Andy Beshear
Governor

Rebecca W. Goodman
Secretary
Energy and Environment Cabinet

Commonwealth of Kentucky
Kentucky State Board on Electric Generation and Transmission Siting
211 Sower Blvd.
P.O. Box 615
Frankfort, Kentucky 40602-0615
Telephone: (502) 564-3940

Michael J. Schmitt
Chairman

March 24, 2021

TO: FILINGS DIVISION

RE: Case No. 2020-00219
ELECTRONIC APPLICATION OF AEUG MADISON SOLAR, LLC FOR A CERTIFICATE OF CONSTRUCTION FOR AN APPROXIMATELY 100 MEGAWATT MERCHANT ELECTRIC SOLAR GENERATING FACILITY IN MADISON COUNTY, KENTUCKY PURSUANT TO KRS 278.700 AND 807 KAR 5:110

Please file in the administrative record of the above-referenced case the attached copy of the final report of Wells Engineering, "Solar Generation Final Report – AEUG Madison Solar," both dated March 23, 2021.

Sincerely,

Linda C. Bridwell, PE
Executive Director
Public Service Commission *on behalf* of the Kentucky State Board on Electric Generation and Transmission Siting

Attachment

cc: Parties of Record

March 23, 2021

Solar Generation Siting Final Report – AEUG Madison Solar

KY State Board on Electric Generation and Transmission Siting

Customer:
Kentucky Public Service Commission

Prepared for:
Quang D. Nguyen

Wells Engineering, PSC
6900 Houston Road, STE 38 • Florence, Kentucky 41042 • Office 859.282.7538
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March 23, 2021

Prepared by:

Vasu Chikkeruru, P.E.
Sr. Power Systems Engineer

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Sr. Power Systems Engineer

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Sr. Electrical Designer

Reviewed by:

Jim Cook
Chief Operating Officer

Approved by:

Patrick Wells, P.E.
President/CEO

Solar Generation siting Final Report – AEUG Madison Solar

Synopsis

This document is the Final Report prepared by Wells Engineering for AEUG Madison Solar siting in Madison, KY.

WEPSC Order: WE200928193

Public Service Commission PO:
PON2 123 2100001588

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REVISIONS

Revision	Date Issued	Issue Type	By	Description
0	03-23-2021	For Review	VC	Issue for Review & Record

Power Systems Engineering

Since 2004, Wells Engineering has served utility, industrial, and commercial facilities for all their power needs. Quality and innovation have established Wells as the go-to engineering firm specializing in the planning, design, control, and analysis of electrical power systems. With a great reputation of working closely with our clients and listening to their requests, our team diligently provides solutions that fit every need.

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APPLICATION ENGINEERING. Relay Protection & Control • RTU & RTAC Programming • Induction Motor Control • Synchronous Motor Control • Capacitor & Filter Banks • SVC Systems • FACTS/STATCOM • Forensic Investigation • Sequence of Events Failure Analysis • Power Systems Planning • Grounding & Bonding • Maintenance Planning & Audits • Troubleshooting • Disaster Recovery Plans • Technical Witness.

PROJECT AND CONSTRUCTION MANAGEMENT. Equipment Specifications • Bid Document Facilitation • Subcontractor Qualification • Vendor Selection • Construction Estimates • Contract Administration & Implementation • OEM Factory Witness Testing • Resource Management • Master Project Schedule • Material Tracking • Spare Parts Management • Warranty Negotiation • Procurement Leveraging • Cash Flow Management

TESTING AND COMMISSIONING. MV/HV/EHV Circuit Breakers • Circuit Switchers • MV Switchgear • GSU & Power Transformers • Capacitor Banks • Harmonic Filter Banks • PTs & CCVTs • CTs • Substation Relay Protection & Control • Overcurrent, Fault Locators, & Distance Relays • Generator Protection Relaying Disconnect Switches • Surge Arrestors • Station Batteries • Grounding Resistors/Reactors/Transformers • Ground Grid • Reclosers • Reactors • Thermography • Relay protection & controls • Substation Commissioning • Predictive & Preventative Maintenance • Field Engineering & Troubleshooting • Arc Flash Hazard Analysis & Training • Refurbishment & Repair Electrical System Upgrades • NERC Compliance Testing

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1 General Statement

The present document is the Final report prepared for the Solar Generation siting project of AEUG Madison Solar, LLC who is applying for a certificate of construction for an approximately 100MW Merchant Electric Solar Generation Facility in Madison County, KY.

1.1 Scope

As part of the personal service contract for the 'Generation Siting Board Fall 2020', between The Commonwealth of Kentucky Energy Environment Cabinet/Public Service commission and Wells Engineering, in the matter of the order issued for case number 2020-00219, Wells Engineering was appointed to review the Application documents and the Site assessment report submitted by the applicant as per the Kentucky Revised Statutes KRS 278.706 & KRS 278.708 and submit a Final report on the Solar Generation Siting for the application for a construction certificate by AEUG Madison Solar in Madison KY.

Wells Engineering performed the review of the Application documents and the Site Assessment report submitted by the applicant by assigning it to the Senior Engineers and Designers at Wells Engineering and also by hiring experts as per different requirements of the siting project as seen by Wells Engineering.

Wells Engineering contracted 'Clover lake Consulting Services' for Noise & Environmental assessment and Mary McClinton Clay, MAI for the review on impact on property values.

1.2 Reference Document

The following documents are referenced for the creation of this document.

i. Commonwealth of Kentucky Order for Case no. 2020-00219
ii. Site Assessment Reports Vol.I, Vol.II and Vol.III for Case No. 2020-00219 by AEUG Madison Solar, LLC, KY
iii. Kentucky Revised Statutes[1], KRS 278-706, 708, 710
iv. Exhibit A – Updated site plan, 'Madison Solar General Layout' #C02245_P_AE_EN_LYT_CWS_980000001 Rev.1.9
v. Madison Solar Single Line Diagram (Preliminary) #XXXX-DWG-HVS-101-000003 Rev.A
vi. Responses to RFI-I, provided by AEUG Madison Solar LLC, Case No. 2020-00219

[1] For UpToDate statutes, reference, https://apps.legislature.ky.gov/law/statutes/chapter.aspx?id=38583

2 Solar Electric Power – 'Know-how'

We all know that the energy from Sun is received on earth in the forms of heat and light. The light energy we receive can be converted into electricity by using something called a Solar Cell or a PV Cell. PV is the short form for the term **P**hoto**V**oltaics. As a solar cell produces Electric 'Volts' from the 'Photons' of the sunlight and so is the name given to it.

A simple solar cell is relatively small in size and can only produce couple watts of electricity, which is not sufficient for utilization. In order to increase the power production, several cells are combined together to form a 'Solar Module', which can produce sufficient levels of electric power. A systematic arrangement of Solar modules is called a 'Solar System'.

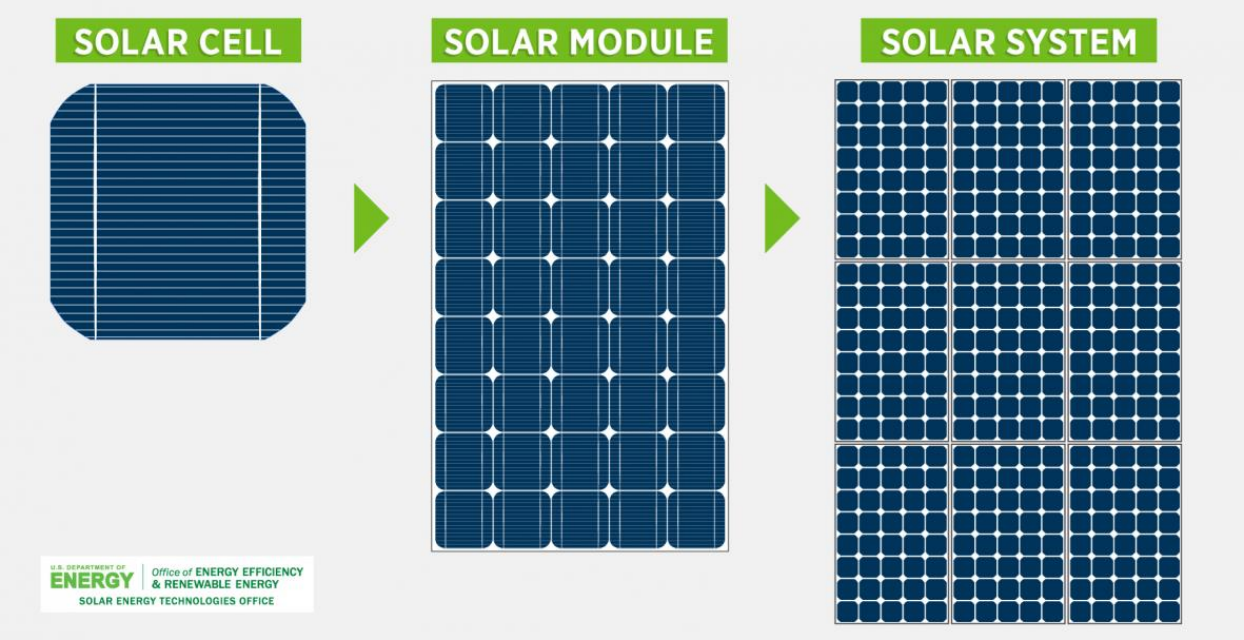

Fig. (1) Solar System[1]

Now, for generating electricity for the utilization of the consumers like, industries, commercial and general household the solar energy that comes from the solar modules has to be supplied to the electric grid of the electricity provider in the region. And this is achieved by constructing a Solar Power Plant with the use of a Solar System, in which the quantity and arrangement of Solar modules is determined as per the electrical system design of the plant.

[1] Picture from the official website of 'Office of Energy Efficiency & Renewable Energy'

2.1 Solar Power Plant

A Solar Power plant is an electric power plant constructed for generating electric power using solar modules that produce energy using sun light. A Solar Power Plant will consist of a solar system and the other associated electrical and plant equipment like, Inverters, Batteries, Transformers, Switchgear, Switchyard, Power Lines, Steel and Concrete structures, Fencing, Access ways, etc.

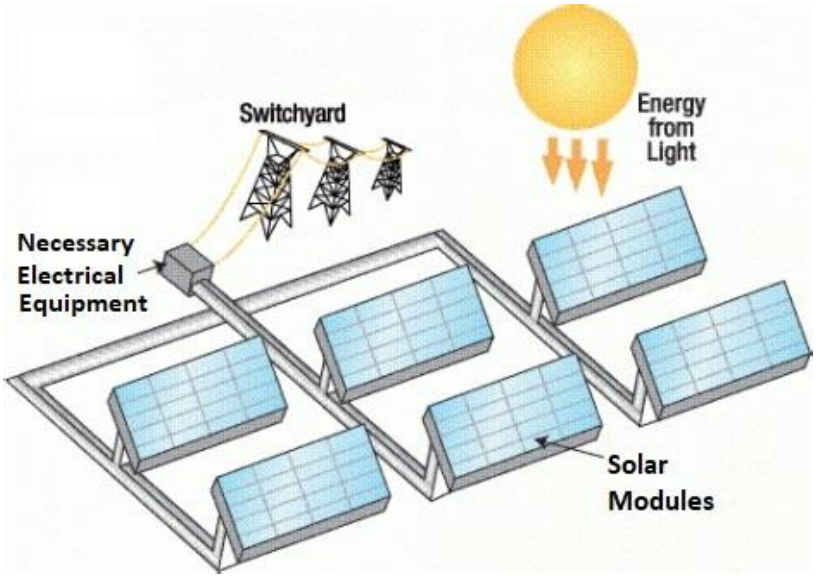

Fig. (2) A Solar Power Plant[1]

Some of the commonly seen equipment in a solar power plant,

i) Steel A frame or H frame structure for the transmission lines,
ii) High voltage switches,
iii) High voltage circuit breakers,
iv) Inverters,
v) Batteries
vi) Power transformer,
vii) Surge arrestors,
viii) CCVT's for metering to the utility,
ix) Overhead electrical bus or cabling, and
x) Medium voltage switches.

A Solar Power plant constructed by a private entity after making power purchase agreements with the local Electric Power grid to supply electric power, is known as a 'Merchant Electric Solar Power Plant'.

[1] Reference the scholarly article http://holbert.faculty.asu.edu/eee463/SOLAR.HTML

2.2 Role of Inverters

The power produced by a solar system, because of its basic principle of operation, produces the electric power in the form of Direct Current or in short, DC. This form of DC Power is not suitable for utilization. The electric power which is in usage is in the form of 'Alternating Current' or in short AC.

A 'Solar inverter' or a 'PV inverter' is a power electronic device which converts the DC Power Produced by the Solar system, into AC Power, to make it useful for utilization.

2.3 Role of Batteries

As a Solar system can produce electric power only when the sunlight is available. It is because of this drawback a Solar power plant cannot produce electricity during night. In order to overcome this drawback Solar power plants are installed with batteries so that some portion of electricity produced by the solar modules during the day is stored in the batteries and retrieved during night.

The Solar Modules and the Batteries function on DC. A proper combination of Solar Modules and Batteries can produce electricity all day long.

2.4 Role of Transformers and Other associated switchyard equipment

A Transformer is an electrical power equipment which is used either to step-up or to step-down the voltage of an electrical power source without changing the frequency of the voltage. A Transformer is an AC power equipment.

In a Solar Power plant, the power produced by the solar modules is converted into the useful form of AC by Inverters. The AC Power produced by inverters are at a relatively lower voltage comparted to the voltage available at the electric power grid. A Transformer, which can step-up the voltage to match it with the grid, is used to overcome the difference in voltages and to establish an interconnection for the supply of power.

In a large Solar Power plant, every Inverter is installed with a Transformer locally to the inverter, to step-up the voltage to a medium level, other than the voltage available at the grid. This is done to form a network of Transformers to collect the power coming from each Inverter.

This Electric network of transformers will have one high-capacity Main Transformer, which does the final step-up for the connection with the grid.

Besides the Transformers, Solar Power plants are installed with some other electrical equipment like,

i) Electric Switchgear
ii) Electric Bus system
iii) Electric Protection system &
iv) Electric Energy measurement system

2.5 Role of Steel & Concrete Structures, Roadways & Fencing

Steel & Concrete structures form the necessary structures for installing the Solar Modules and all other necessary equipment. Roadways provide access for the operations and maintenance. Fencing determines the boundary and is installed for access control and safety.

3 Madison Solar – Application Review & Findings

The present document, as mentioned in the previous sections, is a review report created after reviewing the application documents submitted by the applicant, AEUG, Madison Solar, LLC.
The application submitted by the applicant consists of the following documents,

i) Application filed at the office of the Kentucky Public Service commission, required as per KRS 278.706 (1)
ii) Site Assessment report, required as per KRS 278.706 (2)(l)

In this section, a detailed discussion is made on the Initial review, Site visit and the Final review from Wells Engineering.

3.1 Initial Review

As part of the requirements of the state order, for the applicant's Case No. 2020-00219, Wells Engineering, after the initial review of the application documents, provided list of questions for First as well as Second Request for Information.
The initial review included the review of 'Application document for project siting' & the 'Site Assessment report' submitted by the applicant.

The corresponding documents submitted by Wells Engineering is attached as Appendix-A with the present document.

3.2 Site Visit

As part of the requirements of the state order, for the applicant's Case No. 2020-00219, Wells Engineering, made a visit to site as organized by the Siting board, on March 18th, 2021.

The locations visited are indicated on the site layout below.

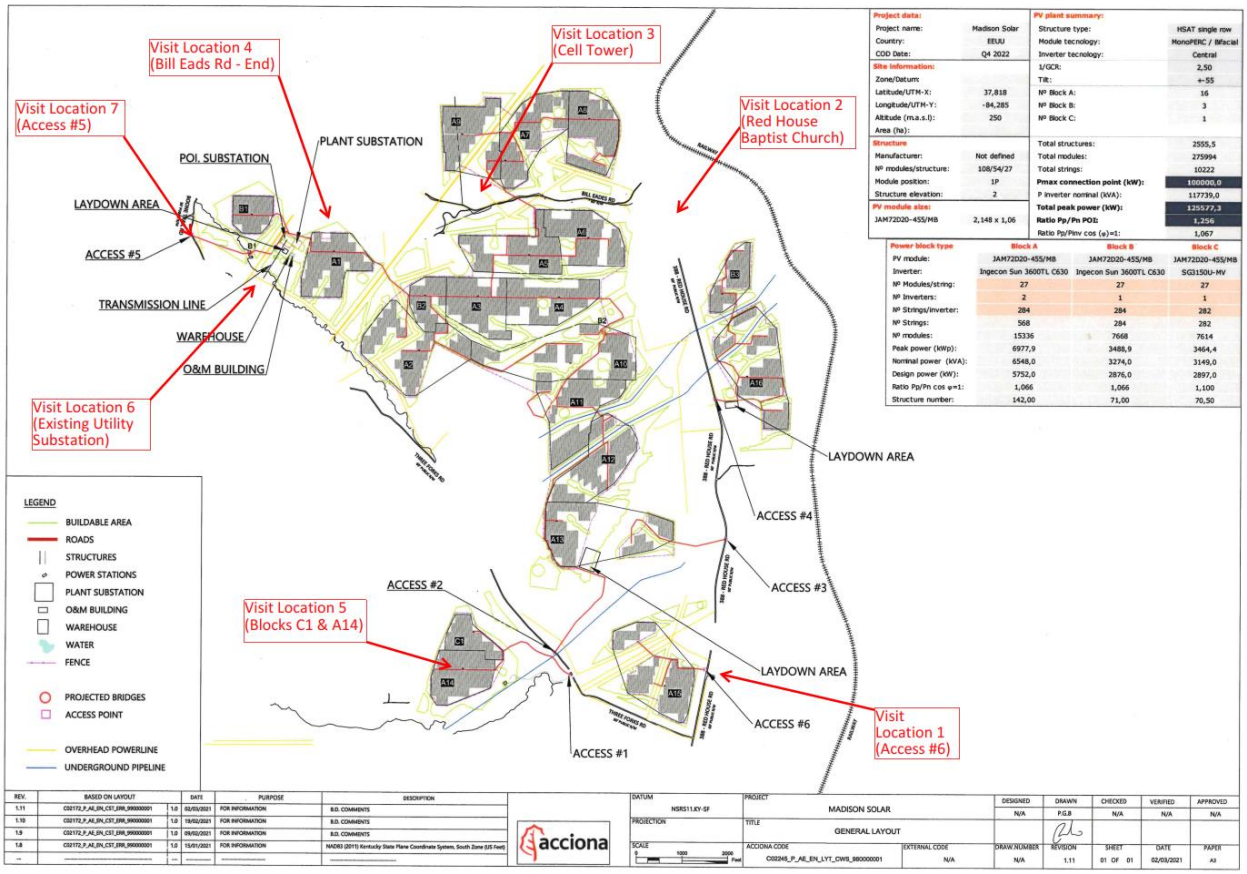

Fig. (3) Site Layout

Pictures from Site visit are shown in the following pages.

Picture (1) Location #1 – Access#6

Picture (2) Location #2 – Red House Baptist Church

Picture (3) Location #3 – Cell Tower

Picture (4) Location #4 – Bill Eads Road - End

Picture (5) Location #5 – Blocks C1&A14

Picture (6) Location #5 – Existing Utility Substation

Picture (7) Location #5 – Access #5

3.3 Final Review & Findings

In this section a detailed discussion is made on the major aspects of the application documents submitted for their compliance as per the statutes KRS 278.706, 708 & 710.

3.3.1 Review of 'Site Assessment Report'

Wells Engineering reviewed the 'Site Assessment report' submitted by the applicant and the corresponding findings were submitted as 'List of Questions' for First & Second RFI.
The documents submitted for First & Second RFI are attached as Appendix-Aaa

3.3.2 Surrounding Land Uses

Wells Engineering reviewed the Site Layout and the 2-mile vicinity maps submitted by the applicant and performed Site Visit on Mar 18th, 2021. The finding after the site visit is discussed below.

Findings on the Site Layout & 2-Mile vicinity maps

1. Red house Baptist Church: On the Site Layout & the 2- mile vicinity maps, the Red house Baptist Church on Red house road shall be identified. Reference picture #2
2. Water bodies: On the site layout all the water bodies like ponds, lakes, creeks shall be identified. Reference the below picture for a pond near the cell tower.

Picture (8) Pond near the cell tower

3.3.3. Legal Boundaries

After reviewing the legal descriptions of the land submitted as part of the application documents with the Madison County PVA, the following finding were made.

Findings on the Legal descriptions

1. Addresses of the Landowners: For several parcels of the land, Where LLCs are formed, the addresses of the LLCs shall be updated on the legal descriptions.
2. Insufficient info on Parcel numbers: Some of the Parcel numbers indicated on the Legal descriptions of the site provided as part of the application are not found on the Madison PVA website. Ex: #0066-0000-0008, #0065-0000-002
3. Change of Ownership/division or Formation of JV: One of the parcels of land had a JV or LLC. And for another the division of property is different from what is found on PVA records. These have to be updated in the legal descriptions of the application documents. Ex: #0066-0000-0018-DA, #0053-0000-0013

3.3.4 Proposed Access Control

As per the KRS requirements KRS 278.708 (3)(a)(3), the applicant has proposed the access control methods that are adopted for the site. However, the as per the Kentucky Energy and Transmission siting board requirements, the applicant has to fulfill FERC & NERC requirements. The conceptual designs do not completely address NERC requirements. Finding on Proposed Access Control: As per NERC, the power plants that are greater than 75MW in capacity fall under Critical Infrastructure Properties.

3.3.5 Location of Facility Buildings & Radial Tie lines

After reviewing the Site Layout and other plans submitted by the applicant and after visiting the site, the following findings were made.

Findings on Location of Facility Buildings and Radial Tie lines

1. Nearest Access: There is only one access point, i.e., Access#5 nearer to the Warehouse & O&M Buildings. Further to this the access #5 pass thru the substation and transmission line. Reference the Figure. (4). Second access is available through the solar development.

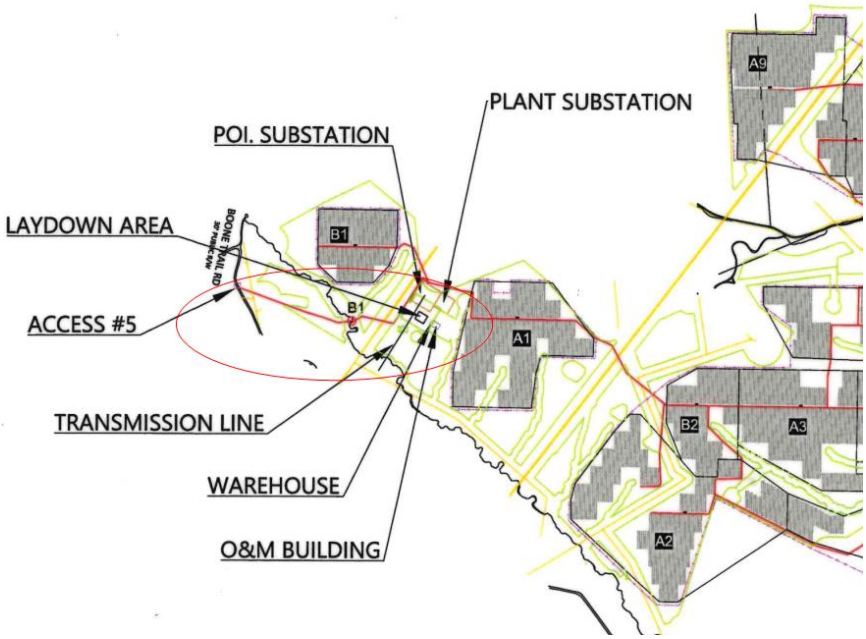

Fig. (4) Access to the Facility Buildings

Findings on Location of Facility Buildings and Radial Tie lines (Contd…)

2. Existing Power Lines: There several existing power lines crossing the project site at several locations. Reference the pictures (9) & (10)

Picture (9) Power Lines

Picture (10) Power Lines

3.3.6 Location and Use of Accessways, Internal Road & Railways

As part of the site visit, major access points are visited, and the following findings were made.

Findings on Location and Use of Accessways, Internal Road & Road

1. The internal roads are proposed to be gravel roads.
2. Rail roads are not applicable to site.
3. The existing bridges on the creeks may require evaluation for their load bearing capacity.

Fig. (5) Otter creek crossing

3.3.7 Existing or Proposed Utilities to Service the Facility

After reviewing the plot plans submitted by the applicant, it was found that the drawings do not indicate the utilities to the facility buildings of the plant, as the drawings are prepared as preliminary. Applicant has indicated that there are no utilities other than phone/internet connection. Power will be derived from an auxiliary transformer in the substation. Water is not provided as there are no employee facilities on the site.

3.3.8 Compliance with Applicable setback requirements

The KRS required setback is 2000 feet. This setback is practical for turbine-based plants and the noise and view generated but not practical for a solar power plant. After reviewing the applications documents and the statutes it was found that the setback distance applicable to site is 200' or as advised by the local planning authority. Compared to other solar developments the current proposed setback is greater than most we have seen.

3.3.9 Evaluation of Noise levels, Impact of Road Traffic/Fugitive Dust

Wells Engineering has appointed industry leading expert for the Environmental Assessment of site for Noise, Traffic & Fugitive dust.

The summary of findings of the expert's review is as under,

> *"Based on a review of The Madison Solar Site Assessment Report Volumes I and II, by W. Thomas Chaney of Cloverlake Consulting, all of the sections of the report are in compliance with the intent of KRS 278.708.*
> *There are a few areas where additional conditions are needed. These proposed conditions are specified in Additional Mitigating Measures proposed by the consultant on page 25 of this report.*
> *By title these measures are*
> • *Historic Resources*
> • *Traffic Safety*
> • *Fugitive Dust*
> • *Protection of Streams in the Project Area"*

The complete report from the expert is attached as Appendix-B

3.3.10 Evaluation of Visual Assessment Report

The report is broken down into different viewpoint looking at the potential of seeing the solar arrays. There are twelve viewpoints located that were evaluated based on the map in Figure 1 of the report. Our exploration of the site confirmed most of the report as descriptive of actual conditions. We noted that some additional information may be of use for the board and have included it below.

At location VP3 the report fails to mention the presence of a neighborhood to the west. From the road looking west the subsequent pictures show the presence of that neighborhood in the background of the picture and a singular dwelling in the foreground will have a more direct view of the solar arrays. In the background neighborhood there are some residence who will have partial views of the solar arrays. We believe the combination of the distance and the existing of some many human made features already in the form of the substation and the power lines will mean little in visual impact from that distance.

Picture (11) Location VP3

Picture (12) Location VP4

In the region of VP4 there are a few houses that have a more significant view of the arrays. The picture below shows one of those houses and the view behind the house where the arrays will be. With the setback so large this should allow enough greenery to keep the impact to a minimum. We would suggest that as the Applicant continues forward with this development that they develop potential screening plan to break up the visual effect of the pattern of the arrays. There may be a few additional with similar impact, however, access to their property would have been required to gain further understanding.

Pictures (13) & (14) Views from Boone Trail Road

Views from Boone Trail Road were not included. This is the road that runs relatively east-west to the north of the substation on the northwest section of the property. There are some residences along this road, but the topography is such that most of the view is obscured by a gentle rise and the tree line along the creek.

3.3.11 Evaluation of Compatibility with Scenic Surroundings / Potential Changes in Property Values

Summary: While there will always be impact to the scenery of neighboring properties the impact of this project is minimal. The combination of the topography, existing tree line, existing human made features, and the large setback from the property line proposed by the developer works well to minimize the impact. The major exceptions to this are the project participants and a few other directly neighboring landowners.

Evaluation of Property Valuation Impact

The data contained in the Site Assessment Report for Madison Solar, Volumes I and II regarding an evaluation of the facility and its impact on property values is in compliance with the intent of KRS 278.216. The report created by Kirkland as part of the application has 44 examples it cites where there are relatively no impacts on land values of the neighboring properties. As we read further in this report, we realized that the methodology for the finding in the report were missing from the report. The report was funded by the Applicant and that all the cases cited had the same conclusion. Our research found a large number of published materials indicating there is little or know impact on neighboring properties to the solar farm, however, a deeper dive showed that all these papers were funded by solar developers. Without the methodology to use to confirm the findings we found it necessary to hire an expert appraiser to review the report and research the cases.

Mary McClinton Clay, MAI who is long time resident of Central Kentucky and currently performs consulting work for the Commonwealth's department of transportation was requested to review the report for conformity with the Uniform Standards of Professional Appraisal Practice. The report is located in Appendix C. The report is not an appraisal estimate but an analysis of the potential flaws with the case studies in the applicant's report. Ms. Clay's review points out some inconsistencies with the case study data as well as omissions to change.

Some of the more interesting information is the number of effected property owners who received compensation through a neighborhood agreement, or had their property directly purchased by the developer. This does not mean that there is an actual impact, but that the developers were attempting to remove or reduce negative responses from property owners.

In the North Star case study Ms. Clay has listed the purchase history of the most effected neighboring properties which were purchased by the developer. The developer then flipped the property a couple of years later at a loss. In total the seven properties listed were sold for a total loss of $629,956 to the developer CER Land, LLC. One other interesting point is one of the sellers of the property to CER Land, LLC bought the house back from them a year and a half later. Common sense would conclude that there was a strong interest by some individuals in exacting compensation from the developer over protecting the viewshed of the housing.

Ms. Clay's review concludes that one size fits all in appraising the actual valuation effect of the Solar Power Plant does not work and that many more data points are needed. Further in the report she states that there is not enough solar development to have the necessary data points.

In order to establish a third point of reference we asked our environmental engineer, Mr. Tom Chaney, to consider the impact on valuation. Concerning the viewshed he writes the following:

The proposed Project would introduce low vertical, geometric elements that are gray in color into a relatively rolling terrain landscape dominated by green vegetation and patches of trees and shrubs. Visual impacts -Visual Assessment Madison Solar Project on Page 8 would vary depending on several factors, such as the distance of the viewer from the Project and whether views toward the Project are unobstructed or screened by vegetation, terrain, or development. The views can be vastly different from one location to another, even in proximity, because of the rolling terrain and vegetation. Viewers in proximity to the Project may have unobstructed or partially screened views and include adjacent rural residences and travelers along the local roads and highways. Existing vegetation between the solar arrays and the residences will be left in place, to the extent practicable, to help screen the Project and reduce visual impacts from the adjacent homes. It is anticipated that views of the Project from surrounding places (e.g., Richmond, Ford) would generally be screened by vegetation and structures associated with development. Roadways and rural residential development located outside of built communities would have elevated views towards the Project. Views would vary from completely screened to partially screened to unobstructed. Portions of the Project that would be visible would be seen in the context of existing development and would appear as a co-dominant feature in the landscape setting.

There is agreement that every site is different and every property within that site is different and to draw a consistent conclusion is difficult. To deny the property rights of those participating in the development for the viewshed of a neighbor when there are so many other "co-dominant" features would seem extreme. Additionally, Mr. Chaney stated that "…the solar farm will have no impact on the value of adjoining or abutting property and that the proposed use is in harmony with the area in which it is located." He also noted some positive implications to neighboring properties. These include the development of something more intrusive to the viewshed such as a housing development, a different type of farming that is more noxious, protection from light pollution, reduced dust, and odors, and minimal traffic after construction.

In conclusion, there are differences of opinion as to the effect on property valuation created from a solar power plant. We do know that some of those neighboring properties will see a greater impact then others and that if it is significant there is nothing stopping them from litigating their claim.

4 Recommendations & Mitigations Measures

After reviewing the application documents and performing the site visit, Wells Engineering provides the following Recommendations & Mitigation measures.

1. Create a Site Survey Map indicating the property boundaries. This will be a good reference for current and future needs of the project.
2. Identify properties with the most effected viewshed and provide a vegetation buffer to create a visual break.
3. Create an over-all plot plan indicating all water bodies, bridges, culverts, access roads, power lines, residential and public structures, etc.
4. Update the property ownership records.
5. Provide Site access control as per NERC guidelines.
6. For locating the Solar Modules and Other associated equipment of the plant maintain sufficient clearance from the existing power lines
7. Evaluate the existing bridges for their load bearing capacity for construction, operation, and Maintenance.
8. Construct new bridge wherever required necessary.
9. Adhere to the setback distance at all locations as per guidelines from the local planning zone authority.
10. Historic Resources: No specific requirements regarding historic resources are called for in KRS 278.708, however, it should be noted that this area is rich with potential archeologic sites and historic buildings that could be affected by the construction of this solar farm. Fort Boones borough, Whitehall and other historic sites are located within the local vicinity. Mitigation of the impacts of this proposed site should include Coordination with, at a minimum, the Madison County Historical Society (MCHS) and the Kentucky Historic Preservation Office (SHPO). A search of archeologic and historic resources should be done in the files of the SHPO and the MCHS. Although the construction of the solar farm could be disruptive to archeologic sites, no field surveys are recommended.
11. Traffic Safety: Most of the roads adjacent and through the site are narrow and, in some cases, curvy. The Applicant should submit a detailed plan on how traffic safety will be maintained during the construction of the facility ten days before commencing construction.
12. Fugitive Dust & PM10: The applicant will submit in writing the specific plan to control fugitive dust and PM 10 during the construction process ten days prior to commencing construction.
13. Protection of Streams: Ten days prior to the commencement of construction, the Applicant will provide a detailed plan on how they will protect the streams in the project area. The site assessment documents in several locations says that certain mitigation measures regarding erosion and protection of water resources “may” be caried out. This needs to be clearly specified.
14. The primary focus should be on preventing turbidity being added to local streams as a result of erosion during construction.

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APPENDIX A

January 21, 2021

List of Questions for Data Request

AEUG Madison Solar, LLC
KY State Board on Electric Generation and Transmission Siting

Customer:
Kentucky Public Service Commission

Prepared for:
Quang D. Nguyen

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January 21, 2021

List of Questions for Data Request

Prepared by:

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Sr. Power Systems Engineer

Reviewed by:

Jim Cook
Chief Operating Officer

Approved by:

Patrick Wells, P.E.
President/CEO

Synopsis

This document is a list of questions prepared for the data (or) information to be requested as part of the application process for Solar Electric Generation Plant in Madison, KY.

WEPSC Order: WE200928193

Public Service Commission PO:
PON2 123 2100001588

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REVISIONS

Revision	Date Issued	Issue Type	By	Description
0	01-20-2021	For Review	VC	Issue for Review & Record
1	01-21-2021	For Submission	VC	Issue for Submission

Power Systems Engineering

Since 2004, Wells Engineering has served utility, industrial, and commercial facilities for all their power needs. Quality and innovation have established Wells as the go-to engineering firm specializing in the planning, design, control, and analysis of electrical power systems. With a great reputation of working closely with our clients and listening to their requests, our team diligently provides solutions that fit every need.

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1 Introduction

The present document is a list of questions prepared for the request of data (or) additional information in the matter of Application of AEUG Madison Solar, LLC for a certificate of construction for an approximately 100MW Merchant Electric Solar Generation Facility in Madison County, KY pursuant to KRS 278.700 & 807 KAR 5:110

Scope

As part of the application evaluation process Kentucky Public Service Commission has appointed Wells Engineering PSC for providing consultancy services.
The present document is created as part of the First request for information required as per the order issued for case number.2020-00219, by the commission.

Reference Document

The following documents are referenced for the creation of this document.

i. Commonwealth of Kentucky Order for Case no. 2020-00219
ii. Site Assessment Reports Vol.I, Vol.II and Vol.III for Case No. 2020-00219 by AEUG Madison Solar, LLC, KY
iii. Kentucky Revised Statutes, KRS 278-706, 708, 710

2 List of Questions

In this section a detailed list of questions is described.

Question#1

Electrical One-Line Diagram

Electrical One-line diagram is very important document required for understanding and evaluating the Electrical Power Network and Interconnection.

Applicant to submit Electrical One-line diagram of the installation.

Question#2

Overall Project Layout

Applicant to submit the Overall layout diagram of the project, indicating the fence line, 200' setback line, Solar Panel Locations, Battery & Inverter locations, Substation location, Transmission line route and Easements, Employee stay/quarters, Provision of Medical/First-Aid service.

Question#3

Project Schedule

Applicant to submit an over-all tentative schedule of the project, starting from the receival of the certificate for construction to the completion of the project.

This document helps in understanding the total time required and the major milestones involved. It will also be used to confirm the timing of the economic benefits listed.

Question#4

Project Generation Capacity

The document 'Generation Interconnection Feasibility Study Report for Queue Project AE2-308 THREE FORKS-DALE 138 KV 110 MW Capacity / 150 MW Energy' which is Appendix E of the Vol.I of the submittal lists 150MW max capacity and 110MW output recognized by PJM. Whereas the application indicates only 100MW as the capacity.

Reference section#2 of application Vol.I, Page 1.
Applicant to provide information on,
What is the reasoning behind the different numbers and what is the actual max output that will be delivered onto the grid at any given time?

Question#5

Area occupied by solar panels.
What is the area occupied by Solar panels is filled with, Sand or Concrete?
Applicant to submit a site plan indicating access road, maintenance pathway, vegetation, and site screening and fencing.

Question#6

Applicant to provide pertinent information for*,*
At end of life when the system is decommissioned will the area be restored? Will the soil be useful for farming after the demolition of the solar plant after 30 years? If not, will the companies do something to bring the soil back to normal?

Question#7

New Roads.
Applicant to provide information on any new roads paved or stoned. If no new roads are paved, the Applicant shall provide information on the '*routes of vehicle movement*.'

Question#8

Largest Trailer/Truck.
Applicant to provide information on the largest trailer or truck that will be used for transporting the plant equipment? & What roadways will be used to access the site for these vehicles?

Question#9

Residential Quarters/trailer homes.

Applicant to provide information on constructing any residential quarters or installing trailer homes for the operations staff.

Question#10

Construction Power
Applicant to provide information on the power required for construction of the plant.

Question#11

Storage Battery Potential Hazards
Applicant to provide information on the potential hazards associated with the storage batteries and what are the safety precautions taken?

Question#12

Storage Battery Environmental Impact
Applicant to provide information on the environmental impact these batteries impose.

Question#13

Local/Regional Grid reliability
Applicant to provide information on any adverse effect on the local or regional grid reliability. Have interconnection studies been competed to that effect?
Ref: KRS 278.710 (1) (f)

Question#14

Cell Phone Towers
Applicant to provide information on any cell phone tower that may be required/constructed for the project.

Question#15

Fiber Optic Communication & Associated excavation

Applicant to provide information on any fiber optic or any kind of communication network installed as part of the project?

Applicant to provide information on excavation that may be required for the above.

Question#16

PV Cell/Solar Panel Manufacturing

Applicant to provide information on where the PV cells/Solar Panels are manufactured?

Applicant to indicate the % of Import & % of Made in USA

Question#17

Substation

Applicant to provide information on the location where the substation which acts as a collector of solar generation is constructed and indicate it on the plant layout.

Question#18

DOE Compliant Transformer

Applicant to provide information on the DOE Compliant transformers used at site.

Question#19

Transmission line Easements

Applicant to provide indicative information on the Transmission line routing and easements.

Question#20

Transfer Function

Applicant to provide a preliminary power system transfer function, available if any.

Question#21

Additional Compliance

Applicant to provide compliance on the following,

(i) Copy of the specification/requirement of 200' setback distance as per local planning zone.

(ii) Summary of efforts as per KRS 278.706(2)(g)

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February 18, 2021

List of Questions for Data Request - II

AEUG Madison Solar, LLC
KY State Board on Electric Generation and Transmission Siting

Customer:
Kentucky Public Service Commission

Prepared for:
Quang D. Nguyen

Wells Engineering, PSC
6900 Houston Road, STE 38 • Florence, Kentucky 41042 • Office 859.282.7538
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February 18, 2021

List of Questions for Data Request - II

Prepared by:

Vasu Chikkeruru, P.E.
Sr. Power Systems Engineer

Reviewed by:

Jim Cook
Chief Operating Officer

Approved by:

Patrick Wells, P.E.
President/CEO

Synopsis

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Scope

As part of the application evaluation process Kentucky Public Service Commission has appointed Wells Engineering PSC for providing consultancy services.
The present document is created as part of the Second request for information required as per the order issued for case number.2020-00219, by the commission.

Reference Document

The following documents are referenced for the creation of this document.

i. Commonwealth of Kentucky Order for Case no. 2020-00219
ii. Site Assessment Reports Vol.I, Vol.II and Vol.III for Case No. 2020-00219 by AEUG Madison Solar, LLC, KY
iii. Kentucky Revised Statutes, KRS 278-706, 708, 710
iv. Exhibit A – Updated site plan, 'Madison Solar General Layout' #C02245_P_AE_EN_LYT_CWS_980000001 Rev.1.9
v. Madison Solar Single Line Diagram (Preliminary) #XXXX-DWG-HVS-101-000003 Rev.A
vi. Responses to RFI-I, provided by AEUG Madison Solar LLC, Case No. 2020-00219

2 List of Questions

In this section a detailed list of questions is described.

Question#1

Electrical One-Line Diagram
Applicant to submit the missing Sheet 2 of the 'Single line diagram.'

Question#2

Overall Project Layout
On the layout diagram the power lines, indicated with the symbol

, are not identified, please indicate the transmission lines & internal power lines, and submit a revised plot plan as necessary.
This is required for assessing the radial clearances from the neighboring property structures.

Question#3

Overall Project Layout
On the layout diagram please locate the Plant and Utility substations.

Question#4

Overall Project Layout
Please provide the information on the utilities like Water, Sewer, etc, to be provided to the O&M building, Warehouse, Project offices and Power Stations.
This is required for assessing the capability of the proposed utilities.

Question#5

Overall Project Layout
Please locate and indicate the railroad on the layout, specifically for blocks A8, B3 & A16.

Question#6

Overall Project Layout
Please locate and indicate the public roads/streets like KY 388, Lost Fork Road, Bill Eades Road, etc, on the plot plan.

Question#7

Site Survey
Applicant to provide a site survey diagram/report, available if any.
This will be used to identify and locate the project legal boundary, with the help of reference points, monuments, etc.

Question#8

Access control
Applicant to provide information on the proposed physical and cyber access control appliable to site as per BES and CIP requirements defined by NERC, FERC & DHS.

Question#9

Good environmental history
Applicant to provide information on applicant's history of good environmental compliance as per KRS 278.710 (1) (i).

Question#10

Full time staff
Applicant to provide an approximate number of full-time employees working at site after construction is complete and the facility operational.

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APPENDIX B

Madison Solar-Applicant Performance Evaluation for the Site Assessment Report Volumes 1 and 2

Developed for Wells Engineering and the Kentucky Public Service Commission- State Board on Electric Generation and Transmission Siting

By Cloverlake Consulting, W. Thomas Chaney, President

March 22, 2021

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Cloverlake Consulting March 22, 2021

On Behalf of Wells Engineering, Florence, Kentucky For the Madison Solar Project Kentucky State Board on Electric Generation and Transmission Siting

Project Description

The proposed Madison Solar Facility (Project) is a 100-megawatt photovoltaic (PV) facility in Madison County, Kentucky, located approximately 4 miles north of Richmond. It is planned to be built on eitherside of KY-388 sitting on 1,700 acres of land. The power generated by the proposed solar facility will beconnected to the existing power grid using the transmission line currently traversing the tract.

The generating facility will sell power on the wholesale market as a merchant power plant or independent power producer.

Construction of the facility is anticipated to last 10 months, commencing in September of 2021 and

completing in June of 2022. Based on the preliminary design, the Project will include 36 inverters,

276,048 modules, and 2,556 trackers onsite. The Project will also include a substation to be located near

the northwest corner of the project and a warehouse and O&M Building to be located just south of the

substation.

The site would be secured using six-foot-high, perimeter, chain-link fencing topped by razor wire surrounding the PV system and switchyard. The entrance gates for the site are anticipated be about 8 feet high and 12 feet wide, to allow for fire department and maintenance access. All fencing would be placed at or above grade to ensure drainage flows are unobstructed. Naturally occurring vegetation around the boundary, most notably small groupings of trees along the north and south property boundaries, would remain in place. At the end of life of the project, the land will likely return to farmland.

1.01 Standard of Adequacy of the Site Assessment Report Submitted By Madison Solar

Requirements of KRS 278.216

Kentucky Revised Statutes require the following for applicants who desire to build a Merchant Generating Facility in the Commonwealth of Kentucky:

278.216 Site compatibility certificate -- Site assessment report -- Commission action on application. (1) Except for a utility as defined under KRS 278.010(9) that has been granted a certificate of public convenience and necessity prior to April 15, 2002, no utility shall begin the construction of a facility for the generation of electricity capable of generating in aggregate more than ten megawatts (10MW) without having first obtained a site compatibility certificate from the commission. (2) An application for a site compatibility certificate shall include the submission of a site assessment report as prescribed in KRS 278.708(3) and (4), except that a utility which proposes to construct a facility on a site that already contains facilities capable of generating ten megawatts (10MW) or more of electricity shall not be required to comply with setback requirements established pursuant to KRS 278.704(3). A utility may submit and the commission may accept documentation of compliance with the National Environmental Policy Act (NEPA) rather than a site assessment report. (3) The commission may deny an application filed pursuant to, and in compliance with, this section. The commission may require reasonable mitigation of impacts disclosed in the site assessment report including planting trees, changing outside lighting, erecting noise barriers, and suppressing fugitive dust, but the commission shall, in no event, order relocation of the facility. (4) The commission may also grant a deviation from any applicable setback requirements on a finding that the proposed facility is designed and located to meet the goals of this section and KRS 224.10-280, 278.010, 278.212, 278.214, 278.218, and 278.700 to 278.716 at a distance closer than those provided by the applicable setback requirements. (5) Nothing contained in this section shall be construed to limit a utility's exemption provided under KRS 100.324. (6) Unless specifically stated otherwise, for the purposes of this section,

"utility" has the same meaning as in KRS 278.010(3)(a) or (9). Effective: June 24, 2003 History: Amended 2003 Ky. Acts ch. 150, sec. 3, effective June 24, 2003. -- Created 2002 Ky. Acts ch. 365, sec. 13, effective April 24, 2002.

102 Specific Requirements By the Statutes and Evaluation on the Performance of the Applicant

278.708 Site assessment report -- Consultant -- Mitigation measures. (1) Any person proposing to construct a merchant electric generating facility shall file a site assessment report with the board as required under KRS 278.706(2)(l). (2) A site assessment report shall be prepared by the applicant or its designee. (3) A completed site assessment report shall include**:**

(a) **A description of the proposed facility that shall include a proposed site development plan that describes:**

1.02.1. Surrounding land uses for residential, commercial, agricultural, and recreational purposes; Madison Solar Project:

COMPLIANCE: AEUG Madison Solar, LLC (AEUG Madison Solar) proposes to develop the 100-megawatt (MW) photovoltaic (PV) Madison Solar Project (Project) in Madison County, Kentucky.

The Project would be built on portions of approximately 1,770 acres (Project Area).

The majority (81.01%) of the Project Area currently is in agricultural use (U.S. Geological Survey 2016)See (Table 1).

Table 1. Land Cover Types in the Madison Solar Project Are

Land Cover Class Acres	Percentage of Project Area
Pasture/Hay 1,434.44	81.01
Cultivated Crops 31.58	1.78
Deciduous Forest 136.99	7.74
Mixed Forest 86.51	4.89
Shrub/Scrub 5.11 0.29	
Developed, Open Space 25.35	1.43
Open Water 1.11	0.06
Grassland/Herbaceous 19.12	1.08
Emergent Herbaceous Wetlands 0.22	0.01
Developed, Low Intensity 5.34	0.30
Barren Land 13.57	0.77
Evergreen Forest 11.34	0.64
Total 1,770.71	100.00

Source: U.S. Geological Survey (2016)

Kentucky PSC Compliance Evaluation:

The data contained in the Site Assessment Report for Madison Solar, Volumes I and II for land use is in compliance with the intent of KRS 278.216.

1.02.2. The legal boundaries of the proposed site;

Kentucky PSC Compliance Evaluation:

The data contained in the Site Assessment Report for Madison Solar, Volumes I and II is in compliance with the intent of KRS 278.216. The Appraisal Report by Kirkland Appraisals as well as construction and engineering documents including maps and figures specifically identify the legal boundaries of the site as well as the legal boundaries of adjacent parcels of land. See Volumes I and II of the Site Assessment for the Madison Solar Project. See Appendix B-Project Vicinity Map.

1.02.3. Proposed access control to the site;

Any entrances to the facility would likely be on KY-388. There are multiple dirt roads leading to the site in either direction that may lead to a site entrance, depending on construction of the facility. These potential access points are identified on the General Layout provided in Appendix E of the Site Assessment Report. Traffic is expected to increase during construction, with a morning and afternoon peak due to workers entering and leaving the site as well as deliveries occurring throughout the day.

The construction of the proposed solar facility is expected to take approximately ten months for completion. During construction, a temporary increase in traffic volume associated with travel of construction laborers, delivery of construction equipment and material, delivery of solar panel components and equipment is anticipated. Laborer commutes with passenger vehicles and trucks will occur daily with two traffic peaks (i.e., morning peak and afternoon peak), whereas deliveries of equipment will occur on trailers, flatbeds, or other large vehicles periodically throughout the construction process at various times of day.

Kentucky PSC Compliance Evaluation:

The data contained in the Site Assessment Report for Madison Solar, Volumes I and II for access control of the site is in compliance with the intent of KRS 278.216.

1.02.4. The location of facility buildings, transmission lines, and other structures;

See the site map in Appendix A and in the Applicants Application Volume II.

Kentucky PSC Compliance Evaluation:

The data contained in the Site Assessment Report for Madison Solar, Volumes I and II for location of facility buildings ,transmission lines and other structures is in compliance with the intent of KRS 278.216.

1.02.5. Location and use of access ways, internal roads, and railways;

See the map in Appendix A and Volumes I and II of the Site Assessment Report.

Kentucky PSC Compliance Evaluation:

The data contained in the Site Assessment Report for Madison Solar, Volumes I and II for location and use of access ways, internal roads and railways is in compliance with the intent of KRS 278.216.

1.02.6. Existing or proposed utilities to service the facility;

See the map in Appendix A.

Kentucky PSC Compliance Evaluation:

The data contained in the Site Assessment Report for Madison Solar, Volumes I and II for for existing or proposed utilities to serve the facility is in compliance with the intent of KRS 278.216.

1.02.7. Compliance with applicable setback requirements as provided under KRS 278.704(2), (3), (4), or (5); a

See volume II, section 1 showing the site development plan. The setback requirements have been met.

Kentucky PSC Compliance Evaluation:

The data contained in the Site Assessment Report for Madison Solar, Volumes I and II regarding applicable setback requirements is in compliance with the intent of KRS 278.216.

1.02.8. Noise and Scenic Surroundings

Evaluation of the noise levels expected to be produced by the facility;

SWCA Environmental Consultants performed a Noise and Traffic Study for the Madison Solar Site. That Study was completed in December of 2020.The following is an excerpt of the noise section of that report:

Noise-sensitive receptors generally are defined as locations where people reside or where the presence of unwanted sound may adversely affect the existing land use. Typically, noise-sensitive land uses include residences, hospitals, places of worship, libraries, performance spaces, offices, and schools, as well as nature and wildlife preserves, recreational areas, and parks.

Excluding the receptors that are on leased land with Owner Waivers of impacts, the closest receptor to any structure is a residence along the northwest boundary of central portion and will be 320 feet from the nearest solar panel and 850 ft from the nearest inverter. The closest receptor to any inverter is a residence along the west boundary of eastern portion and will be 657 feet from the nearest inverter.

A-weighted sound levels are typically measured or presented as the equivalent sound pressure level (Leq), which is defined as the average noise level on an equal-energy basis for a stated period of time and commonly is used to measure steady-state sound that is usually dominant. Another metric used in determining the impact of environmental noise is the differences in response that people have to daytime and nighttime noise levels. During the evening and at night, exterior background noises are generally lower than daytime levels. However, most household noise also decreases at night, and exterior noise becomes more

noticeable. Furthermore, most people sleep at night and are sensitive to intrusive noises.

The Ldn is a noise metric that accounts for the greater annoyance of noise during the nighttime hours (10:00 p.m. to 7:00 a.m.).

Local conditions such as traffic, topography, and winds characteristic of the region can alter background noise conditions. In general, the Ldn sound levels for outdoor quiet urban nighttime noise range from 40 to 50 A-weighted decibels (dBA) (EPA, 1974). The American National Standards Institute (ANSI, 2013)has published a standard with estimates of general ambient noise levels (Leq and Ldn) based on detailed descriptions of land use categories. The ANSI document organizes the land use based on six categories

The project area can be defined as a sparse suburban or rural area with very few (if any) near sources of sound; therefore, background sound levels are conservatively represented by those of Category 6: Very quiet suburban and rural residential. Thus, the majority of the analysis area would be expected to have background noise Ldn of about 40 dBA or less. This noise level would occasionally increase due to passing vehicular traffic from KY-388. There are also temporary increases in the existing noise level from farm equipment (e.g., tractors) used to grow and harvest crops and to raise cattle and other farm animals.

No commercial or industrial sources were identified in the analysis area.

The Richmond, KY Noise Ordinance (Chapter 98, 2019) prohibits producing a noise disturbance that crosses a dwelling boundary due to operating construction equipment or loading and unloading boxes building materials, and similar objects between 10:00 pm and 7:00 am. No relevant county or state noise ordinance was found.

In 1974 the U.S. EPA published “Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin on

building materials, and similar objects between 10:00 pm and 7:00 am. No relevant county or state noise ordinance was found.

In 1974 the U.S. EPA published “Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin on

Safety”. In this publication, the U.S. EPA evaluated the effects of environmental noise with respect to health and safety and determined an Ldn of 55 dBA (equivalent to a continuous noise level of 48.6 dBA) to be the maximum sound level that will not adversely affect public health and welfare by interfering with speech or other activities in outdoor areas.

Since no other local, county, or state thresholds were identified, an Ldn of 55 dBA has been used to determine if the Project would adversely affect public health and welfare.

The existing on-site noise conditions are anticipated to be largely those due to farming and agricultural activities. These include trucks, tractors, and typical farming equipment. Other likely noises are those due to livestock and other wild animals in the area such as birds, frogs, and insects.

The general human response to changes in noise levels that are similar in frequency content (such ascomparing increases in continuous [Leq] traffic noise levels) are summarized as follows:

• A 3-decibel (dB) change in sound level is considered to be a barely noticeable difference.

• A 5-dB change in sound level typically is noticeable.

• A 10-dB increase is considered to be a doubling in loudness.

Community sound levels are generally presented in terms of dBA. The A-weighting network measures

sound in a similar fashion to how a person perceives or hears sound, thus achieving a strong correlation

with how people perceive acceptable and unacceptable sound levels.

Construction

Construction of the facility is expected to commence in September of 2021 and be completed June of

2022. The noisiest phase of construction is anticipated to be the foundations phase due to piledriver use

and would last from December of 2021 to May of 2022 with planned pauses the week of December 27,

2021, and January 3, 2022. It should also be noted that there will be a 4-week period from March to April of 2022 when all six major construction phases will be in progress concurrently. Foundations would be the loudest activity during this time. While other construction activities may be occurring during this

period, construction work is expected to progress across the site such that equipment and activities would only be in a single area for a short period of time. Given this, the potential for adverse impacts at any one receptor is expected to occur for a short period of time.

Construction of the facility is expected to increase traffic. Deliveries will be limited to hours between 7:00 am and 10:00 pm pursuant to the requirements in the

Richmond Noise Ordinance (Chapter 98, 2019). In addition, the loading and unloading of equipment is not anticipated to occur between 10 pm and 7 am and would occur several hundred feet inside the property boundary.

NOISE DURING OPERATION

The solar array associated with this project includes single-axis tracking panels distributed evenly across the site. Tracking systems involve the panels being driven by small, 24-volt brushless DC motors to track the arc of the sun to maximize each panel's potential for solar absorption. Panels would turn no more than five (5) degrees every 15 minutes and would operate no more than one (1) minute out of every 15-minute period. These tracking motors are a potential source of mechanical noise and are included in this assessment. The sound typically produced by panel tracking motors (Nex Tracker or equivalent)

is approximately 78 dBA. For reference, that equates to a sound pressure level of 47 dBA at 10 meters distance.

This facility will consist of approximately 36 inverters, which are expected to be the loudest noise generating operational equipment. The facility is divided into A, B, and C blocks, with A blocks planned to hold two (2) inverters each and B and C planned to hold one (1) each. This is subject to change.

The site layout currently has plans for sixteen (16) A block, three (3) B blocks, and one (1) C block. Inverters are assumed to be either Ingecon Sun 1600TL or Sun Grow SG3150U-MV models.

The inverters will operate with approximately the same noise levels.

According to the manufacturer's specifications, the noise emission produced by the inverter is rated at 66.0 dBA at a distance of 10 meters. This noise produced by the inverter can be described as a hum and has roughly the same noise output of a household air conditioning unit.

The transformer to be used is a 240 MVA ONAF2 with 650 kV BIL. It is located within the planned substation, which is anticipated to cover approximately 1.4 acres on the northwest side of the facility.

The transformer is anticipated to be the loudest noise-generating operational equipment with noise emissions rated at 85 dBA sound power (National Electrical Manufacturers Association, 2019).

The nearest sensitive receptor to the transformer is a residential community approximately 1,000 feet west.

The operation of the Madison County Solar Facility is expected to have a maximum of eight (8) people on staff, normally working Monday through Friday, 7:00AM – 3:30PM, but will change shifts as needed to perform some planned maintenance at night. There will also be an On-Call schedule to respond to any corrective maintenance that is impacting production.

Maintenance activities may also be conducted at night up to 30 days a year. While dispatches are not anticipated on weekends, they remain a possibility in the event of a component outage that would require timely repair in order to limit production impact from the site. Maintenance employees will be in mid- or full-sized trucks and will contribute less to traffic noise than a typical single-family home. With the exception of the scenarios mentioned above, vehicular traffic on the project site will be limited to typical weekday work hours.

Photovoltaic facilities contain very few moving parts and have limited ongoing maintenance requirements. Maintenance activities would consist of checking electrical performance parameters via remote monitoring, performing periodic inspections and maintenance of transformers and inverters, responding to any

problems detected by remote monitoring, conducting weed abatement, mowing grass cover, performing dust control activities, cleaning PV panels, and maintaining all-weather access roads.

Water would be used for cleaning PV panels and controlling dust as well as to establish landscaping (both for the trees and shrubs, forming a visual buffer along the boundaries of the site, and the native grass cover) during the first 3 years, but no water would be used by the facility for the production of electricity.

No major equipment is anticipated to be required for maintenance of the facility except as necessary for maintenance of all-weather access roads.

Noise Impact Conclusions

The maximum worst-case scenario value estimated under the assumption all pieces of equipment are operating simultaneously and that all the inverters are located at a minimum distance of 985 feet (300 meters) from any sensitive receptor, is below the EPA's recommended value, approximately53.9 dBA Ldn. Therefore, the Project does comply with the EPA's recommendation.

The average sound level (LAEq) would be 9.2 dBA higher than the current estimated ambient noise levels

for the area, which would be perceived by humans as approximately a doubling of sound level (Bies andHansen 1988).

The loudest noise-generating operational equipment will consist of inverters, trackers, and transformers.

No operational components of the project include significant ground borne noise or vibration sources, and no significant vibrations sources currently exist, or are planned, in the area. Thus, no significant ground borne vibration impacts would occur with operation of the project. In addition, blasting would not be required as part of the project

Kentucky PSC Compliance Evaluation:*The data contained in the Site Assessment Report for Madison Solar, Volumes I and II regarding noise impacts is in compliance with the intent of KRS 278.216.*

Traffic Study (This impacts noise levels)

The anticipated routes for construction equipment, materials deliveries, and construction and operation crews to access the project site consist of the existing roads that are adjacent to the sites and the existing roads that would be used to access Richmond, Lexington, and Winchester (see Figure A-1). The major roads to be used to access the facility are anticipated to be KY-388, I-75, and KY-627. KY-388 would be the main route to access the facility from Richmond, which is south of the facility, and runs north and south on the east side of the facility, and partially through the facility. I-75 is a divided highway that will provide access from Lexington, which is northwest of the facility. I-75 runs generally north and south along the west side of the site. KY-627 will be the main route from Winchester in the northeast, eventually connecting with KY-388 to reach the facility and runs northeast and southwest.

The facility will be manned during normal business operation with eight (8) people on staff, normally working Monday through Friday, 7:00AM – 3:30PM, but will change shifts as needed to perform some planned maintenance at night. There will also be an On-Call schedule to respond to any corrective maintenance that is impacting production. It is anticipated that workers making site visits will be in mid to full-size trucks, accounting for less vehicle traffic than an average single-family home. During operation, workers are not anticipated to create a significant impact on local traffic and will generally be entering and leaving on

normal weekdays during daylight hours. During construction of this facility, traffic is anticipated to increase, with morning and evening peaks for daily workers and deliveries being made to the site periodically. All necessary safety precautions, including use signage and flagmen, will be taken to best ensure collisions are

prevented on the surrounding roads. It is not anticipated that there will be any damages to the existing road infrastructure.

Operation of the facility is not expected to cause a significant impact to local traffic as the expected traffic to be contributed to the area will be similar to that of a typical single-family home.

Kentucky PSC Compliance Evaluation:

The data contained in the Site Assessment Report for Madison Solar, Volumes I and II regarding traffic impacts is in compliance with the intent of KRS 278.216.

An evaluation of the compatibility of the facility with scenic surroundings;

REQUIREMENT: per KRS 278.708 (3)(b); An evaluation of the compatibility of the facility with scenic surroundings.

COMPLIANCE: See Appendix F in Volume II of the Applicant's Site Assessment Report for a Visual Assessment report written by Tetra Tech studying potential visual impacts to the community surrounding the proposed facility. The conclusion of the report, on page 7, reads as follows:

The proposed Project would introduce low vertical, geometric elements that are gray in color into a relatively rolling terrain landscape dominated by green vegetation and patches of trees and shrubs. Visual impacts -Visual Assessment Madison Solar Project on Page 8 would vary depending on several factors, such as the distance of the viewer from the Project and whether views toward the Project are unobstructed or screened by vegetation, terrain, or development. The views can be vastly different from one location to another, even in proximity, because

of the rolling terrain and vegetation. Viewers in proximity to the Project may have unobstructed or partially screened views and include adjacent rural residences and travelers along the local roads and highways. Existing vegetation between the solar arrays and the residences will be left in place, to the extent practicable, to help screen the Project and reduce visual impacts from the adjacent homes. It is anticipated that views of the Project from surrounding places (e.g., Richmond, Ford) would generally be screened by vegetation and structures associated with development. Roadways and rural residential development located outside of built communities would have elevated views towards the Project. Views would vary from completely screened to partially screened to unobstructed. Portions of the Project that would be visible would be seen in the context of existing development and would appear as a co-dominant feature in the landscape setting.

Kentucky PSC Compliance Evaluation:

The data contained in the Site Assessment Report for Madison Solar, Volumes I and II regarding an evaluation of the facility with scenic surroundings is in compliance with the intent of KRS 278.216.

The potential changes in property values and land use resulting from the siting, construction, and operation of the proposed facility for property owners adjacent to the facility;

REQUIREMENT: per KRS 278.708 (3)(c); The potential changes in property values and land use resulting from the siting, construction, and operation of the proposed facility for property owners adjacent to the facility.

COMPLIANCE: Please refer to the Property Value Impact Report in Appendix A (Kirkland Appraisals LLC 2020). In his transmittal letter, Mr. Kirkland provides the following conclusions:

The matched pair analysis shows no 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 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.

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. Industrial uses rarely absorb negative impacts from adjoining uses.

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 property 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 2 intrusive uses, reduced dust, odor and chemicals from former farming operations, protection from light pollution at night, it's quiet, and there is minimal traffic.

The data contained in the Site Assessment Report for Madison Solar, Volumes I and II regarding an evaluation of the facility and its impact on property values is in compliance with the intent of KRS 278.216.

Evaluation of anticipated peak and average noise levels associated with the facility's construction and operation at the property boundary.

See the section previous to this one for a discussion of peak and average noise levels. It is not anticipated that noise levels during peak construction and operation will affect any sensitive noise receptors within or adjacent to the site.

This information can be found in the very first paragraph of Noise Impact Conclusions.

(e) The impact of the facility's operation on road and rail traffic to and within the facility, including anticipated levels of fugitive dust created by the traffic and any anticipated degradation of roads and lands in the vicinity of the facility**.**

Road

During construction of this facility, traffic is anticipated to increase, with morning and evening peaks for

daily workers and deliveries being made to the site periodically. All necessary safety precautions,

including use signage and flagmen, will be taken to best ensure collisions are prevented on the surrounding roads. It is not anticipated that there will be any damages to the existing road infrastructure.

Operation of the facility is not expected to cause a significant impact to local traffic as the expected traffic to be contributed to the area will be similar to that of a typical single-family home.

The data contained in the Site Assessment Report for Madison Solar, Volumes I and II regarding noise levels is in compliance with the intent of KRS 278.216.

FUGITIVE DUST IMPACTS

The proposed facility will only have minimal fugitive dust during construction. The facility will be constructed within the existing contours and topography of the land. For those limited areas that are cleared and grubbed, water trucks are anticipated be employed to keep dust to a minimum, authorized by Sections of the Kentucky Pollutant Discharge Elimination System (KPDES) as a non-storm water discharge (KPDES, 2018).

The earth moving required for the site is anticipated to last from October of 2021 to April of 2022.

The total acres to be disturbed is assumed to be approximately 275, which is estimated as 25% of the total facility acres. It is estimated that over the course of construction there will be 3.54 tons of PM10 (particulate matter 10 microns or less in diameter) released and 0.35 tons of PM2.5 (particulate matter

2.5 microns or less in diameter) released due to fugitive dust. Calculations for fugitive dust emissions were based on the emission factors provided in the WRAP Fugitive Dust Handbook (Countess Environmental, 2004).

To reduce wind erosion of recently disturbed areas, appropriate revegetation measures, application of water, or covering of spoil piles may occur. In addition, any open-bodied truck transporting dirt will be covered when the vehicle is in motion. The size of the project site, distance to nearby structures and roadways, combined with vegetated buffers along the property boundaries and fencerows will aid in managing off-site dust impacts. Internal roads will be compacted gravel, which may result in an increase in airborne dust particles during dry conditioned and internal road traffic is heavy. During construction activities water may be applied to internal road system to reduce dust generation. Once operational, the only source of dust emissions would be due to occasional maintenance vehicle traffic on the access roads. Typical existing sources of dust in the project area include agricultural activities (e.g., from plowing, planting, and harvesting fields) and from travel along gravel and dirt roads.

The data and conclusions contained in the Site Assessment Report for Madison Solar, Volumes I and II regarding fugitive dust impacts is in compliance with the intent of KRS 278.216.

Rail

An existing railway is located on the eastern side of the Project that runs through Ford, Kentucky. However, the Project will not use railways for any construction or operational activities. Therefore, the proposed solar facility will have no impacts on rail facilities as a result of Project construction or operation.

The data and conclusions contained in the Site Assessment Report for Madison Solar, Volumes I and II regarding rail is in compliance with the intent of KRS 278.216.

(5) The board shall have the authority to hire a consultant to review the site assessment report and provide recommendations concerning the adequacy of the report and proposed mitigation measures. The board may direct the consultant to prepare a separate site assessment report. Any expenses or fees incurred by the board's hiring of a consultant shall be borne by the applicant.

The board has hired Wells Engineering and Cloverlake Consulting to review the adequacy of the Site Assessment Report.

(6) The applicant shall be given the opportunity to present evidence to the board regarding any mitigation measures. As a condition of approval for an application to obtain a construction certificate, the board may require the implementation of any mitigation measures that the board deems appropriate. Effective: April 10, 2014 History: Amended 2014 Ky. Acts ch. 88, sec. 4, effective April 10, 2014. -- Created 2002 Ky. Acts ch. 365, sec. 5, effective April 10, 2014.

The site assessment report shall also suggest any mitigating measures to be implemented by the applicant to minimize or avoid adverse effects identified in the site assessment report.

Below are the Mitigation Measures recommended by the Applicant. In addition the reviewer of the Site Assessment documents has additional recommendations that are suggested to minimize or avoid adverse effects identified in the site assessment report.

Applicant's Mitigation Measures

COMPLIANCE: Specific mitigation measures are listed below.

Existing vegetation between the solar arrays and the residences will be left in place, to the extent practicable, to help screen the Project and reduce visual impacts to the adjacent homes. It is anticipated that views of the Project from

surrounding places (e.g., Richmond, Ford) would generally be screened by vegetation and structures associated with development.

Other permit applications to the appropriate regulatory body will follow, as described below, as the Project enters the construction phase.

Stormwater Discharges Associated with Construction Activity:

Regulatory Agency: Kentucky Energy & Environment Cabinet – Department for Environmental Protection – Division of Water (DOW)

The Project will obtain a Kentucky Department of Environmental Protection Stormwater Construction General Permit from the Kentucky Division of Water (DOW) for construction projects that disturb 1 or more acres of land in compliance with the National Pollutant Discharge Elimination System (NPDES) of the Clean Water Act (CWA). The Kentucky Pollution Discharge Elimination System

(KPDES) permit (KPDES No. KYR100000) is a General Permit for Stormwater Discharges Associated with Construction Activity.

Wetlands and Waters of the United States:

Federal Regulatory Agency: United States Army Corps of Engineers – Louisville District

AEUG Madison Solar has completed a Phase I Environmental Site Assessment (Appendix D) for the Project. In the assessment, National Wetlands Inventory wetlands categorized as riverine, freshwater pond, and freshwater emergent were identified on the Subject Property by the U.S. Fish and Wildlife Service wetland identification application. Therefore, an Approved Jurisdictional Determination (AJD) will be requested through the U.S. Army Corps of Engineers (USACE), Louisville District. The AJD process will include the USACE Louisville District in determining which aquatic features are considered federally jurisdictional under the CWA. If the Project design entails impacts to aquatic features, features that are deemed federally jurisdictional, a CWA Section 404 permit will be needed from the USACE.

The type of USACE permit required will depend on the amount of impact (e.g., acres or linear feet) to jurisdictional wetlands and/or waters of the U.S. If the proposed activity has minimal impacts, it may be authorized under a Nationwide Permit. If Project impacts exceed threshold requirements of the Nationwide Permit, an Individual Permit may be necessary.

Kentucky Regulatory Agency: Kentucky Energy & Environment Cabinet – Department for Environmental Protection – DOW

Depending on Project impacts and type of Section 404 permit necessary (discussed above), a Section 401 Water Quality Certification may be needed. An applicant seeking a Section 401 Water Quality Certification must submit an Application for Permit to Construct Across or Along a Stream and/or Water

Quality Certification to the DOW. The DOW reviews projects jointly for potential impacts to water and floodplains.

Projects proposing to minimally affect waters of the state may be authorized under General Certifications of USACE Nationwide Permits. General Certifications may include impact thresholds and specific conditions for the proposed activity. If the proposed activity qualifies for coverage under the Nationwide Permit and the corresponding General Certification, an applicant does not need anything from the DOW. An applicant can request a letter from the DOW that the project meets

requirements of a Nationwide Permit. An Individual Water Quality Certification is required if the activity does not qualify for General Certification.

Below are the additional mitigating measures recommended by the Consultant (Cloverlake Consultants)

Historic Resources

No specific requirements regarding historic resources are called for in KRS 278.708, however, it should be noted that this area is rich with potential archeologic sites and historic buildings that could be affected by the construction of this solar farm. Fort Boonesborough , Whitehall and other historic sites are located within the local vicinity. Mitigation of the impacts of this proposed site should include Coordination with, at a minimum, the Madison County Historical Society (MCHS) and the Kentucky Historic Preservation Office (SHPO). A search of archeologic and historic resources should be done in the files of the SHPO and the MCHS. Although the construction of the solar farm could be disruptive to archeologic sites, no field surveys are recommended.

Traffic Safety

Most of the roads adjacent and through the site are narrow and in some cases curvy. The Applicant should submit a detailed plan on how traffic safety will be maintained during the construction of the facility ten days before commencing construction.

Fugitive Dust and PM10

The applicant will submit in writing the specific plan to control fugitive dust and PM 10 during the construction process ten days prior to commencing construction.

Protection of Streams in the Project Area

Ten days prior to the commencement of construction, the Applicant will provide a detailed plan on how they will protect the streams in the project area. The site assessment documents in several locations says that certain mitigation measures regarding erosion and protection of water resources “may” be caried out. This needs to be clearly specified.

The primary focus should be on preventing turbidity being added to local streams as a result of erosion during construction.

Summary of the Adequacy of the Applicants Site Assessment Report

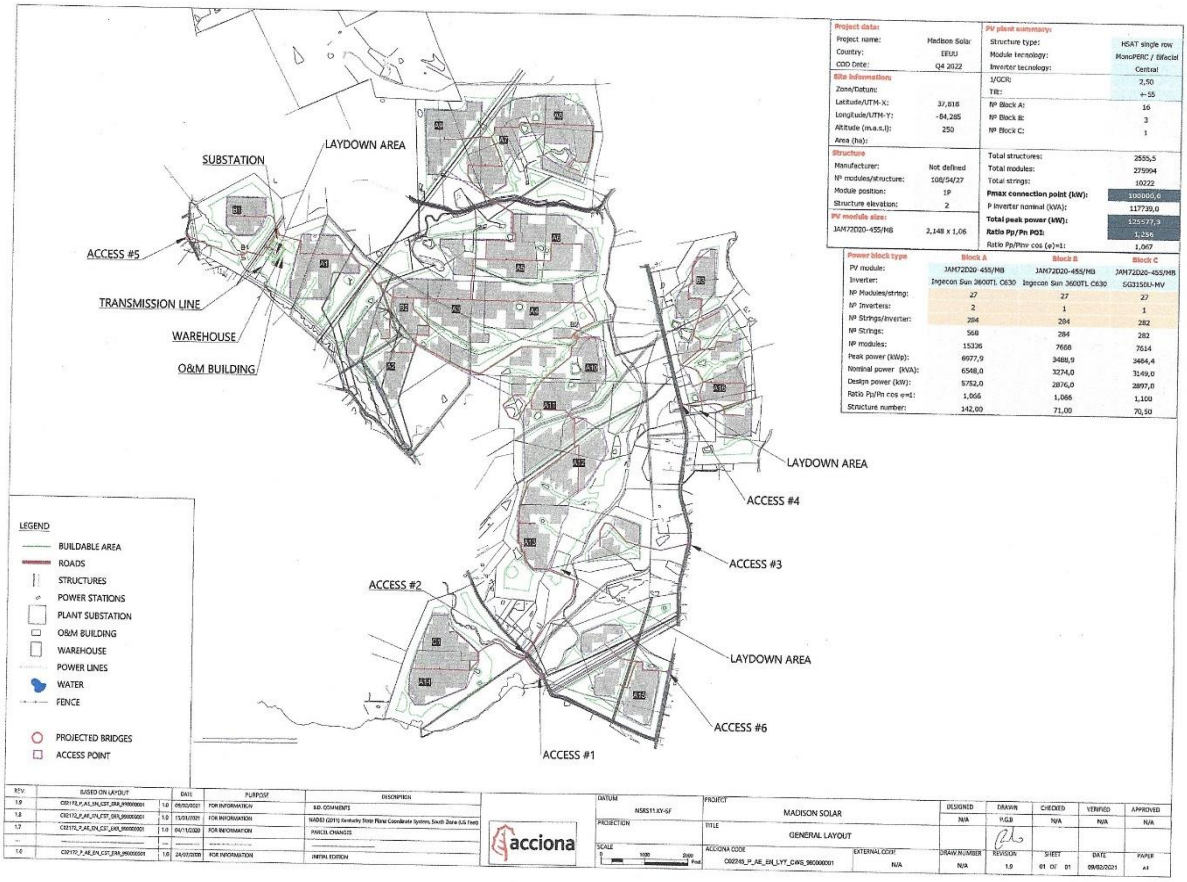
Based on a review of The Madison Solar Site Assessment Report Volumes I and II, by W. Thomas Chaney of Cloverlake Consulting, all of the sections of the report are in compliance with the intent of KRS 278.708.

There are a few areas where additional conditions are needed. These proposed conditions are specified in Additional Mitigating Measures proposed by the consultant on page 25 of this report.

By title these measures are

- Historic Resources
- Traffic Safety
- Fugitive Dust
- Protection of Streams in the Project Area

APPENDIX A-Site Map



Project data:	
Project name:	Madison Solar
Country:	EEUU
COD Date:	Q4 2022
Site information:	
Zone/Datum:	
Latitude/UTM-X:	37,818
Longitude/UTM-Y:	-84,285
Altitude (m.a.s.l):	250
Area (ha):	
Structure	
Manufacturer:	Not defined
Nº modules/structure:	108/54/27
Module position:	1P
Structure elevation:	2
PV module size:	
JAM72D20-455/MB	2,148 x 1,06

PV plant summary:	
Structure type:	HSAT single row
Module tecnology:	MonoPERC / Bifacial
Inverter tecnology:	Central
I/CCR:	2,50
Tilt:	+-55
Nº Block A:	16
Nº Block B:	3
Nº Block C:	1
Total structures:	2555,5
Total modules:	275904
Total strings:	10222
Pmax connection point (kW):	100000,6
P inverter nominal (kVA):	117739,0
Total peak power (kW):	125577,3
Ratio Pp/Pn POI:	1,256
Ratio Pp/Pinv cos (e)=1:	1,067

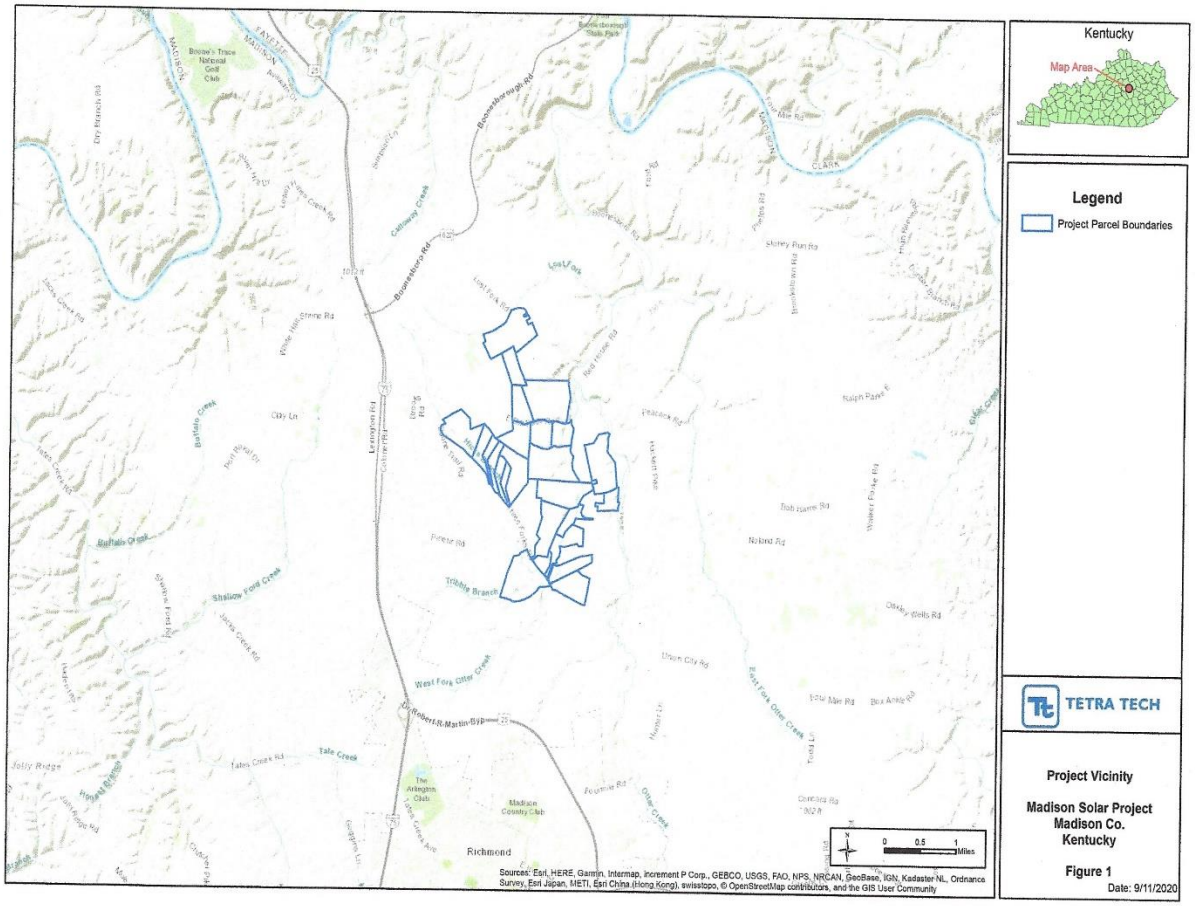
Power block type	Block A	Block B	Block C
PV module:	JAM72D20-455/MB	JAM72D20-455/MB	JAM72D20-455/MB
Inverter:	Ingecon Sun 3600TL C630	Ingecon Sun 3600TL C630	SG3150U-MV
Nº Modules/strtng:	27	27	27
Nº Inverters:	2	1	1
Nº Strings/inverter:	284	284	282
Nº Strings:	568	284	282
Nº modules:	15336	7668	7614
Peak power (kWp):	6977,9	3488,9	3464,4
Nominal power (kVA):	6548,0	3274,0	3149,0
Design power (kW):	5752,0	2876,0	2897,0
Ratio Pp/Pn cos e=1:	1,066	1,066	1,100
Structure number:	142,00	71,00	70,50

REV.	ISSUED ON LAYOUT		DATE	PURPOSE	DESCRIPTION
1.9	C02172_P_AE_SN_CST_DRB_990000001	1.0	09/02/2021	FOR INFORMATION	RD COMMENTS
1.8	C02172_P_AE_SN_CST_DRB_990000001	1.0	15/01/2021	FOR INFORMATION	NAD83 (2011) Kentucky State Plane Coordinate System, South Zone (US Feet)
1.7	C02172_P_AE_EN_CST_DRB_990000001	1.0	04/11/2020	FOR INFORMATION	PARCEL CHANGES
...	...	...	...	...	...
1.0	C02172_P_AE_SN_CST_DRB_990000001	1.0	24/07/2020	FOR INFORMATION	INITIAL EDITION

acciona

DATUM	NSRS11.EY-SF	PROJECT	MADISON SOLAR	DESIGNED	DRAWN	CHECKED	VERIFIED	APPROVED
PROJECTION		TITLE	GENERAL LAYOUT	N/A	P.G.B	N/A	N/A	N/A
SCALE	0 1000 2000 Feet	ACCIONA CODE	C02240_P_AE_EN_LYT_DWG_990000001	EXTERNAL CODE	DRAW NUMBER	REVISION	SHEET	DATE	PAPER
				N/A	N/A	1.0	01 OF 01	09/02/2021	A1

APPENDIX B-Vicinity Map


Kentucky
Map Area
Legend
Project Parcel Boundaries
TETRA TECH
Project Vicinity
Madison Solar Project
Madison Co.
Kentucky
Figure 1
Date: 9/11/2020
Richmond
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, © OpenStreetMap contributors, and the GIS User Community

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Gallery of Photographs Taken the Site visit on March 16, 2021


RESPECT AND
SUPPORT
LEXINGTON
POLICE


RESTRICTED AREA
SYSTEM MONITORED 24/7
809 Three Forks Rd.
Richmond, KY
WARNING
S61
THREE FORKS
SUBSTATION


THREE FORKS
SUBSTATION
S61
WARNING


A NEW LEAF
OPEN A BIBLE


U.S.MAIL
180

Resume W. Thomas Chaney

W. THOMAS CHANEY, PRESIDENT AND
CEO CLOVERLAKE CONSULTING
11997 CLOVERBROOK DRIVE
UNION, KY 41091
EMAIL ADDRESS:
TOM.CHANEY@ZOOMTOWN.COM

Tom retired in 2019 as a Partner with ERM, based in the Cincinnati Office. In this capacity he directed the work of expert natural resource management teams of engineers and scientists. He has a distinguished background in utility management, organizational development, consultant service to utility companies for environmental and planning work as well as a body of work in land use planning.

He has performed career management service for large utilities including Cinergy, Cincinnati Gas & Electric, Duke, and has consulting experience with Power Engineers, BHE Environmental, GAI Consultants, Booz-Allen Hamilton, Woolpert Consultants, Dames and Moore and the Northern Kentucky Area Development District.

Mr. Chaney's current practice involves Land Use Planning, Zoning, Siting and Environmental Planning for for large utility, industrial and commercial facilities.. He has developed testimony and testified in front of state siting agencies PSCs and Corporation Commissions in Ohio, Kentucky, Virginia, West Virginia, and Texas.

He is a certified mediator and holds a license as a Program Leader for Kepner-Tregoe rational process.

Fields of Competence

- Strategic training and mentoring of employees
- Management and direction of multidiscipline natural resource management consulting teams
- Leadership Development Training and Facilitation
- Advanced Project Management Training
- LandUse Planning and Zoning

Certificates and Training

- Certified Fsamily Court Mediator, 2004
- Certified Kepner-Tregoe Rational Process Program Leader, 2003

Key Areas of Experise

- Gas Utilities
- Electric Utilities
- Renewables, Wind and Solar
- Planning and Zoning
- Environmental Planning
- Transportation Planning
- Aviation Environmental Planning

Pertinent Experience

- Planning Manager for the NKADD
- Development of many land use and zoning plans while at Woolpert Consultants in Dayton, Ohio
- LandUse Plans for the Greater Pittsburgh International Airport
- Landuse(ANCLUC) Plan for the Chicago Airports(Both Midway and O'Hare)
- EIS for the Delta Terminal at O'Hare International Airport
- EIS For the International Terminal at Miami-Dade County International Airport
- Multi County Land Use Plan for the Midwest Ohio Joint Planning Commission plus numerous county zoning regulations and subdivision regulations for member counties.
- Land Use Plan and Zoning Regulations for Lockland, Ohio
- Numerous siting and environmental planning projects for natural gas and electric transmission lines, generating facilities and reneable facilities.

Previous Positions Held

- LandUse Planner-Dames and Moore
- Senior Land Use Planner-Woolpert consultants
- Planning Division Manager-NKADD
- Licensing Associate-CG&E

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- Licensing Division Director-CG&E, Cinergy, Duke
- Cincinnati Managing Officer-GAI Consultants
- Natural Resources Vice President-BHE Environmental
- Eastern US, Director of Biology Services-Power Engineers
- Partner-Environmental Resources Management(ERM)
- Project Manager Advisor Boone County Planning Commission
- President and CEO Cloverbrook Consulting

Key Projects

NIPSCO Permitting In Indiana

Mr. Chaney, likewise was involved in several Transmission Line permitting projects in Indiana for NIPSCO.

GAI Consultants, Constance-Zimmer Natural Gas Transmission Line, Ohio

Project Manager responsible for the siting, routing and certification of this transmission line. The project required numerous environmental permits and a Certificate of Environmental Compatibility and Public need from the Ohio Power Siting Board (OPSB).

Dominion East Ohio Gas, Akron-Canton Gas Transmission Line, Ohio

Project manager responsible for siting, certification (OPSB) and permitting.

Management Consulting, Large Aviation and Environmental Projects

As a management consultant for a private management consulting firm, Mr. Chaney was responsible for numerous large aviation and environmental projects, including the Chicago, O'Hare International Airport Delta Concourse project, the Miami International Airport Runway Environmental Impact Statement (EIS) project, and the Greater Pittsburgh International Airport Midfield Terminal Studies project that required noise and land use compatibility studies.

Regional Planning Manager

As a planning manager for the Northern Kentucky Area Development District, Mr. Chaney covered all aspects of regional planning for eight counties in northern Kentucky. He supervised professional and clerical staff dealing with issues on the environment, housing, land use and recreation in compliance with the Older Americans Act (Title III) and the Social Security Act (Titles XIX and XX).

Senior Environmental Planning Consultant

Mr. Chaney's experience as a Senior Environmental Planner with a private consulting firm required management of numerous land use planning and environmental assessment projects. His duties included marketing, proposal preparation, budget preparation, staffing, and project management that included accountability to the client.

Duke Energy, Edwardsport IGCC Start-Up Natural Gas Line, Indiana

Project Manager for the routing and permitting of a gas transmission line used to start-up the Edwardsport

W. THOMAS CHANEY
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Indiana IGCC. This project is a clean coal endeavor that utilizes Illinois Basin high sulfur coal.

Dominion East Ohio Gas Company, Solid Waste Natural Gas Siting Study and Application, Ohio

Project Manager for the OPSB application for this complex project, which was rerouted due to the construction of a large municipal landfill.

GAI Consultants, Rockies Express Line, Ohio

Project Manager for cultural resources projects associated with this gas transmission line.

CG&E, Gas Storage Site, Kentucky

Project Manager responsible for the environmental permitting of this large gas storage site, formerly a depleted gas and oil production field.

CG&E/Cinergy, Natural Gas Licensing Projects, Multiple States

Reviewed and led the licensing and environmental permitting for all natural gas transmission line projects.

CG&E/Cinergy, Numerous Power Plant, Transmission Line and Gas Line Siting and Permitting Projects

In his capacity as Licensing Division Director, Mr. Chaney was involved in more than 100 Transmission Line, Gas Line and Power Plant projects during his tenure with CG&E/Cinergy/Duke.

Education

* MBA, Point Park University, 2011
- M.A., Environmental Planning, Eastern Kentucky University, 1973-Planning and Environmental Planning
- B.A., Wetlands, Physical Geography and Geology, Eastern Kentucky University, 1972

- Leadership Training Certificate from the Harvard Business School 2008
- MBA, Point Park University, 2011

APPENDIX C

MARY MCCLINTON CLAY, MAI
218 Main Street
Paris, Kentucky 40361
859-987-5698

March 23, 2021

Mr. Jim Cook
Chief Operating Officer
Wells Engineering
6900 Houston Road
Suite 38
Florence, KY 41042

Re: Review of Madison 2 Solar Property Value Impact Report
Prepared by Richard C. Kirkland, Jr., MAI, Kirkland Appraisals, LLC

Dear Mr. Cook:

As requested, I have reviewed the above captioned report which was prepared for the Kentucky State Board on Electric Generation and Transmission Siting for Merchant Facilities on December 7, 2020. This report is part of the application process for the proposed 100 megawatt (MW) utility scale solar facility on 2,021.00 acres in north central Madison County, Kentucky. The solar developer is AEUG Madison Solar, LLC of Chicago, Illinois.

The purpose of the Siting Board "is to review applications and, as appropriate, grant certificates for the construction of electric generating facilities and transmission line that are not regulated by the Public Service Commission." Among the information included within the siting application is "a site assessment report containing a detailed description of the project and thorough analysis of the impacts to be considered by the Siting Board (visual impacts, traffic, **property values**, etc.)."

In this review I have considered the report methodology, claims and omissions. It is my professional opinion that this report is fundamentally flawed, noncredible and is not consistent with the Uniform Standards of Professional Appraisal Practice (USPAP). The report should not be used for any decision-making purposes relating to the proposed Madison County solar electric generating facility. The following report is the basis of my conclusions.

INADEQUACIES OF THE REPORT

METHODOLOGY

The fundamental flaw throughout this report is that it is a simplistic approach to a complex problem. Damage studies include several types of analysis to determine if a land use, is in fact a detrimental condition. There is no discussion of damage study theory and methodology, as documented in three editions of *Real Estate Damages*, by Randall Bell, PhD, MAI and published by the Appraisal Institute. The appraiser's methodology of only analyzing two or more paired sales for each of the 44 solar farms in his survey is inadequate to form an opinion as to whether there is diminution of value or not.

Although the trend to industrial scale solar farms is relatively recent and data is limited, it is even more relevant to analyze all the available data as thoroughly as possible.

The following is the correct methodology for a damage study.

1. The first step is to determine the area affected by the detrimental condition. Once the area of influence is determined, this may be expanded as the research progresses.

2. The second step is to determine a control area that is not near a solar farm. This location is not only free of any influence from the disamenity, but it represents a competing area to the subject area with respect to land and improvement values, demographics and other economic and environmental factors that make the two groups interchangeable with the exception of the disamenity.

3. The third step is to collect the sales data. This includes useful data on either side of the date of knowledge or appearance of the detrimental condition.

4. Once the data has been gathered the sales need to be analyzed with respect to value change (appreciation or depreciation) for the years prior to the event and then after the event. This will determine how the overall community or neighborhood responded to value change, as well as the control area and the subject area. Any difference between these market movements could be attributable to the disamenity. Increased time on the market and decreased sales volume are also indicators of diminution of market value. In addition, proximity to solar farms may affect the absorption rates of vacant lots.

5. After the sales are gathered, they need to be confirmed with a principle to the transaction. It is paramount to gain an understanding of the motivation behind a sale and to determine if it is indeed an arms-length transaction. Any of the latter sales or bank involved sales must be eliminated from the sample.

6. The cleanest way of analyzing paired sales is on a one to one basis since it avoids comingling sales that could lead to distortion. Sale-resales of the same property both before and after the event are alternative indicators.

7. If a large amount of sales data is available a multiple regression analysis is an alternative or an addition to the above methodology.

OMMISSION OF CONSDIERATION OF THE VIEW SHED

The second fundamental flaw of the reports is that the primary issue of diminution in value, as the result of proximity to solar farms is the alteration of the viewshed. This concept was not addressed.

The Kirkland report discussed the typical detrimental conditions that result in damages including hazardous materials, odor, noise, traffic, stigma, and appearance. Because these nuisances do not exist with respect to solar farms, the appraiser concluded that the proposed solar farm would be in "harmony with the area in which it is to be developed."

Real Estate appraisers recognize that view affects property value. According to *The Appraisal of Real Estate*, "The physical characteristics of a parcel of land that an appraiser **must consider** are size and slope, frontage, topography, location and **view**."[1]

"View diminution, therefore, is any impact on the ability to see or be seen that is perceived by the market as negative. As usual, what the market considers to be a negative impact depends on the actual property in question."[2]

With respect to market expectations, the northern area of Madison County, in addition to the other counties that constitute the Lexington Metropolitan Statistical Area (MSA) including Bourbon, Fayette, Woodford, Jessamine and Scott constitute a significant portion of what is uniquely and geographically known as the Inner Bluegrass. This highly fertile area has been recognized since the antebellum period as a center for breeding quality livestock, especially thoroughbred racehorses. Not only does the area have a reputation going back over two hundred years, but the breath of its reputation extends world-wide. In fact, in 2006, the World Monument Fund included the Bluegrass region on its global list of 100 most endangered sites.

Few agricultural regions of the country have a real estate market demand that spans the globe. This is not only true because of the fertility of the soil, but the beauty of the landscape. Despite its threat due to development, the surrounding natural landscape is enhanced by the manicured condition of thoroughbred farms that populate the entire area. This unique, protected and scenic landscape is a large component of the property characteristics that constitute demand for the land. As a result of the scenic viewsheds, roadways throughout the region are designated by the state as scenic byways.

As further indication of the emphasis the region places on the preservation of agricultural lands, farm owners have placed approximately 70,000 acres under conservation easements in the area and Bourbon County, to the north, has six rural historic districts—more than any other county in Kentucky.

"Clearly, view amenities are valuable, and different types of good views can have significantly different quantitative effects on property values."[3]

"A view is normally considered a scene or outlook from a property. Views of bodies of water, city lights, natural settings, parks, golf courses and other amenities are considered desirable features, particularly for residential properties. Such desirable views are typically an enhancement to value. In some cases, however, a view can be considered a negative attribute. A vista of incompatible land, dilapidated buildings, junk vehicles and other undesirable features can be detrimental to value. Allegations of value diminution most often arise from situations in which the view is altered or changed. Examples might include the blockage or obstruction of a desirable view or the creation of an undesirable view. The rezoning of a neighboring property to allow for an undesirable land use could legitimately result in a negative impact on value when such rezoning was not known or anticipated on the date of value."[4]

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[1] Appraisal Institute, *The Appraisal of Real Estate*, 11th Ed. (Chica,go, Illinois: Appraisal Institute, 1996): 323.
[2] Anderson, Ibid.: 28.
[3] James R. Rinehart, PhD. and Jeffery J. Pompe, PhD., "Estimating the Effect of a View on Undeveloped Property Values," *Appraisal Journal*, January, 1999: 61.
[4] Bell, Ibid.: 146.

Ultimately, issues relating to view diminution are dependent on relevant market data. The value of an obstructed view can be measured by the difference between properties with and without similar views.[5]

Although only limited peer reviewed published studies of solar farms currently exist, studies of the impact of high voltage transmission lines have the most reliance to the impact of solar farms on surrounding property.

Of the "three critical drivers of HVTL effect on residential property values that are generally assumed—proximity, visibility and encumbrance," the first two apply to solar farms.[6]

"The two concerns of aesthetics and property values are intrinsically linked. It is well established that a home's value will be increased if high-quality scenic vista is enjoyed from the property (e.g. Seiler, et al, 2001). Alternatively, it is reasonable to assume that if a home's scenic vista overlaps with a view of a disamenity, the home might be devalued, as has been found for high-voltage transmission lines (HVTL) (Kroll and Priestly, 1992; DesRosier, 2002)...Additionally, there is evidence that proximity to a disamenity , even if that disamenity is not visible and is not so close to as have obvious nuisance effects, may still decrease a home's sales price, as has been found in the case for a land fill (Thayer et al., 1992).[7]

The 2002 published study by Des-Rosier measured how views of a disamenity affected sales prices. This study found that homes adjacent to a power line and facing a HVTL tower sold for as much as 20.0 percent less than similar homes that are facing a HVTL tower."[8]

Solar farms could be substituted for wind turbines in the following observation from the Hoen study:

> It is unclear how well the hedonic literature on other disamenities applies to wind turbines, but there are likely some similarities. For instance, in general, the existing literature seems to suggest that concerns about lasting health effects provides the largest diminution in sales prices, followed by concerns for one's enjoyment of the property, such as auditory and **visual nuisances** (emphasis added), and that all the effects tend to fade with distance to the disamenity – as the perturbation becomes less annoying.[9]

With respect to the potential diminution in value to properties in proximity to solar farms, there are no current empirical peer reviewed studies in the valuation literature. This is because the proliferation of solar farms is relatively new. However, data from other disamenity studies can offer some indication that the market would likely discount proximity to such structures upon the landscape, particularly one recognized as world class, as is the Bluegrass region of Kentucky.

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[5] Ibid.

[6] James A. Chalmers, "High-Voltage Transmission Lines and Residential Property Values in New England: What Has Been Leaned," Appraisal Journal, Fall, 2019: 266.

[7] Ben Hoen, et al, "The Impact of Wind Power Projects on Residental Property Values in the United States: A Multi-site Hedonic Analysis," Ernest Orlando Lawrence Berkley National Laboratory Publication No. LBNL-289E, December 2009: 52.

[8] Ibid.: 55.

[9] Ibid.: 55.

Unlike most adverse influences upon adjacent properties that have a direct impact upon their utility to function, solar farms' predominant impact is to the viewshed.

The impact of views upon property values has been studied extensively for the past 25 years. These studies have indicated a range of marginal price effect for homes abutting amenities such as lakefront vacant lots: 91.00 to 223.00 percent; ocean front lots: 47.00 to 147.20 percent; lake front 7.50 to 126.70 percent; golf course vacant lots: 7.00 to 85.00 percent; rivers/streams: 3.00 to 54.4 percent; forest/farms: 1.50 to 35.00 percent; golf course: 7.00 to 28.00 percent; trails and greenways: 3.40 to 20.20 percent; urban parks: 1.00 to 20.00 percent.[10]

With respect to the intrusion of solar farms into the landscape, what happens when desirable views are blocked? "In real estate, a view can generally be defined as the ability to see or be seen. View diminution, therefore, is any impact on the ability to see or be seen that is perceived by the market as negative."[11]

"Since views from a residential property often carry a large premium, changes to a desirable view may be perceived by the market as having a negative impact on value. When a desirable view is blocked, the question of damages is often a question of abutter's rights—a property owner's rights to air, light, view, visibility and access."[12]

MAJORITY OF THE CASE STUDIES ARE NOT RELEVANT TO THE MADISON COUNTY PROPOSED INDUSTRIAL SCALE SOLAR FACILITY

The following chart summarizes the 44 case studies that the appraiser included. Of these case studies, only five had more than 30 MWs. These include Nos. 10 (Wildwood, 80 MW); No. 13 (Manatee, 74.50 MW); No. 14 (McBride Place, 74.90 MW); No. 33 (Innovative 46, 78.50 MW); and 34 (Innovative Solar 42, 71.00 MW). With regard comparability, these are the only case studies that are truly comparable to the proposed 100 MW Madison County project.

OMMISSION OF MCBRIDE PLACE SALE-RESALES

With respect to the McBride Place solar farm in Midland, North Carolina, the appraiser concluded after two matched pair analysis of residential tracts (4380 Joyner Road and 5811 Kristi) adjoining the 74.9 MW generating plant that there was no diminution in value.

In the process of reviewing this case study, this office observed several sale-resales of adjoining properties to the McBride Place solar farm which the appraiser did not include in his analysis. Sale-resales are a superior indicator of value change than matched pairs because the comparison is made to the same property with generally the only difference being time of sale. The sales are depicted on the following chart.

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[10] Jay Mittal, "Valuation Capitalization Effects of Golf Courses, Waterfronts, Parks, Open Spaces, and Green Landscapes—A Cross Disciplinary Review," Auburn University, *JOSRE*, Vol. 8. No. 1, 2016: 62.
[11] Orell Anderson, MAI, "The Value of a View," *Right of Way*, March/April 2017: 28.
[12] Ibid.: 28.

KIRKLAND APPRAISALS CASE STUDIES

NO.	STATE	COUNTY	TOWN	ADDRESS	SOLAR FARM	ACRES	MW	DATE ANN'CE	DATE CONS'T
1	KY		Crittenden	Adjacent to I-75	Crittenden Solar	34.10	2.70		2017
1	NC		Goldsboro	Spring Garden S/D	AM Best				
2	NC	Orange	Chaple Hill	2159 White Cross Rd	White Cross		2.80		2013
3	NC		Roxboro		Wagstaff	30.00			
4	TN		Selmer		Mulberry	208.89			2014
5	MD		W. Friendship		Nixon's		2.00		
6	MD		Hughesville		Leonard Road				
7	MD	Talbot	Easton		TC Comm Cntr				
8	TX	Converse	San Antonio	8203 Binz-Engleman	Alamo II	98.37	4.40		
9	NC		Gastonia	Neal Hawkins Rd	Neal Hawkins				
10	NC	Currituck	Moyock	1374 Caritoke Hwy	Wildwood	2,034.00	80.00	2015	
11	NC	Orange	Chaple Hill	2159 White Cross Rd	White Cross II		2.80		2013
12	NC		Bailey		Tracy Solar		5.00		2015
13	FL		Parrish		Manatee	1,180.36	74.50		
14	NC	Cabarrus	Midland	Mount Plaeasant Rd	McBride Place	627.00	74.90	2017	
15	OR		Yamity		Yamhill II	186.60	1.20		2011
16	OR		Aurora		Marion Solar	2.00	0.30		2014
17	OR		Aurora		Clackaman II	1.00	0.22		2014
18	IL		Streator		Grand Ridge	160.00	20.00		
19	IN		Portage		Portage	56.00	2.00		2012
20	IN		Indianapolis		Dominion IndyII	134.00	8.60		2013
21	NC	Cleveland		Batchelor Rd/Timber	Beetle-Shelby	24.00	4.00		
22	NC	Gaston	Bessemer City	Tryon Court House Rd	Court House	161.92	5.00	2016	
23	NC	Gaston			Mariposa		5.00		
24	VA	Clark			Clark County	234.00	20.00		2017
25	NJ		Flemington	Kuhl Road	Flemington				
26	NJ		Frenchtown	Muddy Run Road	Frenchtown				
27	NJ		E. Windsor	Oak Creek Road	McGraw				
28	NJ		Tinton Falls		Tinton Falls				
29	GA		Social Circle	Hawkins Academy Rd	Simon				
30	NC		Princeton	3839 US 70	Candace				2016
31	KY		Crittenden		Crittenden Solar	181.70	2.70		2017
32	VA		Barhamsville	Barham Road	Walker Correct.	484.65	20.00		2017
33	NC		Hope Mills	Roslin Farm Road	Innovative 46	532.00	78.50		2016
34	NC		Fayetteville		Innovative 42	413.99	71.00		2017
35	MI		Lapeer	Demille Road	Demille	311.40	28.40		
36	MI		Lapeer			230.00	19.60		2017
37	NC		Willow Spring	Keenebeck Road	Sunfish Farm	49.60	6.40		2015
38	NC		Benson		HCE Johnson I		2.60		2015
39	AZ	Pima	Tuscon		Picture Rocks	302.80	20.00		2012
40	AZ	Pima	Tuscon		Avra Valley	319.86	25.00		2013
41	VA	Sussex			Sappony		30.00		2017
42	NC		Camden			49.83			2019
43	NC		Grandy		Grandy	121.00	20.00		
44	SC	Lexington			Champion	366.04	10.00		2017

SALE/RESALES ADJOINING MCBRIDE PLACE SOLAR FARM - MIDLAND, NC

SALE/ RESALE	PARCEL NO.	ADDRESS	SALE DATE	DEED BOOK/PG	GRANTEE	SALE PRICE	SALE TAX ASSESSM'T	ACRES	COMMENTS
1	5556-26-2054	4504 Chanel Court	1/17 1/20	12328-116 13932-047	NA Phillip G. Pees	$399,000 $393,500	$396,720 $474,750	1.730	2005 2,558 SF 1 Sty BV, 4-3.5, Full Bsmt, 2-CAG, FAG, CA, FP Adjust 1/17 Sale to 1/20, or $399,000/3.0 Yr/5.35% = $466,527, or **-15.65%**
2	5556-27-5419	4599 Chanel Court	9/15 8/20	11575-087 14404-283	NA Peter Weinziel	$462,000 $500,000	$473,490 $531,440	1.000	2007 2,411 SF 2 Sty BV, 5/4.5 Full Bsmt, 2-CAG, HP, CA, FP Adjust 9/15 Sale to 8/20, or $462,000/5.0 Yr/5.08% = $591,775, or **-15.51%**
3	5556-15-6844	8704 Haydens Way	7/12 4/19	10081/209 13463/180	NA Ben. Merriman	$322,000 $375,000	$306,680 $372,460	1.960	2001 1,353 SF 2 Sty BV, 4/3 Full Bsmt, 2-CAG, HP, CA, FP Adjust 7/12 Sale to 4/19, or $322,000/6.8 Yr/5.0% = $448,771, or **-16.44%**
4	5556-46-7264	5811 Kristi Lane	4/20	14095/125	Fred E. Trull, Jr.	$530,000	$637,100	3.740	2019 2,462 SF 2 Sty BV, 6/4 Part. Bsmt, 2-CAG, FAE, CA Sale Price compared to Assessment = **-16.81%**

The evidence indicates that three sale-resales occurred in Vanderburg Estate (Sale/Resales No. 1 through 3) and a recent sale in Pressley Grove sold for significantly less than the assessment. Sale-resale No. 1 and No. 2 adjoin the solar farm to the west and indicate a loss of value of **-15.65 percent and -15.51 percent**, respectively. Sale-resale No. 3 is one lot removed from the solar farm to the west and it indicates **-16.44 percent**.

It is notable that No. 4, 5811 Kristi Lane, although is not a resale, its recent sale price of $530,000 when compared with its tax assessment of $637,100 indicates a difference of **-16.81 percent.**

OMMISSION OF A LITERATURE REVIEW AND AVAILABLE DAMAGE STUDIES BY OTHER APPRAISERS

Typically, at the beginning of the discussion of any empirical damage study is a discussion of available peer review journal articles or publicly available reports by other appraisers. This provides context of the instant report and the opportunity for the appraiser to critique the studies or defend his findings, if they are contrary to those of others. The Kirkland report includes no such studies.

This omission is a fundamental flaw of the report because, though limited, all the studies, outside those offered by the solar developers, provide contradictory conclusions. The following chart summarizes their findings. A detailed description of the studies is included in the Addendum.

The first two studies appeared in peer reviewed journals and though the first study was a survey and the second study was a multiple regression analysis of properties out to a distance of 3.0 miles from a solar facilities, nonetheless, acknowledged a negative impact as a result of proximity to solar farms. The University of Texas Study concluded that the impact would increase with the increased size and close distance to the solar farm. The University of Rhode Island study concluded that properties declined **-1.70** percent within a 3.0 mile radius and the average decline was **-7.00** percent within 0.1 mile.

Fred H. Beck and Associates, LLC documented the antidotal evidence of the cancelation of a sales contract after the purchaser learned of the abutting solar plant, as well as the failure to sell lots after the announcement of a solar farm. As a result, the assessor reduced the affected property assessments **-30.00%.** An incompatible intensive commercial use adversely impacted adjoining nearby properties **-10.70 to -25.10** percent, or an average of **-15.20 percent.** Beck also discussed the lack of diminution in value at the AM Best solar farm do to pre-existing industrial zoning for the solar farm.

Mark W. Heckman testified in a Pennsylvania solar case that the loss of view resulted in a **-15.00 to -20.00** percent loss in value.

At a Madison County Indiana hearing a property owner testified by affidavit that she offered **-16.43** percent less than the appraised value after learning of the proposed solar plant.

To generalize, these studies indicate a conservative **-15.00 percent** diminution in value as a result of proximity to solar facilities.

SUMMARY OF INDICATED VALUE DECLINE

DATE	STUDY	RESULT
2018	University	Assessor survey respones ranged from value impact of zero
	of Texas	to estimation of negative impact associated with close
		distance between the homes and the facility, and
		impact increased with increased size of the solar plant.
2020	University	Average decline within 3.0 mile radius was **-1.7%**, or $5,671.
	of Rhode Island	Average decline within 0.1 mile was **-7.0%**, or $23,682.
		The "results suggest extremely large disamenities for
		properties in very close proximity."
2013	Fred H, Beck &	Stras Solar Case Study: Potential Purchasers cancel contract
	Associates, LLC	upon learning of the solar facility.
		Clay County Case Study: Lot sales stopped after announce-
		ment of solar plant. Clay County Board of Equalization
		reduced affected property assessments **-30.0%**.
		Non-residential Use View Impariment Study: Adjacent
		incompatible use adversly impacted nearby properties **-10.7%**
		to **-25.1%,** or an average of **-15.2%.**
		AM Best Solar Farm Study: No diminution in value due to
		pre-existing industrial zoning for solar farm.
2020	Mark W.	Adams County Veiw Case Study: The loss of view results in a
	Heckman, R.E.	a **-15%** to **-20.0%** loss in value.
	Appraisers	
2019	Madison County	Potential purchaser offered **-16.43 %** less than
	Indiana	appriased value upon learing of the proposed solar plant.

Considering how few industrial scale facilities exist with sufficient time to experience sales, it is significant that the appraiser did not include the available sales data from the North Star Solar Farm in North Branch, Minnesota. This 1,100.00 acre, 138 MW facility was the largest of its kind in the Midwest at the time of its construction in 2016. This office recently analyzed this data and the results are included on the following chart, as well as a discussion in the Addendum with the other appraiser studies.

The sales include 7 tracts that were surrounded by the solar farm that were purchased voluntarily by the developer at a premium and subsequently exposed to the market on the local multiple listing service and sold at market value. An analysis comparing the sale to the original owner and to the current owner indicate that the North Star solar farm has negatively impacted property values ranging from **-6.30 percent for -28.00 percent,** with a median decline of **-16.90 percent** and an average decline of **-16.80 percent**.

OMMISSION OF NEIGHBORHOOD AGREEMENTS

Richard Kirkland is not the only appraiser who has concluded that solar farms have no impact on value. The Solar Energy Industries Association (SEIA) published the following claim that "large-scale solar arrays often have no measurable impact on the value of adjacent properties, and in some cases many even have positive effects."[13] This publication also included the following quotes from appraisers used by the solar developers.

- A study conducted across Illinois determined that the value of properties within one mile increased by an average of 2 percent.[14]
- An examination of 5 counties in Indiana indicated that upon completion of a solar farm, properties within 2 miles were an average of 2 percent more valuable compared to their value prior to installation.[15]
- An appraisal study spanning from North Carolina to Tennessee shows that properties adjoining solar farms match the value of similar properties that do not adjoin solar farms within 1 percent.[16]

These conclusions, however, are belied by the actions of their solar developer clients who have not only acquired, in fee, adjoining residential properties to their solar farms and resold them (North Star Solar Farm, North Branch, MN), but have paid nearby adjoining property owners a "good neighbor" fee to refrain from objecting to their proposals.

The first "Neighbor Agreement" from Wisconsin, offering $17,000, is such an offer. This agreement applies to adjacent owners whose property abuts the proposed Western Mustang Solar, LLC project on two or more sides. The agreement binds the adjacent property owners "to cooperate with Western Mustang's development, construction and operation of the project."

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[13] SEIA, "Solar and Property Values, Correcting the Myth that Solar Harms Property Value," July, 2019, www.seia.org.

[14] Richard C. Kirkland, "Grandy Solar Impact Study," Kirkland Appraisals, February 25, 2016.

[15] Andrew Lines, "Property Impact Study: Solar Farms in Illinois," *Mcleancounty.gov*, Nexia International, August 8, 2018.

[16] Patricia McGarr, Property Value Impact Study, Cohn Reznick, LLP Valuation Advisory Services, May 2, 2018.

NORTH STAR SOLAR PV SALE/RESALE COMPARISON

SALE/ RESALE	PARCEL NO.	ADDRESS	SALE DATE	GRANTOR	GRANTEE	NET SALE PRICE	$ CHANGE	% CHANGE	ANNUAL % CHNG	SALE TAX ASSESSM'T	ACRES	COMMENTS
1	110072810	10090 367th Street	05/07/10	Corey Holcomb	Scott Dornbusch	$216,600	NA	NA	NA	NA	10.090	2001 1,990 SF 4LS, 800 SF Fin.
1	110072810	10090 367th Street	08/03/16	Scott Dornbusch	**CER Land, LLC**	$360,800	$144,200	66.57	8.50	$250,600	10.090	4BR-3B; Adj. SF at W & Rear
1	110072810	10090 367th Street	03/21/18	**CER Land, LLC**	Scott Dornbusch	$302,500	($58,300)	-16.16	NA	$269,500	10.090	Time Adjustment from 5/7/10
												Sale to 3/21/18, or 7.9 yrs.
	5/7/10 Sale Price was $219,900 with seller paid amount of $3,300, or $216,600.											$216,600/7.9 Yr/6.8% = $364,296
												$364,296 v. $302,500 = -17.0%
2	110073210	10095 367th Street	07/09/10	Rense Dresel	Shawn Yerges	$299,000	NA	NA	NA	NA	9.900	2002 1,677 SF 3LS, 1000 SF Fin Bsmt,
2	110073210	10095 367th Street	05/18/16	Glenn J. Yerges	**CER Land, LLC**	$365,000	$66,000	22.07	3.46	$277,900	9.900	4BR, 2.5B; Adj. SF 2 Sides, Rear
2	110073210	10095 367th Street	06/15/17	**CER Land, LLC**	Shawn Campbell	$328,004	($36,996)	-10.14	NA	$301,500	9.900	Dense Mature Trees Adj. SF
												Time Adjustment from 7/9/10
	6/15/17 Sale Price was $336,900 with seller paid amount of $8,896, or $328,004.											Sale to 6/15/17, or 6.9 yrs.
	The 2017 sale was encumbered with a 30 year lease on the rear 6.24 acres to North Star Solar PV at a rate of $1,000 per acre, or $6,240											$299,000/6.9 Yr/6.3% = $455,851
	annually with an annual increase of 1.0 percent.											**$455,851 v. $328,004 = -28.0%**
3	90035100	37083 Keystone Ave	08/08/00	P.W. Lee	Douglas Melby	$100,000	NA	NA	NA	NA	6.000	1964 1,442 SF 1 Sty, 228 SF Fin Bsmt
3	90035100	37083 Keystone Ave	10/11/16	Douglas Melby	**CER Land, LLC**	$302,500	$202,500	202.50	7.08	$179,300	6.000	3BR-2B; Adj. SF 2 Sides & Rear
3	90035100	37083 Keystone Ave	08/28/17	CER Land, LLC	Richard Brandt	$252,290	($50,210)	-16.60	NA	$199,140	6.000	Time Adjustment from 8/8/00
												Sale to 8/28/17, or 17.1 yrs.
	8/28/17 Sale Price was $257,000 with seller paid amount of $4,710, or $252,290.											$200,000/17.1 Yr/2.4% = $300,034
	Mr. Mebly stated that subsequent to his sale, he completely renovated his house and constructed a pole barn at a cost of $100,000.											**$300,034 v. $252,290 = -15.9%**
4	110072840	10254 367th Street	11/29/05	Nielson Const.	Kory Abell	$360,000	NA	NA	NA	NA	9.280	2005 2,326 SF 4LS, Unfin. Bsm't,
4	110072840	10254 367th Street	07/27/16	Kory B. Abell	**CER Land, LLC**	$535,000	$175,000	48.81	3.78	$285,000	9.280	3BR-2.5B: Corner Lot, Opposite
4	110072840	10254 367th Street	10/27/17	**CER Land, LLC**	Todd J. Huebl	$324,950	($210,050)	-39.26	NA	$304,600	9.280	SF at W and Front
												Time Adjustment from 12/16/05
	11/29/07 Sale Price was $373,000 with seller paid amount of $13,050, or $360,000.											Sale to 10/17/17, or 11.8 yrs.
	$30,000 Pole Barn was constructed in 2006. $390,000 is the adjusted SP for the 11/29/05 sale.											$390,000/11.8 Yr/0.0% = $390,000
	10/27/17 Sale Price was $335,000 with seller paid amount of $10,050, or $324,950.											**$390,000 v. $324,950 = -16.7%**

NORTH STAR SOLAR PV SALE/RESALE COMPARISON

SALE/ RESALE	PARCEL NO.	ADDRESS	SALE DATE	GRANTOR	GRANTEE	SALE PRICE	$ CHANGE	% CHANGE	ANNUAL % CHNG	SALE TAX ASSESSM'T	ACRES	COMMENTS
5	110072820	10132 367th Street	07/02/01	Corey Holcomb	Richard Daniels	$226,800	NA	NA	NA	NA	9.308	2001 1,446 SF 3LS, 700 SF Fin Bsmt
5	110072820	10132 367th Street	09/23/16	Richard Daniels	**CER Land, LLC**	$371,800	$145,800	63.58	3.30	$239,900	9.308	4BR-2.5B: SF at Rear & Front
5	110072820	10132 367th Street	10/20/17	**CER Land, LLC**	Tyler Winczewski	$333,000	($38,800)	-10.44	NA	$256,600	9.308	Time Adjustment from 7/3/01 Sale to 10/20/17 , or 16.3 yrs. $226,800/16.3 Yr/1.8% = $303,352 28' x 50' Pole Barn Not Included. Constructed after 2001 Sale. **0%**
6	110072830	10200 367th Street	10/27/04	Corey Holcomb	Thomas B. Hoch	$309,000	NA	NA	NA	NA	9.300	2003 1,472 SF TL, 4BR-3.5B, Barn
6	110072830	10200 367th Street	07/27/16	Thomas B. Hoch	**CER Land, LLC**	$387,900	$78,900	25.53	4.71	$262,800	9.300	Renov. 2009, SF at Front
6	110072830	10200 367th Street	11/28/17	**CER Land, LLC**	Mikael Koldste	$320,100	($67,800)	-16.77	NA	$281,200	9.300	Time Adjustment from 11/8/04 Sale to 11/18/17, or 13.0 Yrs. $324,500/13.0 Yr/0.4% = $341,785 **$341,560 v. $320,100 = -6.3%**
	Pole Barn was constructed in 2006 for $15,500. 10/27/04 Sale Price is adjusted to $324,500. 10/28/17 Sale Price was $330,000 with seller paid amount of $9,900 , or $320,100.											
7	110052600	37206 Keystone	07/31/12	John M. Mosley	Kristine Anderson	$212,000	NA	NA	NA	NA	20.110	1996 1,092 SF SE, 900 SF Fin. Bsmt
7	110052600	37206 Keystone	07/20/16	Kristine Jacobsen	CER Land, LLC	$450,000	$238,000	112.30		$258,000	20.110	4BR-2B, Det. Gar. w/Apt
7	110052600	37206 Keystone	06/15/17	CER Land, LLC	Todd R. Iverson	$282,200	($167,800)	-37.3	NA	$273,700	20.110	Time Adjustment from 6-4-13 Sale to 5-15-17, or 3.9 Yrs. $212,000/3.9 Yr/8.6% = $292,552 **$292,552 v. $282,200 = -3.5%**
	Contract for Deed on 7/31/12 with Deed transfer on 6/4/13. 6/15/17 Sale Price was $290,000 with seller paid amount of $7,800, or $282,200.											

Total Purchase Price to CRE Land, LLC	$2,773,000
Total Sales Price from CRE Land, LLC	$2,143,044
Total Loss	$629,956
	-22.72%

By cooperation, the solar developer expects the property owner to "fully support" the developer's efforts to obtain any permits and approvals and to agree "not to oppose, in any way, whether directly or indirectly, any such application or approval at any administrative, judicial or legislative level."

In return for this "cooperation," the developer will pay the property owner a "signing payment" of **$2,000.00** within 45 days after the effective date. In addition, within 45 days of vertical construction of the project, the developer will pay a one-time **additional payment of $15,000.** The agreement is to remain confidential.

A second "Neighbor Agreement," was discussed in a November 23, 2020 article in *The Lima News* of Lima, Ohio. This article described the second public forum which was required by the Ohio Power Siting Board (OPSB) that approves or rejects the proposed 2,600.00 acre 300 MW Birch Solar Project. Lighthouse BP, the developer, stated that: "Landowners who are adjacent to the project will be offered anywhere from **$5,000 to $50,000**, depending on their closeness to the solar farm."

A third neighborhood agreement was recently issued by Posey Solar to the community of Posey County, Indiana. This agreement offered **"an upfront payment equal to 10% of appraised home** value for neighbors within 300 feet of the solar field. This is in addition to the **annual $1,000 payment ($35,000 for project life)** during operations for those who would like to sign a Good Neighbor Agreement.

The North Star solar facility is the example of a solar farm that resulted in the purchase and subsequent resale of adjoining properties. According to the Minnesota Public Utilities Commission in a February 4, 2021 email to this office:

> At no time did the Minnesota Public Utilities Commission require the developer, North Star Solar LLC, to purchase any properties as part of the site permit application review process or as part of granting a site permit. A condition or requirement to purchase property is not something the Public Utilities Commission can require of an applicant/permittee. North Star Solar LLC, on its own accord, offered purchase options to landowners within or near their proposed project boundary.

At the time of its completion, in December 2016, North Star Solar PV was the largest industrial scale plant in the Midwest. This 1,000.00 acre, 138 MW solar farm is in North Branch, Minnesota. It is notable that it cost the North Star developer $627,000 more to acquire these properties than the price for which they were sold.

These four examples of voluntary payments to the surrounding property owners by the solar developer are significant because their own appraisers have determined that their proposed solar farms will have no adverse impact on adjacent property values. However, these offers and purchases can only reasonably be interpreted as a **tacit admission of potential impairment.**

DISCUSSION OF EXISTING KIRKLAND APPRAISAL

LETTER OF TRANSMITTAL

According to the Kirkland report, he was "asked to determine "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 located."

The appraiser states that he has "researched and visited existing and proposed solar farms in Kentucky as well as other states, researched articles through the Appraisal Institute

The appraiser concludes, "that the matched pair analysis shows no impact in home values due to abutting vacant residential or agricultural land" due to the lack of "noise, odor and traffic." Without such influences, "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 basis of his conclusion is the siting of solar farms in "hundreds of towns and counties"…and adjoining agricultural uses, schools, churches and residential developments." The appraiser also remarks that, "Industrial uses rarely absorb negative impacts from adjoining uses." (It is unclear what this sentence means).

STANDARDS AND METHODOLOGY

In this first section of the report, the appraiser stipulates that the report is based on "the standards and practices established by the Appraisal Institute (AI) and the Uniform Standards of Professional Appraisal Practice (USPAP). Apart from mentioning the "matched pair analysis" in the letter of transmittal, there is no discussion of the methodology for conducting a damage or impact study.

Despite the fact the appraiser claims that the report is predicated on USPAP, it lacks the first requirement for any report, whether it is an appraisal or a consulting assignment—Definition of the Problem. This section of the report establishes the relationship between the solar farm in question and the surrounding area; as well as determines the scope of work needed to solve the valuation problem. There is no such section to this report.

The appraiser failed to describe and explain the methodology he used in his analysis. The "matched pair analysis" is only one aspect of the methods used in impact or damage studies. Three editions of *Real Estate Damages* by Randall Bell, PhD, MAI have been published by the Appraisal Institute and the technique is mentioned with only one sentence in the letter of transmittal.

No discussion of a literature review or citing of published studies or studies within the public domain, despite the fact that the appraiser claims to have researched articles. These are particularly important to include due to the limited number of such studies. Even if these studies may contradict the appraiser's conclusions, they must be included and with an explanation of why they should be disregarded if Kirkland believes they are flawed. However, the studies cannot be ignored.

There is no discussion of compatibility with respect to the zoning process and the expectations of the market for non-conforming uses, other than to state that because solar farms have been constructed in agricultural and residential areas, they are comparible.

DETERMINING WHAT IS AN EXTERNAL OBSOLESCNE

This next section of the Kirkland report identifies external obsolescence that "might have a negative impact on the value of adjacent or nearby properties because of identifiable impacts." The appraiser lists the following external obsolescence:

- Traffic. Solar Farms are not traffic generators.
- Odor. Solar farms do not produce odor.
- Noise. Solar farms generate no noise concerns and are silent at night.
- Environmental. Solar farms do not produce toxic or hazardous waste. Grass is maintained underneath the panels so there is minimal impervious surface area.

The appraiser concludes, that "I have observed and studied many solar farms and have never observed any characteristics about such facilities that prevents or impedes neighbor from fully using their homes or farms or businesses for the used intended.

This appraiser has concluded that if there is no traffic, odor, noise or hazardous waste, then, ceteris paribus, there is no diminution in value.

However, with respect to detrimental conditions, as a result of utility scale solar facilities, the appraiser does not discuss the loss of the viewshed, which is the primary impact of such industrial uses on the natural environment.

Also, the appraiser does not discuss the expectations of the market with respect to utility of their property. Utility scale solar plants affect properties in different ways relative to their proximity and degradation of the view. This is true of the effect of high voltage transmission lines, turbines and cell towers, as indicated in peer review studies.

ADJOINING PROPERTIES

The next section of the report merely lists the adjoining properties with their acreage, use, their percentage of adjoining acres and distance from nearest panel. There is no narrative discussion of the surrounding area to the proposed generating facility nor its impact upon the view shed or utility of those properties most affected. The appraiser states that the "closest adjoining home will be 340 feet from the closest panel and the average distance to adjoining homes will be 873 feet. Matched pair data presented later in this report shows no impact on home values as close as 105 feet when reasonable visual buffers are provided." This conclusion can only be interpreted as the following**: "one size fits all" despite the size of the solar generating plant or the expectations of that market segment that is affected by the plant.**

SUMMARY OF SOLAR PROJECTS IN KENTUCKY

This section of the report lists 6 solar facilities in Kentucky including their size, total and used acres, average and closest distance to home, as well as the percentage of land use. This chart is repeated for every solar generating facility throughout the report. Since nearly all solar plants adjoin either agricultural, residential or commercial use, such calculations are only remarking the obvious. To conclude that "the similarity of the sites in terms of adjoining uses and surrounding demographics makes it reasonable to compare the lack of significant impacts in other areas would translate into similar lack of significant impacts" is inconclusive. Additionally, the six generating plants range in size from 2 to 10 MW and are **not comparable** to a 100 MW utility scale plant such as the subject.

II. MARKET ANALYSIS OF THE IMPACT ON VALUE FROM SOLAR FARMS

This section of the report provides the evidence that the appraiser uses to claim that solar utility scale generating facilities have no negative affect upon proximate property values. This appraiser has "researched hundreds of solar farms" in Virginia, South Carolina, Tennessee, Texas, Oregon, Mississippi, Maryland, New York, California, Missouri, Florida, Montana, Georgia, Kentucky and New Jersey and not one of these plants has had an adverse impact on adjacent property values.

The previously cited Kirkland chart summarizes all of the data provided by the appraiser relative to the 44 case studies that are included in the report. Several of these examples are incomplete relative to the description of the solar farm. Particularly important, relative to comparability, are the acres and megawattage of the solar facility. This **data is missing** on several of these examples.

No. 1 KY Matched Pair – Crittenden Solar, Crittenden, KY

This analysis examines 34.10 acre solar farm with only 2.7 MW on a 181.70 acre tract of land adjoining I-75 in Crittenden, a community in northern Kentucky. The subdivision consists of manufactured and conventionally constructed residence. The test property is a $120,000 manufactured house on 0.96 acres that is approximately 750.00 linear feet from the I-75 right of way and 360 linear south of the closest solar panel. In addition, there is a streambed with vegetation between the solar farm and the test property. The solar farm is partially screened with opaque fencing. Because of the price range and construction of the dwelling and proximity to the interstate, the solar farm would not diminish the utility of this property to the point of expecting it to impact the property value.

The two control sales do not appear to be from Crittenden according to Google Earth.

The second test example is 300 Claiborne Drive, which represents a conventionally constructed dwelling approximately 1,250.00 linear feet east of I-75 and 600 linear feet south of the closest panel. In addition, the dwelling is separated by two tree lines from the solar farm. The utility of this tract would not be expected to be impacted by the adjacent solar farm under these conditions.

The control sales either do not appear on Google Earth as listed or are possibly from a different town to the north.

The third test property 350 Claiborne Drive is 1,820 linear feet from I-75 and 750.00 linear feet north of the solar farm separated by a stream and tree line. No loss of utility would be expected under these circumstances.

The fourth example, 370 Claiborne Drive is approximately 2,000 linear feet to I-75 and 900.00 linear feet to the solar farm. This house is also separated by the ravine and tree line.

This sales analysis is not considered reliable as it represents a neighborhood that is impacted by its proximity to I-75, the size of the solar farm is minimal and not comparable in magnitude to the Madison County proposal, and the expectations of this market do not include a scenic view shed. The expectation of this market is for a house, a yard and ease of access to employment.

No. 1 National Matched Pair – AM Best Solar Farm, Goldsboro, NC

The detailed analysis of this solar does not need review because the AM Best Solar Farm was constructed on Industrially (I-2, General Industrial) zoned land. Therefore, the market would have anticipated such a use and the effect of the solar farm would be inherent in the sales prices. The fact of the industrial zoning is not divulged by the appraiser. The size of the land area and solar farm generation capacity (6.65 MW) are not given. Because of the size and the zoning, this case study is not a reliable indicator.

In addition, none of the comparable sales addresses are given. This means that the reader of the report must go to the Property Valuation Office website, if available, or call the PVA to get the addresses of the comparable sales. Some of the comparable sales do not include the Tax ID number. USPAP states that

No. 2 Matched Pair – White Cross Solar Farm, Chapel Hill, NC

This study, from Chapel Hill compares the sale of 47.20 acres of excess land at the solar farm site in 2013 for $5,614 per acre to a non-adjoining wooded tract that sold in 2010 for $6,109 per acre. The appraiser attributed the $500 per acre difference to the timber and concluded no difference. However, he did not address the issue of appreciation, did not provide a timber cruise, nor did he provide the motivation for the purchase of the wooded land or any other conditions of sale that may have impacted the sale price. There are too many unknowns for this comparison for have any credibility. No address is given for the comparable sales. Again, anyone readying this report must have access to the PVA data.

No. 3 Matched Pair – Wagstaff Farm, Roxboro, NC

The third study consists of the comparison of an 18.82 acre off-conveyance from a 594.00 acre farm of which the adjacent 30.00 acres contained a solar facility. The purchaser of the 18.82 acres was the adjoining owner. The sale price of $8,714 acres was comparable to a 14.88 acre tract "not near" the solar farm that sold for $8,739 during the same period of time. The appraiser concluded that "this matched pair again supports the conclusion that adjacency a solar farm has no impact." This comparison is flawed because adjoining owners, based on my appraisal experience, typically pay a 10.00 to 25.00 percent premium for adjoining land. In fact, it is necessary to analyze an adjoining owner sale with numerous non adjoining owner sales within a market to even claim that the resulting value even fits the definition of market value. That is not to say that an adjoining owner sale cannot be used within an analysis, it must be fully discussed. In this case it was not. Also, no addresses are given.

No. 4 Matched Pair – Mulberry, Selmer, TN

The fourth study is from Tennessee and compares sale from the same subdivisions pre and post solar farm construction. This adjustment process is so convoluted that it makes an excessively large gross adjustments to the sales to make his point that there is no impact by the solar farm. This study suffers from the same criticisms cited in previous examples, including expectations for scenic view in a $130,000 residential market.

In addition, Selmer is a small town in of 4,396 people in southwestern Tennessee. The terrain is generally woodland in the vicinity of the solar farm. According to the appraiser lots in the adjoining subdivision sell for $15,000 and the houses are in the $130,000 price range. Sales 6 and 7 are approximately 775 and 500 linear feet north of the closest panel, while Sales 12, 15 and 16 are 610, 690 and 480 linear feet, respectively. All these 1.00 acre+ lots have dense woodland separating them from the solar farm as well as rolling terrain.

Considering the distance from the solar arrays and the price range of the neighborhood the solar farm would not affect the utility of this example and no diminution in value would be expected by this market. This example is not a reliable indicator of no loss in value due to the proximity of the solar farm.

No. 5 Matched Pair – Nixon's Solar Farm, West Friendship, MD

The fifth study is from the 2.0 MW Nelson's Solar Farm in West Friendship, Maryland. This case study compares the sale of a $771,640 residence on less than one acre in a 12 unit subdivision that adjoins a small solar farm of less size than the subdivision. This sale is compared to a sale that is "not nearby" the solar farm that sold for $690,000. After adjustment, the appraiser concluded no impact of the solar farm. The flaw in this analysis is that the nearby sale is within a one street subdivision of lots of approximately one acre that are opposite each other obstructing any view from the front of the properties. Moreover, the 'nearby sale's" view of the solar farm is obstructed by 10 other houses. It is not surprising that the appraiser concluded no impact by this solar farm. Also, since all occupants within the subdivision must drive past the facility to reach their homes, all the properties are impacted to some degree. This example is not a reliable indicator for no loss of value.

No. 6 Matched Pair – Leonard Road Solar Farm, Hughesville, MD

This case study is from the Lenard Road Solar Farm in Hughesville, Maryland. This study compared a 3.00 acre residential tract adjoining the solar farm to the south that sold for $291,000. During the same time period in 2016 a 3.22 acre residential tract sold away from the solar farm for $329,800. After adjustment for the physical differences in the houses, the appraiser concluded no impact from the solar farm. What the appraiser failed to consider was that there is sufficient woodland between the property and the solar panels effectively preventing the solar facility from visibility at the rear of the property. The control sale appears to be from Waldorf, MD, a different town than the test sale. In addition, the control sale required a gross $47,240 adjustment which indicates that the sale is not truly comparable, aside from proximity. Also, the area and wattage of the solar farm is not divulged. It appears small from the photograph. This comparison is also not reliable.

No. 7 Matched Pair – Talbot County Community Center Solar Farm, Easton, MD

This case study is based on proximity to the Talbot Community Center Solar Farm in Easton, Maryland. Although not specified, this is a very small solar farm. (Appears to be less than 3.00 acres). This study compares two 50 to 60 year old dwellings selling for $135,000 in 2012 "nearby" and "not nearby" the solar farm. The "nearby" sale is approximately 850.00 linear feet west of the solar farm while the control sale is 1,000 feet west of the solar farm and both sales are separated by a densely treed fence line. Both properties appear to be equally affected or not affected by the solar farm. Therefore, this study has no credibility.

No. 8 Matched Pair – Alamo II, San Antonio, Texas

The next case study is from Alamo II Solar Farm in San Antonio, Texas. This 98.37 acre solar farm with a 4.4 MW output is surrounded on three sides by minimally sized lot subdivisons with many hundreds of houses selling in the $150,000 range. The sale-resale analysis examines sales occurring in mid to late 2012 to those occurring after the solar farm was constructed in 2013. First, it is not credible to assume that the solar farm was constructed without any knowledge of the neighborhood given the time frame presented. The permitting process alone takes considerable time. Moreover, this market which consists of tightly packed housing does not consider the view shed as a predominant requirement in their

purchase decisions. This study is not a credible indicator since no damage is the expected outcome of these comparisons.

No. 9 Matched Pair – Neal Hawkins Solar, Gastonia, NC

Another North Carolina case study concerns the Neal Hawkins Solar Farm in Gastonia, North Carolina. This is an anecdote of a $270,000 residential sale abutting a proposed solar farm that was acquired by a purchaser who had "no concerns" about the solar farm. There are always potential purchasers who "don't care" about a disamenity and are willing to pay without a discount, as well as potential purchasers who would not consider purchasing a property in proximity to a disamenity at any price. However, they are not representative of any market. Even if they don't care, the lender who is lending them 75.0 percent or greater is more concerned about the next purchaser, if, and when the current purchaser is unable to pay his loan. This is not a credible example.

No. 10 Matched Pair – Summit/Ranchlands Solar, Moyock, NC

Although this case study has potentially more credibility than the previous case studies because it is based on a more comparable utility scale solar farm with 80 MW. However, Parcel 48, the test property, is a manufactured home on 4.29 wooded acres that offers protection from the solar farm 950.00 linear feet distant. In addition, there is a woodland directly behind this property within the solar farm which offers additional protection. The control sales are more distant however, they are sited on 1.00+/- acre lots. Given the distance from the solar farm compounded by the woodland protection of the view and the minimal quality of construction, it is not surprising that this example sold for as much as the control sales. Even considering these facts, the appraiser has estimated that the difference in the test sale and the control sales is **-3.0 percent**.

The next test sale, Parcel 53 is approximately 1,000.00 linear feet northeast of the closest solar farm and separated by approximately 675.00 linear feet of woodland. In addition, this sale adjoins an industrial tract immediately south and east of the solar farm. The 3 control sales are from seemingly the same subdivision, however, the third sale, 127 Ranchland is a similar distance from the solar farm and separated by only one lot. The gross adjustments to the sales are larger than are typically acceptable indicating that these comparisons are not credible.

The next test sale, No. 15 is 430.00 linear feet north of the solar arrays at the northwest corner of the solar plant. In addition, the property is separated from the solar farm by a mature row of trees, as well as the Guinea Mill Run Canal. Because of the distance and intervening tree line and canal, the effect of the solar plant upon the utility of the property is mitigated.

The fourth test sale, Parcel No. 29, is directly across from the interior of the solar facility, but is separated by Ranchland Road, and the tree lined Guinea Mill Run Canal. The house is approximately 420.00 linear feet north of the closest panel. This comparison of manufactured homes indicates a **-10.0 percent** diminution in value.

The fifth test sale, 358 Oxford, is a from a 10.00 acre subdivision that adjoins the generating plant to the west. This tract abuts the solar plant and the dwelling is within 625.00 linear feet of the nearest panel. The first control sale is from the interior of the same subdivision and indicates a loss of value of **-3.0 percent**. The second control sale appears to be the original house from the subdivided farm requiring a gross adjustment of 24.0 percent, which would indicate this is not a reliable comparable sale. The third control sale is from

Caratoke Hwy, a major 4 line divided highway and is diagonally opposite commercial development. This property is not a reliable comparable sale.

The next group of sales that the appraiser analyzed are from a 10.00 acre subdivision west of the solar plant and southwest of the above group of sales.

A Moyock, North Carolina study involves the 2,034.00 acre Wildwood Solar Farm. Among the adjacent properties is a subdivision to the north consisting of older conventional dwellings and newer manufactured homes on lots of minimal size. Two paired sales analysis are made of the respective dwelling types within the subdivision of both adjoining and non-adjoining lots. Credibility of this analysis is also compromised by using the same subdivision for both the test and control sales because the entire subdivision is affected to some degree by proximity to the solar farm.

This solar facility would have been a likely candidate for a search of sale-resales of the surrounding properties.

No. 11 Matched Pair – White Cross II, Chapel Hill, NC

This case study is also from Chapel Hill, North Carolina and compares two sales, one adjoining and one not adjoining the White Cross II solar farm. However, the address of the test sale is not given, only the tax ID number. Nonetheless, the solar farm is surrounded by woodland and is only 2.8 MWs. Regardless of where the test property is, any impact would be expected to be minimal, if at all. This comparison is not credible.

No. 12 Matched Pair – Tracy Solar, Bailey, NC

This comparison involves two communities within 5 miles of each other, which is not indicated in the report. The test sale is in Bailey, NC and the dwelling is within 790.00 linear feet of the closest solar panel. However, the 5 MW generating facility is screened by approximately 500.00 linear feet of dense woodland and it appears that the front of the property is encumbered by a transmission line. However, the appraiser does not indicate this fact. The analysis compares the land sale of the test property with sales from Bailey and Middlesex, NC. However, the location of 427 Young is undeterminable with the information provided, and no house number is given for Claude Lewis Road. The data is insufficient for comparison with the comparable sales, however, based on this description, the utility of the property would likely not be diminished. Therefore, this is not a credible analysis to deduce the impact of an industrial scale solar farm upon property values.

No. 13 Matched Pair – Manatee Solar Farm, Parrish, FL

This case study involves a 74.50 MW generating facility that adjoins Lake Parrish, that appears to be a reservoir. The test sale is approximately 1,200.00 linear feet north of the generating facility and separated by approximately 650.00 linear feet of dense woodland and a railroad at the edge of the woods. Because of the protection offered by the woods and the distance from the solar farm, the utility of the test property would be expected to be similar to that of the control properties. Without the reduction in utility or loss of the view shed, this case study is not a credible example to refute loss of value as a result of proximity to an industrial scale solar generating facility.

No. 14 Matched Pair – McBride Place Solar Farm, Midland, NC

See the sale-resale discussion in the first section of this report, which contradicts the appraiser's finding of no damage.

No. 15 Matched Pair – Yamhill II, Amity, OR

The utility of this "adjoining" sale is not impacted by the 725.00 linear foot proximity to a 1.2 MW solar farm. In addition, the sale is additionally separated from the solar farm by another parcel. No damage should be expected in this example. This is another example of taking a property that is not impacted and declaring it not to be impacted by its proximity to a solar farm and supporting the claim by comparing it to arbitrarily selected sales from three different communities. Moreover, such a small solar farm has no relevance to the impact of an industrial scale farm.

No. 16 Matched Pair – Marion Solar, Aurora, OR

Another example of a very small 0.3 MW solar farm that is diagonally across from a 15.75 acre tract with multiple locations for a house site without being in the direct view of this facility. The comparable sales are from three different towns. Moreover, such a small solar farm has no relevance to the impact of an industrial scale farm.

No. 17 Matched Pair – Clackamus II, Aurora, OR

This is another example of a property that is not impacted by a 0.22 MW solar garden that is on the opposite side of a major highway from the rear of the tract. Dense treed screening is at the rear property line. The houses in this subdivision appear to have approximately a 6.0 foot side yard. This tiny solar array has no impact on any houses in this neighborhood and to attempt to prove this with comparable sales defies credulity. Of course, there is no damage.

No. 18 Matched Pair – Grand Ridge Solar, Streator, IL

In this example, a $186,000 house is northwest of a 20 MW facility and 480.00 linear feet to the closest panel from the rear of the house. The property is compared to four sales, one of which is from the opposite side of town in Streator, however, the other three sales are from any number of possible communities in Illinois, according to Google Earth. The appraiser does not explain how these various communities relate to the subject and how they are a reliable indicator of value. It is insufficient to merely list four sales from different locations, reducing them to a size per square foot and declaring there to be no diminution in value. Considering the price range of the house the orientation of the property to the solar farm, its utility is likely not diminished. However, this cannot be supported by this analysis.

No. 19 Matched Paris – Portage Solar, Portage, IN

This case study involves a 2 MW solar farm at the NW corner of a 56 acre tract. The test property is a 57 year old house abutting the farm at the southeast corner with 5 other houses shielding its view. The house is 1,320 linear feet from the closest solar panel and considering these aspects of the property, the solar farm does not diminish the utility of this test property. Also, the size of the solar farm has no relationship to a 100 MW generating plant.

No. 20 Matched Pair – Dominion Indy III, Indianapolis, IN

The test sale and control sales are from a modestly priced subdivision opposite the 8.6 MW solar farm. The rear of the closest houses are within 400 feet of the solar farm and the subdivision is separated by a 65.00 right of way, a two lane road, and nearly 250.00 liner feet depth of woodland. The solar farm has no effect upon the utility of these residential tracts.

No. 21 Matched Pair – Beetle-Shelby Solar, Cleveland County, NC

This test property is 950.00 linear feet north of a 4 MW solar farm. Between the solar farm and the property are two roads and the view from the dwelling is completely blocked by dense woodland that abuts the structure. This solar farm has no effect upon the utility of the 10.08 acre property.

No. 22 Matched Pair – Courthouse Solar, Gaston, NC

It is doubtful that the utility of a $111,000 house diagonally opposite the proposed 5 MW solar farm would be impacted, or that the view shed would be an important consideration for this market. The second example is shielded from the proposal by dense forest. This analysis lacks credibility for application to other situations.

No. 23 Matched Pair – Gaston County, NC

The first example is a 17.74 acre forested site with a 63 year old dwelling that is on the opposite side of the road and approximately 1,165 linear feet from the solar farm which appears to slope downward from road grade. The utility of this property is clearly not impacted by the 5 MW facility. A second example includes a $180,000 2.91 acre tract that sold in 2015 after the solar farm was approved, but before it had been constructed. A mitigating influence may have been that the rear third of the property is woodland that separates the front third of the tract that contains the dwelling from the solar farm. Since the solar farm was not yet constructed, the potential purchaser may have taken this fact into his calculus for purchase. A third example is an unimproved 21.15 acre tract approximately 1,500 linear feet south of the solar farm and on the opposite side of Blacksnake Road. Also, across from the example on the north side of the road is a highly improved farm and woodland which blocks the view of the solar farm. Any reduction in utility of this property is speculative.

No. 24 Matched Pair – Clark County Solar, Clarke County, VA

This test tract is 1,230 linear feet north east of the closest panel to this 20 MW facility. The tract was purchased prior to the construction of the solar farm. The potential purchaser may have considered the distance to be sufficient. The comparable sales require so much adjustment and appear to be from different towns that that any conclusion as to damage or not is speculative. The analysis is not credible.

No. 25 Matched Pair – Flemington Solar, Flemington, NJ

The size of this solar farm, with respect to area or megawattage is not specified, but it appears small. It adjoins the commercial thoroughfare of the town to the east and is south of the residential development in question. It is not surprising that the properties closest to the solar farm are not impacted because of the natural woodland and is heavily screened within the solar farm.

No. 26 Matched Pair – Frenchtown Solar, Frenchtown, NJ

The size of this solar farm, with respect to area or megawattage is not specified, but it appears small. The appraiser reported that the solar farm was not a factor in the purchaser's decision to buy the property. Therefore, this analysis is unnecessary.

No. 27 Matched Pair – McGraw Solar, East Windsor, NJ

This paired sales analysis is the first truly reliable indication of this report. The discussion does not include the size of the solar farm or its megawattage. It compares an impacted townhouse abutting the solar farm to nearly identical townhouses within the same area, but sufficient distance away that they are unimpacted. ***The difference between these sales range from -9.00 percent to -19.00 percent.***

The sale that indicated **-13.00 percent** is across the street from the subject, while the sale that indicated **-19.00 percent** is in the next block. The **-9.00 percent** sale is the furthest way at the rear of the subdivision. However, the condition of the property or other differences are not divulged.

The second example examines a single-family dwelling in proximity to the solar farm, but compares it to sales from different subdivisions, though less reliable, this analysis shows a -2.0 percent adjustment. This house is farther way from the solar farm than the townhouse example including a field and large trees that separates the house from the plant.

No. 28 Matched Pair – Tinton Falls Solar, Tinton Falls, NJ

This case study examines sales from a condominium development that is on the edge of a densely populated community and adjoins an unspecified solar farm with respect to size and megawattage. Several comparisons ***indicate diminution in value ranging from -1.0 percent to -7.0 percent,*** *which would be expected and is consistent with No. 27 considering the property types. Accuracy is possible when the comparable sales are similar such as these two examples.*

No. 29 Matched Pair – Simon Solar, Social Circle, GA

The size of the solar farm is not given and the comparable sales are not sufficiently described to interpret this case study.

No. 30 Matched Pair – Candace Solar, Princeton, NC

This case study consists of a paired sales comparison of a single-family lot, as well as the subsequent sale of the lot as improved with a modular home. The most reliable comparison of the first analysis is between the subject which adjoins the solar farm and a lot on the opposite side of Herring. This comparison indicates ***a loss of value of -18.0 percent.*** *The second analysis, as improved indicates a range of -3.0 percent to 26.0 percent. This is an unreliable comparison due to the number of adjustments required.*

No. 31 Matched Pair – Crittenden Solar, Crittenden, KY

This is the first solar farm that is discussed.

No. 32 Matched Pair – Walker-Correctional Solar, Barham Road, Barhamsville, VA

According to the appraiser, the purchaser of the property directly opposite the solar farm and within 250.00 linear feet, stated that he preferred the privacy the solar farm offered him and paid more than the asking price. Therefore, no analysis is needed. This is another example of a purchaser's indifference to a detrimental condition. As with potential purchaser's who would not pay any amount regardless of discount for a property with a detrimental condition, these extremes are not indicative of the market and should be eliminated from the data pool.

No. 33 Matched Pair – Innovative Solar 46, Roslin Farm Road, Hope Mills, NC

This 78.5 MW generating plant has potential of being a relevant indicator for the Madison County proposal given its size. This single paired sales analysis uses comparable sales which two of the three required over 30.0 adjustment, which results in an unreliable indication. With such a large solar generating plant, the proper analysis would be to examine all the adjacent properties for sale-resales prior to and after construction, such as the case of No. 14, McBride Place Solar Farm in Midland, N.C.

No. 34 Matched Pair – Innovative Solar 42, Country Line Road, Fayetteville, N.C

This case study examines two adjacent properties opposite this 71 MW generating plant. With respect to the first study, the Shaw Mill Road sale appears in the center of a commercial/industrial intersection and the address of the second sale is incomplete for identification on Google Earth. The first sale required a 40.0 percent adjustment and the second, a 20.0 percent adjustment.

Regard to the second comparison, the sales are within the general vicinity and are comparable to the subject. The Hemingway sale is directly behind the test sale and may be influenced by the solar facility. Assuming the data is correct, this example may not be adversely affected by the solar farm. However, because of the number of adjoining tracts, a search for sale-resales should be made to support the indication of no diminution of value.

No. 35 Matched Pair – Demille Solar, Demille Road, Lapeer, MI

The first case study of a 28.4 MW solar farm compares an adjacent residence at 1120 Don Wayne to the property directly across the street which results in a **-10.0 percent** difference in value. The second comparison is with a dwelling in the same neighborhood a greater distance from the solar farm which indicates a -4.0 percent adjustment. The third comparison is a larger single lot in proximity to commercial development, and not in a subdivision. This comparison indicates a 10.0 percent adjustment in favor 1120 Don Wayne. Since the third sale is not considered comparable, the other two indicators result in **a -4.0 to -10.0 adjustment for proximity the solar farm. The other comparisons of properties on Don Wayne indicate a range of diminution of value from -1.0 to -7.0 percent. This is consistent with the other evidence for modestly price subdivisions.**

No. 36 Matched Pair – Turrill Solar, Turrill Road, Lapeer, MI

This case study involved two analysis. The first tests 1060 Cliff Drive, a residence opposite the 19.6 MW solar plant and in proximity to a commercial area. The first control sale is from a similar neighborhood and indicates **-6.0 percent diminution**. The other two sales are from subdivisions and are not considered to be comparable. The second analysis was inconclusive as admitted by the appraiser.

No. 37 Matched Pair – Sunfish Farm, Keenebec Road, Willow Spring, NC

This case study examines a $185,000 house whose rear corner is diagonally across from a 6.4 MW generating plant. The appraiser concluded that the property was not affected and due to the property's alignment with the solar farm and the woodland and field directly behind the property the likelihood of a reduction in utility is minimal.

No. 38 Matched Pair – HCE Johnstone I, LLC, Benson, NC

This case study examines two woodland lots that adjoin this 2.5 MW solar farm. Due to the small size of the facility and the screening, the utility of these lots is not diminished and consequently indicate no diminution in value compared to competing tracts.

No. 39 Picture Rocks, Tucson County, AZ

This case study examines two sales in a subdivision both approximately 1,000 feet from the 20 MW solar farm. The utility of the examples would not be adversely affected by the proximity to the solar farm.

No. 40 Matched Pair – Avra Valley, Tucson, Pima County, AZ

This case study examines two manufactured houses both approximately 1,500 linear feet from the 25 MW solar farm. With this distance and price range of $130,000 to $150,000 the utility of these examples would not be adversely affect by proximity to the solar farm.

No. 41 Matched Pair – Sappony Solar, Sussex County, VA

This case study examines a 6.00 acre woodland tract improved with a manufactured home 1,425.00 linear feet southwest of the 30 MW solar farm. Such a property's utility with a sale price of $128,400 and at this distance would not be adversely affect by proximity to the solar farm.

No 42 Matched Pair – Camden Dam, Camden, NC

This case study involves a single-family dwelling that sold in three tracts with the second presumably able to be developed that adjoined the 5 MW solar farm. The issue in this instance is did the purchaser of the property lose a building right as a result of that tract adjoining the solar farm. This would be the loss of utility as a result of proximity. However, the appraiser did not discuss this issue. It may not have been a buildable lot, but since it is the central issue, it should have been addressed. Instead the appraiser compared the entire tract to three other sales in the county of which two required adjustments of over 30.0 percent and concluded that there was no damage.

No. 43 Matched Pair – Grandy Solar, Grandy, NC

This 20 MW solar farm is apparently under construction on a former golf course site. According to the appraiser's map exhibit, there are 62 single family and commercial lots that appear to abut the former golf course. The most likely analysis of this tract would be to examine all the lots for sale-resales both before and after the announcement of the conversion to a solar farm. Also, the most probable historic motivation for the purchase of these lots was for the view of the golf course. Several articles have addressed this issue and have documented a premium paid for such locations. The appraiser did not discuss the issue of the removal of a view from such a subdivision. The loss of utility for any of these sales would be the transition from a landscaped natural scenic view to an industrial view. The appraiser did not address any of these issues and found three sales that supported no diminution in value.

No. 44 Matched Pair – Champion Solar, Lexington County, S.C.

It is not obvious where the test sale is on the map. However, considering the intensively developed nature of the area and the $110,000 price range of the property it is likely that its utility would not be diminished by proximity to the 10 MW solar farm.

Conclusions

The appraiser concludes that the 96 matched pairs of comparable sales from solar farms throughout the United States have indicated a range of value differences from -10.00 percent to +10.00 with an average of +1.00 percent and a median of +1.00 percent. He has concluded "that this data shows no negative or positive impact due to adjacency to a solar farm."

The primary flaw of this report is that with any damage or amenity study involving any detrimental or affirmative condition, the result cannot be reduced to a single "one size fits all" percentage in order to accurately describe the impact, whether positive or negative. Typically, a multiple regression analysis which analyzes hundreds, if not thousands of data points results an average or median result. However, even this kind of mass analysis qualifies the conclusion with respect to distance or some other qualifier. It is understood that on either side of the average is a range of values.

The fallacy of this case study is that the appraiser has chosen certain proximate sales to solar farms and compared them to random sales without any explanation as to why they were chosen. The inherent weaknesses of the selection are described above in the review comments of each case study. These include certain facts as to why no damage or loss of utility should even be expected, which would eliminate the necessity for the convoluted adjustment process the appraiser has performed in each case study. This is particularly evident regarding the small solar farms.

This is analogous to citing the sales of properties that are impacted by high voltage transmission lines (HVTL). If, for example, a HVTL traverses the rear corner of a rural acreage residential tract and the dwelling or potential house sites are on the other side of the property and remain intact, there is no loss of utility, and consequently no damage. On the other hand, if a transmission line diagonally bisects a comparable property, it may reduce the value by 50.00 percent. To conclude, just using the first sale that there is no impact from HVTLs, is fundamentally flawed. The appraiser has chosen one or more examples from numerous solar farms throughout the country and has concluded that even those containing 1,000.00+ acres are not detrimental conditions.

Another technique that this appraiser relied upon was establishing the percentage of uses surrounding the solar farms and concluded because the mix or residential, farm, or commercial use was similar, then the electrical generating system was deemed compatible with the surround land uses, regardless of whether it was 0.22 MW or 100 MW. As previously described, there was no discussion of what constitutes compatibility and the real estate market.

III. Distance Between Homes and Solar Panels

The appraiser "has measured distances at matched pairs as close as 105 feet between panel and home to show no impact on value." This claim is not credible due to the unreliable and noncredible matched pair analysis as described in the case study reviews.

IV. Potential Impacts During Construction

The appraiser has noted that he does not anticipate any impacts on property value due to construction on the site. Some solar farm construction has caused temporary damages for such things as erosion and flooding on adjacent properties. Notable examples are in Spotsylvania and Essex Counties in Virginia.

V. Scope of Research

The appraiser has stated that his scope of research is 700 solar farms. As indicated earlier this appraiser has not acknowledged other peer reviewed articles or studies in the public domain that contradicts his findings.

VI. Specific Factors Related to Impacts on Value

The appraiser has determined, from his experience in completing Impact Studies "that the most common areas for impact on adjoining values follow a hierarchy with descending levels of potential impact" and he discussed them as they relate to solar farms.

1. Hazardous material: The appraiser states that, "a solar farm presents no potential hazardous waste byproducts as part of normal operation."
2. Odor: "Solar farms produce no odor."
3. Noise: "There is no negative impact associated with noise from a solar farm."
4. Traffic: "The solar farm will have no onsite staff."
5. Stigma: "There is no stigma associated with solar farms and people generally respond favorably towards such a use."
6. Appearance: "Larger solar farms…are a passive use of the land that is in keeping with a rural/residential area."

The appraiser did not address the view shed as previously described.

VII. Conclusion

The appraiser concludes that "the matched pair analysis shows no 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. Furthermore, it is his "professional opinion is that the solar farm proposed at the subject property will have no impact on the value of adjoining or abutting property."

The most relevant examples cited by the appraiser that either required the least amount of adjustment or represented obvious impacts due to the solar farm are the following which indicated a range of diminution from -1.0 percent to -19.0 percent.

No. 10 Matched Pair – Summit/Ranchlands Solar, Moyock, NC: -3.0% to -10.0%

No. 27 Matched Pair – McGraw Solar, East Windsor, NJ: -9.0% to -19.0%

No. 28 Matched Pair – Tinton Falls Solar, Tinton Falls, NJ: -1.0% to -7.0%

No. 30 Matched Pair – Candace Solar, Princeton, NC: -18.0%

No. 35 Matched Pair – Demille Solar, Demille Road, Lapeer, MI: -1.0% to -10.0%

No. 36 Matched Pair – Turrill Solar, Turrill Road, Lapeer, MI: - 6.0%

These indications are not unlike those of the peer reviewed journals and analysis of other appraisers that are summarized on the following chart. The preponderance of evidence based on these empirical studies indicates that industrial scale solar farms do impact adjacent properties to the extent that their utility, as interpreted by the market, is affected. For this reason, the market considers electric generating facilities to be a detrimental condition.

SUMMARY OF INDICATED VALUE DECLINE

DATE	STUDY	RESULT
2018	University	Assessor survey respones ranged from value impact of zero
	of Texas	to estimation of negative impact associated with close
		distance between the homes and the facility, and
		impact increased with increased size of the solar plant.
2020	University	Average decline within 3.0 mile radius was **-1.7%**, or $5,671.
	of Rhode Island	Average decline within 0.1 mile was **-7.0%**, or $23,682.
		The "results suggest extremely large disamenities for
		properties in very close proximity."
2013	Fred H, Beck &	Stras Solar Case Study: Potential Purchasers cancel contract
	Associates, LLC	upon learning of the solar facility.
		Clay County Case Study: Lot sales stopped after announce-
		ment of solar plant. Clay County Board of Equalization
		reduced affected property assessments **-30.0%**.
		Non-residential Use View Impariment Study: Adjacent
		incompatible use adversly impacted nearby properties **-10.7%**
		to **-25.1%,** or an average of **-15.2%.**
		AM Best Solar Farm Study: No diminution in value due to
		pre-existing industrial zoning for solar farm.
2020	Mark W.	Adams County Veiw Case Study: The loss of view results in a
	Heckman, R.E.	a **-15%** to **-20.0%** loss in value.
	Appraisers	
2019	Madison County	Potential purchaser offered **-16.43 %** less than
	Indiana	appriased value upon learing of the proposed solar plant.

SUMMARY OF INDICATED VALUE DECLINE

DATE	STUDY	RESULT
2021	Mary McClinton	North Star Solar Case Study: An Analysis of the 7 adjoining
	Clay, MAI	properties purchased by North Star PV, LLC. A sale-resale
		analysis of the sale prior to and subsequent to the purchase
		by the solar developer. The sale-resales indicate a range of
		diminution from **-6.3%** to **-28.0%** with a median decline of
		of **-16.9%** and an average decline of **-16.8%.**
2021	Mary McClinton	McBride Place Solar Farm Case Study: Analysis of 3 sale-
	Clay, MAI	resales and a comparison of the sale price and tax assessment.
		The sale-resales indicate **-15.65%, -15.51% and -16.44 percent**
		diminution in value. The sale price/tax assessment indicates
		a **-16.81%** loss of value.
2020	Western	Monetary offer of **$17,000** to adjacent property owners to
	Mustang Solar	quel opposition to the proposed solar facility.
	Neighbor	
	Agreement	
2020	Lighthouse BP	Monetary offer of **$5,000 to $50,000** to adjacent property
	Neighbor	owners depending on proximity to the solar facility to quel
	Agreement	opposition.
2021	Posey Solar, LLC	Monetary offer equal to **10% of appraised value** for neighbors
	Neighbor	within 300 feet of the solar field, plus an **annual $1,000**
	Agreement	payment (**$35,000** for project life).

If you have any questions, or need further documentation, please call.

Sincerely,

Mary McClinton Clay, MAI

ADDENDUM

SOLAR ENERGY GENERATION POWER SYSTEMS

DAMAGE STUDIES

Because the proliferation of SEGPSs is relatively recent, both peer reviewed journal articles, as well as professional appraisal studies concerning the subject are limited. However, the following currently available data document the adverse effect of SEGPS and their negative impact on property value.

I. PEER REVIEWED JOURNALS

I.A UNIVERSITY OF TEXAS STUDY

The first study to discuss any diminution in value as a result of proximity to SEGPSs is a May 2018 study conducted by economists at the LBJ School of Public Affairs at the University of Texas at Austin.[17] This Policy Research Project "investigates where large solar installations are located, the housing and income characteristics of the surrounding areas, and if the installations affect nearby residential properties."[18] The study area ranged from a 100.00 foot to 3.00 mile radius from solar facilities ranging from 1 MW to 100 MW+.

The study was based on geospatial analysis and a survey of residential property assessors' opinions of the impact. The respondents included both assessors who have "and have not assessed nearby solar installations."[19] The study "results show that while a majority of survey respondents estimated a value impact of zero, some estimated a **negative impact associated with close distances between the home and the facility, and larger facility size.**"[20]

Although the study was based on assessor opinions, rather than empirical data, the conclusions of the assessors that a negative impact is associated with close distance between

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[17] Leila Al-Hamoodah, et al, "An Exploration of Property-Value Impacts Near Utility-Scale Solar Installations," LBJ School of Public Affairs, The University of Texas at Austin, May 2018.
[18] Ibid.: 1.
[19] Ibid.: 15.
[20] Ibid.:1

the home and the facility, as well as larger facility size is a correct assumption. This trend is typical of most damage studies, including the 9 environmental damage studies performed by this office that are included in the Addendum.

This study is not considered a reliable indication of potential diminution in value because it measures only the opinion of assessors, who generally are not licensed, certified or designated appraisers. Their charge is not the estimation of market value, but the equalization of property assessment. Though they are concerned with recent sales, the emphasis is on the relationship of assessments to sale ratios in the aggregate.

I.B UNIVERSITY OF RHODE ISLAND STUDY

A study documenting the effect of solar development in Rhode Island and Massachusetts was published in September 2020.[21] "The purpose of this paper is to quantify the externalities associated with proximity to utility-scale solar installations using hedonic valuation."[22] This study used "a difference-in-difference (DID) identification strategy, which compares changes in housing prices after constriction for nearby properties with those further way."[23] The study included 208 solar installations, 71,337 housing transactions occurring within one mile (treated group), and 347,921 transactions between one to three miles (control group).

The study's "results suggest that solar installations negatively affect nearby property values…Property values in the treatment group decline on average 1.7% (or $5,671) relative to the control group."[24] The study also found, with respect to proximity, substantially larger negative impacts on homes located within 0.1 mile of solar installations (-7.0%, or $23,682).

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[21] Vasundhara Gaur and Corey Long, "Property Value Impacts of Commercial-Scale Solar Energy in Massachusetts and Rhode Island," Department of Environmental and National Resource Economics, University of Rhode Island, September, 29, 2020.
[22] Ibid.: 3.
[23] Ibid.: 4.
[24] Ibid.: 4.

This confirms the hypothesis that nearby solar installations are a disamenity.[25] Also, "these **results suggest extremely large disamenities for properties in very close proximity**." [26]

This study, which is based on hundreds of thousands of transactions**, unequivocally has determined that SEGPSs negatively affect nearby property values**, contrary to the claims of solar developers that they have no negative impact.

It is notable, that the conclusions represent an average of all the 208 sites, with both large and small installations, of which some may or may not have a negative affect upon the utility of the nearby property. If the utility of the property is not diminished, or if the expectations of the market are not impacted by the solar facility, then no diminution should be expected. This average includes such properties. For example, this would include modestly priced houses with small lots in large subdivisions opposite a relatively small scaled industrial solar facility where the owner would not have expectations of a view nor would the utility of their homes be impacted by the solar installation. This is evident in the following discussion of the AM Best solar farm.

II. PROFESSIONAL APPRAISAL REPORTS

II.A FRED H. BECK & ASSOCIATES, LLC

The first widely available report documenting property value diminution as a result of proximity to SEGPSs was prepared in 2013 by Fred H. Beck, Jr., MAI, CCIM, MRICS of Denver, North Carolina. The report was prepared for the proposed Webbs Road Solar Farm adjacent to the Sailview Subdivision on Webbs Road and Burton Lane in Denver, Lincoln County, North Carolina. This report summarized the available relevant data from North Carolina at the time it was prepared.

[25] Ibid.: 15.
[26] Ibid.: 17

II.A.1 Strata Solar Case Study

The first case study involves a sale contract that was cancel upon knowledge of the proposed Strata solar farm on Webbs Road. Mr. and Mrs. Daniel McLean owned a 0.60 acre tract with a 2,000 square foot residence at 4301 Burton Lane opposite Sailview Subdivison. The owners listed the property for sale in July 2013 for $225,000. In mid-August 2013, they received an offer to purchase contract for $200,000 with settlement to occur on October 30th. During this period, the public became aware of Strata Solar's proposal. With this knowledge, the **potential purchasers canceled the contract.**

According to the Beck report, the potential purchaser stated:

> The public announcement of the solar farm was the impetus to cancel the contract. Mr. Hibben is in the construction business. He commented the solar farm would be unattractive, and the view would not be complimentary to single family dwellings. He mentioned he could not justify putting money in a dwelling that would be negatively affected by the solar farm for many years. We asked Mr. Hibben if he would reconsider if the purchase price was reduced by $50,000. He said that he would not even consider a more substantial reduction in the purchase price.

Table 1. Impact of Solar Farms on Property Value – Denver, Lincoln County, NC By Fred H. Beck & Associates

Location	Denver, NC
Property Owner	Mr. & Mrs. Daniel McLean
Property Description	2,000 Ft^2 House on 0.6 acres
Advertised Price & Date Listed	$225,000 in July 2013
Event causing potential Buyer to reduce offer	Impaired view caused by Solar Farm
Offer Amount & Date Made	$200,000/August 2013
Potential Settlement Date	October 30, 2013
Event causing Potential Buyer to cancel purchase	Impaired view of Solar Farm caused by potential Buyer to cancel purchase

II.A.2 Clay County Solar Farm Case Studies

Tusquitte Trace Subdivision is a 15 lot, primarily second home development in Hayesville, Clay County, NC. The subdivision was developed in 2006 prior to the 2007 to 2009 recession with houses in the $325,000 range. No lots were sold during the recession. However, from 2009 through 2010, three lots were sold with prices increasing from $73,000 to $75,000. In 2011 an adjacent farmer leased his farm for a small solar facility which was opposite the entrance to the subdivision. As of the date of the report, October 2013, **no additional lots sold.** Real Estate brokers have reported, the "buyers are turned off by the solar array on the adjacent farm, and they chose other lots without impaired views."

In June 2011, Clay County residents successfully petitioned the Board of Equalization to **reduce their assessments an average of -30.0 percent** as a result of the solar farms in the county "hampering their views."

Table 2. Impact of Solar Farms on Property Values – Hayesville, Clay County, NC
By Fred H. Beck & Associates

Location	Hayesville, NC
Type of Development	Subdivision
Date of Development	2006
Price Range of homes	In $325,000 range
Economic Climate	Recession, 2007 - 2009
Activity in 2009 - 2010	Three lots sold in $73,000 - $75,000 range
In 2011, Solar Developer Leases Land across from Subdivision Entrance	Potential purchasers of land adjacent to Subdivision entrance are turned off by impaired view and lose interest.
Subsequent Activity in 2011 - 2013	Potential Buyers were turned off by the solar array to be erected opposite the Entrance.
Subsequent Action by land purchasers	**Purchasers changed their minds and chose other lots in Subdivision without impaired views.**
Community Response	County residents petitioned Clay County Administration to **reduce their assessment by an average of 30% as a result of "impaired views."**

II.A.3 Non-residential Use View Impairment Case Study

This case study examines the effect of an incompatible commercial use on a higher priced residential subdivision in Elgin, Richland County, South Carolina. Southridge is a gated community of houses ranging from $400,000 to $800,000 that were constructed in the mid-2000s. In the fall of 2010, Verizon Wireless competed a 146,000 square foot call center on 29.00 acres adjacent to Southridge. The appraiser analyzed sales within the subdivision both before and after construction of the call center. Prior to construction, the sales appreciated in value, while after construction, **they declined from -10.70 percent to -23.10 percent, or an average of -15.2 percent.**

II.A.4 AM Best Solar Farm Study

This study examines the effect of smaller scaled solar farms on moderately price houses. As of the date of the report, AM Best was one of the few solar facilities adjacent to a developing subdivision. This 6.65 MW Strata Solar plant is in Goldsboro, Wayne County, North Carolina and adjoins Spring Garden Subdivision to the east. Construction, which began in March 2013 was completed in June 2013 on land zoned I-2 (General Industrial). This zoning classification "is established to accommodate the widest range of manufacturing, wholesale and distribution uses, provided the use does not create smoke, dust, noise, vibration or fumes beyond the property line."

The appraiser included a graph indicating the average median housing prices within a 1.00 mile radius of the 42 completed major NC solar farms. The majority of solar farms adjoin houses ranging from $90,000 to $140,000 compared to the $153,000 median price of Spring Garden. Also, a chart is included that represents the average household income within 1.00 mile of the NC solar farms indicating $50,000 to be predominant, which compares to the average Spring Garden household income of $51,543.

This subdivision began development in the late 1990s and at the time of the report had 60 home sites. Most of the lots have dense trees separating them from the solar farm,

however, it is visible during the winter months to potential lots not yet developed. **With no indication of diminution in value, the appraiser concluded that due to the industrial zoning of the solar farm, this market would be aware of the potentially incompatible use to residences and at this price level, the expectations of this market would not discount for proximity to such a use.**

In reviewing reports prepared for various solar developers, this office examined recent sales from this subdivision. Based on their indication of no diminution in value when compared to earlier sales from the same subdivision with more protection from the solar plant, this office concurs with the Beck conclusion. This is an example of a market's perception and expectation of property utility. **Because of the pre-existing industrial zoning of the solar plant, the market does not perceive there to be loss of utility and therefore, no damage to their property value.**

III.A MARK W. HECKMAN REAL ESTATE APPRAISERS

Mark W. Heckman, a Pennsylvania certified general real estate appraiser testified in September 2020 at a Mount Joy Township, Gettysburg, Adams County, PA Board of Supervisors meeting concerning the application of Brookview Solar I, proposed a 75 MW SEGPS on 1,500 acres. Based on the following case studies, the appraiser concluded that the property values of the 114 residences within 1,000 linear feet of the SEGPSs would decline up to 20.00 percent.

III.A.1 Adams County View Case Study

This appraiser compared sales of properties with a Multiple Listing Service (MLS) reported "view" with those without such a designation. "View" was defined as: City, Creek/Stream, Golf Course, Lake, Mountain, Panoramic, Pasture, Pond, River, Scenic Vista, Trees/Woods, Valley and Water.

The MLS search was based on a 3-4 bedroom ranch style single family dwelling on a lot of less than 5.00 acres with and without a "view." The result of the search included a data

set of 85 properties with a "view" which indicated an average sale price of $251,274 and median sale price of $235,000. The data set without a "view" included 410 properties with an average sale price of $227,808 and a median sale price of $215,000. **The difference between the average sale prices was -9.34 percent and the difference between the median sale prices was -8.51%.** (However, the appraiser concluded in the affirmative that the view added 10.31 percent to the average sale price and 9.30 percent to the median sale price).

Table 3. Impact of View on Property Value – Adams County, PA
By Mark W. Heckman Real Estate Appraisers

	With a "View"	Without a "View"
Number of Properties included in study	85	410
Average Sale Price	$251,274	$228,808
Median Sale Price	$235,000	$215,000

- The Impact of View on Property Value is summarized in the Table below:

	Dollar Increase in Price based on "View"	**Percent Increase** in Price based on "View"
Based on Average Sale Price	$22,466	9.34%
Based on Median Sale Price	$20,000	8.87%

The appraiser concluded that, "In Adams County a Good View adds approximately 10% to the value of residential property. So, it is **reasonable to conclude that a loss of 15-20% for degradation of view** is reasonable and credible since many properties would go from Good View to Objectionable View if they now had to see thousands of solar panels."

IV.A MADISON COUNTY INDIANA CASE STUDY

On August 29, 2019 Bethany Keller appeared before the Madison County, Indiana Board of Zoning Appeals to testify with regard to her purchase of an 18.42 acre tract improved with a 2,000 square foot single family residence at 3764 W State Road 28 in Alexandria, Indiana. The property would be surrounded by the proposed Lone Oak Solar

Plant. Aware of the proposed 120 MW solar power plant on 1,890.00 acres, the potential purchasers made an offer of $117,000 on July 31, 2019. The property was appraised on August 14, 2019 for the loan. The appraiser did not know about the proposed solar plant when he appraised the property. The appraised value was $140,000, or a **difference of -16.43 percent**.

According to Mrs. Keller's testimony, "We wanted this property. Then after we found out about the solar farm, we were very hesitant. We are moving forward with it, because this is our dream...We are getting this 16.5% less than appraisal value, and we are still gambling our financial future, our son's financial future, and our future health on this. So if you think this isn't going to affect property values, we are not willing to pay more than this, because we are scared."

VI.A MARY MCCLINTON CLAY, MAI

This office has recently reviewed two reports prepared by Cohn Reznick and Marous & Company for proposed solar farms in Michigan and Indiana, respectively. Included within both reports was an analysis of a case study of the North Star Solar Farm in North Branch, Minnesota. As a result of the errors found within these reports, this office has analyzed the same data that both reports used and refutes their conclusion that there is no negative impact upon adjacent property values.

VI.A.1 North Star Solar PV Case Study – Sale-resales Analysis

As indicated in the previous Western Mustang LLC's Neighborhood Agreement discussion, the North Star SPGPS is the example of such a facility that required the purchase and subsequent resale of adjoining properties.

At the time of its completion, in December 2016, North Star Solar PV was the largest SEGPS in the Midwest. This 1,000.00 acre, 138 MW facility is in North Branch, Minnesota. As a result of pressure from property owners who abutted at least three sides of the SEGPS and as a condition of approval by the Minnesota Public Utilities Commission, the developer

purchased their seven properties and subsequently resold them. The following chart summarizes the sale-resales data of these seven properties.[27] Two maps depicting these properties follow.

The chart depicting the seven sales purchased and resold by the developer, CER Land, LLC, for deed transfer purposes, includes three transfers for each property. The first deed represents the sale to the original property owner, which is an arms-length or market sale because it meets the definition of market value.[28] The second sale is from the original owner to CER Land, LLC. This is not considered a market value sale because it does not meet the definition of market value, primarily because it was negotiated under duress. The third sale is from the developer to new owner (except for Sale-resale No. 1 which was sold back to the original owner). The third sale is considered to be a market value sale because, with the exception of

No. 1, the sales were adequately exposed to the market having been placed on the local Multiple Listing Service.

Because the first and third sale for each property are market value sales, it is possible to apply the sale-resale methodology to these sales to determine if they indicate a "before and after" change in value. The first sale represents a sale that occurred before any knowledge of the solar development existed, while the third sale occurred after construction of the facility. Generally, the only difference between the two sales is time, also referred to as market condition.

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[27] The sales data was obtained from county records, MLS data, and information present to the Minnesota Public Utilities Commission on March 15, 2016 regarding the resolution of the negotiations with landowners.

[28] Definition of Market or Arms-length Sale: A transaction between unrelated parties who are each acting in his or her own best interest. *The Dictionary of Real Estate Appraisal*, 5th ed., s.v. "arms-length transaction." Definition of Market Value: The most probable price that the specified property interest should sell for in a competitive market after a reasonable exposure time, as of a specified date, in cash, or in terms equivalent to cash, under all conditions requisite to a fair sale, with the buyer and seller each acting prudently, knowledgeably, for self-interest and assuming that neither is under duress. *The Dictionary of Real Estate Appraisal*, 5th ed., s.v. "market value."

In order to compare the two sales, an adjustment must be made to the older sale to bring it up to the value level of the second sale. This is done by making a time adjustment based on supporting data from the market. The following chart represents the annual median and average sale price for houses in North Branch and Chisago County.[29] The median sale price for North Branch, specifically, was judged to be the most relevant of the two sources since it does not include the extreme values.

This data was used to calculate the compound rate of increase from the date of the first sale to the second sale and then increase the first sale by the indicated rate. After this adjustment is made, then the adjusted sale price of the first sale can be compared to the sale price of the third sale and an difference in the two sale prices will indicate if there is a diminution in value as a result of the construction of the SEGPS.

Description of the Sales Chart

For ease of comparing the sales data at once, the North Star sales are depicted on the North Star Solar Farm Sale-resale Comparison Chart. The following describes each column of the chart.

Sale-resale: This column identifies the 7 transactions that involved the developer of North Star.

Parcel No.: This is the Chisago County Tax Assessors identifying number of the property.

Address: This is the street address of the property being analyzed.

Sale Date: This is the date that the deed was transferred, i.e. the date on the deed. This date is not to be confused with the date that the deed was recorded, which is sometimes a few days later.

Grantor: This is the seller of the property.

Grantee: This is the buyer of the property.

[29] The time adjustment chart was prepared by David Abbot, a statistician with the Minneapolis Area Board of Realtors.

Net Sale Price: The net sale price is the gross sale price less any money paid by the seller that was applied to reduce the sale price. If the sale price includes any seller paid amount, it will be described in the note after the property transactions.

$ Change: This is the dollar amount difference between the first and second sale, as well as the dollar amount difference between the second and third sale.

% Change: This is the percentage difference between the first and second sale, as well as the percentage difference between the second and third sale.

Annual % Change: This is the annualized rate of change between the first and second sale.

Sale Tax Assessment: This is the property tax assessment of the property as of the date of sale.

Comments: The comments include a description of the property in the following order: date of construction; square footage above ground level; architectural design (3 or 4 level split, 1-story, tri-level, split entry); basement square footage of finish; number of bedrooms and baths; location of solar farm, i.e. rear and front.

Also, under comments, the time adjustment is made from the date of the first sale to the date of the third sale. This includes calculating the number of years between the two sales and determining the rate or percentage change between these two years based on the North Branch median sale price chart. After the number of years is determined and the rate of increase between that time, these numbers are applied to the first sale price which adjusts it the level of the third sale price. In other words, this indicates, in the first example, that the value of the $216,000 sale price in 7.9 years increased at 6.8 percent, is $364,296.

Sale-Resale Analysis

The following is a discussion of the results of each of the seven properties with the first sale adjusted for time from its sale date to the date of the third sale and the resulting comparison of the two sales, adjusted for time, to determine if there is a change in value.

Regarding Sale-Resale No. 1, Scott Dornbusch not only sold his property to CER Land, LLC, for $360,000, but he bought it back for $302,500. However, with respect to the comparison between the first sale price, increased for time, to the date of the third sale, this example indicates a **diminution in value of -17.0 percent.** Although this sale-resale is not arms-length, it is nonetheless, consistent with the other 6 arms-length sales. Because this sale was repurchased by the same individual, it is reasonable that his prior invested interest in the property would indicate this to be a minimal indication of value loss.

Sale-resale No. 2 is the property on the south side of 367th surrounded on three sides by the solar plant. The rear 6.24 acres of this property was encumbered by a 30 year lease to North Star Solar PV, LLC at a rate of $1,000 per year to be increased at 1.0 percent annually. This example represents a highest rate of **decline in value of -28.0 percent.** The most predominant rate of decrease is 17.00 percent (Sale/resales No. 1, No. 3, and No. 4), which suggests that this encumbrance would add an additional 11.00 percent, despite that it contributes an annual income stream of $12,000.

Sale-resale No. 3 represent an original sale that occurred in 2000 that was extensively renovated, subsequent to that sale, with the additional construction of a pole barn. The seller indicated that the cost of such improvements was approximately $100,000. Adjusted for these improvements, this sale-resale **indicates -16.0 percent diminution in value.**

Sale-resale No. 4 is at the corner of Keystone Avenue and represents a **diminution in value of -12.9 percent.**

Sale-resale No. 5 **does not indicate a decrease in value** between the original sale and the second resale. However, the sale price does not reflect the addition of a pole barn in the

estimates. According to reports from the Chisago County Assessor's office more than one purchaser indicated that they did not consider the solar plant to be detrimental—in fact, they preferred this industrial use to having neighbors.

Sale-resale No. 6 **indicates a -6.3 percent diminution in value.**

Sale-resale No. 7 is the largest property among this group on the west side of Keystone Avenue. This example indicates a **diminution in value of -3.5 percent**. The first purchaser reported that the last purchaser stated that, "he did not want neighbors."

The sale-resales indicate a range of diminution in value from 0 to -28.0 percent, or an average of -12.5 percent and a median of -15.9 percent. **The median of -15.9 percent diminution in value is consistent with the indication from the Madison County Indiana case study with a -16.43 percent value decline.**

It is notable that CER Land, LLC purchased the seven properties for a total of $2,773,000 and sold them for $2,143,044. This represents a loss of -$629,956, or -22.72 percent.

CERTIFICATION

The undersigned does hereby certify that, except as otherwise noted in this appraisal report.

To the best of my knowledge and belief, the statements of facts contained in this appraisal report are true and correct.

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

I have no present or prospective interest in the property, that is the subject of the work under review, and I have no personal interest with respect to the parties involved.

I have performed no services, as an appraiser or in any other capacity, regarding the property that is the subject of the work under review within the three-year period immediately preceding acceptance of this assignment.

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

My compensation for completing this assignment is not contingent upon the development or reporting of predetermined assignment results or assignment results that favors the cause of the client, the attainment of a stipulated result, or the occurrence of a subsequent event directly related to the intended use of this appraisal review.

My analysis, opinions, and conclusions were developed and this review report was prepared in conformity with the *Uniform Standards of Professional Appraisal Practice.*

I have not made a personal inspection of the subject of the work under review.

No one provided significant appraisal or appraisal review assistance to the person signing this certification.

Mary McClinton Clay, MAI

March 23, 2021

STATEMENT OF LIMITING CONDITIONS

1. No liability is assumed an account of matters of legal character affecting the property such as title defects, liens, encroachments, overlapping boundaries, etc.
2. No survey was made of the property.
3. Value is reported in dollars on the basis of the current prevailing market on the date of appraisal. The current purchasing power of the dollar is the basis for the value reported.
4. The distribution of the total valuation between land and the improvements applies only under the existing program of utilization and conditions stated in this report. The separate valuations for land and building must not be used in conjunction with any other appraisal and is invalidated under the programs of utilization of conditions, or if used in making the summation appraisal.
5. Possession of this report or copy thereof does not carry with it the right to publication nor may it be used for any purpose by any but the applicant without the previous written consent of the appraiser(s), and in any event, only in its entirety.
6. The information contained in this report, gathered from reliable sources, and opinion is furnished by others, were considered correct, however, no responsibility is assumed as to the accuracy thereof.
7. The appraiser(s) is not required to give testimony in court with reference to the subject property unless further arrangements are made.
8. No liability is assumed for subsoil conditions which would adversely affect construction.
9. "The American Institute of Real Estate Appraisers conducts a voluntary program of continuing education for its designated members. MAI's who meet the minimum standards of this program are awarded periodic education certification." Mary McClinton Clay, MAI has completed this program.
10. Environmental Disclaimer: The values estimated in this damage study is based on the assumption that the property is negatively affected by the existence of detrimental environmental conditions as described within the report. The appraiser is not an expert in the identification of hazardous substance and detrimental environmental conditions. The appraiser's routine inspection of and inquiries about the subject property established the basis for the analysis of the market reaction to the detrimental conditions reported by the owner and neighbors. It is possible that test and inspection made by a qualified hazardous substance and environmental expert would reveal, qualify and quantify the existence of hazardous materials and environmental conditions on or around the property that would negatively affect its value.

MARY MCCLINTON CLAY
PROFESSIONAL QUALIFICATIONS

Mary McClinton Clay, MAI
218 Main Street, Paris, KY 40361
859-987-5698/Cell: 859-707-5575
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Market Area: Commonwealth of Kentucky

Primary Practice Focus: Litigation and zoning support with an emphasis on damage studies, including environmental and eminent domain.

Appraisal Experience:
1985 to Present: Self-employed - engaged in commercial, industrial and farm valuation.
1979-1984: Employed by Realty Research - engaged primarily in income property appraisal.
1976-1979: Residential appraisal experience with fee appraisers.

Previous assignments include: Eastern State Hospital; Gateway Shopping Center; Lakeside Heights Nursing Home, N. KY; L&N Office Building, Louisville; Alltech Biotechnology Center, Nicholasville, Paris Stockyards; Conrad Chevrolet, Lexington; CSX Rail Yards in Mt. Sterling and Paris; First Baptist Church, Cold Spring; Lusk-McFarland Funeral Home, Paris; Feasibility Study of proposed Hamburg Place Office/Industrial Park, Lexington; Rent Analysis of IRS Service Center, Covington; Surtech Coating, Nicholasville; Clem Refrigerated Warehouse, Lexington; Bluegrass Manufacturing, Lexington; Finley Adhesives, Louisville; Central Manufacturing and Central Light Alloy, Paris; Review Appraisal of Rand McNally Plant, Versailles and Timberland Distribution, Danville; Old Scott County Jail; Millspring Battlefield; Truck Terminals, Fast Food Restaurants, Retail Centers, Lumber Mills, Car Wash, Multi-Family Residential, Mobile Home Parks, Convenient Stores and Subdivision Analyses.

Thoroughbred Horse Farms including Pin Oak Farm, Bunker Hunt Farms, Pillar Stud Farms, Elmendorf Farm, Summer Wind Farm, Hidaway Farm, Stoner Creek Stud, Runnymede Farm, Wilshire Farm, Lynnwood Farms, Stonereath Farm, Idle Hour Farm, Canefield Farm, Elk Creek Farm, Lochness Farm, Stoneleigh Farm, Elizabeth Station Farm.

Right of Way Experience: Rose Street Extension, Lexington, 1986-87; AA Highway: Greenup Co., 1989, Carter Co., 1990-91; U.S. 27 Campbell Co. 1991-1992, 1993; Bridge Realignment, Walton, 1992; Industry Rd, Louisville, 1993; 19th St. Bridge, Covington, 1994; U.S. 27, Alexandria, 1994; S. Main St., London, 1995; Paris Pike, Paris and Bourbon County, 1995-98; KY Hwy 22 at I-75, Dry Ridge, 1996; Bridge Projects on KY Hwy 19, Whitley County, 1997; US 150, Danville, 1998; US 460 Morgan Co., 1999; US 62 South, Georgetown, 2000; Bluegrass Pkwy and KY 27 Interchange, Anderson Co., 2001; KY 519, Rowan County, 2002; US 641, Crittenden County, 2005; US 25, Madison County, 2008-09; US 68, Bourbon County, 2009-10; Clark County, 2011; US 68 Millersburg By-pass, Bourbon County, 2012-13; US 119, Bell County, 2014-15; US 25, Madison County, 2016-17; Excess Land, Georgetown By-pass, 2020; Access Break, Industrial Drive, Lebanon, 2020.

Railroad Right of Way Experience: CSX in Floyd, Perry, Clark, Woodford, Franklin, Montgomery, Johnson, Magoffin, Breathitt, Fayette, Madison, Mason, and Bourbon Counties, 1987-2016.

Rails to Trails: Rowan County, 2005; Montgomery County, 2009, Franklin County, 2014; Floyd County, 2016.

MARY MCCLINTON CLAY
PROFESSIONAL QUALIFICATIONS

Environmental Damage Studies: *Yellow Creek Concerned Citizens v. Middlesboro Tannery*: effect of tannery contamination on 350 properties along Yellow Creek, Bell County, KY, 1988; *James E. Sullivan, et al v. Board of Regents, et al*: effect of Animal Waste Fermentation Project at the Organic Pasteurization Plant at North Farm of Murray State University on Sullivan's Executive Par 3 Golf Course and Sports Center, Murray, KY, 2003; West Farm Subdivision, Pulaski County: effect of contamination of groundwater from underground storage of dry cleaning solvents on residential lot values, 2004; *Gene Nettles, et al v. Environmental and Public Protection Cabinet: Division of Water, David Morgan, Director and J.P. Amberg Hog Farm*: Diminution of Value Analysis As a Result of Proximity to Hog Facilities in Daviess, Warren, Calloway, Graves, Hickman and Carlisle Counties, Kentucky, 2006; *Terry Powell, et al v. Tosh, et al*: Diminution of Value Analysis as a Result of Proximity to Hog CAFOs in Marshall County, KY, 2007; City of Versailles v. Prichard Farm Partnership, Ltd,: effect of sewage treatment pump station and ancillary easements upon Woodford County cattle farm, 2008; *Kentucky Utilities Company v. James and Mary Jent, CDH Preserve, LLC and Farm Credit Services of Mid-America, FLC, Violet Monroe:* the effect of High Voltage Transmission Lines on three Hardin County agricultural properties, 2011; *Terrence G. Kerschner, et al v. Burley Oil Company, et al:* the effect of Leaking Underground Gasoline Tanks on Country Lane Estates, Frankfort, KY, 2013; *Jerry Whitson v. Donnie Cross:* effect of Drainage Encroachment upon Adjacent Property, 2013; the effect of Cell Tower on Bourbon County Farm, 2014; *Steve D. Hubbard v. Prestress Services Industries, LLC*: effect of Fugitive Particulate Emissions upon a Single Family Dwelling, 2016; *Henderson City-County Airport v. Mary Janet Williams, et. al.*: the effect of Proximity of a Regional General Aviation Airport on Agricultural Values, 2019; *Patricia Kushino, et al v. Federal Aviation Administration, et al*: the effect of Stormwater Drainage on Woodland Value, 2021.

Additional Damage Studies:
Faulty Construction: 172 Post Oak Road, Paris, KY; 152 Cross Creek Drive, Paris, KY; Hartland Subdivision, Lexington, KY
Flood Damage: 208 Cary Lane, Elizabethtown, KY
Blasting Damage: Chicken Farm, Tolesboro KY
Super Fund Sites: KY Wood Preserving, Inc., Winchester, KY; River Metals Recycling, Somerset, KY

Expert Witness: Circuit Courts of Bourbon, Carter, Fayette, Franklin, Hardin, Laurel and Woodford Counties

Court Testimony:
Laurel Circuit Court: *Yellow Creek Concerned Citizens v. Middlesboro Tannery*, 1995.
Franklin County Circuit Court: *Richard McGehee v. Commonwealth of Kentucky Transportation Cabinet*, 2008; *Terrence G. Kerschner, et al v. Burley Oil Company, et al, 2014.*
Hardin County Circuit Court: *Richard McGehee v. Commonwealth of Kentucky Transportation Cabinet*, 2008.
Woodford County: *Horn v. Horn*, 2009
Bourbon County Circuit Court: Blasting Case, 1980s; Waterway Impediment Case, 2000; Faulty Construction, 2009, *Hadden v. Linville*, 2015.
Fayette County Circuit Court: Faulty Construction, 1980s; Bluegrass Manufacturing (Divorce Case), 1999, *Whitson v. Cross*: Drainage Encroachment, 2013.
Carter County: Condemnation for Commonwealth of KY Transportation Cabinet.

MARY MCCLINTON CLAY
PROFESSIONAL QUALIFICATIONS

Conservation and Wetland Easements: Bluegrass Heights Farm, Fayette County: Conservation and Preservation Easement; Wetland Easements in Pulaski, Lincoln, and Fulton Counties for NRCS.

Zoning Support: *John Vance, et al v. Paris City Commission* 2019; *Citizens for Progressive Growth and Development v. Paris Bourbon County Planning Commission* 2004-2007 and 2016; *Paris First v. Paris Bourbon County Planning Commission* 2003-2006; *Paris First v. Paris City Commission* 2002-2003; *Coppers Run Historic District, Inc. v. Abundant Life Worship Center* 1995; *Sugar Grove Farm v. East Kentucky Power* 1994-1996; *Lawrence Simpson, et al v. Harry Laytart* 1986-1996.

Professional Organizations:
Appraisal Institute: MAI, 1985; SRPA, 1982; SRA, 1980

Appraisal Institute Education Certification:
The Appraisal Institute conducts a voluntary program of continuing education for its designated members. I am certified under this program through December 31, 2023.

Education: Hollins College, B.A., 1972

Appraisal Education: Society of Real Estate Appraisers Course 101, 1977; SREA Course 201, 1978; SREA Course 301, 1981; AIREA Course VIII, 1979; AIREA Course VI, 1979; AIREA Course II, 1980; AIREA Course in Investment Analysis, 1980; AIREA Course in Valuation Litigation, March, 1986; Appraisal Institute Standards of Professional Practice, 1992; AIREA Comprehensive Examination, August, 1983; Courses in Real Estate Finance, Income Property Appraisal, Real Property Valuation, and Investment Analysis, 1977-1978, Eastern Kentucky University; Appraisal Institute Course 400G, Market Analysis/Highest and Best Use, 2008, Conservation Easement Certification, 2008.

Attended numerous seminars covering a variety of topics including investment analysis, feasibility and market analysis, eminent domain and condemnation, valuation of lease interests, component depreciation, risk analysis, current issues in subdivision and zoning law, Yellow Book and appraiser as expert witness.

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