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February 26, 2021

TO: FILINGS DIVISION

RE: Case No. 2020-00206

ELECTRONIC APPLICATION OF AEUG FLEMING SOLAR, LLC FOR A
CERTIFICATE OF CONSTRUCTION FOR AN APPROXIMATELY 188
MEGAWATT MERCHANT ELECTRIC SOLAR GENERATING FACILITY IN
FLEMING 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 Harvey Economics, "Review and Evaluation of the AEUG Fleming Solar, LLC Site Assessment Report," dated February 26, 2021.

Sincerely,

A handwritten signature in blue ink that reads "Linda C. Bridwell".

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

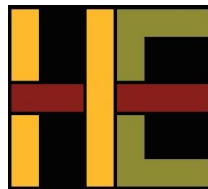
Attachment

cc: Parties of Record

Review and Evaluation of the AEUG Fleming Solar, LLC Site Assessment Report

**Kentucky Public Service Commission and
Kentucky State Board on Electrical Generation and
Transmission Siting**

February 26, 2021



Report

February 26, 2021

Review and Evaluation of the AEUG Fleming Solar, LLC Site Assessment Report

Prepared for

Kentucky Public Service Commission and
Kentucky State Board on Electrical Generation and Transmission Siting
211 Sower Boulevard
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February 26, 2021

Mr. Quang Nguyen
Assistant General Counsel
Kentucky Public Service Commission
211 Sower Blvd.
Frankfort, KY 40601

**Re: Harvey Economics' Review of AEUG Fleming Solar, LLC's Site
Assessment Report for Solar Facilities in Fleming County, Kentucky**

Dear Mr. Nguyen,

Harvey Economics is pleased to provide you with our final report, *Review and Evaluation of the AEUG Fleming Solar, LLC Site Assessment Report*.

Yours truly,

Edward F. Harvey
Principal

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SECTION 1

Introduction

This document provides a review of the Site Assessment Report (SAR) for the proposed AEUG Fleming solar facility (Project) submitted to the Kentucky State Board on Electric Generation and Transmission Siting (Siting Board). The SAR was submitted to the Siting Board by AEUG Fleming Solar, LLC on November 25, 2020. Siting Board staff retained Harvey Economics (HE) to perform a review of the SAR. AEUG Fleming Solar, LLC (AEUG Fleming or Applicant) has submitted the SAR as part of its application for a construction certificate to construct a merchant electric generating facility under KRS 278.706 and 807 KAR 5:110. Requirements specific to the SAR are defined under KRS 278.708.

Statutes Applicable to the SAR Review

KRS 278.706 outlines the requirements for an application to receive a certificate to construct a merchant electric generating facility. Section (2)(l) of that statute requires the Applicant to prepare a SAR, as specified under KRS 278.708. The AEUG Fleming SAR is the main focus of HE's review. However, the Siting Board also requested that HE review the economic impact report prepared by the Applicant. The economic impact report is a requirement of the application under KRS 278.706(2)(j), separate from the SAR.

KRS 278.708(3) states the following:

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. Surrounding land uses for residential, commercial, agricultural, and recreational purposes;
 2. The legal boundaries of the proposed site;
 3. Proposed access control to the site;
 4. The location of facility buildings, transmission lines, and other structures;
 5. Location and use of access ways, internal roads, and railways;
 6. Existing or proposed utilities to service facility;
 7. Compliance with applicable setback requirements as provided under KRS 278.704(2), (3), (4), or (5); and
 8. Evaluation of the noise levels expected to be produced by the facility.

- (b) An evaluation of the compatibility of the facility with scenic surroundings;
- (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;
- (d) Evaluation of anticipated peak and average noise levels associated with the facility's construction and operation at the property boundary; and
- (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.

KRS 278.708(4) states that “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.”

KRS 278.706(2)(j) states that a completed application shall include “an analysis of the proposed facility's economic impact on the affected region and the state.”

KRS 278.706(2)(d) addresses specific setback requirements, as related to distances from adjacent property owners of various types (i.e., residential neighborhoods, schools, hospitals, nursing homes).

SAR Review Process and Methodology

HE completed the following tasks as part of the review of the AEUG Fleming SAR and certain other components of the AEUG Fleming Application:

- Review of the contents and information provided in the site assessment report, application and other documents provided by the Applicant;¹
- Brief review of secondary data sources to obtain background information and geographic setting for the AEUG Fleming Project;
- Limited review of relevant evaluation criteria to identify potential issues and assessment approaches to serve as benchmarks for the adequacy review;
- Identification of additional information we deemed useful for a thorough review, and submittal of questions to the Applicant via Kentucky Public Service Commission Assistant General Counsel;

¹ AEUG Fleming Solar, LLC has submitted a motion for deviation from the setback requirements. That document includes a 15-page letter from AEUG Fleming Solar, LLC counsel, along with several attached Exhibits.

- Review of additional information supplied by the Applicant in response to first submitted HE questions, and discussion of responses with the Siting Board staff;
- Completion of interviews and data collection with outside sources as identified in this document;
- Review of additional information supplied by the Applicant in response to a second set of questions submitted by HE, and discussion of responses with the Siting Board staff;
- Participation in a site visit, including a tour of the Project site with the Applicant and in-person meetings with local officials;
- Completion of analyses and evaluation of the impacts upon each of the previous identified resources; and
- Preparation of this report, which provides HE’s conclusions as to potential Project impacts and mitigation recommendations.

Components of the AEUG Fleming Solar Facility SAR

AEUG Fleming Solar, LLC’s Application to the Siting Board consists of multiple documents included in two volumes.

- Volume 1: The first volume includes:
 - Numerous maps of the project area;
 - Proof of notice of application;
 - Public involvement documents;
 - Certificates of compliance with local regulations;
 - Generation interconnection feasibility and system impact study reports;
 - Economic impact report; and
 - Certificate of authority.
- Volume 2: The second volume is comprised of the SAR, including a summary addressing each requirement of KRS 278.708 and the following “exhibits” or attachments:
 - Property Value Impact Report – includes the Kirkland Appraisals, LLC report (Kirkland report);

- Legal Description of Site – narrative description and map of property;
- Noise and Traffic Study;
- Environmental Site Assessment – Phase 1 Report;
- Preliminary Site Layout, which consists of two figures of the property and project facilities; and
- Visual Assessment Report.

In addition to the application, AEUG Fleming Solar, LLC also provided the Siting Board with a document titled Applicant’s Motion for Deviation from Setback Requirements, which HE reviewed and considered as part of the evaluation of the proposed site development plan.

Additional Information Provided by the Applicant

Once HE reviewed the contents of the SAR, HE and the Siting Board staff independently developed a first list of detailed questions, either requesting additional information or asking for clarification about items in the SAR. The Siting Board staff submitted the first request for information, including questions from HE, on January 8, 2021; AEUG Fleming provided written responses on January 22, 2021.

After HE and the Siting Board staff reviewed AEUG Fleming’s responses to the first request for information, HE and the Siting Board staff independently developed a second list of detailed questions. The Siting Board staff submitted the second request for information, including questions from HE, on February 5, 2019. AEUG Fleming provided written responses to the second request for information on February 19, 2021.

After HE and the Siting Board staff reviewed AEUG Fleming’s responses to the second request for information, HE and certain representatives from the Siting Board met with the Applicant for an in-person meeting on February 23, 2021 to conduct a site visit and discuss remaining issues.

Report Format

This report is intended to support the Siting Board in its decision-making process pertaining to a construction certificate for AEUG Fleming Solar, LLC. The report is structured to respond to the requirements for a SAR as outlined in KRS 278.708, the economic analysis described in KRS 278.706(j) and to our contract:

- This section of the report, Section 1, introduces the purpose and process of the SAR review and HE’s work;
- Section 2 offers a summary and conclusions as to the results of HE’s SAR evaluation;
- Section 3 describes the AEUG Fleming Project and proposed site development plan;

- Section 4 provides a brief profile of Fleming County’s economic and demographic characteristics as context for the Project setting;
- Section 5 offers detailed findings and conclusions for each resource area; and
- Section 6 presents recommendations concerning mitigation measures and future Siting Board actions.

Caveats and Limitations

Review limited to resource areas/issues enumerated in the statutes. HE’s evaluation of the AEUG Fleming Project is contractually limited to a review of the SAR and associated materials, as well as the economic impact analysis. Statutes dictate the issues to be covered in the SAR; HE focused on those specific topic areas that are addressed in this report. For these reasons, cumulative impacts were not addressed. The Siting Board might have additional interests or concerns related to the construction, siting, or operation of the Project; those may be addressed in other documents or by other parties.

Level of review detail determined by expert judgement. KRS 278.708 identifies the required components of an SAR; however, the level of scrutiny and detail of the evaluation depends upon expert judgement as to what information is relevant and what level of detail is appropriate. This level of review generally relates to the assessment methodologies, geographic extent of impacts and the degree of detailed information about the Project as requested by the consultant in follow-up inquiries. Given our experience related to project impact assessments and evaluation of impacts on various socioeconomic and natural resource components, HE believes that we have performed a thorough and comprehensive review of the AEUG Fleming SAR, which will meet the needs of the Siting Board.

Assumption of accurate Applicant data. HE reviewed all the data and information provided by the Applicant as part of the SAR and associated documents, including responses to two sets of inquiries and follow-up discussions. Although we evaluated Applicant data for consistency and clarity as part of our review, we did not perform any type of audit to confirm the accuracy of the provided information. We assume that the Applicant has provided an honest representation of the Project, based on the best data available at the time.

In instances where the Applicant was unsure about certain aspects of the Project, such as exactly where the solar panels would be placed, HE assumed a “worst case” for the purposes of the impact analysis. Should the actual Project development deviate in a manner that materially changes the Project magnitude or location of impacts, or affected parties, the Applicant can be required to notify the Siting Board for it to evaluate such a deviation and take appropriate action as deemed necessary. See mitigation recommendations in Section 6.

Cumulative impacts not evaluated. During its review process, HE became aware that a second solar energy generation facility is being contemplated by a different company for location in Fleming County. As known at the time of this report preparation, the Core Solar Energy project would be an 80 megawatt (MW) facility on approximately 770 acres to the northeast of the AEUG Fleming Project. In the interest of full disclosure to the Siting Board

and public, we have identified this facility and noted the potential for cumulative impacts on the local area from the two facilities, but we have not performed any analyses to quantify or address the full scope of cumulative impacts.

SECTION 2

Summary and Conclusions

AEUG Fleming Solar, LLC (AEUG Fleming or Applicant) proposes to construct a 188-megawatt alternating current photovoltaic electricity generation facility (Project) in Fleming County, KY, generally located between Elizaville, Flemingsburg Junction and Flemingsburg. On November 2020, AEUG Fleming applied to the Kentucky State Board on Electric Generation and Transmission Siting (Siting Board) for a construction certificate to construct a merchant electric generation facility. AEUG Fleming’s application responded to the statutory requirements set forth by the State of Kentucky in KRS 278.706 and 278.708.

The Siting Board retained Harvey Economics (HE) to review and evaluate the Site Assessment Report (SAR) included in the AEUG Fleming application, as well as other supporting information provided by the Applicant. In addition to the topic areas included in the SAR, HE also addressed the Applicant’s economic impact analysis and the topic of decommissioning. The results and conclusions of HE’s review and evaluation are provided below. Recommended mitigation measures are offered in Section 6 of this report.

Facility Description and Site Development Plan

The Project site encompasses a total of about 1,860 acres of rural agricultural land with solar components covering approximately 1,590 acres. Solar infrastructure will include about 510,300 solar panels, 70 inverters, the racking system, a substation, the warehouse, and an operations and maintenance building. The power generated by the Project will be linked to the electric transmission grid via the existing Flemingsburg-Spurlock 138-kilovolt (kV) line. The AEUG Fleming substation will connect with a new Point of Interconnection (POI) switching station to be constructed and operated by the East Kentucky Power Cooperative.

- ***Surrounding land uses*** – The area around the Project site can be generally described as rural agricultural, with rolling hills and some trees. Acreage surrounding the Project site is largely residential agriculture, with additional smaller sections of purely agricultural land or residential properties. Adjacent parcels also include one commercial property and one religious facility. Altogether, 76 individual parcels of land, varying in size from less than one acre to more than 300 acres, are located adjacent to the Project site.²
- ***Proximity to homes and other structures*** – A total of 57 residential structures, one industrial structure and 21 “other” structures (including barns, warehouses, and similar ancillary structures) would be located within 1,200 feet of the property fence.

² Five of the 76 properties included as adjoining parcels do not have any adjoining linear feet to the Project site; those were included as recognition that the parcel data available may have some errors and that those properties were close enough that complete survey and title work may render them adjoining.

Five homes would be located within 300 feet of the property fence and four homes would be located within 300 feet of the nearest solar panels.

- ***Locations of structures*** – Solar panels, inverters and the racking system will be located throughout the property. The sole transformer will be located within the substation, which, along with the warehouse and the operations and maintenance facility, will be in the eastern portion of the Project site. The Flemingsburg-Spurlock 138 kV transmission line generally runs in a north-south direction and is also located within the eastern portion of the Project site.
- ***Locations of access ways*** – Ten potential access points/access roads will allow access to different areas of the property during construction and operations. Those access points include three access roads from Highway 32; four from Old Convict Road (Highway 559); one from Junction Road (Highway 170); and two from Nepton Road (Highway 367). The point of access nearest the substation and the operations and maintenance facility will be the primary access point and the most heavily trafficked.
- ***Access control*** – Security fencing (six-foot high chain link fencing topped with barbed wire) will enclose the facility during construction and operation. During construction, site access will be controlled with dedicated guards or with electronic gating systems. During operations, all gates will have access control systems and the main gate (to the operations and maintenance facility and the substation) will also have cameras.
- ***Utility service*** – Electric power will be provided by the local utility company. Domestic water will be supplied by a new well to be located at the operations and maintenance facility. Wastewater disposal will be accommodated by an on-site septic system, serviced by a local disposal provider.
- ***Project life***—The Applicant anticipates at least a 30-year Project life.

Major Project construction is expected to last approximately 15 months. Construction of the Point of Interconnection with the Substation may require up to 18 months. An estimated average of 346 workers will be on-site throughout the construction period, with a peak of 600 workers on-site over the course of several weeks. The Project construction schedule and description of construction activities is provided in Section 3.

Setback requirements and requested deviation. As proposed, the AEUG Fleming Project does not meet existing setback requirements. The Applicant has entered a motion for a deviation from these requirements. HE reviewed this motion and believes that the Project meets the specific statutes of a setback deviation. The Siting Board must determine if these measures are sufficient.

Conclusions and recommendations. HE believes that the Applicant has generally complied with the legislative requirements for describing the facility and a site development plan, as required by KRS 278.708.

Project Setting

Fleming County had a 2019 population of about 14,600 people. Population levels have been stable and are projected to remain so. The City of Flemingsburg has an estimated 2,800 residents. The area around the Project site can be generally described as rural and agricultural. The County population is relatively older. Residents' income levels are low, and they experience higher than average rates of poverty than in other counties in Kentucky and the U.S.

Compatibility with Scenic Surroundings

The area surrounding the Project is agricultural and residential. Rolling hills and groups of trees help mitigate against any negative visual impacts to residents and commuters, but since the area is converted farmland, there are numerous open spaces that make the solar panels visible from many different viewpoints. Local residents indicate that they value the agrarian aesthetic in Fleming County.

Scenic compatibility focuses on the solar panels with a height above ground of six feet and ten feet at full angle. A small portion of the Project is visible from Kentucky Route (KR)-32, on the south end of the Project site. A majority of the northern portion of the Project will be visible from KR-559. Few native visual buffers exist along the north side of the Project, making it visible to commuters and residents. A portion of the noncontiguous western parcel will also be visible to commuters and residents.

The Applicant has not finalized a specific plan for vegetative buffers, which would at least partially shield the Project from any negative visual impacts; however, the Applicant has committed to working with neighboring homeowners and business owners to address concerns related to visual impacts of the Project.

Any glare resulting from the panels will be mitigated by the Applicant's selection of anti-glare solar panels or operation of tilting the panels, either in the morning or late afternoon.

Potential Changes in Property Values and Land Use

The Applicant's consultant, Kirkland, prepared an extensive data collection effort and analysis of property value impacts of solar facilities in diverse locations, concluding that the Project would have no effect on property values during construction or once in operation. To further assess potential property value impacts, HE: (1) reviewed existing literature related to solar facility impacts; (2) conducted interviews with several local real estate professionals; and (3) prepared further analysis of the data from Kirkland.

The Fleming County Property Valuation Administrator and local realtors have concerns regarding potential effects on property values, especially in one higher value neighborhood located to the southeast of the Project. One recent academic study indicated the potential for negative impacts to property values for homes in close proximity to solar facilities; however, most recent studies indicated no impacts to property values related to solar facilities. HE's further evaluation of the data provided by Kirkland also suggests that property values are

unlikely to be affected by solar facilities, although some uncertainty exists. Mitigation of visual and other effects, with close property owner coordination, can minimize that uncertainty. This conclusion is predicated on the assumption that the mitigation strategies discussed in Section 6 are adopted by AEUG Fleming and the Siting Board.

Anticipated Peak and Average Noise Levels

The baseline noise levels in the area are quiet and tranquil. During construction, most of the noise from the Project site will be intermittent and not cause permanent ear damage to nearby residents. The noise from construction activities will be annoying to some nearby residents for up to as many as 12 months.

Construction equipment, especially pile drivers, will produce noises that the EPA classifies as annoying for residents within at least 4,400 feet from the originating sound. The tamping process, by which posts are pounded into the ground, will be particularly annoying for up to 40 weeks, especially for residents nearest the Project boundaries. Thus, construction activities have the potential to be annoying, but not harmful, to residents in the area for as many as 12 months.

During operations, the inverters are expected to have the most noticeable impact on residents. At least 23 residences, and possibly more, could be regularly annoyed by operations of the inverters since they do not turn off at night and continue to hum throughout the night. The Applicant has not yet pledged any specific plan to plant vegetative buffers that would help mitigate against operational noise of the inverters. The transformer (located in the substation) and tracking motors (that tilt the panels throughout the day) are not expected to be a source of annoyance for any resident.

Road and Rail Traffic, Fugitive Dust and Road Degradation

Traffic impacts during construction have the potential to cause stress for commuters, especially for teenage drivers near the Fleming County High School. The entrance to the primary access point for construction traffic will be about 700 feet from the entrance to the High School, along KR-32. Traffic congestion at the primary Project access point along KR-32 will also be evident during construction. Traffic increases will be substantial on KR-559 and Nepton Road, but existing traffic is minimal at present. There will be no noticeable traffic impacts during operations.

The Applicant has also pledged to fix any potential road degradation that may occur from construction vehicles. Road degradation is more likely for the routes where Project-related heavy loads exceed rated weight limits. Transportation of the transformer is estimated to have a combined weight of 576,000 pounds, which could threaten severe road degradation, but the Applicant has a plan and contractors capable of accomplishing this successfully. Bridge degradation is also possible; there is one bridge along KR-32 that is structurally deficient.

The Applicant has pledged to maintain construction equipment and follow Best Management Practices related to fugitive dust throughout the construction process. This should keep dust impacts off-site to a minimal level.

Economic Impact Analysis

Construction and operation of the AEUG Fleming solar facility will provide some limited economic benefits to the region and the state. Construction employment and income opportunities will be temporary, but local hires will increase employment and incomes in an area that needs it. The bulk of construction purchases will be made outside of Kentucky, limiting opportunities for local business activity or generation of additional sales tax.

Operational employment will be minimal, and purchases of materials or supplies will be small on an annual basis.

Operational economic benefits will be confined mostly to property taxes. Annual property tax payments will be made to multiple Fleming County taxing authorities; however, those payments will likely amount to a small percentage of total tax revenues. The Applicant is seeking to negotiate an Industrial Revenue Bond with the County.

Socioeconomic impacts of the AEUG Fleming solar facility represent a positive, albeit small, contribution to the region.

Decommissioning

The Applicant assumes a 30+ year useful life for the AEUG Fleming solar facility. AEUG Fleming has not prepared a decommissioning plan; however, legal lease agreements with participating landowners include commitments regarding land restoration. HE did not review individual lease agreements. The County is seeking assurances that a decommissioning plan be explicit and that all facility components be removed from the County.

Decommissioning the facility and returning the site to its original condition can be accomplished if all the components are removed. After reclamation, this would return the land to a productive use and property value, and eliminate long term Project-related impacts, compared with simply shuttering the solar facility. This process will also add a modest, temporary positive economic stimulus to the region.

Public Involvement

The Applicant has pursued public involvement since Spring 2020, including two public meetings. However, these were not well attended, possibly due to COVID-19, and public awareness of the Project is limited.

Conclusions and Recommendations

Based on our findings related to the specific siting considerations in the statutes and as addressed in this report, HE recommends that the Siting Board approve AEUG Fleming Solar, LLC's application for a certificate to construct a merchant electric generating facility. This finding assumes that the Project is developed as described in the SAR and the supplemental information, and the mitigation measures set forth in Section 6 of this report are adopted.

SECTION 3

Project Overview and Proposed Site Development Plan

Project Overview

AEUG Fleming Solar, LLC describes the site development plan as follows:³

“AEUG proposes to develop a 188-megawatt (MW) photovoltaic Fleming Solar Project (Project) in Fleming County, Kentucky. The Project would be built on portions of approximately 1,590 acres (Project Area). The majority (95 percent) of the Project Area is in agricultural use.

The Project Area is located between Elizaville, Flemingsburg Junction, and Flemingsburg. It is roughly bounded by Old Convict Road on the north, Highway 32 on the south, Highway 11 on the east, and Nepton Road to the west. The topography in the area consists of a series of gently rolling hills and swales. Land use is primarily pasture and agricultural, as noted above, with no large forested areas. Tree lines typically occur at parcel boundaries, in riparian zones, and along roadways. Scattered rural residential development, commercial and retail businesses, communication facilities, and vehicular transportation network are all present within and surrounding the Project Area.

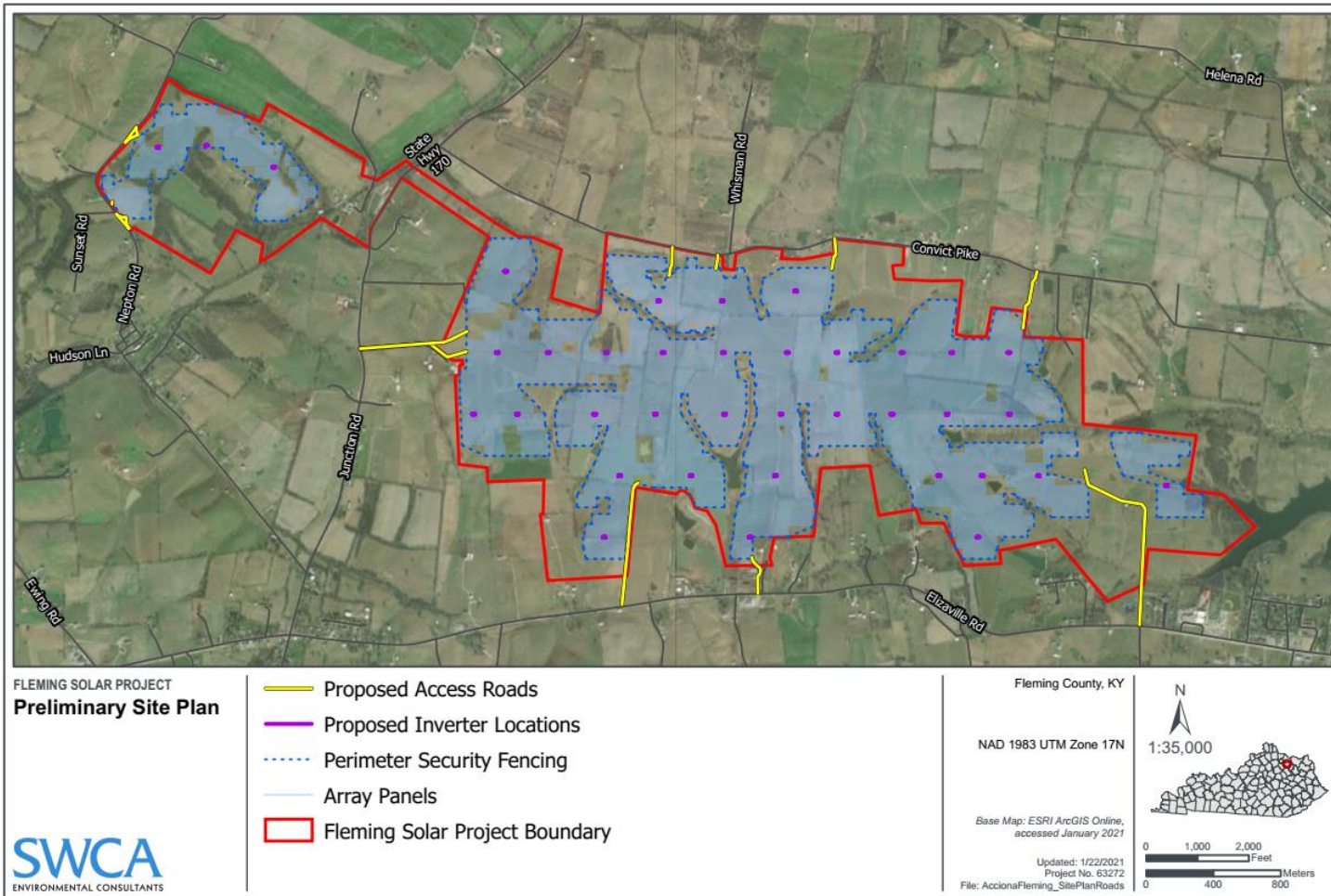
Based on the preliminary design, the Project will consist of the following components: solar panels with an approximate maximum height of six feet; inverters; racking system; associated wiring and balance of system; substation; warehouse; and operations and maintenance building. The Project racking system, which affixes the solar panels to the ground, has a relatively small footprint and does not require concrete. The power generated by the Project will be linked to the electric transmission grid via the Flemingsburg-Spurlock 138-kilovolt line.

AEUG would secure the Project perimeter using a six-foot-high chain-link fencing topped by razor wire and meeting national electrical code requirements. Project entrance gates are anticipated to be approximately eight feet high and 12 feet wide to allow for emergency and maintenance access. All fencing would be placed at or above grade to ensure drainage flows are unobstructed.”

Exhibit 3-1, submitted as part of supplemental application materials, shows a map of the Project site within Fleming County.

³ Volume 1 of the Application, Section 2. “Description of Proposed Site.”

**Exhibit 3-1.
Map of Proposed Project Site and Surrounding Area**



Source: AEUG Fleming Solar, LLC, November 2020.

The Project site is located approximately 64 miles northeast of the City of Lexington, the largest community in the region. The easternmost portion of the Project site is located less than one mile west of the City of Flemingsburg.

Construction Activities

Construction of the AEUG Fleming solar facility is expected to occur over a period of about 15 months, commencing in February of 2022 and ending in April of 2023. The busiest construction time will last from 20 to 25 weeks, when all activities (civil, mechanical, electrical) will be occurring at the same time. This period is projected to last from August to December of 2022. Exhibit 3-2 offers a visualization of the construction schedule, provided by the Applicant.

**Exhibit 3-2.
Estimated AEUG Fleming Construction Schedule**

Week #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	
Laydown yard/Site office	MOB		Laydown yard & Site Offices																								
Civil Works (MW/Wk)	235.0									3	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
Foundations / Poles (MW/Wk)	235.0															3	8	8	8	8	8	8	8	8	8	8	8
Tracker Mechanical Assembly (MW/Wk)	235.0																				3	8	8	8	8	8	8
Module Mechanical Assembly (MW/Wk)	235.0																						3	8	8	8	8
Low Voltage Infrastructure (MW/Wk)	235.0																										
Medium Voltage Infrastructure (MW/Wk)	235.0																										
Substation				Civil Works & Structure Installation								Equipment Installation								Testing							
T-Line				Civil Works & Structure Installation								Stringing & Sagging Conductor								Testing							
Backfeed																											
	MWp	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	1	1	1	1	1	1	1
Commissioning: Tests and Start-Up (Cold) (MW/Wk)	235.0																										
Commissioning: Tests and Start-Up (Hot) (MW/Wk)	235.0																										
Completion																											
Manpower Estimated Count			30	30	40	60	160	170	170	220	250	250	250	250	250	280	380	380	380	380	380	360	360	360	360	355	355
Average Manpower per quarter			157									342															
Max Manpower per quarter			250									380															

Week #	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62
Laydown yard/Site office																																				
Civil Works (MW/Wk)	235.0	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
Foundations / Poles (MW/Wk)	235.0	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
Tracker Mechanical Assembly (MW/Wk)	235.0	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
Module Mechanical Assembly (MW/Wk)	235.0	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
Low Voltage Infrastructure (MW/Wk)	235.0			5	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Medium Voltage Infrastructure (MW/Wk)	235.0			5	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Substation																																				
T-Line																																				
Backfeed																																				
	MWp	1	1	1	1	1	1	1	1	1	1	1	1	52	1	1	1	52	52	1	1	1	1	1	1	1	52	52	52	52	52	52	52	52	52	
Commissioning: Tests and Start-Up (Cold) (MW/Wk)	235.0													10	15	15				15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	
Commissioning: Tests and Start-Up (Hot) (MW/Wk)	235.0													10	15					15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	
Completion																																				
Manpower Estimated Count		305	300	300	350	450	450	450	450	400	400	500	600	600	0	550	550	550	0	0	550	550	550	470	470	470	470	420	420	420	350	350	100	50	50	
Average Manpower per quarter		427									398									292																
Max Manpower per quarter		600									550									470																

Note: The top row of the pictures are week numbers. The "Week #" column denotes the capacity of the Project. The numbers in the schedule are the megawatt direct capacity, not the 188 MW Project name plate capacity. The bottom three rows of the charts indicate estimated counts, averages, and maximum workers on-site in each week.

Source: AEUG Fleming Solar, LLC, "Fleming_Schedule_with_Manpower_fKSSB" Excel spreadsheet in RFI #2. February 2021.

Different construction tasks will overlap to some extent, but will generally occur in the following order:

- Grading and development of the laydown yard and Site office: 6 weeks;
- Civil Works: 30 weeks;
- Foundations and poles: 30 weeks;
- Tracker mechanical assembly: 30 weeks;
- Module mechanical assembly: 30 weeks;
- Low voltage infrastructure: 24 weeks;
- Medium voltage infrastructure: 24 weeks; and
- Construction of the substation, T-Line, and backfeeding: 21 weeks.

The construction for the *Point of Interconnection – Substation* will take approximately 18 months and will begin eight to nine months before the contracted backfeed date. This process will be undertaken by an average of 20 workers, with a peak of 30 workers.

On average, 346 construction workers are estimated to be on-site each week, depending on the specific tasks and activities occurring at that time. Construction of the panels will not be sequential; many different construction activities may take place in different parts of the Project site at the same time (i.e., grading in one area, pounding in posts in a separate area, fixing panels to posts in another area, etc.).

Peak construction activity will most likely occur during the 3rd or 4th quarter of the year, when foundations, pile driving, solar panel installation, and wiring installation is concurrent. Peak construction activities may require as many as 600 workers to be on-site each day, though this period is estimated to only last a few weeks.

Life of the Project

The AEUG Fleming solar facility is anticipated to operate for at least 30 years. Project decommissioning (the process of closing the facility to retire it from service) is discussed in Section 5 of this report.

Proposed Site Development Plan

The following discussion addresses each of the SAR requirements for a proposed site development plan, as laid out in KRS 278.708(3)(a).

Surrounding land uses. Flemingsburg County in general, and the area around Elizaville, Flemingsburg Junction and Flemingsburg specifically, are rural residential areas, with low

population density and an agricultural emphasis. Section 4 of this report provides a general overview of the County's demographic and economic characteristics.

As part of the SAR, the Applicant's consultant, Kirkland, identifies the acreage surrounding the Project site as a mix of residential and agricultural uses. A total of 76 properties are adjacent to or in close proximity to the proposed Project site. The Kirkland report shows that half of the surrounding acreage is defined as agricultural/residential, and another 37 percent of the surrounding acreage is purely agricultural. The remaining 12 percent of the surrounding area is defined as residential. One religious facility and one commercial property are adjacent to the Project site.

The Applicant also provided a table describing the distances between nearby residences or other structures and the Project fence line.⁴ That information is provided in Exhibit 3-3.

**Exhibit 3-3.
Distances between Nearby Structures and the AEUG Fleming Solar, LLC
Project Fence Line**

Distance from Property Fence (ft)	Residential Structures	Other Structures
0 - 300	5	7
301 - 600	12	6
601 - 900	20	5
901 - 1,200	20	3
1,201 - 1,500	24	3
1,501 - 1,800	25	1
1,801 - 2,100	30	6
2,100 - 2,400	<u>39</u>	<u>2</u>
Total Structures:	175	33

Notes: (1) The property fence is located immediately outside the solar panels. Therefore, as shown in Exhibit 3-1, the property fence line does not coincide with the Project boundary in all locations.
 (2) Other structures mostly include barns, warehouses, and similar ancillary structures. Included in Other structures are one commercial/industrial structure located 880 feet from the property fence, one religious facility located 2,000 feet from the property fence and one school located 2,100 feet from the property fence.

Source: AEUG Fleming Solar, LLC, January 2021.

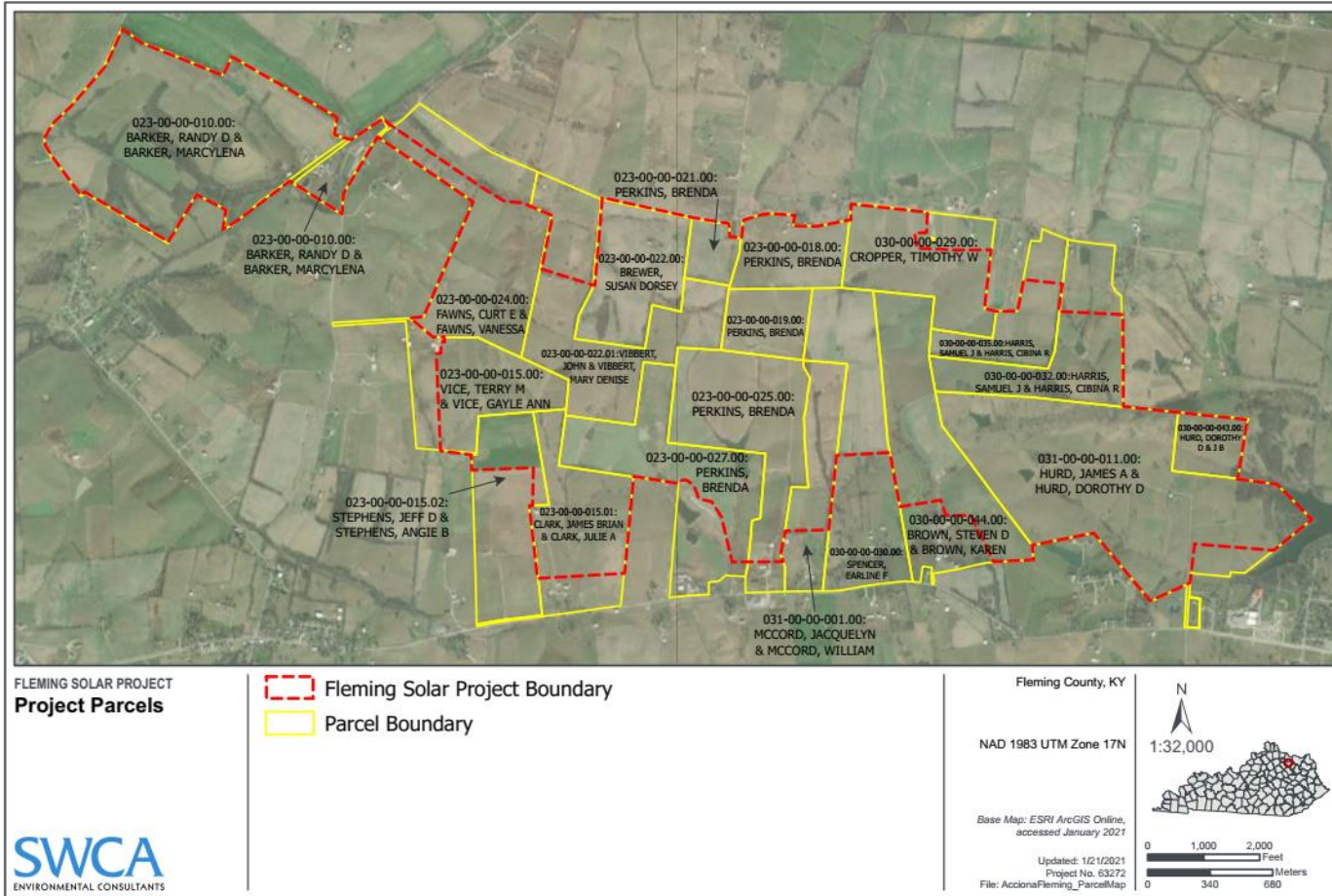
There are 37 residential properties within 900 feet of the Project fence line and 136 residential properties within 2,100 feet of the fence line.

Legal boundaries. The SAR included a legal description of the 14 individual participating properties - those with leases or contracts with the AEUG Fleming Solar, LLC. In response to HE's inquiries, the Applicant also provided maps showing individual parcels and tracts leased from participating landowners. Those maps provide comparisons between the boundaries of the leased properties and the Project boundary. The legal description

⁴ The property fence will be located immediately adjacent to the solar modules. In some areas, that means that the project fence line will not be located along the Project boundary. Exhibit 3-1 illustrates both the fence line and the Project boundary.

corresponds to the total acreage of the 14 participating properties (approximately 2,280 acres), which is greater than the 1,857 acre Project Area. Exhibit 3-4 presents a map of the parcels included in the legal boundary description.

**Exhibit 3-4.
Map of Project Parcels (Participating Landowners) and the AEUG Fleming Solar, LLC Project Boundary**



Source: AEUG Fleming Solar, LLC, January 2021

Access control. In response to HE’s inquiries, the Applicant provided a revised site layout plan from its original SAR, which included a total of ten potential access points/access roads allowing entrance to different areas of the property during construction and operations.⁵ The point of access nearest the substation and the operations and maintenance facility on the eastern side of the property was identified as the primary access point.⁶

According to the Application, AEUG Fleming would secure the Project perimeter using 6-foot-high chain-link fencing topped by razor wire and meeting national electrical code requirements.⁷ Project entrance gates are anticipated to be approximately 8 feet high and 12 feet wide to allow for emergency and maintenance access. All fencing would be placed at or above grade to ensure drainage flows are unobstructed. Construction staging areas may be fenced temporarily if valuable goods are to be stored in those areas.

Supplemental materials provided by the Applicant state that during construction, site access will be controlled with dedicated guards or with electronic gating systems. During operations, no security guards will be present, but all gates will have access control systems and the main gate (to the operations and maintenance facility and the substation) will also have cameras. Buildings will have access control systems and cameras. Site managers for both construction and operations will have contact information for all local police, fire and medical emergency providers. Construction and operations personnel will receive regular training to ensure their familiarity with emergency procedures and emergency contact numbers.

Location of buildings, transmission lines and other structures. Exhibit 3-1 illustrates the locations of the solar panels and inverters within the Project boundary. As shown, the solar panels and inverters will be located throughout the property. Perimeter fencing will be located immediately adjacent to the solar infrastructure and buildings; fencing will not be located at the Project boundary line. The sole transformer will be located within the substation, which, along with the warehouse and the operations and maintenance facility, will be in the eastern portion of the Project site. The existing Flemingsburg-Spurlock 138 kV transmission line generally runs in a north-south direction and is also located within the eastern portion of the Project site.

As noted by the Applicant:

- The solar panels are estimated to be about 35 feet from the Project boundary at the closest points.
- The nearest sensitive noise receptor to the Project boundary is a house located 139 feet away.

⁵ The original site layout plan identified nine potential access points.

⁶ The Applicant has indicated that in the detailed engineering phase, the most likely scenario is that one of the access points entering from the north, one entering from the south and a third for the northwestern portion of the Project site would be selected as final access points.

⁷ The property fence will be located immediately adjacent to the solar modules. In some areas, that means that the project fence line will not be located along the Project boundary. Exhibit 3-1 illustrates both the fence line and the Project boundary.

- The nearest sensitive noise receptor to the solar panels is a house located 212 feet away.
- The nearest sensitive noise receptor to the inverters is a house located 739 feet away.
- The nearest sensitive noise receptor to the transformer is a house located 1,600-2,100 feet away.

During the construction period, three staging areas will be located on the Project site: (1) a 1.7 acre area on the east side of the property, near the Substation and the operations and maintenance facility; (2) a 16 acre area on the north side of the property; and (3) a 1.25 acre area on the west side of the property.

Location and use of access ways, internal roads, and railways. As noted previously and as shown in Exhibit 3-1, ten access points/access roads will allow entrance to different areas of the property during construction and operations. Those include three access roads from Highway 32; four from Old Convict Road (Highway 559); one from Junction Road (Highway 170); and two from Nepton Road (Highway 367). The point of access nearest the substation and the operations and maintenance facility will be the primary access point and the most heavily trafficked. Other access points may be used less frequently for routine maintenance and to reduce the need for bridges and culverts within the Project Area.

Approximately 27 miles of internal roads may be constructed for traveling within the Project boundaries; those roads will be gravel roads.

An existing railway line crosses through a small portion of the western section of the Project site, generally to the southwest of the intersection of Junction Road and Old Convict Road.⁸ The Project will not utilize the railroad for any construction or operational purposes. Supplemental materials provided by the Applicant state that all transport associated with the Project will comply with Kentucky Transportation Cabinet regulations on overweight and oversize loads as they apply to railroad crossings. The railroad has been inactive for the past four years, but this is expected to change in coming years.

Existing or proposed utilities to service facility. According to supplemental materials provided by the Applicant, electric power will be provided by East Kentucky Power Cooperative. Domestic water will be supplied by a new well to be located at the operations and maintenance facility. Wastewater disposal will be accommodated by an on-site septic system, serviced by a local disposal provider.

According to the Cumulative Environmental Assessment included in the Applicant's Motion for Deviation from Setback Requirements, portable chemical toilets will be provided for employees during construction. Sewage waste will be pumped out regularly by a licensed contractor and disposed of at the Flemingsburg Wastewater Treatment Plant. The O&M building will include restroom facilities for use by operations personnel; however, the

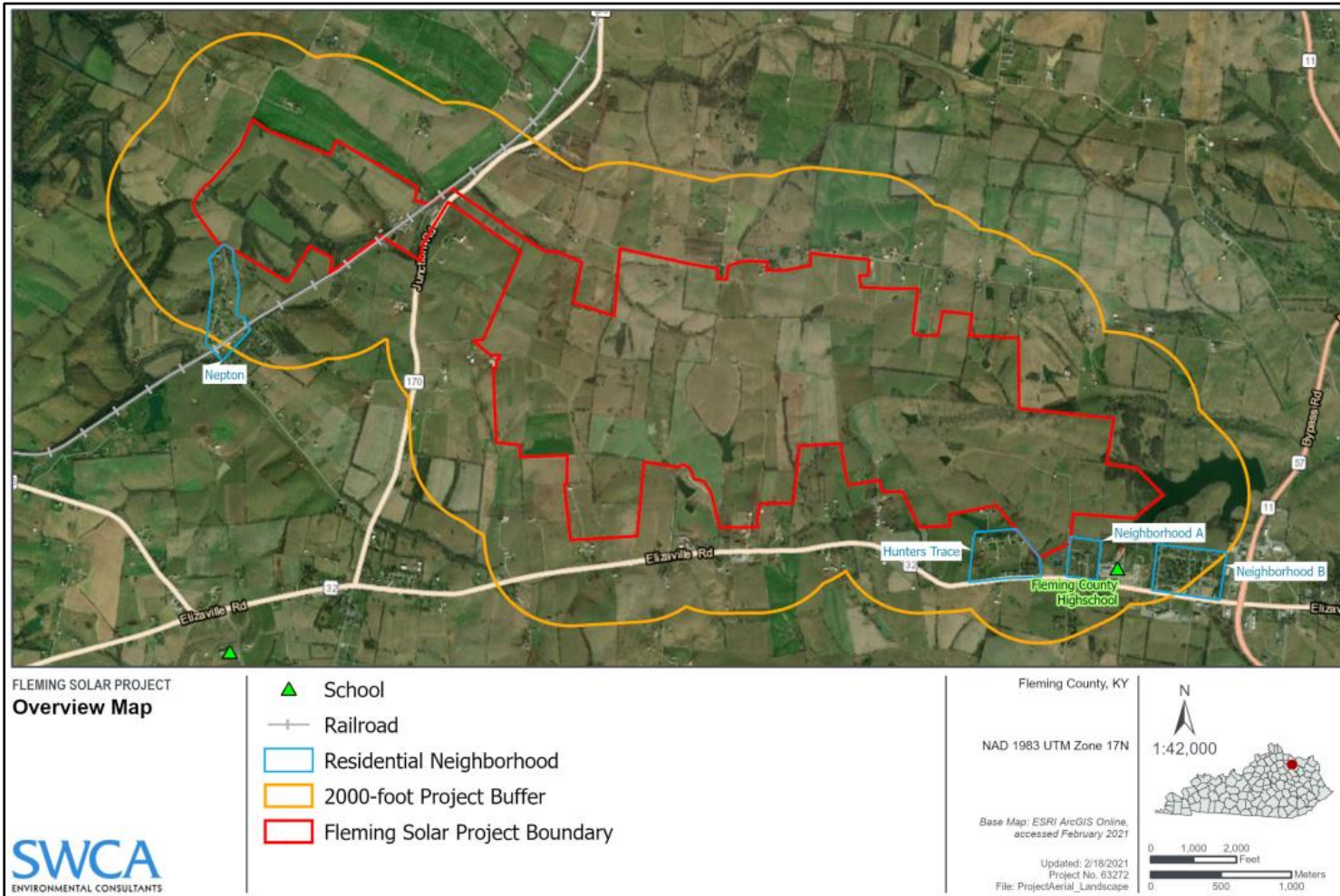
⁸ The railway is considered active; however, no operations have occurred on this line for several years. The railway is addressed in more detail in Section 5 - Road and Rail Traffic, Fugitive Dust and Road Degradation.

minimal volume of sewage to be generated is not expected to exceed the capacity of the plant or otherwise affect sewer services in the area. Therefore, no impact to the Flemingsburg sewer system is anticipated.

Compliance with applicable setback requirements. Applicable portions of the setback statute (KRS 278.706(2)(e)) require that AEUG Fleming Project facilities be located at least 2,000 feet from any residential neighborhood, school, hospital or nursing home facility.⁹ Because four residential neighborhoods and the Fleming County High School are within 2,000 feet of Project facilities, the Applicant is seeking a deviation from the requirements.

⁹ According to KRS 278.700(6), a residential neighborhood is a populated area of five or more acres containing at last one residential structure per acre.

**Exhibit 3-5.
Map of the Project Boundary and Residential Neighborhoods and High School within 2,000 Feet of Project Facilities**



Source: AEUG Fleming Solar, LLC, February 2021.

The Applicant has stated that they do not have the flexibility to move panels in conformance with the 2,000-foot radius because of the associated loss of generating capacity and increase in costs.

KRS 278.704(4) states that deviations from the setback requirements may be granted “on a finding that the proposed facility is designed to, and as located, would meet the goals of KRS 224.10-280, 278.010, 278.212, 278.214, 278.216, 278,218, and 278.700 to 278.716 at a distance closer than” those outlined in the setback statute.

The Applicant has submitted a document titled Applicant’s Motion for Deviation from Setback Requirements (Motion for Deviation). That document addresses each of the statutes listed above, describing the Applicant’s or facility’s compliance with each, as follows:

- ***KRS 224.10-280: Cumulative Environmental Assessment (CEA)***: The Applicant has provided a CEA that addresses air pollutants, water pollutants, waste, and water withdrawal. That report provides a detailed discussion of each topic area and concludes the following:
 - ***Air pollutants*** – Air quality impacts resulting from Project construction activities will be temporary and localized. The severity of air quality impacts may be naturally mitigated by environmental conditions such as wind speed and direction, soil moisture, and other factors. Even under unusually unfavorable environmental conditions, Project construction emissions are not expected to have a meaningful impact on regional air quality and will not contribute to regional NAAQS exceedance.

The Project will generate zero emissions of criteria pollutants during operation. During Project operations, emissions will be limited to those resulting from the occasional presence of maintenance and inspection vehicles and equipment, such as mid- to full-size trucks or all-terrain vehicles during routine inspections, and mowers or trimmers during vegetation maintenance.

- ***Water pollutants*** – Project construction will result in ground disturbance of up to approximately 1,590 acres and resulting stormwater runoff, erosion, and sedimentation may affect receiving surface waters. As such, the Project requires coverage under KYR10. AEUG Fleming will prepare a Stormwater Pollution Prevention Plan (SWPPP) in compliance with KYR10 requirements. The SWPPP will describe erosion and sediment control measures and Best Management Practices (BMPs) to avoid or minimize the discharge of sediment and pollutants into waters of the Commonwealth.

Solar panels will not restrict groundwater infiltration and recharge; panels do not include a runoff collection system and rainwater will be allowed to run off panels directly to re-vegetated ground.

- **Wastes** – Construction activities will intermittently generate Construction and Demolition Debris (CDD) and general trash, including but not limited to wooden crates, pallets, flattened cardboard module boxes, plastic packaging, excess electrical wiring, and trees/vegetation from limited clearing. No special wastes as defined in KRS 224.50-760 are anticipated to be generated during construction or operations and maintenance.

Waste generation during operations and maintenance will be minimal, resulting mainly from the maintenance and/or replacement of worn or broken equipment and defective or broken electrical materials. All waste generated during Project construction and operations and maintenance will be handled and disposed of in accordance with local, state, and federal regulations to minimize the potential for effects to human health and safety.

Hazardous materials stored at the Project Area may include but are not limited to oil, diesel fuel, gasoline, hydraulic fluid, and other lubricants associated with construction vehicles. Small quantities (less than 55 gallons, 500 pounds or 200 cubic feet) of janitorial supplies, paint, degreasers, herbicides, pesticides, air conditioning fluids (chlorofluorocarbons [CFC]), gasoline, hydraulic fluid, propane, and welding rods typical of those purchased from retail outlets may also be used and stored at the Project Area. AEUG Fleming and/or its designated contractor(s) will develop and implement a Hazardous Materials Plan (HMP) to identify the waste types and quantities, temporary storage locations, means and methods of transport and disposal, and means and documentation methods to track hazardous materials. In the unlikely event that a spill occurs, effects would be temporary and localized due to implementation of immediate responses outlined in the plans.

- **Water withdrawal** – During Project construction, water will be needed primarily for fugitive dust control; irrigation for seeded areas and screening vegetation plantings; and compaction for the grading of access roads, foundations, equipment pads, and other Project components. The expected water volume needed during construction activities is not anticipated to exceed the capacity of the Western Fleming County Water District (WFCWD). AEUG Fleming and its contractor(s) will coordinate with the WFCWD as needed to ensure that Project construction does not adversely affect the local water supply.

Water use will be minimal and infrequent during Project operations and maintenance. Natural weather patterns, including rainfall, are expected to be adequate to prevent excessive buildup of dust and debris on solar panels; therefore, no regular rinsing or washing of panels is proposed. Water may be needed intermittently to maintain screening vegetation during drought periods. Water for dust control is not expected to be necessary due to the infrequent vehicle use proposed. Any vehicle washing or potential dust control discharges during operations and maintenance will be implemented in

accordance with BMPs described in the Stormwater Pollution Prevention Program for water-only cleaning. Due to the minimal volume of water needed, ongoing Project operation and maintenance is not expected to exceed the capacity of the local water supply.

- ***KRS 278.010: Definitions applicable to associated statutes:*** The Motion for Deviation states that “AEUG Fleming has satisfied the goal of providing the required information utilizing the definition of any applicable term defined in KRS 278.010.”
- ***KRS 278.212: Filing of plans for electrical interconnection with merchant electric generation facility; costs of upgrading existing grid:*** The Motion for Deviation states that AEUG Fleming will comply with all applicable conditions relating to electrical interconnections with utilities by following the PJM interconnection process. Additionally, AEUG Fleming will accept responsibility for appropriate costs which may result from its interconnecting with the electricity transmission grid.
- ***KRS 278.214: Curtailment of service or generation and transmission cooperative:*** The Motion for Deviation states that AEUG Fleming will abide by the requirements of this provision to the extent that these requirements are applicable.
- ***KRS 278.216: Site compatibility certificate; site assessment report; commission action on application:*** This statute applies to jurisdictional utilities; AEUG Fleming is not such a defined utility. However, the Applicant has submitted a site assessment report in response to other statute requirements.
- ***KRS 278.218: Approval of commission for change in ownership or control of assets owned by utility:*** AEUG Fleming is not a utility as defined by the applicable statute; therefore, the Motion for Deviation indicates that this statute does not apply. The Motion for Deviation does state that “to the extent Board approval may at some time be required for change of ownership or control of assets owned by AEUG Fleming, AEUG Fleming will abide by the applicable rules and regulations which govern its operation.”
- ***KRS 278.700 – 278.716: Electric Generation and Transmission Siting:*** The Motion for Deviation states that “AEUG Fleming has met the goals set forth in these provisions as evidenced by the Application in its entirety”, noting the submittal of a “comprehensive Application with a detailed discussion of all of the criteria applicable to its proposed facility under KRS 278.700 – 278.716.”

Evaluation of noise levels produced by facility. Noise levels related to facility construction and operations are discussed in detail in Section 5 of this report.

Results of SAR Review – Proposed Site Development Plan

Conclusions. Based on HE’s review of the AEUG Fleming SAR, the subsequent information provided by the Applicant in response to two rounds of inquiries, direct

discussions with the Applicant, and other secondary area research, HE offers the following conclusions regarding the proposed site development plan:

- We believe that the Applicant has generally complied with the legislative requirements for describing the facility and a site development plan, as required by KRS 278.708.
- Security and access control measures appear to be adequate, given the type of facility and its location in a rural area.
- The AEUG Fleming Project does not meet the existing setback requirements, so the Applicant has submitted a motion for a deviation from those requirements. HE believes that the Project, as proposed, does meet the specific statutes noted for consideration in a setback deviation, assuming the mitigation HE proposes is adopted. The Siting Board will need to judge the quality of the Applicant responses in the setback deviation request.

Need for mitigation. Mitigation measures described in the SAR, or recommended by HE, which are related to the description of the facility and the proposed site development plan include:

1. A final site layout plan should be submitted to the Siting Board upon completion of the final site design. Deviations from the preliminary site layout plan, which formed the basis for HE's review, should be clearly indicated on the revised graphic. Those changes would include, but are not limited to, location of solar panels, inverters, transformer, the warehouse, substation, operations and maintenance building or other Project facilities or infrastructure.
2. Any change in Project boundaries from the information which formed this evaluation should be submitted to the Siting Board for review.
3. The Siting Board will determine if any deviation in the boundaries or site development plan is likely to create a materially different pattern or magnitude of impacts. If not, no further action is required, but if yes, the Applicant will support the Siting Board's effort to revise its assessment of impacts and mitigation requirements.
4. The Applicant or its contractor will control access to the site during construction and operation. All construction entrances will be gated and locked when not in use.
5. The Applicant's access control strategy should also include appropriate signage to warn potential trespassers. The Applicant must ensure that all site entrances and boundaries have adequate signage, particularly in locations visible to the public, local residents and business owners.
6. According to National Electrical Safety Code regulations, the security fence must be installed prior to any electrical installation work. The substation will have its own separate security fences installed.

SECTION 4

Project Setting

Description of the Area

This section provides a description of the area surrounding the proposed Project site. The Project site is located near Flemingsburg, a small city in Fleming County, in northeastern Kentucky. The topography of the area is mostly rolling hills and agricultural land, with wooded areas sprinkled throughout.¹⁰

Population and housing density. As of mid-2019, approximately 14,600 people resided in Fleming County.¹¹ The County's population has increased slightly over the past 20 years; in 2000 the population was 13,800 and in 2010 the population was 14,350.^{12,13} About 97 percent of the population is white and the median age of residents is 41.¹⁴ Fleming County is predicted to remain stable in population; the Kentucky State Data Center estimates 14,600 people will reside in the County in 2040, which is the current population.¹⁵ Currently, there are about 5,800 households in Fleming County, with an average of about 2.5 persons per household.¹⁶ There are 42 people per square mile, which makes Fleming County more sparsely populated than most other counties in Kentucky.¹⁷

Flemingsburg, the county seat of Fleming County, is a small city in northcentral Kentucky with about 2,800 people. Lexington, located about 64 miles southwest of Flemingsburg, is

¹⁰ Kentucky Geological Survey. Generalized Geologic Map for Land-Use Planning: Fleming County, Kentucky.

https://kgs.uky.edu/kgsweb/olops/pub/kgs/mc137_12.pdf

¹¹ U.S. Census Bureau. Fleming County Quickfacts.

<https://www.census.gov/quickfacts/flemingcountykentucky>

¹² U.S. Census Bureau. Fleming County, Kentucky, Profile of General Demographic Characteristics.

<https://data.census.gov/cedsci/table?q=fleming%20county%20kentucky&y=2000&tid=DECENNIALDPSF42000.DP1&hidePreview=false>

¹³ U.S. Census Bureau. Fleming County, Kentucky, Annual Estimates of the Resident Population: April 2010 – July 1, 2019.

<https://data.census.gov/cedsci/table?q=fleming%20county%20kentucky&tid=PEPPPOP2019.PEPANNRES&hidePreview=true>

¹⁴ U.S. Census Bureau. Fleming County, Kentucky, Age and Sex.

<https://data.census.gov/cedsci/table?q=fleming%20county%20kentucky&tid=ACSST5Y2019.S0101&hidePreview=false>

¹⁵ Kentucky State Data Center, Projections of Population and Households, State of Kentucky, Kentucky Counties, and Area Development Districts 2015 – 2040.

<http://www.ksdc.louisville.edu/wp-content/uploads/2016/10/projection-report-v16.pdf>

¹⁶ U.S. Census Bureau. Fleming County Quickfacts.

<https://www.census.gov/quickfacts/flemingcountykentucky>

¹⁷ Statistical Atlas. Fleming County, Kentucky.

<https://statisticalatlas.com/county/Kentucky/Fleming-County/Population>

the nearest metropolitan area in Kentucky. Lexington has a population of about 323,000.¹⁸ The Lexington-Fayette metropolitan statistical area has a population of about 517,000.¹⁹

Income. In 2019, the per capita personal income in Fleming County was \$34,732.²⁰ This was 21 percent less than the average per capital personal income of the Commonwealth of Kentucky, and 39 percent less than the average in the United States.²¹ As of mid-2019, about 21 percent of the Fleming County population lives in poverty.²²

Business and industry. In 2019, there were about 6,300 jobs in Fleming County, with 58 percent classified as wage and salary jobs and 42 percent being proprietors' employment.²³ Prior to the Great Recession of 2007-2009, the number of jobs in Fleming County hovered around that same level, but in 2009-2010, the number of full-time jobs fell below 6,000 jobs for a short period.²⁴

- Agriculture is the largest employment sector in Fleming County, with 1,060 jobs.²⁵ As of 2017, 171,000 acres were in farms, which equates to roughly 77 percent of the total acreage in Fleming County.²⁶ Forage-land used for hay and grass silage account for most of the cropland, and soybeans and corn are the next most commonly grown crops. In 2015, there were roughly 50,000 head of cattle and calves.²⁷
- Government is the second largest sector in the County, with about 740 jobs. Retail trade is the next largest sector with roughly 690 jobs. The manufacturing sector follows with about 640 jobs. Major industries in the area include A. Raymond Tinnerman (makers of automotive and appliance trim), GreenTree Forest Products (specialty pallets and skids, and hardwood grade lumber products), Wallingford Pallet (pallets, lumber, and sawdust), Appalachian Floor Vents (hardwood floor

¹⁸ U.S. Census Bureau. Lexington-Fayette, Total Population.

<https://data.census.gov/cedsci/table?q=Lexington-Fayette.%20Kentucky&tid=ACSDT1Y2019.B01003&hidePreview=false>

¹⁹ U.S. Census Bureau. Lexington-Fayette, Annual Estimates of the Resident Population by Metropolitan Statistical Area.

<https://www.census.gov/data/tables/time-series/demo/popest/2010s-total-metro-and-micro-statistical-areas.html>

²⁰ U.S. Bureau of Economic Analysis. Fleming County, GDP and Personal Income.

<https://apps.bea.gov/iTable/iTable.cfm?reqid=70&step=1&acrdn=6>

²¹ U.S. Bureau of Economic Analysis. United States and Kentucky, GDP and Personal Income.

<https://apps.bea.gov/iTable/iTable.cfm?reqid=70&step=1&acrdn=2>

²² U.S. Census Bureau. Fleming County Quickfacts.

<https://www.census.gov/quickfacts/fact/table/flemingcountykentucky,US/PST045219>

²³ U.S. Bureau of Economic Analysis. Fleming County, Total Full-Time and Part-Time Employment.

<https://apps.bea.gov/iTable/iTable.cfm?reqid=70&step=1&acrdn=6>

²⁴ U.S. Bureau of Economic Analysis. Fleming County, Total Full-Time and Part-Time Employment.

<https://apps.bea.gov/iTable/iTable.cfm?reqid=70&step=1&acrdn=6>

²⁵ U.S. Bureau of Economic Analysis. Fleming County, Total Full-Time and Part-Time Employment.

<https://apps.bea.gov/iTable/iTable.cfm?reqid=70&step=1&acrdn=6>

²⁶ U.S. Census of Agriculture. Fleming County, Kentucky Profile.

https://www.nass.usda.gov/Publications/AgCensus/2017/Online_Resources/County_Profiles/Kentucky/cp21069.pdf

²⁷ Fleming County Agricultural Development Council. Update of County Comprehensive Plan, 11/15/2015.
<https://agpolicy.ky.gov/SiteCollectionDocuments/county-plans/FLEMING.pdf>

registers), Hypac Inc. (hydraulic equipment refurbishing), Riverside Plastics (plastic flower pots, boat parts, and plastic livestock equipment), Toyo Seat USA (makers of automotive seat tracks, latches, and seat frames), and Ridley Block Operations (manufacturer of agricultural feed supplements).²⁸ The area touts itself as a good place for companies looking for low operating costs, low tax rates, reasonable wage scales, and a quality labor force.

Major and minor roads and railways. The Project site is mostly bounded on the south by KR-32, on the east by KR-11, on the north by KR-559, and on the west by KR-170. A small portion of the Project site extends beyond KR-170, where it crosses over a set of active railroad tracks. There are no interstate highways in Fleming County.

Overall area description. Based on HE's research, the area around the Project site can be generally described as rural and agricultural. The population is generally stable and older; population is expected to remain stable over the next 30 years. Residents' income levels are low, and they experience higher than average rates of poverty than in other counties in Kentucky and the U.S.²⁹

²⁸ Fleming County Chamber of Commerce. Economic Development Profile.
<http://www.flemingkychamber.com/ecdev.html>

²⁹ U.S. Census Bureau. Kentucky Quickfacts.
<https://www.census.gov/quickfacts/fact/table/KY/POP060210>

SECTION 5

Description of Impacts

This section of the report addresses impacts to the following resource topics, as enumerated in KRS 278.708 and KRS 278.706(j):

- Compatibility of the facility with scenic surroundings;
- Potential changes in property values and land use for adjacent property owners;
- Anticipated peak and average noise levels;
- Road and rail traffic, fugitive dust and anticipated degradation of roads and lands; and
- Economic impacts on the region and the state.

The statutes require that the SAR provides information about impacts to the above resources resulting from short-term construction activities and longer-term operational activities. The Siting Board also directed HE to address the potential effects of decommissioning activities, and that discussion is included in this section.

For each resource topic, HE describes generally accepted assessment criteria or methodology necessary to evaluate impacts of a project of this nature. We then summarize the relevant information included in the SAR, as well as supplemental information about the AEUG Fleming Project provided by the Applicant in response to data inquiries. HE also provides additional information gathered about the Project and its potential impacts on the region through secondary source research, including interviews. Finally, HE draws conclusions about Project impacts as well as recommended mitigation measures.

Cumulative impacts associated with a second solar facility potentially located in the vicinity have not been addressed in this report. HE is aware that Core Energy Solar is considering an 80 MW facility on approximately 770 acres in Fleming County. HE has not examined cumulative impacts since that topic is not called out in the KRS, the Siting Board has not directed us to consider these impacts, and we have insufficient information to assess such impacts at the time this report was submitted.

Facility Compatibility with Scenic Surroundings

This component of the statute relates to how well the proposed facility will “blend-in” or is compatible with its physical surroundings and associated land uses. For example, certain industrial facilities can be unsightly, visually unappealing, and generally incongruous with the surrounding area. Coal-fired electric generating plants often have large smokestacks that can be seen from far away. Wind turbines are tall, and their blades can be seen spinning from miles away, etc. Generally, solar farms are considered to be less visually intrusive, as they are relatively short, and can be effectively visually blocked naturally with topographic variation or intervening vegetation, or through strategic means utilized by an applicant.

General methods of assessment. Visual impacts of solar facilities are highly dependent on the characteristics of the surrounding area, i.e., industrial, suburban residential, rural/agricultural. As a result, different methods may be used to assess the visual impacts of solar facilities, depending on location. The Argonne National Laboratory’s Environmental Science Division and the National Park Service jointly developed the *Guide to Evaluating Visual Impact Assessments for Renewable Energy Projects*; that document is a guide designed to help planners evaluate the quality and completeness of visual impact assessments for solar and wind facilities.³⁰ Additional reports have been published from public agencies and private firms on visual impact assessments for solar facilities.

Most visual impact assessments focus on visualizations of the appearance of the project from key observation points (KOPs). Since it is impossible to visualize proposed projects from every observation point, it is common for planners to utilize a “worst-case” potential visual impact, i.e., locations where perceived change may be greatest. The overarching goal of visual impact assessments is to determine potential visual impacts that may result from construction, operations, and decommissioning of a project, in a manner that is logical, repeatable, and defensible.³¹

A standard visual analysis generally proceeds in this sequence:³²

- Description of the Project’s visual setting;
- Identification of KOPs. KOPs are locations near the Project site where there is potential for solar facility components to be seen from ground-level vantage points, i.e., a nearby residence or a passing vehicle;
- Analysis of the visual characteristics of the Project, i.e., height of solar panels, descriptions of other facility components; and
- Evaluation of impacts from KOPs.

³⁰ National Park Service, U.S. Department of the Interior. *Guide to Evaluating Visual Impact Assessments for Renewable Energy Projects*. August 2014. <http://visualimpact.anl.gov/npsguidance/>.

³¹ Dean Apostol, James Palmer, Martin Pasqualetti, Richard Smardon, Robert Sullivan. (2016). *The Renewable Energy Landscape: Preserving Scenic Values in our Sustainable Future*. September 2016.

³² Environmental Design & Research. *Visual Impact Analysis*. May 2019.

Summary of information provided by Applicant. The Applicant provided Appendix F (“Visual Assessment”), which includes a report by Tetra Tech, a Site Plan map, Visual Simulations of what the solar panels may look like, and Line of Sights from KOPs in the vicinity of the Project.

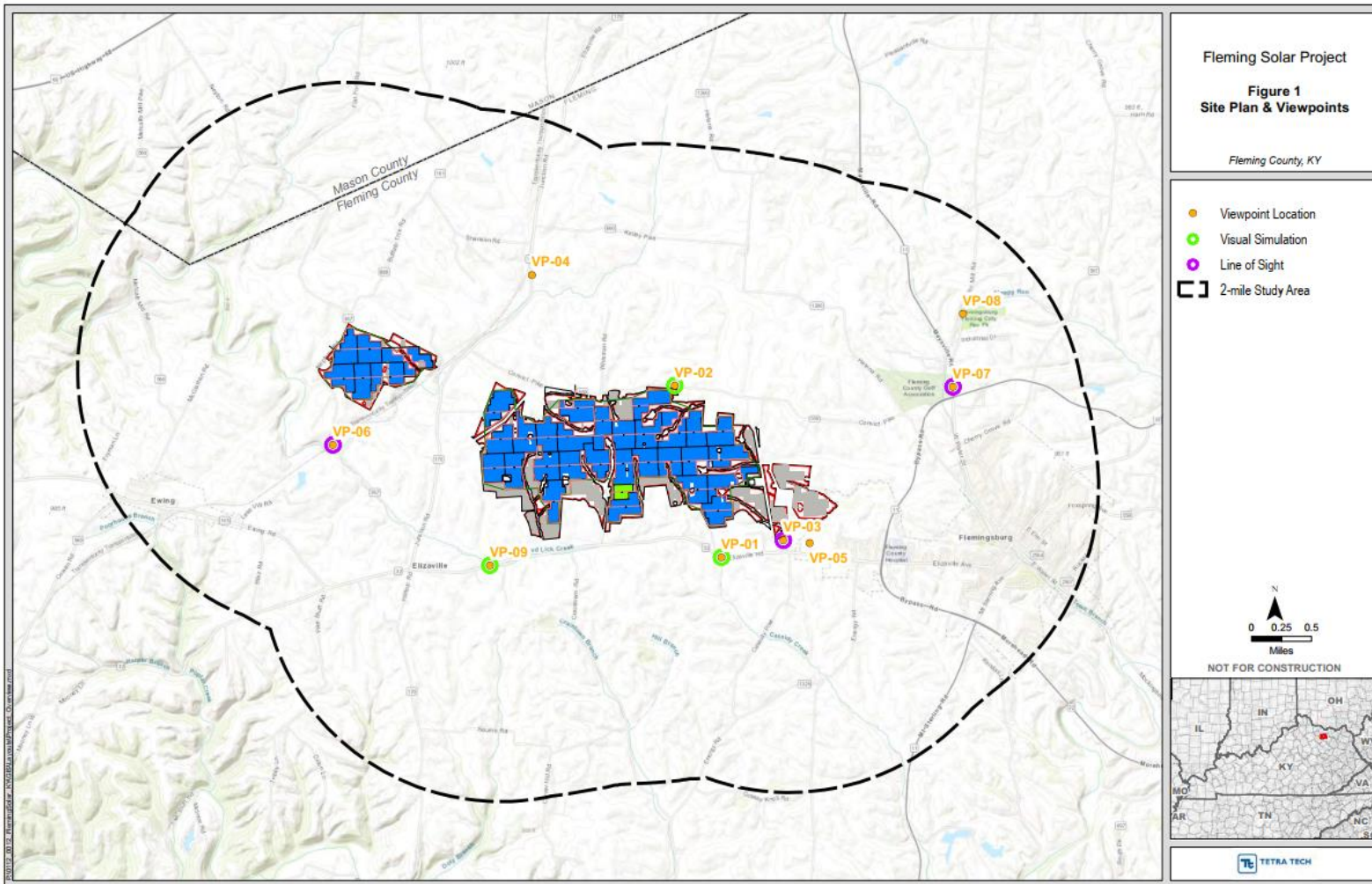
Visual setting. The Applicant describes the area as a rolling terrain landscape dominated by vegetation and patches of trees and shrubs. The Applicant will leave existing vegetation in place, to the extent practicable, which will help screen and reduce visual impacts of the Project from nearby homes. Tetra Tech’s report is consistent with the Applicant’s description of the area.

Key observation points. Tetra Tech selected nine KOPs as viewpoints (VPs) in the vicinity of the Project, as these represent locations around the Project where viewers could notice a change in the existing landscaping setting due to the presence of Project facilities. The viewpoints selected for analysis are as follows:

1. VP-01 (Elizaville Road) represents the view of a resident or traveler. It is 1,427 feet south of the Project Area.
2. VP-02 (Old Convict Road) represents the view of a resident or traveler. It is 250 feet north of the Project Area.
3. VP-03 (Flemingsburg Baptist Church) represents the view from a place of worship, or from a traveler. It is 750 feet southeast of the Project Area.
 - a. VPs 01, 02, and 03 include photos before any solar panels are constructed, and “after” photos where computer-generated images depict what the area might look like after solar panels are constructed.
4. VP-04 (Flemingsburg Junction) represents the view from a resident or traveler. It is a little more than 1 mile north of the Project Area.
5. VP-05 (Fleming County High School) represents the view from the public school, or from a traveler. It is 1,224 feet southeast of the Project Area.
6. VP-06 (Nepton) represents the view from a resident or traveler. It is 2,272 feet south of the noncontiguous western parcel of the Project Area.
7. VP-07 (Fleming County Golf Association) represents the view from a commercial business, or from a recreationalist. It is 1.4 miles east of the Project Area.
8. VP-08 (Fleming County Recreational Park) represents the view from a recreationalist, or from a traveler. It is 1.9 miles northeast of the Project Area.
9. VP-09 (East of Elizaville) represents the view from a resident or traveler. It is 2,331 feet south of the Project Area.

Tetra Tech concludes that the Project would introduce weak contrast, if any, to VP's 01, 04, 05, 06, 07, 08, and 09. Tetra Tech concludes that the Project could introduce moderate contrast to VP's 02 and 03. Exhibit 5-1 shows the KOPs selected by the Applicant:

**Exhibit 5-1.
Key Observation Points Selected by Applicant**



Source: AEUG Fleming Solar, LLC, November 2020.

Construction activities. The Applicant does not indicate what impact construction activities might have on the surrounding area.

Project facilities. The Applicant indicated there would be 510,300 solar panels, which would be the main visual impact of the Project. Tetra Tech concludes that visual impacts 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. Tetra Tech anticipates that views of the Project from surrounding places (Nepton, Elizaville, Flemingsburg Junction, and Flemingsburg) would generally be screened by vegetation and structures associated with development.

The substation is another facility that may create visual impacts, but the Applicant has planned to strategically place the substation on the back side of a hill that prevents it from being seen by most viewpoints. Some residents may be able to see the top of the substation, but any visual effects will be limited.

The Applicant has not studied the potential for glare from the solar panels. The Applicant has studied glare issues at other sites and states that glare impacts primarily occur during early morning and late afternoon hours. The Applicant has pledged to address glare at all locations around the Project and will mitigate primarily by selecting equipment that eliminates or reduces glare. If glare remains an issue, the Applicant has pledged to tilt the angle of the panels to completely eliminate glare from any viewing angle.

HE's evaluation of impacts. HE reviewed maps and Google Earth satellite imagery of the site and used Google Maps to “drive” around the area to assess viewpoints of the Project from a vehicle commuter’s point of view. In addition, HE staff made a visit to the Project site on February 22 and 23, 2021. During this site visit, we visited all proposed access points, drove around the property to gain line-of-sight to various viewpoints, and compiled a photo log of the Property boundary at different areas. The photo log can be found in Appendix B of this report.

Visual setting. The area surrounding the Project is agricultural and residential, but there are homes in close proximity to the Project boundary. Visitation to the area is minimal and virtually no recreation exists in the area, but hunting deer, turkey, and squirrel around the area is common. Rolling hills and groups of trees will help protect against negative visual impacts to residents and commuters.

While conducting field work, HE learned that many residents value the agricultural character of the area and are concerned about losing the vista of rolling fields of crops. There is a concern about the appearance of numerous solar panels.

Portions of the Project site are at a raised elevation to the surrounding area, especially to the south where the Project is virtually blocked from view from KR-32. The northern section of the Project is viewable from KR-559 and from virtually every home along KR-559.

Exhibit 5-2 shows information regarding the proximity of residences and other buildings, in relation to the solar panels. Four residences are within 300 feet of the solar panels, 36

residences are within 900 feet, and 170 residences are within 2,400 feet of the solar panels. It is HE’s observation that few homes along KR-559 will be shielded from the solar panels; many homes have a clear line of sight to the solar panels.

Exhibit 5-2.
Distance of Structures from the Solar Panels

Distance from Solar Panels (ft)	Residential Structures	Other Structures
0 - 300	4	5
301 - 600	11	7
601 - 900	21	6
901 - 1,200	20	3
1,201 - 1,500	22	3
1,501 - 1,800	24	1
1,801 - 2,100	30	4
2,100 - 2,400	<u>38</u>	<u>4</u>
Total Structures	170	33

Source: AEUG Fleming Solar, LLC, January 2021.

One industrial building exists within 900 feet of the solar panels, one school exists within 1,500 feet of the solar panels, and one church exists within 2,100 feet of the solar panels.

Construction activities. Commuters along KR-32 will have minimal glimpses of earth-moving equipment, but the majority of construction equipment will be hidden from viewpoints along KR-32. Commuters along KR-170 and KR-11 will have very minimal glimpses of construction vehicles, if any. Commuters along KR-559 will be able to see most of the construction equipment in the area, but traffic on this road is minimal, and construction vehicles should not impact the view of commuters. Commuters and residents in Nepton will be able to see most of the construction equipment in the area, but traffic in this area is minimal. HE expects the visual impacts from construction activities to be minimal.

Project facilities. HE’s focus of the scenic compatibility evaluation is upon the solar panels, as those structures will be above ground in close proximity to the KOPs. The solar panels rest at a typical height of about six feet tall, which is their height during their “flat” orientation. The solar panels height increases as the tracker motors tilt the panels towards the east in the morning and west in the afternoon; the maximum height of the panels during their biggest tilt is about ten feet.

The panels are expected to be seen from many different viewpoints, since the Applicant has not committed towards any definitive plan regarding a vegetative buffer. Any glare from the panels will be nonexistent if the Applicant makes appropriate adjustments to the panels so as to completely eliminate glare, although the effectiveness of those adjustment is uncertain at this time. The Applicant has committed to work with neighboring homeowners and business owners to address concerns related to the visual impact of the Project on its neighbors. The Applicant is currently conducting an analysis of individual visual impacts at locations in

close proximity to the Project site, but this analysis has not been completed, so HE cannot evaluate that report's conclusions.

The substation will be tucked behind a hill that will prevent it from being seen by most residents. The top of the transformer may be seen by the second and third levels of the Fleming County High School, but HE does not expect the visual impacts to be problematic.

Conclusions and recommendations. Based on our review of the SAR, supplemental information provided by the Applicant, and additional research conducted by HE, we offer the following conclusions and recommendations regarding scenic compatibility:

- Fleming County residents value agricultural vistas and are concerned about being overwhelmed by solar panels.
- Construction vehicles and activity will be seen from numerous vantage points, but these effects will be temporary as construction work moves around the site.
- The operational infrastructure may cause adverse visual impacts to certain residences and businesses since few vegetative buffers are currently planned.
- The substation will be hidden from nearly all viewing points.

Need for mitigation. The visual impacts are likely to be such that the Applicant should consider certain mitigation:

1. The Applicant will not remove any existing vegetation unless the existing vegetation needs to be removed for placement of solar panels.
2. 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.
3. The Applicant has committed to working with homeowners and business owners to address concerns related to the visual impact of the Project on its neighbors.
4. The Applicant should provide a visual buffer between the facility and residences and other occupied structures with a line of sight to the facility to the satisfaction of the affected property owners. If vegetation is used, plantings should reach eight feet high within four years. That vegetation should be maintained or replaced as needed.
5. Applicant will cultivate at least six acres of native pollinator-friendly species within the solar facility site, among the solar panels. At least 0.5 acres of pollinator-friendly species will be planted in the western, noncontiguous parcel of the Project.
6. The Applicant has pledged to select non-glare panels and operate the panels in such a way that all glare from the panels is eliminated. Applicant will provide proof that glare will not occur from the facility or immediately adjust solar panel operations

upon any complaint from those living, working or travelling in proximity to the facility. Failing this, the Applicant will cease operations until the glare is rectified.

Potential Changes in Property Values and Land Use

The construction and operation of industrial facilities has the potential to negatively affect property values and/or land uses of those properties adjacent to, or even in the general vicinity of, the facility in question. The magnitude, timing, and duration of increased traffic volume, noise, odor, visual impairments, or other emissions associated with the facility can influence the marketability and value of nearby properties. Each of those factors are addressed in this report and are considered here in examining property value impacts.

General methods of assessment. The value of a residential property is based on several factors, including characteristics of the home and the land on which it is situated, the uses and values of the surrounding property, among other attributes. The value of a residential property will take into account things such as lot size, age of home, size of home, number of bedrooms and bathrooms, etc. A residential property located near public lands or open spaces may be more highly valued, whereas the same property located near a heavy industry facility might have a lower value. Residential properties will be assessed differently than agricultural or industrial properties.

Several methods are available to assess the impacts of a new development on nearby property values. A technique known as hedonic pricing analysis can be used to determine the impacts of a specific characteristic on the price or value of a property. However, this method of valuation requires large amounts of data, statistical experience, and careful evaluation. Formal appraisal is a technique which uses the concept of specific property characteristics in comparing different properties. Matched pair analysis is another technique. A matched pair analysis makes a comparison between similarly situated properties that sold before and after a new industrial facility is constructed. This approach is described in more detail below.

Summary of information provided by the Applicant. The Property Value Impact Report (Appendix A of the SAR) was completed by the Applicant's consultant, Richard Kirkland of Kirkland Appraisals, LLC. Referred to here as the Kirkland report, that document, along with additional follow-up information from Mr. Kirkland provides the following relevant information:

- ***Land uses of adjacent properties*** – Kirkland describes adjoining land as primarily a mix of residential and agricultural uses. About 37 percent of the acreage adjacent to the facility is agricultural; an additional 50 percent is mixed agricultural/residential and about 12 percent is identified as purely residential. According to the Applicant, an estimated 57 residences, one commercial property and one church are located within 1,200 feet of the Project fence line.³³

³³ The property fence will be located immediately adjacent to the solar modules. In some areas, that means that the Project fence line will not be located along the Project boundary. Exhibit 3-1 illustrates both the fence line and the Project boundary.

- ***Distances between solar panels and homes on adjacent properties*** – the Kirkland report indicates that the closest home will be 175 feet away from a solar panel. In response to HE’s inquiries, the Applicant provided additional information about the distance between various structures and the property fence and between structures and the nearest solar panels; those data were provided in Exhibits 3-3 and 5-2, respectively. Altogether a total of 56 homes and 21 other structures are located within 1,200 feet of the solar panels.³⁴
- ***Discussion of a “matched pair” analysis*** – The Kirkland report employs an analytical approach described as a matched pair analysis, which aims to determine the impact of a specific feature or attribute on property value. This form of “matched pair” analysis compares differences between the sales prices of properties adjacent to a solar facilities and sales prices of properties located further from that same facility.³⁵ Kirkland identifies and compares the sales prices of properties sold using data from 38 different solar farms across multiple states. In general, each of the solar farms included in the analysis are relatively similar in terms of rural, less densely populated locations. Nearby land uses are typically residential and agriculture in nature. The size of the solar facilities evaluated ranges from about 0.2 MW up to 80 MW and from an overall property site of 24 acres (4 MW facility) up to 2,034 acres (80 MW facility). The results of this analysis and Kirkland’s overall conclusions are discussed below.
- ***Narrative discussion of specific factors related to impacts on property values*** – Kirkland briefly addresses the topics of hazardous materials, odor, noise, traffic, stigma and appearance as related to solar facilities in general and concludes that the “proposed solar farm [AEUG Fleming] will not negatively impact adjoining property values”. He does state that “the only category of impact of note is appearance, which is addressed through setbacks and landscaping buffers.”
- ***Construction related impacts to property values*** – Kirkland states that no impacts to property values are anticipated due to construction activity on the Project site. The report notes that “construction will be temporary and consistent with other development uses of the land and in fact dust from the construction will likely be less than most other construction projects given the minimal grading”.

Kirkland’s conclusions. Based on analysis of 83 residential dwelling matched pairs associated with the 38 solar farms noted above, Kirkland concludes that:

“The range of differences (in sales prices) is from -10% to +9% with an average of +1% and median of +1%. This means that the average and median impact is for a slight positive impact due to adjacency to a solar farm. However, this 1% rate is

³⁴ Other structures are described as including barns, warehouses, and similar ancillary facilities.

³⁵ Kirkland adjusts for such factors as date of sale, age of home, square footage, number of bedrooms and bathrooms and garage spaces prior to comparing sales prices.

within the typical variability I would expect from real estate. I therefore conclude that this data shows no negative or positive impact due to adjacency to a solar farm.”³⁶

Kirkland acknowledges that the -10% to +9% range is “seemingly wide” and notes that the “vast majority of the data falls between -5% and +5% and most of those are in the 0 to +5% range.”

Kirkland also evaluated a sub-set of the 38 total solar farms, focused on ten solar farms larger than 20 MWs. That group includes five facilities between about 20 and 30 MW and five facilities larger than 70 MWs. That analysis “shows impacts ranging from -10% to +7%, with an average and median of +1%, which the report notes is similar to the larger data set.” Based on the evaluation of larger solar facilities, Kirkland concludes that “the size of a project has no bearing in adjacent impacts.”

A separate analysis of 10 land sale matched pairs shows property value impacts ranging from -12% to +17%, with a median impact of 0% due to adjacency to a solar facility. Kirkland concludes that the land sale matched pair “data supports no negative or positive impact due to adjacency to a solar farm.”

In response to HE inquiries regarding the potential effects of larger solar facilities, Kirkland points out that “a number of larger solar farm projects that are under development that are similar in size to a 160 MW facility or larger” are included in his original report.³⁷ He states that “it is notable that the breakdown of adjoining uses are similar and the distance to the closest adjoining home remains similar for the larger solar farms as it is to the small solar farms” in the report, concluding that “the expectation shown in these projects clearly indicates an expectation of compatibility.” Kirkland describes the impacts from solar farms (of any size) as being related to the potential for sight, sound, smell or health effects and notes that landscaping is an important tool in maintaining a good visual buffer. He states “adjoining a 20 MW facility with an appropriate landscaping buffer would offer the homeowner the same effective view as a 200 MW facility in most cases. It is for this reason that it is reasonable to compare these larger projects to those shown in the impact study” (the Kirkland report).

HE’s evaluation of impacts. To assess the topic of impacts to property values, HE: (1) reviewed relevant existing literature related to solar facility impacts; (2) conducted interviews with several real estate professionals in Fleming County; and (3) prepared further analysis of the data provided in the Kirkland report. Since the AEUG Fleming solar facility is relatively large at 188 MW (larger than any of the facilities included in Kirkland’s matched pair data sets), HE was particularly interested in potential effects of larger scale facilities on nearby home values.

³⁶ Kirkland report, 2020.

³⁷ The Kirkland report provides a list of additional larger solar facilities, ranging in size from 50 MWs to 1,000 MWs, but states that “many are newer and there have not been any adjoining sales for analysis at this time.”

Literature review. HE reviewed the existing literature related to the relationship between property values and utility – scale solar facilities. Overall, there are not many studies available that address the issue of changes in property values specifically related to solar facilities; the few that are available include the following:

- A 2020 study completed by economists at the University of Rhode Island found that in areas of high population density, houses within a one-mile radius depreciate by about 1.7 percent following construction of a solar array. The study found “substantially larger negative effects for properties within 0.1 miles and properties surrounding solar sites built on farm and forest lands in non-rural areas.” However, additional analysis focused on impacts in more rural areas found that the “effect in rural areas is effectively zero (a statistically insignificant 0.1%) and that the negative externalities of solar arrays are only occurring in non-rural areas.” The researchers note that this may be due to solar facilities being less visible in rural areas (due to land abundance for vegetative buffers).³⁸
- A 2020 study focusing on the property value effects of wind turbines and solar facilities in the Netherlands states evidence suggesting that the negative effects of solar facilities (including noise (buzzing sounds), glare and visibility) results in decreased residential housing prices (2-3%). They found these effects to be localized (within 1km of the facility, or a little more than half a mile). However, the researchers also note that the relatively small number of solar facilities in the Netherlands makes the results less precise (as compared to the wind farm analysis).³⁹
- A 2019 article produced by the American Planning Association (APA) indicates that the “impact of utility-scale solar facilities is typically negligible on neighboring property values.” The issue of property value impacts “can be a significant concern of adjacent residents, but negative impacts to property values are rarely demonstrated.”⁴⁰
- A 2018 University of Texas study included a geospatial analysis and a survey of residential property assessors to determine the potential for property value impacts. The results show “that while a majority of survey respondents estimated a value impact of zero, some estimated a negative impact associated with close distance between the home and the facility, and large facility size. Regardless of

³⁸ Gaur, V., and C. Lang. *Impacts of Commercial-Scale Solar Energy in Massachusetts and Rhode Island*. University of Rhode Island, Department of Environmental and Natural Resource Economics, September 2020. <https://web.uri.edu/coopext/files/PropertyValueImpactsOfSolar.pdf>

³⁹ Koster, H. and M. Drees. *Wind turbines and solar farms drive down house prices*. VoxEU, September 2020. <https://voxeu.org/article/wind-turbines-and-solar-farms-drive-down-house-prices>. Mr. Koster is Professor of Urban Economics and Real Estate at Vrije University in Amsterdam; Mr. Drees is Assistant Professor of real Estate Finance at the University of Amsterdam.

⁴⁰ Coffey, Darren. *Planning for Utility-Scale Solar Energy Facilities*. American Planning Association, PAS Memo, September – October 2019. <https://www.planning.org/pas/memo/2019/sep/>.

these perceptions, geospatial analysis shows that relatively few homes would be impacted.”⁴¹

- Independent appraisers are often hired to conduct analyses related to property value impacts for solar companies, as is the case here for the AEUG Fleming solar facility. Those analyses focus on property value trends of lands adjacent to existing solar farms across the country, using a paired sales or matching pair approach. HE reviewed several appraisal reports (not completed by Kirkland Associates); those appraisals indicate differences in property values ranging from about -3.2% to as much as +27%, although generally in cases with positive impacts, property values increased by about 5% or less. Overall, the conclusions were that solar facilities do not negatively impact property values.⁴²

It is interesting to note that although the few existing studies related to this issue generally indicate no impacts to property values, local residents often bring up concerns about property values during public hearings or open houses related to specific solar facilities. In many cases, as evidenced by newspaper articles or other media, residents believe that property values will be reduced by nearby solar farms. So, there may at least be a perception of negative effects on property values that permeates communities. HE’s interview with the Fleming County Property Valuation Administrator brought up concerns specifically related to changes in property values resulting from the AEUG Fleming solar facility. That interview is discussed more fully below.

Interviews. HE conducted interviews with two individuals familiar with property valuation and real estate in Fleming County.⁴³ Both of those individuals described the local real estate market as strong, with rising home prices and shorter sales time than in the past. Those occurrences were attributed, in part, to COVID-19 effects (people wanting to get away from more densely packed areas) and current low interest rates. Summaries of those interviews are provided below:

- ***Michele Butler, Fleming County Property Valuation Administrator.*** Ms. Butler stated that she was familiar with the AEUG Fleming Project and is concerned about

⁴¹ Al-Hamoodah, Leila, et al. *An Exploration of Property-Value Impacts Near Utility-Scale Solar Installations*. Policy Research Project, LBJ School of Public Affairs, The University of Texas at Austin, May 2018. https://emp.lbj.gov/sites/default/files/property-value_impacts_near_utility-scale_solar_installations.pdf.

⁴² McGarr, P. and A. Lines, CohnReznick, Property Value Impact Study, Proposed Soar Farm, McLean County, IL, 2018; McGarr, P. and A. Lines, CohnReznick, Property Value Impact Study, Proposed Soar Farm, Kane County, IL, 2018; McGarr, P., CohnReznick, Property Value Impact Study, Adjacent Property Values Solar Impact Study: A Study of Nine Existing Solar Farms Located in Champaign, LaSalle, and Winnebago Counties, Illinois; and Lake, Porter, Madison, Marion, And Elkhart Counties, Indiana, 2018; McGarr, P., CohnReznick, Property Value Impact Study, Adjacent Property Values Solar Impact Study: A Study of Eight Existing Solar Farms Located in Lapeer County, Michigan; Chisago County, Minnesota; Marion County, Indiana; LaSalle County, Illinois; Bladen, Cumberland, Rutherford and Wilson Counties, North Carolina; and Isle of Wight County, Virginia, 2020.

⁴³ Michele Butler, Fleming County Property Valuation Administrator and Merd Story, Story Realty. Telephone interviews conducted with Susan Walker of Harvey Economics on February 11, 2021 and February 17, 2021, respectively.

impacts to property values of nearby homes in general and those of homes in the Locust Ridge subdivision specifically. The Locust Ridge subdivision is located near the southeastern portion of the Project site and, according to Ms. Butler, includes homes with some of the highest property values in the County. There are about 20 homes in that subdivision, including two near the Project boundary. Ms. Butler’s concerns are related to visual impacts – solar panels and other structures being visible from nearby residential properties.

- ***Merd Story, Story Realty, Flemingsburg.*** Mr. Story has been a Fleming County resident for over 60 years and has been part of the local real estate industry for the last 10 years. From a realtor’s perspective, Mr. Story commented that he thought the existence of the solar facility could have a negative effect on property desirability and sales price and that those effects would likely be tied to visibility of the Project. He has not specifically dealt with the issue of property sales near a solar facility over the course of his real estate career, but thought that given an alternative, a buyer might rather purchase a home further from a solar facility.

Review of Kirkland data. Although Kirkland concludes that there would be no impacts on property values from the AEUG Fleming solar facility, the matched pair analysis does indicate the potential for a range of positive or negative effects. Ten facilities were larger than 20 MW and five facilities were larger than 70 MW. Of the five facilities larger than 70 MW, two were located in rural areas and three were located in suburban areas. HE examined more closely the data provided in the matched pair sets to determine the likelihood of a positive impact, negative impact, or no impact. Exhibit 5-3 summarizes that effort.

Exhibit 5-3.

Number of Matched Pair Sets with Negative, Positive or No Impact Results

Facility Size	Number of Matched Pairs	Negative Impact		No Impact		Positive Impact	
		# of Pairs	% of Total	# of Pairs	% of Total	# of Pairs	% of Total
> 0.2 MW	83 Pairs	19	22.9%	12	14.5%	52	62.7%
>20 MW	20 Pairs	4	20.0%	3	15.0%	13	65.0%
>70 MW	11 Pairs	2	18.2%	1	9.1%	8	72.7%

Source: Kirkland data set, 2020.

HE’s evaluation of the data by facility size indicates that the majority of matched pair comparisons resulted in no sales price difference or an increase in sales price due to adjacency to the solar facility property, regardless of facility size. Roughly one fifth of matched pair comparisons indicated a negative effect, regardless of facility size. Exhibit 5-4 presents a more detailed picture of the distribution of price differences for matched pair sets, by facility size.

Exhibit 5-4.**Distribution of Sales Price Differences for Matched Pair Sets, by Size of Solar Facility**

Range of Impact	Facility Size					
	> 0.2 MW		>20 MW		>70 MW	
-11% to -15%	1 Pair	1.2%	0 Pairs	0.0%	0 Pairs	0.0%
-6% to -10%	4 Pairs	4.8%	1 Pair	5.0%	1 Pair	9.1%
-1% to -5%	14 Pairs	16.9%	3 Pairs	15.0%	1 Pair	9.1%
0%	12 Pairs	14.5%	3 Pairs	15.0%	1 Pair	9.1%
1% to +5%	43 Pairs	51.8%	12 Pairs	60.0%	8 Pair	72.7%
+6% to +10%	9 Pairs	10.8%	1 Pair	5.0%	0 Pairs	0.0%
+11% to +15%	0 Pairs	0.0%	0 Pairs	0.0%	0 Pairs	0.0%
Total	83 Pairs	100.0%	20 Pairs	100.0%	11 Pairs	100.0%

Source: Kirkland data set, 2020.

For all three levels of facility size (>0.2 MW, >20 MW and >70 MW), the majority of matched pair sets reflected a sales price increase of between 1 percent and 5 percent. The data suggest that as facility size increases, the probability of a negative impact does not increase, remaining at about 20 percent.

Because of the Project boundary proximity of the Locust Ridge subdivision, which according to Ms. Butler is a higher value area, HE also more closely examined the data provided by Kirkland for home sales over \$300,000. A total of 20 matched pair sets associated with 11 different solar facilities met that criteria. Three of the 11 facilities were larger than 70 MW (all were between 70 MW and 80 MW); the remaining seven facilities were all smaller than 10 MW. For the three facilities larger than 70 MW, the five associated matched pair sets all indicated an increase of between 1 percent and 5 percent in sales price for the homes adjacent to the facility. Considering all 20 matched pair sets with home sales over \$300,000, only four indicated a negative impact to home values – those four were all associated with the same suburban New Jersey facility of 9.36 MW. Overall, this analysis suggests that home prices in higher value residential areas are not negatively impacted by adjacency to a solar facility.⁴⁴

Conclusions and recommendations. Based upon review of the Kirkland report and our additional research efforts and interviews, HE offers the following conclusions related to potential impacts to property values or land uses for adjacent property owners:

- Certain literature and our interviews suggest that concerns surrounding impacts to property values from solar facilities stems from visibility of panels and other

⁴⁴ The 20 percent of matched pair sets (4 sets) that indicated a negative impact in the higher home value dataset is similar to the negative impact rate (23 percent) of Kirkland’s total 83 matched pair dataset (all levels of home value), as shown in Exhibit 5-3.

infrastructure. If that is the case, the creation of vegetative or other buffers may go a long way to reducing concerns or mitigating potential reductions in property values.⁴⁵

- Construction activities will be temporary, occurring over a period of about 15 months. Those activities will result in increased traffic and noise in the vicinity of the project; however, homebuyers and those interested in buying other types of properties often have a longer-term mindset when deliberating a purchase. Additionally, the high level of current market activity in Fleming County, coupled with current low interest rates, will likely have a larger influence on desirability and prices than the solar facility construction. Even so, some sales might be delayed because of uncertainty.
- Current research suggests that the existence of solar facilities does not, in general, measurably result in negative influences on property values for adjacent landowners in rural areas. HE's data analyses also generally points to a conclusion of no discernible impacts to property values, although there is a small risk of negative impacts. Although HE acknowledges that local residents and governmental officials are concerned about property values, we conclude that property values in Fleming County are unlikely to be affected by the siting of the AEUG Fleming solar facility. This conclusion assumes that the mitigation strategies discussed in Section 6 are adopted by AEUG Fleming.

Need for mitigation. No unique mitigation measures are recommended related to potential impacts to property values or adjacent land uses because other mitigation can accomplish this. However, close coordination by the Applicant with concerned homeowners regarding these mitigation measures should be initiated.

Anticipated Peak and Average Noise Levels

Noise issues stem from construction activities and operational components of the solar facility. During construction, noise will include graders, bulldozers, excavators, dozers, dump trucks, pile drivers, and other equipment. During operations, noise will be emitted from transformers, inverters, and the tracking motors that tilt the panels to track the sun throughout the day. Distance from noise emitters to noise receptors is important, since noise levels decrease the further a noise receptor from a noise emitter. Fleming County does not have a noise ordinance, but the City of Flemingsburg does.^{46,47}

General methods of assessment. Sound levels are measured in decibel units (dB). Decibels are measured on a logarithmic scale that quantifies sound intensity. Sound levels are

⁴⁵ Community & Environmental Defense Services, located in Maryland supports coordination between solar companies and landowners related to screening measures to protect the view. Community & Environmental Defense Services, *Solar Farms: Protecting Homes, Property Value, Views & the Environment While Reaping Solar Energy Benefits*. <https://ceds.org/solar/>

⁴⁶ Telephone conversation with Fleming County Fiscal Court staff. February 1, 2021.

⁴⁷ American Legal Publishing Corporation. Kentucky, City of Flemingsburg, General Regulations. *Chapter 98: Noise Regulation*. https://codelibrary.amlegal.com/codes/flemingsburg/latest/flemingsburg_ky/0-0-0-8527

typically described as dBA, which is the measure of the overall noise level of sound across the audible spectrum to compensate for the varying sensitivity of the human ear to sound at different frequencies. The impacts of noise are not strictly related to loudness – the time of day when noise occurs, the duration of the noise, and baseline or background noise levels are also important factors in determining the “loudness” of a noise.

Generally speaking, an increase in 10 dBA is perceived as a doubling of loudness, that is to say, 70 dBA is perceived as twice as loud as is a level of 60 dBA.⁴⁸ A change of three decibels is barely noticeable, but a change of five decibels is typically noticeable. Once sounds reach 90 dBA humans can experience pain from the noise and sounds above 150 dBA can cause permanent hearing damage.⁴⁹ For additional context, 30 dBA is the sound emitted by a whisper, 55 dBA are emitted from a percolating coffee-maker, and 90 dBA would be the sound emitted by an individual’s yell.

A standard noise impact assessment focuses on several key factors:⁵⁰

- Measurement of existing ambient noise levels;
- Identification of noise-sensitive receptor sites;
- Calculation of distances between noise sources and sensitive receptors;
- Estimation of Project-related (construction or operational) noise production and exposure, including cumulative noise effects.

Summary of information provided by the Applicant. Appendix C of the SAR is the “Noise and Traffic Study” completed by SWCA Environmental Consultants. There are three types of noise emitters during operations: 4,725 solar panel tracking motors, 70 inverters, and one transformer. The solar panels themselves do not make noise while operating.

Baseline noise levels. The areas surrounding the project site are dominated by active farmland, which contributes to noise typical of active hay production, crop planting harvesting, and transportation of agricultural products and equipment. The Project Area is defined as “*Category 6: Very quiet suburban and rural residential,*” which has a typical daytime noise level of 40 dBA.

Sensitive noise receptors. Exhibit 5-2 (in the ‘Facility Compatibility with Scenic Surroundings’ section) lists the distances between the nearest noise sensitive receptors to the property fence and solar panels.

⁴⁸ RECON Environmental, Inc. *Noise Analysis for the Drew Solar Project, Imperial County, California*. July 24, 2018. <http://www.icpds.com/CMS/Media/Drew-Solar---Appendix-G.pdf>

⁴⁹ Alpine Hearing Protection website, <https://www.alpinehearingprotection.co.uk/5-sound-levels-in-decibels/#:~:text=0%20decibel%20is%20the%20so,permanent%20damage%20to%20your%20hearing.>

⁵⁰ Department of Energy. Noise and Vibration Impact Assessment Methodology. https://www.energy.gov/sites/prod/files/edg/media/EIS0250F-S2_0369_Volume_V_Part_3.pdf;

As noted by the Applicant:

- The solar panels are estimated to be about 35 feet from the Project boundary at the closest points.
- The nearest sensitive noise receptor to the Project boundary is a house located 139 feet away.
- The nearest sensitive noise receptor to the solar panels is a house located 212 feet away.
- The nearest sensitive noise receptor to the inverters is a house located 739 feet away.
- The nearest sensitive noise receptor to the transformer is a house located 1,600-2,100 feet away.

Construction noise emitters. Diverse construction equipment/vehicles are projected to be used in this Project and can generate considerable noise. Bulldozers, backhoes, saws, tractors, and dump trucks all emit noise levels greater than 80 dBA at 50 feet, which can be heard from over 1,000 feet away.

The Applicant has proposed a construction schedule of seven days a week and activities will occur during daylight hours. The Applicant has stated that during normal construction activities, work will not occur after 7pm; however, work may continue after 7pm for specialized work or to catch up on delays. Therefore, HE interprets the Applicant's proposed work schedule as follows:⁵¹

- Spring: 7am – 8:30pm;
- Summer: 6:30am – 9pm;
- Fall: 7:30am – 7pm; and
- Winter: 8am – 6pm.

During construction activities, the loudest piece of equipment used will be a pile driver, which pounds posts into the ground. The posts are a critical part of the operational infrastructure, as they hold the solar panels off the ground. These pile drivers will move throughout the Project Area, pounding posts into the ground wherever solar panels are to be constructed. The pile driving activity can occur for up to 40 weeks and generates noise emissions greater than 55 dBA for nearly a mile.

The Applicant's noise analysis concluded that at the nearest house, a pile driver may cause noise emissions of 89.5 dBA. The noise created by construction activities will vary throughout the day. Further, some days will be louder than others when the construction crew (pile drivers and other equipment) are working near specific residences. Once solar panel

⁵¹ Time and Date. Louisville, Kentucky. *Sunrise, Sunset, and Daylength*. HE selected the 15th of each month and averaged those days to calculate seasonal averages.

<https://www.timeanddate.com/sun/usa/louisville?month=1>

installation has been completed in that area, construction noise in that area will diminish and move on to another area.

Operational noise emitters. The Applicant prepared two sets of analyses to analyze noise emissions from operational components of the Project: an “as proposed” layout and a “worst case” layout. The “as proposed” layout analyzes noise emissions pursuant to the projected layout of the Project. The “worst case” layout analyzes noise emissions assuming all pieces of equipment are operating simultaneously and that all inverters are located at a minimum distance of 985 feet from any sensitive receptor. HE only evaluated the “as proposed” layout since the “worst case” was not appreciably different than the proposed layout.

The solar panel tracking motors are a source of mechanical noise, and the sound typically produced by these motors is approximately 78 dBA at a one-foot distance. The sound from the tracking motors dissipates to 47 dBA at 33 feet. The sound from tracking motors dissipates to imperceptible levels (33 dBA) at the nearest residence, which is 212 feet away.

The 70 inverters are the primary potential source of noise emissions, as these produce a maximum noise level of 66 dBA at 33 feet. These inverters will be scattered evenly across the Property site. The nearest residence will be 739 feet from the inverters. The Applicant’s analysis assumes that, due to reactive power, the inverters will emit noise at the same levels at night as during daytime hours.

Another source of operational noise is the transformer. There is only one transformer on the site, to be located within the substation. The transformer produces a noise of 85 dBA at a distance of one foot, which dissipates to a sound of 54 dBA at 33 feet. The nearest sensitive receptor to the transformer is a residence approximately 1,600-2,100 feet away, so the Applicant concludes that transformer noise will not be an issue.

The Applicant’s “as proposed” analysis concludes that the maximum noise level at the nearest noise sensitive area would be 54.8 dBA. Since no sounds emanating from operation equipment are greater than 55 dBA, the Applicant concluded that the Project complies with the Environmental Protection Agency’s (EPA) noise emission recommendations.

HE’s evaluation of impacts. Fleming County does not have a noise ordinance. HE reviewed the noise ordinance of the City of Flemingsburg but concluded that none of the noise ordinance’s stipulations are relevant to the Project, given the distance from the City to the Project and the stipulations of the ordinance. As such, HE utilized the noise recommendations generated by the EPA and World Health Organization (WHO) to gauge acceptable levels of sound.

- The EPA determined that a constant sound of 70 dBA over a 24-hour period is enough to start causing permanent hearing loss for individuals, and a sound of 55 dBA outdoors is enough to cause activity interference and annoyance.⁵²

⁵² United States Environmental Protection Agency. *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety*. March 1974. <https://nepis.epa.gov/Exe/ZyPDF.cgi/2000L3LN.PDF?Dockey=2000L3LN.PDF>

- The WHO determined that daytime noise emissions greater than 55 dBA over a 16-hour period can cause serious annoyance, and noise emissions greater than 50 dBA over a 16-hour period can cause moderate annoyance. The WHO recommends limits of 45 dBA over an 8-hour period during the night.⁵³

The Applicant pointed out that a difference of three dBA is hardly discernable; thus, the difference between 52 dBA and 55 dBA (the EPA's recommendation) might be difficult to discern. Moreover, noise estimates are nearly impossible to predict with 100 percent accuracy, since topography, wind speed and direction, and other factors influence how far a sound might carry. Therefore, HE notes that impacts in the 55 dBA range can cause impacts to some individuals. HE evaluates noise emissions based on the WHO, which recommends no continuous noise above 50 dBA during the day and 45 dBA during the night.

Construction noise. Even though the Project will generate noise emissions of greater than 55 dBA often during construction, the noise will be sporadic and typically cease after dark. The Applicant stated in a response for information that work after 7pm will only happen for very specialized work (normally not creating any noise) such as substation commissioning or in cases where construction activities are severely delayed.

On some days, construction utilizing the pile driver will be loud and annoying for numerous residences in the area. On other days, as construction equipment migrates across the Project site, construction noise will not be loud enough to interfere with the quality of life for residences. Since these construction activities are not sustained, no hearing loss or long-term annoyance to residents is expected. HE does expect construction activities to be annoying to residences in the short-term, as the pile driver can be heard from more than a mile away.

It is important to note that the Fleming County High School will be within earshot of the loud construction noises, and it is likely high schoolers will notice (and potentially be annoyed) by the construction noises. The Applicant has not committed to mitigate against construction noise to minimize disturbances at the nearby high school. HE estimates the Fleming County High School may be able to hear the noise emissions from pile drivers for 20-40 weeks.

Operational noise. The operational components will be loudest during the day. This is when the tracking motors, inverters, and transformer will all be operating. The Applicant assumes the inverters and transformers will be active during nighttime, but the noise levels of all operational components is estimated to be less than 55 dBA at the nearest noise receptor. The Applicant has yet not developed a plan to strategically plant vegetative buffers within the Project boundaries.

Though the noise emissions from operational components of the solar panels are estimated to be less than 55 dBA at the nearest sensitive noise receptor (which is lower than the EPA's recommendation), the Applicant's day and night noise projections are above the range of 50 dBA (which is higher than the WHO's recommendation). HE is concerned that for the

⁵³ World Health Organization. *Guidelines for Community Noise*. April 1999.
<https://www.who.int/docstore/peh/noise/Comnoise-1.pdf>

twenty-three residences estimated to experience a constant sound of 50 dBA or more, the noise emissions could be perceived as a constant annoyance, given variations in equipment and personal sensitivity. Moreover, the number of homes estimated to have a constant sound of 50 dBA or more may be underestimated; residences in the “Hunters Trace” neighborhood (where Noise Sensitive Areas 5 and 6 exist) have a constant sound of 50 dBA or more, and additional homes in this neighborhood might experience constant sounds above 50 dBA.

Conclusions and recommendations. Based on our review of the SAR, supplemental information provided by the Applicant, and additional research conducted by HE, we offer the following conclusions and recommendations regarding noise emissions:

- The baseline noise levels in the area are serene; the construction noises will be annoying for residents for at least the period of time when construction is active nearby. The pile driving process, pounding the solar posts into the ground, will be particularly annoying for people living or working in the vicinity. There could be as many as 12 months of noticeable noise impacts during construction, with a peak of up to 40 weeks of potentially annoying levels of noise during construction. During construction, almost all the noise from the Project site will be intermittent and will not be permanently impactful to nearby residents.
- A variable construction schedule in daylight hours has the potential to confuse nearby residents who look forward to a peaceful quiet period after returning from work in the evenings. If construction noise is an issue for residents, the variable schedule has the potential to multiply the aggravation.
- Operational noises have the potential to cause a constant annoyance to a number of nearby residences. Twenty-three residences are estimated to experience noise levels above 50 dBA, though this number could be underestimated if all homes in the Hunters Trace neighborhood are analyzed. These constant noise levels, in the range of the “moderately annoying” threshold classified by the WHO, could be an issue for numerous residences.

Need for mitigation. The Applicant should consider certain mitigation to reduce noise impacts:

1. A consistent construction schedule will offer certainty and relief during the construction period, so we recommend avoiding a variable daily construction schedule. HE suggests that the Applicant’s proposed Fall schedule be adopted year-round: no earlier start than 7:30am with a construction stop at 7:00pm.
2. HE suggests that the Applicant consider eliminating construction work on Sundays. The church in the project vicinity and the residents living nearby will likely appreciate the respite from construction noise.
3. The Applicant should consider notifying residents and businesses within 2,400 feet of the project boundary about the construction plan, the noise potential, and the mitigation plans at least one month prior to construction start.

4. The Applicant should remain in contact with nearby residents to confirm that noise levels are not unduly high or annoying after the pounding and placement of the solar panel racking begins and mitigate those effects as needed.
5. HE proposes that the Applicant coordinate with the local school district officials about concentrating all noise-inducing construction activity in the vicinity of the high school in the summer and during non-school periods.
6. The Applicant should coordinate a plan for noise buffering as needed for at least the 23 residences (and potentially the Hunters Trace neighborhood) estimated to experience noise levels of 50 dBA or greater during facility operations. Additional vegetative buffering or fencing should be considered on an as-needed basis for residents who experience annoying and verifiable noise levels during operations.

Road and Rail Traffic, Fugitive Dust and Road Degradation

Traffic concerns related to the development of the AEUG Fleming solar facility during the construction or operational phases are addressed in this section. The 15-month long construction phase would include commuting construction workers, vehicles, and equipment on-site, plus the delivery of heavy loads of solar components, infrastructure, and other equipment. Increased traffic during operations will occur as employees travel to and from the property to monitor and maintain the site. Railway-related issues are essentially nonexistent; the Project will not utilize railways for any construction or operational activities, and the Applicant has pledged to comply with all Kentucky Department of Transportation railroad crossing regulations as appropriate.

General methods of assessment. A typical evaluation of traffic-related impacts include:

- Establishing existing traffic conditions in the area;
- Identifying primary access points that will be used by the Project;
- Estimating changes in traffic due to construction and operations; and
- Assessing the impacts of Project-related traffic on local areas. This includes determining whether additional traffic will lead to congestion, changes in service levels of existing road networks and identifying any potential degradation to existing roadways.

Summary of information provided by the Applicant. Appendix C of the SAR is the “Noise and Traffic Study” completed by SWCA Environmental Consultants.

Access. There are ten access points around the Project site, but the primary access point will be at the southeastern end of the Project Area at Lantern Ridge Drive, which turns north off KR-32 (shown in Exhibit 3-1 in Section 3), and the northeastern most access on the north

side. The other eight access points will be used during construction and operations, but less frequently.

Baseline traffic volumes. The SAR provides average daily traffic (ADT) data for four stations in the vicinity of the Project site. KR-11 and KR-52 are much busier than KR-559 and KR-170. Exhibit 5-5 shows traffic data provided by the Applicant.

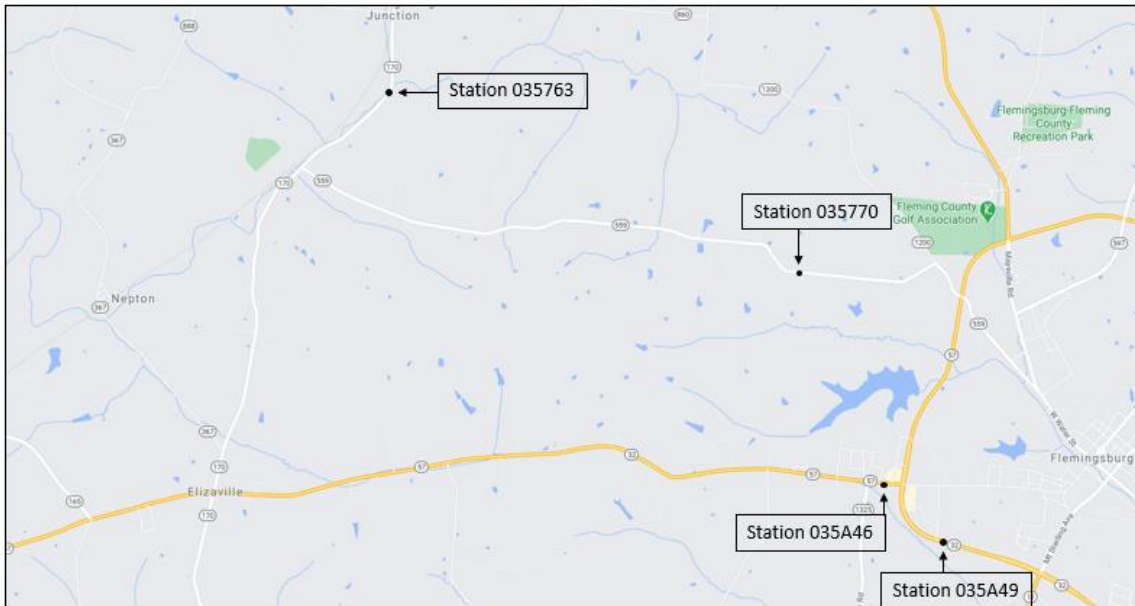
**Exhibit 5-5.
Applicant-Provided Baseline Traffic Data for Roads near the Project Site**

Access Road	Number of Through-lanes	Closest Milepoint to Property Line	Distance (ft) and Direction to Property Line from Closest Milepoint	Average Daily Traffic (ADT)	ADT Station	Lane Width (ft)	Shoulder Width (ft)
KY-32	2	Milepoint 8.2	540 feet north	5,318 (2019)	035A46	10	N/A
KY-559	2	Milepoint 0.8	50 feet south	147 (2018)	035770	8	N/A
KY-11	2	Milepoint 11.8	2,350 feet east	3,047 - 7,927 (2016)	035A49	12	12
KY-170	2	Milepoint 8.2	685 feet west (northwest portion)	482 (2018)	035763	10	N/A

Source: AEUG Fleming SAR, Volume II, and Harvey Economics, 2021.

Exhibit 5-6 shows a map of the ADT stations provided by the Applicant.

**Exhibit 5-6.
Map of ADT Stations for Applicant-Provided Traffic Data**



Source: AEUG Fleming SAR, Volume II, and Harvey Economics, 2021.

Construction related traffic volumes. Exhibit 5-7 shows the predicted increase in traffic volumes related to construction activities.

Exhibit 5-7.

Estimated Number of Vehicle Trips during Construction, by Vehicle Class

Construction Vehicle Type	Vehicle Trips per day (average)	Vehicle Trips per day (maximum)
Employee Passenger Vehicles	40	90
Heavy-Duty Delivery Trucks	8	16
Light-Duty Delivery Trucks	2	5
Water Trucks	1	5

Source: AEUG Fleming SAR, Volume II.

On average, 346 construction workers are expected to be on the Site each week. During peak construction periods, as many as 600 construction workers are expected to be on-site each week. Approximately 25 percent of construction workers are expected to come from within Fleming County; thus, the majority of construction workers will be commuting from outside the county. According to the Applicant, construction workers will arrive at the site in the early morning and typically depart no later than nightfall. Depending on certain times of the year, the Applicant might ask construction workers to work past sundown, from the hours of 6pm – 10pm. The Applicant is also not committed to a 5-day work week; thus, work may continue on the site through weekends.

In a subsequent inquiry, the Applicant indicated that the points of access near the substation (either via KR-32 near Station 035A46 or KR-559 near Station 035770) will be the most heavily trafficked points of access to the site.

The Applicant has pledged to work with the Fleming County High School and District officials to design and implement appropriate safety measures for students and teenage drivers during construction. This is an important aspect of construction activities, since the workforce will be commuting to the site on weekdays at the same time as the students will be arriving at school, both using the same roads.

The Applicant has pledged to implement all necessary safety precautions, including signage and flagmen, to ensure traffic flow remains steady on the surrounding roads. The Applicant does not anticipate damages to any of the existing road infrastructure.

The Applicant will construct and maintain access roads leading to the property during the Project life. Those roads will either be reclaimed or returned to the property owner who leased that land.

Operations related traffic volumes. Operations are not expected to noticeably contribute to current traffic volumes. A maximum of eight employees are expected to staff the site, normally working Monday – Friday from 7am – 3:30pm. Maintenance activities may occur at any time, but these employees will typically arrive to the site in mid- or full-size trucks and will not have any noticeable impact on current traffic volumes.

Road degradation. The Applicant does not expect construction activities to have any impacts on road infrastructure, except for possible increased wear due to access points on KR-32 on the south side of the site and KR-559 on the north side. The Applicant has pledged to repair any impacts to road networks due to construction of the facility.

Most vehicles traveling to the site will be personal vehicles and mid-size trucks for service use. The weight of these vehicles is 4,500 pounds – 8,000 pounds. Periodic deliveries from FedEx or UPS are also expected, about 1– 2 times per week; the weight of those vehicles is approximately 23,000 pounds. The site will also receive regular deliveries of large spare parts (e.g., PV panels); the weight of these delivery vehicles is assumed to be a load limit of 80,000 pounds, as indicated by the Applicant in the first round of inquiries. The heaviest vehicle will be the truck that carries the main power transformer; the combined weight of this vehicle is estimated to be 554,000 pounds.

Fugitive dust. The Applicant expects construction activities to produce minimal fugitive dust. The Applicant will utilize water trucks to spray down roads and lots “as needed,” to help reduce the amount of airborne dust generated by construction activities. The Applicant will also utilize revegetation measures and cover spoil piles to help reduce wind erosion of disturbed areas. The Applicant will build an internal road network with compacted gravel, which produces less dust than dirt roads.

HE’s evaluation of impacts. HE conducted the following additional research and analyses related to traffic, road degradation and fugitive dust.

The Applicant provided traffic volume information at four stations within the vicinity of the Project (Exhibit 5-6). Exhibit 5-8 below presents traffic and road data at eight additional stations (in green text). HE researched traffic data at additional stations for two reasons: (1) we deemed these additional stations as relevant to a better understanding the traffic scenarios in the vicinity of the Project; and (2) the Applicant has not decided where construction traffic will originate. Thus, it is possible for these ADT stations to see increases in vehicular traffic during construction activities.

Exhibit 5-8.

Traffic Data for Roads near the Project Site, Baseline and Anticipated Change

Access Road	ADT Station	Average Daily Traffic (ADT)	Year of Estimate	Road Weight Limit	% Change in Activity (Avg.)	% Change in Activity (Peak)
KY-32	035A46	5,318	2019	80,000	1%	2%
KY-32	035772	3,617	2018	80,000	2%	4%
KY-559	035770	147	2018	80,000	66%	116%
KY-559	035010	717	2019	80,000	14%	24%
KY-11	035A49	7,927	2017	80,000	1%	2%
KY-11	035A43	6,914	2018	80,000	1%	2%
KY-170	035763	482	2018	80,000	5%	9%
KY-170	035753	937	2017	80,000	3%	5%
Nepton	035754	260	2019	44,000	19%	33%
Nepton	035761	80	2017	44,000	61%	107%
Buffalo Trace	035792	181	2018	44,000	27%	47%
Lazy Oaks	035950	77	2009	44,000	63%	111%

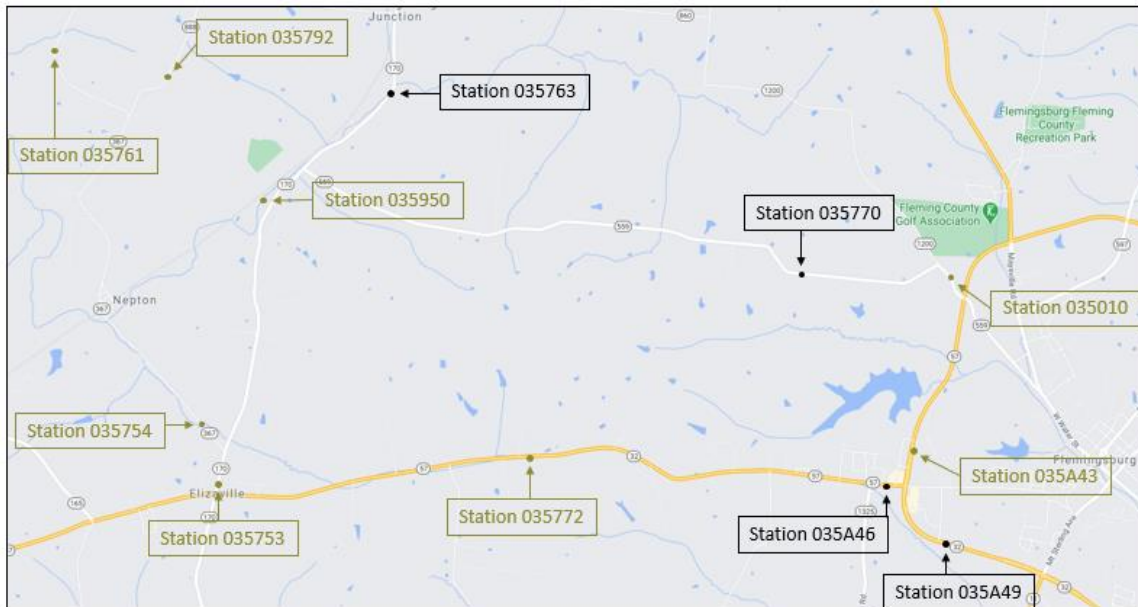
Note: ADT Stations in black are those provided by AEUG Fleming Solar, LLC.

Source: AEUG Fleming SAR, Volume II, and Harvey Economics, 2021.

Exhibit 5-9 shows the physical location of the stations provided in Exhibit 5-8.

Exhibit 5-9.

Locations of Traffic Counting Stations near the Project Site



Source: AEUG Fleming SAR, Volume II, and Harvey Economics, 2021.

Construction related traffic impacts. The Applicant stated that KR-32, KR-559, KR-11, and KR-170 will be used during construction, but did not indicate that Nepton, Shanklin, or Lazy Oaks roads will be used to facilitate construction on the western (noncontiguous) parcel.

As shown in Exhibit 5-7, the Applicant estimated that 51 vehicles will travel to the site on an average day, and 116 vehicles will travel to the site during peak activity. HE deems these

vehicle estimates too low, since an average of 346 construction workers are expected on-site each week, and 600 workers will be on-site during peak construction activities. The Applicant has not committed to implementing a carpooling shuttling program for construction workers; thus, HE assumes average traffic counts for employee passenger vehicles will increase from 40 vehicles to 231 vehicles (346 workers / 1.5 workers per vehicle = 231 vehicles). HE also assumes peak traffic counts for employee passenger vehicles will increase from 90 vehicles to 400 vehicles (600 workers / 1.5 workers per vehicle = 400 vehicles).

In the last two columns of Exhibit 5-8, HE estimates a percent increase in estimated traffic volumes due to the increase in construction-related activity at each potentially relevant ADT station. Since the Applicant is not able to confirm points of origin for construction traffic and construction activities are expected to occur simultaneously at different areas within the Project, HE attributes a portion of construction traffic equally to each proposed access point:

- For the “% Change in Activity (Avg.) column,” HE estimates 242 vehicles may pass through all ADT stations in any given day. HE calculates 242 as follows: [231 commuter vehicles + 8 heavy-duty delivery trucks + 2 light-duty delivery trucks + 1 water truck].
 - Since there are four access points along KR-559, HE assumes traffic along KR-559 at Station 035770 may increase by as much as 66 percent during an average day ([242 vehicles / 10 access points] * 4 access points along KR-559 / 147 ADT).
- For the “% Change in Activity (Peak) column,” HE estimates as many as 426 vehicles may pass through all ADT stations in any given day. HE calculates 426 as follows: [400 commuter vehicles + 16 heavy-duty delivery trucks + 5 light-duty delivery trucks + 5 water trucks].
 - Since there are two access points along Nepton Road, HE assumes traffic at Station 035754 may increase by as much as 33 percent during a peak day ([426 vehicles / 10 access points] * 2 access points along Nepton Road / 260 ADT).

HE’s calculations in Exhibit 5-8 show activity along KR-559 will increase substantially, although there are few residents and light traffic on that road. Areas around Nepton will also experience influxes of construction-related traffic. KR-11 and KR-32 are not expected to receive noticeable influxes of traffic, but since KR-32 is a two lane highway, left turns in/out of Lantern Ridge Drive (near the Flemingsburg Baptist Church) may cause congestion.

A special traffic issue during construction will relate to the Fleming County High School located along KR-32. The School has an average of 700 students and 100 faculty. There is already considerable congestion when students are arriving between 7:15am-8:00am and when they leave after 3:00pm. Project-related traffic, especially in the morning, could add to this problem.

Road degradation. The Applicant has pledged to repair any impacts to roads due to construction of the facility. The Applicant has not stated how it will determine whether repairs will be needed, however.

According to the Kentucky Transportation Cabinet (KTC), KR-32, KR-559, KR-11, and KR-170 are all rated to 80,000 pounds; this means the combined weight of vehicles plus loads under 80,000 pounds are allowed to travel on these highways.⁵⁴ Nepton, Shanklin, and Lazy Oaks roads are only rated to 44,000 pounds.⁵⁵ Since most of the vehicles utilized by the Applicant are 80,000 pounds or less, HE does not expect much road degradation to occur around the majority of the Project site. However, the roads that provide access to the western (noncontiguous) parcel are rated at a maximum of 44,000 pounds. Thus, if road degradation is to occur, it is likely to occur in the area surrounding the unincorporated community of Nepton. Special attention should be focused on this area when determining construction traffic routes, since these roads are more prone to degradation.

The transportation of the main power transformer is estimated to be 277 tons, and the roads around the area are only rated to 40 tons. Special attention should be paid to the specific route before and after the main power transformer is delivered to the Project site. Based on interviews with KTC staff and community road development agencies, the severity of road degradation is difficult to predict, since it depends on a host of factors, such as the combinations between the number of axles of a vehicle, the vehicle weight, weight distribution on each tire, and other factors too difficult to model. The Applicant has a specific plan for transporting this load and contractors experienced in doing so.

Bridge degradation. This topic is a crucial aspect of road degradation, as collapsing bridges can have a dangerous and substantial impact to vehicular traffic. The KTC classifies bridges under a three-color coded system: “green” bridges are in good condition and not deficient; “yellow” bridges are in fair condition but not structurally deficient; and “red” bridges are in poor condition and structurally deficient.

Exhibit 5-10 shows various bridges surrounding the Project site. The identified bridges on the map are either “yellow” or “red.”

⁵⁴ Commonwealth of Kentucky. *Overweight / Over-Dimensional Legal Dimensions*. 2021. [https://drive.ky.gov/motor-carriers/Pages/OWOD-Legal-Dimensions.aspx#:~:text=No%20single%20axle%20in%20any,eighty%20thousand%20\(80%2C000\)%20pounds.](https://drive.ky.gov/motor-carriers/Pages/OWOD-Legal-Dimensions.aspx#:~:text=No%20single%20axle%20in%20any,eighty%20thousand%20(80%2C000)%20pounds.)

⁵⁵ Kentucky Transportation Cabinet. *Kentucky Truck Weight Classification*. 12/2015. <https://transportation.ky.gov/Planning/Documents/Weight%20Class.pdf>

Exhibit 5-10.
Map of Brges near the Project Site



Source: Kentucky Transportation Cabinet and Harvey Economics, 2021.

As of early 2018, Kentucky identified over 1,000 bridges, about seven percent of all bridges in the Commonwealth, that are structurally deficient.⁵⁶ There are two deficient bridges, ID 035800038N (“38N”) and ID 035C00040N (“40N”) in the Project vicinity. Bridge 38N carries traffic along KR-32. Bridge 40N is less likely to be an issue because the Applicant does not expect to utilize this bridge, as there is no access point off Lazy Oaks Lane, although this road is included in the Project footprint.

The railroad crossing through Nepton allows traffic to cross over the tracks without a crossing bar, as does the railroad crossing near 40N and Lazy Oaks Lane. Transkentucky Transportation Railroad, Inc. indicated to HE that although activity on this railroad has been largely inactive for the past four years, they are hoping to get the railroad back up and running in the next couple of years.⁵⁷

Operations related traffic impacts. Only a few vehicles will travel daily to the Project site during operations, contributing very little to existing or projected traffic volumes. HE reached out to the KTC to obtain traffic volume projections, but no projections were available. Based on the stable population projections of Fleming County, HE does not expect the operational traffic to make any noticeable difference to the area over the life of the Project.

⁵⁶ WKYT Kentucky Local News. More than 1,000 bridges in Kentucky ‘structurally deficient’. January 30, 2018.
<https://www.wkyt.com/content/news/Report-More-than-1000-bridges-in-Kentucky-structurally-deficient-471812134.html>

⁵⁷ Electronic communication with Teresa Mills, Director of Administration for TTI Railroad. 2/19/2021.

Fugitive dust impacts. Since the Applicant is committed to spraying down roads and lots with water, utilizing revegetation measures, covering spoil piles, and building internal road networks with compacted gravel, HE does not predict significant issues related to airborne dust particles. In HE's first request for information, the Applicant stated that there will be no protocol for spraying down roads; rather, during dry periods the Applicant has pledged to increase the frequency of spraying down roads and lots.

Conclusions and recommendations. Based on our review of the SAR and subsequent information provided by the Applicant, as well as other secondary research conducted regarding roads and dust, HE offers the following conclusions regarding traffic, fugitive dust, and road and bridge degradation:

- Project-related traffic congestion will occur near the entrance to Fleming County High School, especially in the morning when both students, faculty and construction workings are arriving simultaneously.
- Traffic congestion will also be noticeable along KR-32 near the Flemingsburg Baptist Church. Left turns in/out of Lantern Ridge Drive could frustrate commuters to the point where a temporary stop light may be necessary.
- Traffic congestion during construction will likely be noticeable along Nepton Road (and potentially Buffalo Trace Road and Lazy Oaks Lane if the Applicant utilizes these routes), which provides access to the westernmost (noncontiguous) parcel. KR-559 is also expected to experience substantial increases in traffic volumes during construction, especially near Station 035770, which might be a primary access point.
- There will be no noticeable traffic impacts during operations.
- Road degradation could occur while carrying heavy loads and especially along Nepton Road (and potentially Buffalo Trace Road and Lazy Oaks Lane), since these roads are only rated at 44,000 pounds. The delivery of the main power transformer will also be a challenge, since this vehicle is nearly seven times heavier than the any of the roads in the vicinity are rated to handle. Road degradation is also more likely to occur near primary access points, especially the primary access point utilized in delivery of the main transformer substation.
- Bridge degradation is possible, especially for bridge 38N, which exists along KR-32. Bridge 38N is structurally deficient and has the potential to collapse if put under immense stress. Bridge 40N is also structurally deficient, but there are no access points off Lazy Oaks Lane.
- Fugitive dust should not be an issue with the Applicant's proposed mitigation.

Need for mitigation. The Applicant has stated a commitment to repair any impact to road infrastructure. To ensure this commitment, HE recommends the following mitigation:

1. HE suggests that the Applicant work with the Commonwealth road authorities and the Fleming County Road Department to perform a road survey, before and after construction activities, for KR-32, KR-11, KR-559, KR-170, and Nepton Road. This road survey should include any bridges along these routes.
2. The Applicant has committed to fix or fully compensate the appropriate transportation authorities for any damage or degradation to roads or bridges that it causes or to which it materially contributes to.
3. The Applicant should develop special plans and obtain necessary permits before bringing heavy loads, especially the transformer, onto state or county roads in the vicinity. Heavy loads over state-designated deficient bridges should be avoided.
4. Additional heavy truck trips along Nepton Road should be minimized or diverted, to disperse the weight of vehicles on the roadway to less than 44,000 pounds. Currently, the weight of vehicles plus loads exceeds the 44,000-pound weight limit around the western (noncontiguous) parcel of the Project site.
5. The Applicant should meet with the Fleming County High School Board to ensure proper road safety measures are designed and implemented. The Applicant should utilize appropriate signage and safety equipment along KR-32 to aid the flow of traffic in the vicinity of Fleming County High School.
6. As needed, the Applicant will place a temporary stop light at the intersection of KR-32 and Lantern Ridge Drive.
7. Lazy Oaks Lane should be avoided during construction and operations. The bridge under Lazy Oaks Lane is structurally deficient and near a railroad crossing.
8. The Applicant will properly maintain construction equipment and follow BMPs related to fugitive dust throughout the construction process. This should keep dust impacts off-site to a minimal level.

Economic Impacts

Evaluation of the potential economic effects of the AEUG Fleming Project is based on knowledge of the Project's construction timeline and activities and the solar facility's long-term operational activities. Project employment needs, local expenditures (labor, materials/supplies, equipment) and payment of applicable taxes (sales tax, lodging tax, property tax) and other fees are considered over the short- and long-term and placed within the context of existing demographic and economic conditions.

General methods of assessment. Both the construction and operational phases should be evaluated to include:

- Detailed understanding of the project: specific activities to occur, the timeline of those activities, geographic extent of project effects;

- Quantification of direct effects: Number of employees and range of wage levels, materials purchases, supplies and equipment and associated sales tax payments, other tax payments including property taxes. Determining the portion of purchases to occur in the local area or within the Commonwealth is key;
- Estimation of total effects: Use of region and industry specific multipliers to estimate indirect and induced effects to calculate total effects such as employment, income and overall economic activity;
- Other social or economic benefits, including potential non-monetary benefits, to the local community or surrounding area; and
- Potential curtailments or impacts to other industries.

Summary of information provided by the Applicant. Volume 1 of the Application (Appendix G) provided a report prepared by economic consultant David Loomis, titled Economic Impact and Land Use Analysis of Fleming Solar Project, which included a discussion and explanation of the Project’s economic benefits. That report provided estimates of employment, earnings and output benefits generated by Project construction and operations, both for Fleming County and the Commonwealth of Kentucky. Estimates of annual property tax revenues generated over 30 years of operations were also included in the report. In response to HE inquires, the Applicant provided additional information regarding construction and operational expenditures and tax payments.

Excerpts from the Applicant’s economic impact analysis and supplemental materials provided to HE included the following:

- ***Capital investment:*** The total Project cost is expected to be \$190 million. In addition to installation labor and materials and equipment, this figure includes other “soft-costs” such as permitting and business overhead. Although some of the materials and equipment will certainly be purchased from within Fleming County and within Kentucky, the specific percentage of those items that would be sourced locally is unknown. Therefore, in an effort to conservatively estimate the Project benefits, the assumption was that zero percent of the materials and equipment would be sourced from within Fleming County and from within Kentucky.
- ***Construction employment and earnings:*** Construction of the facility is anticipated to generate approximately 166 full-time equivalent (FTE) positions in Fleming County. However, the number of individual jobs created by the project may be greater than that if at least some workers are hired for only a portion of the construction period, i.e., some special tasks may occur over a limited time period. Total earnings for Fleming County construction workers are estimated to be about \$14.3 million.
- ***Operational employment, earnings and expenditures:*** Project operations will require between eight and nine permanent positions for ongoing operations and maintenance of the facility; salaries for those employees are estimated to be

about \$50,000 per year. According to the Economic Impact report, these well-paid professionals boost economic development in rural communities where new employment opportunities are welcome due to economic downturns. About 25 percent of annual operating expenditures for materials and supplies are expected to be made within Fleming County.

- **Property tax revenues:** Solar energy projects increase the property tax base of a county, creating a new revenue source for education and other local government services, such as fire protection, park districts, and road maintenance. The expected total property taxes paid over the lifetime of the Project is over \$9.3 million. Annual property taxes paid range from about \$482,300 in Year 1 to about \$221,600 in Year 30.⁵⁸

Exhibits 5-11 through 5-13 present the estimated economic benefits of the Project, as described by the Applicant.

Exhibit 5-11.

Total Economic Benefits of the AEUG Fleming Project, Construction Phase

	Fleming County			Commonwealth of Kentucky		
	<u>Employment</u>	<u>Earnings</u>	<u>Economic Output</u>	<u>Employment</u>	<u>Earnings</u>	<u>Economic Output</u>
Direct	166	\$14.3 M	\$17.0 M	302	\$29.6 M	\$32.9 M
Total	245	\$17.0 M	\$25.7 M	543	\$39.4 M	\$61.7 M

- Notes: (1) Employment is measured in full-time equivalents, FTEs.
 (2) Total benefits include direct, indirect, and induced effects.
 (3) Economic output includes earnings.
 (4) Commonwealth of Kentucky columns are inclusive of Fleming County

Source: AEUG Fleming Solar, LLC, November 2020 and February 2021.

Exhibit 5-12.

Annual Economic Benefits of the AEUG Fleming Project, Operations Phase

	Fleming County			Commonwealth of Kentucky		
	<u>Employment</u>	<u>Earnings</u>	<u>Economic Output</u>	<u>Employment</u>	<u>Earnings</u>	<u>Economic Output</u>
Direct	8.5	\$421,706	\$421,673	8.5	\$841,624	\$841,624
Total	17.6	\$678,597	\$1,713,662	22.0	\$1,410,891	\$2,842,685

- Notes: (1) Employment is measured in full-time equivalents, FTEs.
 (2) Total benefits include direct, indirect, and induced effects.
 (3) Economic output includes earnings.
 (4) Commonwealth of Kentucky columns are inclusive of Fleming County

Source: AEUG Fleming Solar, LLC, November 2020 and February 2021.

⁵⁸ Annual decreases in property taxes paid is due to depreciation applied to the value of manufacturing machinery. All tax rates were assumed to remain constant at the 2020 rate level.

Exhibit 5-13.

Total Property Tax Revenues Generated by the AEUG Fleming Project, 30-Year Operations Phase

Fleming County									
Soil Conservation District	Fox Creek WCD	Extension Service	Health Department	Ambulance	Library	Fiscal Court	School District	Commonwealth of Kentucky	Total
\$49,000	\$49,000	\$240,000	\$250,000	\$425,000	\$476,000	\$801,000	\$2.2 M	\$4.8 M	\$9.3 M

Note: The Fox Creek WCD is the Fox Creek Watershed Conservation District.

Source: AEUG Fleming Solar, LLC, November 2020 and February 2021.

On an annual basis, these property taxes would amount to \$310,000 per year, of which 52 percent would go to the Commonwealth, 24 percent would go to the School District, and 24 percent would go to various county level service agencies.

The Applicant is seeking an Industrial Revenue Bond (IRB) to help finance the project. An IRB is a type of economic development tool used in Kentucky in which no borrowing occurs, and no money is exchanged, but allows the developing entity to ensure that local taxes are paid, while offsetting some state level taxes. Payment in lieu of taxes would accrue to the County. Negotiations are underway.

HE's evaluation of impacts. An economic impact analysis can be an opportunity to identify the monetary and other benefits provided by Project construction and operational activities. A meaningful discussion of the monetary and other benefits must provide some quantification of said benefits, along with additional context to determine the magnitude of those benefits:

- For most solar facilities, the purchase of materials, supplies and equipment makes up a large portion of total project construction costs. In response to HE inquiries, the Applicant noted that the economic analysis assumes that none of the materials and equipment would be sourced from within Fleming County or from within Kentucky. The majority of the Project's capital expenditures are anticipated to occur out-of-state, limiting the economic benefits to the Commonwealth. Therefore, the economic benefits of construction focus mainly on labor activities.
- It is also important to note that direct construction jobs, as well as indirect and induced, will be temporary, resulting from the 15-month construction period. Additionally, the construction period jobs described above for Fleming County will only be realized if there are enough available and qualified workers in the County to comprise the estimated 166 FTEs.
- Annual operations and maintenance expenditures for the Project were not provided to HE due to confidentiality. HE assumes that those expenditures would be relatively minimal on an annual basis and that the majority of economic benefits generated during operations would result from employee earnings and property taxes.

- Property taxes distributed to local entities within Fleming County provide additional revenue for these agencies; however, those payments will generally amount to a small percentage of total tax revenues for any individual entity.
- Landowner leases are not mentioned in the economic analysis. Those landowners will realize direct benefits from the Project via lease payments.

Conclusions and recommendations. Construction and operation of the AEUG Fleming solar facility will provide some limited economic benefits to the region and to the Commonwealth. Overall, the AEUG Fleming Project will result in measurable, but temporary, positive economic effects to the region during the construction phase. Construction activity will generate regional employment and income opportunities; those effects will be temporary, but local hires will increase employment and incomes to an area that needs it. Most construction purchases will be made outside of Kentucky.

Operational economic benefits will be confined mostly to property taxes, although these will be relatively minor. Operational employment will be minimal, and purchases of materials or supplies will be very small on an annual basis. Annual property tax payments made to Fleming County taxing authorities will start out at over \$480,000 and will gradually decline over time due to depreciation of Project assets. Those payments will generally amount to a small percentage of total tax revenues for any one entity.

Need for mitigation. Socioeconomic impacts of the AEUG Fleming solar facility represent a positive contribution to the region. However, the economic benefits to the local area are small and largely temporary. The Applicant should attempt to hire local workers and contractors to the extent they are qualified to perform the construction and operations work. The Applicant should consider other opportunities to optimize local benefits. For example, the Fleming County High School would welcome the opportunity for its students to learn more about solar energy and skills in this industry.

Decommissioning Activities

Decommissioning is the process of safely closing the solar facility to retire it from service at the end of its useful life, and subsequently returning the land to its original condition. This might include removal of solar panels and all associated facilities, and restoration of the property to pre-Project conditions. Although not specifically addressed in the statutes, the Siting Board requested that HE discuss the potential impacts associated with decommissioning activities.

General methods of assessment. The types of impacts likely to result from decommissioning might be similar in nature to those experienced during construction. For example, workers would need to commute to the site daily, trucks would be required to haul equipment away using local roads and noise may be generated by all of the activity. Therefore, the methods of assessing decommissioning impacts would be similar to those employed to evaluate the construction phase effects.

In addition, the decommissioning of a facility is often compared to the conditions that might exist if the facility is not commissioned. This step is relevant if decommissioning is not required or the facility owner is not committed to decommissioning.

Removal and disposal of the project components should also be addressed in this assessment.

Summary of information provided by the Applicant. According to the Applicant, the AEUG Fleming solar facility would have an expected useful life of at least 30 years.

Supplemental materials provided by the Applicant state that a formal decommissioning plan has not been prepared, but that commitments regarding land restoration are included in individual lease agreements with participating landowners. HE was not able to review those agreements due to confidentiality concerns on the part of AEUG Fleming Solar, LLC.

However, the Applicant has indicated that it has committed to removing all facility components and selling or disposing of them outside Fleming County.

HE's evaluation of impacts. The impacts of decommissioning activities are likely to be somewhat smaller than those of construction. Fewer workers may be able to complete facility removal activities in a shorter time period, as compared to construction activities. Additionally, decommissioning work may not require the same level of experience or skill sets as project construction, resulting in the employment of more general laborers at lower wages. Therefore, the benefits to local employment and income during decommissioning would be somewhat less than those described for the construction phase.

Given the County's experience with past industrial waste decommissioning, they are understandably concerned about the AEUG Fleming solar facility decommissioning plan. Details and commitments associated with that plan have not yet been forthcoming.

Conclusions and recommendations. HE believes that decommissioning the facility and returning the site to its original condition can be accomplished if all the components will be removed. After reclamation, this would return the land to its pre-Project productive use and property value, and eliminate long term Project-related negative impacts, compared with simply shutting the solar facility. This process will also have a modest and temporary positive economic stimulus to the region.

Need for mitigation. The Applicant has stated that commitments regarding land restoration are included in individual lease agreements with participating landowners. To ensure that those commitments are met, we recommend the following:

1. As applicable to individual lease agreements, the Applicant, its successors, or assigns will abide by the specific land restoration commitments agreed to by individual property owners, as described in each signed lease agreement.
2. The Applicant should develop an explicit decommissioning plan. This plan should commit the Applicant to removing all facility components from the Project site and Fleming County at the cessation of operations.

Public Involvement

According to the Application, AEUG Fleming conducted the following activities to notify and inform Fleming County residents about the Project:

- AEUG Fleming has been active in the Project Area since March 2020. During that time, AEUG Fleming has met with landowners, stakeholders, and local government officials about the Project.
- AEUG Fleming held a virtual community meeting on July 22, 2020. This meeting was held virtually out of an abundance of caution due to COVID-19. Neighbors were invited to pick up dinner through a drive-thru BBQ, followed by an online virtual presentation about the Project. The Applicant reported three dozen participants attended the online virtual presentation at some point.
- A public meeting was held on the evening of August 7, 2020. Because of COVID-19, attendance at this meeting was limited to no more than 25 people. The meeting was also made available for public participation through a virtual meeting with online and call-in options. A notice announcing the public meeting was printed in the Flemingsburg Gazette on July 15, 2020. AEUG Fleming also mailed letters to all adjoining landowners notifying them of the public meeting. A scan of this notice and a copy of the information packet sent to neighboring landowners is included in the Application. The Company reported that approximately one dozen people participated in the public meeting virtually and five participated in-person.⁵⁹
- AEUG Fleming Solar, LLC sent letters to 96 nearby property owners on November 19, 2020 and posted a notice in the Flemingsburg Gazette on November 18, 2020. A sample of the letter sent to neighboring landowners, a list of the recipients and an affidavit of publication are provided in the Application. The text comprising the notice in the Flemingsburg Gazette is also provided in the Application.

As part of HE's site visit to the Project Area, we met with the Fleming County Judge Executive, Larry Foxworthy, and other County officials. Mr. Foxworthy and others in the group indicated that local residents were mostly unaware of the Project, possibly due to COVID-19 limitations. This perception was reiterated by a local realtor, Merd Story, who has been a Fleming County resident for over 60 years.

Need for mitigation. It is suggested that the Applicant pursue additional public involvement.

⁵⁹ The presentation materials provided to the public at the community meeting and the public meeting are included in the Application.

SECTION 6

Recommended Mitigation

This section identifies actions the Applicant can take to mitigate potential negative impacts on certain regional resources. Other regulatory processes will determine the need for particular actions; these are only noted here, and Harvey Economics makes no recommendation as to their merit. Beyond those actions, HE recommends a list of mitigation actions for Siting Board and Applicant consideration.

Regulatory Actions and Mitigation Outside Siting Board Jurisdiction

The Siting Board should be aware of the following permitting and regulatory actions that will require Applicant compliance and possible mitigation efforts. No action on these actions is required by the Siting Board since these are outside the Siting Board's jurisdiction.

The SAR states that an Approved Jurisdictional Determination will be requested through the U.S. Army Corps of Engineers (USACE) to determine which aquatic features are considered federally jurisdictional under the Clean Water Act (CWA). However, supplemental material provided by the Applicant states that "the Project will not pursue a Jurisdictional Determination from the USACE as there will be no impact to wetlands."

AEUG Fleming will obtain a Kentucky Department of Environmental Protection Stormwater Construction General Permit from the Kentucky Division of Water in compliance with the National Pollutant Discharge Elimination System permit program established under the CWA. The SAR states that the Kentucky Pollution Discharge Elimination System (KPDES) permit (KPDES No: KYR100000) is a general permit for stormwater discharges associated with construction activity.

AEUG Fleming Solar, LLC completed an Environmental Site Assessment (ESA) Phase 1 for the site. The ESA Phase 1 report does not include any recommendations for future actions related to environmental condition on the Project site.

Mitigation for Siting Board and Applicant Consideration

The following mitigation measures are based upon: (1) Applicant commitments set forth in the SAR; (2) measures discussed with the Applicant in subsequent information exchanges or discussions; and (3) additional mitigation steps HE believes will reduce or eliminate negative Project impacts and are reasonable for the Applicant to undertake.

In performing this comprehensive review of the AEUG Fleming SAR, HE has gained an understanding of the Project, the location, the construction and operational activities, the Applicant's intentions, and the Project's impacts. Our recommended mitigation actions are intended to reduce or eliminate potential adverse impacts.

A. Site development plan:

1. A final site layout plan should be submitted to the Siting Board upon completion of the final site design. Deviations from the preliminary site layout plan, which formed the basis for HE's review, should be clearly indicated on the revised graphic. Those changes would include, but are not limited to, location of solar panels, inverters, transformer, the warehouse, substation, operations and maintenance building or other Project facilities or infrastructure.
2. Any change in Project boundaries from the information that formed this evaluation should be submitted to the Siting Board for review.
3. The Siting Board will determine if any deviation in the boundaries or site development plan is likely to create a materially different pattern or magnitude of impacts. If not, no further action is required, but if yes, the Applicant will support the Siting Board's effort to revise its assessment of impacts and mitigation requirements.
4. The Applicant or its contractor will control access to the site during construction and operation. All construction entrances will be gated and locked when not in use.
5. The Applicant's access control strategy should also include appropriate signage to warn potential trespassers. The Applicant must ensure that all site entrances and boundaries have adequate signage, particularly in locations visible to the public, local residents and business owners.
6. According to National Electrical Safety Code regulations, the security fence must be installed prior to any electrical installation work. The substation will have its own separate security fences installed.

B. Compatibility with scenic surroundings:

1. The Applicant will not remove any existing vegetation unless the existing vegetation needs to be removed for placement of solar panels.
2. 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.
3. The Applicant has committed to working with homeowners and business owners to address concerns related to the visual impact of the Project on its neighbors. The Applicant should provide a visual buffer between the facility and residences and other occupied structures with a line of sight as requested by these property owners. If vegetation is used, plantings should reach at least eight feet high within four years. That vegetation should be maintained or replaced as needed. The Applicant should coordinate with existing adjacent property owners that have a line of sight to Project infrastructure to determine how this should be accomplished.

4. Applicant will cultivate at least six acres of native pollinator-friendly species within the solar facility site, among the solar panels. At least 0.5 acres of pollinator-friendly species will be planted in the western, noncontiguous parcel of the Project.
5. The Applicant has pledged to select non-glare panels and operate the panels in such a way that all glare from the panels is eliminated. Applicant will provide proof that glare will not occur from the facility or immediately adjust solar panel operations upon any complaint about glare from those living, working or traveling in proximity to the facility. Failing this, the Applicant will cease operations until the glare is rectified.

C. Potential changes in property values and land use:

1. No unique mitigation measures are recommended related to potential impacts to property values or adjacent land uses because other mitigation can accomplish this. However, close coordination by the Applicant with concerned homeowners regarding these mitigation measures should be initiated.

D. Peak and average noise levels:

1. A consistent construction schedule will offer certainty and relief during the construction period, so we recommend avoiding a variable daily construction schedule. HE suggests that the Applicant's proposed Fall schedule be adopted year-round: no earlier start than 7:30am with a construction stop at 7:00pm.
2. HE suggests that the Applicant consider eliminating construction work on Sundays. The church in the vicinity and the residents living nearby will likely appreciate the respite from construction noise.
3. The Applicant should notify residents and businesses within 2,400 feet of the Project boundary about the construction plan, the noise potential, and the mitigation plans at least one month prior to construction start.
4. The Applicant should remain in contact with nearby residents to confirm that noise levels are not unduly high or annoying after the pounding and placement of the solar panel racking begins.
5. HE proposes that the Applicant coordinate with the local school district officials about concentrating all noise-inducing construction activity in the vicinity of the high school to the summer and during non-school periods.
6. The Applicant should coordinate with and plan for noise buffering as needed for at least the 23 residences (and potentially the Hunters Trace neighborhood) estimated to experience noise levels of 50 dBA or greater during facility operations. Additional vegetative buffering or fencing should be considered on an as-needed basis for residents who experience annoying and verifiable high noise levels during operations.

E. Road and rail traffic, dust, and road degradation:

1. HE suggests that the Applicant work with the Commonwealth road authorities and the Fleming County Road Department to perform a road survey, before and after construction activities, for KR-32, KR-11, KR-559, KR-170, and Nepton Road. This road survey should include any bridges along these routes.
2. The Applicant has committed to fix or fully compensate the appropriate transportation authorities for any damage or degradation to roads or bridges that it causes or materially contributes to.
3. The Applicant should develop special plans and obtain necessary permits before bringing heavy loads, especially the transformer, onto state or county roads in the vicinity. Heavy loads over state-designated deficient bridges should be avoided.
4. Additional heavy truck trips along Nepton Road should be minimized or diverted to disperse the weight of vehicles on the roadway to less than 44,000 pounds to remain under the weight limit around the western (noncontiguous) parcel of the Project site.
5. The Applicant should meet with the Fleming County High School Board to ensure proper road safety measures are designed and implemented. The Applicant should utilize appropriate signage and safety equipment along KR-32 to aid the flow of traffic in the vicinity of Fleming County High School.
6. As needed, Applicant will place a temporary stop light at the intersection of KR-32 and Lantern Ridge Drive during construction.
7. Lazy Oaks Lane should be avoided at all times during construction and operations. The bridge that carries Lazy Oaks Lane is structurally deficient and near a railroad crossing.
8. The Applicant will properly maintain construction equipment and follow BMPs related to fugitive dust throughout the construction process. This should keep dust impacts off-site to a minimal level.

F. Economic impacts:

1. Socioeconomic impacts of the AEUG Fleming solar facility represent a positive contribution to the region. However, the economic benefits to the local area are small and largely temporary. The Applicant should attempt to hire local workers and contractors to the extent they are qualified to perform the construction and operations work. The Applicant should consider other opportunities to optimize local benefits. For example, the Fleming High School would welcome the opportunity for its students to learn more about solar energy and skills in this industry.

G. Decommissioning:

1. As applicable to individual lease agreements, the Applicant, its successors, or assigns will abide by the specific land restoration commitments agreed to by individual property owners as described in each signed lease agreement.
2. The Applicant should develop an explicit decommissioning plan. This plan should commit the Applicant to removing all facility components from the Project site and Fleming County at the cessation of operations.

H. Public Involvement:

1. It is suggested that the Applicant pursue additional public involvement.

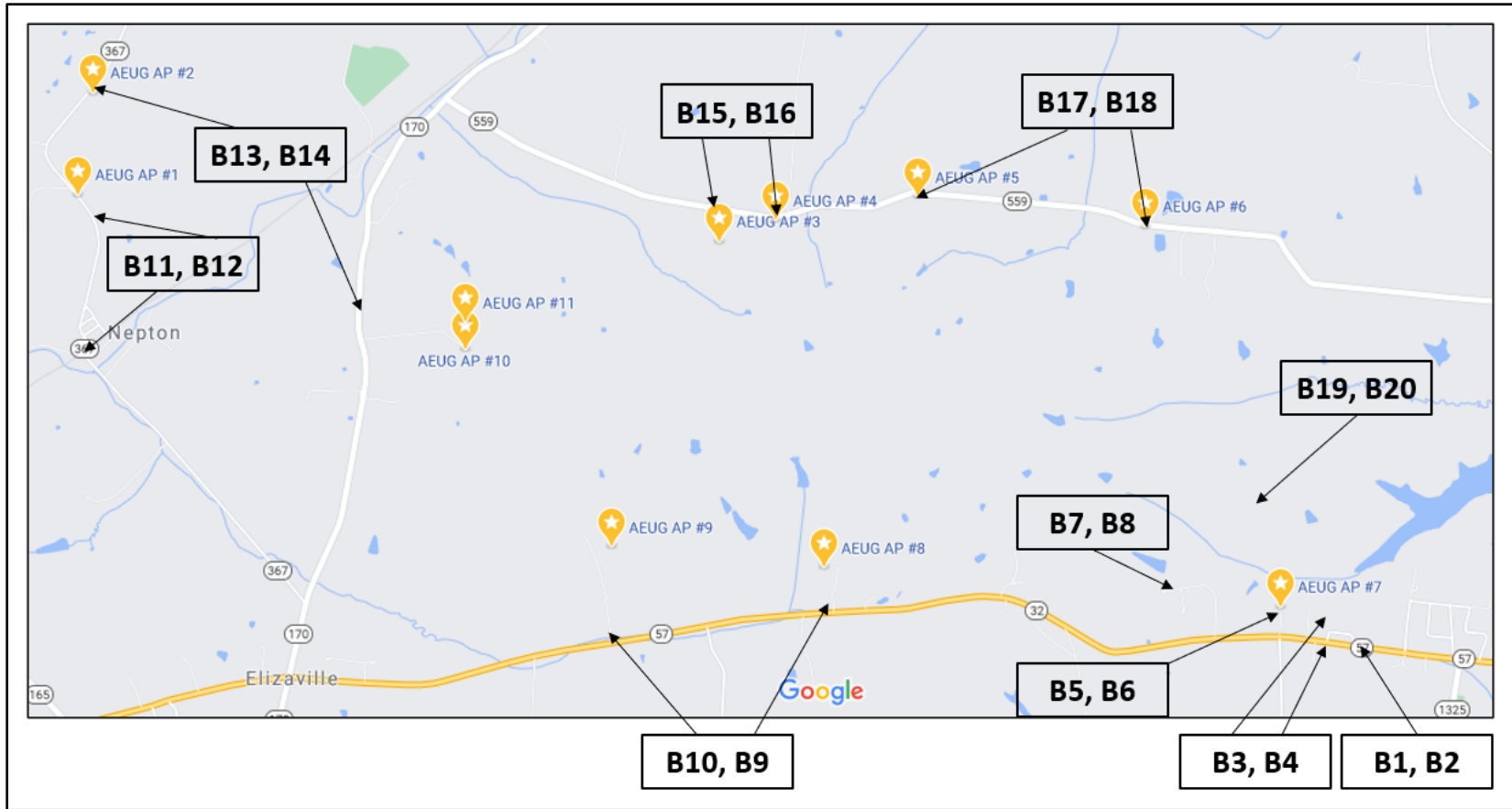
Deviation from Setback Requirements

As presently proposed, the AEUG Fleming Project does not meet the existing setback requirements. As such, the Applicant has entered a motion for a deviation from those requirements. HE reviewed this motion and believes that the Project does meet the specific statutes noted for consideration of a setback deviation. The Siting Board will need to judge whether the quality of the Applicant responses on the setback deviation request is satisfactory.

APPENDICES

Appendix A

Photo Log Index Map



Appendix B

Site Photos

Figure B-1.

Entrance to Fleming County High School along KR-32, facing east/southeast



Figure B-2.

Entrance to Fleming County High School along KR-32, facing west/southwest



Figure B-3.
Location north of Fleming County High School, facing north



Figure B-4.
Entrance to Fleming County High School along KR-32, facing east/southeast



Note: Second view showing slight hill between separate high school entrances

Figure B-5.
Existing access point (AP) #7 to be used during construction, facing north



Figure B-6.
Location near AP #7 to be used during construction, facing northwest



Figure B-7.
Location in Hunters Trace neighborhood, facing north



Figure B-8.
Location in Hunters Trace neighborhood, facing northwest



Figure B-9.
Location near AP #8 to be used during construction, facing north



Figure B-10.
Location near AP #9 to be used during construction, facing north



Figure B-11.
Railroad crossing with no crossing guards in Nepton, facing southwest



Figure B-12.
Location near AP #1 to be used during construction, facing northwest



Figure B-13.

Location near AP #2 to be used during construction, facing east



Figure B-14.

Location near AP #10 & AP #11 to be used during construction, facing east



Figure B-15.
Location near AP #3 to be used during construction, facing south



Figure B-16.
Location near AP #4 to be used during construction, facing south



Figure B-17.
Location near AP #5 to be used during construction, facing south



Figure B-18.
Location near AP #6 to be used during construction, facing south



Figure B-19.
Location near proposed substation, facing northwest



Figure B-20.
Location near proposed substation, facing south/southeast



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