

Glover Creek Solar, LLC  
Responses to Siting Board Staff's First Request for Information  
Case No. 2022-00356

Request No. 1:

Provide a schedule for the project.

Response No. 1:

Glover Creek Solar, LLC anticipates commencing construction of the line in Q2 of 2023 and completing construction of the line in late Q3 or early Q4 of 2023.

Responding Witness: Drew Chandler

Glover Creek Solar, LLC  
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Case No. 2022-00356

Request No. 2:

Refer to the Glover Creek Notice of Final Development Plan in Case No. 2020-00043. Also refer to the Application, Exhibit B.

- a. Explain why the Final Development Plan shows a different location for the project substation.
- b. Provide a map showing the correct location of the substation.

Response No. 2:

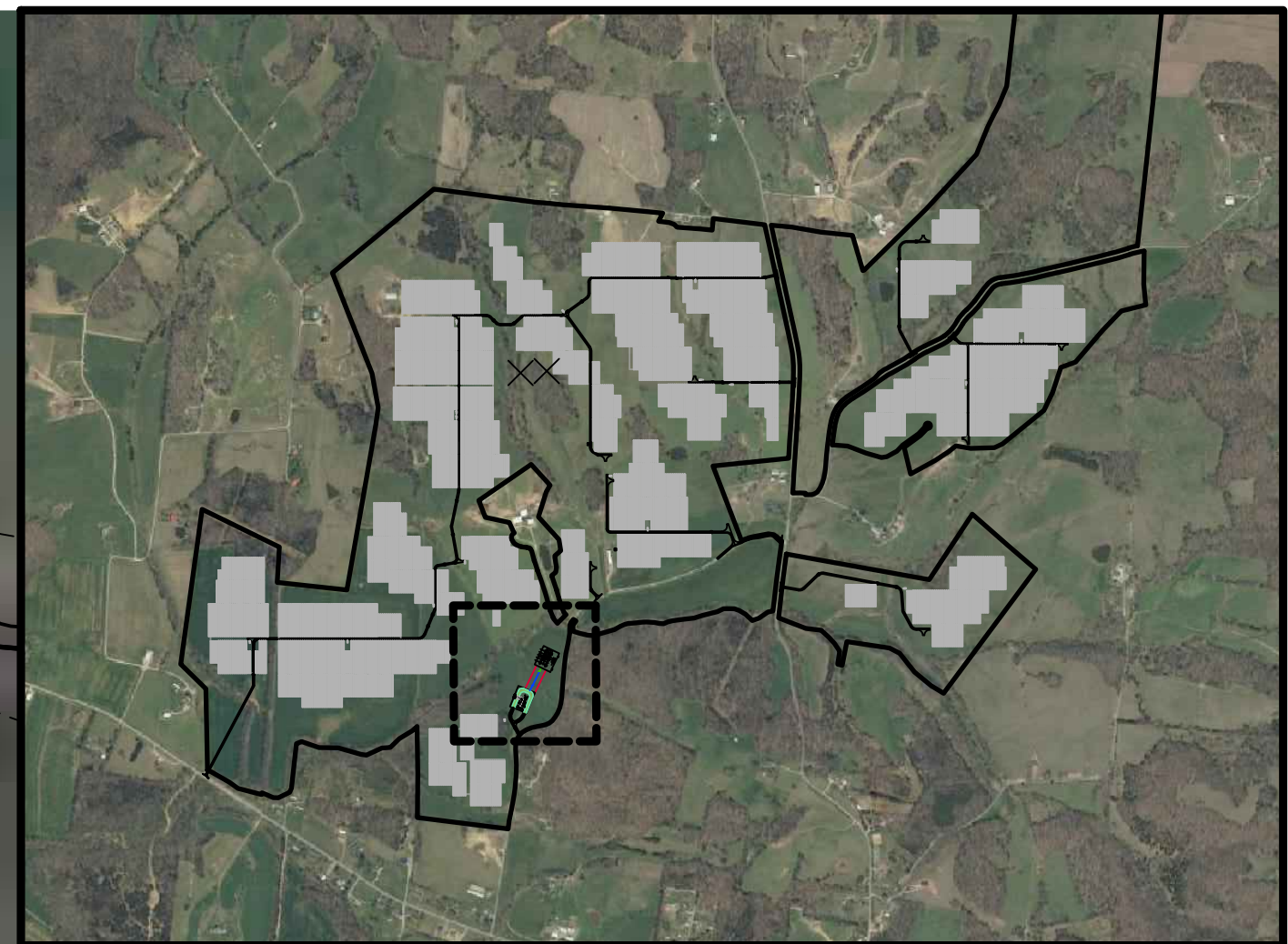
- a. The proposed location of the Glover Creek substation depicted in the context map provided as Exhibit B to the Application ("Context Map") matches the proposed location of the Glover Creek substation as depicted in the final site layout plan provided as Exhibit 1 to the Glover Creek Notice of Filing Final Site Plan in Case No. 2020-00043 ("Final Site Layout Plan"). In both maps, the Glover Creek substation's proposed location is just south of the existing East Kentucky Power Cooperative (EKPC) Patton Road-Summer Shade 69 kV transmission line. In addition, the proposed location of EKPC's switchyard is depicted consistently in the Context Map and the Final Site Layout Plan. In both maps the EKPC switchyard is shown just north of the EKPC Patton Road-Summer Shade 69 kV transmission line.
- b. While the final site layout plan and the Context Map both show the correct location of the substation, please see the attached map that further depicts the proposed location of the Glover Creek substation and the EKPC switchyard. The map also depicts the locations of the YY-1 switching pole, the proposed 200-foot nonregulated electric transmission line, the proposed 200-foot nonregulated electric transmission line's 100-foot right-of-way, the 30-foot transmission line to be constructed by EKPC, and the EKPC Patton Road-Summer

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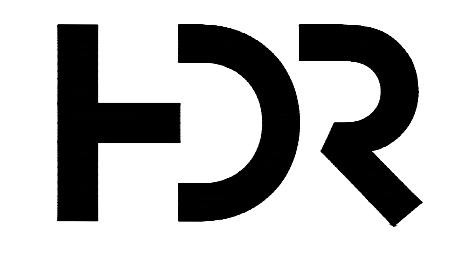
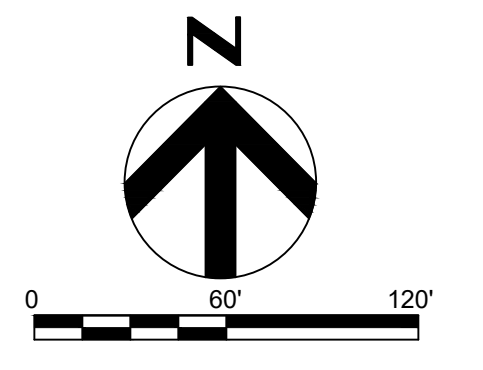
Shade 69 kV transmission line's 100-foot right-of-way, which will intersect with the right-of-way for Glover Creek's proposed nonregulated electric transmission line.

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Responding Witness: Drew Chandler

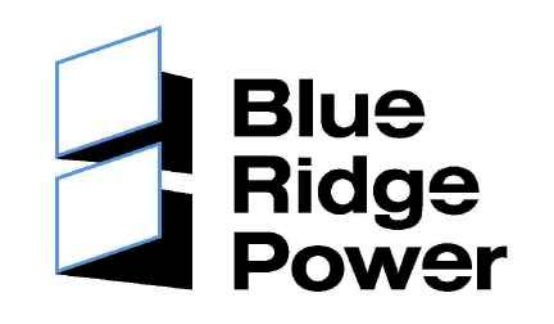


- UTILITY/CIVIL LINE SYMBOLOGY**
- OHE — UTILITY OVERHEAD LINE (EKPC)
  - OHE — OVERHEAD LINE (GLOVER CREEK, LLC)
  - — — — — PROPERTY LINE
  - — — — — EDGE OF PAVEMENT
  - — — — — RIGHT OF WAY (EKPC)
  - R/W — RIGHT OF WAY (GLOVER CREEK, LLC)
  - x — PROPOSED SECURITY FENCE
  - - - - - 25' WETLAND BUFFER
  - — — — — JURISDICTIONAL LINE
  - — — — — DITCH/STREAM
  - — POWER POLE (EKPC)
  - — POWER POLE (GLOVER CREEK, LLC)



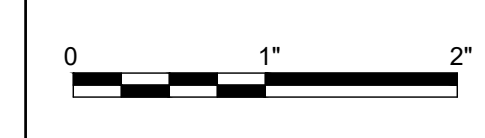
ISSUE	DATE	DESCRIPTION
A	1/13/2023	ISSUE FOR APPLICATION

PROJECT MANAGER	COREY SCHMITT, P.E.
DESIGNED BY	
DRAWN BY	
CHECKED BY	
PROJECT NUMBER	10334011



**BLUE RIDGE POWER (BRP)  
GLOVER CREEK SOLAR**

**INTERCONNECTION PLAN**



FILENAME | Z102.DWG  
SCALE | 1:60

SHEET  
Z102

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Request No. 3:

Refer to the Application, Exhibit B. Provide a detailed map showing the project substation, the YY-1 switching pole, the EKPC switching station, the 200-foot transmission line, the 30-foot transmission line being constructed by EKPC, and the 100-foot right-of-way.

Response No. 3:

Please see the map provided in Response 2b.

Responding Witness: Drew Chandler

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Request No. 4:

Refer to the Application, Exhibit A, September 23, 2022 Order, page 30. Also refer to the Application, Exhibit D. The September 23, 2022 Order stated the PJM Interconnect LLC (PJM) Facilities Study was to be completed in September 2020. The Application's Exhibit D does not include the Facilities Study. Provide the Facilities Study completed by PJM. If it still has not been completed, provided an estimated completion date.

Response No. 4:

Please see the attached *Generation Interconnection Facility Study Report for PJM Interconnection Request Queue Position – AE2-071 Patton Road Junction – Summer Shade 69 kV Solar Project – 55 MW* (the “Facilities Study”). Note that the map attached to the Facilities Study is out of date and depicts the East Kentucky Power Cooperative (EKPC) switchyard as being on the wrong side of the existing Patton Road-Summer Shade 69 kV transmission line. The EKPC switchyard relocation to the north side did not alter the underlying conclusions or permitting requirements of the attached PJM Facilities Study.

Responding Witness: Drew Chandler



***Generation Interconnection  
Facility Study Report***

***For***

***PJM Generation Interconnection Request  
Queue Position – AE2-071***

***Patton Road Junction – Summer Shade 69kV  
Solar Project – 55 MW***

**December 2022**

## General

Glover Creek Solar LLC, the Interconnection Customer, has proposed a solar generating facility located in Metcalfe County, Kentucky. This solar facility will have a total capability of 55 MW with 33 MW of this output being recognized by PJM as capacity. The assumed in-service date for this project is June 1, 2023. **This study does not imply an East Kentucky Power Cooperative commitment to this in-service date.**

### Point of Interconnection

AE2-071 will interconnect with the East Kentucky Power Cooperative (“EKPC”) transmission system at the new proposed Eighty Eight 69kV Substation, located along the EKPC Patton Road Junction-Summer Shade 69kV line near Summer Shade, KY.

### Cost Summary

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

Description	Total Estimated Cost
Attachment Facilities	\$1,110,000
Direct Connection Network Upgrades	\$3,735,000
Non Direct Connection Network Upgrades	\$1,145,000
Allocation for EKPC Network Upgrades for AE2-071	\$590,000
Allocation for non-EKPC Network Upgrades for AE2-071	\$0
<b>Total Estimated Costs for AE2-071</b>	<b>\$6,580,000</b>

## A. Transmission Owner Facilities Study Summary

### 1. General Description of Project

Glover Creek Solar LLC (“Glover Creek Solar”), the Interconnection Customer (“IC”), has proposed a 55 MW solar generating facility located near Summer Shade, in Metcalfe County, Kentucky. PJM studied the AE2-071 queue request as a 35 MW injection into the EKPC transmission system at a newly constructed 69kV switching station (“Eighty Eight Switching”). PJM evaluated these generation interconnection projects for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Some of the equipment will be built to 161kV standards to account for EKPC planned future system upgrades to 161kV in this portion of the EKPC system. The proposed in-service date is assumed to be **June 1, 2023**.



The intent of this study is to develop detailed engineering cost estimates and construction schedules for necessary EKPC transmission facilities and system reinforcements, and protection requirements to accommodate this Generator Interconnection Request.

## **2. Amendments to the System Impact Study Data or System Impact Study**

### **Results**

The project costs and construction schedule have been refined in this report for increased accuracy and thereby differ from that which was presented in the Feasibility and System Impact Study reports. All estimates have been created based on meeting the earliest in-service date possible at the request of the IC. EKPC estimates a fifteen (15) month implementation duration after a project kickoff meeting is held and the Interconnection Construction Service Agreement (“ICSA”) is signed. Therefore, the assumed Commercial Operation Date (“COD”) of June 1, 2023 (and requested backfeed date of May 1, 2023) may be possible if an Interconnection Construction Service Agreement (“ICSA”) is executed in an expedient manner. Any delay in the execution of this ICSA could result in a delay in the projected in-service date for EKPC’s required facilities.

### **Stability Analysis:**

1. PJM completed the stability analysis and determined the following that the AE2-071 project is responsible for the following:

The reactive power capability of AE2-071 does not meet the 0.95 lagging and leading PF requirement at the high-voltage side of the main transformer.

## **3. Interconnection Customer’s Milestone Schedule**

The IC’s assumed requested Commercial Operation Date (“COD”) for the Glover Creek Solar generation facility is **June 1, 2023**. The requested backfeed date for the project is May 1, 2023. Milestone details have not been provided for the IC’s schedule.

## **4. Scope of Interconnection Customer’s Work**

The Point of Interconnection (“POI”) will be the IC side of a 161kV-rated disconnect switch to be installed by EKPC at the interface between the IC-owned substation facilities and EKPC’s substation facilities at the new Eighty Eight Switching 69kV substation. This switch will be located on a steel structure immediately outside of the new Eighty Eight Switching substation. EKPC will install, own, operate, and maintain the switch structure/switch. The IC substation will be constructed in the vicinity of the new EKPC Eighty Eight Switching 69kV substation. The IC will install necessary 69kV equipment (bus conductors, jumpers, etc.) from this disconnect switch to its substation equipment. Note that EKPC is planning to convert the Eighty Eight Switching substation and the Patton Road Junction-Summer Shade line to 161kV operation in the future (expected in the 10-20 year future timeframe). The IC should design its substation accordingly and initially install as much equipment as possible that is rated for 161kV operation in order to prepare for this future voltage conversion.

The IC will be responsible for acquiring all rights-of-way, easements, and environmental approvals and permits for its facilities. The IC will be responsible for constructing, owning, operating, and maintaining its facilities, and EKPC will have no responsibility for any of these activities.

The IC will acquire sufficient property that is suitable for EKPC's new 69kV switching substation and will grant ownership of this property to EKPC at no cost. Prior to taking ownership, EKPC or its Representative will perform all necessary engineering and environmental reviews to ensure that the site is suitable. EKPC will have the right to request modifications to the site or to reject the site if it is not suitable for EKPC's needs.

## **5. Description of Facilities Included in Facilities Study**

This report describes the EKPC transmission system additions and upgrades necessary to support the IC's project.

EKPC will construct a 69kV switching station built to 161kV standards and a new 69kV loop-in tap from the EKPC Patton Road Junction-Summer Shade 69kV line section to accommodate the direct connection of the IC's substation facilities to the EKPC transmission system. EKPC will construct a 69kV (rated for 161kV operation) disconnect switch structure which will be the POI interface. A proposed one-line diagram and draft geographical footprint of the EKPC substation are included as Attachments 1 and 2 of this report.

EKPC will complete the required non-direct connection network upgrades at existing EKPC substations, which are system protection changes necessary at the Fox Hollow and Summer Shade Substations to accommodate the addition of this new facility. In addition, a new fiber optic connection using overhead optical ground wire ("OPGW") will be installed from the new Eighty Eight 69kV switching station to EKPC's existing Summer Shade Substation for communication purposes.

EKPC will also complete the required network upgrades identified as needed to address thermal loading issues impacted by the Glover Creek Solar facility. These upgrades consist of line capacity upgrades on the existing Edmonton/JB Galloway Junction-Knob Lick 69kV line section to 176<sup>0</sup> F operating temperature for the AE2-071 queue project to provide adequate thermal ratings for the line to accommodate the peak power flow with the generation facilities added to the system.

EKPC has also identified an issue with protecting the system due to the new 69 kV switching station required for interconnection of the Glover Creek Solar project. This new 69 kV switching station will create a 4-terminal transmission line, which cannot be adequately protected. EKPC has performed an engineering analysis of the protection for the area and determined that the existing transmission line switch W11-615 between the Temple Hill and Roseville distribution substations (i.e., the Temple Hill-Roseville Junction 69 kV line section) will need to be operated normally-open to eliminate this protection issue.

## **6. Total Costs of Transmission Owner Facilities included in Facilities Study**

The costs estimated below are in 2022 dollars and do not include a Contribution in Aid of Construction ("CIAC") Federal Income Tax Gross Up charge. This tax may or may not be charged based on IRS requirements.

<b>Description</b>	<b>Total Cost</b>
Attachment Facilities	\$1,110,000
Direct Connection Network Upgrades	\$3,735,000
Non Direct Connection Network Upgrades	\$1,145,000
Allocation for EKPC Network Upgrades for AE2-071	\$590,000
<b>Total Costs for AE2-071</b>	<b>\$6,580,000</b>

## **7. Summary of Milestone Schedules for Completion of Work Included in Facilities Study:**

A fifteen (15) month construction schedule is estimated from the date of a fully executed ICSA to complete construction of necessary EKPC facilities. This schedule is dependent on several factors, including convening a construction kickoff meeting immediately after execution of the ICSA. A more detailed construction schedule will be developed for the ICSA. EKPC’s construction shall not begin until all applicable permits, easements and land rights have been obtained.

This proposed schedule assumes the following:

1. Required transmission line outages can be scheduled as planned. Transmission line outages are:
  - a. typically not taken in the winter (December-February) periods,
  - b. cancelled during extreme weather conditions, and
  - c. in some cases, required to be scheduled twelve (12) months or more in advance.
2. No delays due to equipment delivery, environmental, regulatory, permitting, real estate, extreme weather, or similar events.
3. Procurement and/or construction delays due to the COVID-19 pandemic can be mitigated or will no longer be an issue when these activities start.
4. No significant sub-surface rock is encountered during construction, and soil conditions are suitable for EKPC standard ground grid and foundation installations.
5. Required easements for line installation (if necessary) and access to facilities can be acquired by EKPC in a timely manner.
6. Suitable and adequate substation property is provided to EKPC by the IC in a timely manner.
7. Necessary permits can be acquired and environmental reviews can be completed in a timely manner.

If any of these assumptions are not correct, the schedule is likely to be negatively impacted. EKPC’s preliminary milestone schedule beginning from the project kickoff meeting month is shown below.

<b>Description</b>	<b>Start Month</b>	<b>Completion Month</b>
<i>Project Kickoff Meeting</i>	Month 0	Month 0
<i>Transmission Line Design</i>	Month 1	Month 4
<i>Substation Design (Including Site Grading Design)</i>	Month 1	Month 7
<i>Procure Materials and Equipment</i>	Month 3	Month 13
<i>Edmonton/JB Galloway Junction-Knob Lick 69kV Line Conductor Temperature Upgrade</i>	Month 8	Month 11
<i>Site Preparation</i>	Month 8	Month 10
<i>Summer Shade-Eighty Eight 69kV Transmission Line OPGW Installation</i>	Month 10	Month 13
<i>Substation Construction</i>	Month 10	Month 14
<i>Patton Road Junction-Summer Shade 69kV Transmission Line Loop-In Construction</i>	Month 11	Month 14
<i>Remote End Relay Setting Updates at Fox Hollow and Summer Shade Substations</i>	Month 14	Month 15
<i>Commissioning and Testing</i>	Month 14	Month 15

**8. Technical Considerations/Requirements:**

The proposed facility must meet EKPC’s published facility connection requirements. The latest version of these requirements can be accessed via the following link:

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

The following discussion of requirements regarding connection of inverter-based generating facilities to the EKPC system is excerpted from this document (section 5.9).

*A Generating Facility comprising static inverters shall utilize inverters that have been tested and certified to UL 1741 with Advanced Inverter functionality (UL 1741 SA or subsequent UL equivalent), by a NRTL certified by OSHA to perform the UL 1741 SA test standard. The programming/set points to be determined per EKPC recommendations and proof such shall be provided by the IC (i.e. certified test report, inverter settings print-out, and/or EKPC inspection/validation). Unity power factor shall be the default mode unless otherwise determined*

by mutual consent between EKPC and the IC. At a minimum, the following grid support features are required unless otherwise specified by EKPC:

- a) *Anti-Islanding – Support anti-islanding to trip off under extended anomalous conditions*
- b) *Volt/Var Mode – Voltage/Var control through dynamic reactive power injection through autonomous responses to local voltage measurement*
- c) *Volt/Watt Mode – Voltage/Watt control through dynamic reactive power injection through autonomous responses to local voltage measurement*
- d) *Fixed Power Factor Mode – Reactive Power by fixed power factor*
- e) *Constant Reactive Power Mode – Reactive power by a fixed percentage of kVA rating of the inverter nameplate*
- f) *Frequency/Watt Mode – Frequency/Watt control to counteract frequency excursions beyond normal limits by decreasing or increasing real power*
- g) *Low/High Voltage Ride-Through (LHVRT) – Ride-through of low/high voltage excursions beyond normal limits*
- h) *Low/High Frequency Ride-Through (LHFRT) - Ride-through of low/high frequency excursions beyond normal limits*
- i) *Ramping – Capability to define active and reactive power ramp rates*
- j) *Soft-Start Reconnection – Reconnect after grid power is restored*
- k) *Cease to Energize – Capability to remotely turn off active power delivery*
- l) *Power Curtailment – Capability to remotely curtail the active power production within the range of 0% to 100%*

*A redundant over/undervoltage relay will be required for static inverters with an AC output nominal rating of  $\geq 1000$  kW, or whenever the aggregate inverter AC output nominal rating of a Generating Facility  $\geq 1000$  kW. For installations  $\geq 10$  MW redundant over/undervoltage and over/underfrequency protection will be required. Such protection shall be applied to one or more breakers external to the inverter(s).*

*The IC shall ensure, at a minimum, that the inverter performance tests specified below are performed and certified by a NRTL to ensure compliance with the following sections of IEEE1547-2018 Section 7.0 Power Quality*

- a. *Section 7.1 Limitation of DC Injection*
- b. *Section 7.2 Limitation of Voltage Fluctuations induced by the DER*
- c. *Section 7.3 Limitation of Current Distortion*
- d. *Section 7.4 Limitation of Overvoltage Contribution*

*The IC shall provide EKPC with a copy of the test results and certification from the NRTL, for EKPC review and approval.*

## **B. Transmission Owner Facilities Study Results**

The facilities identified to be installed, replaced, and/or upgraded by EKPC to accommodate the proposed project are described in this section. During detailed design and analysis, other components may be identified for installation or replacement due to this project.

## **1. Transmission Lines – New**

A new loop-in tap line will be constructed from EKPC’s existing Patton Road Junction-Summer Shade 69kV transmission line to the new Eighty-Eight Switching 69kV substation as shown in Attachment 2 of this report. The new transmission line loop-in facilities will be owned, operated, and maintained by EKPC. Four (4) new transmission poles, designed to 161kV standards, will be installed to facilitate the connection to the existing line section and looping the line in/out of the new switching station. The loop from the Patton Road to Summer Shade 69kV line to the new substation is expected to extend approximately 175 feet from the existing 69kV centerline. **(PJM ID n7849)**

The estimated cost for the new line construction for this project is \$555,000.

### **Transmission Line Assumptions:**

The following general assumptions have been included for the transmission line information provided:

1. Required transmission line outages can be scheduled as planned. Transmission line outages are:
  - a. typically not taken in the winter (December-February),
  - b. cancelled during extreme weather conditions, and
  - c. in some cases, required to be scheduled twelve (12) or more months in advance.
2. No delays due to equipment or material delivery, environmental, regulatory, permitting, real estate, extreme weather, or similar events.
3. No significant sub-surface rock encountered during construction, and soil conditions are suitable for standard foundation installations.
4. The primary access point for the transmission line work will be along the substation site and/or existing roads.

The following engineering assumptions have been included for the transmission line information provided:

1. Foundation analyses have not been performed. Information provided assumes that no significant foundation or structural issues are present. All dead-end structures will be guyed and do not require concrete foundations.
2. Construction will be scheduled to avoid winter peak load periods (December-February).
3. The preliminary schedule assumes that transmission line outages can be obtained as necessary.
4. Material and equipment costs are based on current (March 2022) pricing.
5. Easements, if necessary, shall be acquired by EKPC or provided by IC.
6. Environmental permits and reviews shall be completed by EKPC or its Representative and can be completed in a timely manner.

## **2. Transmission Line – Modifications/Upgrades**

An upgrade of the maximum operating temperature of the 266 MCM ACSR conductor on the Edmonton/JB Galloway Junction-Knob Lick (5.7 miles) 69kV line section is required to address overloads of this line section identified in the System Impact Study for these queue projects. EKPC determined that the conductor operating temperature will need to be upgraded to 176 degrees Fahrenheit (**PJM ID N6494**) for the addition of the AE2-071 project to provide adequate ratings for the line section.

For the upgrade to 176 degrees Fahrenheit, five (5) tangent h-frame structures are required to be replaced and five (5) h-frame structures will be modified to add shield-wire bayonet extensions to both poles to maintain adequate clearances to operate the line at the higher conductor operating temperature. The five (5) h-frame structures for which bayonets will be added will also require cross-bracing to be added to the existing structures. Additionally, one (1) structure will have insulator weights installed to mitigate swing caused due to an adjacent structure replacement.

The estimated cost for the maximum conductor operating temperature increase to 176 degrees Fahrenheit is \$590,000 for the Edmonton/JB Galloway Junction-Knob Lick line section.

Overhead optical ground wire (“OPGW”) installation will be required to meet communications requirements for the new EKPC Eighty Eight Switching substation. Therefore, OPGW installation on the Eighty Eight-Summer Shade 69kV line section (1.7 miles) is required (**PJM ID n7852**).

In order to accommodate the OPGW installation and replacement of the existing shield wire, three (3) monopole tangent structures shall be replaced with new structures, three (3) tangent structures shall be reframed with horizontal line post insulators, and four (4) structures shall have bayonets installed.

The estimated cost for the new OPGW installation necessary to facilitate this project is \$500,000.

## **3. New Substation/Switchyard Facilities**

EKPC will build a new 69kV switching station (“Eighty Eight Switching”) built to 161kV standards in the vicinity of the IC’s substation for interconnection of the new generating facility. The new switching station will be constructed near EKPC’s Patton Road Junction-Summer Shade 69kV transmission line, approximately 10.1 miles from the Patton Road Junction location and 1.7 miles from Summer Shade Substation. This new 69kV switching station will be owned, operated, and maintained by EKPC. (**PJM ID n7848**)

The major equipment and material associated with the new switching station is listed below:

<b>QTY</b>	<b>Unit</b>	<b>DESCRIPTION</b>
1	Each	161kV High Profile Substation Structure
4	Each	69kV, 2000 Amp Circuit Breakers
11	Each	161kV GOAB Switches
1	Lot	Electrical Material (insulators, terminals, etc.)
1	Each	Station Service Transformer, 100 KVA (40kV-120/240V)
9	Each	Arresters, Lightning 69kV Station 48 MCOV Polymer
3	Each	Stand Alone Metering CT Units, 69kV
3	Each	PT's, 69kV

For attachment facilities, EKPC will also construct a 161kV switch structure to provide a single stand-alone isolation point between the EKPC switching station and the IC substation. The POI between EKPC and the IC will be the 4-hole pad on the disconnect switch on this structure. The IC will build its bus conductors from its facilities to this demarcation point. This switch will be located on a steel structure immediately outside of the new Eighty Eight Switching substation. EKPC will own, operate, and maintain this switch and its associated structure. The attachment facilities also include the required interconnection metering facilities and telecommunications facilities installed by EKPC on the connection facilities between the new EKPC substation and the IC substation.

The IC is responsible for construction of all of the facilities on its side of the POI, as shown in the attached one-line diagram.

The IC is responsible for obtaining property rights for the EKPC switching station site and deeding the property to EKPC. EKPC also assumes that the IC will provide all necessary easements for a permanent road to provide substation access. This substation access shall be from an existing county or state road. The IC will convey these rights to EKPC if they own the property on which the substation access road will be located. Otherwise, EKPC will need to acquire the access rights from the owner of the property.

### **System Protection**

The following system protection scope of work applies for this project. All system protection equipment described in this section will be owned, operated, and maintained by EKPC.



Control House: EKPC shall procure and install a drop-in style control building fully furnished and complete with one bus differential panel, three transmission line panels (this includes the connection to the solar facility), one transfer breaker panel, one SCADA panel, two telecom panels, two 125V DC battery banks, and all required operating equipment.

Relay Panels: EKPC shall install the following panels:

- Panel 1 - Standard bus differential panel complete with P1 SEL-587Z and P2 SEL-487B relays tripping P1 & P2 lock out relays. One (1) SEL-2407 GPS satellite clock.
- Panel 2 – Summer Shade Line. Standard line panel with P1 & P2 SEL-421 relays. A SEL-451 relay shall be utilized for breaker control, breaker failure, and reclosing. The P1 & P2 relays do not have a piloting scheme.
- Panel 3 – Patton Road Junction Line. Standard line panel with P1 & P2 SEL-421 relays. A SEL-451 relay shall be utilized for breaker control, breaker failure, and reclosing. The P1 & P2 relays do not have a piloting scheme.
- Panel 4 – AE2-071 Solar Connection. Standard line panel with P1 & P2 SEL-421 relays. A SEL-451 relay shall be utilized for breaker control, breaker failure, and reclosing. The P1 and P2 relays will utilize a high-speed POTT scheme over fiber. A SEL-735 meter will be added for revenue metering.
- Panel 7 – Transfer Bus. Standard transfer bus panel with P1 & P2 SEL-421 relays. A SEL-451 relay shall be utilized for breaker control, breaker failure, and reclosing. The line panel shall have the capability to transfer the other circuit breaker terminals.
- Panel 18 – Standard SCADA panel with Novatech OrionLX RTU, Novatech OrionLX Port Expander, and Novatech Orion I/O.
- Telco Panel 1 – Newmar breaker distribution panel, one (1) 48V Unipower Sageon Base System and two (2) sets of 190Ah 48V battery banks.
- Telco Panel 2 – Newmar fuse distribution panel, two (2) MOXA ethernet switches and two (2) RLH Optimum 2 RU fiber patch panel.

EKPC requires the IC to utilize all Schweitzer Engineering Laboratories (SEL) relays and related protective equipment for facilities that will be interconnecting or communicating with EKPC relaying. EKPC reserves the right to specify relays or other protective equipment utilized in the IC substation as required based on the protection schemes utilized. All protection system designs shall be reviewed by EKPC’s System Protection department or its designee during the design phase to ensure proper clearing times, coordination, and compliance with applicable NERC regulations.

Control cables shall be pulled from the new breakers and other required equipment to the control house.

Commissioning: Each relay panel shall be fully commissioned prior to being placed in service. Commissioning shall include AC current and potential circuits, DC functional, relay testing, and end-to-end testing where required.

The estimated total cost for the Eighty Eight Switching Station and system protection construction for this project is \$4,845,000. This estimate also includes costs for metering and telecommunications equipment that will be located inside the new EKPC substation. The estimated cost of \$4,845,000 includes \$1,110,000 for the attachment facilities between the IC substation and the new EKPC substation, as follows:

- \$200,000 for the 69kV (rated for 161kV) switch structure and switch for isolation
- \$150,000 for interconnection metering facilities
- \$760,000 for the 69kV circuit breaker, disconnect switches, relay panel, and for telecommunications facilities between the EKPC substation and the IC substation

### **Substation & System Protection Assumptions:**

The following general assumptions have been included for the substation information provided:

1. No delays due to equipment or material delivery, environmental, regulatory, permitting, property/easement acquisitions, extreme weather, or similar events.
2. No significant sub-surface rock encountered during construction, and soil conditions suitable for standard ground-grid and foundation installations.
3. IC shall acquire an adequate and suitable site and grant ownership to EKPC to accommodate EKPC's interconnection substation, as mentioned above.
4. The IC will provide all necessary easements for a permanent road to provide substation access. This substation access shall be from an existing county or state road. The IC will convey these rights to EKPC if they own the property on which the substation access road will be located. Otherwise, EKPC will need to acquire the access rights from the owner of the property.

The following engineering assumptions have been included for the substation information provided:

1. Neither foundation nor structural analyses have been performed. Information provided assumes that no significant foundation or structural issues are present.
2. The schedule assumes no issues related to scheduling outages of existing transmission lines to terminate into the new substation.
3. Material and equipment-related costs are based on current (March 2022) pricing.
4. Environmental permits and reviews will be completed by EKPC or its Representative and can be completed in a timely manner.

## **4. Upgrades to Substation/Switchyard Facilities**

EKPC shall complete the required non-direct connection network substation upgrades, which will include system protection changes at both the existing Fox Hollow and Summer Shade 69kV substations to accommodate the addition of this new facility.

Fox Hollow – Relay settings shall be reviewed for the Fox Hollow -Summer Shade 69kV line to accommodate the new Eighty Eight Switching station, and relay files will be updated accordingly. The estimated total cost of this work at Fox Hollow is \$45,000. **(PJM ID n7850)**

Summer Shade – Relay settings shall be reviewed for the Fox Hollow-Summer Shade 69kV line to accommodate the new Eighty Eight Switching station, and relay files will be updated accordingly. The estimated total cost of this work at Summer Shade is \$45,000. **(PJM ID n7851)**

EKPC has identified an issue with protecting the system due to the new 69 kV switching station required for interconnection of the Glover Creek Solar project. This new 69 kV switching station will create a 4-terminal transmission line, which cannot be adequately protected. EKPC has performed an engineering analysis of the protection for the area and determined that the existing transmission line switch W11-615 between the Temple Hill and Roseville distribution substations (i.e., the Temple Hill-Roseville Junction 69 kV line section) will need to be operated normally-open to eliminate this protection issue. The estimated cost of this work is \$0.

Therefore, the estimated total cost for the relay settings changes at the existing remote ends of the lines to be connected to the Eighty Eight Switching Station is \$90,000.

## **5. Metering & Communications**

### **EKPC Metering:**

Metering requirements for this facility include the installation of EKPC’s standard revenue-quality metering package, including potential transformers, current transformers, remote-terminal unit and associated SCADA equipment.

The cost for installation of the metering facilities contained in the new EKPC substation are included in the substation costs provided in Section 3 above.

### **Metering Assumptions:**

The following assumptions have been included for the metering information provided:

1. No delays due to equipment or material delivery, environmental, regulatory, permitting, real estate, extreme weather, or similar events.
2. Fiber-optic cable and associated equipment installation is completed as scheduled.
3. Material and equipment-related costs are based on current (March 2022) pricing.
4. Once fiber-optic cable installation is complete the fiber will not be damaged.

### **Communications:**

EKPC shall use telecommunications equipment that matches its current network and equipment requirements.

A 48-count ADSS fiber will be installed between the EKPC substation control house and the IC facility for relaying, metering, and SCADA circuit requirements. The exact details and installation plans for this fiber will be developed during project scoping.

The cost for installation of the telecommunications facilities contained in the new EKPC substation are included in the substation costs provided in Section 3 above.

### **Communications Assumptions:**

The following assumptions have been included for the telecommunications information provided:

1. No delays due to equipment or material delivery, environmental, regulatory, permitting, real estate, extreme weather, or similar events.
2. Material and equipment-related costs are based on current (March 2022) pricing.
3. Once fiber-optic cable installation is complete the fiber will not be damaged.

## **6. Other Required Upgrades**

No other required upgrades were identified on the EKPC transmission system.

## **7. Environmental, Real Estate and Permitting Issues**

The IC is responsible for obtaining all of the required property rights to provide EKPC ownership of the new switching station site, as well as any other property ownership needed for the switching station access road and the transmission tap line, if appropriate. The IC shall convey the necessary property rights to EKPC for construction of its facilities. The IC shall work directly with EKPC when acquiring these rights to ensure that they meet EKPC requirements and standards.

EKPC or its Representative will perform all necessary environmental assessments and obtain all necessary permits/approvals associated with construction of all EKPC facilities required to facilitate the interconnection of the new generating facility. This includes the Stormwater Pollution Prevention Plan, obtaining the KYR 10 stormwater permit, and conducting the necessary SWPPP inspections prior to all construction activities.

The following general assumptions have been included for environmental permitting requirements:

1. For the IC's project, there are no "federal actions" (i.e. federal financial assistance or grants; or federal permit, license or approval) present that would trigger NEPA compliance obligations for the EKPC facilities as a connected action.
2. Substation location will remain in the currently identified location, which is approximately 150 feet west of the point where EKPC's Patton Road Junction-Summer Shade 69kV transmission line crosses Big Jack Road (see Attachment 2). Relocation of the substation site would require a re-evaluation of the permitting obligations.

## **8. Cost Summary**

The necessary projects and estimated costs to facilitate interconnection of the AE2-071 queue project (Glover Creek Solar) are summarized in the tables below:

Description	Direct Labor	Direct Material	Indirect Labor	Indirect Material	Total
<b>Attachment Facilities</b>					
EKPC to install necessary equipment (a 69kV isolation switch structure and associated switch [rated for 161kV operation], 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	\$405,000	\$410,000	\$150,000	\$145,000	\$1,110,000
<b>Direct Connection</b>					
EKPC to construct a new 69kV switching station built to 161kV standards (Eighty Eight Switching) to facilitate connection of the Glover Creek Solar generation project ( <b>PJM ID n7848</b> )	\$1,340,000	\$1,425,000	\$480,000	\$490,000	\$3,735,000
<b>Non-Direct Connection</b>					
EKPC to construct facilities (~175 feet) to loop the existing Patton Road Junction-Summer Shade 69kV line section into the new Eighty Eight Switching substation ( <b>PJM ID n7849</b> )	\$390,000	\$85,000	\$70,000	\$10,000	\$555,000

Description	Direct Labor	Direct Material	Indirect Labor	Indirect Material	Total
EKPC to modify relay settings at Fox Hollow substation for existing line to Eighty Eight Switching station <b>(PJM ID n7850)</b>	\$28,000	\$0	\$17,000	\$0	\$45,000
EKPC to modify relay settings at Summer Shade substation for existing line to Eighty Eight Switching substation <b>(PJM ID n7851)</b>	\$28,000	\$0	\$17,000	\$0	\$45,000
EKPC to install OPGW in the Summer Shade-Eighty Eight 69kV line section (1.7 miles) <b>(PJM ID n7852)</b>	\$355,000	\$65,000	\$70,000	\$10,000	\$500,000
<b>EKPC Network Upgrades</b>					
EKPC to upgrade the maximum operating temperature of the 266 MCM ACSR conductor in the Edmonton/JB Galloway Junction-Knob Lick 69kV line section (5.7 miles) to 176 degrees F. <b>(PJM ID N6494, needed for AE2-071)</b>	\$340,000	\$155,000	\$75,000	\$20,000	\$590,000
<b>Total Estimated Facility Costs for AE2-071</b>	<b>\$2,886,000</b>	<b>\$2,140,000</b>	<b>\$879,000</b>	<b>\$675,000</b>	<b>\$6,580,000</b>

<b>Total Estimated Costs of EKPC Facilities</b>	
Description	Total Cost
Attachment Facilities	\$1,110,000
Direct Connection Network Upgrades	\$3,735,000
Non Direct Connection Network Upgrades	\$1,145,000
Other EKPC Network Upgrades for AE2-071	\$590,000
<b>Total Costs for AE2-071</b>	<b>\$6,580,000</b>

<b>AE2-071 Cost Responsibility for Estimated Costs</b>	
<b>Description</b>	<b>Cost Responsibility</b>
Attachment Facilities	\$1,110,000
Direct Connection Network Upgrades	\$3,735,000
Non-Direct Connection Network Upgrades	\$1,145,000
Other EKPC Network Upgrades	\$590,000
<b>Total Costs</b>	<b>\$6,580,000</b>

## **9. EKPC Oversight Costs for Customer Self-Build Option**

The PJM Tariff allows an Interconnection Customer to exercise the Option-to-Build alternative during the ISA/ICSA execution phase with regard to a new greenfield substation needed to facilitate the generation facility interconnection to the transmission system. For the Glover Creek Solar project, the IC will have the option to build the Eighty Eight 69kV Switching Station. EKPC’s estimated cost of \$600,000 for the Option-to-Build alternative includes the following costs:

- \$220,000 for substation construction oversight.
- \$380,000 for design review, project coordination activities, and witness testing and commissioning for the Option-to-Build alternative.

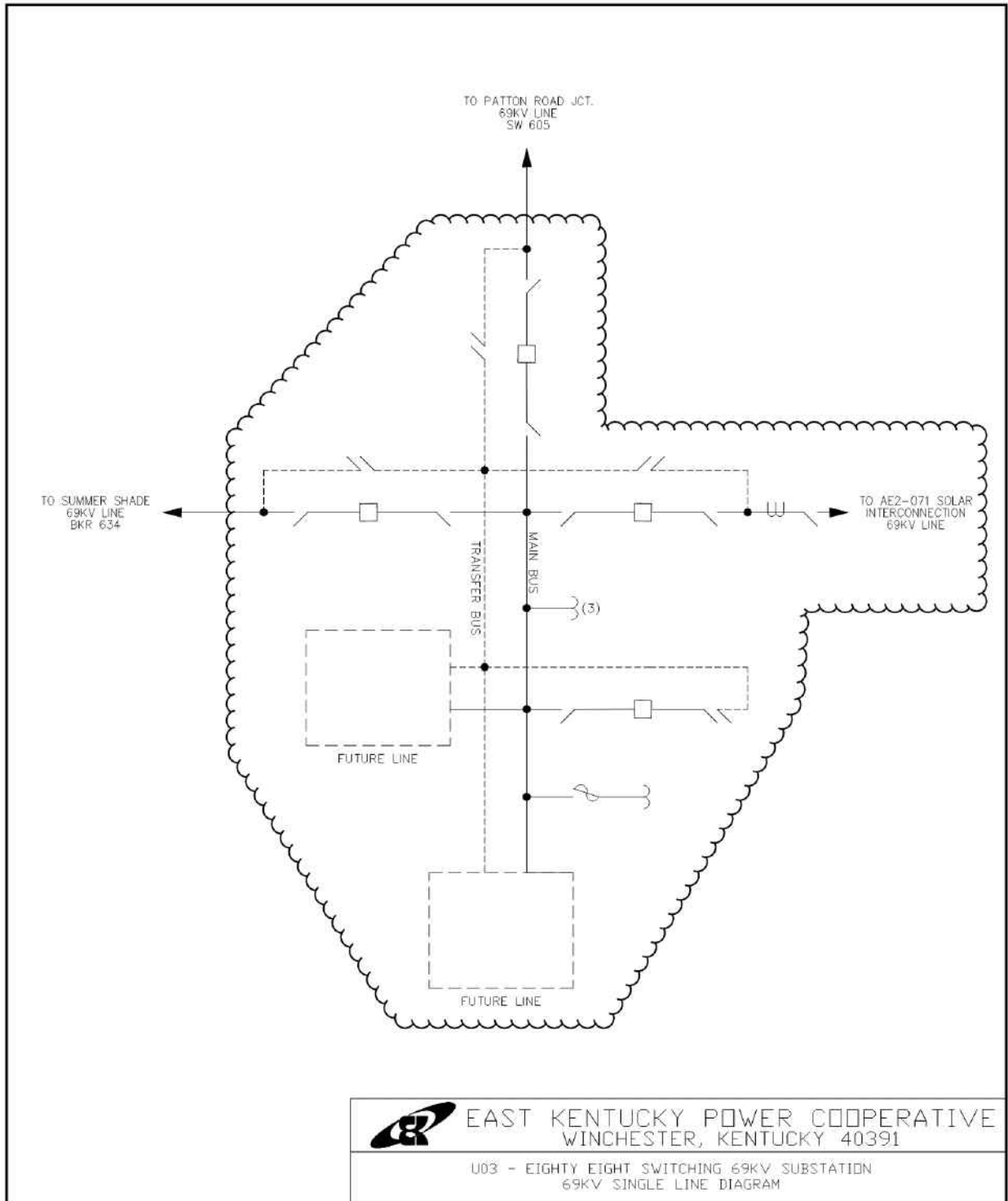
## **10. Attachments**

Attachment 1 – EKPC Temporary One Line Diagram

Attachment 2 – EKPC General Substation Location/Layout

# Attachment 1:

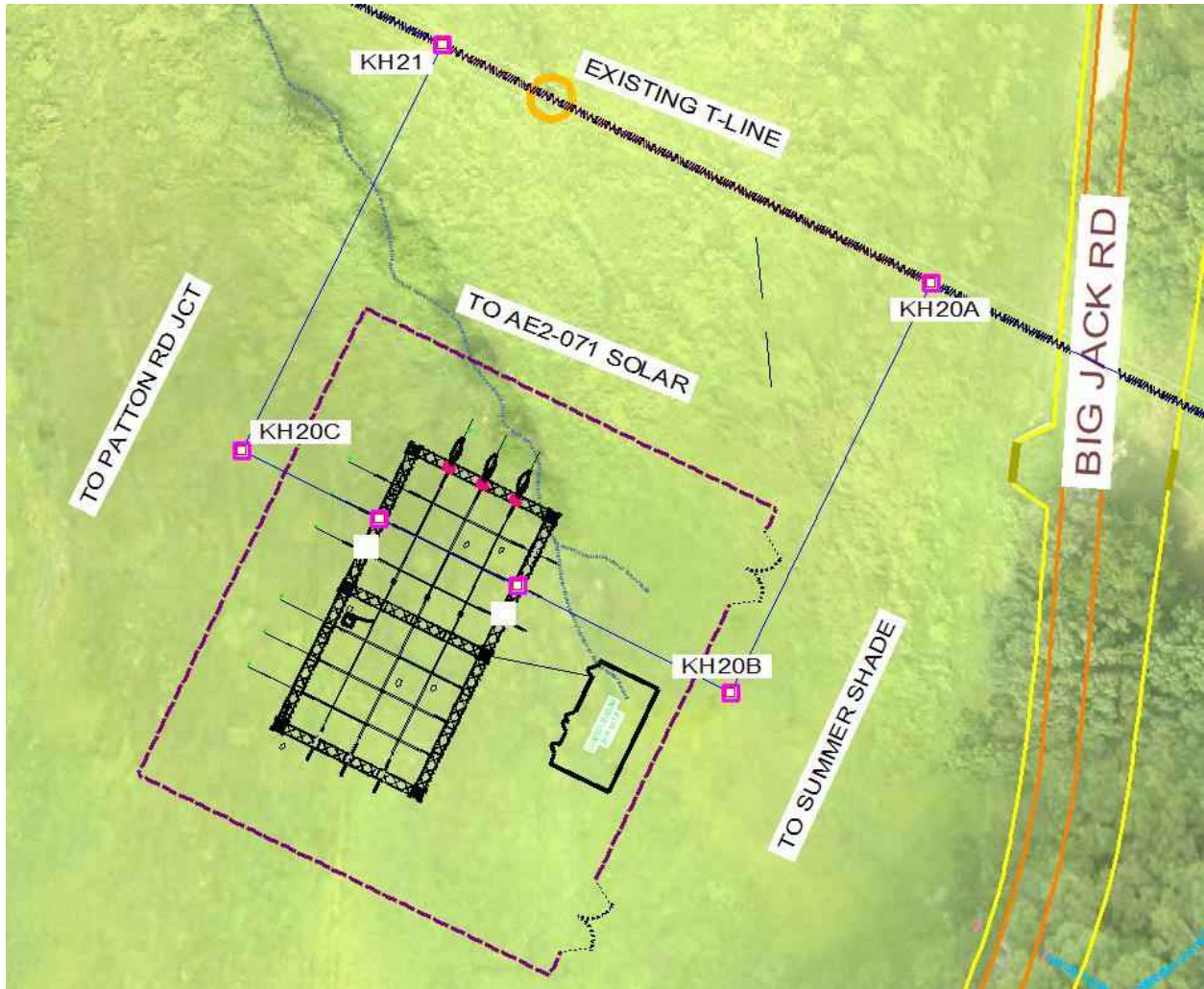
## Eighty Eight Switching Single Line Diagram





*Attachment 2:*

***EKPC Station General Location/Layout***



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Glover Creek Solar, LLC  
Responses to Siting Board Staff's First Request for Information  
Case No. 2022-00356

Request No. 5:

Explain if any additional permits are required by Metcalfe County for the nonregulated transmission line. If required, provide details about the status of those permits.

Response No. 5:

A Metcalfe County building permit is required for constructing the nonregulated transmission line. Glover Creek Solar, LLC's contractor applied for and received the building permit on June 29, 2022. While no other county-level permits are required to construct the nonregulated electric transmission line, Glover Creek Solar, LLC obtained an electrical permit from the Kentucky Department of Housing, Buildings and Construction on October 31, 2022.

Responding Witness: Drew Chandler

Glover Creek Solar, LLC  
Responses to Siting Board Staff's First Request for Information  
Case No. 2022-00356

Request No. 6:

Explain how Glover Creek will minimize adverse impacts of the transmission line on the scenic assets of Metcalfe County.

Response No. 6:

The proposed 69 kV nonregulated electric transmission line will have minimal adverse impacts to Metcalfe County's scenic assets. Glover Creek Solar, LLC's proposed nonregulated transmission line will cross under an existing 69 kV transmission line owned by EKPC, so the new transmission line will not be out of character with the area. The proposed line will be constructed entirely on a parcel owned by a participating landowner, and all adjoining parcels are owned by participating landowners. Further, the proposed nonregulated electric transmission line will be located adjacent to the northern terminus of the Metcalfe County-owned Big Jack Road, which is not subject to regular through-traffic.

Responding Witness: Drew Chandler

Glover Creek Solar, LLC  
Responses to Siting Board Staff's First Request for Information  
Case No. 2022-00356

Request No. 7:

Explain any interstate benefits expected to be achieved by the proposed nonregulated transmission line.

Response No. 7:

The power generated from the Glover Creek Solar project will be sold to the PJM Interconnection (PJM) wholesale market. PJM operates and manages the wholesale electricity market serving 65 million people in a region spanning 13 states and the District of Columbia. This interstate reach ensures reliable power is delivered to homes and businesses and provides capacity for the future by enabling that energy to be exchanged economically when less expensive resources in one area can be used to meet consumer demand in another area.

Responding Witness: Drew Chandler

Glover Creek Solar, LLC  
Responses to Siting Board Staff's First Request for Information  
Case No. 2022-00356

Request No. 8:

State whether a power purchase agreement has been made. If so, provide a copy of the power purchase agreement.

Response No. 8:

Applicant does not have a traditional power purchase agreement for this project, but has executed a virtual PPA wherein the renewable energy credits are sold to a buyer. The power will be sold on the PJM marketplace. Applicant objects to provision of the virtual PPA based on relevance to this proceeding and the confidential nature of the agreement.

Responding Witness: Drew Chandler

Glover Creek Solar, LLC  
Responses to Siting Board Staff's First Request for Information  
Case No. 2022-00356

Request No. 9:

Identify and describe the National Electric Safety Code (NESC) requirements for the nonregulated transmission line.

Response No. 9:

Glover Creek intends to comply with all National Electric Safety Code (NESC) requirements applicable to its proposed 69 kV nonregulated electric transmission line. The proposed 69 kV tie-line will be built in accordance with the 2017 NESC, including but not limited to, Section 21 General Requirements, Section 23 Clearances for Zone 2, and Table 124-1 Clearances from live parts for 72.5 kV and 350 kV BIL, and Section 250 Medium Loading District. The NESC includes numerous requirements related to the construction of the nonregulated transmission line. These include, but are not limited to:

- Clearances: The NESC specifies minimum clearances that must be maintained between the transmission lines and other structures or obstacles, such as buildings, roads, and waterways.
- Structures: The NESC sets requirements for the strength and stability of the structures that support the transmission lines, including towers, poles, and guy wires.
- Conductors: The NESC specifies the types of conductors that can be used in 69 kV transmission lines, as well as the minimum size and strength of the conductors
- Protection: The NESC sets requirements for the protection of transmission lines from damage, such as from lightning strikes or falling trees.
- Maintenance: The NESC requires regular inspections and maintenance of transmission lines to ensure they are safe and in good working condition.

Responding Witness: Drew Chandler