



**INTERCONNECTION  
FACILITIES STUDY  
REPORT**

GEN-2017-191

Published April 2023

By SPP Generator Interconnections Dept.

## REVISION HISTORY

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| DATE OR VERSION NUMBER | AUTHOR | CHANGE DESCRIPTION                             |
|------------------------|--------|--|
| 04/13/2023             | SPP    | Initial draft report issued.                   |
| 07/05/2023             | SPP    | Updated Table 3 to include UID 143370          |
| 07/24/2023             | SPP    | Table 5 revised to reflect updated AECI costs. |

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# SUMMARY

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## INTRODUCTION

This Interconnection Facilities Study (IFS) for Interconnection Request is for a 201.6 MW generating facility located in Osage County, KS. The Interconnection Request was studied in the DISIS-2017-002 Impact Study for ERIS. The Interconnection Customer's requested in-service date is November 30, 2025.

The interconnecting Transmission Owner, Evergy (WERE), performed a detailed IFS at the request of SPP. The full report is included in Appendix A. SPP has determined that full Interconnection Service will be available after the assigned Transmission Owner Interconnection Facilities (TOIF), Non-Shared Network Upgrades, Shared Network Upgrades, Contingent Network Upgrades, and Affected System Upgrades that are required for full interconnection service are completed.

The primary objective of the IFS is to identify necessary Transmission Owner Interconnection Facilities, Network Upgrades, other direct assigned upgrades, cost estimates, and associated upgrade lead times needed to grant the requested Interconnection Service.

## PHASE(S) OF INTERCONNECTION SERVICE

It is not expected that Interconnection Service will occur in phases. However, full Interconnection Service will not be available until all Interconnection Facilities and Network Upgrade(s) can be placed in service.

## COMPENSATION FOR AMOUNTS ADVANCED FOR NETWORK UPGRADE(S)

FERC Order ER20-1687-000 eliminated the use of Attachment Z2 revenue crediting as an option for compensation. The Incremental Long Term Congestion Right (ILTCR) process will be the sole process to compensate upgrade sponsors as of July 1st, 2020.

## **INTERCONNECTION CUSTOMER INTERCONNECTION FACILITIES**

The Generating Facility is proposed to consist of (112) General Electric PV 0.90 MW/1 MVA inverters for a total generating nameplate capacity of 201.6 MW.

The Interconnection Customer's Interconnection Facilities to be designed, procured, constructed, installed, maintained, and owned by the Interconnection Customer at its sole expense include:

- 34.5 kV underground cable collection circuits;
- 34.5 kV to 345 kV transformation substation with associated 34.5 kV and 345 kV switchgear;
- One 345/34.5 kV 135/180/225 MVA (ONAN/ONAF/ONAF) step-up transformer to be owned and maintained by the Interconnection Customer at the Interconnection Customer's substation;
- Approx. 0.05 mile 345 kV line to connect the Interconnection Customer's substation to the Point of Interconnection ("POI") at the 345 kV bus at existing Transmission Owner substation ("Swissvale 345kV") that is owned and maintained by Transmission Owner;
- All transmission facilities required to connect the Interconnection Customer's substation to the POI;
- Equipment at the Interconnection Customer's substation necessary to maintain a composite power delivery at continuous rated power output at the high-side of the generator substation at a power factor within the range of 95% lagging and 95% leading in accordance with Federal Energy Regulatory Commission (FERC) Order 827. The Interconnection Customer may use inverter manufacturing options for providing reactive power under no/reduced generation conditions. The Interconnection Customer will be required to provide documentation and design specifications demonstrating how the requirements are met; and,
- All necessary relay, protection, control and communication systems required to protect Interconnection Customer's Interconnection Facilities and Generating Facilities and coordinate with Transmission Owner's relay, protection, control and communication systems.

**TRANSMISSION OWNER INTERCONNECTION FACILITIES AND NON-SHARED NETWORK UPGRADE(S)**

To facilitate interconnection, the interconnecting Transmission Owner will perform work as shown below necessary for the acceptance of the Interconnection Customer’s Interconnection Facilities.

**Table 1** and **Table 2** lists the Interconnection Customer’s estimated cost responsibility for Transmission Owner Interconnection Facilities (TOIF) and Non-Shared Network Upgrade(s) and provides an estimated lead time for completion of construction. The estimated lead time begins when the Generator Interconnection Agreement has been fully executed.

*Table 1: Transmission Owner Interconnection Facilities (TOIF)*

| <b>Transmission Owner Interconnection Facilities (TOIF)</b>   | <b>Total Cost Estimate (\$)</b> | <b>Allocated Percent (%)</b> | <b>Allocated Cost Estimate (\$)</b> | <b>Estimated Lead Time</b> |
|---|---------------------------------|------------------------------|-------------------------------------|----------------------------|
| <b><u>Swissvale 345kV GEN-2017-191 Interconnection (TOIF) (WERE) (143469)</u></b> : Interconnection upgrades and cost estimates needed to interconnect the following Interconnection Customer facility, GEN-2017-191 (201.6 MW/Solar), into the Point of Interconnection (POI) at Swissvale 345kV | \$639,474.50                    | 100%                         | \$639,474.50                        | 36 Months                  |
| <b>Total</b>  | <b>\$639,474.50</b>             |                              | <b>\$639,474.50</b>                 |                            |

*Table 2: Non-Shared Network Upgrade(s)*

| <b>Non-Shared Network Upgrades Description</b> | <b>ILTCR</b> | <b>Total Cost Estimate (\$)</b> | <b>Allocated Percent (%)</b> | <b>Allocated Cost Estimate (\$)</b> | <b>Estimated Lead Time</b> |
|--|--------------|---------------------------------|------------------------------|-------------------------------------|----------------------------|
| <b><u>NA</u></b>                               | <b>NA</b>    | <b>NA</b>                       | <b>NA</b>                    | <b>NA</b>                           | <b>NA</b>                  |
| <b>Total</b>                                   |              | NA                              |                              | NA                                  |                            |

**SHARED NETWORK UPGRADE(S)**

The Interconnection Customer’s share of costs for Shared Network Upgrades is estimated in **Table 3** below.

*Table 3: Interconnection Customer Shared Network Upgrade(s)*

| Shared Network Upgrades Description  | ILTCR      | Total Cost Estimate (\$) | Allocated Percent (%) | Allocated Cost Estimate (\$) | Estimated Lead Time |
|--|------------|--------------------------|-----------------------|------------------------------|---------------------|
| <b><u>Swissvale 345kV Interconnection Expansion (DISIS-2017-002) (WERE) (143370)</u></b> : Expand the Swissvale 345kV substation to accommodate the interconnection of GEN-2017-125, GEN-2017-128, GEN-2017-191 and GEN-2017-192 | Ineligible | \$25,565,648             | 28.4%                 | \$7,260,644.03               | 36 Months           |
| <b>Total</b>   |            | <b>\$25,565,648</b>      |                       | <b>\$7,260,644.03</b>        |                     |

All studies have been conducted assuming that higher-queued Interconnection Request(s) and the associated Network Upgrade(s) will be placed into service. If higher-queued Interconnection Request(s) withdraw from the queue, suspend or terminate service, the Interconnection Customer’s share of costs may be revised. Restudies, conducted at the customer’s expense, will determine the Interconnection Customer’s revised allocation of Shared Network Upgrades.

### CONTINGENT NETWORK UPGRADE(S)

Certain Contingent Network Upgrades are **currently not the cost responsibility** of the Interconnection Customer but will be required for full Interconnection Service.

*Table 4: Interconnection Customer Contingent Network Upgrade(s)*

| <b>Contingent Network Upgrade(s) Description</b> | <b>Current Cost Assignment</b> | <b>Estimated In-Service Date</b> |
|--|--------------------------------|----------------------------------|
| <u>NA</u>  | <u>NA</u>                      | <u>NA</u>                        |

Depending upon the status of higher- or equally-queued customers, the Interconnection Request’s in-service date is at risk of being delayed or Interconnection Service is at risk of being reduced until the in-service date of these Contingent Network Upgrades.



**AFFECTED SYSTEM UPGRADE(S)**

To facilitate interconnection, the Affected System Transmission Owner will be required to perform the facilities study work as shown below necessary for the acceptance of the Interconnection Customer’s Interconnection Facilities. **Table 5** displays the current impact study costs provided by either MISO or AECI as part of the Affected System Impact review. The Affected System facilities study could provide revised costs and will provide each Interconnection Customer’s allocation responsibilities for the upgrades.

*Table 5: Interconnection Customer Affected System Upgrade(s)*

| <b>Affected System Upgrades Description</b>   | <b>Total Cost Estimate (\$)</b> | <b>Allocated Percent (%)</b> | <b>Allocated Cost Estimate (\$)</b> |
|---|---------------------------------|------------------------------|-------------------------------------|
| <b><u>AECI; Install a second Lamar 161/69 kV transformer rated at 84 MVA Summer, 95 MVA Winter unit</u></b> | \$6,129,000                     | 4.69%                        | \$304,101                           |
| <b>Total</b>  | <b>\$6,129,000</b>              |                              | <b>\$304,101</b>                    |

## CONCLUSION

After all Interconnection Facilities and Network Upgrades have been placed into service, Interconnection Service for MW can be granted. Full Interconnection Service will be delayed until the TOIF, Non-Shared NU, Shared NU, Contingent NU, Affected System Upgrades that are required for full interconnection service are completed. The Interconnection Customer’s estimated cost responsibility for full interconnection service is summarized in the table below.

*Table 6: Cost Summary*

| Description  | Allocated Cost Estimate |
|--|-------------------------|
| Transmission Owner Interconnection Facilities Upgrade(s) | \$639,474.50            |
| Non-Shared Network Upgrade(s)                            | \$0                     |
| Shared Network Upgrade(s)                                | \$7,260,644.03          |
| Affected System Upgrade(s)                               | \$304,101               |
| <b>Total</b>   | <b>\$8,204,219.53</b>   |

Use the following link for Quarterly Updates on upgrades from this report: <https://spp.org/spp-documents-filings/?id=18641>

A draft Generator Interconnection Agreement will be provided to the Interconnection Customer consistent with the final results of this IFS report. The Transmission Owner and Interconnection Customer will have 60 days to negotiate the terms of the GIA consistent with the SPP Open Access Transmission Tariff (OATT).

# APPENDICES

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**A: TRANSMISSION OWNER'S INTERCONNECTION FACILITIES STUDY  
REPORT AND NETWORK UPGRADES REPORT(S)**

See next page for the Transmission Owner's Interconnection Facilities Study Report and Network Upgrades Report(s).



## **Interconnection Facilities Study**

### **Network Upgrades associated with DISIS-2017-002 Rev. 3**

**June 2023**

## **Introduction**

This report summarizes the scope of the Interconnection Facilities Analysis for Network Upgrade(s) to determine costs related to the addition of the SPP-GI DISIS-2017-002 Interconnection Request(s).

## **Southwest Power Pool Generation Interconnection Request:**

Per the SPP Generator Interconnection Procedures (GIP), SPP has requested that Evergy perform an Interconnection Facilities Study (IFS) for Network Upgrade(s) in accordance with the Scope of Interconnection Facilities Study GIP Section 8.10 and the Interconnection Facilities Study Procedures in accordance with GIP Section 8.11 for the following Interconnection Request(s):

| <b>Upgrade Type</b> | <b>UID</b> | <b>Upgrade Name</b>   | <b>DISIS Cost</b> | <b>DISIS Lead Time</b> |
|---------------------|------------|---|-------------------|------------------------|
| Interconnection     | 143452     | Nashua – St. Joe 345kV New Interconnection Substation (Non-Shared NU) (DISIS-2017-002)              | \$27,890,401      | 36 Months              |
| Interconnection     | 143453     | Nashua - St. Joe 345kV GEN - 2017-183 Interconnection (TOIF) (KCPL)                                 | \$1,229,421       | 36 Months              |
| Interconnection     | 143364     | Abilene Energy Center – Northview 115kV GEN-2017-120 Interconnection (NU) (WERE)                    | \$10,641,983      | 36 Months              |
| Interconnection     | 143500     | LaCygne – Neosho 345kV GEN 2017-209 Interconnection (Non-Shared NU) (WERE)                          | \$30,439,276      | 36 Months              |
| Interconnection     | 143501     | LaCygne – Neosho 345kV GEN 2017-209 Interconnection (Non-Shared TOIF) (WERE)                        | \$1,705,966       | 36 Months              |
| Network Upgrade     | 156516     | Archie 161 kV Terminal Upgrades (DISIS-2017-002) (EMW)  | \$1,455,934       | 36 Months              |
| Network Upgrade     | 156851     | Archie – G17-108 Tap 161 kV Rebuild (DISIS-2017-002) (EMW)  | \$41,157,960      | 36 Months              |
| Interconnection     | 143342     | Stilwell – Clinton 161kV New Three (3) Breaker Ring Bus Interconnection Substation (DISIS-2017-002) | \$11,780,129      | 36 Months              |
| Network Upgrade     | 156461     | Craig to Lenexa 161 kV Double CKT 1 & 2 Rebuild (DISIS-2017-002)                                    | \$8,294,859       | 36 Months              |
| Network Upgrade     | 156457     | Post Oak 69-35 kV Transformer Replacement (DISIS-2017-002) (EKC)                                    | \$2,796,764       | 36 Months              |
| Interconnection     | 143446     | Gordon Evans 138kV Interconnection Expansion (DISIS-2017-002)                                       | \$2,422,517       | 36 Months              |

|                 |        |  |              |           |
|-----------------|--------|--|--------------|-----------|
| Interconnection | 143330 | Post Oak 34.5kV ASGI-2017- 014 Interconnection (Non-Shared NU) (KCPL)              | \$2,796,764  | 36 Months |
| Interconnection | 143331 | Post Oak 34.5kV ASGI-2017- 014 Interconnection (Non-Shared TOIF) (KCPL)            | \$252,256    | 36 Months |
| Interconnection | 143518 | Buffalo Flats 345kV Interconnection Expansion (NU) (DISIS-2017 -002)               | \$2,287,129  | 36 Months |
| Interconnection | 143476 | West Gardner 345kV Interconnection Expansion (NU) (DISIS-2017-002)                 | \$2,156,278  | 36 Months |
| Interconnection | 143455 | Nashua -St. Joe 345kV GEN - 2017-184 Interconnection (NU) (KCPL)                   | \$1,229,421  | 36 Months |
| Interconnection | 143519 | Buffalo Flats 345kV GEN-2017-220 Interconnection (TOIF) (WERE)                     | \$579,336    | 36 Months |
| Interconnection | 143521 | Buffalo Flats 345kV GEN-2017-221 Interconnection (TOIF) (WERE)                     | \$579,336    | 36 Months |
| Interconnection | 143477 | West Gardner 345kV GEN-2017-195 Interconnection (TOIF) (KCPL)                      | \$947,036    | 36 Months |
| Interconnection | 143479 | West Gardner 345kV GEN-2017-196 Interconnection (TOIF) (KCPL)                      | \$947,036    | 36 Months |
| Interconnection | 143370 | Swissvale 345kV GEN-2017-125 Interconnection Expansion (DISIS-2017-002)            | \$25,565,648 | 36 Months |
| Interconnection | 143371 | Swissvale 345kV GEN-2017-125 Interconnection (TOIF) (WERE)                         | \$1,278,950  | 36 Months |
| Interconnection | 143373 | Swissvale 345kV GEN-2017-128 Interconnection (TOIF) (WERE)                         | \$1,278,950  | 36 Months |
| Interconnection | 143365 | Abilene Energy Center - Northview 115kV GEN-2017-120 Interconnection (TOIF) (WERE) | \$842,713    | 36 Months |
| Interconnection | 143447 | Gordon Evans 138kV GEN-2017-179 Interconnection (TOIF) (WERE)                      | \$717,053    | 36 Months |
| Interconnection | 143534 | Stilwell 345kV GEN-2017-229 Interconnection (NU) (KCPL)                            | \$78,073,008 | 36 Months |
| Interconnection | 143535 | Stilwell 345kV GEN-2017-229 Interconnection (TOIF) (KCPL)                          | \$1,341,356  | 36 Months |
| Interconnection | 143354 | Holt County 345kV GEN-2017-115 (NU) (KCPL)   | \$1,016,595  | 36 Months |
| Interconnection | 143355 | Holt County 345kV GEN-2017-115 Interconnection (Non-Shared TOIF) (KCPL)            | \$646,577    | 36 Months |
| Interconnection | 143469 | Swissvale 345kV GEN-2017-191 Interconnection (TOIF) (WERE)                         | \$639,474    | 36 Months |
| Interconnection | 143471 | Swissvale 345kV GEN-2017-192 Interconnection (TOIF) (WERE)                         | \$639,474    | 36 Months |

|                 |        |   |              |           |
|-----------------|--------|---|--------------|-----------|
| Interconnection | 143347 | Clinton - Stilwell 161kV GEN-2017-111 Interconnection (TOIF) (KCPL)           | \$1,262,482  | 36 Months |
| Interconnection | 143343 | Stillwell - Clinton 161kV GEN-2017-108 Interconnection (TOIF) (KCPL)          | \$631,241    | 36 Months |
| Interconnection | 143366 | Sumner 138kV GEN-2017-121 Interconnection (Non-Shared NU) (WERE)              | \$591,566    | 36 Months |
| Interconnection | 143367 | Sumner 138kV GEN-2017-121 Interconnection (TOIF) (WERE)                       | \$648,517    | 36 Months |
| Interconnection | 143529 | Gordon Evans 138kV GEN-2017-226 Interconnection (TOIF) (WERE)                 | \$372,381    | 36 Months |
| Interconnection | 143531 | Gordon Evans 138kV GEN-2017-227 Interconnection (TOIF) (WERE)                 | \$372,380    | 36 Months |
| Interconnection | 143374 | Altoona - NE Parson 138kV GEN-2017-131 Interconnection (Non-Shared NU) (WERE) | \$12,381     | 36 Months |
| Interconnection | 143375 | Altoona - NE Parson 138kV GEN-2017-131 Interconnection (TOIF) (WERE)          | \$24,762     | 36 Months |
| Network Upgrade | 156471 | Viola to G17-185 Tap 345 kV Line Rebuild (DISIS-2017-002) (EKC)               | \$47,418,635 | 36 Months |



## **Nashua – St. Joe 345kV New Interconnection Substation (Non-Shared NU)**

### **345 kV Substation**

Construct the network upgrades required for the Horse Thief I wind farm GEN-201-183 generator interconnection. The interconnection sub be shared among GEN-2017-183 and GEN-2017-184. UID 143452

### **Total Cost**

The total cost estimate for this Interconnection is:

|       |            |                         |
|-------|------------|-------------------------|
| \$    | 6,253,553  | 345kV Transmission Line |
| \$    | 21,356,767 | 345kV Substation        |
| \$    | 280,080    | AFUDC                   |
| \$    | 0          | Contingency             |
| <hr/> |            |                         |
| \$    | 27,890,401 | Total                   |

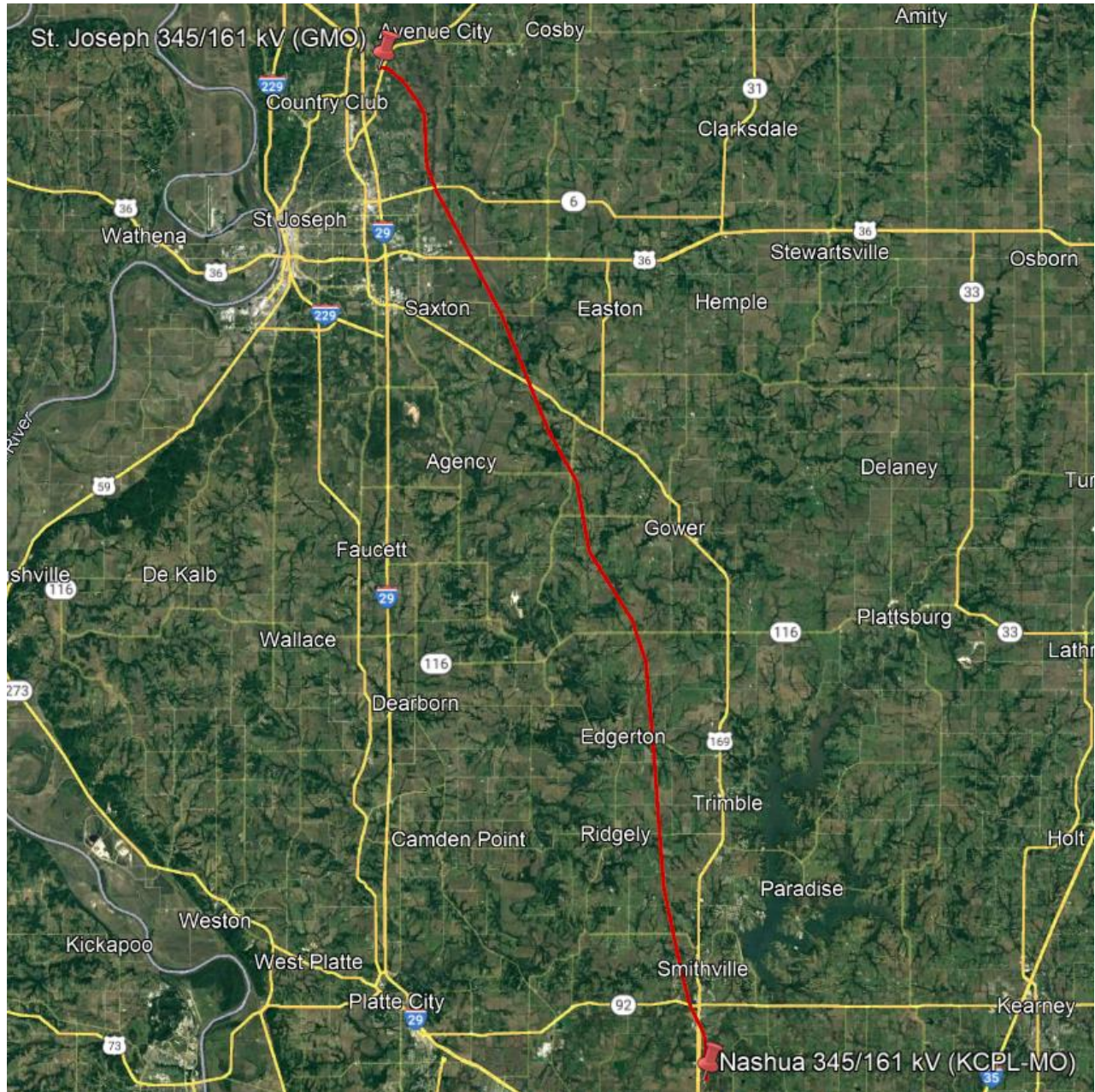
This estimate is accurate to +/- twenty (20) percent, based on current prices, in accordance with Attachment A of Appendix 4 of the Interconnection Facilities Study Agreement. However, recent cost fluctuations in materials are very significant and the accuracy of this estimate at the time of actual settings cannot be assured.

### **Time Estimate**

Time estimates are based on current version of the project schedule and some processes of each category run concurrently.

|                      |       |        |
|----------------------|-------|--------|
| Engineering Time     | 12-18 | Months |
| Procurement Time     | 12-18 | Months |
| Construction Time    | 12    | Months |
| <hr/>                |       |        |
| Total Project Length | 36-48 | Months |

**Figure 1 – Nashua – St. Joseph 345kV Line**



**Nashua – St. Joe 345kV GEN-2017-183 Interconnection (TOIF)**

**345 kV Substation**

TOIF requires a new four-terminal substation along the Nashua-St. Joseph 345kV line near the clean-line express right-of-way for GEN-2017-183. The interconnection sub be shared among GEN-2017-183 and GEN-2017-184. UID 143453 and 143455

**Total Cost**

The total cost estimate for this Interconnection is:

|       |           |                           |
|-------|-----------|---------------------------|
| \$    | 0         | 345kV Transmission Line   |
| \$    | 1,225,744 | 345kV Substation for each |
| \$    | 3,677     | AFUDC for each            |
| \$    | 0         | Contingency               |
| <hr/> |           |                           |
| \$    | 1,229,421 | Total                     |

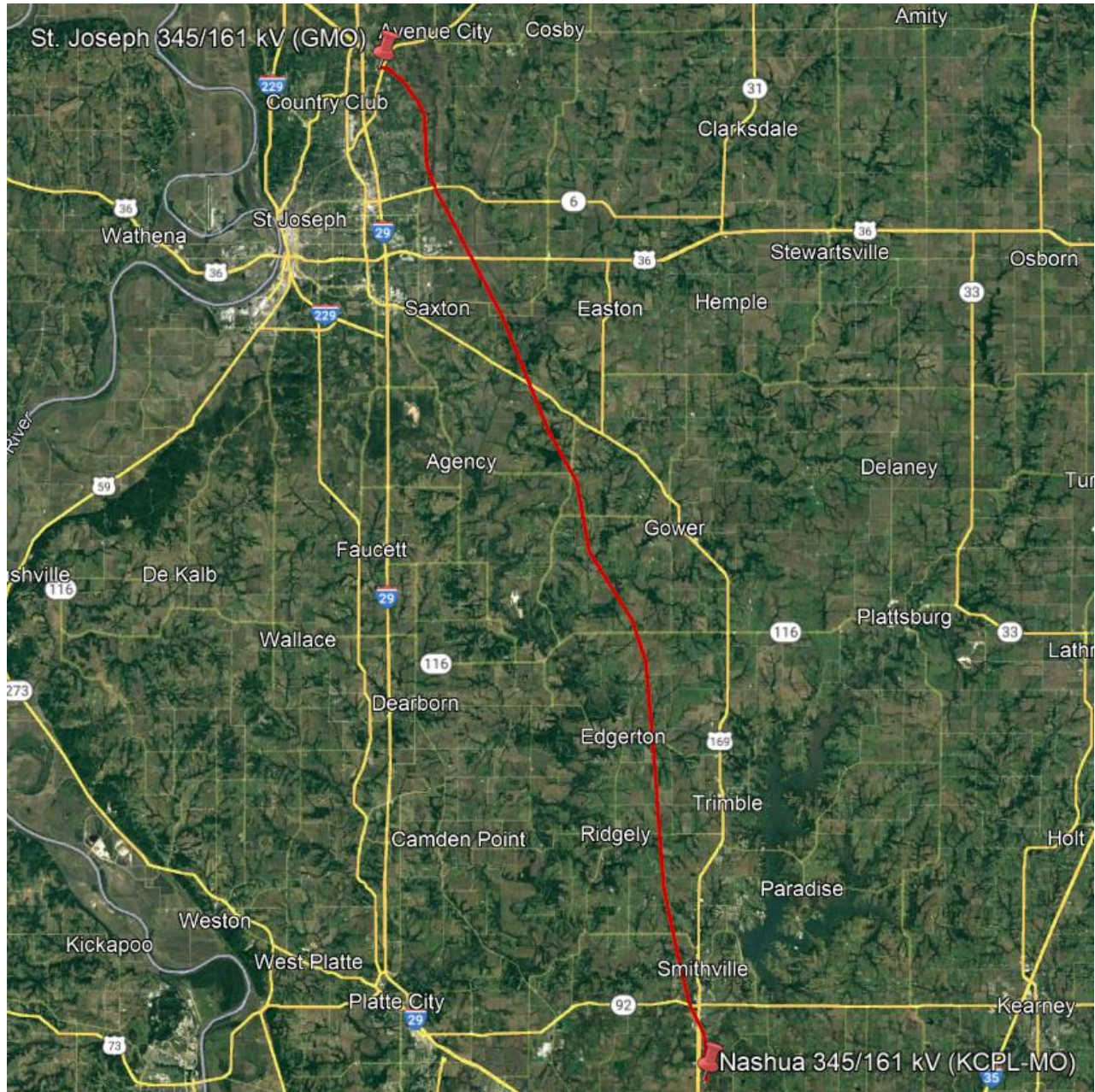
This estimate is accurate to +/- twenty (20) percent, based on current prices, in accordance with Attachment A of Appendix 4 of the Interconnection Facilities Study Agreement. However, recent cost fluctuations in materials are very significant and the accuracy of this estimate at the time of actual settings cannot be assured.

**Time Estimate**

Time estimates are based on current version of the project schedule and some processes of each category run concurrently.

|                      |       |        |
|----------------------|-------|--------|
| Engineering Time     | 12-18 | Months |
| Procurement Time     | 12-18 | Months |
| Construction Time    | 12    | Months |
| <hr/>                |       |        |
| Total Project Length | 36-48 | Months |

**Figure 2 – Nashua – St. Joseph 345kV Line**



## Abilene Energy Center – Northview 115kV GEN-2017-120 Interconnection

### (NU) (WERE)

#### 115 kV Substation

Network Upgrades include a new 3-terminal greenfield ring bus substation tapping the Abilene Energy Center-Northview 115kV line (approximately 17.5 mile from Northview 115kV, 4.2 mile from the Abilene EC 115kV). GEN-2017-120 and GEN-2018-013 will be on the same gen-tie fed from this substation. UID 143364

#### Total Cost

The total cost estimate for this Interconnection is:

|       |            |                         |
|-------|------------|-------------------------|
| \$    | 1,215,171  | 115kV Transmission Line |
| \$    | 9,394,980  | 115kV Substation        |
| \$    | 31,830     | AFUDC                   |
| \$    | 0          | Contingency             |
| <hr/> |            |                         |
| \$    | 10,641,983 | Total                   |

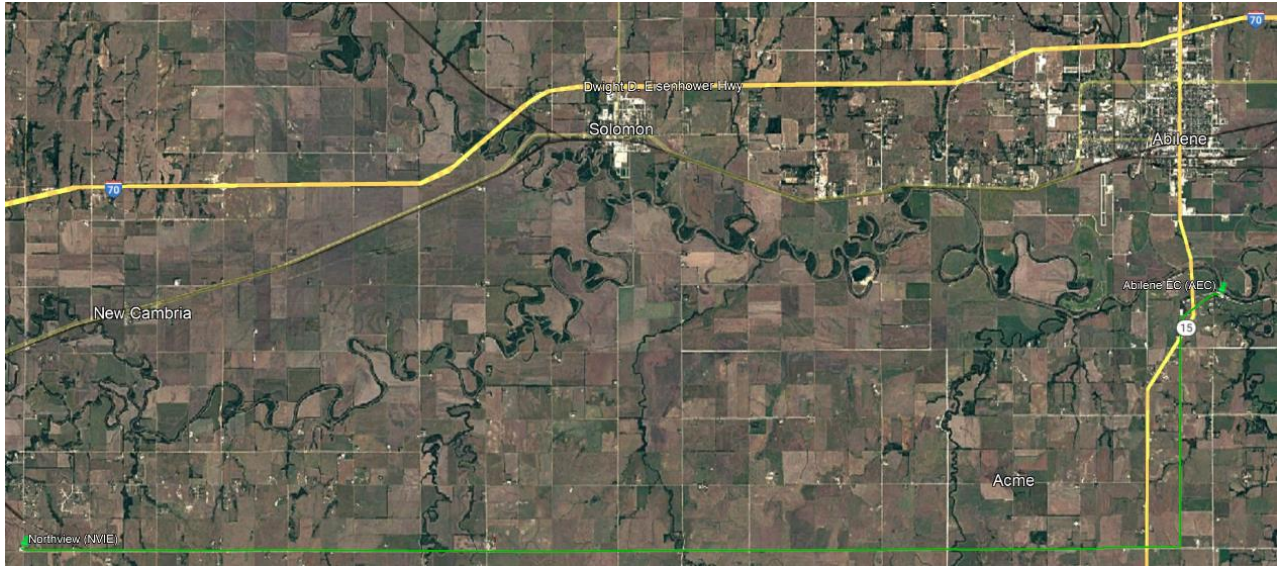
This estimate is accurate to +/- twenty (20) percent, based on current prices, in accordance with Attachment A of Appendix 4 of the Interconnection Facilities Study Agreement. However, recent cost fluctuations in materials are very significant and the accuracy of this estimate at the time of actual settings cannot be assured.

#### Time Estimate

Time estimates are based on current version of the project schedule and some processes of each category run concurrently.

|                      |       |        |
|----------------------|-------|--------|
| Engineering Time     | 12-18 | Months |
| Procurement Time     | 12-18 | Months |
| Construction Time    | 12    | Months |
| <hr/>                |       |        |
| Total Project Length | 36-48 | Months |

**Figure 5 – Abilene EC - Northview 115kV Line**



**LaCygne – Neosho 345kV GEN 2017-209 Interconnection (Non-Shared NU)**  
**(WERE)**

**345 kV Substation**

This is the network upgrades portion of the Swan solar generator interconnection. It requires a new three-terminal substation along the LaCygne-Neosho 345kV line. UID 143500

**Total Cost**

The total cost estimate for this Interconnection is:

|       |            |                         |
|-------|------------|-------------------------|
| \$    | 8,991,464  | 345kV Transmission Line |
| \$    | 21,356,767 | 345kV Substation        |
| \$    | 91,044     | AFUDC                   |
| \$    | 0          | Contingency             |
| <hr/> |            |                         |
| \$    | 30,439,276 | Total                   |

This estimate is accurate to +/- twenty (20) percent, based on current prices, in accordance with Attachment A of Appendix 4 of the Interconnection Facilities Study Agreement. However, recent cost fluctuations in materials are very significant and the accuracy of this estimate at the time of actual settings cannot be assured.

**Time Estimate**

Time estimates are based on current version of the project schedule and some processes of each category run concurrently.

|                      |       |        |
|----------------------|-------|--------|
| Engineering Time     | 12-18 | Months |
| Procurement Time     | 12-18 | Months |
| Construction Time    | 12    | Months |
| Total Project Length | 36-48 | Months |

**Figure 6 – LaCygne - Neosho 345kV Line**



**LaCygne – Neosho 345kV GEN 2017-209 Interconnection (Non-Shared TOIF)**

**(WERE)**

**345 kV Substation**

This is the TOIF portion of the Swan solar generator interconnection. It requires a new three-terminal substation along the LaCygne-Neosho 345kV line. UID 143501

**Total Cost**

The total cost estimate for this Interconnection is:

|       |           |                         |
|-------|-----------|-------------------------|
| \$    | 0         | 345kV Transmission Line |
| \$    | 1,700,863 | 345kV Substation        |
| \$    | 5,102     | AFUDC                   |
| \$    | 0         | Contingency             |
| <hr/> |           |                         |
| \$    | 1,705,966 | Total                   |

This estimate is accurate to +/- twenty (20) percent, based on current prices, in accordance with Attachment A of Appendix 4 of the Interconnection Facilities Study Agreement. However, recent cost fluctuations in materials are very significant and the accuracy of this estimate at the time of actual settings cannot be assured.

**Time Estimate**

Time estimates are based on current version of the project schedule and some processes of each category run concurrently.

|                      |       |        |
|----------------------|-------|--------|
| Engineering Time     | 12-18 | Months |
| Procurement Time     | 12-18 | Months |
| Construction Time    | 12    | Months |
| <hr/>                |       |        |
| Total Project Length | 36-48 | Months |



Figure 7 – LaCygne - Neosho 345kV Line



## Archie 161kV Terminal Upgrades (DISIS-2017-002)

### 161 kV Substation

All terminal equipment to be replaced to meet a 2000 Amp rating. This will require a main bus rebuild to 4" aluminum pipe bus and includes bus side disconnects for the other three line terminals. UID 156516

### Total Cost

The total cost estimate for this Network Upgrade is:

|       |           |                         |
|-------|-----------|-------------------------|
| \$    | 0         | 161kV Transmission Line |
| \$    | 1,451,579 | 161kV Substation        |
| \$    | 4,354     | AFUDC                   |
| \$    | 0         | Contingency             |
| <hr/> |           |                         |
| \$    | 1,455,934 | Total                   |

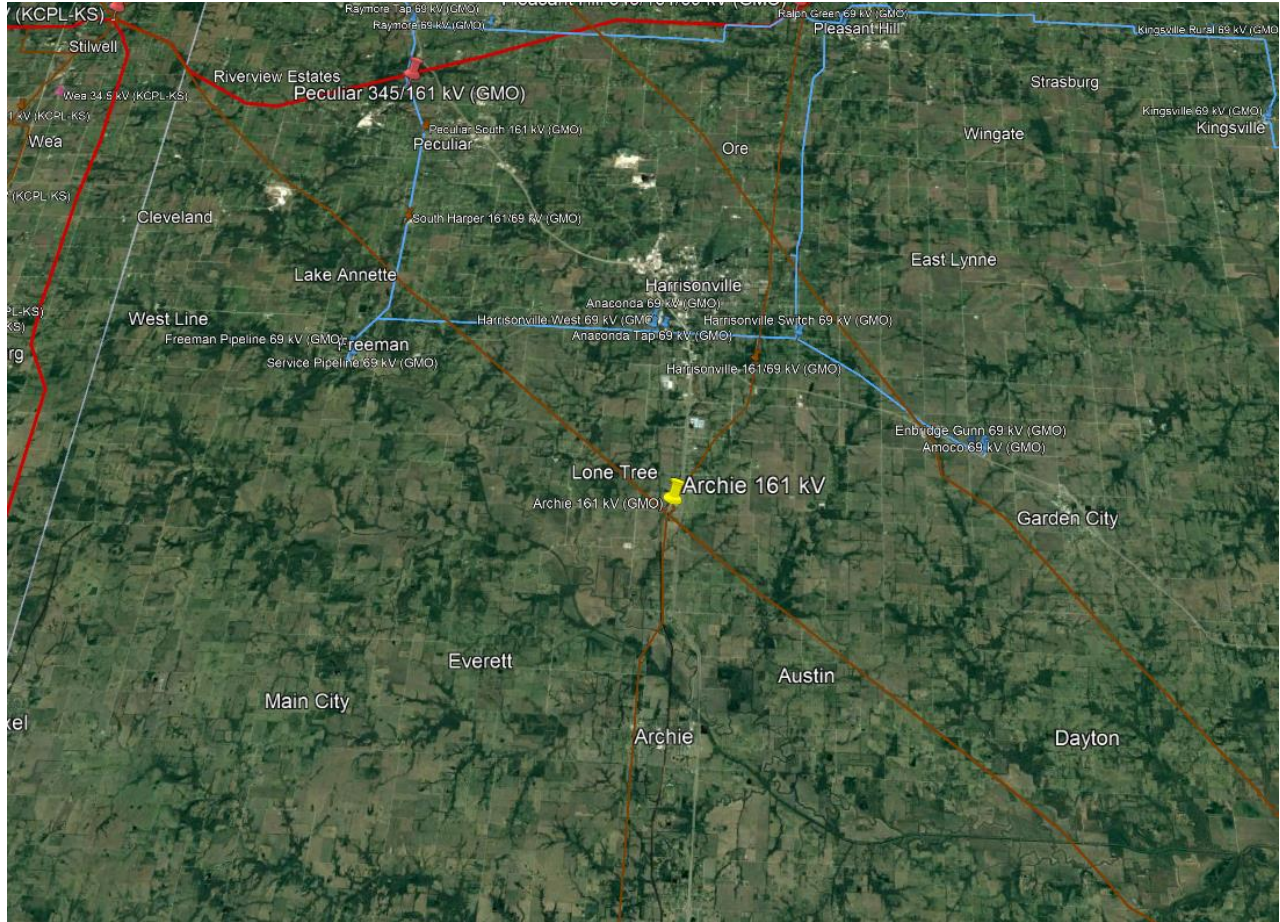
This estimate is accurate to +/- twenty (20) percent, based on current prices, in accordance with Attachment A of Appendix 4 of the Interconnection Facilities Study Agreement. However, recent cost fluctuations in materials are very significant and the accuracy of this estimate at the time of actual settings cannot be assured.

### Time Estimate

Time estimates are based on current version of the project schedule and some processes of each category run concurrently.

|                      |       |        |
|----------------------|-------|--------|
| Engineering Time     | 12-18 | Months |
| Procurement Time     | 12-18 | Months |
| Construction Time    | 12    | Months |
| <hr/>                |       |        |
| Total Project Length | 36-48 | Months |

**Figure 9 – Archie 161kV Sub**



## **Archie – G17-108 Tap 161 kV Rebuild**

### **161 kV Transmission Line**

The estimated cost is for 28.73 miles of 161kV circuit. Line will be rebuilt using steel structures, with angles and dead-ends on drilled piers. Estimate assumes the conductor will be 1192 ACSS/TW and OPGW will be installed. UID 156851

### **Total Cost**

The total cost estimate for this Network Upgrade is:

|       |            |                          |
|-------|------------|--------------------------|
| \$    | 39,783,750 | 161 kV Transmission Line |
| \$    | 0          | 161 kV Substation        |
| \$    | 1,374,210  | AFUDC                    |
| \$    | 0          | Contingency              |
| <hr/> |            |                          |
| \$    | 41,157,960 | Total                    |

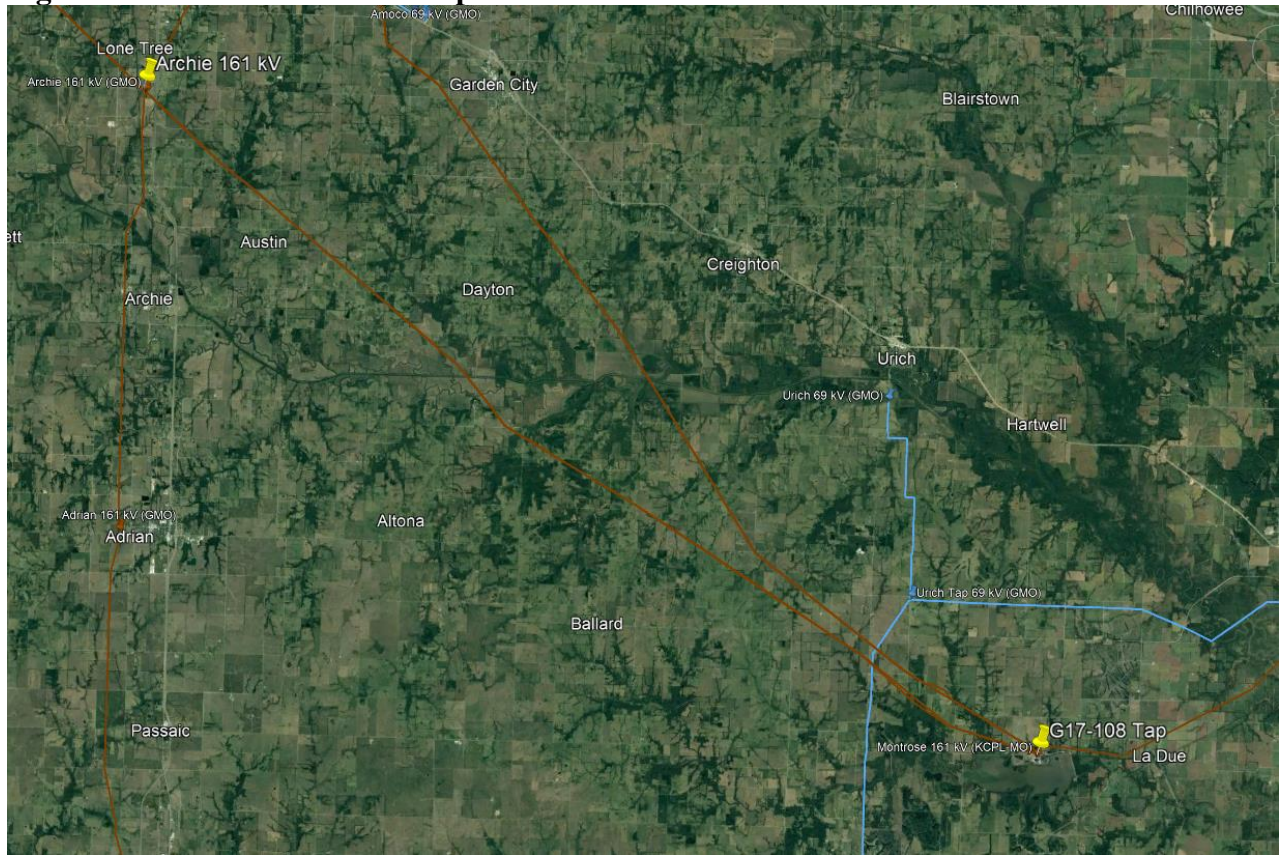
This estimate is accurate to +/- twenty (20) percent, based on current prices, in accordance with Attachment A of Appendix 4 of the Interconnection Facilities Study Agreement. However, recent cost fluctuations in materials are very significant and the accuracy of this estimate at the time of actual settings cannot be assured.

### **Time Estimate**

Time estimates are based on current version of the project schedule and some processes of each category run concurrently.

|                      |       |        |
|----------------------|-------|--------|
| Engineering Time     | 12-18 | Months |
| Procurement Time     | 12-18 | Months |
| Construction Time    | 12    | Months |
| <hr/>                |       |        |
| Total Project Length | 36-48 | Months |

**Figure 10 – Archie – G17-108 Tap**



**Stilwell – Clinton 161kV New Three (3) Breaker Ring Bus Interconnection Substation (DISIS-2017-002)**

**161 kV Substation**

Network Upgrades include work associated with construction of a three breaker ring bus substation on the Stilwell-Clinton 161 kV Line with three line terminals. UID 143342

**Total Cost**

The total cost estimate for this Network Upgrade is:

|       |            |                          |
|-------|------------|--------------------------|
| \$    | 2,205,862  | 161 kV Transmission Line |
| \$    | 9,394,980  | 161 kV Substation        |
| \$    | 179,286    | AFUDC                    |
| \$    | 0          | Contingency              |
| <hr/> |            |                          |
| \$    | 11,780,129 | Total                    |

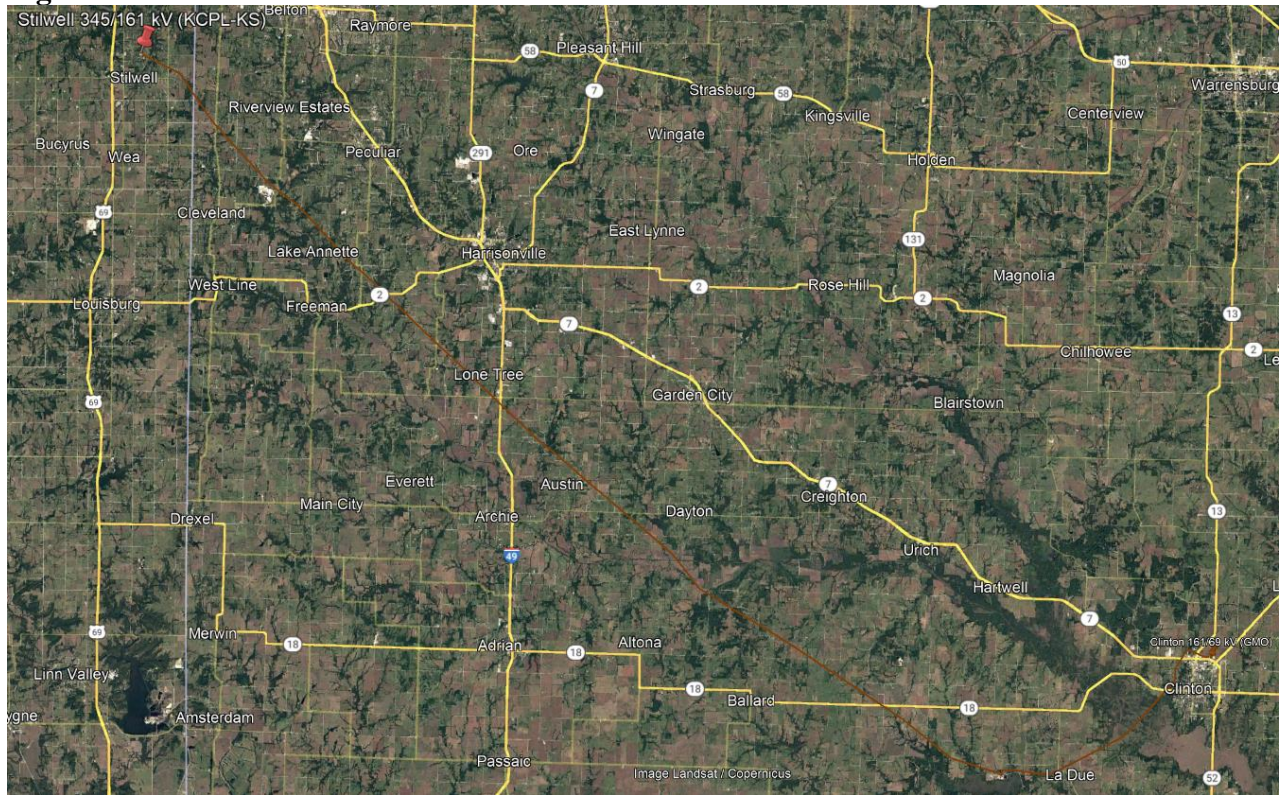
This estimate is accurate to +/- twenty (20) percent, based on current prices, in accordance with Attachment A of Appendix 4 of the Interconnection Facilities Study Agreement. However, recent cost fluctuations in materials are very significant and the accuracy of this estimate at the time of actual settings cannot be assured.

**Time Estimate**

Time estimates are based on current version of the project schedule and some processes of each category run concurrently.

|                      |       |        |
|----------------------|-------|--------|
| Engineering Time     | 12-18 | Months |
| Procurement Time     | 12-18 | Months |
| Construction Time    | 12    | Months |
| <hr/>                |       |        |
| Total Project Length | 36-48 | Months |

**Figure 11 – Stilwell – Clinton 161kV Line**



**Clinton – Stilwell 161kV GEN-2017-1111 Interconnection (TOIF) (KCPL)**

**161 kV Substation**

TOIF includes construction of a three breaker ring bus substation with three line terminals on the Stilwell-Clinton 161 kV line to accommodate GEN-2017-111. UID 143347

**Total Cost**

The total cost estimate for this Network Upgrade is:

|       |         |                          |
|-------|---------|--------------------------|
| \$    | 0       | 161 kV Transmission Line |
| \$    | 629,353 | 161 kV Substation        |
| \$    | 1,888   | AFUDC                    |
| \$    | 0       | Contingency              |
| <hr/> |         |                          |
| \$    | 631,241 | Total                    |

This estimate is accurate to +/- twenty (20) percent, based on current prices, in accordance with Attachment A of Appendix 4 of the Interconnection Facilities Study Agreement. However, recent cost fluctuations in materials are very significant and the accuracy of this estimate at the time of actual settings cannot be assured.

**Time Estimate**

Time estimates are based on current version of the project schedule and some processes of each category run concurrently.

|                      |       |        |
|----------------------|-------|--------|
| Engineering Time     | 12-18 | Months |
| Procurement Time     | 12-18 | Months |
| Construction Time    | 12    | Months |
| <hr/>                |       |        |
| Total Project Length | 36-48 | Months |

**Stilwell – Clinton 161kV GEN-2017-108 Interconnection (TOIF) (KCPL)**

**161 kV Substation**

TOIF includes construction of a three breaker ring bus substation with three line terminals on the Stilwell-Clinton 161 kV line to accommodate GEN-2017-108. UID 143343

**Total Cost**

The total cost estimate for this Network Upgrade is:

|    |         |                          |
|----|---------|--------------------------|
| \$ | 0       | 161 kV Transmission Line |
| \$ | 629,353 | 161 kV Substation        |
| \$ | 1,888   | AFUDC                    |



|    |         |             |
|----|---------|-------------|
| \$ | 0       | Contingency |
| \$ | 631,241 | Total       |

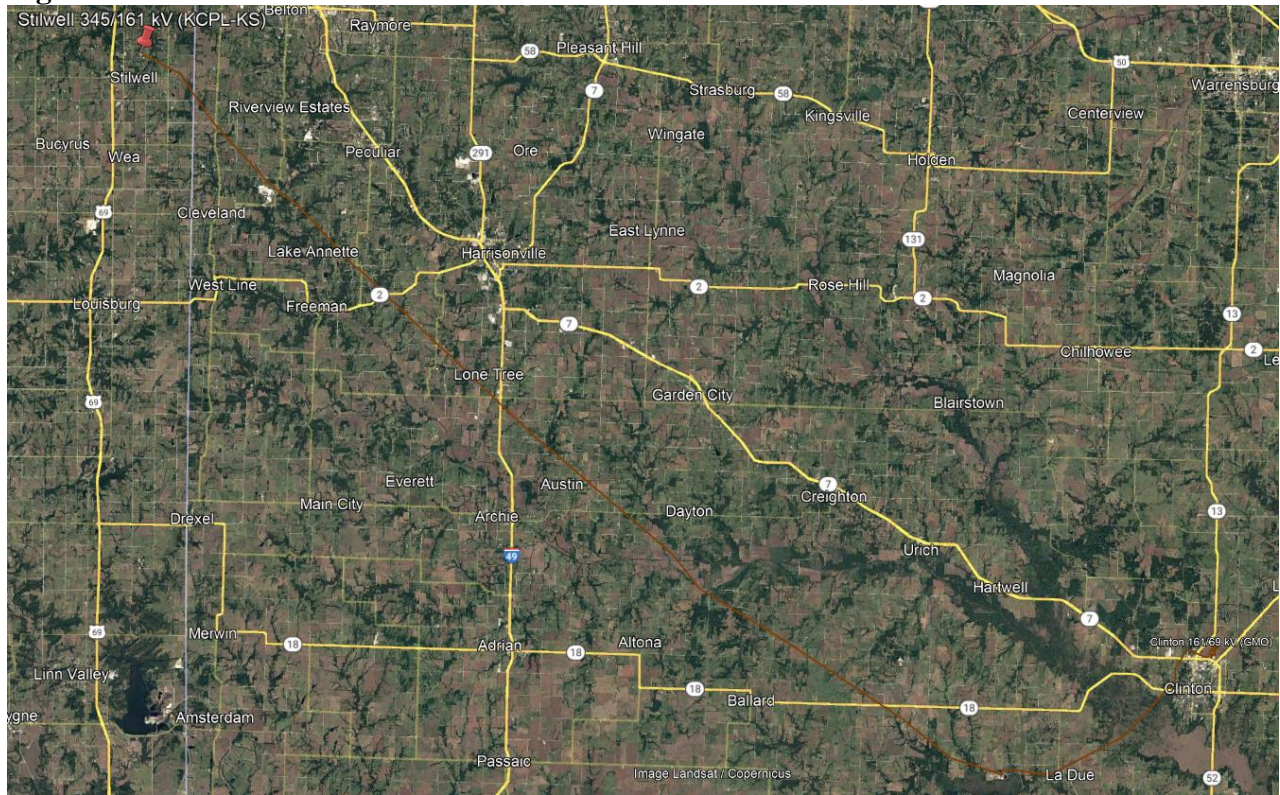
This estimate is accurate to +/- twenty (20) percent, based on current prices, in accordance with Attachment A of Appendix 4 of the Interconnection Facilities Study Agreement. However, recent cost fluctuations in materials are very significant and the accuracy of this estimate at the time of actual settings cannot be assured.

**Time Estimate**

Time estimates are based on current version of the project schedule and some processes of each category run concurrently.

|                             |              |               |
|-----------------------------|--------------|---------------|
| Engineering Time            | 12-18        | Months        |
| Procurement Time            | 12-18        | Months        |
| Construction Time           | 12           | Months        |
| <b>Total Project Length</b> | <b>36-48</b> | <b>Months</b> |

**Figure 12 – Stilwell – Clinton 161kV Line**



**Craig to Lenexa 161 kV Ckt 1 & 2 Rebuild (DISIS-2017-002)**

**161 kV Transmission Line**

The estimated cost is for 2.95 miles of 161kV double circuit. The lines will be rebuilt with steel structures, 1192 ACSS/TW conductor and two OPGW's designed to Evergy standards. UID 156461

**Total Cost**

The total cost estimate for this Network Upgrade is:

|       |           |                          |
|-------|-----------|--------------------------|
| \$    | 7,763,088 | 161 kV Transmission Line |
| \$    | 0         | 161 kV Substation        |
| \$    | 531,771   | AFUDC                    |
| \$    | 0         | Contingency              |
| <hr/> |           |                          |
| \$    | 8,294,859 | Total                    |

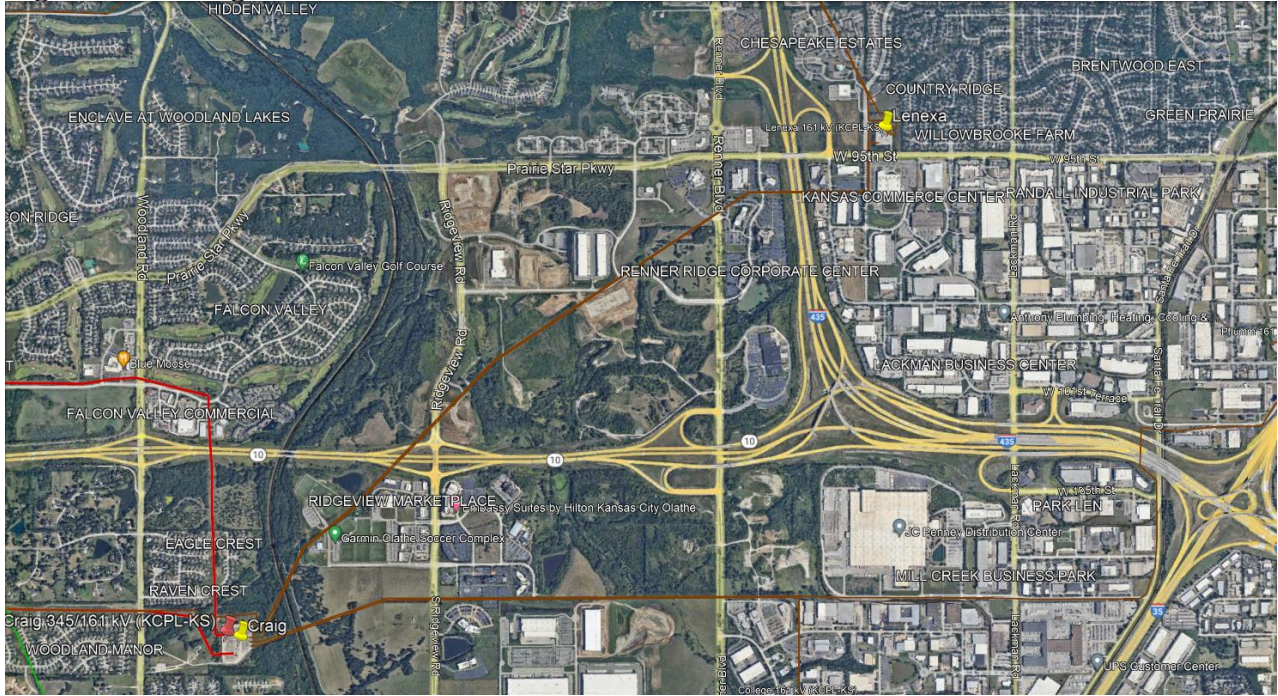
This estimate is accurate to +/- twenty (20) percent, based on current prices, in accordance with Attachment A of Appendix 4 of the Interconnection Facilities Study Agreement. However, recent cost fluctuations in materials are very significant and the accuracy of this estimate at the time of actual settings cannot be assured.

**Time Estimate**

Time estimates are based on current version of the project schedule and some processes of each category run concurrently.

|                      |       |        |
|----------------------|-------|--------|
| Engineering Time     | 12-18 | Months |
| Procurement Time     | 12-18 | Months |
| Construction Time    | 12    | Months |
| <hr/>                |       |        |
| Total Project Length | 36-48 | Months |

**Figure 13 – Craig – Lenexa 161kV Line**



## **Post Oak 69-35 kV Transformer Replacement (DISIS-2017-002)**

### **69 kV Transformer**

Replace Post Oak 69/35 kV Transformer with a 50MVA 69/34kV Transformer. This will also require a 34kV bank breaker, 34kV feeder breaker, box bay, RTU, control house and metering equipment. UID 156457

### **Total Cost**

The total cost estimate for this Network Upgrade is:

|       |           |                                 |
|-------|-----------|---------------------------------|
| \$    | 2,788,399 | 69 kV Substation<br>Transformer |
| \$    | 8,365     | AFUDC                           |
| \$    | 0         | Contingency                     |
| <hr/> |           |                                 |
| \$    | 2,796,764 | Total                           |

This estimate is accurate to +/- twenty (20) percent, based on current prices, in accordance with Attachment A of Appendix 4 of the Interconnection Facilities Study Agreement. However, recent cost fluctuations in materials are very significant and the accuracy of this estimate at the time of actual settings cannot be assured.

### **Time Estimate**

Time estimates are based on current version of the project schedule and some processes of each category run concurrently.

|                      |       |        |
|----------------------|-------|--------|
| Engineering Time     | 12-18 | Months |
| Procurement Time     | 12-18 | Months |
| Construction Time    | 12    | Months |
| <hr/>                |       |        |
| Total Project Length | 36-48 | Months |

**Figure 14 – Post Oak – 69kV Transformer**



## **Gordon Evans 138kV Interconnection Expansion (DISIS-2017-002)**

### **Gordon Evans 138kV Substation**

NU costs associated for adding an additional 138kV terminal to the Gordon Evans CT 138kV substation to accommodate a generator lead. UID 143446

### **Total Cost**

The total cost estimate for this Network Upgrade is:

|       |           |                  |
|-------|-----------|------------------|
| \$    | 1,184,282 | Line costs       |
| \$    | 1,230,989 | Substation costs |
| \$    | 7,245     | AFUDC            |
| \$    | 0         | Contingency      |
| <hr/> |           |                  |
| \$    | 2,422,517 | Total            |

This estimate is accurate to +/- twenty (20) percent, based on current prices, in accordance with Attachment A of Appendix 4 of the Interconnection Facilities Study Agreement. However, recent cost fluctuations in materials are very significant and the accuracy of this estimate at the time of actual settings cannot be assured.

### **Time Estimate**

Time estimates are based on current version of the project schedule and some processes of each category run concurrently.

|                      |       |        |
|----------------------|-------|--------|
| Engineering Time     | 12-18 | Months |
| Procurement Time     | 12-18 | Months |
| Construction Time    | 12    | Months |
| <hr/>                |       |        |
| Total Project Length | 36-48 | Months |

**Figure 15 – Gordon Evans 138kV Sub**



**Post Oak 34.5kV ASGI-2017- 014 Interconnection (Non-Shared NU)**

**69/34.5 kV Substation**

Network Upgrades include a rebuild of the Post Oak 69/34.5 kV substation with the addition of equipment to support a new 34.5 kV terminal. RTU needs replaced during the rebuild and a bigger control house is needed. UID 143330

**Total Cost**

The total cost estimate for this Interconnection is:

|       |           |                        |
|-------|-----------|------------------------|
| \$    | 0         | 69kV Transmission Line |
| \$    | 2,788,399 | 69kV Substation        |
| \$    | 8,365     | AFUDC                  |
| \$    | 0         | Contingency            |
| <hr/> |           |                        |
| \$    | 2,796,764 | Total                  |

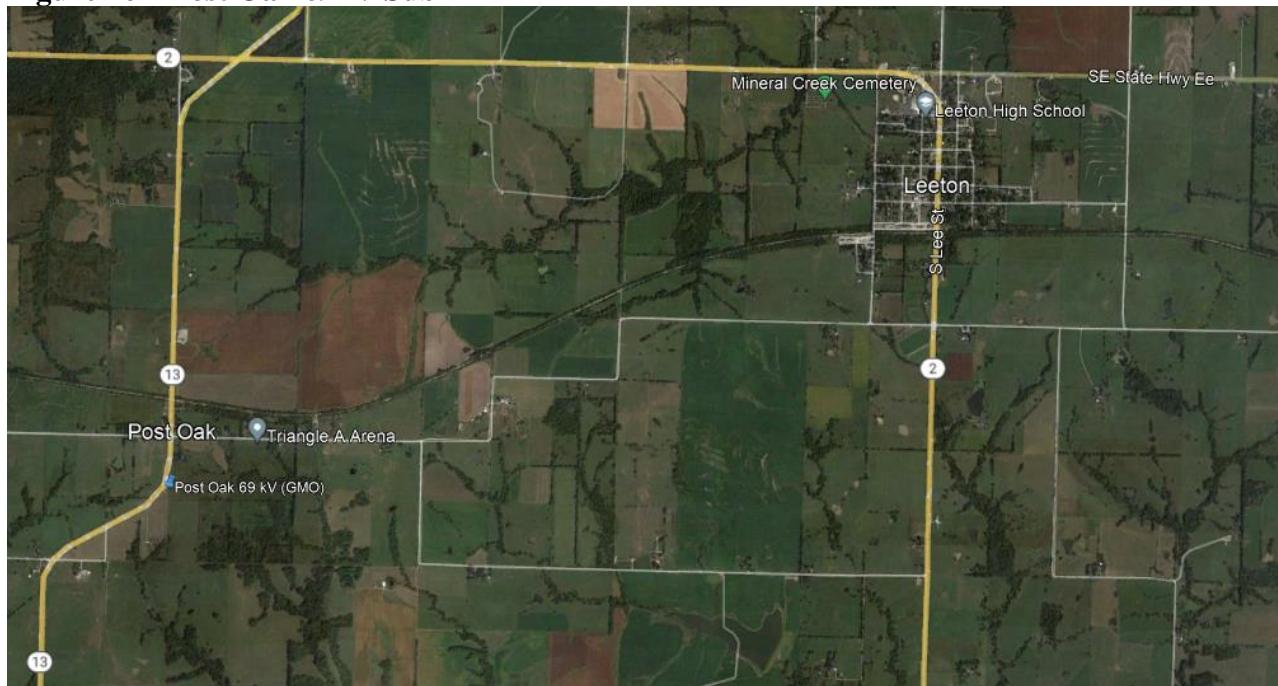
This estimate is accurate to +/- twenty (20) percent, based on current prices, in accordance with Attachment A of Appendix 4 of the Interconnection Facilities Study Agreement. However, recent cost fluctuations in materials are very significant and the accuracy of this estimate at the time of actual settings cannot be assured.

## Time Estimate

Time estimates are based on current version of the project schedule and some processes of each category run concurrently.

|                      |       |        |
|----------------------|-------|--------|
| Engineering Time     | 12-18 | Months |
| Procurement Time     | 12-18 | Months |
| Construction Time    | 12    | Months |
| <hr/>                |       |        |
| Total Project Length | 36-48 | Months |

**Figure 16 – Post Oak 69kV Sub**





## **Post Oak 34.5kV ASGI-2017- 014 Interconnection (TOIF)**

### **69/34.5 kV Substation**

TOIF includes a new 34.5 kV terminal and metering at Post Oak 69/34.5 kV substation.  
UID 143331

### **Total Cost**

The total cost estimate for this Interconnection is:

|       |         |                        |
|-------|---------|------------------------|
| \$    | 0       | 69kV Transmission Line |
| \$    | 251,601 | 69kV Substation        |
| \$    | 754     | AFUDC                  |
| \$    | 0       | Contingency            |
| <hr/> |         |                        |
| \$    | 252,256 | Total                  |

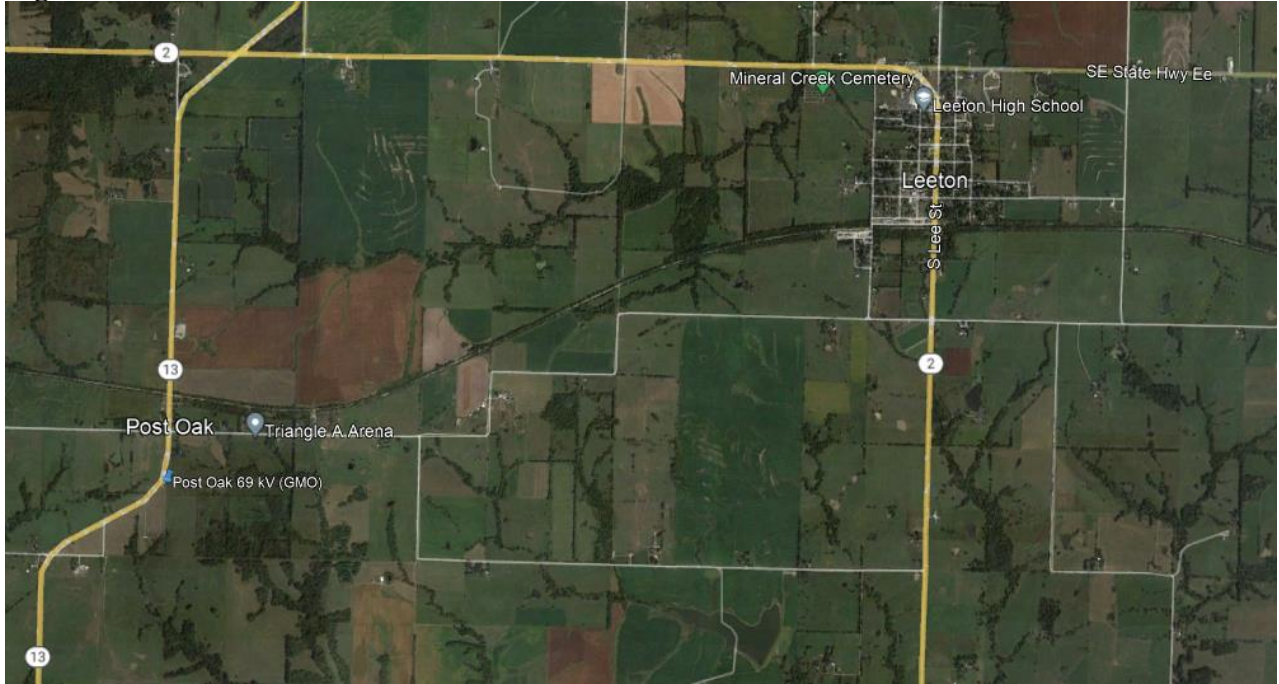
This estimate is accurate to +/- twenty (20) percent, based on current prices, in accordance with Attachment A of Appendix 4 of the Interconnection Facilities Study Agreement. However, recent cost fluctuations in materials are very significant and the accuracy of this estimate at the time of actual settings cannot be assured.

### **Time Estimate**

Time estimates are based on current version of the project schedule and some processes of each category run concurrently.

|                      |       |        |
|----------------------|-------|--------|
| Engineering Time     | 12-18 | Months |
| Procurement Time     | 12-18 | Months |
| Construction Time    | 12    | Months |
| <hr/>                |       |        |
| Total Project Length | 36-48 | Months |

**Figure 17 – Post Oak 69kV Sub**



## **Buffalo Flats 345kV Interconnection Expansion (DISIS-2017-002)**

### **345 kV Substation**

Assuming a shared interconnection tie into the Buffalo Flats 345kV substation for requests GEN-2017-220 and GEN-2017-221. One open terminal on existing rung but will potentially be used by GEN-2016-073 if it moves forward. If that terminal is taken, another rung would be required. May be able to expand substation to the west but would need to relocate existing interconnection tie into substation. UID 143518

### **Total Cost**

The total cost estimate for this Interconnection is:

|       |           |                         |
|-------|-----------|-------------------------|
| \$    | 0         | 345kV Transmission Line |
| \$    | 2,280,289 | 345kV Substation        |
| \$    | 6,840     | AFUDC                   |
| \$    | 0         | Contingency             |
| <hr/> |           |                         |
| \$    | 2,287,129 | Total                   |

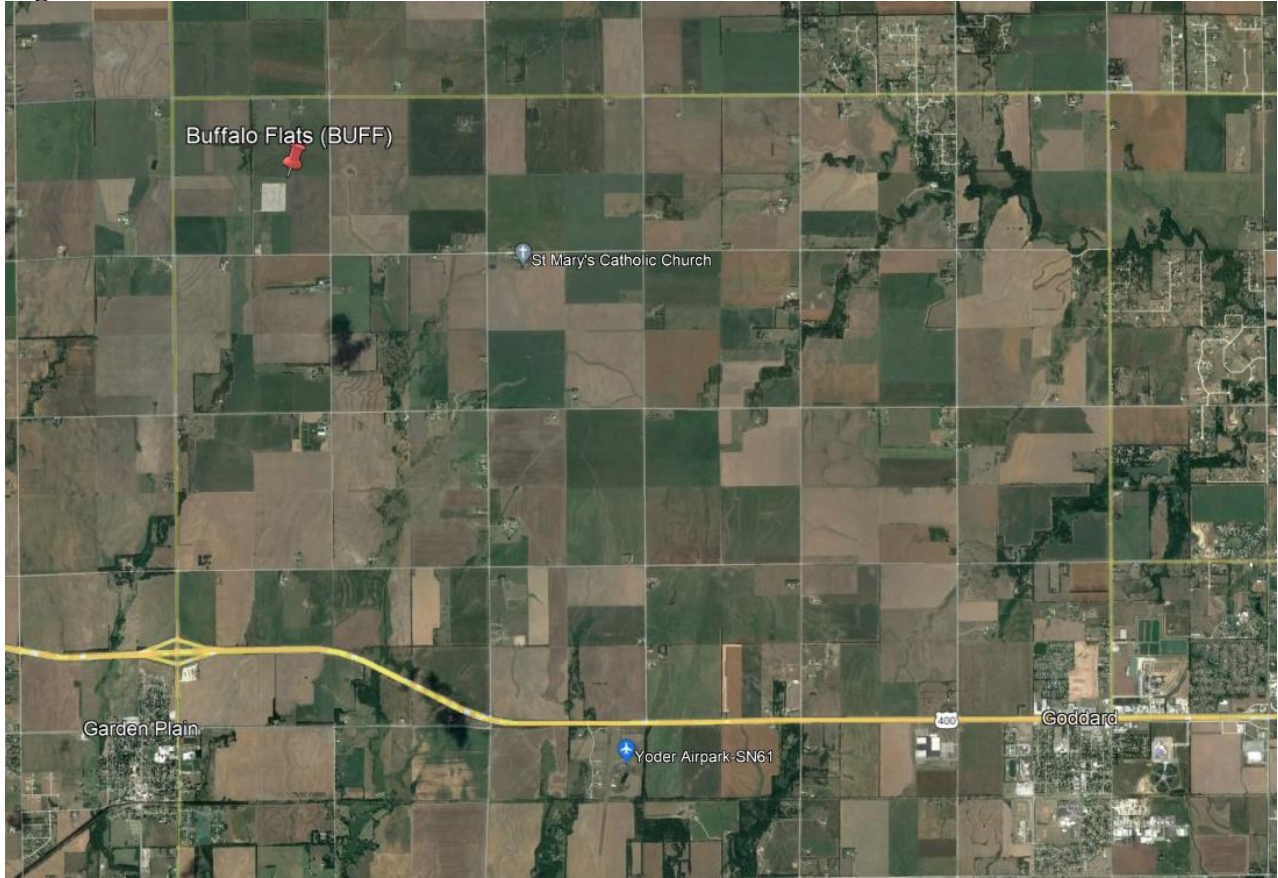
This estimate is accurate to +/- twenty (20) percent, based on current prices, in accordance with Attachment A of Appendix 4 of the Interconnection Facilities Study Agreement. However, recent cost fluctuations in materials are very significant and the accuracy of this estimate at the time of actual settings cannot be assured.

### **Time Estimate**

Time estimates are based on current version of the project schedule and some processes of each category run concurrently.

|                      |       |        |
|----------------------|-------|--------|
| Engineering Time     | 12-18 | Months |
| Procurement Time     | 12-18 | Months |
| Construction Time    | 12    | Months |
| <hr/>                |       |        |
| Total Project Length | 36-48 | Months |

**Figure 18 – Buffalo Flats 345kV Sub**



## **West Gardner 345kV Interconnection Expansion (DISIS-2017-002)**

### **345 kV Substation**

Network Upgrades associated with the interconnection of GEN-2017-195. The POI is West Gardner 345kV. Currently Marmaton I and II wind farms have a GIA that requires West Gardner to be built as breaker and a half, the costs below reflect the Marmaton I and II completing their GI. GEN-2017-195 will share costs with GEN-2017-196 as they are sharing a generation tie to West Gardner 345kV. UID 143476

### **Total Cost**

The total cost estimate for this Interconnection is:

|       |           |                  |
|-------|-----------|------------------|
| \$    | 2,152,819 | 345kV Substation |
| \$    | 6,459     | AFUDC for each   |
| \$    | 0         | Contingency      |
| <hr/> |           |                  |
| \$    | 2,159,278 | Total            |

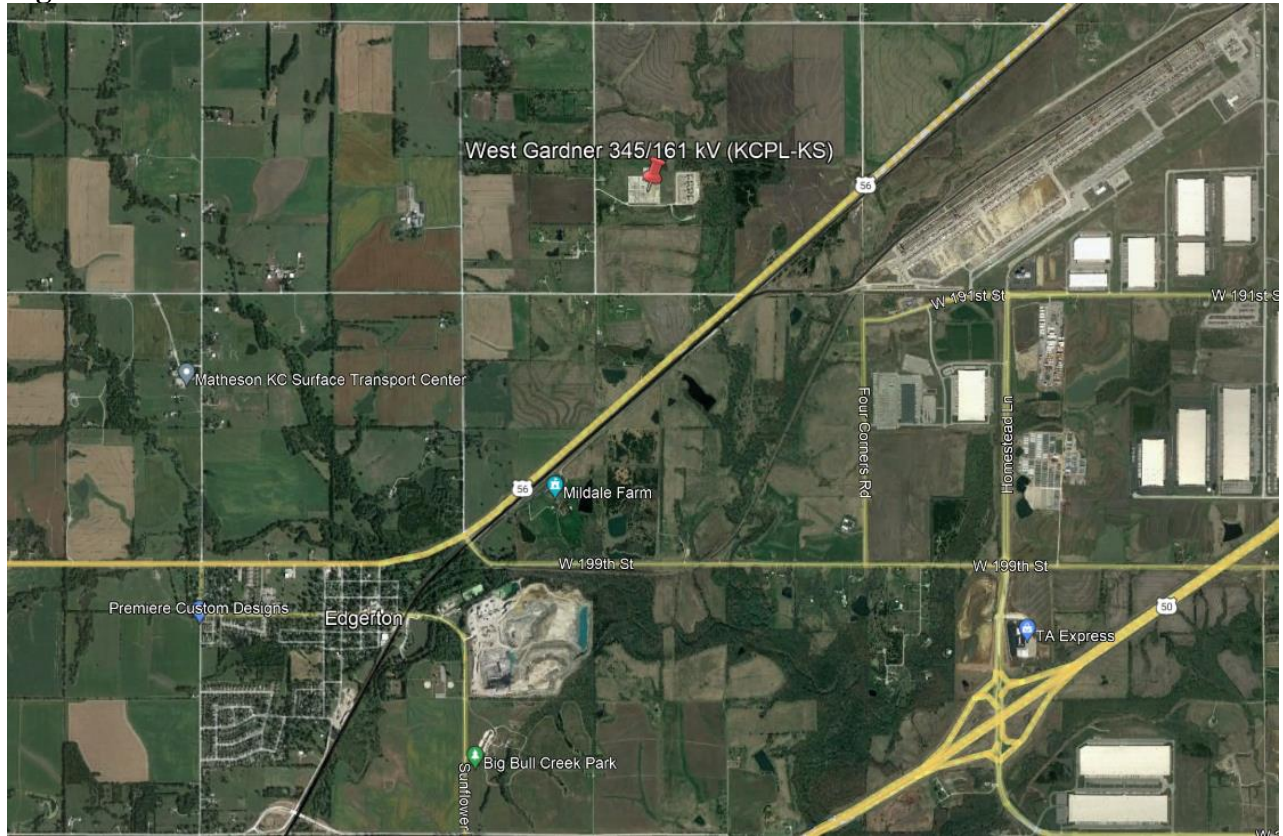
This estimate is accurate to +/- twenty (20) percent, based on current prices, in accordance with Attachment A of Appendix 4 of the Interconnection Facilities Study Agreement. However, recent cost fluctuations in materials are very significant and the accuracy of this estimate at the time of actual settings cannot be assured.

### **Time Estimate**

Time estimates are based on current version of the project schedule and some processes of each category run concurrently.

|                      |       |        |
|----------------------|-------|--------|
| Engineering Time     | 12-18 | Months |
| Procurement Time     | 12-18 | Months |
| Construction Time    | 12    | Months |
| <hr/>                |       |        |
| Total Project Length | 36-48 | Months |

**Figure 19 – West Gardner 345kV Sub**



## **West Gardner 345kV GEN-2017-195 & 196 Interconnection Expansion TOIF**

### **345 kV Substation**

TOIF costs associated with the interconnection of GEN-2017-195. The POI is West Gardner 345kV. Currently Marmaton I and II wind farms have a GIA that requires West Gardner to be built as breaker and a half. This interconnection will share costs with GEN-2017-196 as they are sharing a generation tie to West Gardner 345kV. UID 143477 & 143479

### **Total Cost**

The total cost estimate for this Interconnection is:

|       |         |                           |
|-------|---------|---------------------------|
| \$    | 944,204 | 345kV Substation for each |
| \$    | 2,832   | AFUDC for each            |
| \$    | 0       | Contingency               |
| <hr/> |         |                           |
| \$    | 947,037 | Total                     |

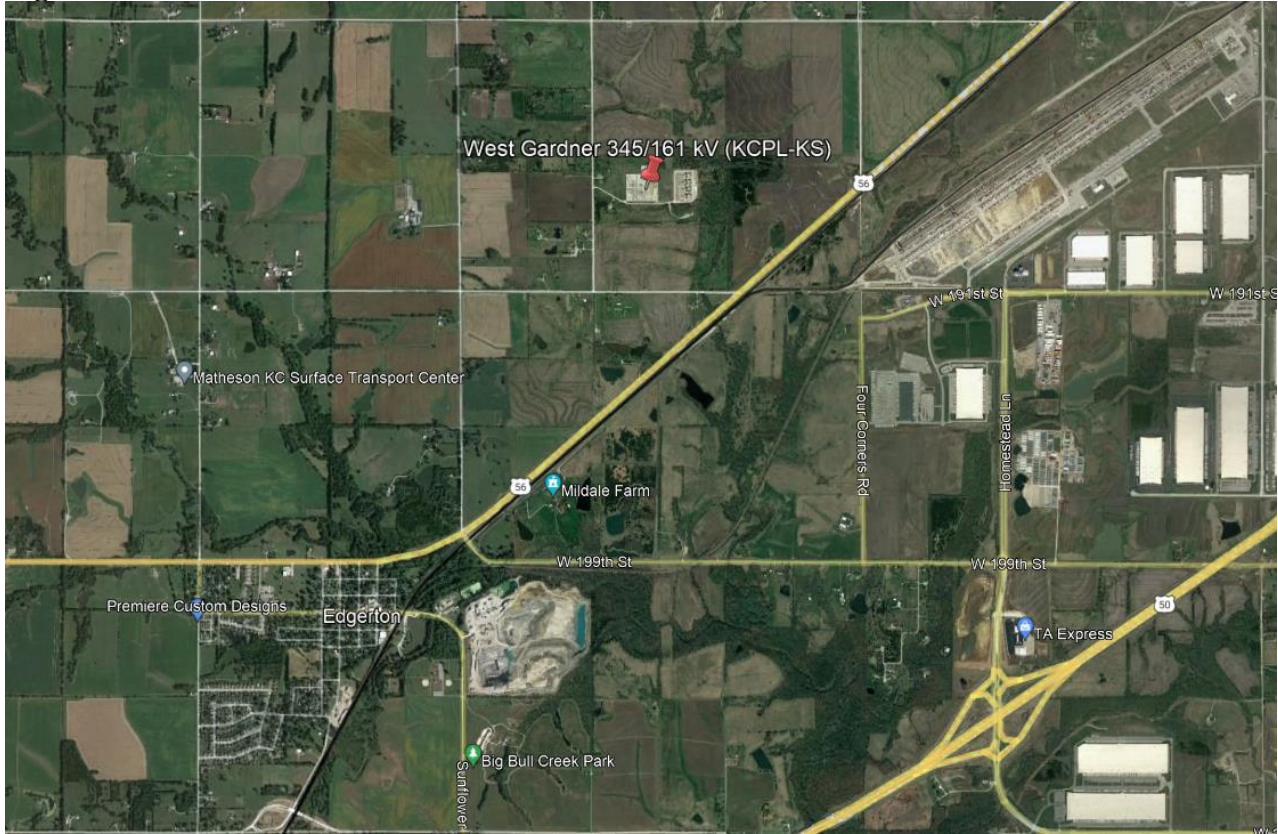
This estimate is accurate to +/- twenty (20) percent, based on current prices, in accordance with Attachment A of Appendix 4 of the Interconnection Facilities Study Agreement. However, recent cost fluctuations in materials are very significant and the accuracy of this estimate at the time of actual settings cannot be assured.

### **Time Estimate**

Time estimates are based on current version of the project schedule and some processes of each category run concurrently.

|                      |       |        |
|----------------------|-------|--------|
| Engineering Time     | 12-18 | Months |
| Procurement Time     | 12-18 | Months |
| Construction Time    | 12    | Months |
| <hr/>                |       |        |
| Total Project Length | 36-48 | Months |

Figure 20 – West Gardner 345kV Sub





## **Buffalo Flats 345kV GEN-2017-220 Interconnection (TOIF) (WERE)**

### **345 kV Substation**

Assuming a shared interconnection tie into the Buffalo Flats 345kV substation for requests GEN-2017-220 and GEN-2017-221. One open terminal on existing rung but will potentially be used by GEN-2016-073 if it moves forward. If that terminal is taken, another rung would be required. May be able to expand substation to the west but would need to relocate existing interconnection tie into substation. UID 143519 and 143521

### **Total Cost**

The total cost estimate for this Interconnection is:

|       |           |                         |
|-------|-----------|-------------------------|
| \$    | 0         | 345kV Transmission Line |
| \$    | 1,155,206 | 345kV Substation        |
| \$    | 3,465     | AFUDC                   |
| \$    | 0         | Contingency             |
| <hr/> |           |                         |
| \$    | 1,158,671 | Total                   |

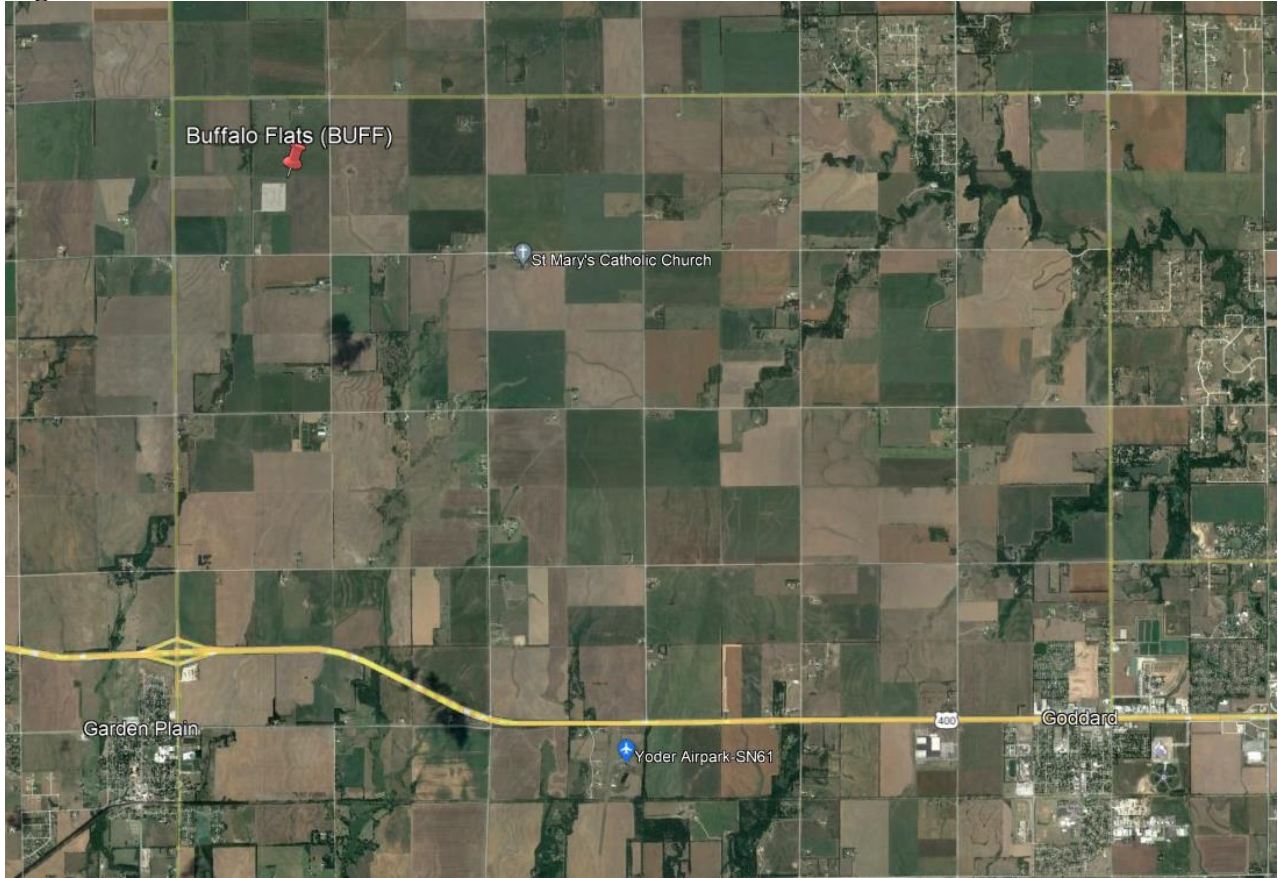
This estimate is accurate to +/- twenty (20) percent, based on current prices, in accordance with Attachment A of Appendix 4 of the Interconnection Facilities Study Agreement. However, recent cost fluctuations in materials are very significant and the accuracy of this estimate at the time of actual settings cannot be assured.

### **Time Estimate**

Time estimates are based on current version of the project schedule and some processes of each category run concurrently.

|                      |       |        |
|----------------------|-------|--------|
| Engineering Time     | 12-18 | Months |
| Procurement Time     | 12-18 | Months |
| Construction Time    | 12    | Months |
| <hr/>                |       |        |
| Total Project Length | 36-48 | Months |

**Figure 22 – Buffalo Flats 345kV Sub**



## **West Gardner 345kV GEN-2017-195 & 196 Interconnection TOIF**

### **345kV Substation Expansion**

TOIF costs associated with the interconnection include shielded cabling, bus conductor and tubing and labor. This interconnection will share costs with GEN-2017-195 and 196, as they will be on the same generation tie at the West Gardner 345kV substation. UID 143477 and 143479

### **Total Cost**

The total cost estimate for this TOIF is:

|       |         |                           |
|-------|---------|---------------------------|
| \$    | 944,204 | Substation costs for each |
| \$    | 2,832   | AFUDC for each            |
| \$    | 0       | Contingency               |
| <hr/> |         |                           |
| \$    | 947,036 | Total                     |

This estimate is accurate to +/- twenty (20) percent, based on current prices, in accordance with Attachment A of Appendix 4 of the Interconnection Facilities Study Agreement. However, recent cost fluctuations in materials are very significant and the accuracy of this estimate at the time of actual settings cannot be assured.

### **Time Estimate**

Time estimates are based on current version of the project schedule and some processes of each category run concurrently.

|                      |       |        |
|----------------------|-------|--------|
| Engineering Time     | 12-18 | Months |
| Procurement Time     | 12-18 | Months |
| Construction Time    | 12    | Months |
| <hr/>                |       |        |
| Total Project Length | 36-48 | Months |

**Figure 24 – West Gardner 345kV substation**



## Swissvale 345kV Interconnection Expansion (DISIS-2017-002)

### 345kV Substation expansion

Network upgrade costs associated with an interconnection expansion to accommodate the interconnection of GEN-2017-125, GEN-2017-128, GEN-2017-191 and GEN-2017-192. This includes site expansion, construction of a new 345kV 4 rung breaker and half with a new equipment enclosure. Equipment will include breakers, switches, VTs, CCVTs, steel, bus and other miscellaneous equipment at the Swissvale 345kV substation. This estimate includes terminal equipment for two line terminals (Emporia EC and Kansas City) and two for 138/230kV Transformers. These costs will be shared by GEN-2017-125, 128, 191 and 192. UID 143370

### Total Cost

The total cost estimate for this Network Upgrade is:

|       |            |                  |
|-------|------------|------------------|
| \$    | 1,768,500  | Line Costs       |
| \$    | 23,720,681 | Substation costs |
| \$    | 76,467     | AFUDC            |
| \$    | 0          | Contingency      |
| <hr/> |            |                  |
| \$    | 25,565,648 | Total            |

This estimate is accurate to +/- twenty (20) percent, based on current prices, in accordance with Attachment A of Appendix 4 of the Interconnection Facilities Study Agreement. However, recent cost fluctuations in materials are very significant and the accuracy of this estimate at the time of actual settings cannot be assured.

### Time Estimate

Time estimates are based on current version of the project schedule and some processes of each category run concurrently.

|                      |       |        |
|----------------------|-------|--------|
| Engineering Time     | 12-18 | Months |
| Procurement Time     | 12-18 | Months |
| Construction Time    | 12    | Months |
| <hr/>                |       |        |
| Total Project Length | 36-48 | Months |

## Swissvale 345kV GEN-2017-125 & 128 Interconnection TOIF

### 345kV Substation

TOIF costs associated with the interconnection include two new terminals and metering at the Swissvale 345kV substation. Cost assumes there is an existing 345kV breaker and half with existing control enclosure. Line steel and miscellaneous equipment (VTs, 3CTs and dead end) are also included. These costs will be shared by GEN-2017-125 and 128. UID 143371 and 143373

### Total Cost

The total cost estimate for this TOIF is:

|       |           |                  |
|-------|-----------|------------------|
| \$    | 2,550,249 | Substation costs |
| \$    | 7,650     | AFUDC            |
| \$    | 0         | Contingency      |
| <hr/> |           |                  |
| \$    | 2,557,900 | Total            |

This estimate is accurate to +/- twenty (20) percent, based on current prices, in accordance with Attachment A of Appendix 4 of the Interconnection Facilities Study Agreement. However, recent cost fluctuations in materials are very significant and the accuracy of this estimate at the time of actual settings cannot be assured.

### Time Estimate

Time estimates are based on current version of the project schedule and some processes of each category run concurrently.

|                      |       |        |
|----------------------|-------|--------|
| Engineering Time     | 12-18 | Months |
| Procurement Time     | 12-18 | Months |
| Construction Time    | 12    | Months |
| <hr/>                |       |        |
| Total Project Length | 36-48 | Months |

## Swissvale 345kV GEN-2017-191 & 192 Interconnection TOIF

### 345kV Substation

TOIF costs associated with the interconnection include a new terminal and metering at the Swissvale 345kV substation. The estimate assumes there is an existing 345kV breaker and half substation with existing control enclosure. Line steel and miscellaneous equipment (VTs, 3CTs and dead end) are also included. These costs will be shared by GEN-2017-191 and 192. UID 143469 and 143471

### Total Cost

The total cost estimate for this TOIF is:

|       |           |                  |
|-------|-----------|------------------|
| \$    | 1,275,125 | Substation costs |
| \$    | 3,825     | AFUDC            |
| \$    | 0         | Contingency      |
| <hr/> |           |                  |
| \$    | 1,278,950 | Total            |

This estimate is accurate to +/- twenty (20) percent, based on current prices, in accordance with Attachment A of Appendix 4 of the Interconnection Facilities Study Agreement. However, recent cost fluctuations in materials are very significant and the accuracy of this estimate at the time of actual settings cannot be assured.

### Time Estimate

Time estimates are based on current version of the project schedule and some processes of each category run concurrently.

|                      |       |        |
|----------------------|-------|--------|
| Engineering Time     | 12-18 | Months |
| Procurement Time     | 12-18 | Months |
| Construction Time    | 12    | Months |
| <hr/>                |       |        |
| Total Project Length | 36-48 | Months |

Figure 25 – Swissvale 345kV Substation





# Abilene Energy Center – Northview 115kV GEN-2017-120 Interconnection

## TOIF

### Abilene Energy Center – Northview 115kV line

TOIF costs associated with the interconnection a new terminal and metering at the new 115kV interconnection substation. UID 143365

### Total Cost

The total cost estimate for this TOIF is:

|       |         |                  |
|-------|---------|------------------|
| \$    | 840,193 | Substation costs |
| \$    | 2,520   | AFUDC            |
| \$    | 0       | Contingency      |
| <hr/> |         |                  |
| \$    | 842,713 | Total            |

This estimate is accurate to +/- twenty (20) percent, based on current prices, in accordance with Attachment A of Appendix 4 of the Interconnection Facilities Study Agreement. However, recent cost fluctuations in materials are very significant and the accuracy of this estimate at the time of actual settings cannot be assured.

### Time Estimate

Time estimates are based on current version of the project schedule and some processes of each category run concurrently.

|                      |       |        |
|----------------------|-------|--------|
| Engineering Time     | 12-18 | Months |
| Procurement Time     | 12-18 | Months |
| Construction Time    | 12    | Months |
| <hr/>                |       |        |
| Total Project Length | 36-48 | Months |

**Figure 26 – Abilene Energy Center – Northview 115kV line**



## **Stilwell 345kV GEN-2017-229 Interconnection NU**

### **Stilwell 345kV Substation**

NU costs associated with the interconnection includes a rebuild of the Stilwell 345kV substation as a breaker and a half configuration with 7 terminals. This request includes two new 345kV gen lines interconnection at Stilwell 345kV substation. Stilwell 161kV will also have to be rebuilt to accommodate the new 345kV terminals. UID 143534

### **Total Cost**

The total cost estimate for this Network Upgrade is:

|       |            |                  |
|-------|------------|------------------|
| \$    | 5,152,000  | Line Costs       |
| \$    | 72,351,043 | Substation costs |
| \$    | 196,224    | AFUDC            |
| \$    | 0          | Contingency      |
| <hr/> |            |                  |
| \$    | 78,073,007 | Total            |

This estimate is accurate to +/- twenty (20) percent, based on current prices, in accordance with Attachment A of Appendix 4 of the Interconnection Facilities Study Agreement. However, recent cost fluctuations in materials are very significant and the accuracy of this estimate at the time of actual settings cannot be assured.

### **Time Estimate**

Time estimates are based on current version of the project schedule and some processes of each category run concurrently.

|                      |       |        |
|----------------------|-------|--------|
| Engineering Time     | 12-18 | Months |
| Procurement Time     | 12-18 | Months |
| Construction Time    | 12    | Months |
| <hr/>                |       |        |
| Total Project Length | 36-48 | Months |

## **Stilwell 345kV GEN-2017-229 Interconnection TOIF**

### **Stilwell 345kV Substation**

TOIF costs associated with the interconnection a new terminal and metering at Stilwell 345kV substation. UID 143435

### **Total Cost**

The total cost estimate for this TOIF is:

|    |           |                  |
|----|-----------|------------------|
| \$ | 1,337,344 | Substation costs |
|----|-----------|------------------|

|       |           |             |
|-------|-----------|-------------|
| \$    | 4,012     | AFUDC       |
| \$    | 0         | Contingency |
| <hr/> |           |             |
| \$    | 1,341,356 | Total       |

This estimate is accurate to +/- twenty (20) percent, based on current prices, in accordance with Attachment A of Appendix 4 of the Interconnection Facilities Study Agreement. However, recent cost fluctuations in materials are very significant and the accuracy of this estimate at the time of actual settings cannot be assured.

**Time Estimate**

Time estimates are based on current version of the project schedule and some processes of each category run concurrently.

|                      |       |        |
|----------------------|-------|--------|
| Engineering Time     | 12-18 | Months |
| Procurement Time     | 12-18 | Months |
| Construction Time    | 12    | Months |
| <hr/>                |       |        |
| Total Project Length | 36-48 | Months |

**Figure 28 – Stilwell 345 kV substation**



## **Holt 345kV GEN-2017-115 Interconnection NU**

### **Holt 345kV Substation**

NU costs associated with the interconnection includes a breaker that will be added to the ring bus, terminal, and metering at the Holt County 345kV substation. UID 143354

### **Total Cost**

The total cost estimate for this Network Upgrade is:

|       |           |                  |
|-------|-----------|------------------|
| \$    | 1,013,554 | Substation costs |
| \$    | 3,040     | AFUDC            |
| \$    | 0         | Contingency      |
| <hr/> |           |                  |
| \$    | 1,016,595 | Total            |

This estimate is accurate to +/- twenty (20) percent, based on current prices, in accordance with Attachment A of Appendix 4 of the Interconnection Facilities Study Agreement. However, recent cost fluctuations in materials are very significant and the accuracy of this estimate at the time of actual settings cannot be assured.

### **Time Estimate**

Time estimates are based on current version of the project schedule and some processes of each category run concurrently.

|                      |       |        |
|----------------------|-------|--------|
| Engineering Time     | 12-18 | Months |
| Procurement Time     | 12-18 | Months |
| Construction Time    | 12    | Months |
| <hr/>                |       |        |
| Total Project Length | 36-48 | Months |

## **Holt 345kV GEN-2017-115 Interconnection TOIF**

### **Holt 345kV Substation**

TOIF costs associated with the interconnection includes a terminal and metering, for the new breaker, at the Holt County 345kV substation. UID 143355

### **Total Cost**

The total cost estimate for this TOIF is:

|       |         |                  |
|-------|---------|------------------|
| \$    | 644,643 | Substation costs |
| \$    | 1,934   | AFUDC            |
| \$    | 0       | Contingency      |
| <hr/> |         |                  |
| \$    | 646,577 | Total            |

This estimate is accurate to +/- twenty (20) percent, based on current prices, in accordance with Attachment A of Appendix 4 of the Interconnection Facilities Study Agreement. However, recent cost fluctuations in materials are very significant and the accuracy of this estimate at the time of actual settings cannot be assured.

**Time Estimate**

Time estimates are based on current version of the project schedule and some processes of each category run concurrently.

|                      |       |        |
|----------------------|-------|--------|
| Engineering Time     | 12-18 | Months |
| Procurement Time     | 12-18 | Months |
| Construction Time    | 12    | Months |
| <hr/>                |       |        |
| Total Project Length | 36-48 | Months |

**Figure 29 – Holt 345kV Substation**



**Sumner County 138kV GEN-2017-121 Interconnection (Non-Shared NU)**

**Sumner County 138kV Substation**

NU costs associated with the interconnection include a new 138kV breaker and associated equipment for additional terminal at Sumner County 138kV Substation. UID 143366

**Total Cost**

The total cost estimate for this Network Upgrade is:

|       |         |                  |
|-------|---------|------------------|
| \$    | 589,796 | Substation costs |
| \$    | 1,769   | AFUDC            |
| \$    | 0       | Contingency      |
| <hr/> |         |                  |
| \$    | 591,566 | Total            |

This estimate is accurate to +/- twenty (20) percent, based on current prices, in accordance with Attachment A of Appendix 4 of the Interconnection Facilities Study Agreement. However, recent cost fluctuations in materials are very significant and the accuracy of this estimate at the time of actual settings cannot be assured.

**Time Estimate**

Time estimates are based on current version of the project schedule and some processes of each category run concurrently.

|                      |       |        |
|----------------------|-------|--------|
| Engineering Time     | 12-18 | Months |
| Procurement Time     | 12-18 | Months |
| Construction Time    | 12    | Months |
| <hr/>                |       |        |
| Total Project Length | 36-48 | Months |

**Sumner County 138kV GEN-2017-121 Interconnection (TOIF)**

**Sumner County 138kV Substation**

TOIF costs associated with the interconnection include a new terminal and metering at the Sumner County 138kV substation. UID 143367

**Total Cost**

The total cost estimate for this TOIF is:

|       |         |                  |
|-------|---------|------------------|
| \$    | 646,577 | Substation costs |
| \$    | 1,939   | AFUDC            |
| \$    | 0       | Contingency      |
| <hr/> |         |                  |
| \$    | 648,517 | Total            |

This estimate is accurate to +/- twenty (20) percent, based on current prices, in accordance with Attachment A of Appendix 4 of the Interconnection Facilities Study Agreement. However, recent cost fluctuations in materials are very significant and the accuracy of this estimate at the time of actual settings cannot be assured.

**Time Estimate**

Time estimates are based on current version of the project schedule and some processes of each category run concurrently.

|                      |       |        |
|----------------------|-------|--------|
| Engineering Time     | 12-18 | Months |
| Procurement Time     | 12-18 | Months |
| Construction Time    | 12    | Months |
| <hr/>                |       |        |
| Total Project Length | 36-48 | Months |

**Figure 32 – Sumner County 138kV Substation**





## **Gordon Evans 138kV GEN-2017-179 Interconnection (TOIF)**

### **Gordon Evans 138kV Substation**

TOIF costs associated with the interconnection facilities. This interconnection will for GEN-2017-179 tie that connects to Gordon Evans 138kV substation. UID 143447

### **Total Cost**

The total cost estimate for this TOIF is:

|       |         |                  |
|-------|---------|------------------|
| \$    | 714,908 | Substation costs |
| \$    | 2,144   | AFUDC            |
| \$    | 0       | Contingency      |
| <hr/> |         |                  |
| \$    | 717,053 | Total            |

This estimate is accurate to +/- twenty (20) percent, based on current prices, in accordance with Attachment A of Appendix 4 of the Interconnection Facilities Study Agreement. However, recent cost fluctuations in materials are very significant and the accuracy of this estimate at the time of actual settings cannot be assured.

### **Time Estimate**

Time estimates are based on current version of the project schedule and some processes of each category run concurrently.

|                      |       |        |
|----------------------|-------|--------|
| Engineering Time     | 12-18 | Months |
| Procurement Time     | 12-18 | Months |
| Construction Time    | 12    | Months |
| <hr/>                |       |        |
| Total Project Length | 36-48 | Months |

## **Gordon Evans 138kV GEN-2017-226 & 227 Interconnection (TOIF)**

### **Gordon Evans 138kV Substation**

TOIF costs associated with the interconnection include a substation expansion and new 138kV rung. This interconnection will share costs by GEN-2017-226 and GEN-2017-227 as they will share a generation tie that connects to Gordon Evans 138kV substation. UID 143529 and 143531

### **Total Cost**

The total cost estimate for this TOIF is:

|       |         |                  |
|-------|---------|------------------|
| \$    | 742,533 | Substation costs |
| \$    | 2,227   | AFUDC            |
| \$    | 0       | Contingency      |
| <hr/> |         |                  |
| \$    | 744,761 | Total            |

This estimate is accurate to +/- twenty (20) percent, based on current prices, in accordance with Attachment A of Appendix 4 of the Interconnection Facilities Study Agreement. However, recent cost fluctuations in materials are very significant and the accuracy of this estimate at the time of actual settings cannot be assured.

**Time Estimate**

Time estimates are based on current version of the project schedule and some processes of each category run concurrently.

|                      |       |        |
|----------------------|-------|--------|
| Engineering Time     | 12-18 | Months |
| Procurement Time     | 12-18 | Months |
| Construction Time    | 12    | Months |
| <hr/>                |       |        |
| Total Project Length | 36-48 | Months |

**Figure 33 – Gordon Evans 138kV Substation**



**Altoona – NE Parsons 138kV GEN-2017-131 Interconnection (NU)**

**Altoona – NE Parsons 138kV Substation**

Assuming interconnection of GEN-2017-022, network upgrade costs associated with the interconnection include a relay settings only. These costs assumes successful connection of GEN-2017-022. UID 143374

**Total Cost**

The total cost estimate for this Network Upgrade is:

|       |        |                  |
|-------|--------|------------------|
| \$    | 12,344 | Substation costs |
| \$    | 37     | AFUDC            |
| \$    | 0      | Contingency      |
| <hr/> |        |                  |
| \$    | 12,381 | Total            |

This estimate is accurate to +/- twenty (20) percent, based on current prices, in accordance with Attachment A of Appendix 4 of the Interconnection Facilities Study Agreement.

However, recent cost fluctuations in materials are very significant and the accuracy of this estimate at the time of actual settings cannot be assured.

**Time Estimate**

Time estimates are based on current version of the project schedule and some processes of each category run concurrently.

|                      |       |        |
|----------------------|-------|--------|
| Engineering Time     | 12-18 | Months |
| Procurement Time     | 12-18 | Months |
| Construction Time    | 12    | Months |
| <hr/>                |       |        |
| Total Project Length | 36-48 | Months |

**Altoona – NE Parsons 138kV GEN-2017-131 Interconnection (TOIF)**

**Altoona – NE Parsons 138kV Substation**

Assuming interconnection of GEN-2017-022, TOIF costs associated with the interconnection include a daisy chained request. These costs assumes successful connection of GEN-2017-022. UID 143375

**Total Cost**

The total cost estimate for this TOIF is:

|       |        |                  |
|-------|--------|------------------|
| \$    | 24,688 | Substation costs |
| \$    | 74     | AFUDC            |
| \$    | 0      | Contingency      |
| <hr/> |        |                  |
| \$    | 24,762 | Total            |

This estimate is accurate to +/- twenty (20) percent, based on current prices, in accordance with Attachment A of Appendix 4 of the Interconnection Facilities Study Agreement. However, recent cost fluctuations in materials are very significant and the accuracy of this estimate at the time of actual settings cannot be assured.

**Time Estimate**

Time estimates are based on current version of the project schedule and some processes of each category run concurrently.

|                      |   |        |
|----------------------|---|--------|
| Engineering Time     | 2 | Months |
| Procurement Time     | 2 | Months |
| Construction Time    | 2 | Months |
| <hr/>                |   |        |
| Total Project Length | 6 | Months |

**Figure 34 – Altoona – NE Parsons 138kV Line**



**Viola – Renfrow 345 kV Rebuild (Evergy Portion)**

**345 kV Transmission Line**

The estimated cost is for the rebuild of the 23-mile Evergy portion of the Viola – Renfrow 345kV line to meet a 3000 Amp line rating. Line will be rebuilt using steel structures, with angles and dead-ends on drilled piers. Estimate assumes the conductor will be 1590 Lapwing ACSR and OPGW will be installed. UID 156471

**Total Cost**

The total cost estimate for this Network Upgrade is:

|       |            |                          |
|-------|------------|--------------------------|
| \$    | 47,276,805 | 345 kV Transmission Line |
| \$    | 0          | 345 kV Substation        |
| \$    | 141,830    | AFUDC                    |
| \$    | 0          | Contingency              |
| <hr/> |            |                          |
| \$    | 47,418,635 | Total                    |

This estimate is accurate to +/- twenty (20) percent, based on current prices, in accordance with Attachment A of Appendix 4 of the Interconnection Facilities Study Agreement. However, recent cost fluctuations in materials are very significant and the accuracy of this estimate at the time of actual settings cannot be assured.

**Time Estimate**

Time estimates are based on current version of the project schedule and some processes of each category run concurrently.

|                   |       |        |
|-------------------|-------|--------|
| Engineering Time  | 12-18 | Months |
| Procurement Time  | 12-18 | Months |
| Construction Time | 12    | Months |

Total Project Length

36-48

Months

**Figure 35 – Viola – Renfrow 345 kV**

