efforts to combat climate change and reduce our reliance on fossil fuels. By generating clean, renewable energy, the Franklintown project will help to reduce greenhouse gas emissions and work to improve the overall health of our environment and public.

Additionally, the development of this project will bring significant economic benefits to our community. It will create new construction and maintenance jobs, support the ability of our county's farmers to sustain their farmland, and increase the county's property tax revenue significantly without bringing in new residents, all of which will help to strengthen our local economy.

I encourage you to approve this project and support our community's efforts to build a more sustainable and prosperous future.

Sincerely,

Carolyn Wells
467 Lord Fairfax Street
Charlestown, WV 25414

August 22, 2024

Jefferson County Board of Zoning Appeals
200 East Washington Street
Charles Town, WV

I am a Jefferson County resident writing to express my support for the approval of the Franklintown Farm Solar Project. I back this project because I believe in the rights of our County's landowners. Our county's landowners must have the freedom to use their land in the way that best serves their needs and those of their families. Although some have said they do not want to see panels on farmland at all, many farmers view solar installations as a means to preserve their land for future use, while earning income that is essential to the operation and maintenance of their farm. The landowners themselves are the experts on their farmlands and how best to maintain them. We need to trust our farming community to make well-informed decisions about their property that will benefit the entire community.

In fact, unlike residential housing, which seems to be the fastest-growing type of development in the County, solar farms have incredibly little impact on the community's public services and utilities, while offering increased tax revenue. Families with children should welcome this development, as it would result in a new stream of tax income for the school district. Solar panels are also quiet, non-disruptive neighbors. After construction, there is no noise or disruption to the area.

In speaking with other community members, it is clear that there is immense support for solar in Jefferson County. I urge you to do right by the landowners and community and approve this project.

Best regards,

Donna Dimmick

196 Courier Dr.
Charles Town, WV

August 22, 2024

Jefferson County Board of Zoning Appeals
200 East Washington Street
Charles Town, WV

To the Board of Zoning Appeals,

I am a Jefferson County resident in favor of the Franklintown Farm Solar Project. This project is not only a chance to solidify our county's landowner's rights, but to protect our farmland and environment.

It is impossible to deny that the world is facing the effects of climate change. It is imperative that our state and county begin to turn to clean, renewable forms of energy to mitigate the damage done by traditional power sources like coal. Solar energy production makes an enormous difference in reducing the carbon footprint, preserving natural resources, and improving air and water quality by decreasing the amount of toxins released from other power sources. Utility-scale solar is essential to finally breaking free from our reliance on fossil fuels.

No one can argue that it is imperative to protect and preserve our county's farmland. No one knows that better than the farmers themselves, and that is why they are turning to solar. Solar projects allow the farmer to passively earn income while their farmland sits in preservation for around thirty years. It is a huge misconception that solar installations are harmful to the farmland underneath them. There is no loss of topsoil, meaning there is no loss of agricultural land. In fact, the natural biodiversity of the soil is enhanced after sitting untouched for three decades. Afterward, when the panels are removed, and the site is restored to its original condition, the land can go right back into agricultural production.

We must protect both the rights of Jefferson County farming families and the environment. Approve the Franklintown Farm Solar Project!

Best regards,

Christopher Atkins
234 Okanagan Dr.
Charles Town, WV 25414

Support for the Flowing Springs Solar Facility

My name is Richard Zigler. I live on Roper North Fork Road. I support any and all commercial solar facilities for this county. Yes, the first one built is still ugly, because they bought their land and have no one to be accountable to for aesthetics or preservation of soil. The ones that are planned now are to be leasing the land, and will be a continual influx of money to the county through both property taxes and the lease money will, for the most part, remain local. Again, millions of dollars' worth of virtually "free" money will be invested in the county.

Currently, the county is in the process of building two new schools. We, as taxpayers, are trying to find out just how expensive they are. On average, in West Virginia, schools cost around $44 Million to build and equip. Then, if the median salary is $55,000 per teacher salary, annually, 30 years, the expected life of a Solar facility, comes to $1,650,000. I do not know how many new teachers will be required to educate the influx of students soon to be upon us because of the extreme rate of residential growth we currently have.

Then there are the Add-Ons. There is a need for a large public pool. I read where other entities will pick up the major portion of the costs, but that the county would still need to come up with $15 Million to bring this to fruition. But, as we all know, no project ever seems to come in under budget. The people that attended the Townhall meeting in Shepherdstown made it abundantly clear that they will be demanding new, and larger, parks. Maintenance of ball fields and mowing of large acreage is expensive.

This year we experienced severe drought. Water supplies, regionally, were considered dire. Especially in the heavier populated areas. With no guarantees as to future weather patterns, and thus

the renewing of our aquifers, residential housing needs to be slowed. But that doesn't look likely for the near future, until after all the "farmland", that everybody wants to save from solar facilities, is under roof or asphalt.

Solar facilities can answer many of these issues. They retard residential growth, and all the expenses that go with it. They maintain open space for the recharging of our water supplies. They provide millions of dollars' worth of unencumbered tax revenue for the county. Also, since you have to put a value on expenditures you don't have to fulfill, like expensive new schools and supporting infrastructure, Solar facilities are even more of a boon to the county. Corny as it sounds, having Solar facilities, in reality, would be like being paid Millions of dollars to save money, protect natural resources, and slow the exponential residential housing issue we now have.

But these entities should be given a tax break to make them more feasible to become reality. Yes, the PILOT for Wild Hill was unfairly denied, but if the county wants money, the county needs to concede tax relief, because they do not put students in schools, or require emergency services, or require water or sewer infrastructure. They save the county money in this respect. They just sit there and generate money.

The county cannot afford to be blinded by the "Tyranny of the Minority". If asked if taxpayers want more levies to pay for more schools, or free tax dollars for the county, that they don't have to pay, I do believe that they would prefer the latter.

So, I strongly suggest that the Flowing Springs project, as well as the others proposed for the county, be courted to build here, instead of being denied.

August 2024

Jefferson County Board of Zoning Appeals
200 East Washington Street
Charles Town, WV

To the Board of Zoning Appeals:

I am writing to emphasize how solar projects can significantly benefit farming families by providing them with a stable and supplementary income. Many farmland owners face financial uncertainty due to fluctuating crop prices, unpredictable weather patterns, and rising operational costs. By leasing a portion of their land for solar energy installations, farmers can generate a consistent revenue stream that helps to offset these economic pressures. This additional income can be crucial for covering essential expenses, investing in farm improvements, and maintaining their agricultural operations.

Moreover, integrating solar projects into farming operations can offer financial stability beyond mere lease payments. For instance, solar installations often come with tax incentives and rebates that can further alleviate financial burdens. Additionally, some farmers choose to invest in their own solar systems, leading to reduced energy bills and long-term savings. This combination of direct financial support and reduced operational costs makes solar energy a valuable tool for helping farming families manage their financial challenges and sustain their livelihoods.

Thank you for considering how solar projects can support and enhance the economic well-being of Jefferson County landowners. I believe this approach represents a meaningful opportunity for economic resilience and sustainability.

Sincerely,

John Christensen
EPCLC, President
512 Stoney Lick Rd.
Martinsburg, WV 25403

August 22, 2024

Board of Zoning Appeals
Jefferson County
200 East Washington Street
Charles Town, WV

Jefferson County Board of Zoning Appeals,

I am writing to highlight the innovative potential of utilizing agricultural land for dual purposes, specifically combining farmlands with solar energy production. By integrating solar panels into agricultural settings, we can harness the benefits of renewable energy while protecting productive farmland. Over the life of a solar project, the farmland below is enhanced, not destroyed. This approach not only maximizes land use efficiency but also provides shade and reduces soil evaporation, which can enhance crop yields and improve water retention. This also protects the land from permanent developments, like residential housing or warehousing, for at least 30 years. The land can go right back into agricultural production after the solar project is decommissioned.

This dual-use strategy allows farmers to diversify their income streams and stabilize their financial situation, especially during periods of fluctuating crop prices or adverse weather conditions. Solar installations on agricultural land create an additional revenue stream through leasing agreements or energy production, which can be particularly valuable for sustaining farm operations and supporting rural economies like ours. Farmers face incredible financial burdens to maintain their land and operation. By embracing this technology, we can support the agricultural sector and ensure that our land remains productive and economically viable.

Thank you for considering the benefits of this integrated approach to land use. I believe it represents a forward-thinking solution that aligns with both our environmental goals and agricultural interests in Jefferson County.

Sincerely,

549 LORD FAIRFAX ST
CHARLES TOWN, WV

August 22, 2024

Jefferson County Board of Zoning Appeals
200 East Washington Street
Charles Town, West Virginia

Jefferson County Board of Zoning Appeals:

I am writing to express my strong support for the approval of the proposed Franklintown Solar project. It is no secret that carbon dioxide emissions are a major contributor to climate change, and I believe that this solar project can play a crucial role in mitigating these emissions.

Solar panels generate electricity without producing any carbon dioxide or other harmful emission, unlike traditional fossil fuel-based power sources. By harnessing the power of the sun, this solar project can help to reduce our reliance on these dirty energy sources and help to transition our county towards a more sustainable, clean energy future.

I believe this project will benefit our environment and provide economic benefits to our community. I urge you to approve the Franklintown Farm Solar project. Let us take this important step towards a cleaner, healthier and more sustainable future.

Sincerely,

Matthew S. Nuttall
178 Chadwick Dr.

156 New Castle Dr

Charles Town, WV 25414

Aug. 19,2024

RE: Letter of Support for Solar

Dear BZA Board Members:

As a resident of Jefferson County, I am writing to express my support for the Franklintown Solar Project. Having thoroughly examined arguments from both sides, it is evident that the advantages of this initiative far surpass any potential drawbacks.
First, I am grateful that there aren't more homes being built. I understand that homes will be there forever. Solar will only be there for 25 or so years.

Second, the project will inject millions of dollars into the local economy. Moreover, the project respects private property rights, as landowners have willingly signed contracts with ENEL.

Third, I have heard since the 1970's that we need to reduce our reliance on foreign energy sources and fossil fuels. This project plays a part in that.

Thank you,

Rosalind Chapman

Rosalind Chapman

156 New Castle Drive
Charles Town, WV 25414
August 20, 2024

RE: Letter of Support

Dear BZA Board Members,
As someone who has grown up in Jefferson County and now raises a family in Jefferson County, I have reviewed multiple arguments regarding the Franklintown Solar Project and would like to express my support. This project promotes a greener, cleaner, more cost-efficient future and I urge you to approve this Solar Project to bring these benefits to Jefferson County.

Thank you,

Emilia Chapman

111 Circle St.

Ranson, WV 25438

August 19,2024

RE: Letter of Support for Solar

Dear BZA Board Members:

I am writing to you in support of the Franklintown Farm Solar Project. Projects such as this promote clean, renewable energy, create hundreds of good paying construction jobs, and provide substantial additional revenue for the local community. I urge you to approve the Franklintown Solar Project to bring these benefits to Jefferson County.

Sincerely,

Jennifer Chapman

Dear Jefferson County Board of Zoning Appeals,

I am writing to express my strong support for the approval of the proposed Franklintown Farm Solar Project in our community. As we strive to create a more sustainable and resilient future, this project represents a crucial step toward achieving our environmental goals and advancing our commitment to renewable energy.

The benefits of solar energy are numerous. It offers a clean, renewable source of power that will reduce our reliance on fossil fuels, decrease greenhouse gas emissions, and help mitigate climate change. Furthermore, investing in solar technology will generate local jobs and stimulate our economy, providing a much-needed boost to our community.

In addition to environmental and economic advantages, the solar project will enhance energy security and stability. By diversifying our energy sources and tapping into the abundant power of the sun, we can reduce the vulnerability of our energy grid and ensure a more reliable supply of electricity.

I urge you to consider these compelling reasons and support the approval of this important project. Embracing solar energy is not only a wise investment for our community but also a meaningful step toward a sustainable future for generations to come.

Best,

JDA Jr
5 E Deer St
Charlestown, IN

To the Jefferson County Zoning Board of Appeals:

I write to you as a resident of Jefferson County who is in support of bringing clean energy developments like the Franklintown Farm Solar Project to our county. As the world faces the challenges of climate change, it is essential that we take action to reduce our carbon footprint and transition to sustainable energy sources.

Clean energy development can bring numerous benefits to our community, including job creation, economic growth, and a healthier environment. Approving the investment in renewable energy sources like utility scale solar is essential to moving to reduce our dependence on traditional energy sources and help to mitigate climate change's very real effects.

I urge you to prioritize the development of clean energy projects in our county, and support the approval of the Franklintown Farm Solar Project. Together, our county can build a more sustainable future for our community and generations to come.

Thank you for your consideration.

Sincerely,

118 Burnlea Rd.
Charles Town, WV 25414

Dear Jefferson County BZA,

I am reaching out to advocate for the approval of solar farms in Jefferson County. Respecting landowners' rights to use their property as they see fit includes allowing them to pursue solar energy projects. These projects offer a lucrative use of land and contribute significantly to the county's green energy goals.

In addition, the employment benefits associated with solar farms cannot be overlooked. From engineering to installation, these projects create numerous job opportunities within our community. By supporting solar energy, we support both our local economy and our commitment to environmental stewardship.

185 Battlefield Dr Nick Ryan

Dear Jefferson County BZA,

I am writing to support the development of solar farms in our county. Landowners should have the autonomy to choose how they use their property, and solar farms provide a sustainable and financially beneficial option. Allowing these projects respects landowners' rights while offering a new source of revenue.

Solar farms also contribute to significant environmental benefits. They reduce reliance on fossil fuels and help lower carbon emissions, which is crucial for combating climate change. Supporting these projects aligns with our community's values and goals for a healthier planet.

2024-08-15

522 Prospect Hill Blvd

Charles Town WV 25414

To the Jefferson County Board of Zoning Appeals:

I am a Jefferson County resident writing to express my enthusiastic support for the Franklintown Solar Project. This initiative is not only an important step towards embracing renewable energy but also aligns with the principles of landowner's rights and provides crucial support to farming families. By allowing landowners to lease their property for solar installations, we empower them to generate additional income, which is especially valuable in times when farming income can be uncertain. This flexibility can help stabilize their financial situation and offer much-needed relief in an industry that often faces economic challenges.

Moreover, the integration of solar projects on agricultural lands can be a win-win solution. It allows landowners to utilize their property in a way that complements their traditional farming activities, rather than competing with them. This dual-use approach can support sustainable farming practices while also contributing to our renewable energy goals. Supporting this project will demonstrate our commitment to respecting landowner autonomy and addressing the economic hardships faced by farming families, making it a progressive and compassionate choice for our community.

Thank you for considering my perspective on this important issue. I strongly advocate for the approval of the solar project and the benefits it will bring to both landowners and our broader commitment to sustainability.

Sincerely,

S & Davis St.
Charles Town WV

Dear Jefferson County BZA,

I am writing to endorse the development of solar farms in Jefferson County. Landowners have the right to leverage their property in ways that best suit their needs and values. Solar farms represent a forward-thinking use of land that can enhance property values while contributing positively to the community's economic health

From an employment perspective, solar projects create a range of job opportunities, including those in construction, maintenance, and technical support. This boost to local employment, combined with the positive environmental impact of reducing our carbon footprint, makes supporting solar farms a strategic choice for the county's future

[illegible] [illegible] SHEPHERDSTOWN, WV

Dear Jefferson County BZA,

I am writing in favor of supporting solar farm projects in Jefferson County. Landowners should be empowered to use their property in ways that align with their economic and environmental values. Solar farms provide an excellent opportunity for landowners to benefit financially while contributing to the county's renewable energy goals.

The installation of solar farms also promotes local job creation. These projects generate positions not only during construction but also in long-term maintenance and operation. Supporting solar energy is a proactive way to enhance our local economy while making a positive impact on the environment.

[redacted]

Dear Jefferson County BZA,

I am writing to voice my enthusiastic support for solar farms in Jefferson County. Allowing landowners to utilize their property for solar energy projects is an empowering choice that aligns with their rights to manage and benefit from their own land. This flexibility ensures that landowners can generate income while supporting a sustainable energy future.

Moreover, solar farms bring significant environmental benefits, reducing our county's reliance on fossil fuels and decreasing greenhouse gas emissions. By supporting solar energy, we are not only respecting landowners' rights but also taking a meaningful step towards preserving our natural environment for future generations.

327 Prospect Hill Blvd
Charles Town, WV 25414

Dear Jefferson County BZA,

I am writing to express my strong support for the development of solar farms in our county. As a landowner, I deeply value the autonomy and rights associated with property ownership, including the ability to make decisions that benefit both my land and community. Solar farms offer a sustainable and economically beneficial use of land, providing a new revenue stream while maintaining the land's integrity.

Additionally, the expansion of solar energy projects brings substantial employment benefits to our area. These projects create a variety of jobs, from construction and maintenance to administration and operations. Supporting solar farms not only aligns with our county's commitment to sustainability but also fosters local economic growth and job creation, making it a win-win for all residents.

Bob Jenkins
332 Bull skin st
Charles Town, WV. 25414

Franklintown Farm

Solar Project

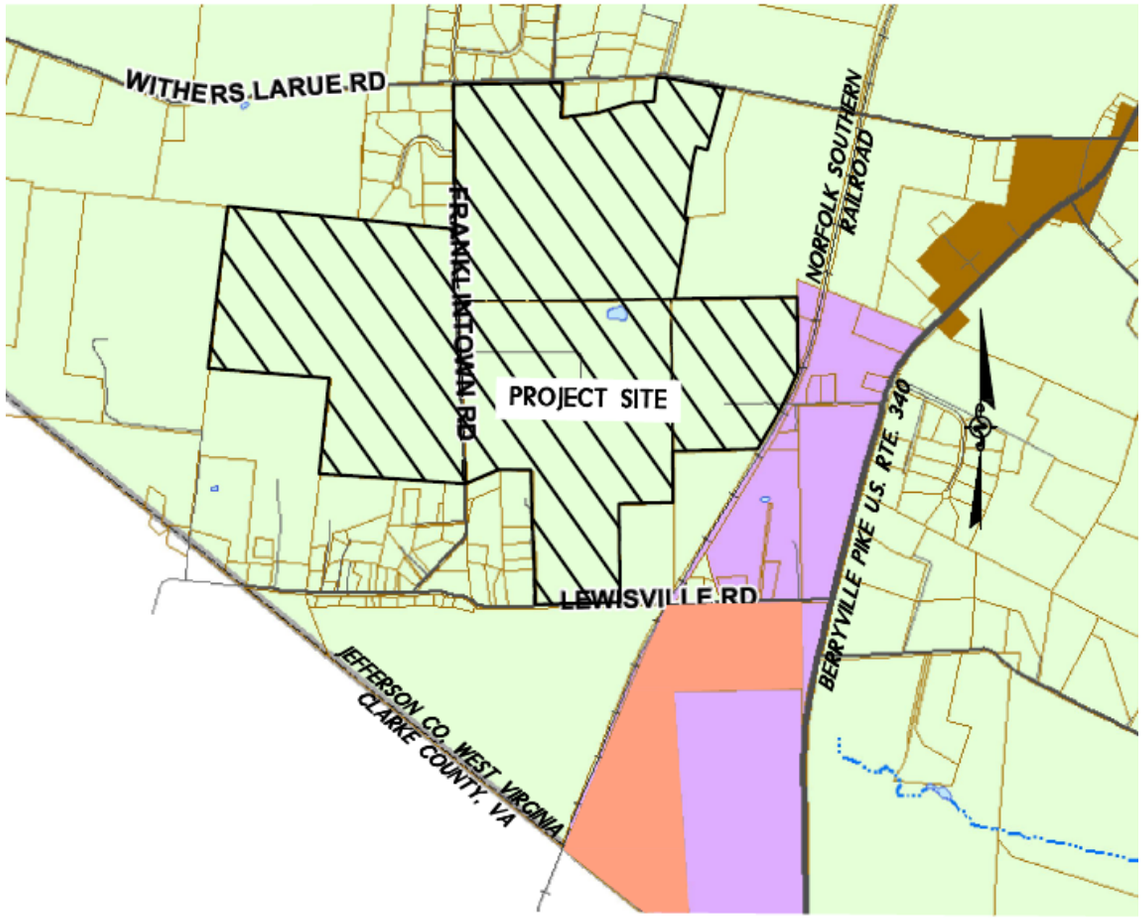
Jefferson County, West Virginia
August 22, 2024

Presented to:
The Jefferson County Board of Zoning Appeals

Applicant:
Franklintown Farm, LLC

INTRODUCTION

- **Project Name:** Franklintown Farm Solar Project
- **Proposed Land Use:** Solar Farm (connected to electrical utility grid)
- **Project Area:** 501.31 acres of routinely-disturbed farmland on 4 parcels
- **Solar Production:** 80 MW
- **Battery Storage:** 20 MW (BESS = Battery Energy Storage System)
- **Grid Interconnection:** Connects to existing 138 kV transmission line that intersects the site along the southern side (Lewisville Road)
- Construction to begin in 2026 and to last approximately 12 months
- Anticipated 30-year project life
- Includes a by-right electrical substation



VICINITY MAP
SCALE: 1"= 2,000'

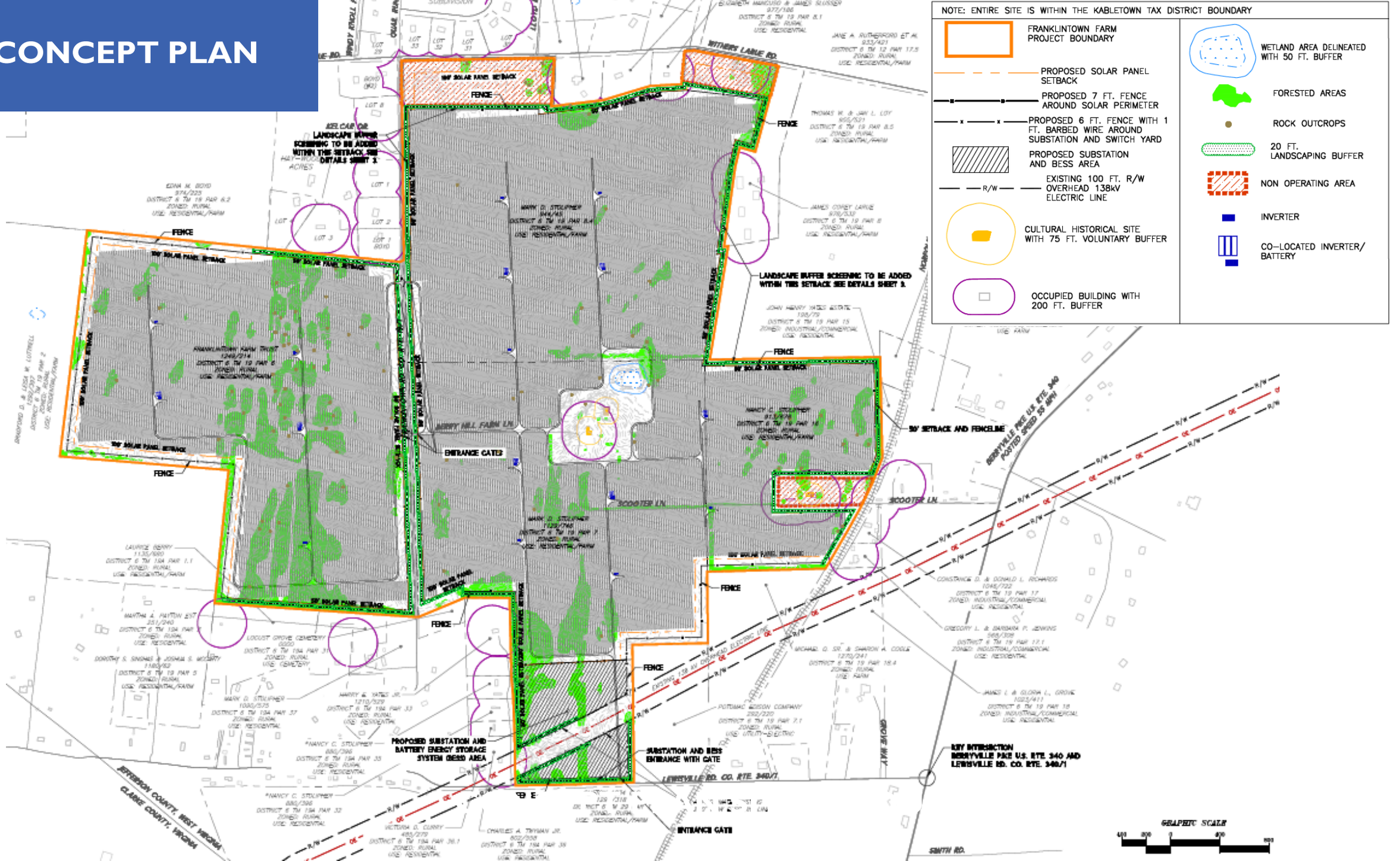
ZONING LEGEND

- RURAL
- RESIDENTIAL/LIGHT INDUSTRIAL/COMMERCIAL
- VILLAGE
- INDUSTRIAL/COMMERCIAL
- PARCELS

- Project is bound by Withers Larue Road to the North, Lewisville Road to the South, and the Norfolk Southern railroad tracks to the East.
- Franklintown Road bisects the project north-to-south.
- All four (4) project parcels are in the Rural Zoning District.
- The eastern end of the project abuts an Industrial/Commercial Zoning District.
- The southeastern corner of the project abuts a Residential/Light Industrial/Commercial Zoning District.

PROJECT LOCATION AND ZONING

CONCEPT PLAN

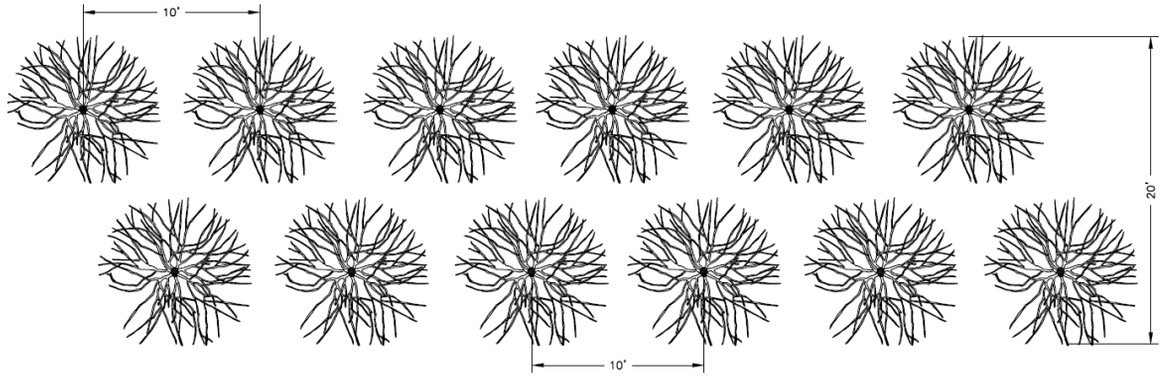


SETBACKS & BUFFERS

- In locations where the project abuts residential parcels or a roadway, a 50 ft setback to the fence shall be applied from the property boundary or edge of road right-of-way. In these locations, **a 20' wide vegetative buffer** will be planted within the setback area.
- In locations where the project abuts a parcel primarily in agricultural use, a 100 ft setback to the fence shall be applied with **no vegetative buffer**.
- A 100 ft setback will be applied adjacent to the Locust Grove Cemetery and will include **a 20' wide vegetative** buffer within the setback area. Ground penetrating radar (GPR) will be performed around the historical cemetery prior to construction.
- Solar Panels that are located within 200 feet of any residence, Category 1 Historic Resource, Institution for Human Care, Church, or similar use or structure as determined by the Zoning Administrator, shall provide **a 20' wide vegetative buffer** along common property lines within the setback area.

VEGETATIVE BUFFER

- Two rows of evergreen trees, staggered. Trees will be planted at a minimum of 6 feet high and will be 10 feet on center.
- Species have been selected to optimize survival, and to provide visual interest.
- Evergreens will be properly maintained and watered until established.
- Dead or dying trees will be promptly replaced by the solar farm owner.



PLANTING DESCRIPTION:

TWO ROWS OF EVERGREENS, 10' ON CENTER, PLANTED AT MINIMUM 6' HIGH

PROPOSED LANDSCAPE BUFFER LAYOUT

NO SCALE

Botanical Name	Common Name	Height at Planting	Growth Rate (in/year)	Estimated Height and Spread at Maturity	Spacing	Root
EVERGREEN TREES						
Ilex opaca	American Holly	6'	12-24	30' x 20'	10' O.C.	B&B
Juniperus virginiana	Eastern Red Cedar	6'	12-18	50' x 25'	10' O.C.	B&B
Ilex opaca 'Dan Fenton'	Dan Fenton American Holly	6'	12-24	40' x 25'	10' O.C.	B&B
Cryptomeria japonica 'Sekkan Sugi'	Japanese Cedar	6'	12-14	30' x 25'	10' O.C.	B&B
Thuja x 'Green Giant'	Green Giant Arborvitae	6'	36-60	50' x 20'	10' O.C.	B&B

EVERGREEN BUFFER PLANT SCHEDULE

VISUAL SIMULATIONS

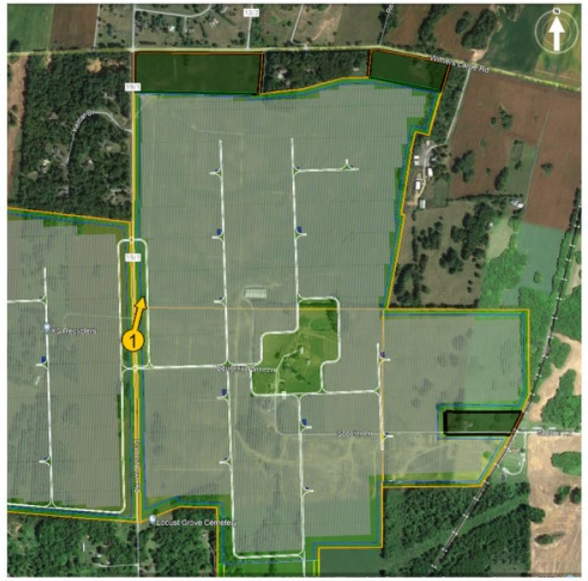
SIMULATED CONDITION

YEAR 0: LANDSCAPE

VIEWPOINT 1

FRANKLINTOWN RD
looking north

KEYMAP



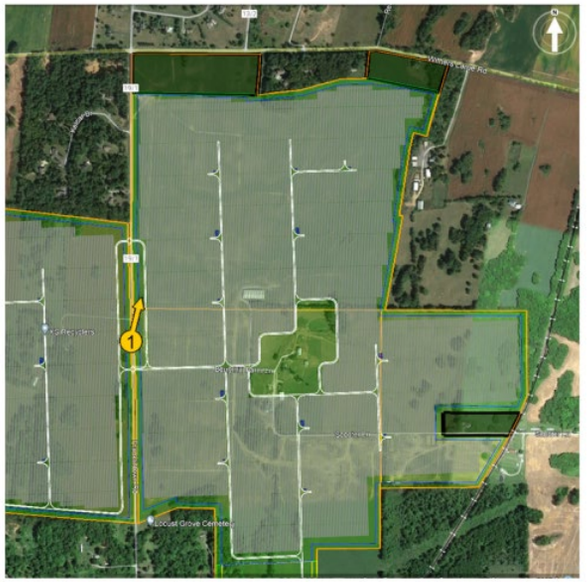
SIMULATED CONDITION

YEAR 2: LANDSCAPE

VIEWPOINT 1

FRANKLINTOWN RD
looking north

KEYMAP



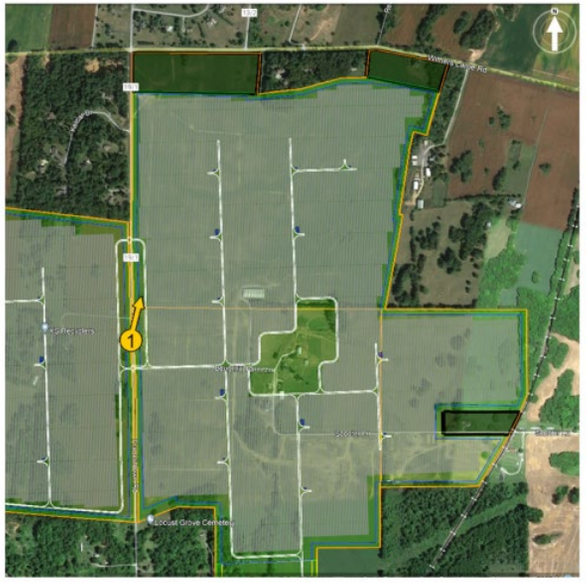
SIMULATED CONDITION

YEAR 5: LANDSCAPE

VIEWPOINT 1

FRANKLINTOWN RD
looking north

KEYMAP



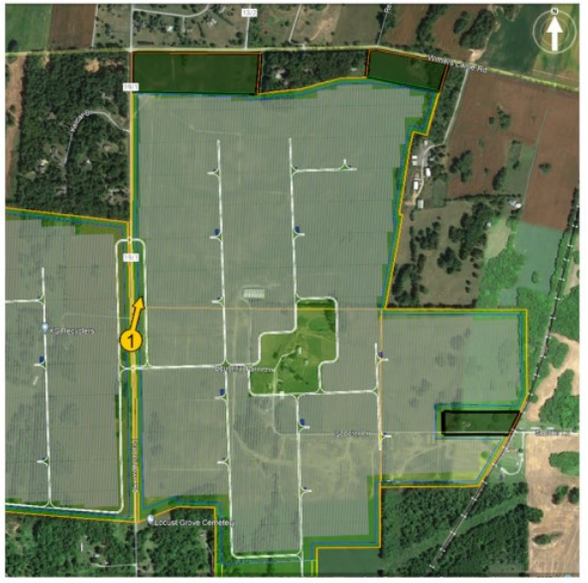
SIMULATED CONDITION

YEAR 15: LANDSCAPE

VIEWPOINT 1

FRANKLINTOWN RD
looking north

KEYMAP



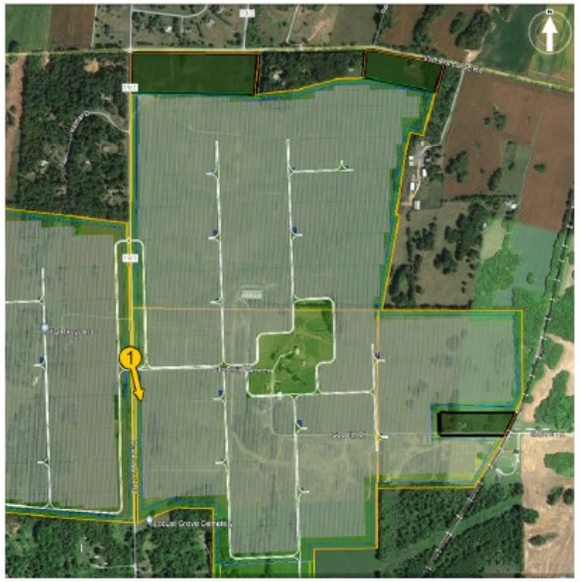
SIMULATED CONDITION

YEAR 0: LANDSCAPE

VIEWPOINT **2**

FRANKLINTOWN RD
looking south

KEYMAP



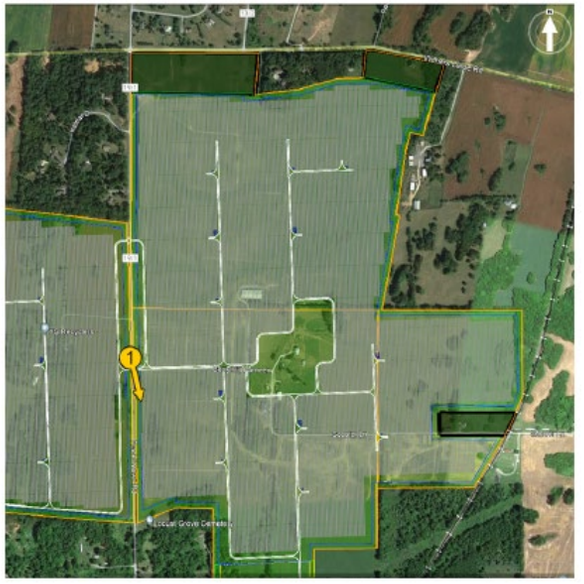
SIMULATED CONDITION

YEAR 2: LANDSCAPE

VIEWPOINT **2**

FRANKLINTOWN RD
looking south

KEYMAP



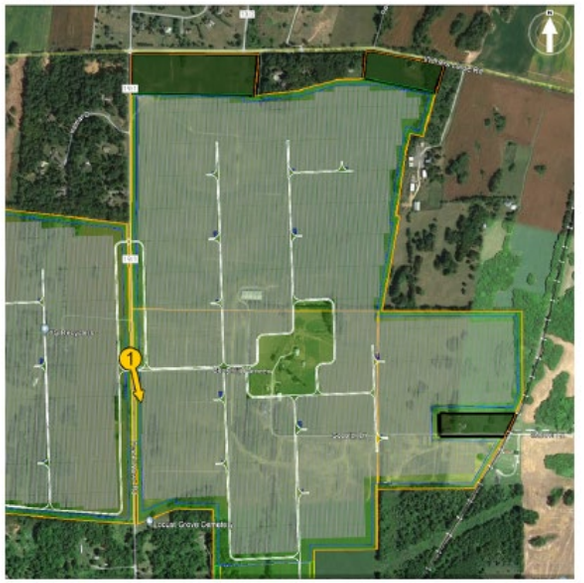
SIMULATED CONDITION

YEAR 5: LANDSCAPE

VIEWPOINT **2**

FRANKLINTOWN RD
looking south

KEYMAP



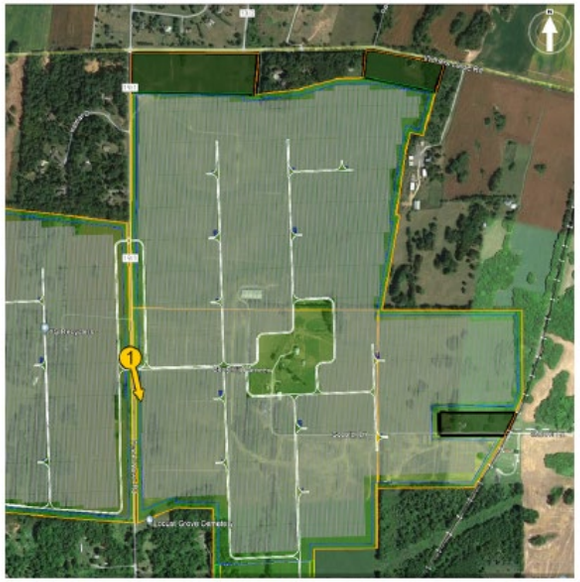
SIMULATED CONDITION

YEAR 15: LANDSCAPE

VIEWPOINT **2**

FRANKLINTOWN RD
looking south

KEYMAP



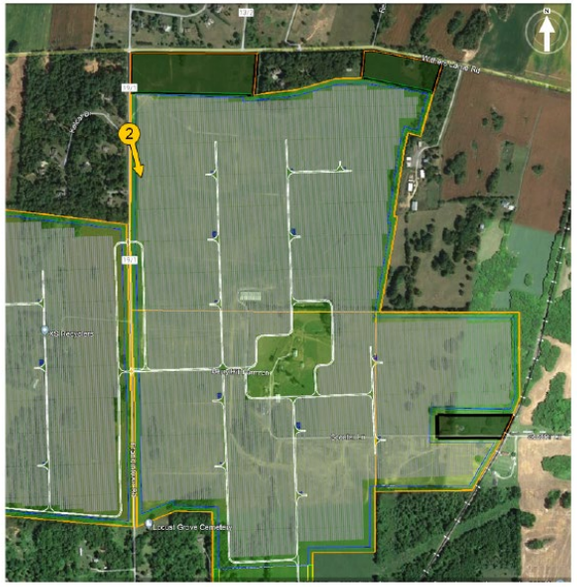
SIMULATED CONDITION

YEAR 0: LANDSCAPE

VIEWPOINT **3**

FRANKLINTOWN ROAD

KEYMAP



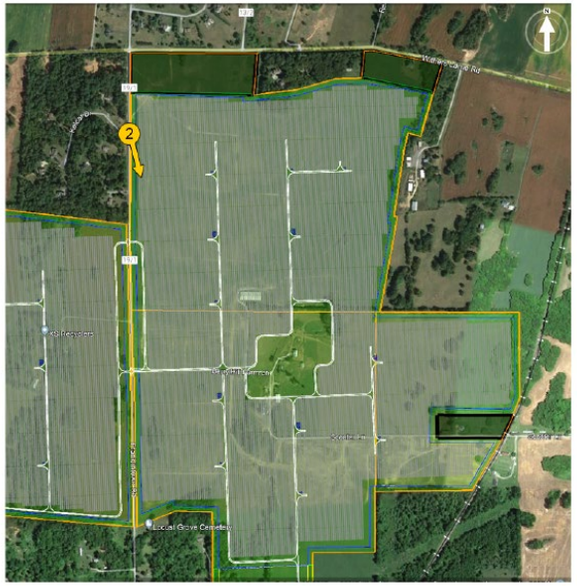
SIMULATED CONDITION

YEAR 2: LANDSCAPE

VIEWPOINT **3**

FRANKLINTOWN ROAD

KEYMAP



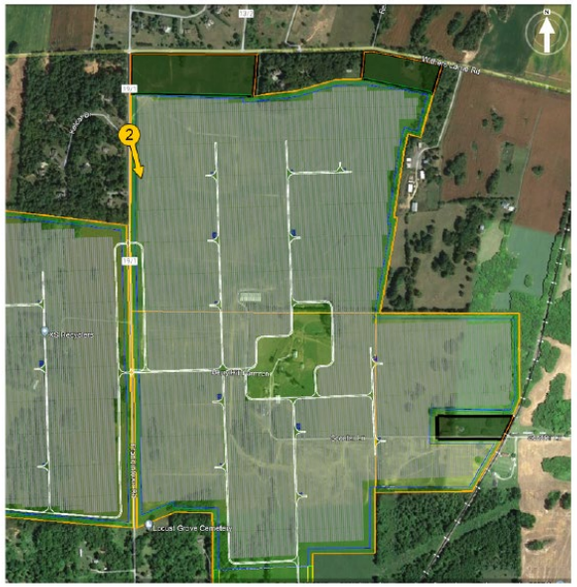
SIMULATED CONDITION

YEAR 5: LANDSCAPE

VIEWPOINT **3**

FRANKLINTOWN ROAD

KEYMAP



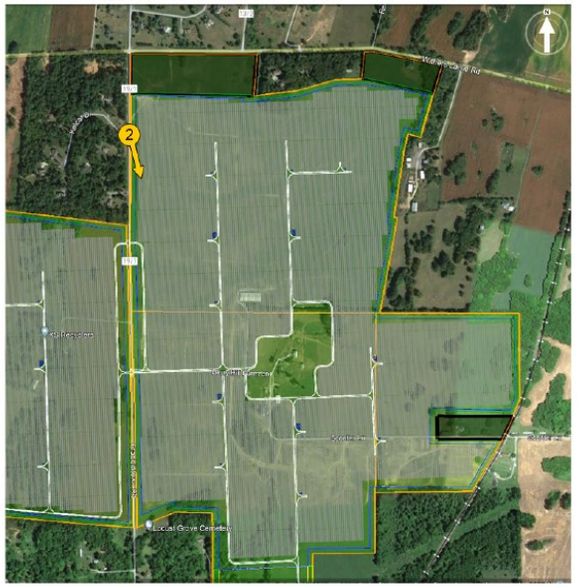
SIMULATED CONDITION

YEAR 15: LANDSCAPE

VIEWPOINT **3**

FRANKLINTOWN ROAD

KEYMAP



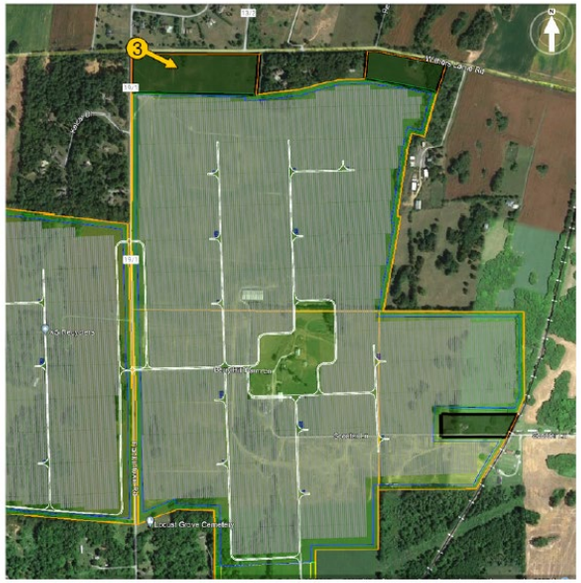
SIMULATED CONDITION

YEAR 0: LANDSCAPE

VIEWPOINT **4**

WITHERS LARUE RD

KEYMAP



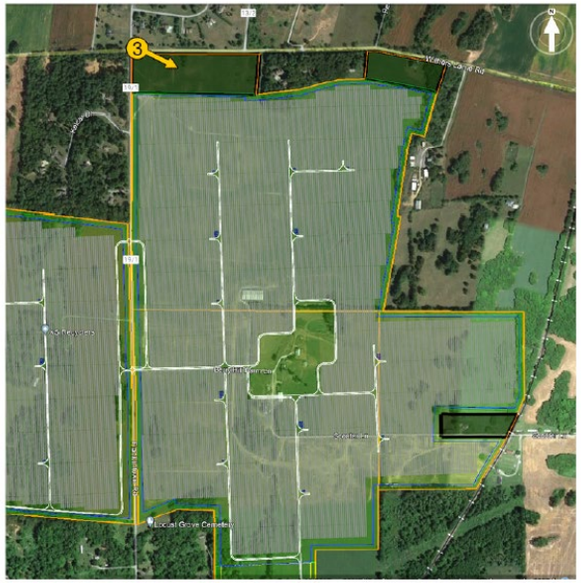
SIMULATED CONDITION

YEAR 2: LANDSCAPE

VIEWPOINT **4**

WITHERS LARUE RD

KEYMAP



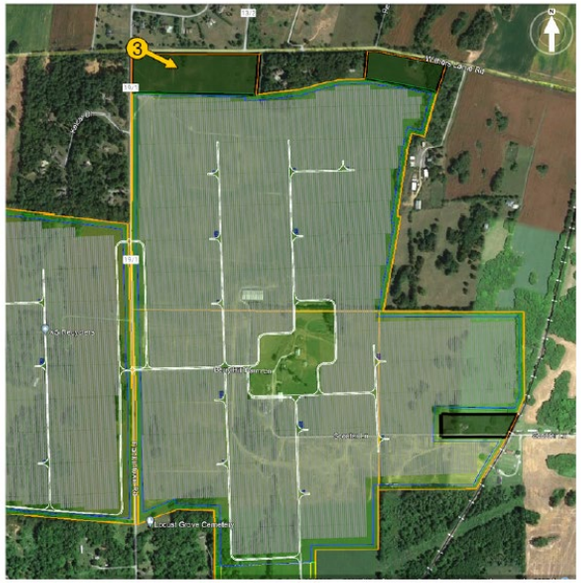
SIMULATED CONDITION

YEAR 5: LANDSCAPE

VIEWPOINT **4**

WITHERS LARUE RD

KEYMAP



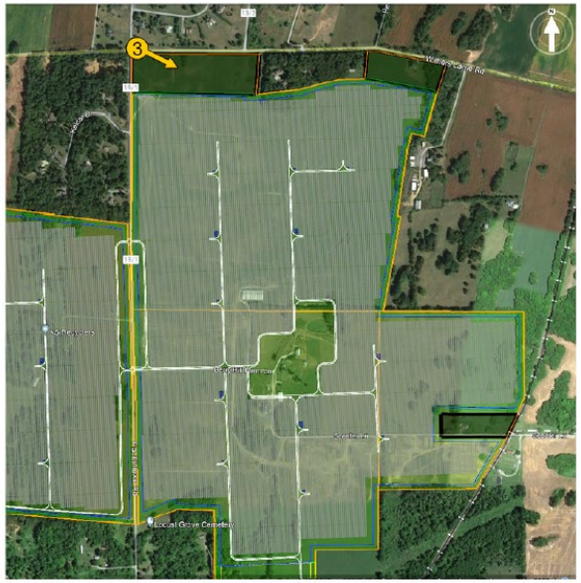
SIMULATED CONDITION

YEAR 15: LANDSCAPE

VIEWPOINT **4**

WITHERS LARUE RD

KEYMAP



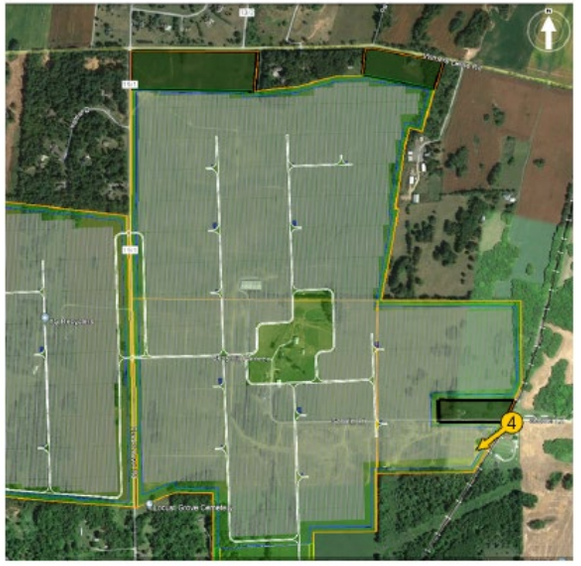
SIMULATED CONDITION

YEAR 0: LANDSCAPE

VIEWPOINT **5**

SCOOTER LN
looking south

KEYMAP



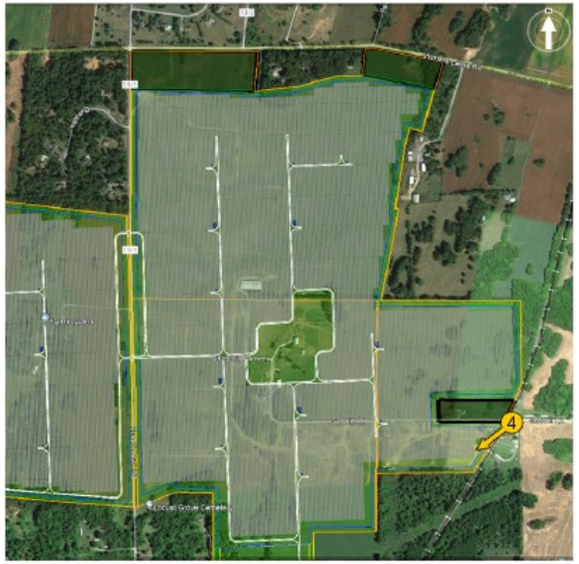
SIMULATED CONDITION

YEAR 2: LANDSCAPE

VIEWPOINT **5**

SCOOTER LN
looking south

KEYMAP



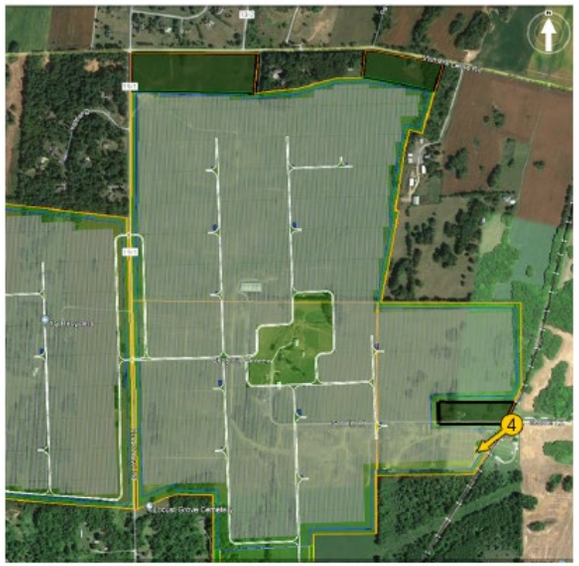
SIMULATED CONDITION

YEAR 5: LANDSCAPE

VIEWPOINT **5**

SCOOTER LN
looking south

KEYMAP



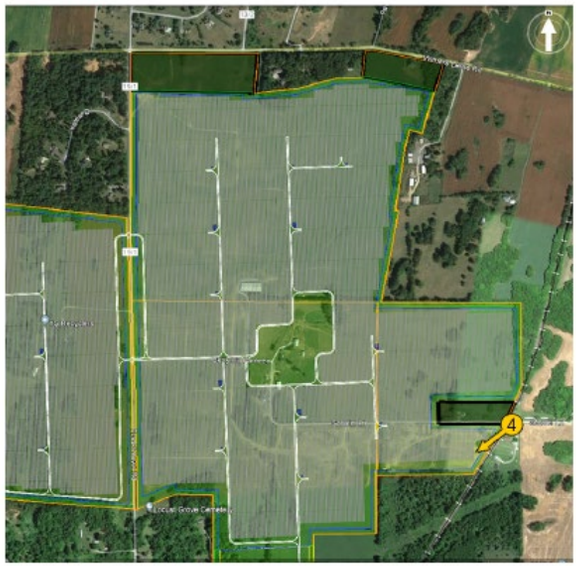
SIMULATED CONDITION

YEAR 15: LANDSCAPE

VIEWPOINT **5**

SCOOTER LN
looking south

KEYMAP



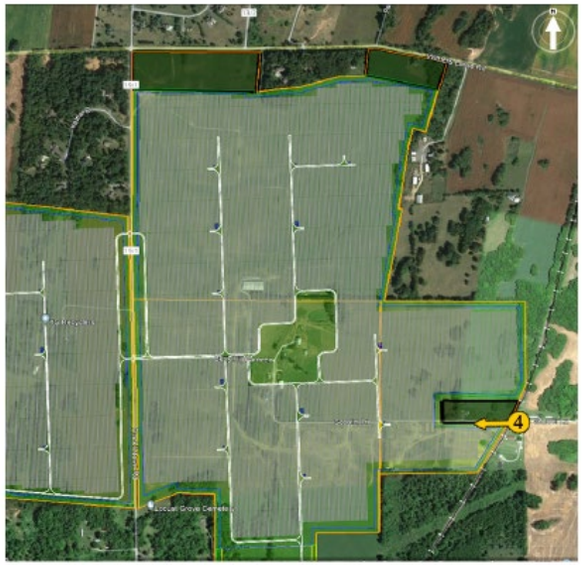
SIMULATED CONDITION

YEAR 0: LANDSCAPE

VIEWPOINT **6**

SCOOTER LN
looking west

KEYMAP



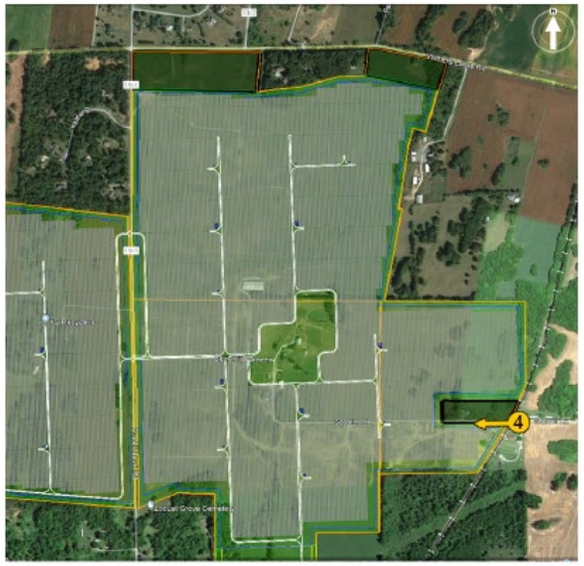
SIMULATED CONDITION

YEAR 2: LANDSCAPE

VIEWPOINT **6**

SCOOTER LN
looking west

KEYMAP



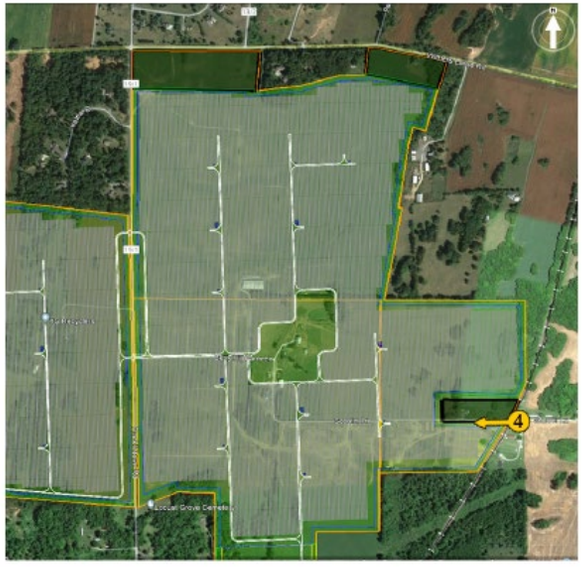
SIMULATED CONDITION

YEAR 5: LANDSCAPE

VIEWPOINT **6**

SCOOTER LN
looking west

KEYMAP



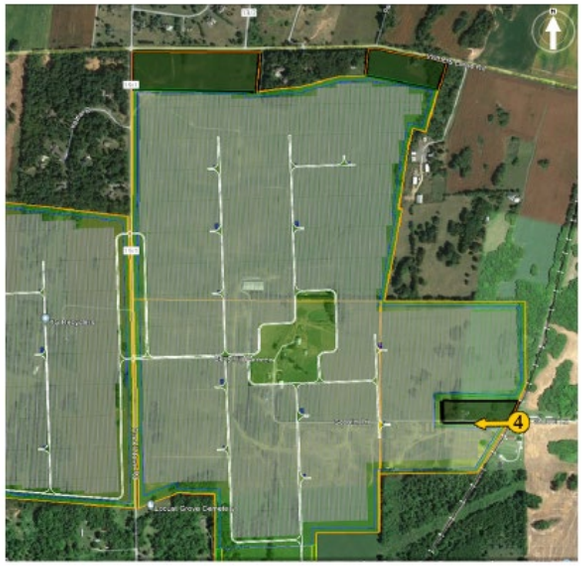
SIMULATED CONDITION

YEAR 15: LANDSCAPE

VIEWPOINT **6**

SCOOTER LN
looking west

KEYMAP



GROUNDCOVER

- Site will be seeded with native and/or naturalized perennial vegetation to create a meadow condition.

- A Vegetation Management Plan has been established for the project to guide the activities of site preparation, installation, and overall management of the established vegetation on the site.

- The seed mix has been formulated with the goals of stabilizing soil, reducing chemical use, reducing runoff and enhancing wildlife habitat.

- Cultivating native vegetation at solar sites is a regenerative practice that stores nutrients in the landscape for long-term ecological and biodiversity value, even after decommissioning. It also establishes favorable conditions for stormwater protection and carbon sequestration.

- The site is not currently planned to utilize grazing as a method of maintenance.

TOPSOIL MANAGEMENT

- A main objective during civil design is to avoid regrading altogether. This is achieved by modifying the “reveal heights” of the steel support piles to stay within the racking system’s design constraints.

- Regrading is only used when existing slopes are just too high for the racking system selected. If regrading is necessary in some locations, the topsoil will be segregated and stockpiled.

- The Soil Management Plan will include topsoil salvage and storage requirements, as well as guidelines for the contractors to follow related to topsoil handling and conservation.

- Topsoil will be redistributed throughout the site prior to groundcover seeding.

NOISE & GLARE

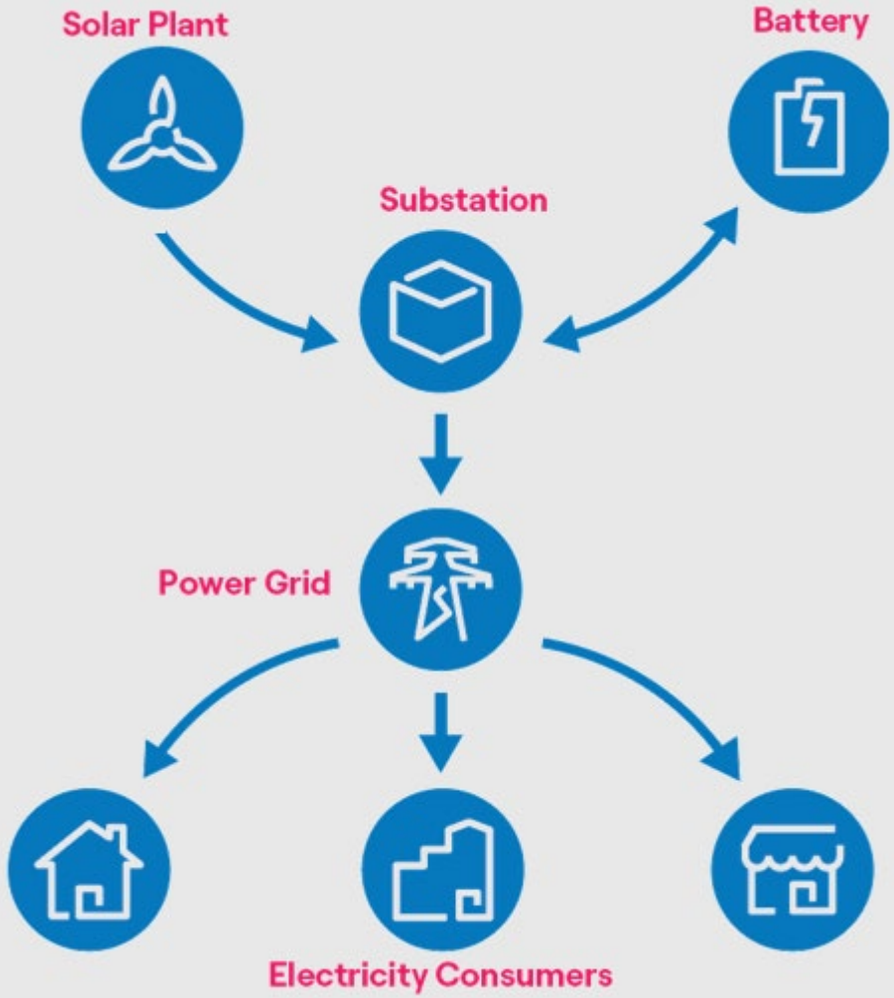
- Applicant recognizes that the project must be in conformance with all environmental standards as described in Article 8, Section 8.9 of the Jefferson County Zoning and Land Development Ordinance.
- An operational noise assessment concluded that Project-generated noise levels would be well below the County Zoning standard of 60 dBA during the daytime and 50 dBA during the nighttime.
- Photovoltaic panels are generally designed to absorb sunlight rather than reflect it.
- A third-party glare analysis was performed and concluded that there are no predicted unacceptable glare occurrences for nearby residences or roadways as a result of the single-axis tracking arrays.
- Panels will be installed at a 10 degree or greater angle while they are in their "stored" position, prior to the motors being hooked up to eliminate any potential glare occurrences.

TRAFFIC

- The operation and maintenance of the solar facility will result in minimal vehicular traffic generation post-construction.
- Approximately 2-3 vehicles per day

BATTERY ENERGY STORAGE SYSTEMS

- Battery Energy Storage Systems (BESS) are a technology that allows energy to be stored and dispatched on demand.
- Units consist of batteries housed in a container, connected to the power grid.
- Each battery container has its own HVAC and a power conversion system and are tested to meet the most stringent standards such as UL9540/UL9540A.
- The BESS will either be located adjacent to the substation (just north of Lewisville Road) or they will be dispersed throughout the site and co-located near some of the electrical inverters.



STORMWATER MANAGEMENT

- Stormwater Management for this Project will follow the amended Jefferson County Stormwater Management Ordinance, Article I D.2.h for Solar Energy Facilities. A Stormwater Management report with documentation and drawings will be submitted to Jefferson County for review and approval.
- Additionally, the Applicant's Engineer has met with the County Engineer and agreed to incorporate some of the County's suggested enhancements to the existing SWM Ordinance based on the County's experience with the previous Solar Projects.
- The Project will also develop the required Erosion and Sediment Control Plan, Stormwater Pollution Prevention Plan, and Groundwater Protection Plan and apply for the WVDEP National Pollution Discharge Elimination System (NPDES) permit for construction.
- Will follow the West Virginia Department of Environmental Protection (WVDEP) approved Erosion and Sediment Controls (E&S) Plans. Will limit grading to only areas necessary and will be seeded immediately.
- Native grasses and/or naturalized perennial vegetation will be planted to minimize erosion and to provide a natural filtration system for stormwater.
- Will develop permanent Stormwater Management structures as necessary to meet pre-development flows (County & State requirement).
- Will follow Best Management Practices and control stormwater runoff until vegetation is re-established, including routine inspections.

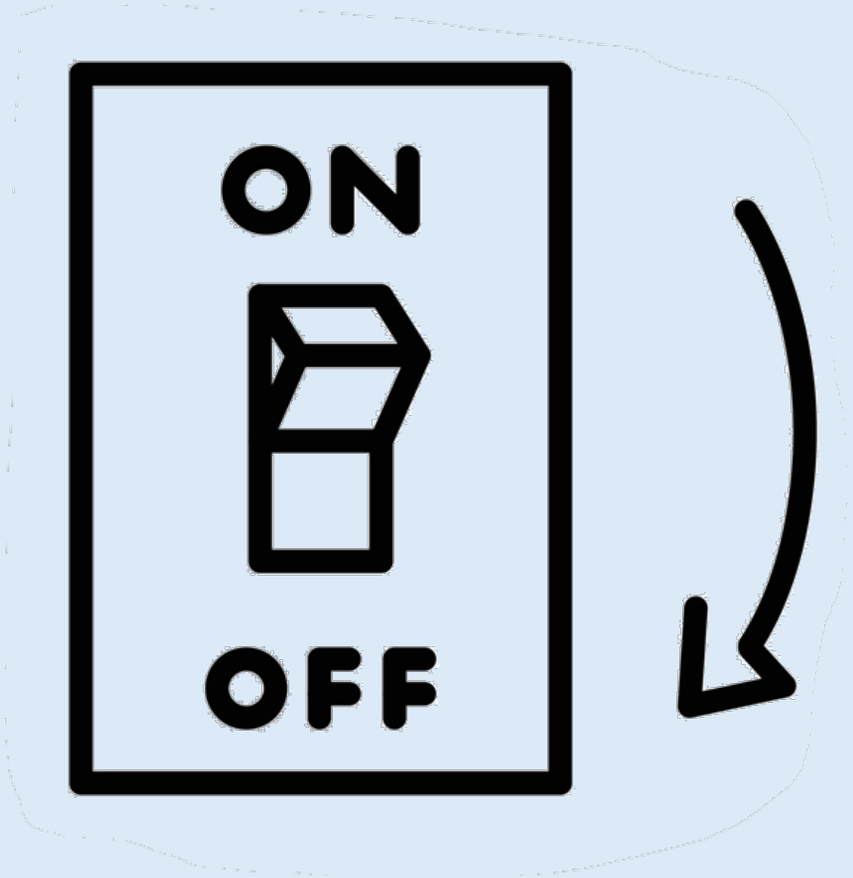
DECOMMISSIONING & SITE RESTORATION

The West Virginia Department of Environmental Protection (WVDEP) has requirements for decommissioning solar facilities, including:

- Decommissioning Plan: The plan must include a commitment to remove all aboveground solar panels, wind turbines, and towers.
- Bonding: Owners can apply to the WVDEP for a reduction in the amount of the decommissioning bond every five years. The application must include written evidence of a reduction in the total disturbed acreage and a modification fee of $50 per megawatt of nameplate generation capacity.
- Decommissioning Agreements: Agreements must address at a minimum the term and scope of the agreement.
- Submitting an intent to decommission to the permit authority 60 days before the end of commercial service.
- Removing structures and foundations to a depth of 3-feet below grade, roads, gravel areas, and cables to a depth of 2-feet below grade.
- Restoring the ground to a similar condition to before the solar project was built.

SITE ACCESS & SECURITY

- Fencing:
  - Solar Facility Perimeter: 7-foot-high chain link security fence will be installed around the facility.
  - Substation Area: 7-foot-high chain link security fence (including 1-foot of barbed wire) will be installed around the substation.
- Security gates will be located at each entrance.
- 24/7 remote monitoring at control center.
- Local operations team members.
- Knox boxes to allow for unimpeded access for first responders.



SITE LIGHTING

- Light fixtures are located only at the Substation and BESS Yard.
- Full cutoff light fixtures are turned on/off via a light switch by operators.
- The lights will normally be OFF unless activated by operations personnel.
- Lighting shall be shielded and directed down to prevent glare and to minimize light trespass.
- Lighting will follow the "Five Lighting Principles for Responsible Outdoor Lighting" as defined by DarkSky International.

COMPREHENSIVE PLAN

GOALS

- The site is compatible with the goals of the Comprehensive Plan and will ensure the preservation and enhancement of the agricultural economy, rural land use, rural neighborhoods, and rural character of Jefferson County.
- Development of facility will follow compliance with both the Zoning and Concept Plan Standards.

COMPREHENSIVE PLAN
RECOMMENDATIONS

The Comprehensive Plan recommends the following:

1. Encourage public entities to utilize alternative and renewable energy sources, specifically solar

2. Enable the construction of renewable energy generation facilities

3. Consider implementation of alternative energy systems

4. Encourage the creation of and use of a variety of energy sources (including renewable energy)

PUBLIC HEALTH, SAFETY AND WELFARE

- Our first priority is ensuring the safety of our workers, contractors, first responders, operators and the surrounding communities at each of our projects. **We will develop a site-specific Emergency Response Plan (ERP) to outline response procedures to protect people, property, and the environment during an emergency or disaster situation.**

- The ERP is developed in coordination with Health and Safety professionals, facility operators, equipment manufacturers, and local first responders. We will work closely with local first responders throughout development, construction, and operations of the Project.

- **The Project Team has had preliminary discussions with the Citizens Fire Company and the Jefferson County Emergency Services Agency, and will continue discussions and coordination throughout development, construction and operations.**

- Additional training and resources will be provided to local first responders to ensure they can execute necessary elements related to the plan and protocols. Mock emergency drills are often held during construction and operations, in coordination with first responders, to ensure readiness and validate that the ERP is effective.

- Fires at solar farms are exceptionally rare and facilities are monitored remotely 24/7.

SCALE AND INTENSITY

- The scale and intensity of the Project will remain compatible with the surrounding land uses in terms of sound, traffic, dust, and other things typically involved in farming of the surrounding areas. Upon completion, there will be very little traffic generated by the Project.

- There are no paved areas in and around the solar panel arrays. Furthermore, the Project will not require new sewer service, new water service, nor new public roads and it will not add any burden to the school system.

- Suitable buffers to neighboring properties will be installed and maintained as required by the Jefferson County Ordinances.

- Solar will be less intrusive than a permitted residential development in the rural district which could develop one house lot for every 5 acres.

LOW-IMPACT DEVELOPMENT

- Land use for solar will be no more intensive than the existing farm use.
- Low-growing vegetation is utilized to minimize mowing needs.
- Reduces herbicide use by providing spot-treatments of invasive/weedy species on a limited, as-needed basis.
- Decreases fertilizer and pesticide use from previous land uses.
- Allows land to remain fallow, accumulating organic materials and improving soil and water quality.
- Solar farm has easy access to the electrical utility grid and there are no new transmission lines required for the project.
- No need for public services like water or sewer.

NEIGHBORHOOD CHARACTER

- County setback and screening requirements will be met or exceeded.
- Panels are mostly hidden behind vegetative screening resulting in minimal visual impacts.
- No impact on public services (no new public roads, no sewer, no water, no added strain on public school system).
- No increased traffic post-construction.
- No additional noise generated which maintains the quiet feel of the surrounding agricultural community.
- Low-intensity development – consists of gravel access roads and naturalized perennial vegetation to create a meadow condition.

PROPERTY VALUES

- A third-party Property Impact Analysis was performed by Richard Kirkland, MAI. Richard has been researching solar project impacts related to property values since 2008, including over 1,000 solar projects in over 25 states.

- The analysis shows no impact on home values due to abutting or adjoining a solar farm as well as no impact to abutting or adjacent vacant residential or agricultural land where the solar farm is properly screened and buffered.

- The criteria that typically correlates with downward adjustments on property values such as noise, odor, and traffic all indicate that a solar farm is a compatible use for rural/residential transition areas and that it would function in a harmonious manner with this area.

- The report noted that some of the positive implications of a solar farm that have been expressed by people living next to solar farms include protection from future residential developments or other more intrusive uses, reduced dust, odor and chemicals from former farming operations, protection from light pollution at night, it is quiet, and there is minimal traffic.

HISTORICAL COMPLIANCE

- Applicant has performed a Cultural Desktop Study.
- According to the JC Historical Landmarks Commission (JCHLC) online maps and database, there are no Category I sites on, or adjacent to, the project. There is one Category II site within project boundaries. No solar panels nor land disturbance is proposed within this site's buffer.
- A 200' buffer has been added around all recognized JCHLC historic sites within the project boundaries.
- JCHLC will have 14 days to review and comment on project during Concept Plan Process.

FUTURE LAND USE

- Solar farm groundcover consists of natural vegetation like deep-rooted fescue grass that improves the organic content and richness of the soil as the land lies uncultivated.
- Solar farm infrastructure can be removed once the solar farm reaches the end of its useful life.
- The land can be restored back to its original state through the site restoration and decommissioning process.

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