

COMMONWEALTH OF KENTUCKY  
BEFORE THE KENTUCKY STATE BOARD ON  
ELECTRIC GENERATION AND TRANSMISSION SITING

In the Matter of:

ELECTRONIC APPLICATION OF	)	
GLOVER CREEK SOLAR, LLC FOR A	)	
CERTIFICATE OF CONSTRUCTION	)	
FOR A NONREGULATED ELECTRIC	)	Case No. 2022-00356
TRANSMISSION LINE IN METCALFE	)	
COUNTY, KENTUCKY PURSUANT	)	
TO KRS 278.714 AND 807 KAR 5:110	)	

**APPLICATION FOR A CERTIFICATE OF CONSTRUCTION**

Glover Creek Solar, LLC (the “Applicant” or “Glover Creek”), files this application seeking from the Kentucky State Board on Electric Generation and Transmission Siting (the “Siting Board” or “Board”) a certificate of construction for a 69kV nonregulated electric transmission line pursuant to KRS 278.714 (the “Application”). The nonregulated electric transmission line for which the certificate is sought will be located in Metcalfe County, Kentucky.

In support of this Application and for ease of review, the Applicant submits herewith the Table of Contents required by 807 KAR 5:110 §3(2)(b) and a Crosswalk of Regulatory Requirements. The Crosswalk lists the legal requirements for a nonregulated electric transmission line application, and the principal place(s) each requirement is addressed in these Application materials. The facts on which the Application is based are contained in the concurrently filed exhibits, reports, and the statements further made by the Applicant, as follows:

## **I. Applicant Information**

1. Pursuant to KRS 278.714(2)(a), the Applicant's name and address are Glover Creek Solar, LLC, 130 Roberts Street, Asheville, North Carolina, 28801. The Applicant's telephone number is: (855) 969-3380 and its email address is: info@pgrenewables.com.

2. The Applicant has previously applied for and received a certificate of construction for an approximately 55 megawatt (MW) solar photovoltaic (PV) electric generating facility (the "Facility"), issued by the Siting Board on September 23, 2020, in Case No. 2020-00043. The Board's final order conditionally granting the Applicant's construction certificate for its merchant solar electric generating facility and an appendix of mitigation measures are enclosed as Exhibit A.

## **II. Description of Proposed Route**

3. Pursuant to KRS 278.714(2)(b), the proposed nonregulated electric transmission line will travel approximately 200 feet from the Facility's onsite substation on a Facility-owned line to the YY-1 switching pole, which is owned by East Kentucky Power Cooperative (EKPC). EKPC will build a 30-foot line to EKPC's switching substation. A context map, which includes the proposed line, its route, and supporting structures, is enclosed as Exhibit B.

4. Pursuant to KRS 278.714(2)(b)(1), the proposed line will be located west of Big Jack Road, in the southern portion of the Facility's site.

5. Pursuant to KRS 278.714(2)(b)(2), the proposed line will be maintained within a proposed 100-foot right-of-way.

6. Pursuant to KRS 278.714(2)(b)(3), the proposed line will begin at the Facility's onsite substation on a portion of the Facility's leased property owned by the Mike and Elaine Wade Irrevocable Trust, Parcel ID 017-00-00-026.00. The line will follow a route due north crossing

underneath the existing EKPC-owned Patton Road-Summer Shade 69 kV line and connect to the YY-1 switching pole, which will also be located on a portion of the leased property described above. Thus, 100 feet of the proposed line will be within the EKPC Patton Road-Summer Shade 69 kV line's existing 100-foot Right of Way. A map of the subject property is enclosed as Exhibit C.

7. Pursuant to KRS 278.714(2)(b)(4)(a), there are four residential neighborhoods within one mile of the proposed facilities, and no schools or parks are located within one mile of the proposed facilities. See Exhibit B for the distances between the proposed line and each neighborhood.

### **III. Description of Proposed Line and Appurtenances**

8. Pursuant to KRS 278.714(2)(c), the Applicant proposes to construct a 69kV nonregulated electric transmission line. The Applicant submitted Feasibility Studies for queue positions AE2-071 and AF1-203, and a Generation Interconnection System Impact Study Report for queue position AE2-071 as part of its application for the Facility, detailing the original 35 MW position and a 20 MW uprate (collectively, the "Interconnection Study Reports"). Both PJM queue positions will be combined into a single interconnection point totaling 55 MW. The Interconnection Study Reports are enclosed as Exhibit D.

9. The nonregulated electric transmission line will be approximately 200 feet in total length and will run between the Glover Creek Solar facility's onsite substation and the YY-1 switching pole. The YY-1 switching pole will be built and owned by EKPC. The Applicant will build and own approximately 200 feet of the transmission line located between the facility substation and the YY-1 switching pole. EKPC will build and own the remaining 30 feet of line, which will continue from the YY-1 switching pole to EKPC's switching substation.

**IV. Statement of Compliance with National Electric Safety Code**

10. Pursuant to KRS 278.714(2)(d), the Applicant has designed the project to be consistent with legal requirements applicable to nonregulated electric transmission lines. The Applicant hereby certifies that the proposed nonregulated electric transmission line will be constructed and maintained in accordance with accepted engineering practices and the National Electric Safety Code.

**V. Public Notice**

11. Pursuant to KRS 278.714(2)(e), Glover Creek's public notice of the Application was published in the Edmonton News Herald, the newspaper of general circulation in Metcalfe County on November 30, 2022. The Applicant's proof of publication is enclosed as Exhibit E.

12. Pursuant to KRS 278.714(2)(f), a copy of the Application was hand delivered to Harold D. Stilts, the County Judge/Executive of Metcalfe County on December 1, 2022.

Dated this 1st day of December 2022.

Respectfully submitted,



---

Gregory T. Dutton  
**FROST BROWN TODD LLC**  
400 W. Market Street, 32<sup>nd</sup> Floor  
Louisville, KY 40202  
(502) 589-5400  
(502) 581-1087 (fax)  
[gdupton@fbtlaw.com](mailto:gdupton@fbtlaw.com)  
*Counsel for Glover Creek Solar, LLC*

**Statutory/Regulation Requirements**  
**ESB Certificate Transmission Line**

<b>KRS 278.714</b>	<b>Description</b>	<b>Filing</b>
<b><u>2(a)</u></b>	The name, address, and telephone number of the person proposing construction of the nonregulated electric transmission line or the carbon dioxide transmission pipeline.	Application ¶ 1, Exhibit A
<b><u>2(b)</u></b>	A full description of the proposed route of the electric transmission line or the carbon dioxide transmission pipeline and its appurtenances. The description shall include a map or maps showing: <ol style="list-style-type: none"> <li>1. The location of the proposed line or pipeline and all proposed structures that will support it;</li> <li>2. The proposed right-of-way limits;</li> <li>3. Existing property lines and the names of persons who own the property over which the line or pipeline will cross; and</li> <li>4. The distance of the proposed electric transmission line from residential neighborhoods, schools, and public and private parks within one (1) mile of the proposed facilities.</li> </ol>	Application ¶¶ 3-7, Exhibit B, Exhibit C
<b><u>2(c)</u></b>	With respect to electric transmission lines, a full description of the proposed line and appurtenances, including the following: <ol style="list-style-type: none"> <li>1. Initial and design voltages and capacities;</li> <li>2. Length of line;</li> <li>3. Terminal points; and</li> <li>4. Substation connections.</li> </ol>	Application ¶¶ 8-9, Exhibit D
<b><u>2(d)</u></b>	A statement that the proposed electric transmission line and appurtenances will be constructed and maintained in accordance with accepted engineering practices and the National Electric Safety Code.	Application ¶ 10
<b><u>2(e)</u></b>	Evidence that public notice has been given by publication in a newspaper of general circulation in the general area concerned. Public notice shall include the location of the proposed electric transmission line or carbon dioxide pipeline, shall state that the proposed line or pipeline is subject to approval by the board, and shall provide the telephone number and address of the Public Service Commission.	Application ¶ 11, Exhibit E
<b><u>2(f)</u></b>	Proof of service of a copy of the application upon the chief executive officer of each county and municipal corporation in which the proposed electric transmission line or carbon dioxide transmission pipeline is to be located, and upon the chief officer of each public agency charged with the duty of planning land use in the general area in which the line or pipeline is proposed to be located.	Application ¶ 12

**EXHIBIT A**

COMMONWEALTH OF KENTUCKY  
BEFORE THE KENTUCKY STATE BOARD ON  
ELECTRIC GENERATION AND TRANSMISSION SITING

In the Matter of:

ELECTRONIC APPLICATION OF GLOVER CREEK	)	
SOLAR, LLC FOR A CONSTRUCTION	)	
CERTIFICATE TO CONSTRUCT AN	)	CASE NO.
APPROXIMATELY 55 MEGAWATT MERCHANT	)	2020-00043
ELECTRIC SOLAR GENERATING FACILITY IN	)	
METCALFE COUNTY, KENTUCKY PURSUANT TO	)	
KRS 278.700 AND 807 KAR 5:110	)	

ORDER

On March 27, 2020, Glover Creek Solar, LLC (Glover Creek) filed an application (Application) requesting a Certificate of Construction to construct a 55 megawatt alternating current (MWac) solar photovoltaic electric generating facility to be located in Summer Shade, Metcalfe County, Kentucky.<sup>1</sup> Glover Creek is a limited liability company and is based in Durham, North Carolina, with Carolina Solar Energy, III, LLC, also a North Carolina limited liability company, being the sole member of Glover Creek.<sup>2</sup> The footprint of the proposed solar facility is approximately 400 acres that has been historically used as pasture and crop land. The on-site equipment will consist of polycrystalline solar panels with a tracking system, an energy storage system, inverters, substation transformer, and associated wiring and balance of system.<sup>3</sup> The facility's output will be

---

<sup>1</sup> Application at 1.

<sup>2</sup> *Id.*

<sup>3</sup> Application Volume 1, Item 2, Description of Proposed Site.

transmitted and sold in the wholesale power market through the existing transmission line that crosses the property.<sup>4</sup>

Pursuant to a Siting Board Staff Notice issued on May 13, 2020, a procedural schedule was established for the orderly review and processing of this matter. The procedural schedule provided for two rounds of discovery upon Glover Creek's Application, a deadline for the filing of the consultant's report, and an opportunity for Glover Creek to submit comments in response to the consultant's report. The May 13, 2020 Siting Board Staff Notice also included a memorandum from Rebecca W. Goodman, Secretary, Energy and Environment Cabinet, extending the deadline for the processing of this matter to 180 days from the date of the filing of the application, pursuant to the authority delegated to Secretary Goodman under KRS Chapter 39A and the Governor's Executive Orders, including Executive Orders 2020-00243 and 2020-00257.

Pursuant to 807 KAR 5:110, Section 4, requests to intervene had to be filed within 30 days from the date of the filing of the application. Also, pursuant to 807 KAR 5:110, Section 6, the Siting Board on its own motion or any party to this case may file a motion requesting an evidentiary hearing within 30 days from the date of the filing of the Application. Under KRS 278.712(1), a request for a local public hearing may be requested by at least three interested persons that reside in Metcalfe County or from the local planning and zoning commission, mayor of the city or county fiscal court of a jurisdiction where the solar facility is proposed to be located. Lastly, pursuant to 807 KAR 5:110, Section 8, a request for a public meeting must be made within 30 days from the date of the filing of the application. There have been no requests for intervention in this

---

<sup>4</sup> Application at 1.



matter, no requests for an evidentiary hearing, and no requests for a public meeting or a local public hearing in this matter.

Glover Creek has filed responses to multiple rounds of discovery in this matter. On April 20, 2020, Glover Creek filed a motion requesting deviations from certain setback requirements set forth in KRS 278.704(2). Pursuant to KRS 278.708(5), the Siting Board retained a consultant, Harvey Economics, to review Glover Creek's site assessment report (SAR) and to provide recommendations concerning the adequacy of the SAR and propose mitigation measures. A site visit was held on July 30, 2020. The Harvey Economics Report was filed on July 10, 2020. On July 24, 2020, Glover Creek submitted its response to the Harvey Economics Report.

There were no intervention requests, no intervenors, and no public comments submitted in this matter. The matter now stands submitted for a decision.

#### PROPOSED GLOVER CREEK SOLAR FACILITY

According to the Application, the proposed Glover Creek solar facility will be located at 7449 Randolph-Summer Shade Road, Summer Shade, Metcalfe County, Kentucky. The solar facility site is bounded by Summer Shade Road (SR 90) to the south and Randolph-Summer Shade Road (SR 640) to the east.<sup>5</sup> The proposed site totals approximately 556 acres. Glover Creek has entered into lease agreements with three adjoining landowners<sup>6</sup> to establish site control on enough usable acreage to match the maximum size solar project that Glover Creek calculated would be able to connect to one of the two electric transmission lines that run through the site. Glover Creek anticipates

---

<sup>5</sup> Application Volume 1, Item 2, Description of Proposed Site.

<sup>6</sup> Glover Creek's Response to Siting Board's First Request for Information (filed June 1, 2020), Item 2a.

using up to 400 acres for the installation of the necessary solar equipment and facilities. Glover Creek states that a fence meeting the National Electrical Safety Code (NESC) requirements, which is typically a six-foot fence with three strings of barbed wire at the top, will enclose the facility.<sup>7</sup> Glover Creek further states that where there are potential visual impacts created by the solar facility, a 15-foot wide vegetative buffer will be planted consisting of two staggered rows of evergreen shrubs (such as Arborvitae Emerald Green) at least three feet in height at time of planting and growing to a maximum of 12 to 15 feet high.<sup>8</sup> The solar facility has a rated capacity of 55 MWac and will be connected to East Kentucky Power Cooperative, Inc.'s (EKPC) Patton Road – Summer Shade 69 kV transmission line. The 69 kV line runs diagonally across the southern portion of the proposed site.<sup>9</sup> The other transmission line is EKPC's Summer Shade – Barren County 161 kV, which runs diagonally across the northern portion of the site.<sup>10</sup> The site will not connect to the 161 kV line. Glover Creek states that electric service during construction and operation will be provided by Farmers Rural Electric Cooperative Corporation.<sup>11</sup>

Based on both acreage and parcels, the surrounding land use consists of agricultural/residential (69 percent), agricultural only (no residences 25 percent), and residential only (6 percent).<sup>12</sup>

---

<sup>7</sup> Application Volume 1, Item 2, Description of Proposed Site.

<sup>8</sup> *Id.*

<sup>9</sup> Application Volume 1, Item 9, Effect on Kentucky Electricity Generation System.

<sup>10</sup> Harvey Economics' Review of Glover Creek Solar LLC's Site Assessment Report for Solar Facilities in Metcalfe County, Kentucky (Harvey Economics Report) (filed July 10, 2020) at III-8.

<sup>11</sup> Glover Creek Solar, LLC's Response to Harvey Economics' Second Request for Information (filed June 29, 2020) Item IIG.

<sup>12</sup> Application Volume 2, Item 1, Description of Proposed Site.

Pursuant to KRS 278.706(2)(c), Glover Creek notified landowners whose property borders the proposed solar facility site once via U.S. regular mail and a second time via certified mail. Glover Creek also published notice of the proposed solar facility in the *Edmonton Herald News*, the newspaper of general circulation in Metcalfe County, on March 5, 2020.<sup>13</sup> In addition, Glover Creek also engaged in public involvement program activities as required by KRS 278.706(2)(f) prior to the filing of its application. Glover Creek states that it held a public meeting on December 12, 2019, at the Metcalfe County Government Center, which is located in central Edmonton, to inform the public about the solar project and receive comments from the public. Glover Creek published notice of the public meeting in the November 21, 2019 edition of the *Edmonton Herald News*. Glover Creek indicates that it also mailed letters to adjoining landowners notifying them of the meeting.<sup>14</sup> In addition to the public meeting, Glover Creek also held a neighborhood dinner on December 11, 2020. The dinner, held at the Edmonton City Grill, was for neighboring landowners and various local public officials. Glover Creek states that it had experts at the dinner to provide information regarding environmental health and safety of photovoltaics, specifics about the battery energy storage system, the impact of solar facilities on neighboring property values, economic impact of solar projects, and the construction, operation, and maintenance of the Glover Creek solar development.<sup>15</sup> Glover Creek provided additional public involvement measures that were undertaken with respect to the proposed solar project, including, meeting with, and conducting a utility

---

<sup>13</sup> Application Volume 1, Item 3, Public Notice Evidence.

<sup>14</sup> Application Volume 1, Item 6, Public Notice Report.

<sup>15</sup> *Id.*

scale solar workshop for local public officials; and meeting with neighboring property owners.<sup>16</sup>

## DISCUSSION

### I. Requirements Under KRS 278.708 – Site Assessment Report

KRS 278.704(1) states that “[n]o person shall commence to construct a merchant electric generating facility until that person has applied for and obtained a construction certificate for the facility from the [Siting] [B]oard.” KRS 278.708 requires a Site Assessment Report be prepared and filed with an application. The SAR should provide (1) a detailed description of the proposed site; (2) an evaluation of the compatibility of the facility with scenic surroundings; (3) 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; (4) evaluation of anticipated peak and average noise levels associated with the facility's construction and operation at the property boundary; (5) 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; and (6) any mitigating measures to be implemented by the applicant to minimize or avoid adverse effects identified in the site assessment report.

#### Detailed Site Description

In addition to the description of the proposed solar facility as described above, Glover Creek states that the area around the project site can be generally described as rural, agricultural, with rolling hills and areas of trees. There are 28 individual parcels of

---

<sup>16</sup> *Id.*

land, varying in size from less than one acre to more than 200 acres, located adjacent to the Glover Creek solar site. There are also 32 homes located within 1,000 feet of the Glover Creek facility boundaries. Nine homes are within 300 feet of the boundaries and five homes are within 300 feet of the nearest solar panels. Exact locations of some solar panels and the locations of the inverters, transformer, and energy storage system have not been finalized by Glover Creek but will be located at least 150 feet from the property boundaries. All site entrances on SR 90, SR 640, and Big Jack Road will be gated and locked when not in use.<sup>17</sup> Security fencing, as described above, will enclose the facility during construction and operation. The Glover Creek facility's electric needs will be served by Farmers Rural Electric Cooperative Corporation during construction and operation.

The Harvey Economics Reports concludes that Glover Creek has generally complied with the legislative requirements for describing the facility and a site development plan, as required by KRS 278.708. The report recommends the following mitigation measures.

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 the instant review should be clearly indicated on the revised graphic. Those changes might include location of solar panels, transformer/inverter/energy storage system groupings, panel motors, the substation, or other project facilities or infrastructure.

---

<sup>17</sup> Application Volume 2, Appendix D.

2. Any change in Glover Creek's 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 that is the case, Glover Creek will support the Siting Board's effort to revise its assessment of impacts and mitigation requirements.

4. Glover Creek 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 fence surrounding the property boundary will be installed after grading of the site and before the main array installation begins. According to NESC regulations, the security fence must be installed prior to any electrical installation work. The substation and construction staging area will also have their own separate security fences installed.<sup>18</sup>

The Siting Board finds that Glover Creek's detailed description of the proposed solar facility site complies with the requirement set forth in KRS 278.708(3)(a). The Siting Board also finds that the mitigation measures recommended in the Harvey Economics Report are reasonable and, therefore, will require Glover Creek to implement the mitigation measures identified above. The Siting Board further finds that the following additional mitigation measures should be implemented to ensure a comprehensive, robust, and accurate site development plan for the Glover Creek solar facility.

1. Glover Creek should post adequate signage to warn potential trespassers to ensure that access control measures will be consistent with industry standards.

---

<sup>18</sup> Harvey Economics Report at III-12.

2. Glover Creek must ensure that all site entrances and boundaries have adequate signage, particularly in locations visible to the general public, local residents, and business owners.

#### Compatibility with Scenic Surroundings

Glover Creek states that the proposed site of the solar facility is located at a raised elevation surrounded by agricultural and residential properties. Due to the elevation difference and the existing vegetation, Glover Creek maintains that the solar facility will be shielded from view from most of the neighboring landowners. Glover Creek also states that its solar facility, which uses tracking panels, are a passive use of the land that would blend in with the nearby rural and residential area. Glover Creek asserts that the height of solar panels, which are generally 6 to 10 feet off the ground but no more than 12 feet high at maximum when they are tracking the sun, is similar to the height of a typical greenhouse and lower than a single story residential home. Glover Creek notes that, as compared to the proposed solar facility, if the subject property was developed with single family housing, that development would have a much greater visual impact on the surrounding area given that a two-story home with attic could be three to four times as high as the proposed panels. Glover Creek further indicates that sections of the solar facility that adjoin roadways and other properties will have a vegetative buffer planted if one does not already exist. This 15-foot wide buffer will consist of two staggered rows of evergreen shrubs, which will be at least three feet in height at time of planting and will grow to approximately six feet in three years with continued growth thereafter. Lastly, Glover Creek states that it met with numerous landowners near the proposed solar site,

and the landowners had input in the placement of some of the visual buffers associated with the facility, including the cultivation of a pollinator area.<sup>19</sup>

At the request of Harvey Economics, Glover Creek also conducted a glare analysis comparing glare impacts from typical solar panels and solar panels coated with an anti-reflective coating at three different locations where drivers might be affected (no homes near the solar site would be exposed to glare). Because the areas to the north and west of the solar site are exclusively farmland, Glover Creek selected three key observation points where commuters may be able to see a small portion of the solar arrays, two of which are located on SR 640 and the third located to the southwest of the solar site on SR 90. The only potential glare issue identified was at the key observation point located on the northern most point of the project boundary along SR 640. This observation point may experience as many as 2,017 minutes of Green glare in one year, or about 34 hours over the course of a year.<sup>20</sup> For standard solar panels, this glare is expected to last 10-20 minutes per day between about 9:00 am and 9:20 am in the months of January, November, and December. Additional glare is expected to last one to ten minutes per day between about 8:40 am to 8:50 am for portions of the months of February and October. For anti-reflective solar panels, the anticipated glare will decrease from 2,017 minutes per year to 927 minutes per year, a decrease of 54 percent. Anti-reflective panels will reduce glare to five to ten minutes per day from the beginning of November to the end

---

<sup>19</sup> Application Volume 1, Item 2, Description of Proposed Site.

<sup>20</sup> The glare study identifies the following three types of glares as measured by the Federal Aviation Administration:

Red Glare – this is the most severe rating for glare, which causes after-image.

Yellow Glare – this type of glare has the potential to cause temporary after-image.

Green Glare – this type of glare has low potential to cause temporary after-image.



of January. Glover Creek has not made a determination about purchasing anti-reflective panels at this time. It should be noted that the glare study indicates that this potential glare issue will only affect truckers after the first three years of the project as the impacts of glare are estimated at a height of ten feet and most traffic will not see most of the solar panels due to the six-foot high vegetative buffer.

The Harvey Economics Report finds that the visual setting surrounding the Glover Creek solar site is largely agricultural with few homes in close proximity to the site boundaries. The report also finds that rolling hills and clumps of trees will help protect against negative visual impacts to residents and commuters. Portions of the property where the solar facility is located is at a raised elevation to the surrounding rural agricultural and residential properties, which will help shield the project from certain viewpoints. The area towards the northeastern sections of the project (along SR 640) has fewer trees and is more open, but traffic volume on that road is relatively minimal. The report further states that the vegetative buffer proposed by Glover Creek and natural landscape will shield the majority of solar facilities from view of the residences that are closest in proximity to the site.

The Harvey Economics Report concludes that given the rural nature of the Summer Shade area, the number of people that will see the panels or other infrastructure will be very small; numerous clumps of trees and rolling hills will help the panels stay hidden from potential viewers; and the substation, which is the only building on the solar site, is hidden from nearly all viewing points. The report also concludes that glare will occur for fewer than 20 minutes per day during several winter months in one location on SR 640, which is a lightly traveled road. After three years, there should be virtually no

glare experienced by personal vehicles; only truckers may experience slight glare in the mornings. The Harvey Economics Report ultimately concludes that the Glover Creek solar facility will not result in adverse visual impacts to residents or commuters, especially given Glover Creek's commitment to vegetative buffers.

The Harvey Economics Report agrees with Glover Creek's proposed mitigation measures regarding the implementation of a vegetative buffer around certain areas of the solar site and the planting of at least two acres of native pollinator-friendly species within the solar facility site, among the solar panels. The report also agrees with Glover Creek's commitment to monitor the growth of the vegetative buffer, ensuring that its plantings are thriving to at least six feet in height.

Having reviewed the record, the Siting Board finds that the passive characteristics of the proposed solar facility combined with existing topography of the surroundings where the solar facility will be located as well as the trees and other vegetation in the area will significantly mitigate the effects the proposed facility will have on the scenic surroundings of the site. We note that the proposed site for the Glover Creek facility is significantly elevated and primarily surrounded by vegetation, both of which create a natural visual buffer for the facility. The physical characteristics of the solar facility also does not pose any adverse impact to the scenic surroundings given that the majority of the day the solar panels will be between six and ten feet high and will only be at the maximum height of 12 feet, which would be a lower profile than most single-family homes. Any potential scenic impact will be further mitigated by Glover Creek's commitment to implement a 15-foot wide vegetative buffer in areas adjacent the proposed site where there are no current vegetation.

While the Siting Board agrees with Glover Creek's proposed mitigation measures to reduce the visual impacts of the proposed solar facility, the Siting Board finds that the Glover Creek's current proposal of planting evergreen shrubs that will take at least three years to grow to full maturity does not ensure immediate mitigation of any visual or noise impacts from the solar facility. The Siting Board will modify the proposed mitigation measure to require Glover Creek to implement one of the following modified vegetative buffering options: (1) if Glover Creek elects to plant non-mature evergreen shrubs, Glover Creek should also include additional temporary buffers that would immediately help to mitigate noise and visual impacts until the evergreen shrubs have grown to maturity or (2) Glover Creek can elect to plant mature evergreen shrubs of at least 6 feet in height at the outset of the vegetative buffering process. Accordingly, the Siting Board will require Glover Creek to implement the vegetative buffer, as modified herein, and the two acre native pollinator area as described in the application.

#### Impact on Property Values

With respect to impact on property values, Glover Creek submitted a Property Value Impact Report from a certified real estate appraiser that found that, based upon a comparative analysis, the solar facility will have no impact on the property values of abutting or adjacent residential or agricultural properties. The report indicates that the solar facility would function in a harmonious manner with the nearby surroundings, which is mostly agricultural, and that operation of the solar facility would not generate the level of noise, odor, or traffic impacts to negatively impact the nearby surroundings as compared to a fossil fuel generating facility or other industrial facility.

The Harvey Economics Report evaluated the impacts to property values by reviewing relevant existing literature related to solar facility impacts; prepared further analysis of the data provided in Glover Creek's Property Value Impact Report; and conducted interviews with several real estate professionals. Among the literature reviewed by Harvey Economics was a 2018 University of Texas study, which included a geospatial analysis and a survey of residential property assessors to determine the potential for property value impacts related to solar projects. The results of the University of Texas study showed that a majority of survey respondents estimated a value impact of zero and geospatial analysis showed that relatively few homes would be impacted. Harvey Economics also reviewed a 2019 article produced by the American Planning Association, which indicates that the impact of utility-scale solar facilities is typically negligible on neighboring property values. Additional materials reviewed by Harvey Economics included several independent appraisal reports related to property value impacts for solar companies. The Harvey Economics Report states that overall conclusions of these independent appraisal reports were that solar facilities do not negatively impact property values.

In addition to reviewing the methodology and underlying matched pair analysis used in Glover Creek's Property Value Impact Report, Harvey Economics also examined more closely the data provided in the matched pair sets to determine the likelihood of a positive impact, negative impact, or no impact. Harvey Economics determined that the outcome of the evaluation of the solar facilities greater than 20 MW, which included 21 pair data set, indicates that over 80 percent of matched pair comparisons resulted in no

sales price difference or an increase in sales price due to adjacency to the solar facility property.

Harvey Economics also interviewed the Metcalfe County Property Valuation Administrator and a local real estate agent both of whom were familiar with the Glover Creek project. The Metcalfe County Property Valuation Administrator stated that it was difficult to project the impact the facility might have on property values. Although he has received no calls or heard any concerns from landowners related to the Glover Creek facility, he thought it would be difficult to identify any specific issues relating to the solar facility and changes in property values. The local real estate agent did not think that there would be any negative concerns or associations made in relation to the solar facility. His personal observation was that the solar facility would not deter buyers from the area or result in lower prices.

The Harvey Economics Report concludes that the current research indicates that the existence of solar facilities does not, in general, influence property values for adjacent landowners. The report notes that its own research, in combination with local interviews, point to a conclusion of no discernible impacts to property values. That conclusion, as stated in the report, is also supported by the specifics of operational activity at the Glover Creek facility, including minimal increased traffic or noise, no odors, panels which will be largely hidden from view by shrubbery, and no emissions of any kind. The Harvey Economics Report also concludes that the Glover Creek solar facility would not affect the current or future desired land uses of surrounding agricultural or residential properties in light of the operational characteristics of a solar facility. Accordingly, the Harvey

Economics Report does not recommend any mitigation measures related to potential impacts on property values or land use.

Having reviewed the record, the Siting Board finds that there is sufficient evidence to conclude that the proposed Glover Creek solar facility will more than likely not have any adverse impact on nearby property values. As we noted earlier, the characteristics of the solar facility's operations is passive in nature in that it does not produce any air, noise, waste, or water pollution nor does it create any traffic issues during operations.

The Siting Board agrees with the Harvey Economics Report's recommendation that a vegetative buffer, as modified above, would provide sufficient protection against any potential visual impacts of the proposed Glover Creek solar facility on adjoining property in terms of property values. The modified vegetative buffer should provide mitigation against adverse impacts to the scenic surroundings and to property values.

#### Impact on Roads, Railways, and Fugitive Dust

With respect to the impact on roads, railways, and fugitive dust, Glover Creek's Noise and Traffic Assessment as part of its SAR notes that the proposed solar facility is adjacent to two major roadways, SR 90 and SR 640. A third road, Big Jack Road, is a single-lane unpaved road that runs through the project site and connects SR 90 and SR 640. All equipment, materials, and personnel will be transported to the site via existing roads. Glover Creek will utilize SR 90 and SR 640 during the construction period and utilize Big Jack Road for access to the substation. There is no rail to the site.

It is expected that construction will take up to 8 to 12 months to complete the solar facility. Glover Creek's Traffic Study indicates that there are two average daily traffic (ADT) monitoring stations along SR 640 and along Hill Top View Road, which measures

vehicle traffic in both directions. The ADT for SR 640 mile point 1.62, which is located 10 feet from the solar site to the east, is 358. The ADT for Hill Top View Road mile point 0.14, which is 2,370 feet south of the solar site boundary, is 106. Glover Creek supplemented the traffic data to include two ADT stations along SR 90. The ADT for SR 90 at mile point 17.0490 is 5,960 and the ADT for SR 90 at mile point 4.7690 is 3,351.

Glover Creek anticipates a temporary increase in traffic near the vicinity of the solar site during construction activities. The increase in traffic will occur in the morning and evening when construction workers are entering and exiting the project site as well as periodic delivery of construction materials and equipment. Glover Creek estimates 40 to 150 workers will be on site throughout this period, with a peak of 250 workers. At the onset of mobilization, trucks will deliver heavy machinery to the site, and after that there will be daily truck deliveries of installation materials to the site. Heavy traffic will occur for the first few weeks after mobilization, but will slow towards the end of the installation period. Glover Creek states that there will be appropriate signage, signaling, flagmen, and temporary lane closures may be employed to increase driver safety and reduce the risk of any vehicle accidents. Glover Creek anticipates the potential of additional wear to the existing roads but no significant damages. Any damages resulting from the construction will be rectified. Glover Creek states that water may be applied during construction to reduce any potential dust generation. Glover Creek further states that land disturbing activities associated with the proposed project may temporarily contribute to airborne materials. To reduce wind erosion of recently disturbed areas, appropriate revegetation measures, application of water, or covering of spoil piles may occur. In

addition, any open-bodied truck transporting dirt will be covered when the vehicle is in motion.

During operations, Glover Creek states that the facility will be mostly un-manned with approximately two employees making site visits a few times a week to inspect the site, ensure proper equipment operation, and note any maintenance needs. Glover Creek further states that employees will be in mid- or full-sized trucks and will contribute less to vehicle traffic than a typical single-family home. According to Glover Creek, vehicular traffic on the project site will be limited to typical weekday work hours and will not significantly contribute to additional traffic in the project vicinity.

The Harvey Economics Report notes that traffic volumes associated with light duty commuter vehicles, including pickup trucks, during construction on an average day is 50 vehicles with a peak day volume of 90 vehicles. Traffic volumes associated with multiple axle trucks with trailers during construction on an average day is two trucks with a peak day volume of 15 trucks. Traffic volumes associated with Class 21 trucks, which are multiple axle trucks designed to carry very heavy cargo (e.g., substation transformer at a maximum weight of 120,000 pounds), are expected to make 11 total trips during construction.

The Harvey Economics Report concludes that traffic impacts during construction will be limited, but somewhat higher during the peak construction weeks. The report notes that there is the potential for traffic congestion to increase along SR 640, especially during the peak construction phase, but qualifies that this road has only modest traffic currently. Harvey Economics states that the entrance to the Glover Creek site from SR 640 should be able to handle the increase. The report finds that there should be no noticeable traffic



impacts during operations. With respect to fugitive dust, the report indicates that Glover Creek has pledged to properly maintain construction equipment and follow best management practices related to fugitive dust throughout the construction process. Harvey Economics is of the opinion that this should keep dust impacts off site to a minimal level. With respect to road degradation, the report finds that this should not occur unduly from construction commuting and other vehicles except for the very large Class 21 truck trips. There are expected to be up to approximately 11 Class 21 truck trips, which will exceed the weight classification on roadways in the area. Harvey Economics concludes that road damage is quite possible from these vehicles.

The Harvey Economics Report identified the following mitigation measures that has either been proposed by Glover Creek or recommended by Harvey Economics and accepted by Glover Creek:

1. Glover Creek will use appropriate signage and traffic signaling as needed to aid construction traffic and prevent severe traffic issues.
2. As needed, Glover Creek will provide a temporary traffic signal at the intersection of SR 640 and SR 90.
3. As needed, Glover Creek will shuttle commuting construction workers.
4. Glover Creek's contractor will apply best management practices regarding dust mitigation, including but not limited to: water applied to internal roads as needed; internal roads compacted; internal roads constructed or improved as needed; loads of dirt and other air-pollution causing particles covered while in transit; revegetation measures and covering of spoil piles.

5. Glover Creek will inform and obtain permits from State and local road authorities as pertaining to the Class 21 vehicle transport to the site. Glover Creek will also comply with those permit requirements.

6. Glover Creek will fix or pay for damage resulting from Class 21 vehicle transport to the project site and will coordinate with proper road officials prior to these trips.

The Siting Board finds that the 8 to 12 month construction phase of the Glover Creek solar facility would have an adverse impact on traffic during the peak morning and evening time periods particularly on SR 640. The Siting Board, however, finds there to be very little, if any, impact to SR 90 and SR 640 during the operational phase of the solar facility. The Siting Board agrees with the mitigation measures recommended in the Harvey Economics Report, which were accepted by Glover Creek, and will require Glover Creek to implement those measures. To further ensure that traffic impacts during construction are kept to a minimum, the Siting Board will also require Glover Creek to develop a traffic management plan to minimize the impacts of any traffic increase and keep traffic safe. Any such traffic management plan should also identify any noise concerns during the construction phase and develop measures that would address those noise concerns. The Siting Board will also require Glover Creek to limit the construction activity, process, and deliveries to the hours of 8 a.m. and 6 p.m. Monday through Saturday. These hours represent a reasonable timeframe to ensure that nearby property owners are not too impacted by the construction activities.

### Anticipated Noise Level

Glover Creek submitted a Noise and Traffic Assessment,<sup>21</sup> which found that noise during construction of the solar facility is expected to temporarily increase during daylight hours, and will be in the form of heavy equipment, passenger cars and trucks, and tool use during assembly of the solar facilities. Noise will be present on the project site during construction; however, due to the size of the project site and the distance to the nearest receptors, construction will not contribute to a significant noise increase when compared to noise currently occurring on site (such as the operation of farming equipment for livestock, hay production, and crop harvesting).

When the solar facility is operating, there will be periodic noise associated with the solar panel tracking system and the relatively constant noise of inverters. Glover Creek states that the increase in noise is negligible due to the distance of noise generating solar equipment from the nearest noise receptor and the implementation of two rows of evergreen shrubbery. The noise produced by the inverters is 67.0 dB measured at 10 meters (akin to a hum), which is slightly above that of a typical person-to-person conversation (i.e., 60.0), and will not be a contributor of noise to the nearest receptor (i.e., single-family home) located at 2,000+ feet away with a planted buffer and a strip of trees between the source and receptor. The panel tracking motors on the solar panels will operate at 78 dB (measured at 10 meters) no more than one minute out of every 15-minute period. Glover Creek further states that site visits and maintenance activities, such as mowing, will take place during daylight hours and will not significantly contribute to noise. The noise associated with these activities is very similar to those currently

---

<sup>21</sup> Application Volume 2, Attachment C.

generated on-site by farming activities and off-site by commercial and farm uses. Glover Creek notes that Metcalfe County does not have any noise control ordinances currently in effect.<sup>22</sup>

The Harvey Economics Report notes that noise issues stem from construction activities and operational components of the solar facility. During construction, noise will include graders, bulldozers, excavators, dozers, dump trucks, and other equipment. During Glover Creek operation, noise will be emitted from transformers, inverters, and the tracking motors which rotate the panels to track the sun. The report further notes that distance from noise emitters to noise receptors also matters, since the further a noise receptor from a noise emitter, the less noise impact overall. Lastly, the report also points out that Metcalfe County and Summer Shade do not have any noise ordinances applicable to the project.

The Harvey Economics Report states that the areas surrounding the project site are dominated by active farmland, which contributes to noise typical of active hay production, crop planting and harvesting, and transportation of agricultural products and equipment. Other noises on-site include sounds from personal trucks and all-terrain vehicles. The report also points out that, according to the Glover Creek Noise and Traffic Assessment, those noises typically range from 80 to 120 dB during normal business hours.

The Harvey Economics Report concludes that during construction, almost all the noise from the Glover Creek site will be intermittent and will not be permanently damaging to nearby residents. According to Glover Creek's Noise and Traffic Assessment, baseline

---

<sup>22</sup> Application Volume 1, Item 4. Compliance with Local Ordinances and Regulations.

noise levels in the area are about as loud as the construction noises. However, Harvey Economics notes that the tamping process that drives the solar posts into the ground will be particularly annoying for up to two and a half weeks, especially to the closest residences. Other construction equipment, especially earth-moving equipment (such as backhoes and bulldozers) will produce noises that is classified as annoying for residents within 1,500 feet from the originating sound. Thus, Harvey Economics finds that the construction phase has the potential to be annoying, but not harmful, to residents in the area for as many as eight months, based on the construction schedule provided by Glover Creek.

The Harvey Economics Report states that operational noises have the potential to impact a small number of nearby residences. The report notes that during operation, the co-located transformers and inverters are not expected to have a noticeable noise impact on residences due to distance and vegetative buffering. The transformers and inverters will be at least 200 feet away from the nearest residence, and the constant hum of the equipment (during the day) is anticipated to be less than what is classified as a nuisance or annoyance. However, the report finds that the solar panel tracker motors, which are louder than the transformers and inverters and will be closer to residences, might create an annoying noise impact for a small number of residents.

The Harvey Economics Reports recommends the following mitigation measures to address any potential noise impacts.

1. Residents within 1,500 feet of the property boundaries of the Glover Creek solar facility should be notified about potential construction noises. Residents within 500 feet of the solar panels should be notified about potential operational noises.

2. Glover Creek 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. Any noise generator that creates noise levels in excess of 120 dB should be considered unduly high or annoying.

3. If noise levels during this period are unacceptable to nearby residents or landowners (i.e., noise levels greater than 120 dB), Glover Creek will take such steps to mitigate the noise impact.

4. Glover Creek should contact nearby residents to confirm that noise levels are not unduly high or annoying after operations begin. Any noise generator that creates noise levels in excess of 120 dB should be considered unduly high or annoying.

5. Glover Creek should consider, among other things, additional buffering, fencing, or revising the construction schedules or delivery patterns in those areas where noise impacts are annoying residents or will potentially annoy them.

The Siting Board finds that while the noise levels during the operational phase of the Glover Creek Solar facility will not create any issues, the noise levels created during the construction phase would cause adverse impacts to the nearby property owners. The Siting Board agrees with the mitigation measures recommended in the Harvey Economics Report and will require Glover Creek to implement those measures. To further ensure as little noise impacts as reasonably possible during the construction period, the Siting Board will require the following additional mitigation measures.

1. During the construction process, construction activity and delivery of materials to the site should be limited to the hours between 8 a.m. and 6 p.m. Monday through Saturday.

2. Glover Creek should implement the modified vegetative buffers to those properties that are within 1,500 feet of the solar facilities' boundary lines before the tamping of the racking panels and Glover Creek should schedule the tamping process at these nearby homes so that the tamping will occur at the end of the tamping process period.

#### Mitigation Measures Proposed by Glover Creek

Glover Creek's SAR contained the following mitigation measures that it plans to implement.

1. Planting of native evergreen species as a visual buffer to mitigate view shed impacts. Plantings to primarily be in areas directly adjacent to the project without existing vegetation. In addition, Glover Creek has met with neighbors to discuss specific view shed concerns and to provide visual buffers to address to specific concerns.

2. Cultivation of at least two acres of native pollinator-friendly species on-site.

3. Completion of an Environmental Site Assessment Phase 1 for the site, which was submitted with the instant application.

The Siting Board has reviewed the mitigation measures that have either been proposed by Glover Creek or measures that have been accepted by the applicant in response to discovery requests or recommended in the BBC Report and have modified those measures associated with the implementation of the vegetative buffer. The Siting Board finds that the mitigation measures as proposed and as modified are appropriate and reasonable.

The Siting Board finds that Glover Creek's SAR complies with all of the statutory requirements of KRS 278.708 subject to the mitigation measures and conditions imposed in this Order and the attached Appendix A.

II. Requirements under KRS 278.710(1)

In addition to the evaluation of the factors contained in the Site Assessment Report, KRS 278.710(1) directs the Siting Board to consider the following additional criteria in rendering its decision:

- Economic impact on the affected region and state;
- Existence of other generation facilities;
- Local planning and zoning requirements;
- Potential impact on the electricity transmission system;
- Compliance with statutory setback requirements; and
- History of environmental compliance.

Economic Impact on Affected Region and the State

According to Glover Creek's economic impact analysis, the proposed solar facility will generate lasting and significant positive economic and fiscal impacts on the entire affected region and the state. Such impacts includes the creation of hundreds of construction jobs, expansion of the local tax base, and the benefits of having a long-term employer and corporate citizen in the region that has a strong commitment to investing in the communities it serves. Glover Creek states that the project will pay approximately \$1 million in county property taxes over the first 20 years of operation, with ongoing county tax payments continuing after this period.

During construction, Glover Creek estimates that approximately 450 total jobs will be created, consisting of 300 direct jobs and 150 indirect jobs. The vast majority of these jobs will be filled by craft workers and contractors. The 450 jobs translate to a projected injection of approximately \$15 million in new wages into the local economy, which will



support local businesses, and a labor income multiplier impact of an additional \$2.31 million. The total construction phase economic impact of the Glover Creek facility (exclusive of capital investment and tax revenues) is projected to be approximately \$17.31 million.

The Harvey Economics Report determined that the construction and operation of the Glover Creek Solar facility will provide some, limited economic benefits to the region and to the state. The report states that overall, the Glover Creek project will result in measurable, but temporary, positive economic effects to the region during the construction phase. Harvey Economics found that 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 which needs it. During the operational phase, the report finds that operational benefits will be confined mostly to property taxes. Lastly, the report notes that operational employment will be minimal, and purchases of materials or supplies will be very small on an annual basis.

Having reviewed the record, the Siting Board finds that the Glover Creek solar facility will have a positive economic impact on the region. The Siting Board notes that the solar facility will be one of the very few utility-scale renewable generation resource in the state and will be the largest solar facility in the state.

#### Existence of Other Generating Facilities

Glover Creek states that it is rare for utility-scale solar projects to be co-located with existing electricity generating infrastructure, such as a coal or natural gas-fired power plant.<sup>23</sup> As a result of Glover Creek's efforts, the proposed solar project is located on land

---

<sup>23</sup> Application Volume 1, Item 7, Efforts to locate near Existing Electric Generation.

with existing transmission lines. Glover Creek informs that the project will interconnect to an on-site, existing transmission line owned by EKPC. At the project's expense, EKPC will build a new tap line to interconnect the solar facility. The proposed interconnection is to on-site, existing infrastructure owned by EKPC to be used for the sale and distribution of energy created by the Glover Creek solar facility.<sup>24</sup>

KRS 278.710(1)(d) provides that the Siting Board must consider whether a merchant plant is proposed for a site upon which facilities capable of generating 10 MW or more of electricity are currently located. Although the site upon which the Glover Creek solar facility will be located does not contain any other generating facilities, the Siting Board notes the selected site will encompass an existing transmission line and Glover Creek will be able to directly interconnect its solar facility to that of the existing transmission line without the need for any additional land. Also, as previously determined, the passive characteristics of the solar facility will be substantially compatible with the surrounding area.

#### Local Planning and Zoning Requirements

Glover Creek states that the proposed solar facility will be located entirely in Metcalfe County. Glover Creek notes that Metcalfe County has not enacted any zoning ordinances or setback requirements for the location of the Glover Creek solar facility. Glover Creek informs that there are no setback requirements established by a planning and zoning commission for the location of the project. Glover Creek submitted as part of its Application a certification that the proposed project will be in compliance with all local planning and zoning requirements that existed on the date the Application was filed.

---

<sup>24</sup> *Id.*

The Siting Board finds that Glover Creek's certification that the proposed facility will meet all local planning and zoning requirements that existed on the date the Application was filed satisfies the requirements of KRS 278.710(1)(e).

#### Impact on Transmission System

Glover Creek states that the proposed solar facility will be located within the PJM Interconnection LLC (PJM) footprint. Glover Creek informs that PJM is the Regional Transmission Organization for 13 states, including parts of Kentucky, and is therefore managing the interconnection of the project in coordination with EKPC, who owns the transmission infrastructure to which the project is proposing to interconnect.<sup>25</sup> The interconnection study process for PJM involves three study phases: Feasibility Study, System Impact Study, and Facilities Study. The purpose of the feasibility study is to determine a plan, with ballpark cost and construction time estimates, to connect the proposed Glover Creek solar facility to the PJM network at a location specified by Glover Creek. PJM issued the Feasibility Study Reports on the Glover Creek project in July 2019 and identified that the proposed solar project will require approximately \$6 million in upgrade costs to interconnect with EKPC's existing Patton Road – Summer Shade 69 kV transmission line. The upgrades consist of attachment facilities along with direct (construction of a switching station) and non-direct (relay upgrades) connection network upgrade. The Feasibility Study Reports also identified the need to system upgrades as a result of the interconnection which is estimated to cost Glover Creek approximately \$15 million. The biggest portion of this cost will involve the need to rebuild the Barren County – Horse Cave Junction 69 kV transmission line section; rebuild the AE2-071 – Summer

---

<sup>25</sup> Application Volume 1, Attachment E.

Shade 69 kV transmission line; and rebuild the Horse Cave Junction – Munfordville 69 kV transmission line.<sup>26</sup>

The System Impact Study determines potential impacts to the regional electric grid and the need for any network upgrades to mitigate potential impacts. PJM issued the System Impact Study Report for the Glover Creek solar facility in January 2020 and found that Glover Creek will be responsible for approximately \$7.135 million in system upgrades. These system upgrades consists of \$610,000 for attachment facilities (69 kV isolation switch structure and associated switch); \$5.420 million in direct connection network upgrades (construct a new 69 kV switching station to 161 kV standards); \$795,000 in non-direct connection network upgrades (construct looping facilities); and \$310,000 in allocation for new system upgrades.<sup>27</sup>

Glover Creek also requested LG&E to perform an affected system study in connection with the Glover Creek solar facility. Glover Creek states that LG&E's evaluation found that LG&E's system is not affected by the Glover Creek solar facility.<sup>28</sup>

Glover Creek states that the Facilities Study is currently underway and expected to be issued in September 2020.<sup>29</sup> Based upon information provided by PJM, Glover Creek informs that the Facilities Study encompasses the engineering design work necessary to begin construction of required expansion plan upgrades identified by PJM to accommodate an interconnection request. Glover Creek does not anticipate any issues resulting from this study.

---

<sup>26</sup> Application Volume 1, Attachment G.

<sup>27</sup> Application Volume 1, Attachment F.

<sup>28</sup> Application Volume 1, Attachment D.

<sup>29</sup> Application Volume 1, Item 9, Effect on Kentucky Electricity Generation System.

KRS 278.710(f) provides that the Siting Board should consider whether the additional load imposed upon the electricity transmission system by use of the Glover Creek solar facility will adversely affect the reliability of service for retail customers of electric utilities regulated by the Public Service Commission (PSC). Having reviewed the record, the Siting Board finds that the proposed solar facility will not adversely impact the reliability of service provided by retail electric utilities under the PSC's jurisdiction based upon Glover Creek's commitment to the interconnection process and protocols and its acceptance of any cost obligations resulting from the interconnection process and protocols consistent with the requirements under KRS 278.212. The Siting Board finds that Glover Creek has satisfied the requirements of KRS 278.710(f).

#### Compliance with Setback Requirements

Glover Creek's application acknowledges that KRS 278.706(2)(e) requires all proposed structures or facilities used for generation of electricity to be at least 2,000 feet from any residential neighborhood, school, hospital, or nursing home facility subject to a certain exception that is not applicable in this instance. KRS 278.700(6) defines "residential neighborhood" as a populated area of five or more acres containing at least one residential structure per acre. Glover Creek states that there are two residential neighborhoods within 2,000 feet of the proposed solar development. Glover Creek filed a motion, pursuant to KRS 278.704(4), seeking a deviation from the 2,000 feet setback requirement.<sup>30</sup> The two nearby residential neighborhoods are described as follows:

1. The closest residential neighborhood to the solar facility is designated as Neighborhood A and is located along SR 90 west of Big Jack Road. Neighborhood A has

---

<sup>30</sup> Applicant's Motion for Deviation from Setback Requirements (Motion) (filed Apr. 20, 2020).

approximately 15 single family homes and is about 800 feet from Glover Creek's boundary. Neighborhood A is separated by SR 90 and a part of that neighborhood is located south of SR 90.

2. The second residential neighborhood is designated by Glover Creek as Neighborhood B and is approximately 1,400 feet from the solar facility's boundary. Neighborhood B runs along Summer Shade Road, including Bowman Estates and Whitlow Road. Neighborhood B is separated by SR 90 and a part of that neighborhood is located south of SR 90.<sup>31</sup>

KRS 278.704(4) provides that the Siting Board may grant a deviation from the setback requirements if it is determined that the proposed facility as designed and as located would meet the goals of KRS 224.10-280 (Cumulative Environmental Assessment) 278.010 (definitions), 278.212 (costs of upgrading existing grid), 278.214 (curtailment of service), 278.216 (site assessment report), 278.218 (transfer of ownership), and 278.700 to 278.716 (Siting Board requirements) at a distance closer than the required 2,000 feet.

Subject to certain exceptions not applicable in this matter, KRS 224.10-280 requires a person to submit a cumulative environmental assessment (CEA) to the Kentucky Energy and Environment Cabinet (Cabinet) along with a fee before beginning construction of an electric power plant. Although it is unaware of any regulations that have been promulgated regarding CEAs, including any regulations that would establish a fee for the processing of a CEA, Glover Creek developed a CEA for submission to the Cabinet. Glover Creek states that the CEA provides an in-depth analysis of the potential

---

<sup>31</sup> Application Volume 2, Exhibit B.

air pollutants, water pollutants, wastes, and water withdrawal associated with the proposed merchant solar facility. The CEA shows that the Glover Creek solar facility will produce zero emissions and is not expected to emit any of the criteria pollutants such as particulate matter, carbon monoxide, sulfur dioxide, nitrogen oxide, volatile organic contaminants, or lead. Although there will be some indirect air emissions during construction and operations from the use of vehicles and mowing, respectively, no air quality permit is required for these construction or ancillary activities. With respect to water pollutants, the CEA shows that the Glover Creek solar facility will result in the discharge of stormwater during construction.<sup>32</sup> Glover Creek states that it intends to comply with the Kentucky Division of Water's Construction (KDOW) Storm Water Discharge General Permit for those construction activities that disturb one acre or more.<sup>33</sup> Glover Creek also will submit a Notice of Intent prior to the commencement of construction and a notice of termination upon completion. Glover Creek will use stormwater best management practices, such as silt fences, to manage stormwater during construction. Lastly, a stormwater pollution prevention plan also will be prepared and implemented to comply with KDOW requirements.

With respect to waste evaluation, the CEA notes that construction activities will generate solid waste consisting of construction debris and general trash, such as wooden crates, pallets, flattened cardboard module boxes, plastic packaging, and excess electrical wiring. To the extent, feasible, and practicable, Glover Creek will recycle

---

<sup>32</sup> Motion at 6 and Exhibit 3.

<sup>33</sup> Glover Creek's Response to Siting Board's First Request for Information (filed June 1, 2020), Exhibit J.

construction waste and material that cannot be recycled will be disposed off-site at a permitted facility. The project will also generate very small amounts of hazardous waste, which will be managed off-site at a permitted facility.<sup>34</sup>

With respect to managing water withdrawal and usage, the Glover Creek solar facility will primarily utilize groundwater from existing onsite wells to provide water needed for construction activities. Construction-related water use would support site preparation (including dust control, if applicable) and grading activities. Similar to other solar facilities, the Glover Creek project is not water intensive during the operational phase.

Glover Creek states that, based upon the CEA submitted to the Cabinet, the goals of the requirements of KRS 224.10-280 have been met.

With respect to KRS 278.010, Glover Creek states that this statutory provision sets forth the definitions to be used in conjunction with KRS 278.010 to 278.450, 278.541 to 278.544, 278.546 to 278.5462, and 278.990. Glover Creek asserts that the Siting Board's authority begins with KRS 278.700 and extends through KRS 278.716 and any applicable provision of 278.990. Glover Creek contends that in filing a complete Application pursuant to the applicable statutes in this proceeding, the company has satisfied the goal of providing the required information utilizing the definition of any applicable term defined in KRS 278.010.

KRS 278.212 requires the filing of plans and specifications for electrical interconnection with merchant electric generating facility and imposes the obligation upon a merchant electric generating developer for any costs or expenses associated with upgrading the existing electricity transmission grid as a result of the additional load

---

<sup>34</sup> Application Volume 2, Exhibit A.



caused by a merchant electric generating facility. Glover Creek avers that it has met the goals of KRS 278.212 because Glover Creek will comply with all applicable conditions relating to electrical interconnection with utilities by following the PJM interconnection process. Additionally, Glover Creek states that it will accept responsibility for appropriate costs which may result from its interconnecting with the electricity transmission grid.<sup>35</sup>

KRS 278.214 governs the curtailment of service and establishes the progression of entities whose service may be interrupted or curtailed pursuant to an emergency or other event. Glover Creek states that it will abide by the requirements of this provision to the extent that these requirements are applicable.

KRS 278.216 requires utilities under the jurisdiction of the Kentucky Public Service Commission to obtain a site compatibility certificate before beginning construction of an electric generating facility capable of generating more than 10 megawatts. An application for a site compatibility certificate should include the submission of a site assessment report as prescribed in the applicable Siting Board statutes. Glover Creek states that it is not a utility under the jurisdiction of the Kentucky Public Service Commission. However, Glover Creek states that it has nonetheless met the requirements of KRS 278.216 by complying with the requirements of KRS 278.700 *et seq.*, including the submission of a site assessment report.

KRS 278.218 provides that no transfer of utility assets having an original book value of \$1 million or more without prior approval of the Kentucky Public Service Commission if the assets are to be transferred by reasons other than obsolescence or the assets will continue to be used to provide the same or similar service to the utility or

---

<sup>35</sup> Motion at 10.

its customers. Glover Creek states that it is not a utility as that term is defined in KRS 278.010(3). However, to the extent Siting Board approval may at some time be required for change of ownership or control of assets owned by Glover Creek, Glover Creek states that it will abide by the applicable rules and regulations which govern its operation.

KRS 278.700 *et seq.* governs the Siting Board's jurisdiction and process. Glover Creek states that it has met the goals set forth in these provisions as evidenced by the application in its entirety. Glover Creek further states that it has provided a comprehensive application with a detailed discussion of all of the criteria applicable to its proposed facility under KRS 278.700–278.716.

Having reviewed the record and being otherwise sufficiently advised, the Siting Board finds that Glover Creek has demonstrated the proposed facility as designed and as located would meet the goals of the various statutes set forth in KRS 278.704(4) at a distance closer than the required 2,000 feet and is therefore permitted to a deviation from the 2,000 feet setback requirement, with the exception of the location of the inverters. The Siting Board will require that the inverters be located at least 2,000 feet from the closest residence given that the application provided that the location of the inverters will be at least at such a distance.

#### History of Environmental Compliance

Glover Creek states that neither it nor any entity with ownership interest in the proposed solar project has violated any state or federal environmental laws or regulations. Glover Creek further states that there are no pending actions against Glover Creek nor any entity with ownership interest in the proposed solar project.

KRS 278.710(1)(i) directs the Siting Board to consider whether the applicant has a good environmental compliance history. In light of Glover Creek's verified statement and no evidence to the contrary, the Siting Board finds that Glover Creek has satisfied the requirements of KRS 278.710(1)(i).

### Decommissioning

According to Glover Creek, the proposed solar facility would have an expected useful life of 40 years. The Noise and Traffic Assessment also states that at the end of the project's life, the equipment and electrical infrastructure will be removed from the site, and land may return to farming or other development.<sup>36</sup> According to Glover Creek, decommissioning activities would include the removal of all solar facility equipment, substation equipment and fencing, as well as land restoration and erosion control for about 450 acres.<sup>37</sup> Glover Creek states that land restoration would entail removal of gravel access roads and re-seeding of disturbed area. Erosion control would include installation of perimeter erosion control measures prior to the start of decommissioning and removal of those measures following decommissioning. Glover Creek also suggests an economic incentive to properly remove the solar equipment, citing estimates that the material value of items such as aluminum, copper and steel would be greater than the cost of removing the equipment and restoring the property.

Because it is of the belief that the economic incentive relied by Glover Creek is highly uncertain due to projected costs for decommissioning and future metal prices and

---

<sup>36</sup> Application Volume 2, Exhibit C.

<sup>37</sup> Glover Creek's Responses to Harvey Economics' Second Requests for Information (filed June 29, 2020), Item IX.

the land lease provisions also might not cover the entire site or be easily enforceable, Harvey Economics recommends the following decommissioning measures.

1. Glover Creek, its successors or assigns, will decommission the entire site and complete reclamation to its original or a superior state after the project has served its useful life. This mitigation requirement should be deferred if Glover Creek continues with its currently proposed operation beyond 40 years.

2. If Glover Creek, its successors or assigns, retrofit the current proposed facility to produce solar energy beyond 40 years, it must demonstrate to the Siting Board that the retrofit facility will not result in a material change in the pattern or magnitude of impacts as addressed in the Harvey Economics Report. Otherwise, a new SAR must be submitted for Siting Board review.

3. Glover Creek, its successors or assigns, will prepare a new SAR for Siting Board review if the power producer intends to retire the currently proposed facility and employ a different technology.

The Siting Board finds that the decommissioning measures recommended by Harvey Economics to be appropriate and reasonable. Accordingly, the Siting Board will require Glover Creek to implement the recommended decommissioning measures as conditions of its grant of a certificate in this matter.

### CONCLUSION

After carefully considering the criteria outlined in KRS Chapter 278, the Siting Board finds that Glover Creek has presented sufficient evidence to support the issuance of a deviation from the setback requirements of KRS 278.704(2) and a Certificate to Construct the proposed merchant solar facility. The Siting Board conditions its approval

upon the full implementation of all mitigation measures described herein and listed in Appendix A to this Order. A map showing the location of the proposed solar generating facility is attached hereto as Appendix B.

IT IS THEREFORE ORDERED that:

1. Glover Creek's Application for a Certificate to Construct an approximately 55 MWac merchant solar electric generating facility in Metcalfe County, Kentucky is conditionally granted subject to full compliance with the mitigation measures and condition prescribed in Appendix A.

2. Glover Creek's motion for deviation from the 2,000 feet setback requirement is granted except for the location of the inverters.

3. Glover Creek shall fully comply with the mitigation measures and conditions prescribed in Appendix A.

By the Kentucky State Board on Electric  
Generation and Transmission Siting



ATTEST:

A blue ink signature, appearing to be "B. J. [unclear]", written in a cursive style over a horizontal line.

Acting Executive Director  
Public Service Commission  
*on behalf* of the Kentucky State  
Board on Electric Generation  
and Transmission Siting

## APPENDIX A

### APPENDIX TO AN ORDER OF THE KENTUCKY STATE BOARD ON ELECTRIC GENERATION AND TRANSMISSION SITING IN CASE NO. 2020- 00043 DATED SEP 23 2020

#### MITIGATION MEASURES AND CONDITIONS IMPOSED

The following mitigation measures and conditions are hereby imposed on Glover Creek Solar, LLC (Glover Creek) to ensure that the facilities proposed in this proceeding are constructed as ordered.

1. Glover Creek shall place “High Voltage Keep Out” or equivalent warning signs along the perimeter at approximately every 100–200 feet and at all gates or entrances.

2. Upon its completion, a final site layout plan shall be submitted to the Siting Board. Material deviations from the preliminary site layout plan which formed the basis for the instant review shall be clearly indicated on the revised graphic. Those material changes might include substantive changes in the location of solar panels, transformer, inverters, panel motors, substation, or other project facilities or infrastructure.

3. Any change in Glover Creek’s boundaries from the information that formed the basis of this evaluation shall be submitted to the Siting Board for review.

4. The Siting Board shall determine whether 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 that is the case, Glover Creek shall support the Siting Board’s effort to revise its assessment of impacts and mitigation requirements.

5. Glover Creek or its contractor shall control access to the site during construction and operation. All construction entrances shall be gated and locked when not in use.

6. The fence surrounding the property boundary shall be installed after grading of the site and before the main array installation begins. According to NESC regulations, the security fence shall be installed prior to any electrical installation work. The substation and construction staging area shall also have their own separate security fences installed.

7. Where there are potential visual or noise impacts created by the solar facility, Glover Creek shall plant a 15-foot wide vegetative buffer consisting of two staggered rows of evergreen shrubs. The evergreen shrubs shall be either mature at the time of planting or at least six feet in height, or if Glover Creek elects to plant non-mature evergreen shrubs of at least 3 feet at the time of planting, Glover Creek shall also include additional temporary buffers that would immediately help to mitigate any potential noise and visual impacts until the evergreen shrubs have grown to maturity.

8. Glover Creek shall implement the modified vegetative buffers to those properties that are within 1,500 feet of the solar facilities' boundary lines before the tamping of the racking panels and Glover Creek shall schedule the tamping process at these nearby homes so that the tamping will occur at the end of the tamping process period.

9. Glover Creek shall cultivate at least two acres of native, pollinator-friendly species on-site.

10. Glover Creek shall develop a traffic management plan to minimize the impacts of any traffic increase and keep traffic safe. Part of this traffic management plan



will be to maintain all traffic and staging on-site. In addition, the traffic management plan shall also identify any noise concerns during the construction period and develop measures that would address those noise concerns.

11. Glover Creek's construction activity, process, and deliveries shall be limited to the hours of 8 a.m. and 6 p.m. Monday through Saturday.

12. Glover Creek shall use appropriate signage and traffic signaling as needed to aid construction traffic and prevent severe traffic issues.

13. As needed, Glover Creek shall provide a temporary traffic signal at the intersection of SR 90 and SR 640.

14. As needed, Glover Creek will shuttle commuting construction workers.

15. Glover Creek's contractor shall apply best management practices regarding dust mitigation, including but not limited to water applied to internal roads as needed; internal roads compacted; internal roads constructed or improved as needed; loads of dirt and other air-pollution causing particles covered while in transit; revegetation measures and covering of spoil piles.

16. Glover Creek shall inform and obtain permits from State and local road authorities as pertaining to any Class 21 vehicle transport to the site. Glover Creek shall also comply with those permit requirements and shall coordinate with proper road officials prior to these trips.

17. Glover Creek shall fix or pay for damage resulting from any vehicle transport to the project site.

18. Residents within 1,500 feet of the property boundaries of the Glover Creek solar facility shall be notified about potential construction noises. Residents within 500 feet of the solar panels shall be notified about potential operational noises.

19. Glover Creek shall 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. Any noise generator that creates noise levels in excess of 120 dB shall be considered unduly high or annoying.

20. If noise levels during the construction period are unacceptable to nearby residents or landowners (i.e., noise levels greater than 120 dB), Glover Creek shall take such steps to mitigate the noise impact.

21. Glover Creek shall contact nearby residents to confirm that noise levels are not unduly high or annoying after operations begin. Any noise generator that creates noise levels in excess of 120 dB shall be considered unduly high or annoying.

22. Glover Creek shall consider, among other things, additional buffering, fencing, or revising the construction schedules or delivery patterns in those areas where noise impacts are annoying residents or will potentially annoy them.

23. Glover Creek shall comply with all applicable conditions relating to electrical interconnection with utilities by following the PJM interconnection process. Glover Creek shall also accept responsibility for appropriate costs which may result from its interconnecting with the electricity transmission grid consistent with the obligations imposed by KRS 278.212.

24. Glover Creek, its successors or assigns, shall decommission the entire site and complete reclamation to its original or a superior state after the project has served its

useful life. This mitigation requirement shall be deferred if Glover Creek continues with its currently proposed operation beyond 40 years.

25. If Glover Creek, its successors or assigns, retrofit the current proposed facility to produce solar energy beyond 40 years, it shall demonstrate to the Siting Board that the retrofit facility will not result in a material change in the pattern or magnitude of impacts as addressed in the Harvey Economics Report. Otherwise, a new SAR must be submitted for Siting Board review.

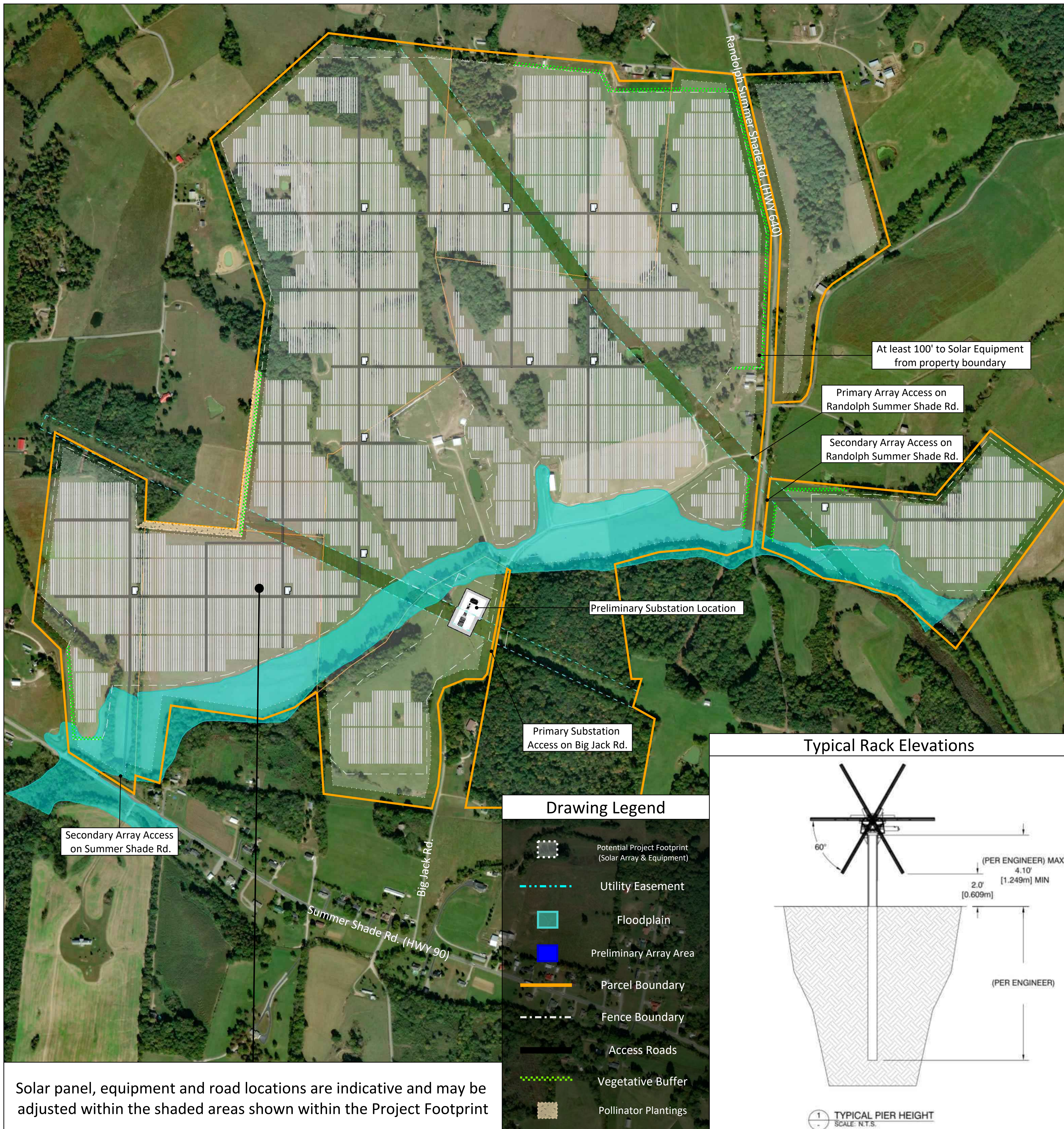
26. Glover Creek, its successors or assigns, shall prepare a new SAR for Siting Board review if the power producer intends to retire the currently proposed facility and employ a different technology.

APPENDIX B

APPENDIX TO AN ORDER OF THE KENTUCKY STATE BOARD ON  
ELECTRIC GENERATION AND TRANSMISSION SITING IN CASE NO. 2020-  
00043 DATED SEP 23 2020

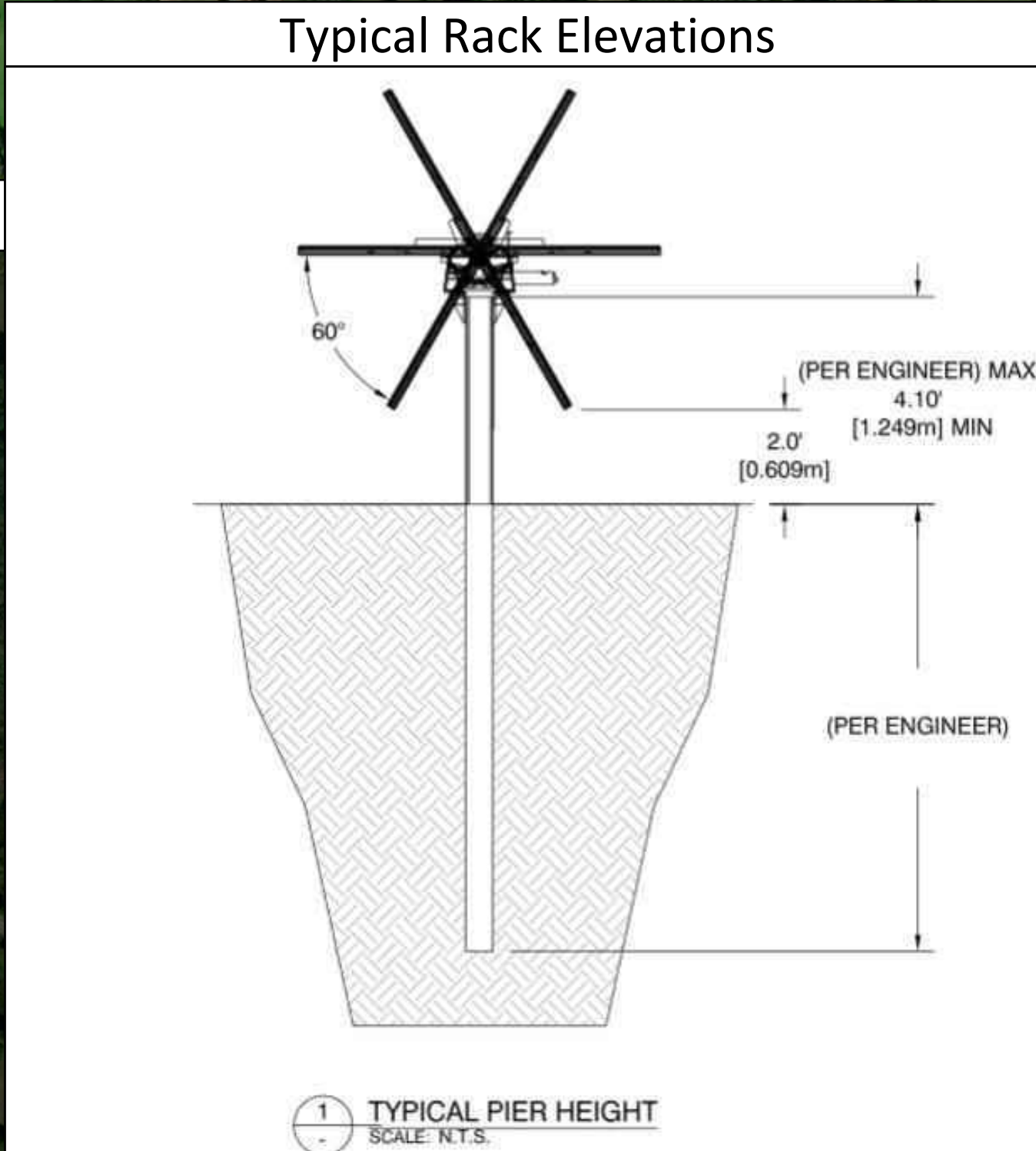
[ONE PAGE TO FOLLOW]



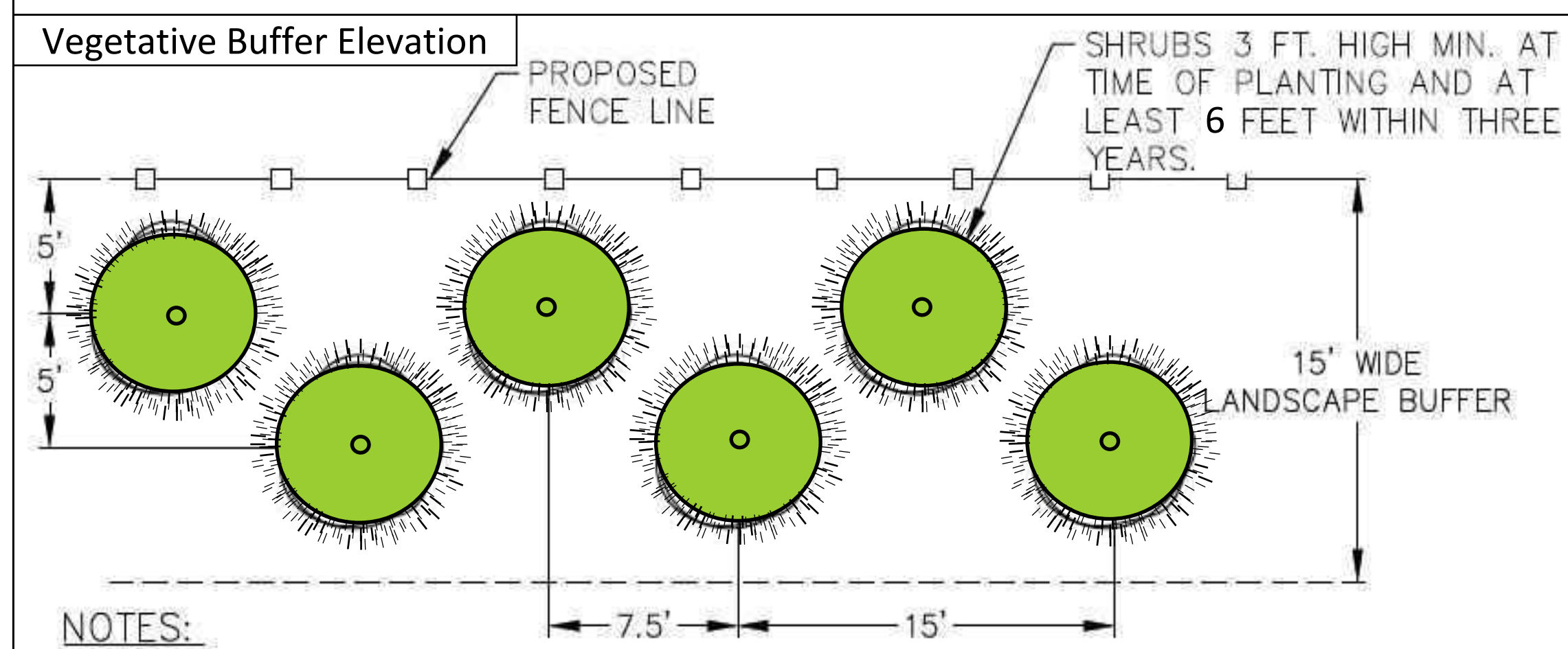


Solar panel, equipment and road locations are indicative and may be adjusted within the shaded areas shown within the Project Footprint

Drawing Legend	
	Potential Project Footprint (Solar Array & Equipment)
	Floodplain
	Preliminary Array Area
	Parcel Boundary
	Fence Boundary
	Access Roads
	Vegetative Buffer
	Pollinator Plantings
	Utility Easement



- Standard Notes
- (1) The Purpose of this plan is for a Power Generation Permit for review and approval by the Kentucky State Siting Board to construct a solar energy system. All information shown is for planning purposes only.
  - (2) The property lines, existing improvements, and topographic data shown hereon are not based on a field survey and have been completed from ArcGIS & Google Earth Imagry. No field evidence of property markers were located with this Exhibit.
  - (3) Wetlands and Streams are shown representative of a delineation received by Carolina Solar Energy.
  - (4) Project area will be cleared and grubbed as necessary, retaining pre-development drainage patterns as much as possible. Minor grading will occur around inverter areas to divert surface drainage. Areas subject to rutting during construction will be temporarily stabilized with gravel that will remain after construction. Soil conditions and equipment loads will determine final design.
  - (5) Proposed construction and temporary laydown yard/construction staging area to be used during site construction. A portion of this area will be covered with gravel to allow delivery of construction materials. Prior to construction, this area will be compacted by a smooth drum or sheepsfoot roller to reduce/prevent rutting. Following construction gravel laydown yard will be removed.
  - (6) Access aisles shown on this plan indicate construction and maintenance access points for ingress/egress. Prior to construction, these aisles are compacted by a smooth drum or sheepsfoot roller to reduce/prevent rutting. Gravel may be placed in high traffic or poorly draining areas during construction activities to improve access. Soil access aisle will be scarified, aerated, and re-seeded after construction. Access aisles to inverters may require gravel to support delivery equipment loads. Soil conditions and final equipment selection will determine if gravel access aisles will be required to inverter locations
  - (7) All Right-Of-Ways are public unless noted otherwise.
  - (8) Utility lines and services shown hereon are approximate per aerial photography or as reported by various responsible parties. Location of underground utilities are not shown. Call appropriate authorities before digging.
  - (9) No lighting is proposed for the array area. The Interconnection Substation will have some lighting.
  - (10) 6' tall chain link fence with three strands of barbed wire or similar to meet National Electric Code requirements. The proposed access gate will be will be locked with a standard keyed or combination lock. Emergency personnel will be provided a key or combination for access.



---

Carolina Solar Energy  
 400 W Main St  
 Durham, NC 27701  
 Suite 503

---

**PROJECT**  
 Glover Creek

---

**ISSUE**  
 06.17.20  
 05.26.20  
 12.02.19  
 12.05.19

---

**DESCRIPTION**  
 Array Layout

---

**DRAWN BY**  
 CJ

---

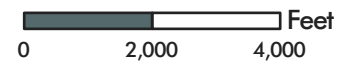
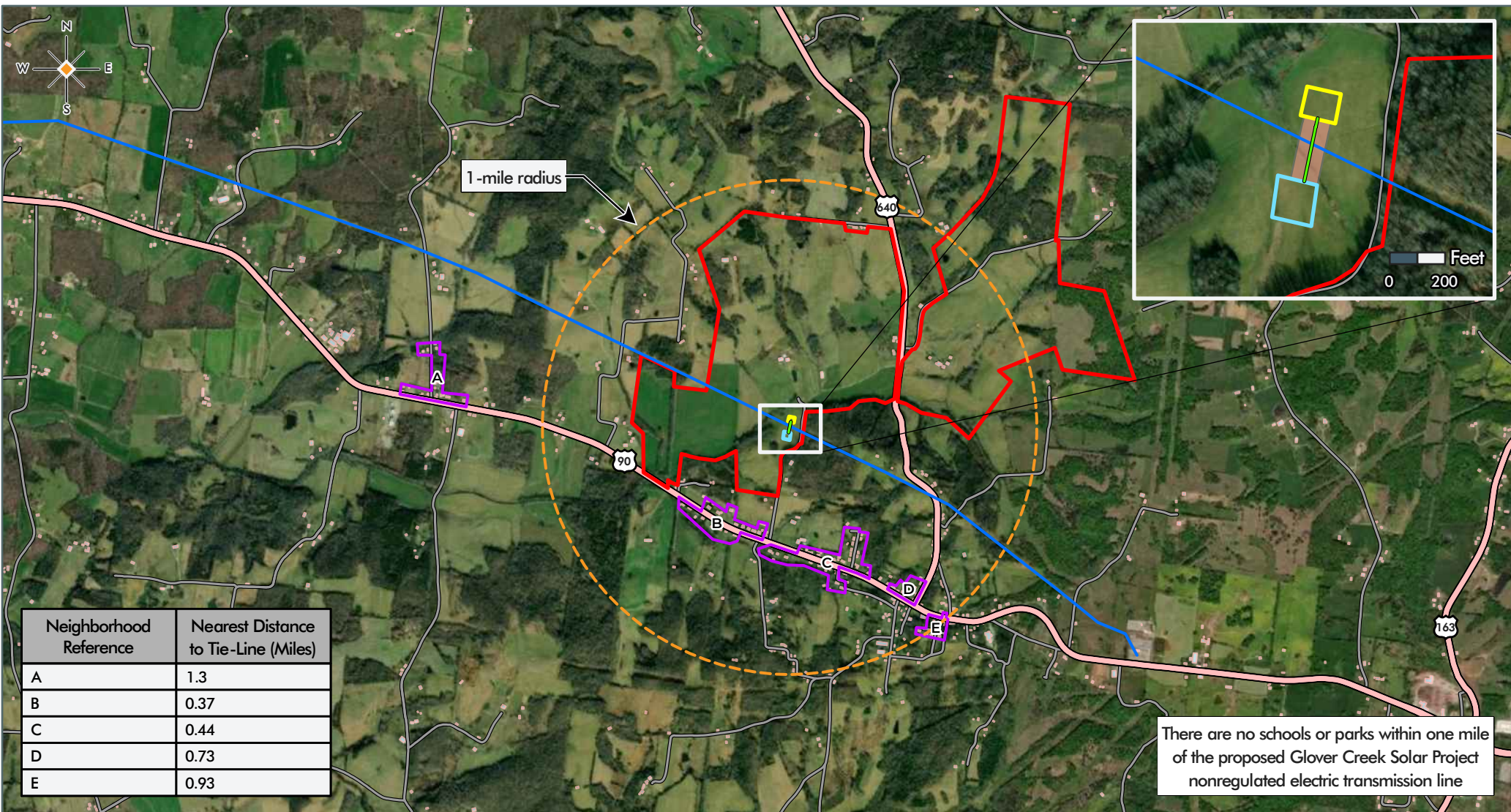
a

---

01



**EXHIBIT B**



**TITLE**

**Glover Creek Solar - Context Map**













**LOCATION**

Metcalfe County, Kentucky

**LAYER CREDITS**

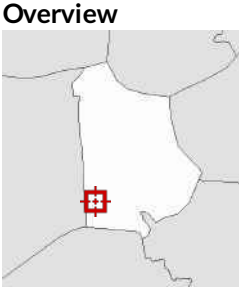
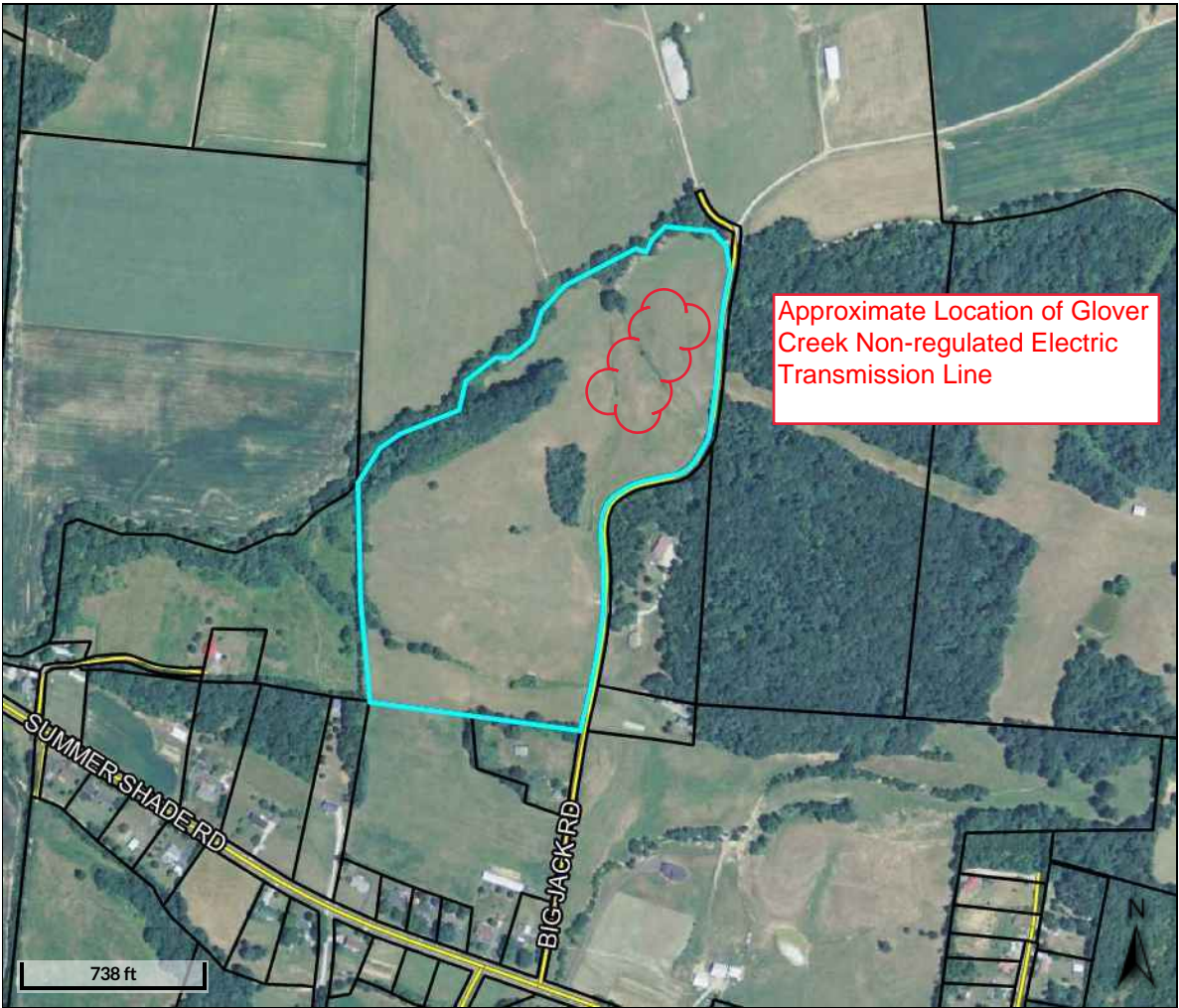
Basemap: Maxar  
 Layers: USA Structures and USA Roads were acquired from Esri Living Atlas,  
 Transmission Lines were acquired from Platts

**LEGEND**

-  Glover Creek Solar Project Outline
-  1-Mile Buffer (from Tie-Line Center)
-  Residential Neighborhoods (as defined in KRS 278.700(6))
-  EKPC Switchyard
-  Glover Creek Solar Project Substation
-  USA Structures
-  East Kentucky Power Cooperative Transmission Line
-  Glover Creek Solar Project Tie-Line
-  Tie-Line Right-of-Way
- USA ROADS**
-  Primary Road
-  Secondary Road
-  Local Roads

**EXHIBIT C**





- Legend**
- Parcels
  - Roads
  - City Limits

<b>Parcel ID</b>	017-00-00-026.00	<b>Physical Address</b>	BIG JACK RD	<b>Land Value</b>	\$14,100	<b>Last 2 Sales</b>			
<b>Property Class</b>	FARM (20)	<b>Mailing Address</b>	WADE ELAINE TRUSTEE MIKE WADE IRREVOCABLE GIFT TRUST	<b>Improvement Value</b>	\$92,000	<b>Date</b>	12/28/2012	<b>Price</b>	0
<b>Taxing District</b>	00-County	<b>Address</b>	110 KARAKAL DRIVE GLASGOW, KY 42141	<b>Total Value</b>	\$106,100		5/1/2001	<b>Reason</b>	n/a
<b>Acres</b>	44.81							<b>Qual</b>	Q

*Disclaimer: The information in this web site represents current data from a working file which is updated continuously. Information is believed reliable, but its accuracy cannot be guaranteed. No warranty, expressed or implied, is provided for the data herein, or its use. Metcalfe County digital cadastral data are a representation of recorded plats and surveys for use within the Geographic Information System for purposes of data access and analysis. These and other digital data do not replace or modify land surveys, deeds, and/or other legal instruments defining land ownership or use.*

Date created: 11/30/2022  
 Last Data Uploaded: 11/30/2022 1:21:19 PM

Developed by Schneider GEOSPATIAL

**EXHIBIT D**



# **Generation Interconnection**

## **Feasibility Study Report**

**for**

### **Queue Project AE2-071**

**PATTON RD-SUMMER SHADE 69 KV**

**21 MW Capacity / 35 MW Energy**

July, 2019

## 1 Preface

The intent of the feasibility study is to determine a plan, with ballpark cost and construction time estimates, to connect the subject generation to the PJM network at a location specified by the Interconnection Customer. The Interconnection Customer may request the interconnection of generation as a capacity resource or as an energy-only resource. As a requirement for interconnection, the Interconnection Customer may be responsible for the cost of constructing: (1) Direct Connections, which are new facilities and/or facilities upgrades needed to connect the generator to the PJM network, and (2) Network Upgrades, which are facility additions, or upgrades to existing facilities, that are needed to maintain the reliability of the PJM system.

In some instances a generator interconnection may not be responsible for 100% of the identified network upgrade cost because other transmission network uses, e.g. another generation interconnection, may also contribute to the need for the same network reinforcement. Cost allocation rules for network upgrades can be found in PJM Manual 14A, Attachment B. The possibility of sharing the reinforcement costs with other projects may be identified in the feasibility study, but the actual allocation will be deferred until the impact study is performed.

The Interconnection Customer seeking to interconnect a wind or solar generation facility shall maintain meteorological data facilities as well as provide that meteorological data which is required per Schedule H to the Interconnection Service Agreement and Section 8 of Manual 14D.

PJM utilizes manufacturer models to ensure the performance of turbines is properly captured during the simulations performed for stability verification and, where applicable, for compliance with low voltage ride through requirements. Turbine manufacturers provide such models to their customers. The list of manufacturer models PJM has already validated is contained in Attachment B of Manual 14G. Manufacturer models may be updated from time to time, for various reasons such as to reflect changes to the control systems or to more accurately represent the capabilities turbines and controls which are currently available in the field. Additionally, as new turbine models are developed, turbine manufacturers provide such new models which must be used in the conduct of these studies. PJM needs adequate time to evaluate the new models in order to reduce delays to the System Impact Study process timeline for the Interconnection Customer as well as other Interconnection Customers in the study group. Therefore, PJM will require that any Interconnection Customer with a new manufacturer model must supply that model to PJM, along with a \$10,000 fully refundable deposit, no later than three (3) months prior to the starting date of the System Impact Study (See Section 4.3 for starting dates) for the Interconnection Request which shall specify the use of the new model. The Interconnection Customer will be required to submit a completed dynamic model study request form (Attachment B-1 of Manual 14G) in order to document the request for the study.

The Feasibility Study estimates do not include the feasibility, cost, or time required to obtain property rights and permits for construction of the required facilities. The project developer is responsible for the right of way, real estate, and construction permit issues. For properties currently owned by Transmission Owners, the costs may be included in the study.

## 2 General

The Interconnection Customer (IC), has proposed a Solar generating facility located in Metcalfe, Kentucky. The installed facilities will have a total capability of 35 MW with 21 MW of this output being recognized by PJM as Capacity. The proposed in-service date for this project is 12/31/2021. This study does not imply a TO commitment to this in-service date.

<b>Queue Number</b>	<b>AE2-071</b>
<b>Project Name</b>	PATTON RD-SUMMER SHADE 69 KV
<b>Interconnection Customer</b>	Carolina Solar Energy III, LLC
<b>State</b>	None
<b>County</b>	Metcalfe
<b>Transmission Owner</b>	EKPC
<b>MFO</b>	35
<b>MWE</b>	35
<b>MWC</b>	21
<b>Fuel</b>	Solar
<b>Basecase Study Year</b>	2022

## 2.1 Point of Interconnection

AE2-071 will interconnect with the EKPC transmission system tapping the Patton Rd. to Summer Shade 69kV line.

## 2.2 Cost Summary

The AE2-071 project will be responsible for the following costs:

Description	Total Cost
Attachment Facilities	\$250,000
Direct Connection Network Upgrade	\$5,650,000
Non Direct Connection Network Upgrades	\$100,000
<b>Total Costs</b>	<b>\$6,000,000</b>

In addition, the AE2-071 project may be responsible for a contribution to the following costs

Description	Total Cost
System Upgrades	\$785,000

Cost allocations for these upgrades will be provided in the System Impact Study Report.

### 3 Transmission Owner Scope of Work

#### 4 Attachment Facilities

The total preliminary cost estimate for the Attachment work is given in the table below. These costs do not include CIAC Tax Gross-up.

<b>Description</b>	<b>Total Cost</b>
Install a 69 kV switch structure at the point of demarcation.	\$250,000
<b>Total Attachment Facility Costs</b>	<b>\$250,000</b>



## 5 Direct Connection Cost Estimate

The total preliminary cost estimate for the Direct Connection work is given in the table below. These costs do not include CIAC Tax Gross-up.

Description	Total Cost
Build 69 kV switching station at 161 kV standards near Eighty Eight, KY including associated transmission line work. Estimated Time to Construct: 24 months	\$5,650,000
<b>Total Direct Connection Facility Costs</b>	<b>\$5,650,000</b>

## 6 Non-Direct Connection Cost Estimate

The total preliminary cost estimate for the Non-Direct Connection work is given in the table below. These costs do not include CIAC Tax Gross-up.

Description	Total Cost
Relaying Upgrades at the remote end substations	\$100,000
<b>Total Non-Direct Connection Facility Costs</b>	<b>\$100,000</b>

## 7 Incremental Capacity Transfer Rights (ICTRs)

Will be determined at a later study phase

## 8 Interconnection Customer Requirements

1. An Interconnection Customer entering the New Services Queue on or after October 1, 2012 with a proposed new Customer Facility that has a Maximum Facility Output equal to or greater than 100 MW shall install and maintain, at its expense, phasor measurement units (PMUs). See Section 8.5.3 of Appendix 2 to the Interconnection Service Agreement as well as section 4.3 of PJM Manual 14D for additional information.
2. The Interconnection Customer may be required to install and/or pay for metering as necessary to properly track real time output of the facility as well as installing metering which shall be used for billing purposes. See Section 8 of Appendix 2 to the Interconnection Service Agreement as well as Section 4 of PJM Manual 14D for additional information.

## 9 Revenue Metering and SCADA Requirements

### 9.1 PJM Requirements

The Interconnection Customer will be required to install equipment necessary to provide Revenue Metering (KWH, KVARH) and real time data (KW, KVAR) for IC's generating Resource. See PJM Manuals M-01 and M-14D, and PJM Tariff Sections 24.1 and 24.2.

### 9.2 EKPC Requirements

The Interconnection Customer will be required to comply with all EKPC Revenue Metering Requirements for Generation Interconnection Customers. The Revenue Metering Requirements may be found within the "EKPC Facility Connection Requirements" document located at the following link:

<http://www.pjm.com/planning/design-engineering/to-tech-standards/ekpc.aspx>

## 10 Option-1 Network Impacts

The Queue Project AE2-071 was evaluated as a 35.0 MW (Capacity 21.0 MW) injection tapping the Patton Rd. to Summer Shade 69kV line in the EKPC area. Project AE2-071 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AE2-071 was studied with a commercial probability of 0.53. Potential network impacts were as follows:

# Summer Peak Load Flow

## 11 Generation Deliverability

(Single or N-1 contingencies for the Capacity portion only of the interconnection)

None

## 12 Multiple Facility Contingency

(Double Circuit Tower Line, Fault with a Stuck Breaker, and Bus Fault contingencies for the full energy output)

None

## 13 Contribution to Previously Identified Overloads

(This project contributes to the following contingency overloads, i.e. "Network Impacts", identified for earlier generation or transmission interconnection projects in the PJM Queue)

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC DC	MW IMPACT
2155211	341059	2BARREN CO	EKPC	341651	2HORSECAVE J	EKPC	1	EKPC_P4-2_SSHAD S11-1004	breaker	90.0	159.96	161.48	DC	3.03
2155212	341059	2BARREN CO	EKPC	341651	2HORSECAVE J	EKPC	1	EKPC_P4-2_SSHAD S11-1044	breaker	90.0	154.77	156.29	DC	3.03
2155616	341059	2BARREN CO	EKPC	341651	2HORSECAVE J	EKPC	1	EKPC_P1-2_BARR-SUMSH161-B	single	90.0	116.32	118.26	DC	1.75
2155403	342322	2SUMM SHADE	EKPC	341431	2EDM-JBGAL J	EKPC	1	EKPC_P4-2_GREEN W45-1014	breaker	46.0	105.87	108.22	DC	2.4
2155431	342718	5SCOOPER2	EKPC	324141	5ELIHU	LGEE	1	EKPC_P4-5_LAURL S50-1024	breaker	277.0	103.7	105.19	DC	4.12
2155982	342718	5SCOOPER2	EKPC	324141	5ELIHU	LGEE	1	EKPC_P7-1_LAURL 161 DBL	tower	277.0	103.74	105.22	DC	4.12

## 14 Potential Congestion due to Local Energy Deliverability

PJM also studied the delivery of the energy portion of this interconnection request. Any problems identified below are likely to result in operational restrictions to the project under study. The developer can proceed with network upgrades to eliminate the operational restriction at their discretion by submitting a Merchant Transmission Interconnection request.

Note: Only the most severely overloaded conditions are listed below. There is no guarantee of full delivery of energy for this project by fixing only the conditions listed in this section. With a Transmission Interconnection Request, a subsequent analysis will be performed which shall study all overload conditions associated with the overloaded element(s) identified.

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC DC	MW IMPACT
2155615	341059	2BARREN CO	EKPC	341651	2HORSECAVE J	EKPC	1	EKPC_P1-2_BARR-SUMSH161-B	operation	90.0	152.86	154.32	DC	2.92
2155805	342718	5COOPER2	EKPC	324141	5ELIHU	LGEE	1	EKPC_P1-2_LAUR-L DAM161	operation	277.0	103.55	105.04	DC	4.13
2155725	940050	AE1-247 TAP	EKPC	342814	5SUMM SHADE	EKPC	1	Base Case	operation	186.0	115.33	115.81	DC	2.0



## 15 System Reinforcements

ID	Index	Facility	Upgrade Description	Cost
2155403	2	2SUMM SHADE 69.0 kV - 2EDM-JBGAL J 69.0 kV Ckt 1	r0004 (506) : Increase MOT of Summershade-Edm. JB Galloway Jct 69kV line section 266 MCM conductor to 212F (~7.9 miles) Project Type : FAC Cost : \$525,000 Time Estimate : 12.0 Months	\$525,000
2155616,2155211, 2155212	1	2BARREN CO 69.0 kV - 2HORSECAVE J 69.0 kV Ckt 1	r0001 (503) : Uprate CT associated with Barren Co-Horsecave Jct 69kV line section to minimum 166 MVA Summer LTE Project Type : FAC Cost : \$0 Time Estimate : 6.0 Months  r0002 (504) : Upgrade jumpers associated with Barren Co 69kV bus to 2-500 MCM 37 CU conductor Project Type : FAC Cost : \$10,000 Time Estimate : 6.0 Months  r0003 (505) : Increase MOT of Barren Co-Horsecave Jct 69kV line section 795 MCM conductor to 302F (~3.88 miles) Project Type : FAC Cost : \$250,000 Time Estimate : 6.0 Months	\$260,000
2155431,2155982	3	5COOPER2 161.0 kV - 5ELIHU 161.0 kV Ckt 1	r0006 (508) : No Violation. EKPC emergency rating 298 MVA. Project Type : FAC Cost : \$0 Time Estimate : N/A Months  NonPJMArea (635) : The external (i.e. Non-PJM) Transmission Owner, LGEE, will not evaluate this violation until the impact study phase. Project Type : FAC Cost : \$0 Time Estimate : N/A Months	\$0
			TOTAL COST	\$785,000

## 16 Flow Gate Details

The following appendices contain additional information about each flowgate presented in the body of the report. For each appendix, a description of the flowgate and its contingency was included for convenience. However, the intent of the appendix section is to provide more information on which projects/generators have contributions to the flowgate in question. Although this information is not used "as is" for cost allocation purposes, it can be used to gage other generators impact. It should be noted the generator contributions presented in the appendices sections are full contributions, whereas in the body of the report, those contributions take into consideration the commercial probability of each project.

---

## 16.1 Index 1

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC DC	MW IMPACT
2155211	341059	2BARREN CO	EKPC	341651	2HORSECAVE J	EKPC	1	EKPC_P4-2_SSHAD S11-1004	breaker	90.0	159.96	161.48	DC	3.03

Bus #	Bus	MW Impact
940041	AE1-246 C O1	24.92
940042	AE1-246 E O1	12.13
940051	AE1-247 C O1	42.33
940052	AE1-247 E O1	20.96
940831	AE2-071 C O1	1.82
940832	AE2-071 E O1	1.21
BLUEG	BLUEG	0.97
CANNELTON	CANNELTON	0.16
CBM-N	CBM-N	0.01
CBM-S1	CBM-S1	0.9
CBM-S2	CBM-S2	0.28
CBM-W2	CBM-W2	3.07
CPL	CPL	0.09
EDWARDS	EDWARDS	0.0
ELMERSMITH	ELMERSMITH	0.31
G-007A	G-007A	0.03
GIBSON	GIBSON	0.04
MEC	MEC	0.29
NEWTON	NEWTON	0.02
NYISO	NYISO	0.03
TILTON	TILTON	0.04
TRIMBLE	TRIMBLE	0.1
VFT	VFT	0.08

## 16.2 Index 2

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC DC	MW IMPACT
2155403	342322	2SUMM SHADE	EKPC	341431	2EDM-JBGAL J	EKPC	1	EKPC_P4-2_GREEN W45-1014	breaker	46.0	105.87	108.22	DC	2.4

Bus #	Bus	MW Impact
940831	AE2-071 C O1	1.44
940832	AE2-071 E O1	0.96
BLUEG	BLUEG	0.78
CANNELTON	CANNELTON	0.07
CBM-N	CBM-N	0.0
CBM-S1	CBM-S1	0.71
CBM-S2	CBM-S2	0.22
CBM-W1	CBM-W1	0.08
CBM-W2	CBM-W2	3.14
CPLE	CPLE	0.07
ELMERSMITH	ELMERSMITH	0.1
G-007A	G-007A	0.02
GIBSON	GIBSON	0.02
MEC	MEC	0.33
NYISO	NYISO	0.02
TILTON	TILTON	0.02
TRIMBLE	TRIMBLE	0.08
VFT	VFT	0.05
WEC	WEC	0.01

### 16.3 Index 3

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC DC	MW IMPACT
2155982	342718	5COOPER2	EKPC	324141	5ELIHU	LGEE	1	EKPC_P7-1_LAURL 161 DBL	tower	277.0	103.74	105.22	DC	4.12

Bus #	Bus	MW Impact
342900	1COOPER1 G	7.85
342903	1COOPER2 G	15.28
342945	1LAUREL 1G	4.75
939131	AE1-143 C	10.07
939132	AE1-143 E	4.99
940041	AE1-246 C O1	9.04
940042	AE1-246 E O1	4.4
940051	AE1-247 C O1	15.37
940052	AE1-247 E O1	7.61
940831	AE2-071 C O1	2.47
940832	AE2-071 E O1	1.65
CARR	CARR	0.06
CBM-S1	CBM-S1	3.76
CBM-S2	CBM-S2	0.41
CBM-W1	CBM-W1	1.15
CBM-W2	CBM-W2	18.72
CIN	CIN	0.55
CPLE	CPLE	0.08
G-007	G-007	0.17
IPL	IPL	0.22
MEC	MEC	2.26
O-066	O-066	1.09
RENSELAER	RENSELAER	0.05
TRIMBLE	TRIMBLE	0.02
WEC	WEC	0.15

## Affected Systems

## **17 Affected Systems**

### **17.1 LG&E**

LG&E Impacts to be determined during later study phases (as applicable).

### **17.2 MISO**

MISO Impacts to be determined during later study phases (as applicable).

### **17.3 TVA**

TVA Impacts to be determined during later study phases (as applicable).

### **17.4 Duke Energy Progress**

Duke Energy Progress Impacts to be determined during later study phases (as applicable).

### **17.5 NYISO**

NYISO Impacts to be determined during later study phases (as applicable).

Contingency Name	Contingency Definition
<b>EKPC_P4-2_SSHAD S11-1004</b>	CONTINGENCY 'EKPC_P4-2_SSHAD S11-1004' /* SUMMERSHADE OPEN BRANCH FROM BUS 940050 TO BUS 342814 CKT 1 /* 940050 AE1-247 TAP 161.00 342814 5SUMM SHADE 161.00 OPEN BRANCH FROM BUS 342811 TO BUS 342814 CKT 1 /* 342811 5SUMM SHAD T161.00 342814 5SUMM SHADE 161.00 OPEN BRANCH FROM BUS 342733 TO BUS 342814 CKT 1 /* 342733 5GREEN CO 161.00 342814 5SUMM SHADE 161.00 END
<b>EKPC_P1-2_BARR-SUMSH161-B</b>	CONTINGENCY 'EKPC_P1-2_BARR-SUMSH161-B' /* BARREN CO - SUMMERSHADE OPEN BRANCH FROM BUS 940050 TO BUS 342814 CKT 1 /* 940050 AE1-247 TAP 161.00 342814 5SUMM SHADE 161.00 END
<b>EKPC_P4-2_GREEN W45-1014</b>	CONTINGENCY 'EKPC_P4-2_GREEN W45-1014' /* GREEN CO OPEN BUS 342733 /* 5GREEN CO DROPS BUS OPEN BRANCH FROM BUS 342817 TO BUS 342818 CKT 1 /* 342817 5TAYLOR CO J161.00 342818 5TAYLRCO 161.00 OPEN BRANCH FROM BUS 342805 TO BUS 342817 CKT 1 /* 342805 5SALOMA T 161.00 342817 5TAYLOR CO J161.00 OPEN BRANCH FROM BUS 342802 TO BUS 342805 CKT 1 /* 342802 5SALOMA 161.00 342805 5SALOMA T 161.00 OPEN BRANCH FROM BUS 342775 TO BUS 342805 CKT 1 /* 342775 5MARION IP T161.00 342805 5SALOMA T 161.00 OPEN BRANCH FROM BUS 342772 TO BUS 342775 CKT 1 /* 342772 5MARION IP 161.00 342775 5MARION IP T161.00 OPEN BRANCH FROM BUS 342769 TO BUS 342775 CKT 1 /* 342769 5MARION CO 161.00 342775 5MARION IP T161.00 END
<b>Base Case</b>	
<b>EKPC_P7-1_LAURL 161 DBL</b>	CONTINGENCY 'EKPC_P7-1_LAURL 161 DBL' /* LAUREL CO - LAUREL DAM 161 & LAUREL CO - TYNER 161 OPEN BRANCH FROM BUS 342754 TO BUS 342757 CKT 1 /* 342754 5LAUREL CO 161.00 342757 5LAUREL DAM 161.00 OPEN BRANCH FROM BUS 342754 TO BUS 342781 CKT 1 /* 342754 5LAUREL CO 161.00 342781 5PITTSBURG 161.00 OPEN BRANCH FROM BUS 342781 TO BUS 342820 CKT 1 /* 342781 5PITTSBURG 161.00 342820 5TYNER 161.00 END
<b>EKPC_P4-2_SSHAD S11-1044</b>	CONTINGENCY 'EKPC_P4-2_SSHAD S11-1044' /* SUMMERSHADE OPEN BRANCH FROM BUS 940050 TO BUS 342814 CKT 1 /* 940050 AE1-247 TAP 161.00 342814 5SUMM SHADE 161.00 OPEN BRANCH FROM BUS 342700 TO BUS 342811 CKT 1 /* 342700 5BULLITT CO 161.00 342811 5SUMM SHAD T161.00 OPEN BRANCH FROM BUS 342811 TO BUS 360334 CKT 1 /* 342811 5SUMM SHAD T161.00 360334 5SUMMER SHAD161.00 OPEN BRANCH FROM BUS 342811 TO BUS 342814 CKT 1 /* 342811 5SUMM SHAD T161.00 342814 5SUMM SHADE 161.00 END

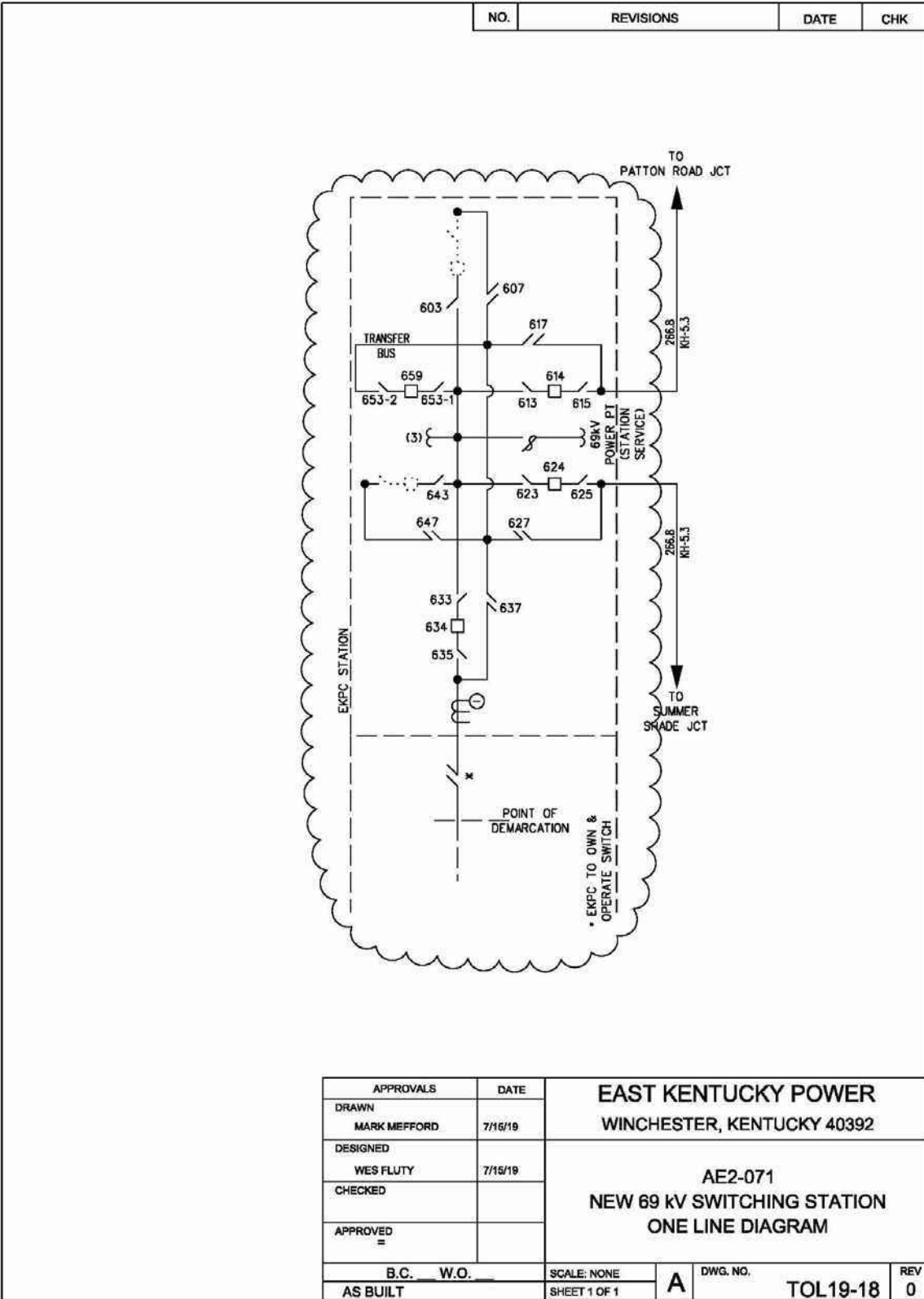


Contingency Name	Contingency Definition
EKPC_P4-5_LAURL S50-1024	CONTINGENCY 'EKPC_P4-5_LAURL S50-1024' /* LAUREL CO OPEN BUS 342754 /* 5LAUREL CO DROPS BUS OPEN BRANCH FROM BUS 324688 TO BUS 342781 CKT 1 /* 324688 2PITTSKU 69.000 342781 5PITTSBURG 161.00 OPEN BRANCH FROM BUS 342781 TO BUS 342820 CKT 1 /* 342781 5PITTSBURG 161.00 342820 STYNER 161.00 END
EKPC_P1-2_LAUR-L DAM161	CONTINGENCY 'EKPC_P1-2_LAUR-L DAM161' /* LAUREL CO - LAUREL DAM OPEN BRANCH FROM BUS 342754 TO BUS 342757 CKT 1 /* 342754 5LAUREL CO 161.00 342757 5LAUREL DAM 161.00 END

# Short Circuit

## 18 Short Circuit

# Attachment 1. Single Line Diagram (Primary POI)



## **Secondary Point of Interconnection:**

AE2-071 will interconnect with the EKPC transmission system at the Summer Shade 69kV substation.

## **Option 2 : Network Impacts**

The Queue Project AE2-071 was evaluated as a 35.0 MW (Capacity 21.0 MW) injection at the Summer Shade 69kV substation in the EKPC area. Project AE2-071 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AE2-071 was studied with a commercial probability of 0.53. Potential network impacts were as follows:

# Summer Peak Load Flow

## 1 Generation Deliverability

(Single or N-1 contingencies for the Capacity portion only of the interconnection)

None

## 2 Multiple Facility Contingency

(Double Circuit Tower Line, Fault with a Stuck Breaker, and Bus Fault contingencies for the full energy output)

None

## 3 Contribution to Previously Identified Overloads

(This project contributes to the following contingency overloads, i.e. "Network Impacts", identified for earlier generation or transmission interconnection projects in the PJM Queue)

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC DC	MW IMPACT
2155211	341059	2BARREN CO	EKPC	341651	2HORSECAVE J	EKPC	1	EKPC_P4-2_SSHAD S11-1004	breaker	90.0	159.96	161.05	DC	2.17
2155212	341059	2BARREN CO	EKPC	341651	2HORSECAVE J	EKPC	1	EKPC_P4-2_SSHAD S11-1044	breaker	90.0	154.78	155.87	DC	2.18
2155616	341059	2BARREN CO	EKPC	341651	2HORSECAVE J	EKPC	1	EKPC_P1-2_BARR-SUMSH161-B	single	90.0	116.31	117.69	DC	1.24
2155403	342322	2SUMM SHADE	EKPC	341431	2EDM-JBGAL J	EKPC	1	EKPC_P4-2_GREEN W45-1014	breaker	46.0	105.87	108.65	DC	2.84
2155431	342718	5SCOOPER2	EKPC	324141	5ELIHU	LGEE	1	EKPC_P4-5_LAURL S50-1024	breaker	277.0	103.73	105.29	DC	4.32
2155982	342718	5SCOOPER2	EKPC	324141	5ELIHU	LGEE	1	EKPC_P7-1_LAURL 161 DBL	tower	277.0	103.76	105.32	DC	4.32

## 4 Potential Congestion due to Local Energy Deliverability

PJM also studied the delivery of the energy portion of this interconnection request. Any problems identified below are likely to result in operational restrictions to the project under study. The developer can proceed with network upgrades to eliminate the operational restriction at their discretion by submitting a Merchant Transmission Interconnection request.

Note: Only the most severely overloaded conditions are listed below. There is no guarantee of full delivery of energy for this project by fixing only the conditions listed in this section. With a Transmission Interconnection Request, a subsequent analysis will be performed which shall study all overload conditions associated with the overloaded element(s) identified.

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC DC	MW IMPACT
2155615	341059	2BARREN CO	EKPC	341651	2HORSECAVE J	EKPC	1	EKPC_P1-2_BARR-SUMSH161-B	operation	90.0	152.85	153.89	DC	2.06
2155805	342718	5COOPER2	EKPC	324141	5ELIHU	LGEE	1	EKPC_P1-2_LAUR-L DAM161	operation	277.0	103.55	105.11	DC	4.33



## 5 Flow Gate Details

The following appendices contain additional information about each flowgate presented in the body of the report. For each appendix, a description of the flowgate and its contingency was included for convenience. However, the intent of the appendix section is to provide more information on which projects/generators have contributions to the flowgate in question. Although this information is not used "as is" for cost allocation purposes, it can be used to gage other generators impact. It should be noted the generator contributions presented in the appendices sections are full contributions, whereas in the body of the report, those contributions take into consideration the commercial probability of each project.

---

## 5.1 Index 1

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC DC	MW IMPACT
2155211	341059	2BARREN CO	EKPC	341651	2HORSECAVE J	EKPC	1	EKPC_P4-2_SSHAD S11-1004	breaker	90.0	159.96	161.05	DC	2.17

Bus #	Bus	MW Impact
940041	AE1-246 C O1	24.92
940042	AE1-246 E O1	12.13
940051	AE1-247 C O1	42.33
940052	AE1-247 E O1	20.96
940831	AE2-071 C O2	1.3
940832	AE2-071 E O2	0.87
BLUEG	BLUEG	0.97
CANNELTON	CANNELTON	0.16
CBM-N	CBM-N	0.01
CBM-S1	CBM-S1	0.9
CBM-S2	CBM-S2	0.28
CBM-W2	CBM-W2	3.07
CPL	CPL	0.09
EDWARDS	EDWARDS	0.0
ELMERSMITH	ELMERSMITH	0.31
G-007A	G-007A	0.03
GIBSON	GIBSON	0.04
MEC	MEC	0.29
NEWTON	NEWTON	0.02
NYISO	NYISO	0.03
TILTON	TILTON	0.04
TRIMBLE	TRIMBLE	0.1
VFT	VFT	0.08

## 5.2 Index 2

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC DC	MW IMPACT
2155403	342322	2SUMM SHADE	EKPC	341431	2EDM-JBGAL J	EKPC	1	EKPC_P4-2_GREEN W45-1014	breaker	46.0	105.87	108.65	DC	2.84

Bus #	Bus	MW Impact
940831	AE2-071 C O2	1.7
940832	AE2-071 E O2	1.14
BLUEG	BLUEG	0.78
CANNELTON	CANNELTON	0.07
CBM-N	CBM-N	0.0
CBM-S1	CBM-S1	0.71
CBM-S2	CBM-S2	0.22
CBM-W1	CBM-W1	0.08
CBM-W2	CBM-W2	3.14
CPLE	CPLE	0.07
ELMERSMITH	ELMERSMITH	0.1
G-007A	G-007A	0.02
GIBSON	GIBSON	0.02
MEC	MEC	0.33
NYISO	NYISO	0.02
TILTON	TILTON	0.02
TRIMBLE	TRIMBLE	0.08
VFT	VFT	0.05
WEC	WEC	0.01

### 5.3 Index 3

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC DC	MW IMPACT
2155982	342718	5COOPER2	EKPC	324141	5ELIHU	LGEE	1	EKPC_P7-1_LAURL 161 DBL	tower	277.0	103.76	105.32	DC	4.32

Bus #	Bus	MW Impact
342900	1COOPER1 G	7.85
342903	1COOPER2 G	15.28
342945	1LAUREL 1G	4.75
939131	AE1-143 C	10.07
939132	AE1-143 E	4.99
940041	AE1-246 C O1	9.04
940042	AE1-246 E O1	4.4
940051	AE1-247 C O1	15.37
940052	AE1-247 E O1	7.61
940831	AE2-071 C O2	2.59
940832	AE2-071 E O2	1.73
CARR	CARR	0.06
CBM-S1	CBM-S1	3.76
CBM-S2	CBM-S2	0.41
CBM-W1	CBM-W1	1.15
CBM-W2	CBM-W2	18.7
CIN	CIN	0.55
CPLE	CPLE	0.08
G-007	G-007	0.17
IPL	IPL	0.22
MEC	MEC	2.26
O-066	O-066	1.09
RENSELAER	RENSELAER	0.05
TRIMBLE	TRIMBLE	0.02
WEC	WEC	0.15

## Affected Systems

## **6 Affected Systems**

### **6.1 LG&E**

LG&E Impacts to be determined during later study phases (as applicable).

### **6.2 MISO**

MISO Impacts to be determined during later study phases (as applicable).

### **6.3 TVA**

TVA Impacts to be determined during later study phases (as applicable).

### **6.4 Duke Energy Progress**

Duke Energy Progress Impacts to be determined during later study phases (as applicable).

### **6.5 NYISO**

NYISO Impacts to be determined during later study phases (as applicable).

Contingency Name	Contingency Definition
<b>EKPC_P4-2_SSHAD S11-1004</b>	CONTINGENCY 'EKPC_P4-2_SSHAD S11-1004' /* SUMMERSHADE OPEN BRANCH FROM BUS 940050 TO BUS 342814 CKT 1 /* 940050 AE1-247 TAP 161.00 342814 5SUMM SHADE 161.00 OPEN BRANCH FROM BUS 342811 TO BUS 342814 CKT 1 /* 342811 5SUMM SHAD T161.00 342814 5SUMM SHADE 161.00 OPEN BRANCH FROM BUS 342733 TO BUS 342814 CKT 1 /* 342733 5GREEN CO 161.00 342814 5SUMM SHADE 161.00 END
<b>EKPC_P1-2_BARR-SUMSH161-B</b>	CONTINGENCY 'EKPC_P1-2_BARR-SUMSH161-B' /* BARREN CO - SUMMERSHADE OPEN BRANCH FROM BUS 940050 TO BUS 342814 CKT 1 /* 940050 AE1-247 TAP 161.00 342814 5SUMM SHADE 161.00 END
<b>EKPC_P4-2_GREEN W45-1014</b>	CONTINGENCY 'EKPC_P4-2_GREEN W45-1014' /* GREEN CO OPEN BUS 342733 /* 5GREEN CO DROPS BUS OPEN BRANCH FROM BUS 342817 TO BUS 342818 CKT 1 /* 342817 5TAYLOR CO J161.00 342818 5TAYLRCO 161.00 OPEN BRANCH FROM BUS 342805 TO BUS 342817 CKT 1 /* 342805 5SALOMA T 161.00 342817 5TAYLOR CO J161.00 OPEN BRANCH FROM BUS 342802 TO BUS 342805 CKT 1 /* 342802 5SALOMA 161.00 342805 5SALOMA T 161.00 OPEN BRANCH FROM BUS 342775 TO BUS 342805 CKT 1 /* 342775 5MARION IP T161.00 342805 5SALOMA T 161.00 OPEN BRANCH FROM BUS 342772 TO BUS 342775 CKT 1 /* 342772 5MARION IP 161.00 342775 5MARION IP T161.00 OPEN BRANCH FROM BUS 342769 TO BUS 342775 CKT 1 /* 342769 5MARION CO 161.00 342775 5MARION IP T161.00 END
<b>EKPC_P7-1_LAURL 161 DBL</b>	CONTINGENCY 'EKPC_P7-1_LAURL 161 DBL' /* LAUREL CO - LAUREL DAM 161 & LAUREL CO - TYNER 161 OPEN BRANCH FROM BUS 342754 TO BUS 342757 CKT 1 /* 342754 5LAUREL CO 161.00 342757 5LAUREL DAM 161.00 OPEN BRANCH FROM BUS 342754 TO BUS 342781 CKT 1 /* 342754 5LAUREL CO 161.00 342781 5PITTSBURG 161.00 OPEN BRANCH FROM BUS 342781 TO BUS 342820 CKT 1 /* 342781 5PITTSBURG 161.00 342820 5TYNER 161.00 END
<b>EKPC_P4-2_SSHAD S11-1044</b>	CONTINGENCY 'EKPC_P4-2_SSHAD S11-1044' /* SUMMERSHADE OPEN BRANCH FROM BUS 940050 TO BUS 342814 CKT 1 /* 940050 AE1-247 TAP 161.00 342814 5SUMM SHADE 161.00 OPEN BRANCH FROM BUS 342700 TO BUS 342811 CKT 1 /* 342700 5BULLITT CO 161.00 342811 5SUMM SHAD T161.00 OPEN BRANCH FROM BUS 342811 TO BUS 360334 CKT 1 /* 342811 5SUMM SHAD T161.00 360334 5SUMMER SHAD161.00 OPEN BRANCH FROM BUS 342811 TO BUS 342814 CKT 1 /* 342811 5SUMM SHAD T161.00 342814 5SUMM SHADE 161.00 END

Contingency Name	Contingency Definition
EKPC_P4-5_LAURL S50-1024	CONTINGENCY 'EKPC_P4-5_LAURL S50-1024' /* LAUREL CO OPEN BUS 342754 /* 5LAUREL CO DROPS BUS OPEN BRANCH FROM BUS 324688 TO BUS 342781 CKT 1 /* 324688 2PITTSKU 69.000 342781 5PITTSBURG 161.00 OPEN BRANCH FROM BUS 342781 TO BUS 342820 CKT 1 /* 342781 5PITTSBURG 161.00 342820 STYNER 161.00 END
EKPC_P1-2_LAUR-L DAM161	CONTINGENCY 'EKPC_P1-2_LAUR-L DAM161' /* LAUREL CO - LAUREL DAM OPEN BRANCH FROM BUS 342754 TO BUS 342757 CKT 1 /* 342754 5LAUREL CO 161.00 342757 5LAUREL DAM 161.00 END



# Short Circuit

## 7 Short Circuit

None



# **Generation Interconnection**

## **Feasibility Study Report**

**for**

### **Queue Project AF1-203**

**PATTON RD-SUMMER SHADE 69 KV**

**12 MW Capacity / 20 MW Energy**

January, 2020

# Table of Contents

1	Preface.....	4
2	General.....	5
2.1	Point of Interconnection .....	6
2.2	Cost Summary.....	6
3	Transmission Owner Scope of Work.....	7
4	Attachment Facilities .....	7
5	Direct Connection Cost Estimate.....	7
6	Non-Direct Connection Cost Estimate.....	7
7	Incremental Capacity Transfer Rights (ICTRs) .....	8
8	Interconnection Customer Requirements.....	8
9	Revenue Metering and SCADA Requirements .....	8
9.1	PJM Requirements .....	8
9.2	EKPC Requirements.....	8
10	Revenue Metering and SCADA Requirements .....	8
10.1	PJM Requirements.....	8
10.2	EKPC Requirements.....	8
11	Network Impacts.....	9
12	Generation Deliverability .....	11
13	Multiple Facility Contingency .....	11
14	Contribution to Previously Identified Overloads .....	11
15	Potential Congestion due to Local Energy Deliverability.....	13
16	System Reinforcements.....	15
17	Flow Gate Details .....	18
17.1	Index 1 .....	19
17.2	Index 2 .....	20
17.3	Index 3 .....	21
17.4	Index 4 .....	22
17.5	Index 5 .....	23
17.6	Index 6 .....	24
17.7	Index 7 .....	25
17.8	Index 8 .....	26

17.9	Index 9 .....	27
17.10	Index 10.....	28
17.11	Index 11.....	29
18	Affected Systems .....	31
18.1	LG&E.....	31
18.2	MISO .....	31
18.3	TVA.....	31
18.4	Duke Energy Progress.....	31
18.5	NYISO .....	31
19	Contingency Descriptions.....	32
20	Short Circuit.....	35
21	Single Line Diagram .....	36

## 1 Preface

The intent of the feasibility study is to determine a plan, with ballpark cost and construction time estimates, to connect the subject generation to the PJM network at a location specified by the Interconnection Customer. The Interconnection Customer may request the interconnection of generation as a capacity resource or as an energy-only resource. As a requirement for interconnection, the Interconnection Customer may be responsible for the cost of constructing: (1) Direct Connections, which are new facilities and/or facilities upgrades needed to connect the generator to the PJM network, and (2) Network Upgrades, which are facility additions, or upgrades to existing facilities, that are needed to maintain the reliability of the PJM system.

In some instances a generator interconnection may not be responsible for 100% of the identified network upgrade cost because other transmission network uses, e.g. another generation interconnection, may also contribute to the need for the same network reinforcement. Cost allocation rules for network upgrades can be found in PJM Manual 14A, Attachment B. The possibility of sharing the reinforcement costs with other projects may be identified in the feasibility study, but the actual allocation will be deferred until the impact study is performed.

The Interconnection Customer seeking to interconnect a wind or solar generation facility shall maintain meteorological data facilities as well as provide that meteorological data which is required per Schedule H to the Interconnection Service Agreement and Section 8 of Manual 14D.

PJM utilizes manufacturer models to ensure the performance of turbines is properly captured during the simulations performed for stability verification and, where applicable, for compliance with low voltage ride through requirements. Turbine manufacturers provide such models to their customers. The list of manufacturer models PJM has already validated is contained in Attachment B of Manual 14G. Manufacturer models may be updated from time to time, for various reasons such as to reflect changes to the control systems or to more accurately represent the capabilities turbines and controls which are currently available in the field. Additionally, as new turbine models are developed, turbine manufacturers provide such new models which must be used in the conduct of these studies. PJM needs adequate time to evaluate the new models in order to reduce delays to the System Impact Study process timeline for the Interconnection Customer as well as other Interconnection Customers in the study group. Therefore, PJM will require that any Interconnection Customer with a new manufacturer model must supply that model to PJM, along with a \$10,000 fully refundable deposit, no later than three (3) months prior to the starting date of the System Impact Study (See Section 4.3 for starting dates) for the Interconnection Request which shall specify the use of the new model. The Interconnection Customer will be required to submit a completed dynamic model study request form (Attachment B-1 of Manual 14G) in order to document the request for the study.

The Feasibility Study estimates do not include the feasibility, cost, or time required to obtain property rights and permits for construction of the required facilities. The project developer is responsible for the right of way, real estate, and construction permit issues. For properties currently owned by Transmission Owners, the costs may be included in the study.

## 2 General

The Interconnection Customer (IC), has proposed an uprate (Storage generating facility) to an existing Solar generating facility (AE2-071) located in Metcalfe County, KY. This projects requests an increase to the install capability of 20 uprate MW with 12 of uprate MW of this output being recognized by PJM as Capacity. The installed facilities will have a total capability of 55 MW with 33 MW of this output being recognized by PJM as Capacity. The proposed in-service date for this project is 12/31/2022. This study does not imply a TO commitment to this in-service date.

<b>Queue Number</b>	<b>AF1-203</b>
<b>Project Name</b>	PATTON RD-SUMMER SHADE 69 KV
<b>State</b>	Kentucky
<b>County</b>	Metcalfe
<b>Transmission Owner</b>	EKPC
<b>MFO</b>	55
<b>MWE</b>	20
<b>MWC</b>	12
<b>Fuel</b>	Solar
<b>Basecase Study Year</b>	2023

## 2.1 Point of Interconnection

AF1-203 will interconnect with the EKPC transmission system tapping the Patton Rd Jct. to Summer Shade Jct. 69 kV line.

## 2.2 Cost Summary

The AF1-203 project will be responsible for the following costs:

Description	Total Cost
Attachment Facilities	\$0
Direct Connection Network Upgrade	\$0
Non Direct Connection Network Upgrades	\$0
<b>Total Costs</b>	<b>\$0</b>

In addition, the AF1-203 project may be responsible for a contribution to the following costs

Description	Total Cost
System Upgrades	\$14,325,000

Cost allocations for these upgrades will be provided in the System Impact Study Report.



### **3 Transmission Owner Scope of Work**

#### **4 Attachment Facilities**

The total preliminary cost estimate for the Attachment work is given in the table below. These costs do not include CIAC Tax Gross-up.

No additional TO attachment facilities required beyond those identified for AE2-071.

#### **5 Direct Connection Cost Estimate**

The total preliminary cost estimate for the Direct Connection work is given in the table below. These costs do not include CIAC Tax Gross-up.

No additional direct connection network upgrades required beyond those identified for AE2-071.

#### **6 Non-Direct Connection Cost Estimate**

The total preliminary cost estimate for the Non-Direct Connection work is given in the table below. These costs do not include CIAC Tax Gross-up.

No additional direct connection network upgrades required beyond those identified for AE2-071.

## 7 Incremental Capacity Transfer Rights (ICTRs)

Will be determined at a later study phase

## 8 Interconnection Customer Requirements

1. An Interconnection Customer entering the New Services Queue on or after October 1, 2012 with a proposed new Customer Facility that has a Maximum Facility Output equal to or greater than 100 MW shall install and maintain, at its expense, phasor measurement units (PMUs). See Section 8.5.3 of Appendix 2 to the Interconnection Service Agreement as well as section 4.3 of PJM Manual 14D for additional information.
2. The Interconnection Customer may be required to install and/or pay for metering as necessary to properly track real time output of the facility as well as installing metering which shall be used for billing purposes. See Section 8 of Appendix 2 to the Interconnection Service Agreement as well as Section 4 of PJM Manual 14D for additional information.

## 9 Revenue Metering and SCADA Requirements

### 9.1 PJM Requirements

The Interconnection Customer will be required to install equipment necessary to provide Revenue Metering (KWH, KVARH) and real time data (KW, KVAR) for IC's generating Resource. See PJM Manuals M-01 and M-14D, and PJM Tariff Sections 24.1 and 24.2.

### 9.2 EKPC Requirements

The Interconnection Customer will be required to comply with all EKPC Revenue Metering Requirements for Generation Interconnection Customers. The Revenue Metering Requirements may be found within the "EKPC Facility Connection Requirements" document located at the following link:

<http://www.pjm.com/planning/design-engineering/to-tech-standards/ekpc.aspx>

## 10 Revenue Metering and SCADA Requirements

### 10.1 PJM Requirements

The Interconnection Customer will be required to install equipment necessary to provide Revenue Metering (KWH, KVARH) and real time data (KW, KVAR) for IC's generating Resource. See PJM Manuals M-01 and M-14D, and PJM Tariff Section 8 of Attachment O.

### 10.2 EKPC Requirements

[Please enter any TO revenue metering and SCADA Requirements]

## 11 Network Impacts

The Queue Project AF1-203 was evaluated as a 20.0 MW (Capacity 12.0 MW) injection tapping the Patton Rd Jct. to Summer Shade Jct. 69 kV line in the EKPC area. Project AF1-203 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AF1-203 was studied with a commercial probability of 0.53. Potential network impacts were as follows:

# Summer Peak Load Flow

## 12 Generation Deliverability

(Single or N-1 contingencies for the Capacity portion only of the interconnection)

None

## 13 Multiple Facility Contingency

(Double Circuit Tower Line, Fault with a Stuck Breaker, and Bus Fault contingencies for the full energy output)

None

## 14 Contribution to Previously Identified Overloads

(This project contributes to the following contingency overloads, i.e. "Network Impacts", identified for earlier generation or transmission interconnection projects in the PJM Queue)

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJE CT LOADIN G %	POST PROJE CT LOADIN G %	AC D C	MW IMPAC T
41615269	341059	2BARREN CO	69.0	EKPC	341651	2HORSECAV EJ	69.0	EKPC	1	EKPC_P4-2_SSHAD S11-1004	breaker	90.0	203.3	203.97	DC	1.34
41615270	341059	2BARREN CO	69.0	EKPC	341651	2HORSECAV EJ	69.0	EKPC	1	EKPC_P4-2_SSHAD S11-1044	breaker	90.0	197.73	198.41	DC	1.34
41845978	341059	2BARREN CO	69.0	EKPC	341651	2HORSECAV EJ	69.0	EKPC	1	EKPC_P2-2_SUMMSHA DE 161 #2-B	bus	90.0	206.56	207.27	DC	1.42
41845979	341059	2BARREN CO	69.0	EKPC	341651	2HORSECAV EJ	69.0	EKPC	1	EKPC_P2-3_SSHAD S11-1004-C	bus	90.0	203.3	203.97	DC	1.34
41845980	341059	2BARREN CO	69.0	EKPC	341651	2HORSECAV EJ	69.0	EKPC	1	EKPC_P2-3_SSHAD S11-1044-B	bus	90.0	197.73	198.41	DC	1.34
41615728	341158	2BONNIV DIST	69.0	EKPC	341161	2BONNIV EK	69.0	EKPC	1	EKPC_P4-2_SSHAD S11-1004	breaker	98.0	116.91	117.53	DC	1.34
41615729	341158	2BONNIV DIST	69.0	EKPC	341161	2BONNIV EK	69.0	EKPC	1	EKPC_P4-2_SSHAD S11-1044	breaker	98.0	111.8	112.41	DC	1.34
41846252	341158	2BONNIV DIST	69.0	EKPC	341161	2BONNIV EK	69.0	EKPC	1	EKPC_P2-2_SUMMSHA DE 161 #2-B	bus	98.0	119.8	120.45	DC	1.42
41846253	341158	2BONNIV DIST	69.0	EKPC	341161	2BONNIV EK	69.0	EKPC	1	EKPC_P2-3_SSHAD S11-1004-C	bus	98.0	116.91	117.53	DC	1.34
41846254	341158	2BONNIV DIST	69.0	EKPC	341161	2BONNIV EK	69.0	EKPC	1	EKPC_P2-3_SSHAD S11-1044-B	bus	98.0	111.8	112.41	DC	1.34
41615866	341431	2EDM-JBGAL J	69.0	EKPC	341728	2KNOB LICK	69.0	EKPC	1	EKPC_P4-2_GREEN W45-1014	breaker	46.0	104.71	106.25	DC	1.57
41846342	341431	2EDM-JBGAL J	69.0	EKPC	341728	2KNOB LICK	69.0	EKPC	1	EKPC_P2-3_GREEN W45-1014-A	bus	46.0	104.71	106.25	DC	1.57
41846343	341431	2EDM-JBGAL J	69.0	EKPC	341728	2KNOB LICK	69.0	EKPC	1	EKPC_P2-3_GREEN W45-1014	bus	46.0	104.49	106.03	DC	1.57

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CK T ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADIN G %	POST PROJECT LOADIN G %	AC/D C	MW IMPAC T
41615551	341651	2HORSECAVEJ	69.0	EKPC	341914	2MUNFVILKUT	69.0	EKPC	1	EKPC_P4-2_SSHAD S11-1004	breaker	98.0	133.03	133.65	DC	1.34
41615552	341651	2HORSECAVEJ	69.0	EKPC	341914	2MUNFVILKUT	69.0	EKPC	1	EKPC_P4-2_SSHAD S11-1044	breaker	98.0	127.82	128.43	DC	1.34
41846158	341651	2HORSECAVEJ	69.0	EKPC	341914	2MUNFVILKUT	69.0	EKPC	1	EKPC_P2-2_SUMMSHADE 161 #2-B	bus	98.0	135.92	136.57	DC	1.42
41846159	341651	2HORSECAVEJ	69.0	EKPC	341914	2MUNFVILKUT	69.0	EKPC	1	EKPC_P2-3_SSHAD S11-1004-C	bus	98.0	133.03	133.65	DC	1.34
41846160	341651	2HORSECAVEJ	69.0	EKPC	341914	2MUNFVILKUT	69.0	EKPC	1	EKPC_P2-3_SSHAD S11-1044-B	bus	98.0	127.82	128.43	DC	1.34
41615698	341908	2MUNFVILEK	69.0	EKPC	341158	2BONNIVDIST	69.0	EKPC	1	EKPC_P4-2_SSHAD S11-1004	breaker	98.0	119.36	119.98	DC	1.34
41615699	341908	2MUNFVILEK	69.0	EKPC	341158	2BONNIVDIST	69.0	EKPC	1	EKPC_P4-2_SSHAD S11-1044	breaker	98.0	114.14	114.76	DC	1.34
41846237	341908	2MUNFVILEK	69.0	EKPC	341158	2BONNIVDIST	69.0	EKPC	1	EKPC_P2-2_SUMMSHADE 161 #2-B	bus	98.0	122.24	122.9	DC	1.42
41846238	341908	2MUNFVILEK	69.0	EKPC	341158	2BONNIVDIST	69.0	EKPC	1	EKPC_P2-3_SSHAD S11-1004-C	bus	98.0	119.36	119.98	DC	1.34
41846239	341908	2MUNFVILEK	69.0	EKPC	341158	2BONNIVDIST	69.0	EKPC	1	EKPC_P2-3_SSHAD S11-1044-B	bus	98.0	114.14	114.76	DC	1.34
41615618	341914	2MUNFVILKUT	69.0	EKPC	341908	2MUNFVILEK	69.0	EKPC	1	EKPC_P4-2_SSHAD S11-1004	breaker	98.0	125.99	126.61	DC	1.34
41615619	341914	2MUNFVILKUT	69.0	EKPC	341908	2MUNFVILEK	69.0	EKPC	1	EKPC_P4-2_SSHAD S11-1044	breaker	98.0	120.78	121.39	DC	1.34
41846192	341914	2MUNFVILKUT	69.0	EKPC	341908	2MUNFVILEK	69.0	EKPC	1	EKPC_P2-2_SUMMSHADE 161 #2-B	bus	98.0	128.88	129.53	DC	1.42
41846193	341914	2MUNFVILKUT	69.0	EKPC	341908	2MUNFVILEK	69.0	EKPC	1	EKPC_P2-3_SSHAD S11-1004-C	bus	98.0	125.99	126.61	DC	1.34
41846194	341914	2MUNFVILKUT	69.0	EKPC	341908	2MUNFVILEK	69.0	EKPC	1	EKPC_P2-3_SSHAD S11-1044-B	bus	98.0	120.78	121.39	DC	1.34
41025675	342286	2SOMERSETKU	69.0	EKPC	342287	2SOMERSETKU	69.0	EKPC	1	EKPC_P7-1_COOP 161 DBL 2	tower	115.0	123.76	124.33	DC	1.45
41025575	342287	2SOMERSETKU	69.0	EKPC	324531	2FERGUSONSO	69.0	LGEE	1	EKPC_P7-1_COOP 161 DBL 2	tower	105.0	144.49	145.28	DC	1.84
41615558	342319	2SUMMSHADJ	69.0	EKPC	342322	2SUMMSHADE	69.0	EKPC	1	EKPC_P4-2_SSHAD S11-1004	breaker	98.0	116.3	131.45	DC	14.85
41846188	342319	2SUMMSHADJ	69.0	EKPC	342322	2SUMMSHADE	69.0	EKPC	1	EKPC_P2-3_SSHAD S11-1004-C	bus	98.0	116.3	131.45	DC	14.85
41846189	342319	2SUMMSHADJ	69.0	EKPC	342322	2SUMMSHADE	69.0	EKPC	1	EKPC_P2-2_SUMMSHADE 161 #2-B	bus	98.0	115.33	130.45	DC	14.82
41615711	342322	2SUMMSHADE	69.0	EKPC	341431	2EDM-JBGALJ	69.0	EKPC	1	EKPC_P4-2_GREEN W45-1014	breaker	46.0	117.1	118.64	DC	1.57
41846268	342322	2SUMMSHADE	69.0	EKPC	341431	2EDM-JBGALJ	69.0	EKPC	1	EKPC_P2-3_GREEN W45-1014-A	bus	46.0	117.1	118.64	DC	1.57

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CK T ID	CONT NAME	Type	Rating MVA	PRE PROJE CT LOADIN G %	POST PROJE CT LOADIN G %	AC D C	MW IMPAC T
41846269	342322	2SUMM SHADE	69.0	EKPC	341431	2EDM-JBGAL J	69.0	EKPC	1	EKPC_P2-3_GREEN W45-1014	bus	46.0	116.88	118.42	DC	1.57
41615418	940830	AE2-071 TAP	69.0	EKPC	342319	2SUMM SHAD J	69.0	EKPC	1	EKPC_P4-2_SSHAD S11-1004	breaker	63.0	123.91	149.7	DC	16.25
41846109	940830	AE2-071 TAP	69.0	EKPC	342319	2SUMM SHAD J	69.0	EKPC	1	EKPC_P2-3_SSHAD S11-1004-C	bus	63.0	123.91	149.7	DC	16.25
41846110	940830	AE2-071 TAP	69.0	EKPC	342319	2SUMM SHAD J	69.0	EKPC	1	EKPC_P2-2_SUMMSHA DE 161 #2-B	bus	63.0	123.21	148.98	DC	16.23

## 15 Potential Congestion due to Local Energy Deliverability

PJM also studied the delivery of the energy portion of this interconnection request. Any problems identified below are likely to result in operational restrictions to the project under study. The developer can proceed with network upgrades to eliminate the operational restriction at their discretion by submitting a Merchant Transmission Interconnection request.

Note: Only the most severely overloaded conditions are listed below. There is no guarantee of full delivery of energy for this project by fixing only the conditions listed in this section. With a Transmission Interconnection Request, a subsequent analysis will be performed which shall study all overload conditions associated with the overloaded element(s) identified.

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CK T ID	CONT NAME	Type	Rating MVA	PRE PROJE CT LOADIN G %	POST PROJE CT LOADIN G %	AC D C	MW IMPAC T
41293698	341059	2BARREN CO	69.0	EKPC	341651	2HORSECAV E J	69.0	EKPC	1	EKPC_P1-2_BARR-SUMSH16 1-C	operation	90.0	195.61	196.24	DC	1.28
41293702	341059	2BARREN CO	69.0	EKPC	341651	2HORSECAV E J	69.0	EKPC	1	Base Case	operation	77.0	103.64	104.29	DC	1.12
41294384	341158	2BONNIV DIST	69.0	EKPC	341161	2BONNIV EK	69.0	EKPC	1	EKPC_P1-2_BARR-SUMSH16 1-C	operation	98.0	109.84	110.43	DC	1.28
41294168	341651	2HORSECAV E J	69.0	EKPC	341914	2MUNFVILK U T	69.0	EKPC	1	EKPC_P1-2_BARR-SUMSH16 1-C	operation	98.0	125.96	126.55	DC	1.28
41294344	341908	2MUNFVIL EK	69.0	EKPC	341158	2BONNIV DIST	69.0	EKPC	1	EKPC_P1-2_BARR-SUMSH16 1-C	operation	98.0	112.29	112.88	DC	1.28
41294279	341914	2MUNFVILK U T	69.0	EKPC	341908	2MUNFVIL EK	69.0	EKPC	1	EKPC_P1-2_BARR-SUMSH16 1-C	operation	98.0	118.92	119.51	DC	1.28
41294126	342319	2SUMM SHAD J	69.0	EKPC	342322	2SUMM SHADE	69.0	EKPC	1	EKPC_P1-2_BARR-SUMSH16 1-C	operation	98.0	114.64	129.78	DC	14.84

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC/DC	MW IMPACT
42523239	342757	5LAUREL DAM	161.0	EKPC	342754	5LAUREL CO	161.0	EKPC	1	EKPC_P1-2_COOP-ELIHU161	operation	200.0	99.87	100.11	DC	1.05
42523204	342775	5MARION IPT	161.0	EKPC	342769	5MARION CO	161.0	EKPC	1	Base Case	operation	84.0	101.89	102.88	DC	1.84
41293945	940830	AE2-071 TAP	69.0	EKPC	342319	2SUMM SHAD J	69.0	EKPC	1	EKPC_P1-2_BARR-SUMSH16 1-C	operation	63.0	122.46	148.24	DC	16.24



## 16 System Reinforcements

ID	Index	Facility	Upgrade Description	Cost
41025675	7	2SOMERSET 69.0 kV - 2SOMERSET KU 69.0 kV Ckt 1	r0080 (82) : Replace the 500 MCM copper jumpers at the Somerset substation using 750 MCM copper or equivalent Project Type : FAC Cost : \$10,000 Time Estimate : 6.0 Months	\$10,000
41615866,41846342, 41846343	3	2EDM-JBGAL J 69.0 kV - 2KNOB LICK 69.0 kV Ckt 1	r0049 (51) : Increase the maximum operating temperature of the 266 MCM ACSR conductor in the Edmonton/JB Galloway Jct-Knob Lick 6 9kV line section to 176 degrees F (5.7 miles) Project Type : FAC Cost : \$310,000 Time Estimate : 12.0 Months	\$310,000
41025575	8	2SOMERSET KU 69.0 kV - 2FERGUSON SO 69.0 kV Ckt 1	r0078 (80) : Replace the 1200A current transformer at Somerset with a 2000A current transformer. Project Type : FAC Cost : \$35,000 Time Estimate : 6.0 Months  NonPJM Area: The external (i.e. Non-PJM) Transmission Owner, LGEE, will not evaluate this violation until the impact study phase.	\$35,000
41845980,41615270, 41845979,41615269, 41845978	1	2BARREN CO 69.0 kV - 2HORSECAVE J 69.0 kV Ckt 1	N6197.1 (1) : Upgrade CT associated with Barren Co-Horsecave Jct 69kV line section to minimum 166 MVA Summer LTE Project Type : FAC Cost : \$0 Time Estimate : 6.0 Months  N6197.2 (2) : Upgrade jumpers associated with Barren Co 69kV bus to 2-500 MCM 37 CU conductor Project Type : FAC Cost : \$10,000 Time Estimate : 6.0 Months  r0022 (24) : Rebuild the Barren County-Horse Cave Junction 69 kV line section using 954 MCM ACSS conductor at 392 degrees F (3.9 miles) Project Type : FAC Cost : \$3,900,000 Time Estimate : 15.0 Months  r0023 (25) : Replace the 1200A circuit breaker W59-614 at Barren County with a 2000A circuit breaker Project Type : FAC Cost : \$125,000 Time Estimate : 9.0 Months  r0024 (26) : Replace the 1200A disconnect switches W59-613 and W59-615 at Barren County substation and W611-605 at Horse Cave Junction Project Type : FAC Cost : \$300,000 Time Estimate : 12.0 Months	\$4,335,000

ID	Index	Facility	Upgrade Description	Cost
41615711,41846269, 41846268	10	2SUMM SHADE 69.0 kV - 2EDM-JBGAL J 69.0 kV Ckt 1	r0004 (5) : Increase the maximum operating temperature of the Summershade-Edm. JB Galloway Jct 69kV line section 266 MCM conductor to 212F (~7.9 miles) Project Type : FAC Cost : \$525,000 Time Estimate : 12.0 Months	\$525,000
41615728,41615729, 41846254,41846252, 41846253	2	2BONNIV DIST 69.0 kV - 2BONNIV EK 69.0 kV Ckt 1	r0028 (30) : Replace the 556 MCM ACSR conductor (~50 feet) in the line section using 795 MCM ACSR conductor at 212 degrees F Project Type : FAC Cost : \$10,000 Time Estimate : 6.0 Months	\$10,000
41846110,41615418, 41846109	11	AE2-071 TAP 69.0 kV - 2SUMM SHAD J 69.0 kV Ckt 1	r0071 (73) : Rebuild the AE2-071-Summer Shade 69 kV line section using 795 MCM ACSR conductor at 212 degrees F (1.7 miles) Project Type : FAC Cost : \$2,110,000 Time Estimate : 16.0 Months	\$2,110,000
41615558,41846188, 41846189	9	2SUMM SHAD J 69.0 kV - 2SUMM SHADE 69.0 kV Ckt 1	r0065 (67) : Increase the maximum operating temperature of the 556 MCM ACSR conductor in the Summer Shade-Summer Shade Junction 69 kV line section to 302 degrees F (0.2 mile) Project Type : FAC Cost : \$10,000 Time Estimate : 6.0 Months  r0066 (68) : Change the current transformer setting at Summer Shade associated with circuit breaker S11-634 from 600A to 800A. Project Type : FAC Cost : \$10,000 Time Estimate : 6.0 Months  r0067 (69) : Replace the 500 MCM copper bus and jumpers at the Summer Shade substation using 750 MCM copper or equivalent Project Type : FAC Cost : \$120,000 Time Estimate : 6.0 Months  r0068 (70) : Change the Zone 3 relay setting at Summer Shade associated with the line protection to at least 132 MVA LTE rating. Project Type : FAC Cost : \$0 Time Estimate : 6.0 Months	\$140,000
41846193,41846192, 41615618,41615619, 41846194	6	2MUNFVILKU T 69.0 kV - 2MUNFVIL EK 69.0 kV Ckt 1	r0051 (53) : Increase the maximum operating temperature of the 556 MCM ACSR conductor in the Munfordville KU Tap-Munfordville EK 69 kV line section to 302 degrees F (2.0 miles) Project Type : FAC Cost : \$140,000 Time Estimate : 7.0 Months	\$140,000

ID	Index	Facility	Upgrade Description	Cost
41615552,41615551, 41846159,41846158, 41846160	4	2HORSECAVE J 69.0 kV - 2MUNFVILKU T 69.0 kV Ckt 1	<p>r0035 (37) : Increase the maximum operating temperature of the 556 MCM ACSR conductor in the KU Horse Cave Junction-Munfordville KU Tap 69 kV line section to 302 degrees F (6.8 miles) Project Type : FAC Cost : \$460,000 Time Estimate : 9.0 Months</p> <p>r0055 (57) : Rebuild the Horse Cave Junction-Munfordville KU 69 kV line section using 954 MCM ACSR conductor at 212 degrees F (6.8 miles) Project Type : FAC Cost : \$6,160,000 Time Estimate : 20.0 Months</p>	\$6,160,000
41846238,41846237, 41615698,41615699, 41846239	5	2MUNFVIL EK 69.0 kV - 2BONNIV DIST 69.0 kV Ckt 1	<p>r0021 (23) : Increase the maximum operating temperature of the 556 MCM ACSR conductor in the Bonnieville Dist.-Munfordville EK 69 kV line section to 302 degrees F (8.2 miles) Project Type : FAC Cost : \$550,000 Time Estimate : 9.0 Months</p>	\$550,000
			<b>TOTAL COST</b>	<b>\$14,325,000</b>

## 17 Flow Gate Details

The following indices contain additional information about each flowgate presented in the body of the report. For each index, a description of the flowgate and its contingency was included for convenience. However, the intent of the appendix section is to provide more information on which projects/generators have contributions to the flowgate in question. Although this information is not used "as is" for cost allocation purposes, it can be used to gage other generators impact. It should be noted the generator contributions presented in the appendices sections are full contributions, whereas in the body of the report, those contributions take into consideration the commercial probability of each project.

---

## 17.1 Index 1

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC DC	MW IMPACT
41845978	341059	2BARREN CO	EKPC	341651	2HORSECAVE J	EKPC	1	EKPC_P2-2_SUMMSHADE 161 #2-B	bus	90.0	206.56	207.27	DC	1.42

Bus #	Bus	MW Impact
940041	AE1-246 C O1	25.1728
940042	AE1-246 E O1	12.2588
940051	AE1-247 C O1	42.7656
940052	AE1-247 E O1	21.1800
940831	AE2-071 C	1.2718
940832	AE2-071 E	0.8479
944981	AF1-163 C O1 (Withdrawn : 12/11/2019)	23.6755
944982	AF1-163 E O1 (Withdrawn : 12/11/2019)	13.7561
945381	AF1-203 C	0.3852
945382	AF1-203 E	0.2568
NEWTON	NEWTON	0.0118
CPLE	CPLE	0.1039
G-007A	G-007A	0.0384
VFT	VFT	0.1032
CBM-W2	CBM-W2	1.3186
CBM-W1	CBM-W1	0.0125
TVA	TVA	0.6678
CBM-S2	CBM-S2	1.1733
EDWARDS	EDWARDS	0.0028
CBM-S1	CBM-S1	2.7946
TILTON	TILTON	0.0460
MADISON	MADISON	0.3871
MEC	MEC	0.1192
GIBSON	GIBSON	0.1267
BLUEG	BLUEG	0.5139
TRIMBLE	TRIMBLE	0.1519

## 17.2 Index 2

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC DC	MW IMPACT
41846252	341158	2BONNIV DIST	EKPC	341161	2BONNIV EK	EKPC	1	EKPC_P2-2_SUMMSHADE 161 #2-B	bus	98.0	119.8	120.45	DC	1.42

Bus #	Bus	MW Impact
940041	AE1-246 C O1	25.1728
940042	AE1-246 E O1	12.2588
940051	AE1-247 C O1	42.7656
940052	AE1-247 E O1	21.1800
940831	AE2-071 C	1.2718
940832	AE2-071 E	0.8479
944981	AF1-163 C O1 (Withdrawn : 12/11/2019)	23.6755
944982	AF1-163 E O1 (Withdrawn : 12/11/2019)	13.7561
945381	AF1-203 C	0.3852
945382	AF1-203 E	0.2568
NEWTON	NEWTON	0.0118
CPLE	CPLE	0.1039
G-007A	G-007A	0.0384
VFT	VFT	0.1032
CBM-W2	CBM-W2	1.3186
CBM-W1	CBM-W1	0.0125
TVA	TVA	0.6678
CBM-S2	CBM-S2	1.1733
EDWARDS	EDWARDS	0.0028
CBM-S1	CBM-S1	2.7946
TILTON	TILTON	0.0460
MADISON	MADISON	0.3871
MEC	MEC	0.1192
GIBSON	GIBSON	0.1267
BLUEG	BLUEG	0.5139
TRIMBLE	TRIMBLE	0.1519

### 17.3 Index 3

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC DC	MW IMPACT
41846343	341431	2EDM-JBGALJ	EKPC	341728	2KNOB LICK	EKPC	1	EKPC_P2-3_GREEN W45-1014	bus	46.0	104.49	106.03	DC	1.57

Bus #	Bus	MW Impact
940831	AE2-071 C	1.4027
940832	AE2-071 E	0.9351
945381	AF1-203 C	0.4248
945382	AF1-203 E	0.2832
CPLE	CPLE	0.0688
G-007A	G-007A	0.0216
VFT	VFT	0.0581
WEC	WEC	0.0038
CBM-W2	CBM-W2	1.1138
CBM-W1	CBM-W1	0.1877
TVA	TVA	0.4662
CBM-S2	CBM-S2	0.7861
CBM-S1	CBM-S1	1.9426
TILTON	TILTON	0.0151
MADISON	MADISON	0.3165
MEC	MEC	0.1128
GIBSON	GIBSON	0.0497
BLUEG	BLUEG	0.2951
TRIMBLE	TRIMBLE	0.0907

## 17.4 Index 4

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC DC	MW IMPACT
41846158	341651	2HORSECAVE J	EKPC	341914	2MUNFVILKU T	EKPC	1	EKPC_P2- 2_SUMMSHADE 161 #2-B	bus	98.0	135.92	136.57	DC	1.42

Bus #	Bus	MW Impact
940041	AE1-246 C O1	25.1728
940042	AE1-246 E O1	12.2588
940051	AE1-247 C O1	42.7656
940052	AE1-247 E O1	21.1800
940831	AE2-071 C	1.2718
940832	AE2-071 E	0.8479
944981	AF1-163 C O1 (Withdrawn : 12/11/2019)	23.6755
944982	AF1-163 E O1 (Withdrawn : 12/11/2019)	13.7561
945381	AF1-203 C	0.3852
945382	AF1-203 E	0.2568
NEWTON	NEWTON	0.0118
CPLE	CPLE	0.1039
G-007A	G-007A	0.0384
VFT	VFT	0.1032
CBM-W2	CBM-W2	1.3186
CBM-W1	CBM-W1	0.0125
TVA	TVA	0.6678
CBM-S2	CBM-S2	1.1733
EDWARDS	EDWARDS	0.0028
CBM-S1	CBM-S1	2.7946
TILTON	TILTON	0.0460
MADISON	MADISON	0.3871
MEC	MEC	0.1192
GIBSON	GIBSON	0.1267
BLUEG	BLUEG	0.5139
TRIMBLE	TRIMBLE	0.1519



## 17.5 Index 5

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC DC	MW IMPACT
41846237	341908	2MUNFVIL EK	EKPC	341158	2BONNIV DIST	EKPC	1	EKPC_P2-2_SUMMSHADE 161 #2-B	bus	98.0	122.24	122.9	DC	1.42

Bus #	Bus	MW Impact
940041	AE1-246 C O1	25.1728
940042	AE1-246 E O1	12.2588
940051	AE1-247 C O1	42.7656
940052	AE1-247 E O1	21.1800
940831	AE2-071 C	1.2718
940832	AE2-071 E	0.8479
944981	AF1-163 C O1 (Withdrawn : 12/11/2019)	23.6755
944982	AF1-163 E O1 (Withdrawn : 12/11/2019)	13.7561
945381	AF1-203 C	0.3852
945382	AF1-203 E	0.2568
NEWTON	NEWTON	0.0118
CPLE	CPLE	0.1039
G-007A	G-007A	0.0384
VFT	VFT	0.1032
CBM-W2	CBM-W2	1.3186
CBM-W1	CBM-W1	0.0125
TVA	TVA	0.6678
CBM-S2	CBM-S2	1.1733
EDWARDS	EDWARDS	0.0028
CBM-S1	CBM-S1	2.7946
TILTON	TILTON	0.0460
MADISON	MADISON	0.3871
MEC	MEC	0.1192
GIBSON	GIBSON	0.1267
BLUEG	BLUEG	0.5139
TRIMBLE	TRIMBLE	0.1519

## 17.6 Index 6

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC DC	MW IMPACT
41846192	341914	2MUNFVILKUT	EKPC	341908	2MUNFVILEK	EKPC	1	EKPC_P2-2_SUMMSHADE 161 #2-B	bus	98.0	128.88	129.53	DC	1.42

Bus #	Bus	MW Impact
940041	AE1-246 C O1	25.1728
940042	AE1-246 E O1	12.2588
940051	AE1-247 C O1	42.7656
940052	AE1-247 E O1	21.1800
940831	AE2-071 C	1.2718
940832	AE2-071 E	0.8479
944981	AF1-163 C O1 (Withdrawn : 12/11/2019)	23.6755
944982	AF1-163 E O1 (Withdrawn : 12/11/2019)	13.7561
945381	AF1-203 C	0.3852
945382	AF1-203 E	0.2568
NEWTON	NEWTON	0.0118
CPL	CPL	0.1039
G-007A	G-007A	0.0384
VFT	VFT	0.1032
CBM-W2	CBM-W2	1.3186
CBM-W1	CBM-W1	0.0125
TVA	TVA	0.6678
CBM-S2	CBM-S2	1.1733
EDWARDS	EDWARDS	0.0028
CBM-S1	CBM-S1	2.7946
TILTON	TILTON	0.0460
MADISON	MADISON	0.3871
MEC	MEC	0.1192
GIBSON	GIBSON	0.1267
BLUEG	BLUEG	0.5139
TRIMBLE	TRIMBLE	0.1519

## 17.7 Index 7

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC DC	MW IMPACT
41025675	342286	2SOMERSET	EKPC	342287	2SOMERSET KU	EKPC	1	EKPC_P7-1_COOP 161 DBL 2	tower	115.0	123.76	124.33	DC	1.45

Bus #	Bus	MW Impact
342900	1COOPER1 G	4.4802
342903	1COOPER2 G	8.6895
939131	AE1-143 C	5.3375
939132	AE1-143 E	2.6438
940041	AE1-246 C O1	4.2392
940042	AE1-246 E O1	2.0644
940051	AE1-247 C O1	7.2019
940052	AE1-247 E O1	3.5668
940831	AE2-071 C	1.2979
940832	AE2-071 E	0.8652
943701	AF1-038 C	6.1942
943702	AF1-038 E	4.1294
943821	AF1-050 C	1.1896
943822	AF1-050 E	0.7931
944151	AF1-083 C O1	1.2604
944152	AF1-083 E O1	0.8403
944511	AF1-116 C	3.1726
944512	AF1-116 E	2.1150
944981	AF1-163 C O1 (Withdrawn : 12/11/2019)	2.1292
944982	AF1-163 E O1 (Withdrawn : 12/11/2019)	1.2371
945381	AF1-203 C	0.3931
945382	AF1-203 E	0.2620
LGEE	LGEE	0.0120
CPL	CPL	0.0304
WEC	WEC	0.0479
LGE-0012019	LGE-0012019	5.0391
CBM-W2	CBM-W2	3.5463
NY	NY	0.0431
CBM-W1	CBM-W1	1.6763
TVA	TVA	1.0696
O-066	O-066	0.5242
CBM-S2	CBM-S2	0.5953
CBM-S1	CBM-S1	5.3335
G-007	G-007	0.0811
MADISON	MADISON	0.7540
MEC	MEC	0.4481

## 17.8 Index 8

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC DC	MW IMPACT
41025575	342287	2SOMERSET KU	EKPC	324531	2FERGUSON SO	LGEE	1	EKPC_P7-1_COOP 161 DBL 2	tower	105.0	144.49	145.28	DC	1.84

Bus #	Bus	MW Impact
342900	1COOPER1 G	4.3847
342903	1COOPER2 G	8.5042
939131	AE1-143 C	6.4726
939132	AE1-143 E	3.2061
940041	AE1-246 C O1	5.3429
940042	AE1-246 E O1	2.6019
940051	AE1-247 C O1	9.0769
940052	AE1-247 E O1	4.4954
940831	AE2-071 C	1.6418
940832	AE2-071 E	1.0946
943701	AF1-038 C	8.4535
943702	AF1-038 E	5.6357
943821	AF1-050 C	1.3743
943822	AF1-050 E	0.9162
944151	AF1-083 C O1	1.3582
944152	AF1-083 E O1	0.9055
944511	AF1-116 C	7.2590
944512	AF1-116 E	4.8394
944981	AF1-163 C O1 (Withdrawn : 12/11/2019)	2.6865
944982	AF1-163 E O1 (Withdrawn : 12/11/2019)	1.5610
945381	AF1-203 C	0.4972
945382	AF1-203 E	0.3315
CPLE	CPLE	0.0642
WEC	WEC	0.0617
LGE-0012019	LGE-0012019	5.1436
CBM-W2	CBM-W2	4.6028
NY	NY	0.0442
CBM-W1	CBM-W1	2.1893
TVA	TVA	1.4140
O-066	O-066	0.5174
CBM-S2	CBM-S2	1.0057
CBM-S1	CBM-S1	6.9779
G-007	G-007	0.0801
MADISON	MADISON	0.9919
MEC	MEC	0.5800

## 17.9 Index 9

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC DC	MW IMPACT
41846188	342319	2SUMM SHAD J	EKPC	342322	2SUMM SHADE	EKPC	1	EKPC_P2-3_SSHAD S11-1004-C	bus	98.0	116.3	131.45	DC	14.85

Bus #	Bus	MW Impact
940041	AE1-246 C O1	19.4261
940042	AE1-246 E O1	9.4603
940051	AE1-247 C O1	33.0027
940052	AE1-247 E O1	16.3449
940831	AE2-071 C	15.5887
940832	AE2-071 E	10.3925
944981	AF1-163 C O1 (Withdrawn : 12/11/2019)	18.2706
944982	AF1-163 E O1 (Withdrawn : 12/11/2019)	10.6158
945381	AF1-203 C	8.9078
945382	AF1-203 E	5.9386
CPL	CPL	0.0053
WEC	WEC	0.0198
CBM-W2	CBM-W2	1.0893
NY	NY	0.0033
CBM-W1	CBM-W1	0.7131
TVA	TVA	0.1918
O-066	O-066	0.0403
CBM-S2	CBM-S2	0.0867
CHEOAH	CHEOAH	0.0150
CBM-S1	CBM-S1	0.8946
G-007	G-007	0.0062
MADISON	MADISON	0.2258
MEC	MEC	0.1541
CALDERWOOD	CALDERWOOD	0.0159
BLUEG	BLUEG	0.0052
TRIMBLE	TRIMBLE	0.0033

## 17.10 Index 10

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC DC	MW IMPACT
41846269	342322	2SUMM SHADE	EKPC	341431	2EDM-JBGAL J	EKPC	1	EKPC_P2-3_GREEN W45-1014	bus	46.0	116.88	118.42	DC	1.57

Bus #	Bus	MW Impact
940831	AE2-071 C	1.4027
940832	AE2-071 E	0.9351
945381	AF1-203 C	0.4248
945382	AF1-203 E	0.2832
CPLE	CPLE	0.0688
G-007A	G-007A	0.0216
VFT	VFT	0.0581
WEC	WEC	0.0038
CBM-W2	CBM-W2	1.1138
CBM-W1	CBM-W1	0.1877
TVA	TVA	0.4662
CBM-S2	CBM-S2	0.7861
CBM-S1	CBM-S1	1.9426
TILTON	TILTON	0.0151
MADISON	MADISON	0.3165
MEC	MEC	0.1128
GIBSON	GIBSON	0.0497
BLUEG	BLUEG	0.2951
TRIMBLE	TRIMBLE	0.0907

## 17.11 Index 11

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC DC	MW IMPACT
41846109	940830	AE2-071 TAP	EKPC	342319	2SUMM SHAD J	EKPC	1	EKPC_P2-3_SSHAD S11-1004-C	bus	63.0	123.91	149.7	DC	16.25

Bus #	Bus	MW Impact
940041	AE1-246 C O1	10.7928
940042	AE1-246 E O1	5.2560
940051	AE1-247 C O1	18.3358
940052	AE1-247 E O1	9.0809
940831	AE2-071 C	17.0602
940832	AE2-071 E	11.3735
944981	AF1-163 C O1 (Withdrawn : 12/11/2019)	10.1509
944982	AF1-163 E O1 (Withdrawn : 12/11/2019)	5.8979
945381	AF1-203 C	9.7487
945382	AF1-203 E	6.4991
CPL	CPL	0.0033
WEC	WEC	0.0110
CBM-W2	CBM-W2	0.6061
NY	NY	0.0017
CBM-W1	CBM-W1	0.3878
TVA	TVA	0.1064
O-066	O-066	0.0202
CBM-S2	CBM-S2	0.0462
CHEOAH	CHEOAH	0.0085
CBM-S1	CBM-S1	0.4942
G-007	G-007	0.0031
MADISON	MADISON	0.1250
MEC	MEC	0.0858
CALDERWOOD	CALDERWOOD	0.0089
BLUEG	BLUEG	0.0035
TRIMBLE	TRIMBLE	0.0017

# Affected Systems



## **18 Affected Systems**

### **18.1 LG&E**

LG&E Impacts to be determined during later study phases (as applicable).

### **18.2 MISO**

MISO Impacts to be determined during later study phases (as applicable).

### **18.3 TVA**

TVA Impacts to be determined during later study phases (as applicable).

### **18.4 Duke Energy Progress**

Duke Energy Progress Impacts to be determined during later study phases (as applicable).

### **18.5 NYISO**

NYISO Impacts to be determined during later study phases (as applicable).

## 19 Contingency Descriptions

Contingency Name	Contingency Definition
EKPC_P4-2_SSHAD S11-1004	CONTINGENCY 'EKPC_P4-2_SSHAD S11-1004' /* SUMMERSHADE OPEN BRANCH FROM BUS 944980 TO BUS 342814 CKT 1 /* 944980 AF1-163 TAP 161.00 342814 5SUMM SHADE 161.00 OPEN BRANCH FROM BUS 361788 TO BUS 342814 CKT 1 /* 361788 5SUM SHAD TP161.00 342814 5SUMM SHADE 161.00 OPEN BRANCH FROM BUS 943820 TO BUS 342814 CKT 1 /* 943820 AF1-050 TAP 161.00 342814 5SUMM SHADE 161.00 END
EKPC_P4-2_GREEN W45-1014	CONTINGENCY 'EKPC_P4-2_GREEN W45-1014' /* GREEN CO OPEN BUS 342733 /* 5GREEN CO DROPS BUS OPEN BRANCH FROM BUS 342817 TO BUS 342818 CKT 1 /* 342817 5TAYLOR CO J161.00 342818 5TAYLR CO 161.00 OPEN BRANCH FROM BUS 944150 TO BUS 342817 CKT 1 /* 944150 AF1-083 TAP 161.00 342817 5TAYLOR CO J161.00 END
EKPC_P2-3_GREEN W45-1014-A	CONTINGENCY 'EKPC_P2-3_GREEN W45-1014-A' /* OPEN BUS 342733 /* 5GREEN CO OPEN BRANCH FROM BUS 342817 TO BUS 342818 CKT 1 /* 342817 5TAYLOR CO J161.00 342818 5TAYLR CO 161.00 OPEN BRANCH FROM BUS 342805 TO BUS 944150 CKT 1 /* 342805 5SALOMA T 161.00 342817 5TAYLOR CO J161.00 END
EKPC_P2-3_GREEN W45-1014	CONTINGENCY 'EKPC_P2-3_GREEN W45-1014' /* OPEN BUS 342733 /* 5GREEN CO OPEN BRANCH FROM BUS 342817 TO BUS 342818 CKT 1 /* 342817 5TAYLOR CO J161.00 342818 5TAYLR CO 161.00 OPEN BRANCH FROM BUS 342805 TO BUS 944150 CKT 1 /* 342805 5SALOMA T 161.00 342817 5TAYLOR CO J161.00 OPEN BRANCH FROM BUS 342802 TO BUS 342805 CKT 1 /* 342802 5SALOMA 161.00 342805 5SALOMA T 161.00 OPEN BRANCH FROM BUS 342775 TO BUS 342805 CKT 1 /* 342775 5MARION IP T161.00 342805 5SALOMA T 161.00 OPEN BRANCH FROM BUS 342772 TO BUS 342775 CKT 1 /* 342772 5MARION IP 161.00 342775 5MARION IP T161.00 OPEN BRANCH FROM BUS 342769 TO BUS 342775 CKT 1 /* 342769 5MARION CO 161.00 342775 5MARION IP T161.00 END
EKPC_P1-2_COOP-ELIHU161	CONTINGENCY 'EKPC_P1-2_COOP-ELIHU161' /* COOPER - KU ELIHU OPEN BRANCH FROM BUS 324141 TO BUS 342718 CKT 1 /* 324141 5ELIHU 161.00 342718 5COOPER2 161.00 END

Contingency Name	Contingency Definition
<b>EKPC_P7-1_COOP 161 DBL 2</b>	CONTINGENCY 'EKPC_P7-1_COOP 161 DBL 2' /* COOPER - ELIHU 161 & COOPER - LAUREL DAM 161 OPEN BRANCH FROM BUS 324141 TO BUS 342718 CKT 1 /* 324141 5ELIHU 161.00 342718 5COOPER2 161.00 OPEN BRANCH FROM BUS 342718 TO BUS 342757 CKT 1 /* 342718 5COOPER2 161.00 342757 5LAUREL DAM 161.00 END
<b>Base Case</b>	
<b>EKPC_P2-3_SSHAD S11-1044-B</b>	CONTINGENCY 'EKPC_P2-3_SSHAD S11-1044-B' /* SUMMERSHADE OPEN BRANCH FROM BUS 944980 TO BUS 342814 CKT 1 /* 940050 AE1-247 TAP 161.00 342814 5SUMM SHADE 161.00 OPEN BRANCH FROM BUS 342700 TO BUS 361788 CKT 1 /* 342700 5BULLITT CO 161.00 361788 5SUM SHAD TP161.00 OPEN BRANCH FROM BUS 361788 TO BUS 360334 CKT 1 /* 361788 5SUM SHAD TP161.00 360334 5SUMMER SHAD161.00 OPEN BRANCH FROM BUS 361788 TO BUS 342814 CKT 1 /* 361788 5SUM SHAD TP161.00 342814 5SUMM SHADE 161.00 END
<b>EKPC_P2-3_SSHAD S11-1004-C</b>	CONTINGENCY 'EKPC_P2-3_SSHAD S11-1004-C' /* SUMMERSHADE OPEN BRANCH FROM BUS 944980 TO BUS 342814 CKT 1 /* AF1-163 TAP 161.00 342814 5SUMM SHADE 161.00 OPEN BRANCH FROM BUS 361788 TO BUS 342814 CKT 1 /* 361788 5SUM SHAD TP161.00 342814 5SUMM SHADE 161.00 OPEN BRANCH FROM BUS 943820 TO BUS 342814 CKT 1 /* 943820 AF1-050 TAP 161.00 342814 5SUMM SHADE 161.00 END
<b>EKPC_P4-2_SSHAD S11-1044</b>	CONTINGENCY 'EKPC_P4-2_SSHAD S11-1044' /* SUMMERSHADE OPEN BRANCH FROM BUS 944980 TO BUS 342814 CKT 1 /* 944980 AF1-163 TAP 161.00 342814 5SUMM SHADE 161.00 OPEN BRANCH FROM BUS 342700 TO BUS 361788 CKT 1 /* 342700 5BULLITT CO 161.00 361788 5SUM SHAD TP161.00 OPEN BRANCH FROM BUS 361788 TO BUS 360334 CKT 1 /* 361788 5SUM SHAD TP161.00 360334 5SUMMER SHAD161.00 OPEN BRANCH FROM BUS 361788 TO BUS 342814 CKT 1 /* 361788 5SUM SHAD TP161.00 342814 5SUMM SHADE 161.00 END
<b>EKPC_P1-2_BARR-SUMSH161-C</b>	CONTINGENCY 'EKPC_P1-2_BARR-SUMSH161-C' /* BARREN CO - SUMMERSHADE OPEN BRANCH FROM BUS 944980 TO BUS 342814 CKT 1 /* 944980 AF1-163 TAP 161.00 342814 5SUMM SHADE 161.00 END
<b>EKPC_P2-2_SUMMSSHADE 161 #2-B</b>	CONTINGENCY 'EKPC_P2-2_SUMMSSHADE 161 #2-B' /* SUMMERSHADE 161 BUS OPEN BRANCH FROM BUS 943820 TO BUS 342814 CKT 1 /* AF1-050 342814 5SUMM SHADE 161.00 OPEN BRANCH FROM BUS 944980 TO BUS 342814 CKT 1 /* AF1-163 161.00 342814 5SUMM SHADE 161.00 OPEN BUS 361788 /* 361788 5SUM SHAD TP161.00 END

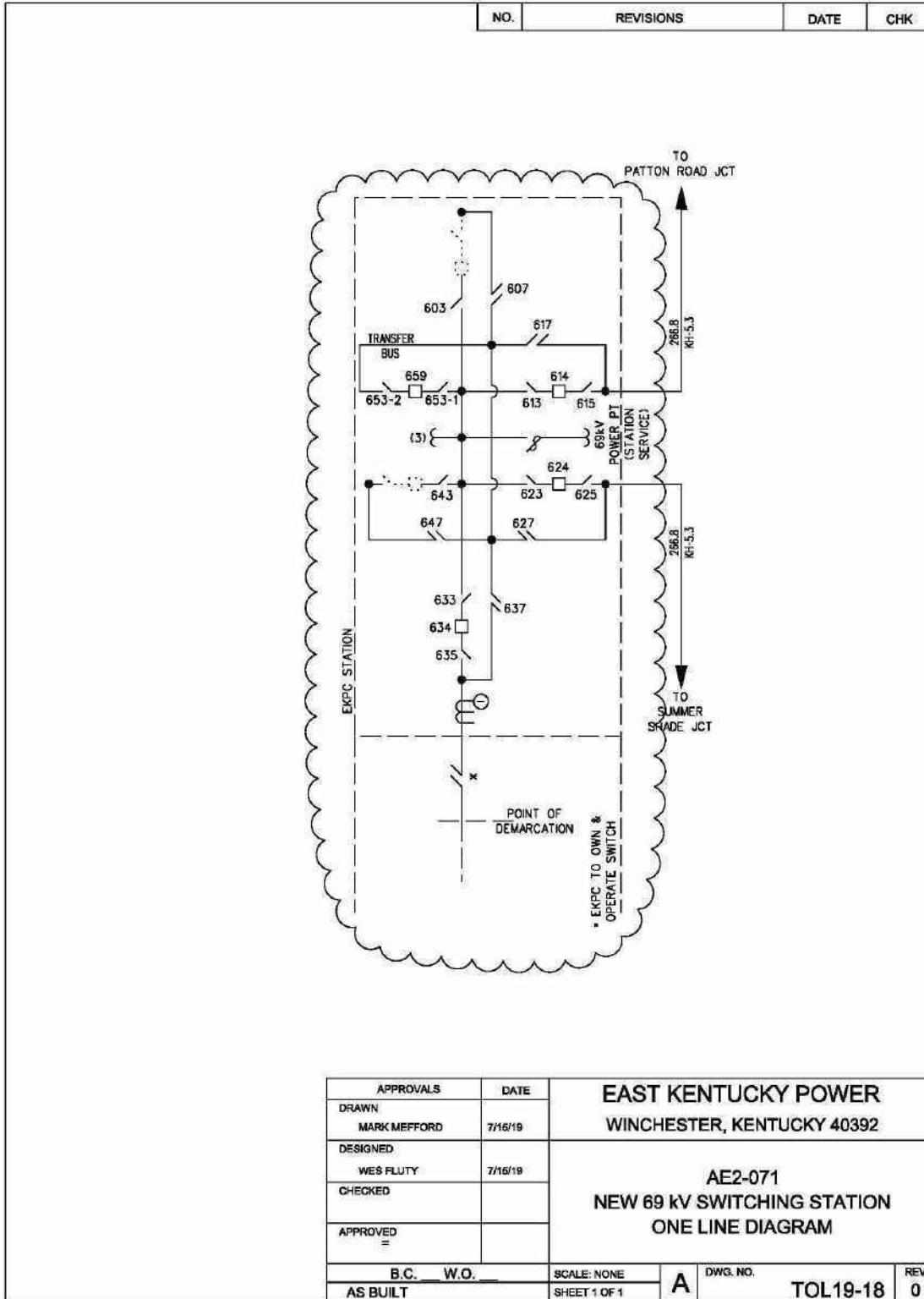
# Short Circuit

## 20 Short Circuit

The following Breakers are overduty

Bus Number	Bus Name	BREAKER	Type	Capacity (Amps)	Duty Percentage Post Queue	Duty Percentage Pre Queue

## 21 Single Line Diagram





**Generation Interconnection  
System Impact Study Report**

**for**

**Queue Project AE2-071**

**PATTON RD-SUMMER SHADE 69 KV**

**21 MW Capacity / 35 MW Energy**

February 2020

## 1 Preface

The intent of the System Impact Study is to determine a plan, with approximate cost and construction time estimates, to connect the subject generation interconnection project to the PJM network at a location specified by the Interconnection Customer. As a requirement for interconnection, the Interconnection Customer may be responsible for the cost of constructing: Network Upgrades, which are facility additions, or upgrades to existing facilities, that are needed to maintain the reliability of the PJM system. All facilities required for interconnection of a generation interconnection project must be designed to meet the technical specifications (on PJM web site) for the appropriate transmission owner.

In some instances, a generator interconnection may not be responsible for 100% of the identified network upgrade cost because other transmission network uses, e.g. another generation interconnection, may also contribute to the need for the same network reinforcement. Cost allocation rules for network upgrades can be found in PJM Manual 14A, Attachment B. The possibility of sharing the reinforcement costs with other projects may be identified in the feasibility study, but the actual allocation will be deferred until the impact study is performed.

The System Impact Study estimates do not include the feasibility, cost, or time required to obtain property rights and permits for construction of the required facilities. The project developer is responsible for the right of way, real estate, and construction permit issues. For properties currently owned by Transmission Owners, the costs may be included in the study.

The Interconnection Customer seeking to interconnect a wind or solar generation facility shall maintain meteorological data facilities as well as provide that meteorological data which is required per Schedule H to the Interconnection Service Agreement and Section 8 of Manual 14D.

An Interconnection Customer with a proposed new Customer Facility that has a Maximum Facility Output equal to or greater than 100 MW shall install and maintain, at its expense, phasor measurement units (PMUs). See Section 8.5.3 of Appendix 2 to the Interconnection Service Agreement as well as section 4.3 of PJM Manual 14D for additional information.



## 2 General

The Interconnection Customer (IC), has proposed a Solar generating facility located in Metcalfe, Kentucky. The installed facilities will have a total capability of 35 MW with 21 MW of this output being recognized by PJM as Capacity.

The proposed in-service date for this project is 12/31/2021. This study does not imply a TO commitment to this in-service date.

<b>Queue Number</b>	<b>AE2-071</b>
<b>Project Name</b>	PATTON RD-SUMMER SHADE 69 KV
<b>Interconnection Customer</b>	Carolina Solar Energy III, LLC
<b>State</b>	Kentucky
<b>County</b>	Metcalfe
<b>Transmission Owner</b>	EKPC
<b>MFO</b>	35
<b>MWE</b>	35
<b>MWC</b>	21
<b>Fuel</b>	Solar
<b>Basecase Study Year</b>	2022

## 2.1 Point of Interconnection

AE2-071 will interconnect with the EKPC transmission system tapping the Patton Rd. to Summer Shade 69kV line.

## 2.2 Cost Summary

The AE2-071 project will be responsible for the following costs:

Description	Total Cost
Attachment Facilities	\$610,000
Direct Connection Network Upgrade	\$5,420,000
Non Direct Connection Network Upgrades	\$795,000
Allocation for New System Upgrades	\$310,000
Contribution for Previously Identified Upgrades	\$0
<b>Total Costs</b>	<b>\$7,135,000</b>

### 3 Transmission Owner Scope of Work

#### 4 Attachment Facilities

The total preliminary cost estimate for the Attachment work is given in the table below. These costs do not include CIAC Tax Gross-up.

Description	Total Cost
Install necessary equipment (a 69 kV isolation switch structure and associated switch, plus interconnection metering, fiber-optic connection and telecommunications equipment, circuit breaker and associated switches, and relay panel) at the new Eighty Eight switching station, to accept the IC generator lead line/bus (Estimated time to implement is 24 months)	\$610,000
<b>Total Attachment Facility Costs</b>	<b>\$610,000</b>

#### 5 Direct Connection Cost Estimate

The total preliminary cost estimate for the Direct Connection work is given in the table below. These costs do not include CIAC Tax Gross-up.

Description	Total Cost
Construct a new 69 kV switching station to 161 kV standards (Eighty Eight Switching) to facilitate connection of the IC solar generation project to the existing Patton Road Junction-Summer Shade 69 kV line (Estimated time to implement is 24 months)	\$5,420,000
<b>Total Direct Connection Facility Costs</b>	<b>\$5,420,000</b>

## 6 Non-Direct Connection Cost Estimate

The total preliminary cost estimate for the Non-Direct Connection work is given in the table below. These costs do not include CIAC Tax Gross-up.

Description	Total Cost
Construct facilities to loop the existing Patton Road Junction-Summer Shade 69 kV line into the new Eighty Eight switching station (Estimated time to implement is 24 months)	\$560,000
Modify relays and/or settings at Summer Shade substation for the existing line to the new Eighty Eight switching station (Estimated time to implement is 9 months)	\$45,000
Modify relays and/or settings at Fox Hollow substation for the existing line to the new Eighty Eight switching station (Estimated time to implement is 9 months)	\$45,000
Install OPGW on the Eighty Eight-Summer Shade 69 kV line (1.7 miles) (Estimated time to implement is 12 months)	\$145,000
<b>Total Non-Direct Connection Facility Costs</b>	<b>\$795,000</b>

## 7 Incremental Capacity Transfer Rights (ICTRs)

None

## 8 Interconnection Customer Requirements

1. An Interconnection Customer entering the New Services Queue on or after October 1, 2012 with a proposed new Customer Facility that has a Maximum Facility Output equal to or greater than 100 MW shall install and maintain, at its expense, phasor measurement units (PMUs). See Section 8.5.3 of Appendix 2 to the Interconnection Service Agreement as well as section 4.3 of PJM Manual 14D for additional information.
2. The Interconnection Customer may be required to install and/or pay for metering as necessary to properly track real time output of the facility as well as installing metering which shall be used for billing purposes. See Section 8 of Appendix 2 to the Interconnection Service Agreement as well as Section 4 of PJM Manual 14D for additional information.

## 9 Revenue Metering and SCADA Requirements

### 9.1 PJM Requirements

The Interconnection Customer will be required to install equipment necessary to provide Revenue Metering (KWH, KVARH) and real time data (KW, KVAR) for IC's generating Resource. See PJM Manuals M-01 and M-14D, and PJM Tariff Sections 24.1 and 24.2.

### 9.2 EKPC Requirements

The Interconnection Customer will be required to comply with all EKPC Revenue Metering Requirements for Generation Interconnection Customers. The Revenue Metering Requirements may be found within the "EKPC Facility Connection Requirements" document located at the following link:

<http://www.pjm.com/planning/design-engineering/to-tech-standards/ekpc.aspx>

## 10 Network Impacts

The Queue Project AE2-071 was evaluated as a 35.0 MW (Capacity 21.0 MW) injection tapping the Patton Rd. to Summer Shade 69kV line in the EKPC area. Project AE2-071 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AE2-071 was studied with a commercial probability of 1.00. Potential network impacts were as follows:

# Summer Peak Load Flow

## 11 Generation Deliverability

(Single or N-1 contingencies for the Capacity portion only of the interconnection)

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC DC	MW IMPACT
2155713	342838	7SPURLOK	345.0	EKPC	253077	09STUART	345.0	DAY	1	AEP_P1-2_#1027	single	1421.0	99.93	100.05	AC	1.85

## 12 Multiple Facility Contingency

(Double Circuit Tower Line, Fault with a Stuck Breaker, and Bus Fault contingencies for the full energy output)

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC DC	MW IMPACT
2155501	341431	2EDM-JBGALJ	69.0	EKPC	341728	2KNOBLICK	69.0	EKPC	1	EKPC_P4-2_GREEN W45-1014	breaker	46.0	97.6	102.68	AC	2.75

## 13 Contribution to Previously Identified Overloads

(This project contributes to the following contingency overloads, i.e. "Network Impacts", identified for earlier generation or transmission interconnection projects in the PJM Queue)

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC DC	MW IMPACT
2155211	341059	2BARRENCO	69.0	EKPC	341651	2HORSECAVEJ	69.0	EKPC	1	EKPC_P4-2_SSHAD S11-1004	breaker	90.0	159.45	161.66	AC	2.34
2155212	341059	2BARRENCO	69.0	EKPC	341651	2HORSECAVEJ	69.0	EKPC	1	EKPC_P4-2_SSHAD S11-1044	breaker	90.0	154.15	156.37	AC	2.35
2155616	341059	2BARRENCO	69.0	EKPC	341651	2HORSECAVEJ	69.0	EKPC	1	EKPC_P1-2_BARR-SUMSH16 1-B	single	90.0	114.86	116.18	AC	1.34
40564759	342286	2SOMERSET	69.0	EKPC	342287	2SOMERSETKU	69.0	EKPC	1	EKPC_P7-1_COOP 161 DBL 2	tower	115.0	100.97	104.6	AC	2.53
2156031	342287	2SOMERSETKU	69.0	EKPC	324531	2FERGUSONSO	69.0	LGEE	1	EKPC_P7-1_COOP 161 DBL 2	tower	105.0	115.05	119.48	AC	3.21
2155431	342718	5SCOOPER2	161.0	EKPC	324141	5ELIHU	161.0	LGEE	1	EKPC_P4-5_LAURL S50-1024	breaker	277.0	109.96	111.51	AC	4.28
2155982	342718	5SCOOPER2	161.0	EKPC	324141	5ELIHU	161.0	LGEE	1	EKPC_P7-1_LAURL 161 DBL	tower	277.0	109.96	111.52	AC	4.28



## 14 Potential Congestion due to Local Energy Deliverability

PJM also studied the delivery of the energy portion of this interconnection request. Any problems identified below are likely to result in operational restrictions to the project under study. The developer can proceed with network upgrades to eliminate the operational restriction at their discretion by submitting a Merchant Transmission Interconnection request.

Note: Only the most severely overloaded conditions are listed below. There is no guarantee of full delivery of energy for this project by fixing only the conditions listed in this section. With a Transmission Interconnection Request, a subsequent analysis will be performed which shall study all overload conditions associated with the overloaded element(s) identified.

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC/D C	MW IMPACT
2155615	341059	2BARRENCO	69.0	EKPC	341651	2HORSECAVEJ	69.0	EKPC	1	EKPC_P1-2_BARR-SUMSH161-B	operation	90.0	152.57	154.68	AC	2.23
19134578	341059	2BARRENCO	69.0	EKPC	341651	2HORSECAVEJ	69.0	EKPC	1	Base Case	operation	77.0	104.87	107.03	AC	1.96
2155805	342718	5SCOOPER2	161.0	EKPC	324141	5ELIHU	161.0	LGEE	1	EKPC_P1-2_LAUR-LDAM161	operation	277.0	109.73	111.29	AC	4.29

## 15 Steady-State Voltage Requirements

*(Summary of the VAR requirements based upon the results of the steady-state voltage studies)*

To be evaluated during the Facilities Study Phase

## 16 Stability and Reactive Power Requirements for Low Voltage Ride Through

*(Summary of the VAR requirements based upon the results of the dynamic studies)*

To be evaluated during the Facilities Study Phase

## 17 Light Load Analysis

*Light Load Studies (applicable to wind, coal, nuclear, and pumped storage projects).*

Not required

## 18 System Reinforcements

ID	Index	Facility	Upgrade Description	Cost	Cost Allocated to AE2-071	Upgrade Number
40564759	4	2SOMERSET 69.0 kV - 2SOMERSET KU 69.0 kV Ckt 1	<p>EKPC N6232: Replace the 500 MCM copper jumpers at the Somerset substation using 750 MCM copper or equivalent. Project Type : FAC Cost : \$ 250,000 Time Estimate : 6 Months New Ratings: Rate A: 146 MVA Rate B: 152 MVA Rate C: 154 MVA</p> <p>This constraint is driven by a prior queue. Per PJM cost allocation rules, AE2-071 does not presently receive cost allocation.</p> <p>Note 1: as changes to the interconnection process occur, such as prior queued projects withdrawing from the queue, reducing in size, etc., Queue Project AE2-071 could receive cost allocation.</p> <p>Note 2: Although Queue Project AE2-071, Queue Project AE2-071 may need this upgrade in-service to be deliverable to the PJM system. If Queue Project AE2-071 comes into service prior to completion of the upgrade, Queue Project AE2-071 will need an interim study.</p>	\$ 250,000	\$ 0	N6232
2155501	2	2EDM-JBGAL J 69.0 kV - 2KNOB LICK 69.0 kV Ckt 1	<p>EKPC N6494: Increase the maximum operating temperature of the 266 MCM ACSR conductor in the Edmonton/JB Galloway Jct-Knob Lick 6 9kV line section to 176 degrees F (5.7 miles) Project Type : FAC Cost : \$ 310,000 Time Estimate : 12 Months New Ratings: Rate A: 46 MVA Rate B: 50 MVA Rate C: 53 MVA</p>	\$310,000	\$310,000	N6494
2156031	5	2SOMERSET KU 69.0 kV - 2FERGUSON SO 69.0 kV Ckt 1	<p>EKPC No violation. EKPC emergency rating is 152 MVA.</p> <p>LGEE LGEE has been identified as an Affected System. LG&amp;E-end impacts will be determined during the Facilities Study. The customer is required to sign a LG&amp;E Affected System Study Agreement.</p>	\$0	\$0	N/A

ID	Index	Facility	Upgrade Description	Cost	Cost Allocated to AE2-071	Upgrade Number
2155616,2155211,2155212	3	2BARREN CO 69.0 kV - 2HORSECAVE J 69.0 kV Ckt 1	<p>EKPC</p> <p><b>N6197.1: Uprate CT associated with Barren Co-Horsecave Jct 69kV line section to minimum 166 MVA Summer LTE</b>  Project Type : FAC  Cost : \$ 0  Time Estimate : 6 Months  New Ratings:  Rate A: 90 MVA  Rate B: 115 MVA  Rate C: 133 MVA</p> <p><b>N6197.2: Upgrade jumpers associated with Barren Co 69kV bus to 2-500 MCM 37 CU conductor</b>  Project Type : FAC  Cost : \$ 10,000  Time Estimate : 6 Months  New Ratings:  Rate A: 114 MVA  Rate B: 127 MVA  Rate C: 133 MVA</p> <p><b>N6197.3: Increase MOT of Barren Co-Horsecave Jct 69kV line section 795 MCM conductor to 302F (~3.88 miles)</b>  Project Type : FAC  Cost : \$ 250,000  Time Estimate : 6 Months  New Ratings:  Rate A: 133 MVA  Rate B: 163 MVA  Rate C: 179 MVA</p> <p>This constraint is driven by a prior queue. Per PJM cost allocation rules, AE2-071 does not presently receive cost allocation.</p> <p>Note 1: as changes to the interconnection process occur, such as prior queued projects withdrawing from the queue, reducing in size, etc, Queue Project AE2-071 could receive cost allocation.</p> <p>Note 2: Although Queue Project AE2-071, Queue Project AE2-071 may need this upgrade in-service to be deliverable to the PJM system. If Queue Project AE2-071 comes into service prior to completion of the upgrade, Queue Project AE2-071 will need an interim study.</p>	\$260,000	\$0	N6197.1, N6197.2, N6197.3

ID	Index	Facility	Upgrade Description	Cost	Cost Allocated to AE2-071	Upgrade Number
2155431,2155982	6	5COOPER2 161.0 kV - 5ELIHU 161.0 kV Ckt 1	<p>EKPC N6238: Increase the maximum operating temperature of the 795 MCM ACSR conductor in the Cooper-Elihu 161 kV line section to 275 degrees F (6.7 miles) Project Type : FAC Cost : \$ 660,000 Time Estimate : 9 Months New Ratings: Rate A: 312 MVA Rate B: 371 MVA Rate C: 381 MVA</p> <p>This constraint is driven by a prior queue. Per PJM cost allocation rules, AE2-071 does not presently receive cost allocation.</p> <p>Note 1: as changes to the interconnection process occur, such as prior queued projects withdrawing from the queue, reducing in size, etc., Queue Project AE2-071 could receive cost allocation.</p> <p>Note 2: Although Queue Project AE2-071, Queue Project AE2-071 may need this upgrade in-service to be deliverable to the PJM system. If Queue Project AE2-071 comes into service prior to completion of the upgrade, Queue Project AE2-071 will need an interim study.</p> <p>LGEE LGEE has been identified as an Affected System. LG&amp;E-end impacts will be determined during the Facilities Study. The customer is required to sign a LG&amp;E Affected System Study Agreement.</p>	\$660,000	\$0	N6238
2155713	1	7SPURLOCK 345.0 kV - 09STUART 345.0 kV Ckt 1	<p>EKPC No Violation. EKPC continuous and emergency ratings are both 1792 MVA.</p> <p>DAY No violation. The emergency rating is 1532 MVA SE.</p>	\$0	\$0	N/A
<b>TOTAL COST</b>				<b>\$1,480,000</b>	<b>\$310,000</b>	

## 19 Flow Gate Details

The following indices contain additional information about each flowgate presented in the body of the report. For each appendix, a description of the flowgate and its contingency was included for convenience. However, the intent of the appendix section is to provide more information on which projects/generators have contributions to the flowgate in question. Although this information is not used "as is" for cost allocation purposes, it can be used to gage other generators impact. It should be noted the generator contributions presented in the appendices sections are full contributions, whereas in the body of the report, those contributions take into consideration the commercial probability of each project.

## 19.1 Index 1

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC DC	MW IMPACT
2155713	342838	7SPURLOCK	EKPC	253077	09STUART	DAY	1	AEP_P1-2_#1027	single	1421.0	99.93	100.05	AC	1.85

Bus #	Bus	MW Impact
251968	08ZIMRHP	23.8643
251969	08ZIMRLP	13.0686
251970	08MELDL1	1.3667
251971	08MELDL2	1.3667
251972	08MELDL3	1.3704
342918	1JKCT 1G	3.5851
342921	1JKCT 2G	3.5851
342924	1JKCT 3G	3.5851
342927	1JKCT 4G	2.3792
342930	1JKCT 5G	2.3662
342933	1JKCT 6G	2.3792
342936	1JKCT 7G	2.3792
342939	1JKCT 9G	2.6253
342942	1JKCT 10G	2.6253
342957	1SPURLK1G	17.6669
342960	1SPURLK2G	33.3218
342963	1SPURLK3G	17.5102
342966	1SPURLK4G	17.5102
925981	AC1-074 C O1	14.8400
926061	AC1-085 C O1	-30.9628
926101	AC1-089 C O1	3.7752
926791	AC1-165 C	-3.6957
926951	AC1-182	4.2904
930061	AB1-014 C	-5.5431
932461	AC2-066 C	-3.3259
932551	AC2-075 C	3.5245
936381	AD2-048 C	11.6302
936571	AD2-072 C O1	10.1731
936821	AD2-105 C O1	3.5249
936831	AD2-106 C O1	2.4073
936841	AD2-107 C O1	1.8810
939131	AE1-143 C	6.6101
939141	AE1-144 C O1	30.0830
940041	AE1-246 C O1	5.8731
940051	AE1-247 C O1	9.9777
940531	AE2-038 C O1	20.0679
940831	AE2-071 C	1.5710
941411	AE2-138 C	58.9917
941961	AE2-208	2.0357
941981	AE2-210 C O1	20.3270
942411	AE2-254 C O1	5.0016
942591	AE2-275 C O1	15.1028

<b>Bus #</b>	<b>Bus</b>	<b>MW Impact</b>
942891	AE2-308 C O1	25.3627
943111	AE2-339 C	7.0396
LGEE	LGEE	7.3912
CIN	CIN	10.0230
CPL	CPL	0.5107
IPL	IPL	6.0669
LGE-0012019	LGE-0012019	3.9776
CBM-W2	CBM-W2	82.9309
CBM-W1	CBM-W1	6.0274
WEC	WEC	0.9762
CBM-S2	CBM-S2	2.2550
CARR	CARR	0.4969
CBM-S1	CBM-S1	17.2882
MEC	MEC	10.3211
RENSSELAER	RENSSELAER	0.3925

## 19.2 Index 2

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC DC	MW IMPACT
2155501	341431	2EDM-JBGALJ	EKPC	341728	2KNOB LICK	EKPC	1	EKPC_P4-2_GREEN W45-1014	breaker	46.0	97.6	102.68	AC	2.75

Bus #	Bus	MW Impact
940831	AE2-071 C	1.4030
940832	AE2-071 E	0.9353
CPL	CPL	0.0675
G-007A	G-007A	0.0192
VFT	VFT	0.0516
CBM-W2	CBM-W2	3.1361
CBM-W1	CBM-W1	0.0753
WEC	WEC	0.0066
CBM-S2	CBM-S2	0.2181
CBM-S1	CBM-S1	0.7148
TILTON	TILTON	0.0151
CBM-N	CBM-N	0.0038
BLUEG	BLUEG	0.7766
MEC	MEC	0.3280
CANNELTON	CANNELTON	0.0703
GIBSON	GIBSON	0.0178
TRIMBLE	TRIMBLE	0.0818
NYISO	NYISO	0.0132



### 19.3 Index 3

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC DC	MW IMPACT
2155211	341059	2BARREN CO	EKPC	341651	2HORSECAVE J	EKPC	1	EKPC_P4-2_SSHAD S11-1004	breaker	90.0	159.45	161.66	AC	2.34

Bus #	Bus	MW Impact
940041	AE1-246 C O1	24.9177
940042	AE1-246 E O1	12.1347
940051	AE1-247 C O1	42.3324
940052	AE1-247 E O1	20.9655
940831	AE2-071 C	1.1956
940832	AE2-071 E	0.7971
NEWTON	NEWTON	0.0138
CPLE	CPLE	0.0873
G-007A	G-007A	0.0336
VFT	VFT	0.0903
CBM-W2	CBM-W2	3.0890
CBM-S2	CBM-S2	0.2821
EDWARDS	EDWARDS	0.0042
CBM-S1	CBM-S1	0.9048
TILTON	TILTON	0.0391
CBM-N	CBM-N	0.0076
BLUEG	BLUEG	0.9619
MEC	MEC	0.2957
CANNELTON	CANNELTON	0.1565
GIBSON	GIBSON	0.0420
TRIMBLE	TRIMBLE	0.1002
NYISO	NYISO	0.0330

## 19.4 Index 4

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC DC	MW IMPACT
40564759	342286	2SOMERSET	EKPC	342287	2SOMERSET KU	EKPC	1	EKPC_P7-1_COOP 161 DBL 2	tower	115.0	100.97	104.6	AC	2.53

Bus #	Bus	MW Impact
342900	1COOPER1 G	4.2468
342903	1COOPER2 G	8.2367
939131	AE1-143 C	5.3222
939132	AE1-143 E	2.6362
940041	AE1-246 C O1	4.2138
940042	AE1-246 E O1	2.0521
940051	AE1-247 C O1	7.1587
940052	AE1-247 E O1	3.5454
940831	AE2-071 C	1.2907
940832	AE2-071 E	0.8605
CIN	CIN	0.4116
CPLE	CPLE	0.0278
IPL	IPL	0.1953
G-007	G-007	0.0819
LGE-0012019	LGE-0012019	5.0358
CBM-W2	CBM-W2	10.1630
CBM-W1	CBM-W1	0.7701
WEC	WEC	0.0978
O-066	O-066	0.5249
CBM-S2	CBM-S2	0.1640
CARR	CARR	0.0287
CBM-S1	CBM-S1	1.9610
MEC	MEC	1.2982
RENSSELAER	RENSSELAER	0.0227

## 19.5 Index 5

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC DC	MW IMPACT
2156031	342287	2SOMERSET KU	EKPC	324531	2FERGUSON SO	LGEE	1	EKPC_P7-1_COOP 161 DBL 2	tower	105.0	115.05	119.48	AC	3.21

Bus #	Bus	MW Impact
342900	1COOPER1 G	4.1542
342903	1COOPER2 G	8.0570
939131	AE1-143 C	6.4534
939132	AE1-143 E	3.1965
940041	AE1-246 C O1	5.3230
940042	AE1-246 E O1	2.5922
940051	AE1-247 C O1	9.0431
940052	AE1-247 E O1	4.4787
940831	AE2-071 C	1.6368
940832	AE2-071 E	1.0912
CIN	CIN	0.4949
CPLE	CPLE	0.0609
IPL	IPL	0.2315
G-007	G-007	0.0830
LGE-0012019	LGE-0012019	5.1458
CBM-W2	CBM-W2	13.1812
CBM-W1	CBM-W1	1.0017
WEC	WEC	0.1264
O-066	O-066	0.5317
CBM-S2	CBM-S2	0.2772
CARR	CARR	0.0294
CBM-S1	CBM-S1	2.5696
MEC	MEC	1.6817
RENSSELAER	RENSSELAER	0.0232

## 19.6 Index 6

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC DC	MW IMPACT
2155982	342718	SCOOPER2	EKPC	324141	SELIHU	LGEE	1	EKPC_P7-1_LAURL 161 DBL	tower	277.0	109.96	111.52	AC	4.28

Bus #	Bus	MW Impact
342900	1COOPER1 G	8.5360
342903	1COOPER2 G	16.6060
342945	1LAUREL 1G	5.1663
939131	AE1-143 C	10.0672
939132	AE1-143 E	4.9866
940041	AE1-246 C O1	9.0658
940042	AE1-246 E O1	4.4150
940051	AE1-247 C O1	15.4018
940052	AE1-247 E O1	7.6279
940831	AE2-071 C	2.5672
940832	AE2-071 E	1.7115
CIN	CIN	0.5537
CPLE	CPLE	0.0833
IPL	IPL	0.2236
G-007	G-007	0.1680
LGE-0012019	LGE-0012019	7.9596
CBM-W2	CBM-W2	18.7461
CBM-W1	CBM-W1	1.1406
WEC	WEC	0.1470
O-066	O-066	1.0835
CBM-S2	CBM-S2	0.4100
CARR	CARR	0.0603
CBM-S1	CBM-S1	3.7610
MEC	MEC	2.2638
TRIMBLE	TRIMBLE	0.0239
RENSSELAER	RENSSELAER	0.0476

# Affected Systems

## **20 Affected Systems**

### **20.1 LG&E**

An LG&E affected system study will be required for AE2-071.

### **20.2 MISO**

MISO Impacts to be determined during later study phases (as applicable).

### **20.3 TVA**

None

### **20.4 Duke Energy Progress**

None

## 21 Contingency Descriptions

Contingency Name	Contingency Definition
EKPC_P4-2_SSHAD S11-1004	CONTINGENCY 'EKPC_P4-2_SSHAD S11-1004' /* SUMMERSHADE OPEN BRANCH FROM BUS 940050 TO BUS 342814 CKT 1 /* 940050 AE1-247 TAP 161.00 342814 5SUMM SHADE 161.00 OPEN BRANCH FROM BUS 342811 TO BUS 342814 CKT 1 /* 342811 5SUMM SHAD T161.00 342814 5SUMM SHADE 161.00 OPEN BRANCH FROM BUS 342733 TO BUS 342814 CKT 1 /* 342733 5GREEN CO 161.00 342814 5SUMM SHADE 161.00 END
EKPC_P1-2_BARR-SUMSH161-B	CONTINGENCY 'EKPC_P1-2_BARR-SUMSH161-B' /* BARREN CO - SUMMERSHADE OPEN BRANCH FROM BUS 940050 TO BUS 342814 CKT 1 /* 940050 AE1-247 TAP 161.00 342814 5SUMM SHADE 161.00 END
EKPC_P4-2_GREEN W45-1014	CONTINGENCY 'EKPC_P4-2_GREEN W45-1014' /* GREEN CO OPEN BUS 342733 /* 5GREEN CO DROPS BUS OPEN BRANCH FROM BUS 342817 TO BUS 342818 CKT 1 /* 342817 5TAYLOR CO J161.00 342818 5TAYLR CO 161.00 OPEN BRANCH FROM BUS 342805 TO BUS 342817 CKT 1 /* 342805 5SALOMA T 161.00 342817 5TAYLOR CO J161.00 OPEN BRANCH FROM BUS 342802 TO BUS 342805 CKT 1 /* 342802 5SALOMA 161.00 342805 5SALOMA T 161.00 OPEN BRANCH FROM BUS 342775 TO BUS 342805 CKT 1 /* 342775 5MARION IP T161.00 342805 5SALOMA T 161.00 OPEN BRANCH FROM BUS 342772 TO BUS 342775 CKT 1 /* 342772 5MARION IP 161.00 342775 5MARION IP T161.00 OPEN BRANCH FROM BUS 342769 TO BUS 342775 CKT 1 /* 342769 5MARION CO 161.00 342775 5MARION IP T161.00 END
EKPC_P7-1_COOP 161 DBL 2	CONTINGENCY 'EKPC_P7-1_COOP 161 DBL 2' /* COOPER - ELIHU 161 & COOPER - LAUREL DAM 161 OPEN BRANCH FROM BUS 324141 TO BUS 342718 CKT 1 /* 324141 5ELIHU 161.00 342718 5COOPER2 161.00 OPEN BRANCH FROM BUS 342718 TO BUS 342757 CKT 1 /* 342718 5COOPER2 161.00 342757 5LAUREL DAM 161.00 END
Base Case	
EKPC_P7-1_LAURL 161 DBL	CONTINGENCY 'EKPC_P7-1_LAURL 161 DBL' /* LAUREL CO - LAUREL DAM 161 & LAUREL CO - TYNER 161 OPEN BRANCH FROM BUS 342754 TO BUS 342757 CKT 1 /* 342754 5LAUREL CO 161.00 342757 5LAUREL DAM 161.00 OPEN BRANCH FROM BUS 342754 TO BUS 342781 CKT 1 /* 342754 5LAUREL CO 161.00 342781 5PITTSBURG 161.00 OPEN BRANCH FROM BUS 342781 TO BUS 342820 CKT 1 /* 342781 5PITTSBURG 161.00 342820 5TYNER 161.00 END

Contingency Name	Contingency Definition
<b>AEP_P1-2_#1027</b>	CONTINGENCY 'AEP_P1-2_#1027' OPEN BRANCH FROM BUS 248000 TO BUS 324114 CKT 1 / 248000 06CLIFTY 345 324114 7TRIMBLE CO 345 1 END
<b>EKPC_P4-2_SSHAD S11-1044</b>	CONTINGENCY 'EKPC_P4-2_SSHAD S11-1044' /* SUMMERSHADE OPEN BRANCH FROM BUS 940050 TO BUS 342814 CKT 1 /* 940050 AE1-247 TAP 161.00 342814 5SUMM SHADE 161.00 OPEN BRANCH FROM BUS 342700 TO BUS 342811 CKT 1 /* 342700 5BULLITT CO 161.00 342811 5SUMM SHAD T161.00 OPEN BRANCH FROM BUS 342811 TO BUS 360334 CKT 1 /* 342811 5SUMM SHAD T161.00 360334 5SUMMER SHAD161.00 OPEN BRANCH FROM BUS 342811 TO BUS 342814 CKT 1 /* 342811 5SUMM SHAD T161.00 342814 5SUMM SHADE 161.00 END
<b>EKPC_P4-5_LAURL S50-1024</b>	CONTINGENCY 'EKPC_P4-5_LAURL S50-1024' /* LAUREL CO OPEN BUS 342754 /* 5LAUREL CO DROPS BUS OPEN BRANCH FROM BUS 324688 TO BUS 342781 CKT 1 /* 324688 2PITTSKU 69.000 342781 5PITTSBURG 161.00 OPEN BRANCH FROM BUS 342781 TO BUS 342820 CKT 1 /* 342781 5PITTSBURG 161.00 342820 5TYNER 161.00 END
<b>EKPC_P1-2_LAUR-L DAM161</b>	CONTINGENCY 'EKPC_P1-2_LAUR-L DAM161' /* LAUREL CO - LAUREL DAM OPEN BRANCH FROM BUS 342754 TO BUS 342757 CKT 1 /* 342754 5LAUREL CO 161.00 342757 5LAUREL DAM 161.00 END

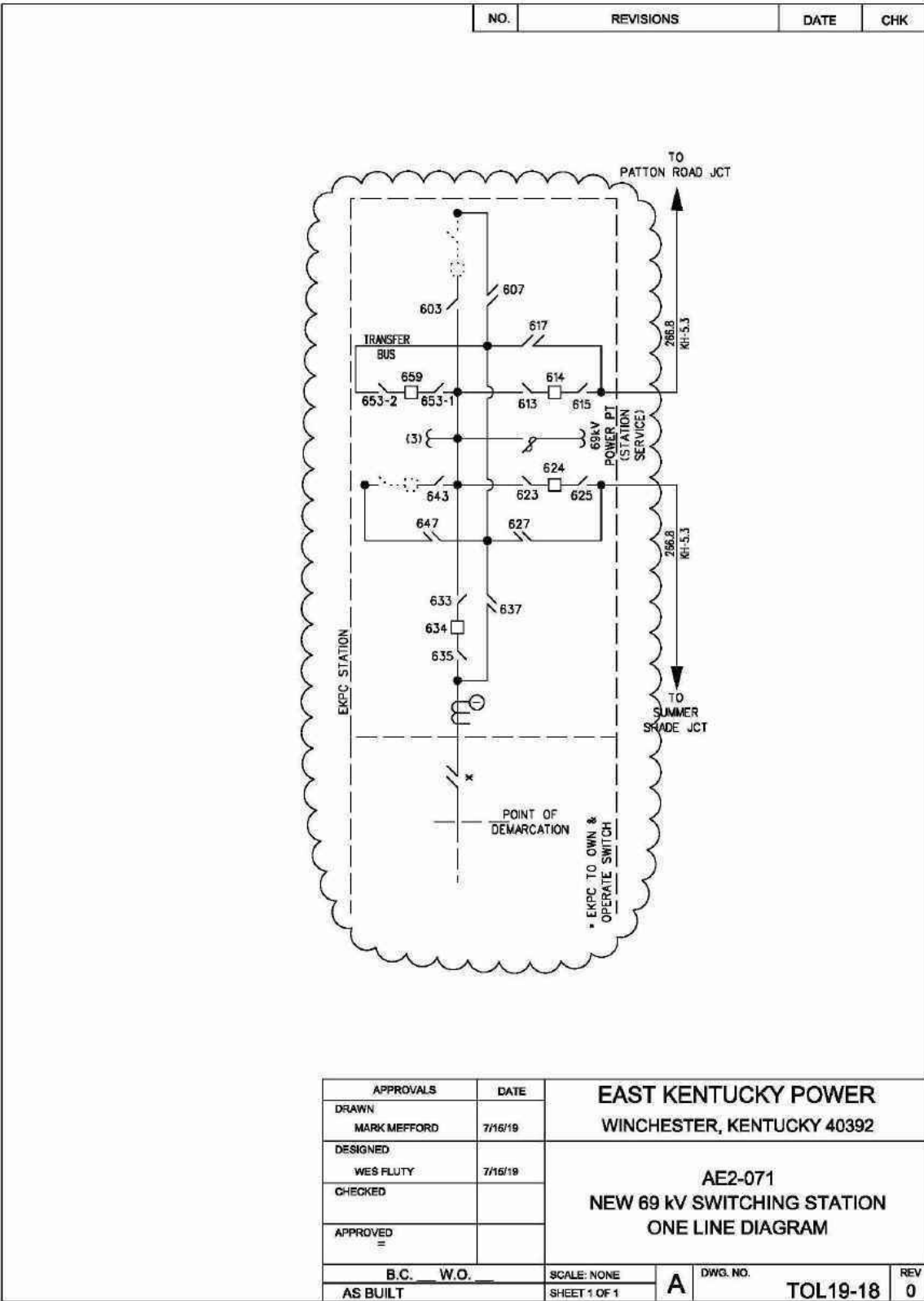


# Short Circuit

## 22 Short Circuit

None

# Attachment 1. Single Line Diagram (Primary POI)



**EXHIBIT E**



METCALFE COUNTY'S NEWSPAPER OF RECORD

The Edmonton Herald-News

# CLASSIFIEDS

JOB NETWORK DELIVERS MORE THAN ALL OTHERS COMBINED

EMAIL: heraldnews@jpinews.com    READER SERVICE LINE ADS    PHONE: 270-432-3291  
UP TO 25 WORDS \$12.00 - ADD ADDITIONAL NEWSPAPERS FOR ONLY \$5 EACH  
NEWSPAPERS SERVING-METCALFE-HART-BARREN-EDMONSON-CUMBERLAND-RUSSELL-BUTLER-ALLEN

### Edmonton Manor Apartments

Taking Applications for 1,2 & 3 Bedroom Apartments  
\*FREE Garbage! \*FREE Water!  
•Laundry Facilities •Playground •Total Electric  
•Rent Based on Income  
Equal Housing Opportunity

**432-3020**

### APARTMENTS NOW AVAILABLE

RENT BASED ON INCOME!  
SECTION 8 WELCOME!

Mon. & Wed. 8:00 AM - 4:30 PM  
270-432-4742 or  
Before 2 PM 270-432-3455  
Tues. & Thurs. 270-487-9116

### EDMONTON HEIGHTS

Professionally Managed By **WINTERWOOD INCORPORATED**

www.WinterwoodOnline.com  
312 Muncie Court, Edmonton, KY 42129  
TDD# 800-648-6055  
Income restrictions apply.

We are an equal opportunity provider and employer.

### WOOD FURNACES

**CENTRAL BOILER OUTDOOR WOOD FURNACES**  
Parts, accessories, insulated underground pipe and radiant floor heat supplies in stock

**SOUTHERN KY WOOD FURNACES**  
270-459-1840  
southernkywoodfurnaces.com

### \$3,000 REWARD

**\$3,000 Reward** for information/proof to convict person who stole these items from 458 Ralph Edwards Road, Edmonton: 2004 271 Massey Ferguson tractor, 800 Ford tractor, turning plow, A/C, microwave, and Furniture. Call (615) 670-3074

### APARTMENTS NOW AVAILABLE

RENT BASED ON INCOME!  
SECTION 8 WELCOME!

Mon. & Wed. 2:00 PM - 7:00 PM  
270-432-4742 or  
Before 2 PM 270-432-3455  
Tues. & Thurs. 270-487-9116

### STOCKTON APARTMENTS

Professionally Managed By **WINTERWOOD INCORPORATED**

www.WinterwoodOnline.com  
302 Rogers St • Edmonton, KY 42129  
TDD# 800-648-6055  
Income restrictions apply.

We are an equal opportunity provider and employer.

#### NOTICE OF APPLICATION

Glover Creek Solar, LLC, is proposing to construct a nonregulated electric transmission line located at 7449 Randolph-Summer Shade Road, Summer Shade, Metcalfe County, Kentucky. Glover Creek Solar, LLC, is required to file an application for a certificate of construction for the proposed nonregulated electric transmission line. This application is subject to the approval of the Kentucky State Board on Electric Generation and Transmission Siting, which can be reached at P.O. Box 615, 211 Sower Boulevard, Frankfort, Kentucky 40602-0615 or via telephone at (502) 564-3940.

YOUR LEADING REGIONAL NEWS SOURCE  
**sckentucky.com**  
The Jobe Newspaper Network

### READER LINE ADS UP TO 25 WORDS \$12.00

Add additional newspapers for ONLY \$5 EACH!

### LOGGING SERVICES

**STANDING TIMBER:** Nolin River Logging, Certified Kentucky Master Logger. In business since 1983. 270-528-1537.

### PETS

**PUPPIES, DOGS, KITTENS, AND CATS:** Glasgow/Barren County Animal Center. 175 Trojan Trail, or call 270-651-PAWS (7297)

## BUSINESS & SERVICES DIRECTORY

### APARTMENTS

**Tree Top Apartments**

Nationally Recognized as a Community of Quality

We have immediate openings for one, two and three bedroom units. All rent based on income. Newly remodeled! Washers and dryers in each unit. All electric appliances, two playgrounds, excellent maintenance dept.

Professionally Managed by:  
**ALCO Management, Inc., AMO**

**270-432-7010**  
102 Tree Top Drive  
Edmonton, Kentucky  
EDE/ME/D

### DON'T MISS A SINGLE ISSUE!

**SUBSCRIBE TO THE EDMONTON HERALD-NEWS \$31.95/Year**

116 S. Main Street • PO Box 87  
Edmonton, KY 42129  
Phone: 432-3291

### LOGGING

### WANTED: STANDING TIMBER

Money Grows On Trees

• Certified Logger • Licensed and Insured  
• References Available

Experience Makes The Difference

## ELI MILLER LOGGING

**270-524-2967**  
Please leave message

### LOGGING

### ATTENTION LOGGERS: WE NEED YOUR LOW GRADE LOGS!

We are a large consumer of low grade logs in Central Kentucky.

**Cub Run Hardwoods in Cub Run, KY and Eagle Lumber in Greensburg, KY**

### WE BUY YEAR ROUND!

**Tie Logs (Oak)**    **(Mixed Hwd Tie Logs)**    **Pallet Grade**

Call for current pricing!  
(Delivered to the mill. We can arrange freight to pick up at your yard. Call for specs.)

**CUB RUN HARDWOODS** Wilmer Yoder • 270-524-7811  
**EAGLE LUMBER** Rodney Zimmerman • 270-405-7472

## PROJECT

Metcalfe Industrial Development Authority met where a resolution was passed to increase a loan amount to \$825,000 with Edmonton State Bank, which Chairman Wes Jolly explained after the meeting is due to supply chain issues and added expenses, as well as price changes since the original bid for the overall scope of work.

Costs are listed in a line item expense report provided by Jolly that shows each paid invoice and where the funding came from for those invoices.

Invoices paid-to-date include: BRADD - \$6,000; MSE of KY, Inc. - \$125,625; Smith Land Surveying - \$4,950; Precision Engineering - \$3,900; and contractor Scott, Murphy, & Daniel - \$1,460,236.

Community development grants, Appalachian Regional Commission (ARC) and Community Development Block Grant (CDBG), have helped to fund a large portion of the project.

IDA received CDBG funding in the amount of \$1,000,000 and ARC funding, \$616,900, at the start of the project.

Currently, \$883,500 (CDBG) and \$422,923 (ARC) have been spent, according to the expense sheet, leaving an available balance between the two grant

funds of \$310,477.

Overall and according to the expense sheet, between the grants and the IDA funding, a total spent thus far totals \$1,600,711.

Costs that are expected but not yet invoiced will bring the total costs for the project to nearly \$2.5M.

Jolly said with regard to the numbers, "If everything holds true here, we're going to come in just by the hair of our chin."

If everything doesn't hold true, Jolly said they will need to figure out where additional funds are going to come from.

The minutes in a special-called meeting on Nov. 1 state the industrial board approved a Change Order (CO-3) following a conference call prior to the meeting between SMD, MSE, BRADD, and PS&C.

At that meeting, approval was made to write a resolution to amend the Lease to Buy agreement and last week, approval of the actual resolution was passed, allowing IDA to move forward with the \$825K ESB loan.

Metcalfe Judge/Executive Harold Stilts said last week in the meeting, "Whenever you do a change order, you're just at their mercy—they can charge you whatever they want to."

Jolly added, "When they bid a project, they need to hold within their bid, but we're not there yet."

Funds from the Rural Development Appalachian Project Program (RDAPP) with the Tennessee Valley Authority (TVA) have been received totaling \$452,820.50.

Jolly said those funds paid for two notes: \$133,629.25 to Edmonton State Bank for a loan payoff and \$261,565.19 to TVA, and the agreement made is to utilize the remaining funds for the stave project costs.

There have been delays along the way including supply chain issues and added expenses as well as price changes since the original bid to the overall scope of work, Jolly explained after the meeting. He also said stave equipment should be moved in the first week of December.

Jolly said the CDBG grant funding, according to agreements, will be paid back by PS&C over the span of 84-months.

"Those monies will be held in the county for reinvestment in small business in Metcalfe and the county will be establishing a 5-member board to manage those funds for an economical development standpoint."

## Super Crossword

12-01-22    WAX SHADES

**ACROSS**

- 1 Played golf on the green
- 7 Baseball card company
- 12 Indy sponsor
- 15 Andy's pal
- 19 Ryan and Tatum
- 20 Little Mermaid's name
- 21 Superman's love interest
- 23 Kitschy lawn adornment (1997)
- 25 Rotating part in a water pump
- 26 Chicago-to-Atlanta dir.
- 27 Fraternal org. with lodges
- 28 Canine with gray brindled fur (1993)
- 30 Carnival treat on a stick (1998)
- 35 Loch monster, informally
- 36 Shoe parts
- 37 Piccolo's kin
- 39 Skin art
- 43 Retail store's beginning?
- 44 Rice — (food brand)
- 46 Iowa college
- 48 Woman on "Frasier"
- 49 Plant also called bachelor's button (1958)
- 53 Glitzy display
- 57 Verse tribute
- 58 Counterpart of masc.
- 59 Test versions
- 60 Old- (quaint)
- 61 Sky, to the U.S. Air Force (2003)
- 66 Tax-deferred svgs. plan
- 67 Nestlé movie theater treats
- 68 Zadora of "Butterfly"
- 69 "That's a big yes from me!"
- 73 "Criminal Minds" aier
- 74 Grassland on the slope of a peak (1998)
- 78 Pond growth
- 81 Curt
- 82 P.O. arrival
- 83 Hip-hop "Dr."
- 84 Plant rolled about by the wind (1993)
- 86 Makeup of many dunes (1998)
- 90 Deg. for a future exec
- 91 Large tank
- 92 Novelist Jong
- 94 Often-refined resource
- 95 Capitol group
- 98 Life story: Abbr.
- 99 Gets by
- 103 Lose all feeling
- 106 Both pleasant and sad (1958)
- 109 "The final frontier" (1998)
- 113 See 54-Down
- 114 Caustic alkali
- 115 Muscle rotating the forearm to a palm-down position
- 116 What each of this puzzle's featured answers is (with the year it was introduced)
- 121 Lily Tomlin's little girl persona
- 122 Confine
- 123 Spelunking chamber
- 124 Pecans, e.g.
- 125 "Norma —"
- 126 Hops-drying ovens
- 127 Sports deals

**DOWN**

- 1 "Nova" genre, for short
- 2 Togetherness
- 3 Doctrines
- 4 "... we'll — a cup o' kindness ..."
- 5 Pixieish sort
- 6 WWW access inits.
- 7 Florida port
- 8 Sky hunter
- 9 Missed badly
- 10 Wooden pin
- 11 Vegas fixture
- 12 Gloppy stuff
- 13 Burial places
- 14 Calumet part
- 15 100% wrong
- 16 St. — (French resort)
- 17 Like Nash's "lama"
- 18 Feudal slave
- 22 Opera — (many a Handel work)
- 24 Basic skills
- 29 Suffix with hero
- 31 Smallish city
- 32 Royal Norse name
- 33 Little — (Dickens girl)
- 34 Yang go-with
- 38 Tried to hit, as a clay target
- 40 British trolley
- 41 Leak slowly
- 42 Rocker
- 43 Osbourne
- 44 — bit (just slightly)
- 45 — Martin (cognac)
- 46 Energy mogul
- 47 Pound divs.
- 49 Dairy animals
- 50 Norse god
- 51 Move, in Realtor lingo
- 52 "Just the Two —" (1981 hit)
- 54 With 113-Across, had some humble pie
- 55 Based on — story
- 56 Fancy crown
- 59 Square in the first bingo-card column
- 62 Mr. T movie
- 63 Biblical tower setting
- 64 Old hi-fi buys
- 65 "The Da Vinci Code" group
- 66 Suffix with hero
- 69 Apropos of
- 70 Old Icelandic saga
- 71 Michael who played Worf
- 72 Had liabilities
- 74 Confront
- 75 Often-refined resource
- 76 Sir Guinness 77 "— boy!"
- 78 S&L devices
- 79 Garage job
- 80 Certain Fed
- 81 Pan Am rival
- 85 Planet seen at sunset, old-style
- 86 Canon or Sony products, for short
- 87 Wave sound
- 88 Baking pans
- 89 Deli dish
- 93 Steal from
- 96 Go-between
- 97 Yeshiva text
- 98 Telly network
- 99 Cry feebly
- 100 Solidified
- 101 Pal of Pooh
- 102 Ships' backs
- 104 "Once — midnight dreary ..."
- 105 Seine feeder
- 107 "Taste this"
- 108 Cel figures
- 109 Not closed
- 110 Language of Pakistan
- 111 "Snap —!"
- 112 Canyon effect
- 117 Actor Stephen
- 118 Be a thespian
- 119 Road vehicle
- 120 Eggs

SUPER CROSSWORD PUZZLE ANSWERS CAN BE FOUND ON PAGE 5