

Andy Beshear
Governor

Rebecca W. Goodman
Secretary
Energy and Environment Cabinet



Commonwealth of Kentucky
Public Service Commission
211 Sower Blvd.
P.O. Box 615
Frankfort, Kentucky 40602-0615
Telephone: (502) 564-3940
Fax: (502) 564-3460
psc.ky.gov

Kent A. Chandler
Chairman

Angie Hatton
Vice Chairman

Mary Pat Regan
Commissioner

January 5, 2024

Staff Opinion 2023-006

Sent electronically to JCrawford@cbkylaw.com

Hon. James M. Crawford
Crawford & Baxter, P.S.C.
P.O. Box 353
523 Highland Avenue
Carrollton, Kentucky 41008

Re: Owen Electric Cooperative, Inc. 2024-2025 Construction Work Plan

Dear Mr. Crawford:

Commission Staff acknowledges receipt of your letter dated November 30, 2023, on behalf of Owen Electric Cooperative, Inc. (Owen Electric) requesting a staff advisory opinion. Specifically, the letter requests an opinion as to whether any or all projects contained in Owen Electric's 2024-2025 Construction Work Plan (CWP) require a Certificate of Public Convenience and Necessity (CPCN) or whether the projects fall within the "ordinary course of business" exemption and, therefore, do not require a CPCN.

Pursuant to the Commission's decision that each construction project contained in a CWP should be analyzed on an individual basis to determine whether that individual project is exempt from the requirement in KRS 278.020(1) to obtain a CPCN, Commission Staff has reviewed the projects contained in Owen Electric's 2024-2025 CWP. This letter represents Commission Staff's opinion, which is advisory in nature, and not binding on the Commission should the issues herein be formally presented for Commission resolution.

As with all legal opinions requesting a determination of the exemption from the requirement of a CPCN, Commission Staff's review does not consider the reasonableness or the need for each project. Therefore, because reasonableness and need are not considered herein, or in other non-rate cases, the cost of such a project can be denied recovery in a rate case if found to be unreasonable or unnecessary.

According to its 2024-2025 CWP, Owen Electric's proposed construction projects may be broken down by the following RUS Codes: (1) Code 100 new distribution line at an estimated total cost of \$13,690,447; (2) Code 300 line conversion and replacement at an estimated total cost of \$4,718,700; (3) Code 600 miscellaneous equipment and poles

at an estimated total cost of \$24,836,317¹; (4) Code 611 line relocations at an estimated total cost of \$2,161,000; and (5) Code 700 other distribution items (outdoor lights, AMI and SCADA/DA hardware and software) at an estimated total cost of \$1,599,228.

KRS 278.020(1) provides, in relevant part, as follows:

No person, partnership, public or private corporation, or combination thereof shall commence providing utility service to or for the public or begin the construction of any plant, equipment, property, or facility for furnishing to the public any of the services enumerated in KRS 278.010, except retail electric suppliers for service connections to electric consuming facilities located within its certified territory and ordinary extensions of existing systems in the usual course of business, until that person has obtained from the Public Service Commission a certificate that public convenience and necessity require the service or construction.

Regarding the exception to the CPCN requirement, Administrative Regulation 807 KAR 5:001, Section 15(3) provides, in full, as follows:

Extensions in the ordinary course of business. A certificate of public convenience and necessity shall not be required for extensions that do not create wasteful duplication of plant, equipment, property, or facilities, or conflict with the existing certificates or service of other utilities operating in the same area and under the jurisdiction of the commission that are in the general or contiguous area in which the utility renders service, and that do not involve sufficient capital outlay to materially affect the existing financial condition of the utility involved, or will not result in increased charges to its customers.

¹ The estimated project costs included in RUS Codes 600 and 700 over the two-year CWP period are as follows:

• Code 601 - New Transformers/Meters	\$7,755,122
• Code 602 - Service Upgrades	\$487,991
• Code 603 - Sectionalizing	\$1,000,000
• Code 604 - Voltage Regulators.....	\$88,000
• Code 606 - Pole Replacement	\$6,852,516
• Code 607 - Miscellaneous	\$4,400,000
• Code 608 - Conductor Replacement (OH)	\$4,000,000
Code 611 Line Relocations.....	\$2,161,000
Code 700 Outdoor Lighting.....	\$755,632
Code 704 SCADA / DA	\$638,616
Code 705 AMI Equipment.....	\$204,980

In analyzing whether the proposed projects would materially affect Owen Electric's financial condition, Commission Staff takes notice of Owen Electric's 2022 Annual Report, which shows Owen Electric having net utility plant of approximately \$179,073,931 as of December 31, 2022. Commission Staff is of the opinion that the individual projects in Owen Electric's 2024-2025 CWP do not require a CPCN. When reviewed individually, each of those proposed construction project based on its estimated cost would not materially impact Owen Electric's existing financial condition. Therefore, each construction project is generally considered an extension in the ordinary course of business. Likewise, the cost estimate of each project considered separately in the 2024-2025 CWP will not have an immediate or significant impact on Owen Electric's rates. Thus, assuming that the projects were needed and prudent, Commission Staff is of the opinion that each of the proposed projects set out in Owen Electric's 2024-2025 CWP satisfy the "ordinary course of business" exemption from CPCN requirement.

It should be noted that Owen Electric was included as a party to Case Number 2012-00428, *Consideration of the Implementation of Smart Grid and Smart Meter Technologies*. As a party to that case, Owen Electric received a copy of the final order dated April 13, 2016 that stated in pertinent part:

With regard to CPCNs, the Commission finds it appropriate for jurisdictional electric utilities to obtain CPCNs for major AMR or AMI meter investments and distribution grid investments for DA, SCADA or volt/var resources. In the past, when addressing requests for CPCNs for AMR and AMI meters, the Commission has noted its concern regarding a number of meter related issues such as cost, compatibility with current system equipment and software, and unplanned obsolescence.

The New Meters part of this 2024-2025 Construction Work Plan is part of a six-year project that began in 2018 wherein Owen Electric replaced PLC meters with RF meters (both AMI meters). Owen Electric should have applied to the Commission for a CPCN for this six-year project so that the Commission could determine whether or not to grant a CPCN, or if the meter replacement project is generally considered an extension in the ordinary course of business. Moving forward, Owen Electric should apply to the Commission for a CPCN for major AMR or AMI meter investments.

This letter represents Commission Staff's interpretation of the law as applied to the facts presented. However, Commission Staff does not represent Owen Electric or its agents and, therefore, this opinion should not be interpreted as legal advice from Commission Staff. Owen Electric should consult with its counsel for legal advice regarding this matter. Further, this opinion is advisory in nature and not binding on the Commission should the issues herein be formally presented for Commission resolution. Questions concerning this opinion should be directed to Andrew Bowker at (502) 782-2580.

Sincerely,



Linda Bridwell, PE
Executive Director

CRAWFORD & BAXTER, P.S.C.

ATTORNEYS AT LAW
523 Highland Avenue
P.O. Box 353
Carrollton, Kentucky 41008

James M. Crawford
E-Mail: JCrawford@cbkylaw.com

Ruth H. Baxter
E-Mail: RBaxter@cbkylaw.com

Jake A. Thompson
E-Mail: JThompson@cbkylaw.com

Phone: (502) 732-6688
Toll Free: 1-800-442-8680
Fax: (502) 732-6920

November 16, 2023

VIA EMAIL PSCED@KY.GOV

Ms. Linda Bridwell
Executive Director
Kentucky Public Service Commission
211 Sower Boulevard
P.O. Box 615
Frankfort, KY 40602

RECEIVED

NOV 16 2023

PUBLIC SERVICE
COMMISSION

RE: Request for Staff Opinion – Construction Work Plan

Dear Ms. Bridwell:

Please find attached for electronic filing with the Commission, Owen Electric Cooperative, Inc.'s Request for Staff Opinion on its 2024-2025 Construction Work Plan. Pursuant to the Orders in Case 2020-00085 dated March 16, 2020, March 24, 2020, and July 22, 2021 this filing is being submitted electronically.

Respectfully yours,

CRAWFORD & BAXTER, P.S.C.


James M. Crawford
Attorney for Owen Electric Cooperative, Inc.

Enclosures

Owen Electric

Kentucky 37 Owen

2024-2025 Construction Work Plan

October 2023

Prepared by:

Owen Electric Staff

I hereby certify that this 2024-2025 CWP Report was prepared by me or under my direct supervision and that I am a duly registered professional engineer under the laws of the State of Kentucky. Registration No. 28011



10/25/2023
Date

By: J. K. Taylor
Jennifer K. Taylor, P.E.

**OWEN ELECTRIC COOPERATIVE
2024 – 2025 CONSTRUCTION WORK PLAN REPORT**

Kentucky 37 Owen

TABLE OF CONTENTS

SECTION NUMBER	TITLE
I.	EXECUTIVE SUMMARY
	A. Purpose, Results and General Basis of Study.
	B. Service Area and Power Supply.
	C. Summary of Construction Program and Costs.
II.	STUDY GUIDELINES AND ANALYSIS OF SYSTEM
	A. Distribution System Design Criteria.
	B. Distribution and Line Equipment Costs.
	C. Status of Previous CWP Items.
	D. Analysis of System Studies.
	E. Analysis of Substation Loading and Reliability.
	F. Non-Funded System Recommendations.
III.	DATA RESOURCES
	A. Data Resources.
	B. Basic Data and Assumptions, Historical Data/Cost Summary.
IV.	PROPOSED CONSTRUCTION ITEMS
	A. Service to New Customers.
	B. System Improvements
	C. Miscellaneous Distribution Equipment.
	D. Automation & Outdoor Lights.

PURPOSE OF REPORT

This report documents the engineering analysis of, and summarizes the proposed construction for Owen Electric Cooperative (OEC) electric distribution system for the two-year planning period of 2024-2025.

The report also provides engineering support in the form of descriptions, costs and justifications of the required new facilities for a loan application to RUS in order to finance the proposed construction program.

GENERAL BASIS OF STUDY

The summer 2025 and winter 2026 projected total peak system loads were taken from the OEC 2022 Load Forecast (LF) as approved by RUS. Residential and small commercial loads were grown at rates consistent with the LF.

From 2016-2021, the annual average increase in residential energy sales was 1.2%. This rate is projected to be 1.5% over the next five years. Small commercial sales are projected to increase at 1.4% annually over the next five years. Large Commercial / Industrial energy sales are projected to increase at 0.8% annually over the next five years. OEC is seeing growth in its northern region especially in Boone County with an increase in development around the Greater Cincinnati airport and recent upgrades to the sanitation infrastructure. Commercial growth and building activity continue to rise.

System analysis models are based on non-coincidental (NC) system peaks that are outlined in the LF. The projected winter 2025/2026 NC peak (based on LF and GFR meeting) is 345,000 kW. The projected summer 2025 NC peak (based on LF and GFR meeting) is 338,000 kW.

Winter and summer growth models were examined. The OEC system has some regions that are summer peaking; and some regions that are winter peaking. Both seasons were reviewed to address system deficiencies for either season.

The current OEC 2006 Long Range Plan (LRP) load projections and improvement recommendations were reviewed to make sure that they generally agree with scope of the 2024-2025 construction work plan (CWP) recommendations. Additionally OEC periodically does area-specific Long Range mini-studies on areas of high projected growth. All projects in the 2024-2025 CWP align with the goals in the current system-wide LRP, as well as relevant mini-LRP studies.

GENERAL BASIS OF STUDY (cont.)

A RUS Operations and Maintenance Survey (FORM 300) has been completed with the RUS GFR. This survey is used to determine portions of the construction required to replace physically deteriorated equipment and material, upgrade areas of the system to conform to code or safety requirements, and improve the reliability and quality of service.

A system analysis using RUS guidelines and the OEC Design Criteria was performed on all of the substations and distribution lines of the system. Milsoft Integrated Solutions' PC-Based Distribution Analysis Program – “Windmil” version 8.7 was used to analyze the existing system configuration that was modeled with the projected load growth.

For each deficiency that was found, alternate solutions were considered and economically evaluated.

SUMMARY - RESULTS OF PROPOSED CONSTRUCTION

Upon completion of the proposed construction, the system will provide adequate and dependable service to 64,503 residential customers as well as 37 industrial/large commercial loads and 2,757 small commercial loads. Average monthly residential usage is projected to be 1,116 kWh. It is estimated that there will be 1,900 idle services.

There will be an increased focus on aged single-phase conductor replacement in this construction work plan with an estimated 20 miles of replacement targeted in this work plan.

There are two new or expanded substations planned in this construction work plan. A new substation near the Greater Cincinnati/Northern Kentucky airport (CVG) will be completed in 2024 to serve anticipated load growth near the airport. The new Mineola substation will be supplied by a new EKPC 7-mile 69kV transmission line that will also serve the existing Downing substation which is currently fed by a Duke Energy 69kV line. A transmission hot tie will be maintained with Duke for contingency purposes at Downing. As part of the transmission project OEC will build a bus-to-bus distribution underbuild along the transmission line between Hebron and Downing substations. This new distribution line will provide contingency opportunities between Hebron and Downing and also help shorten existing distribution feeders out of Downing thereby reducing exposure and improving reliability. As part of this project a second low bay will be added at the existing Hebron substation to accommodate the new distribution feeder.

Additionally, the Bullittsville substation is scheduled to be rebuilt in 2025 as part of EKPC's ongoing efforts to upgrade aging substation infrastructure. There are several new commercial buildings and a large 300+ acre site zoned for industrial/commercial along Bullittsville and North Bend Roads. These new sites will increase loading on the existing Bullittsville substation necessitating an increase in capacity as well.

SUMMARY - RESULTS OF PROPOSED CONSTRUCTION (con't.)

Several new feeders are projected in order to increase capacity to areas that are expecting concentrated load growth. A potential new feeder out of the Bristow I substation may be necessary as commercial/industrial growth is anticipated in conjunction with a highway widening project along Hwy 536 in Kenton County. The need for this project will be dependent on the timing and eventual size of loads that develop along the Hwy 536 corridor. The second new projected feeder is out of the Hebron substation and will be necessary to increase capacity into the northern Boone county area which is experiencing increased growth due to expanded sewage infrastructure and continued development around the CVG airport. This new feeder will utilize the second low bay being constructed at the Hebron station as part of the aforementioned Hebron to Downing II distribution underbuild.

Lastly adding a second transformer and high side at the Hebron substation may be necessary by the end of the work plan period. The projected loading puts that station right at capacity limits by the end of the work plan period. Loading on the station will be monitored to see how quickly the areas of potential growth come to fruition.

11.2 miles of site-specific conductor replacement and conversion will take place in the two-year plan period. Also 3.5 miles of line will be relocated due to road projects. And an additional 20 miles of conductor will be selected for aged conductor replacement. The aged conductor replacement line sections will be selected based on conductor condition, operational experience and the number of customers served.

SERVICE AREA

OWEN ELECTRIC COOPERATIVE is a RUS-funded electric distribution cooperative. OEC is located in Northern Kentucky. OEC serves portions of Boone, Kenton, Campbell, Grant, Pendleton, Carroll, Scott, Gallatin and Owen Counties. The headquarters are located in Owenton, KY (Owen County). *See Maps on following page.*

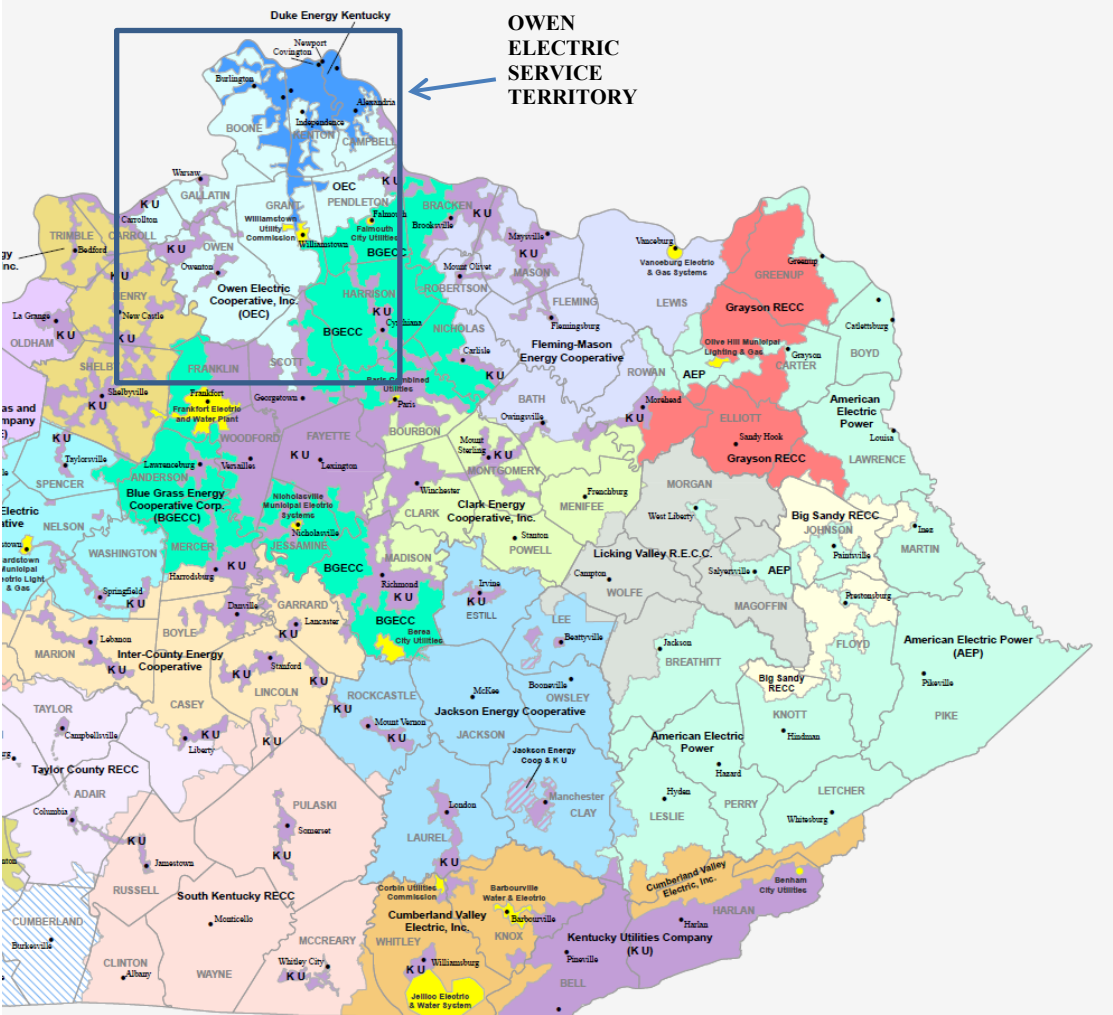
The OEC service area is due south of Cincinnati, Ohio and north of Georgetown, Kentucky. The system has a fine balance of large industrial and commercial customers combined with a large residential base due to the close proximity to Cincinnati.

The following data is from OEC's 12/22 RUS Form 7:

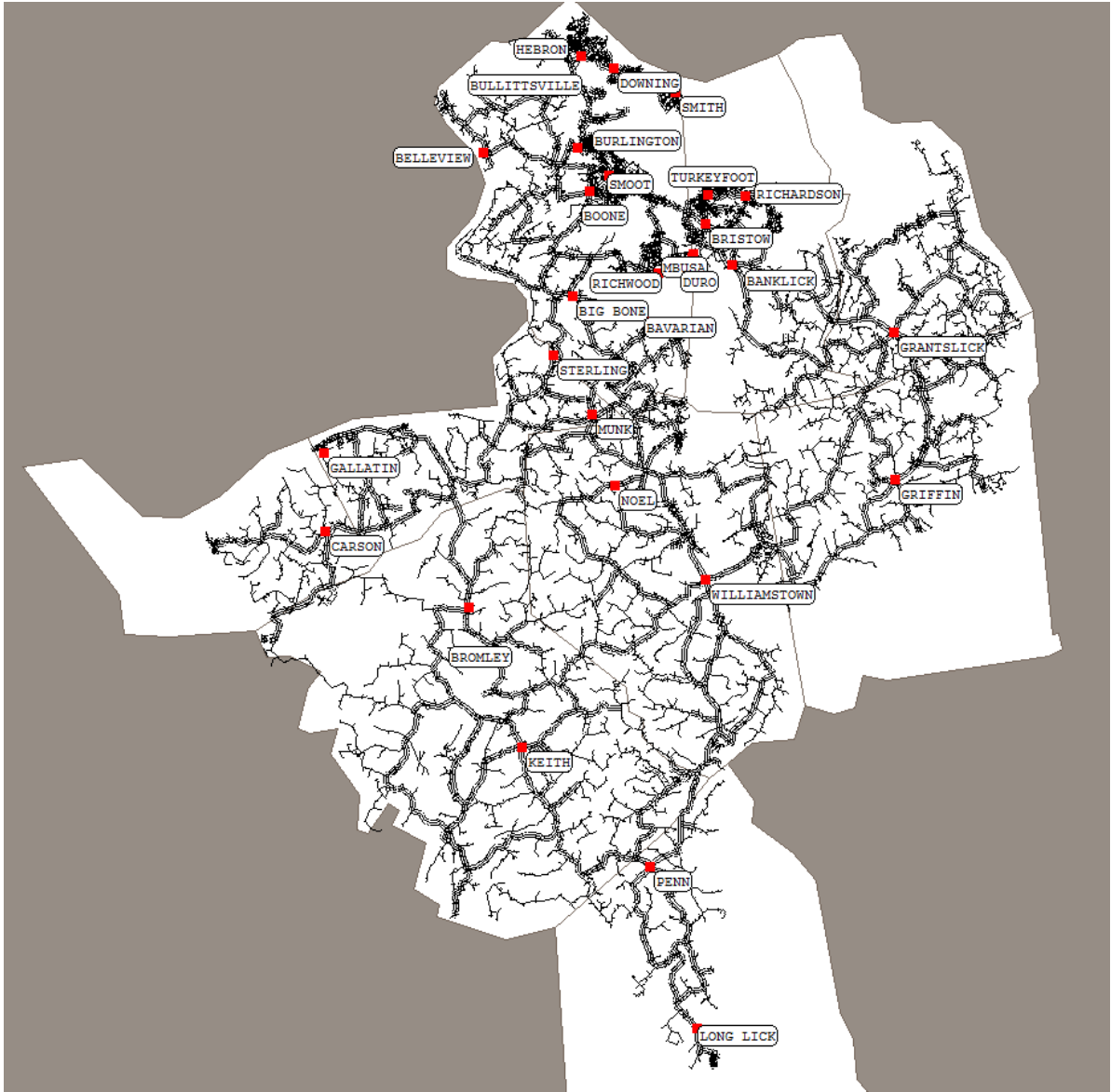
<i>Total Services in Place</i>	66,708
<i>MWH Purchased</i>	2,588,670
<i>MWH Sold</i>	2,538,898
<i>Maximum MW Demand</i>	653.6
<i>Total Utility Plant</i>	\$344,308,045
<i>Plant Dollars Per Active Member</i>	\$5,161
<i>Consumers/Mile</i>	14.3

OEC will operate 30 delivery points by the end of the CWP and distribute power at a primary voltages of 12.5/7.2 kV and 14.4/25 kV over approximately 4,700 miles of line.

EASTERN KENTUCKY COOPERATIVES



OEC SYSTEM MAP



GENERATION and TRANSMISSION POWER SUPPLIER

East Kentucky Power Cooperative (EKPC) provides all power and energy needs to OEC. EKPC provides service to the twenty-nine distribution substations. EKPC is located in Winchester, Kentucky.

The 2022 Load Forecast (LF) is a joint effort between OEC and EKPC. OEC provides loading data and system growth predictions to EKPC for use in the LF growth models.

All new distribution, transmission, and substation construction requirements are considered simultaneously as a “one system” concept - between OEC & EKPC - for the orderly and most economic development of the total system. All of the recommendations relative to power supply and delivery are discussed with EKPC.

SUMMARY OF CONSTRUCTION PROGRAM AND COSTS

Owen Electric's distribution system was analyzed in order to identify the construction requirements needed to adequately serve the projected CWP load of 345 MW. Improvements were identified based on voltage drop, conductor loading, system reliability improvements, and operational experience. A narrative list of system improvements is located in Section IV.

A breakdown of proposed construction projects by RUS 740C codes is listed below in Table I-C-1.

**Table I-C-1
System Additions and Improvements Summary**

Category Number	Category Name	Estimated Cost
100	New Distribution Line	\$13,690,447
300	Line Conversion & Replacement	\$4,718,700
600	Misc. Equip. & Poles	\$24,836,317
611	Line Relocates	\$2,161,000
700	Outdoor Lights, AMI & SCADA/DA H/W & S/W	\$1,599,228
	2024-2025 CWP TOTAL	\$47,005,692

100 – New Construction planned to serve 2,480 new services.

300 – 11.2 miles of conductor upgrading and replacement.

600 - Miscellaneous distribution equipment and pole changes. This includes aged conductor replacement, voltage regulators, switched capacitors, sectionalizing, automated meters, transformers, pole changes and increased service capacity upgrades.

611 – Line relocations due to road projects.

700 – Other Distribution Items - Outdoor lighting, and software and hardware for AMI, and SCADA/DA.

**OWEN ELECTRIC 2024-2025 Construction Workplan
COST SUMMARY SPREADSHEET**

NEW CONSTRUCTION -- RUS CODE 100

ITEM	RUS CODE	AVE. \$/CONSUMER	# CONS.	2024	2025	TOTAL
New Construction (OH)	100	\$5,618	440	\$1,205,783	\$1,266,072	\$2,471,855
New Construction (UG)	101	\$4,892	2,000	\$4,772,484	\$5,011,108	\$9,783,592
New Construction (LP)	102	\$35,875	40	\$700,000	\$735,000	\$1,435,000
		TOTAL CODE 100:	2,480	\$6,678,267	\$7,012,180	\$13,690,447

LINE CONVERSION / REPLACEMENT - RUS CODE 300

SUB - SECTION	RUS CODE	Original Conductor	Proposed Conductor	# OF MILES	2024	2025	TOTAL
Banklick 31254 to 32224	320	3 ph 1/0 Cu	3 ph 336ACSR	2.5	\$0	\$588,600	\$588,600
Banklick 31296 to 31264	321	1ph #2ACSR	3 ph 1/0 ACSR	0.2	\$65,000	\$0	\$65,000
Bristow I Sub to 27840	310	3 ph 336 ACSR	3 ph DCT 556 ACSR	0.6	\$500,000	\$0	\$500,000
Bullittsville getaways	322	3 ph 336 ACSR	3ph 336 ACSR and 500MCM	0.1	\$0	\$135,000	\$135,000
Burlington 65040	303	3 ph 336 ACSR	3 ph 500MCM	0.6	\$500,000	\$0	\$500,000
Downing II to Hebron line	374		3 ph 795 ACSR	3.0	\$990,000	\$0	\$990,000
Downing II 44510	323		3ph 4/0URD	0.2	\$0	\$90,000	\$90,000
Hebron Sub to 15063	312	3 ph 336 ACSR	3ph 500MCM and DCT 336ACSR	1.7	\$0	\$1,200,000	\$1,200,000
Hebron 13868 to 13697	324	3 ph 336 ACSR	3ph 336 ACSR	0.7	\$160,700	\$0	\$160,700
Hebron 14101 to 13200	325	3 ph #2ACSR	3ph 1/0 ACSR	0.1	\$42,000	\$0	\$42,000
Keith 511108 to 511120	326	V ph 6a CWC	3ph 1/0 ACSR	1.0	\$0	\$127,400	\$127,400
Mineola getaways	327		3ph 336ACSR	0.1	\$80,000	\$0	\$80,000
Mineola to 49721	328	1 ph 6A CWC	3ph 336 ACSR and 500MCM	0.4	\$240,000	\$0	\$240,000
			TOTAL CODE 300:	11.2	\$2,577,700	\$2,141,000	\$4,718,700

CARRYOVERS are in BOLD

MISCELLANEOUS DISTRIBUTION EQUIPMENT – RUS CODE 600's

ITEM	RUS CODE		2 YR. AVE. COST	# ITEMS		2024	2025	TOTAL
New Underground Transformers	601		\$3,370	500		\$821,858	\$862,950	\$1,684,808
New 3ph UG Transformers	601		\$31,918	40		\$622,794	\$653,933	\$1,276,727
New Overhead Transformers	601		\$1,885	1,700		\$1,563,348	\$1,641,515	\$3,204,862
New Meters	601		\$354	4,490		\$755,550	\$833,175	\$1,588,725
New Polyphase Meters	601		\$1,974	128		\$124,840	\$127,848	\$252,688
Service Upgrades	602		\$3,486	140		\$238,044	\$249,947	\$487,991
Sectionalizing	603					\$500,000	\$500,000	\$1,000,000
Voltage Regulators	604					\$43,000	\$45,000	\$88,000
Capacitors	605					\$0	\$0	\$0
Pole Changes	606		\$5,710	1,200		\$3,342,691	\$3,509,825	\$6,852,516
Misc. Replacements	607					\$2,200,000	\$2,200,000	\$4,400,000
Conductor Replacement (OH)	608			20 mi		\$2,000,000	\$2,000,000	\$4,000,000
			TOTAL					
			MISC. CODE 600'S:			\$12,212,124	\$12,624,193	\$24,836,317

OTHER DIST. ITEMS - RUS CODE 700

ITEM	RUS CODE		2 YR. AVE. COST	# ITEMS		2024	2025	TOTAL
Outdoor Lighting	701		\$1,511	500		\$368,601	\$387,031	\$755,632
SCADA	704					\$12,000	\$626,616	\$638,616
AMI Equipment	705					\$116,270	\$88,710	\$204,980
			TOTAL CODE 700:			\$496,871	\$1,102,357	\$1,599,228

DOT Jobs - 611

SUB - SECTION	RUS CODE	Original Conductor	Proposed Conductor		# OF MILES	2024	2025	TOTAL
Bristow I & II Hwy 1303 to B'grove		DCT 336 ACSR and Spcr	DCT 336 ACSR and Spcr		1.2	\$1,220,000	\$0	\$1,220,000
Smith I&II Mineola Pike Cleanup		DCT 336 ACSR	DCT 336 ACSR		0	\$15,000	\$0	\$15,000
Duro I Gunpowder		3 ph 336 ACSR	3 ph 336 ACSR		0.9	\$225,000	\$0	\$225,000
Duro Frogtown Rd		3 ph 336 ACSR	3 ph 336 ACSR		1.3	\$0	\$501,000	\$501,000
Hebron Roundabout Graves/Cardinal		3 ph 336 ACSR	3 ph 336 ACSR		0.1	\$110,000	\$0	\$110,000
Boone Camp Ernst Widening			Sub getaways		0	\$90,000	\$0	\$90,000
			TOTAL CODE 611:		3.5	\$1,660,000	\$501,000	\$2,161,000

TOTAL ALL CONSTRUCTION WORK

\$47,005,692

DISTRIBUTION SYSTEM DESIGN CRITERIA

Each of the following criteria items were reviewed and accepted by the RUS General Field Representative on July 21, 2023.

- 1) The minimum primary voltage (on a 120 volt base) is 118 volts after re-regulation. The source voltage is 126 volts.
- 2) Primary conductors will be evaluated for replacement, or alternative action, if they exceed 75% of their thermal rating.
- 3) The following line equipment will be evaluated if thermally loaded by more than the percentage shown:

	<u>Winter</u>	<u>Summer</u>
i. Transformers	130%	100%
ii. Voltage Regulators	130%	100%
iii. Step Up / Down Transformers	130%	100%
iv. Reclosers / Line Fuses	80%	80%

- 4) Underground conductors will be considered for replacement on an as needed basis.
- 5) Overhead conductors will be considered for replacement on an as needed basis.
- 6) New primary construction is to be either overhead, or underground, based on governmental or environmental regulations, local restrictions, favorable economics, developmental requests, or safety concerns.
- 7) Single-phase lines with more than 45 Amps of load current will be evaluated for multi-phasing.

DISTRIBUTION LINE AND EQUIPMENT COSTS

Construction cost estimates for the two year planning period are shown in Table II-B-1. Cost summaries for distribution equipment are shown in Table II-B-2.

**Table II-B-1
Line Construction Cost Estimates
Annual Projected Dollars/Mile**

SIZE	TYPE	2024	2025
1/0 ACSR	CONV 3-PH	\$215,000	\$223,500
336.4 ACSR	CONV 3-PH	\$436,000	\$460,000
#2 ACSR	REPL 1-PH	\$170,000	\$178,500
1/0 ALUG	CONV 3-PH	\$600,000	\$630,000
500 MCM ALUG	CONV 3-PH	\$833,000	\$875,000

**Table II-B-2
Distribution Equipment Cost Estimates
Annual Projected Unit Costs**

DEVICE	TYPE	2024	2025
V.Regulators (3)	219 amp	\$59,000	\$62,000
V.Regulators (3)	150 amp	\$42,600	\$44,700
V. Regulator (1)	100 amp	\$13,100	\$13,800

STATUS OF PREVIOUS CWP ITEMS

Following is the status of all projects from the 2022-2023 CWP:

740 C #	Project Description	Status
302	New Bavarian Feed	Complete
310	New feed Hwy 536	Carryover
303	Feed into CVG7	Carryover
311	Backfeed into Parlor Grove	Complete
374	Hebron to Downing feed	Carryover
312	New feed North Bend Rd	Carryover
313	Elk Lake conversion	Complete
314	Webster Road to Richardson	Complete
315	Webster Road conversion	Complete

ANALYSIS OF LONG RANGE PLANS

The previous whole system, 2006 Twenty-Year Long Range Plan (LRP) consisted of three load block levels. Load block “A” was a five-year load level, load block “B” represented the 10-year load level, and load block “C” represented the 20 year load level. The Long Range Load Level (“C”) system summer 2026 peak is approximately 550 MW (excluding Gallatin Steel). The summer 2025 system peak projected in this CWP is 338 MW, and the winter 2026 peak is 345 MW. Both well below the Long Range Load Level.

In **Load Block A**, the LRP recommended four new substation sites and expansions to three existing substation sites. The new substations were Burlington, Sterling, Woolper Creek, and Blanchet. The substations to be expanded/doubled were Munk, Williamstown and Banklick.

The Burlington and Sterling substations were added during the 2008-2009 CWP. The Woolper Creek substation is called the Belleview substation, and was completed during the 2010-2011 CWP. The Blanchet substation has been deferred and is not needed at this time.

Expansion of the Munk substation was completed in the summer of 2022.

The Williamstown expansion was completed in 2016 in order to serve an amusement park called The Ark Encounter. The Banklick substation was expanded in 2015.

In **Load Block B**, the LRP recommended three substation expansions, and three new substation sites. These new substations were North Point, Independence, and Toebben. The substations recommended for expansion were Noel, Bullittsville, Turkeyfoot, and Woolper Creek (now called Belleview).

The Turkeyfoot substation was expanded in 2014. Fans were added at Noel to fully utilize the existing transformer capacity. The need for additional substation expansion at Noel and Belleview has been deferred and not needed in this CWP period. Bullittsville substation will be upgraded in this workplan. Due to the recession and slower growth in the Independence area following 2009, the need for the Independence substation has been deferred. With a planned new feeder out of Bristow II substation and upgrade capabilities at Bristow, the need for Toebben substation is deferred. The Hebron substation nearing capacity in the LRP was the driver for a North Pointe substation. Hebron substation renovations that occurred in 2015 included space being allocated for a Hebron 2 station instead of a North Pointe substation. Once loading on Hebron substation dictates the need for added capacity, the second transformer and high side will be added at that time. The Hebron II low bay will be added in the first year of this work plan period. The new low bay will be tied to the existing Hebron transformer until loading dictates the need for a second high side and transformer.

ANALYSIS OF LONG RANGE PLANS –con’t

Growth in Boone and Kenton counties is being monitored continuously to identify the need for the Independence, Toeppen and Hebron 2 substations.

In **Load Block C (Long-Range Level)**, the LRP recommended six new substation sites. These substations were Waterloo, Richwood, Alexandria, Lake Williamstown, Sulphur Well, and North Holbrook.

The Richwood substation was expedited due to expansion in the Duro industrial park area and expansion of Triple Crown subdivision. The Richwood substation was energized the summer of 2010.

Long Lick substation was constructed in 2017 in lieu of Sulphur Well substation. This substation was expedited to address anticipated growth due to a new bypass around Georgetown and expansion of the Toyota plant in Georgetown.

The remaining substations outlined in Load Block C are not needed in this CWP, and presently are not scheduled with EKPC. Load growth will be monitored in each of these areas to determine when the planned expansions will be necessary.

The 2006 LRP recommended numerous distribution upgrades that include aged conductor replacement over the 20-year Long Range Planning period.

OEC performs regional Long Range mini-studies in high growth areas to ensure that future system planning aligns with future land use and comprehensive plans in the fastest growing counties.

The 2024-2025 CWP is in basic agreement with the current LRP and long range mini-studies. There is one new projected substation, Mineola, in this CWP near CVG. This station is being constructed to meet anticipated load growth near the airport and to improve reliability to one of the most concentrated C&I areas of the OEC system.

OPERATIONS & MAINTENANCE SURVEY

The current O&M Survey (“Review Rating Summary”) was completed in August 2021.

OEC will continue to coordinate with other utilities through frequent follow-ups concerning joint use compliance. A planned pole attachment audit will be conducted on 20% of the system each year whereby stub poles and egregious attachment violations will be noted. This will assist with ongoing efforts to alleviate issues with poles left standing next to electric poles once a line has been changed. OEC has a dedicated joint use coordinator position tasked with routinely interfacing with other utilities in an effort to expedite joint use transfer, removal and code compliance concerns.

SECTIONALIZING STUDIES

A sectionalizing study analyzes the existing overcurrent protection scheme and proposes changes to improve the overall effectiveness of the scheme. Sectionalizing studies take place on a feeder-by-feeder basis. Owen is concluding a comprehensive five-year sectionalizing effort in this workplan.

The four main goals of a sectionalizing study are Safety, Reliability, Coordination, and Protection.

1. Safety – Sectionalizing devices should be able to detect and interrupt the full range of fault currents available in their zone of protection coverage. Calculated minimum fault current values should be detected and cleared by the protective device.
2. Reliability – Limit the outage hours per consumer by isolating or “sectionalizing” faulted portions of the circuit so that the minimum number of customers are interrupted. Additional devices – where needed – will further limit the overall outage hours. Operations staff is consulted for input on placement of devices to aid in effective sectionalizing.
3. Coordination – Good protective device coordination will ensure that the closest device to the fault opens. Fault locating is also enhanced. Miscoordination of protective devices can cause confusion and ultimately add to outage times.
4. Protection – A well designed protection scheme will minimize damage to the distribution system by limiting the time that damaging overcurrent is present on the faulted portion of the system.

Changes that can affect the coordination scheme include: load growth; substation transformer capacity increases; reconductoring distribution lines; single-phase to three-phase conversions; changes in the system’s circuit configuration; and the addition of loads in specific locations.

On-going opportunities will be assessed to improve reliability through additional sectionalizing studies. Additionally as load growth or new C&I loads are introduced, sectionalizing impact will be assessed as needed. General sectionalizing device cost projections and project description will be covered in the “603” category in this report.

**TABLE II-E-1
SUBSTATION LOAD
TABLE**

HISTORICAL AND FORECAST LOAD IN KVA

NAME	Installed Capability				Existing Winter		2 Year Winter Unimproved		2 Year Winter Improved		Existing Summer		2 Year Summer Unimproved		2 Year Summer Improved		Notes
	Nameplate (kVA)	Cooling	Winter Rating (kVA)	Summer Rating (kVA)	Jan '22 (kVA)	% Load	Jan '26 (kVA)	% Load	Jan '24 (kVA)	% Load	June '22 (kVA)	% Load	July '25 (kVA)	% Load	July '23 (kVA)	% Load	
Bank Lick	20000	OAFafa-65C	21100	19200	12,234	57.98%	14,990	71.04%	13,412	63.56%	13,004	67.73%	14,981	78.03%	13,043	67.93%	1
Bavarian	20000	OAFafa-65C	13200	13200	6,694	50.71%	9,833	74.49%	9,847	74.60%	5,590	42.35%	8,206	62.17%	8,220	62.27%	
Bellevue	20000	OAFafa-65C	13200	13200	3,614	27.38%	4,550	34.47%	4,519	34.23%	5,481	41.52%	6,241	47.28%	6,226	47.17%	
Big Bone	14000	OAFafa-65C	13200	13200	3,667	27.78%	3,805	28.83%	3,768	28.55%	3,184	24.12%	3,471	26.30%	3,449	26.13%	
Boone Distribution	25000	OAFafa-65C	26400	24000	12,931	48.98%	15,300	57.95%	15,167	57.45%	13,282	55.34%	14,947	62.28%	14,848	61.87%	
Bristow #1	14000	OAFafa-65C	13200	13200	6,084	46.09%	6,277	47.55%	10,691	80.99%	4,634	35.11%	4,656	35.27%	8,805	66.70%	2
Bristow #2	14000	OAFafa-65C	13200	13200	6,714	50.86%	12,624	95.64%	8,062	61.08%	8,557	64.83%	13,952	105.70%	9,722	73.65%	2
Bromley	14000	OAFafa-65C	17900	13200	8,580	47.93%	8,573	47.89%	8,452	47.22%	6,007	45.51%	5,891	44.63%	5,785	43.83%	
Bullittsville	14000	OAFafa-65C	18140	13620	8,881	48.96%	12,092	66.66%	11,938	56.58%	11,446	84.04%	14,270	104.77%	14,118	73.53%	7
Burlington	25000	OAFafa-65C	28200	24000	6,580	23.33%	8,704	30.87%	8,584	30.44%	8,207	34.20%	9,802	40.84%	9,651	40.21%	
Carson	14000	OA-65C	14500	14500	7,683	52.99%	8,471	58.42%	8,471	58.42%	5,790	39.93%	6,407	44.19%	6,406	44.18%	
Downing #1	14000	OAFafa-65C	13200	13200	8,115	61.48%	10,151	76.90%	4,991	37.81%	9,678	73.32%	11,230	85.08%	5,522	41.83%	3
Downing #2	14000	OAFafa-65C	13200	13200	2,297	17.40%	2,330	17.65%	7,344	55.64%	3,090	23.41%	2,962	22.44%	8,523	64.57%	3
Duro #1	14000	OAFafa-65C	13200	13200	2,834	21.47%	4,699	35.60%	5,038	38.17%	3,098	23.47%	4,887	37.02%	5,276	39.97%	5
Duro #2	14000	OAFafa-65C	13200	13200	5,198	39.38%	5,598	42.41%	5,507	41.72%	3,412	25.85%	3,598	27.26%	3,555	26.93%	
Gallatin County	20000	OAFafa-65C	20730	18500	6,185	29.84%	11,480	55.38%	11,480	55.38%	5,137	27.77%	10,423	56.34%	10,423	56.34%	
Grants Lick #1	14000	OAFafa-65C	18100	13600	8,669	47.90%	9,541	52.71%	9,418	52.03%	6,774	49.81%	7,696	56.59%	7,622	56.04%	
Grants Lick #2	25000	OAFafa-65C	27900	24000	16,348	58.59%	16,971	60.83%	16,817	60.28%	13,055	54.40%	13,047	54.36%	12,957	53.99%	
Griffin	14000	OAFafa-65C	21100	19200	9,207	43.64%	9,899	46.91%	9,910	46.97%	7,915	41.22%	8,260	43.02%	8,264	43.04%	
Hebron	20000	OAFafa-65C	21100	19200	8,939	42.36%	13,518	64.07%	13,345	63.25%	15,254	79.45%	19,229	100.15%	19,014	99.03%	6
Keith	10000	OA-55C	14900	8800	9,789	65.70%	9,501	63.77%	9,505	63.62%	6,626	75.30%	6,732	76.50%	6,732	76.50%	
Keith #2	14000	OAFafa-65C	14500	13600	1,515	10.45%	1,515	10.45%	1,500	10.34%	1,620	11.91%	1,706	12.54%	1,705	12.54%	
Long Lick	20000	OAFafa-65C	24100	19200	4,912	20.38%	5,390	22.37%	5,390	22.37%	4,896	25.50%	4,942	25.74%	4,942	25.74%	
MBUSA	25000	OAFafa-65C	25200	24000	10,589	42.02%	19,000	75.40%	19,000	75.40%	18,950	78.96%	19,000	79.17%	19,000	79.17%	
Munk	14000	OAFafa-65C	21100	19200	11,870	56.26%	12,558	59.52%	12,559	59.52%	9,164	47.73%	9,273	48.30%	9,271	48.29%	
Oakley Noel	14000	OA-65C	17900	13600	10,176	56.85%	10,803	60.35%	10,803	60.35%	8,755	64.38%	8,856	65.12%	8,855	65.11%	
Penn	14000	OAFafa-65C	21100	19200	6,463	30.63%	7,562	35.84%	7,604	36.04%	4,537	23.63%	5,226	27.22%	5,238	27.28%	
Richardson #1	14000	OAFafa-65C	13200	13200	5,589	42.34%	6,654	50.41%	8,040	60.91%	8,618	65.29%	9,067	68.69%	10,832	82.06%	1
Richardson #2	11200	OAFafa-65C	13200	13200	3,955	29.96%	6,208	47.03%	6,068	45.97%	4,071	30.84%	5,358	40.59%	5,268	39.91%	
Richwood	20000	OAFafa-65C	19400	19200	7,276	37.51%	7,803	40.22%	7,706	39.72%	10,973	57.15%	11,315	58.93%	11,235	58.52%	
Sterling	20000	OAFafa-65C	13200	13200	7,275	55.11%	7,898	59.83%	7,898	59.83%	7,569	57.34%	8,626	65.35%	8,626	65.35%	
Turkey Foot	20000	OAFafa-65C	21100	19200	14,437	68.42%	12,804	60.68%	12,678	60.09%	10,450	54.43%	9,382	48.86%	9,314	48.51%	
W. M. Smith #1	14000	OAFafa-65C	13200	10900	6,796	51.48%	8,134	61.62%	1,728	13.09%	9,900	90.83%	10,672	97.91%	2,410	22.11%	4
W. M. Smith #2	14000	OAFafa-65C	13200	13200	5,742	43.50%	7,609	57.64%	6,317	47.86%	7,390	55.98%	8,898	67.41%	7,367	55.81%	4
W. R. Smoot #1	14000	OAFafa-65C	18100	13600	8,274	45.71%	9,057	50.04%	8,940	49.39%	9,306	68.43%	9,280	68.24%	9,190	67.57%	
W. R. Smoot #2	14000	OAFafa-65C	21100	19200	10,267	48.66%	12,550	59.48%	11,962	56.69%	12,583	65.54%	14,126	73.57%	13,520	70.42%	5
Williamstown	25000	OAFafa-65C	28200	24000	13,957	49.49%	15,861	56.24%	15,860	56.24%	11,838	49.33%	13,290	55.38%	13,289	55.37%	
Mineola	20000	OAFafa-65C	21100	19200	N/A	N/A	N/A	N/A	7,744	36.70%	N/A	N/A	N/A	N/A	9,872	51.42%	4

1. Load shifted from Banklick substation to Richardson #1 substation.
2. Load shifted from Bristow #2 substation to Bristow #1 substation.
3. Load shifted from Downing #1 substation to Downing #2 substation.
4. Load shifted from Smith 1 and 2 substations to Mineola substation.
5. Load shifted from Smoot #2 substation to Duro #1 substation.
6. Hebron has anticipated commercial/industrial loads that may push substations to capacity. A second low bay will added in this CWP with the option to add the second transformer when needed.
7. Bullittsville substation scheduled for increase during rebuild in 2025 to a 12/16/20MVA transformer.

SERVICE RELIABILITY

The record of OEC's service interruptions for the past five years is shown in Table II-E-2. The five-year average outage minutes per consumer is 172.9. This value is below the minimum level allowed by RUS. Ongoing system improvements and continued feeder sectionalizing studies will help to reduce this value even further.

TABLE II-E-2

	Power Supplier	Extreme Storm	Prearranged	All Other	Total
2018					
OUTAGE MIN/CONS	2.6	130.8	1.6	124.9	259.9
2019					
OUTAGE MIN/CONS	19.6	15.6	3.4	96.7	135.3
2020					
OUTAGE MIN/CONS	2.2	69.1	1.9	89.5	162.7
2021					
OUTAGE MIN/CONS	3.6	58.5	0.9	99.7	162.7
2022					
OUTAGE MIN/CONS	14.2	37.9	2.8	89.1	144.1
FIVE YEAR AVE.					
OUTAGE HR/CONS	8.5	62.4	2.1	100.0	172.9

NON-FUNDED SYSTEM IMPROVEMENTS

The following recommendations are based upon the review of the projected winter and summer peak systems. These recommendations do not affect the total dollar projections for the CWP, but are recommended for the OEC system to meet the design criteria.

Substation	Feeder	Action Plan	Location #	Road
Banklick	201	Move open point between Richardson 1903 and Banklick 201 to VT at R1045	71-440-21-5968	Fowler Creek Road
Bavarian	2301	Put VR1236 online	61-362-04-2172	Stephenson Mill Rd
Big Bone	1201	Move open point between Big Bone 1201 and Sterling 2503 to LS 59973. Add fuse at 61-359-01-7889	61-373-20-1877	Ryle Road
Bromley	602	Move 66819 from Aph to Bph	12-114-09-4963	Old Sweet Owen Rd
Carson	1102	Move 1040 from C to B Phase	91-171-19-5315	Buffalo Creek Rd
	1102	Move 74892 from C to B	91-210-12-4805	Briar Fork Rd
	1102	Move 717 from A to C	12-138-02-7533	Cardinal Ln
	1103	Move 72723 from C to A	91-230-18-0037	KY-2984
	1103	Move 58758 from B to C	91-209-06-6017	KY-36
Duro I	1706	Move 49526 from Aph to Bph	61-423-15-6167	Campo Ct
Grantslick	301	Move 493880 from Bph to Aph	31-371-09-1783	Bayless Rd
	304	Move 56252 from Aph to Bph	31-283-07-9506	Straub Ln
	304	Move 72732 from Bph to Cph	71-337-11-4088	Alexander Rd
	304	Move open point between feeder 304 and 302 to fuse at F11742	82-353-17-0395	Fairlane Rd
Griffin	901	Move 42915 From B to C	31-325-17-0345	HWY 159
	901	Move 39359 from B to C	31-305-05-3200	Falcon Crest Dr
	904	Move 60913 from A to B	31-304-08-7147	HWY 17N
	904	Move 97710 from A to B	31-323-18-6128	HWY 17N
	903	Move 34700 from C to B	31-203-18-5207	Hogg Ridge Rd
Keith I	1301	Move 11921 from B to A	11-057-12-4229	New Columbus Rd
	1301	Move 104171 from B to A	11-026-02-3600	Morgadora Rd
	1301	Move 104201 from C to B	11-066-23-4697	Georgetown Rd
	1302	Move 339210 from C to B	11-076-00-8032	Old Monterey Rd
Long Lick	2903	Move 299605 from A to B	51-016-21-4566	Long Lick Pike
Munk	401	Move 17438 from C to B	42-316-07-2655	HWY-16
	403	Move 18971 from A to B	25-277-04-1634	Harrison Ridge
	403	Move 15988 from A to B	25-297-20-0554	Napoleopn-Zion Station Rd
	404	Move 7851 From A to B	41-275-13-0657	Eagle Tunnel Rd
	405	Move 71632 from A to B	61-316-11-3985	Waller Rd
Penn	701	Move 18018 From C to A	11-048-15-4982	Rockdale Rd
	703	Move 346212 from B to C	51-041-21-0397	Porter Rd
	703	Move 82262 from A to B	51-041-21-0622	Josephine Rd
Smoot II	5307	Move open point between Smoot II 5307 and Duro 1705 to switch at SW15938	61-437-03-1789	Evergreem Drive
Williamstown	503	Move 52885 From B to A	21-165-20-9464	Heekin Rd
	503	Move 61194 from B to A	21-134-23-0844	US 25
	503	Move 26810 from C to B	21-105-02-8875	Keefer Rd
	505	Move 27054 from B to A	25-219-03-0973	Cull Rd

DATA RESOURCES

The following is a list of the basic data used for this analysis and report.

1. Updated circuit model that indicates substations with present feeder configurations.
2. Monthly substation non-coincident peak (NCP) demands.
3. Monthly Min/Max feeder Amps.
4. Billing system kW and kWh sales for last winter and summer peaks.
5. 2022 East Kentucky Power *Load Forecast*.
6. Five Year Outage Summary.
7. RUS Form 7 data.
8. Substation equipment ratings.
9. Results of computerized voltage drop calculations per line section and accumulated voltage drop per location.
10. Results of computerized calculations giving through kW and through current values per location.

BASIC DATA AND ASSUMPTIONS

Design Load – The construction program in the CWP covers a two-year period to serve the 345 MW, January 2026 winter peak and 338 MW, 2025 summer peak. The design load was derived after reviewing the *2022 Load Forecast* with the GFR.

Load Allocation – Individual areas of the system were grown as spot loads based on the potential for growth in that area. The total system design load was attained by allocating each substation's feeder load to its consumers proportional to the kWh consumption of each residential consumer and billed demand for non-residential consumers. Peak summer and peak winter loading were modeled and analyzed. With the more extreme winters in recent years, the system is more winter peaking except for areas served by natural gas.

Voltage Drop – For the design load, an eight volt drop past one set of downline voltage regulators was assumed to be the maximum allowable end-of-line voltage drop.

Substation Voltage Regulation – Voltage regulation was assumed for each substation such that a 10% voltage drop could be experienced on the transmission system at peak load and 126 volts could still be supplied to the substation bus.

System Power Factor – System power factor values were assumed to coincide with the levels listed on the substation load data sheet.

Single-Phase Loading – On taps where more than 45 amps are served from a single-phase line, conversion to 3-phase was considered in order to provide greater system reliability and ease of coordination.

Inflation – An annual inflation rate of 5% was used in this CWP.

Construction Cost Estimates – Cost estimates for the various distribution equipment and conductor sizes are presented in Tables II-B-1 and II-B-2.

Computer Model of Distribution System – The system is modeled on Milsoft Integrated Solution's Windmil v. 8.7 analysis software. Downloading monthly billing computer data into the Windmil billing file directory was the framework for building the winter and summer models. Residential loads were allocated by the kWh Demand Table method. Commercial and industrial loads were allocated based on their billed kW demand. Projected models were analyzed for Design Criteria violations using an unbalanced voltage drop calculation.

BASIC DATA AND ASSUMPTIONS con't

FINANCIAL DATA

- Cost of Capital = 5.0%
- Inflation = 5.0%
- Present Worth Discount Factor = 5.0%
- Depreciation = 3.42%
- O & M = 3.40%
- Tax & Ins = 1.00%
- TOTAL ANNUAL FIXED CHARGE RATE = 12.82%

TABLE III-B-1

Inflation: 5%

COST SUMMARY DATA

(HISTORICAL DATA & PROJECTIONS - EXCLUDING CODES 300, 603, & 604)

DESCRIPTION	Jan'21-Dec'22	2024	2025	CWP TOTAL
New OH Construction (100)				
1. New services constructed	476	220	220	440
2. Cost per Customer	\$4,827	\$5,481	\$5,755	
3. Cost of New Customers	\$2,297,425	\$1,205,783	\$1,266,072	\$2,471,855
4. Total Footage	124,335	57,466	57,466	114,932
New UG Construction (101)				
1. New services constructed	1,993	1000	1000	2,000
2. Cost per Customer	\$3,487	\$4,772	\$5,011	
3. Cost of New Customers	\$6,948,788	\$4,772,484	\$5,011,108	\$9,783,592
4. Total Footage	344,092	172,650	172,650	345,301
New LP Construction (102)				
1. New services constructed	43	20	20	40
2. Cost per Customer	\$17,986	\$35,000	\$36,750	
3. Cost of New Customers	\$773,416	\$700,000	\$735,000	\$1,435,000
Padmount Transformers (601)				
1. New transformers purchased	446	250	250	500
2. Cost per Transformer	\$2,693	\$3,287	\$3,452	
3. Cost of New Transformers	\$1,200,975	\$821,858	\$862,950	\$1,684,808
3 PH Padmount Transformers (601)				
1. New transformers purchased	32	20	20	40
2. Cost per Transformer	\$19,792	\$31,140	\$32,697	
3. Cost of New Transformers	\$633,345	\$622,794	\$653,933	\$1,276,727
New (OH) Transformers (601)				
1. New transformers purchased	1525	850	850	1,700
2. Cost per Transformer	\$1,472	\$1,839	\$1,931	
3. Cost of New Transformers	\$2,245,431	\$1,563,348	\$1,641,515	\$3,204,862
New and Replacment Meters (601)				
1. New Meters purchased	50,014	2,190	2,300	4,490
2. Cost per Meter	\$326	\$345	\$362	
3. Cost of New Meters installed	\$16,327,596	\$755,550	\$833,175	\$1,588,725
New Polyphase Meters (601)				
1. New Meters purchased	184	64	64	128
2. Cost per Meter	\$1,100	\$1,951	\$1,998	
3. Cost of New Meters installed	\$202,419	\$124,840	\$127,848	\$252,688

TABLE III-B-1 continued

DESCRIPTION	Jan'21-Dec'22	2024	2025	CWP TOTAL
Service Upgrades (602)				
1. Number of Service Upgrades	149	70	70	140
2. Cost per Service Upgrade	\$2,330	\$3,401	\$3,571	
3. Cost of Service Upgrades	\$347,219	\$238,044	\$249,947	\$487,991
Pole Changes - Replacement (606)				
1. Poles Changed	951	600	600	1,200
2. Cost per Pole Change	\$4,545	\$5,571	\$5,850	
3. Cost of Pole Changes	\$4,322,114	\$3,342,691	\$3,509,825	\$6,852,516
Miscellaneous - Replacement (607)				
1. Total cost of Misc. Replacements	\$3,988,177	\$2,200,000	\$2,200,000	\$4,400,000
Conductor Replacement (608)				
1. Miles of aged conductor to be replaced	8	10	10	20
2. Cost per mile	\$254,115	\$200,000	\$200,000	
3. Total cost of aged conductor replacement	\$2,109,153	\$2,000,000	\$2,000,000	\$4,000,000
Outdoor Lighting (701)				
1. New Outdoor Lights Added	432	250	250	500
2. Cost per Outdoor Light	\$1,372	\$1,474	\$1,548	
3. Cost of Outdoor Lights	\$592,897	\$368,601	\$387,031	\$755,632
SCADA (704)				
1. SCADA Hardware & Communications	\$0	\$12,000	\$626,616	\$638,616
AMI Equipment (705)				
1. Related Software and Hardware	\$85,249	\$116,270	\$88,710	\$204,980

NEW MEMBER EXTENSIONS – RUS CODE 100

A total of 2,480 new services are anticipated – 2,000 of which are underground, 440 are overhead construction, and 40 new services for large powers. The total projected cost for new service construction is \$13,690,447.

The average length of service per overhead customer is 261 feet, and 173 feet for underground. The total projected length for the work plan period is approximately 87 miles excluding large power extensions.

Cost history and projections are shown in Table III-B-1.

SYSTEM IMPROVEMENTS – RUS CODE 300

LINE CONVERSION NARRATIVES

Note: Refer to the Design Criteria (DC) in Section II-A

Banklick Substation

Code 320

Estimated Cost: \$588,600

Year: 2025

Description of Proposed Construction

Sections 31254 to 32224 – Replace 2.5 miles of three-phase 1/0 Cu to three-phase 336 ACSR. These line sections begin 71-410-15-9071 along Wilson Road through right-of-way and end on Bird Road at pole 71-378-05-6673. This feeder out of Banklick is the last of the aged three-phase copper wire on the OEC system.

Reason For Proposed Construction

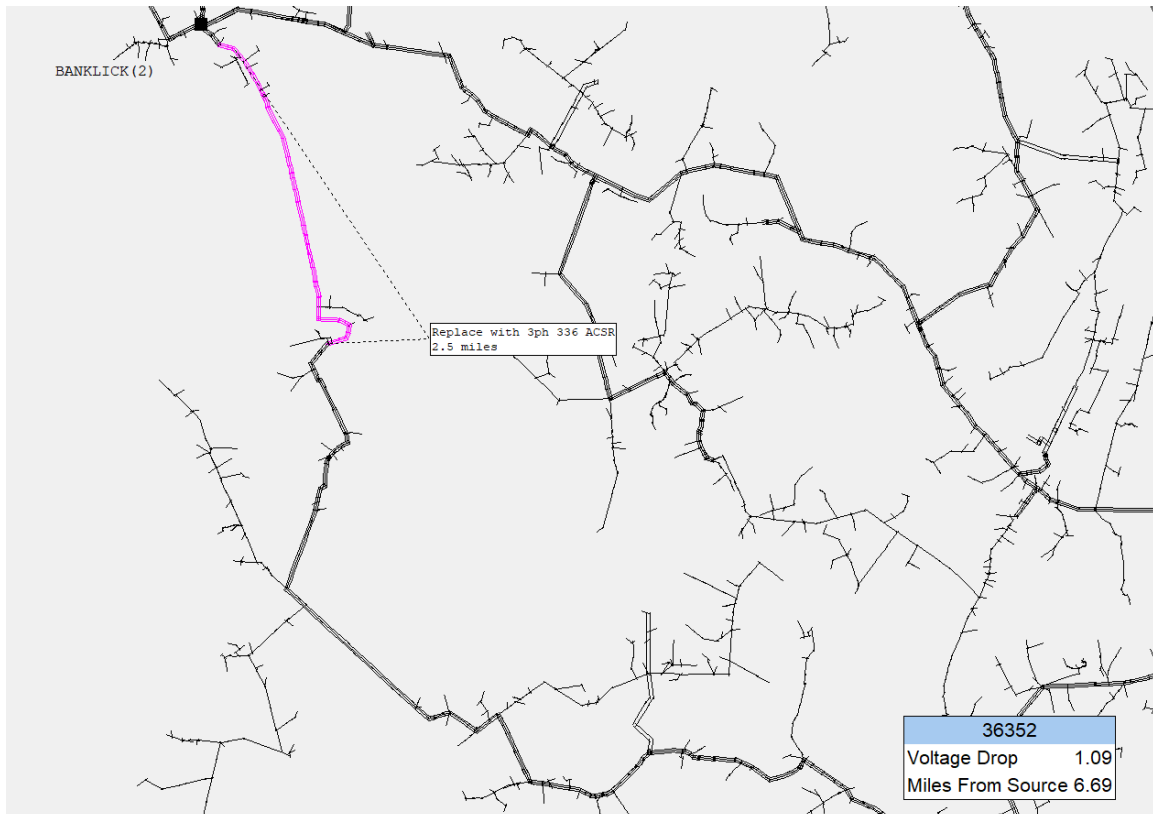
Design Criteria (DC) Item 5.

Results of Proposed Construction

DC Item 5 will be met.

Alternative Corrective Plan Investigated

These line sections were chosen for aged deterioration. Therefore, no alternatives were considered.



SYSTEM IMPROVEMENTS – RUS CODE 300

Banklick Substation

Code 321

Estimated Cost: \$65,000

Year: 2024

Description of Proposed Construction

Sections 31296 to 31264 – Convert 0.2 mile of single-phase #2 ACSR to three-phase 1/0 ACSR. These line sections begin 72-439-21-9618 along Webster Road to a new Sanitation District 1 (SD1) pump station.

Reason For Proposed Construction

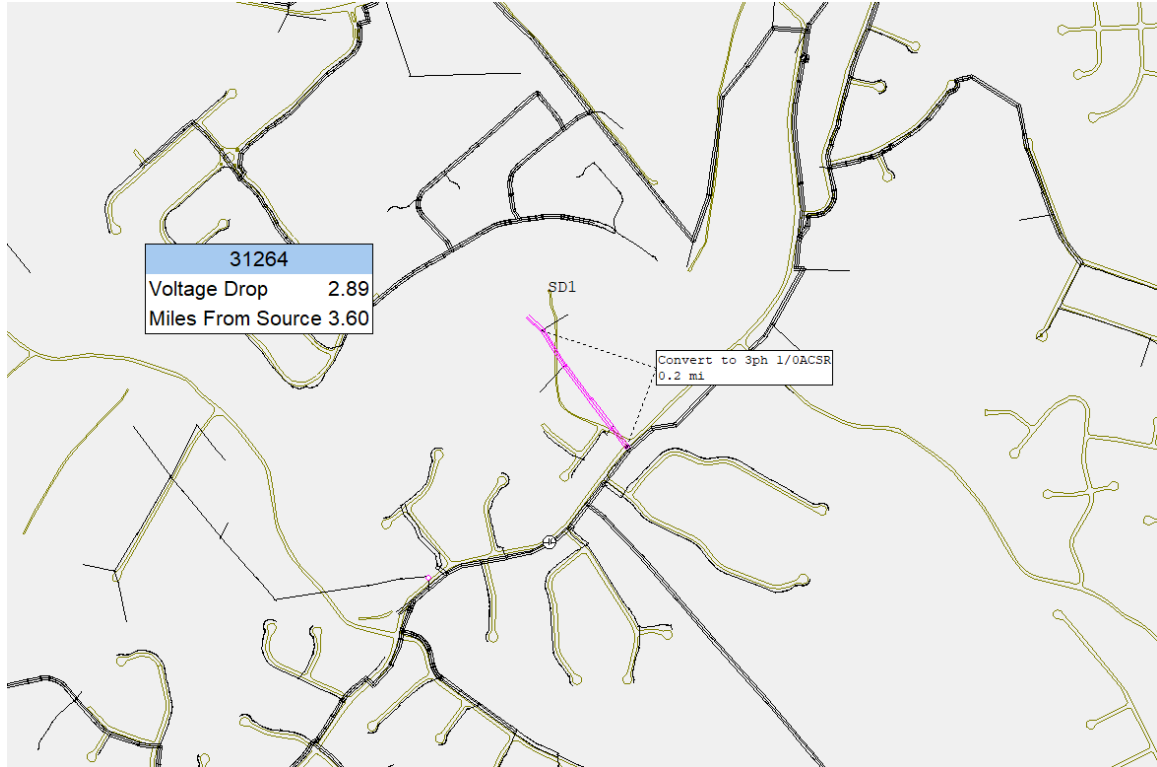
Design Criteria (DC) Item 7 is being violated.

Results of Proposed Construction

DC Item 7 will be met.

Alternative Corrective Plan Investigated

The loading for the new plant will require three-phase service and overload the existing single-phase line. Alternative feeds to this location were considered, but this route is the most cost effective and direct feed to the plant along existing right of way.



SYSTEM IMPROVEMENTS – RUS CODE 300

Bristow I Substation

Code 310 Carryover

Estimated Cost: \$500,000

Year: 2024

Description of Proposed Construction

Section Sub to 27840 – Convert 0.6 mile of three-phase 336 ACSR to three phase DCT 556 ACSR, with a 500MCM substation getaway. These line sections begin at the substation and follow Hwy 536 to pole 72-438-21-9719. This project will serve new commercial/industrial loads along Hwy 536. The existing circuit will be the top circuit and serve as an express to feed Toebben Drive and the remainder of the existing feeder 5605.

Reason For Proposed Construction

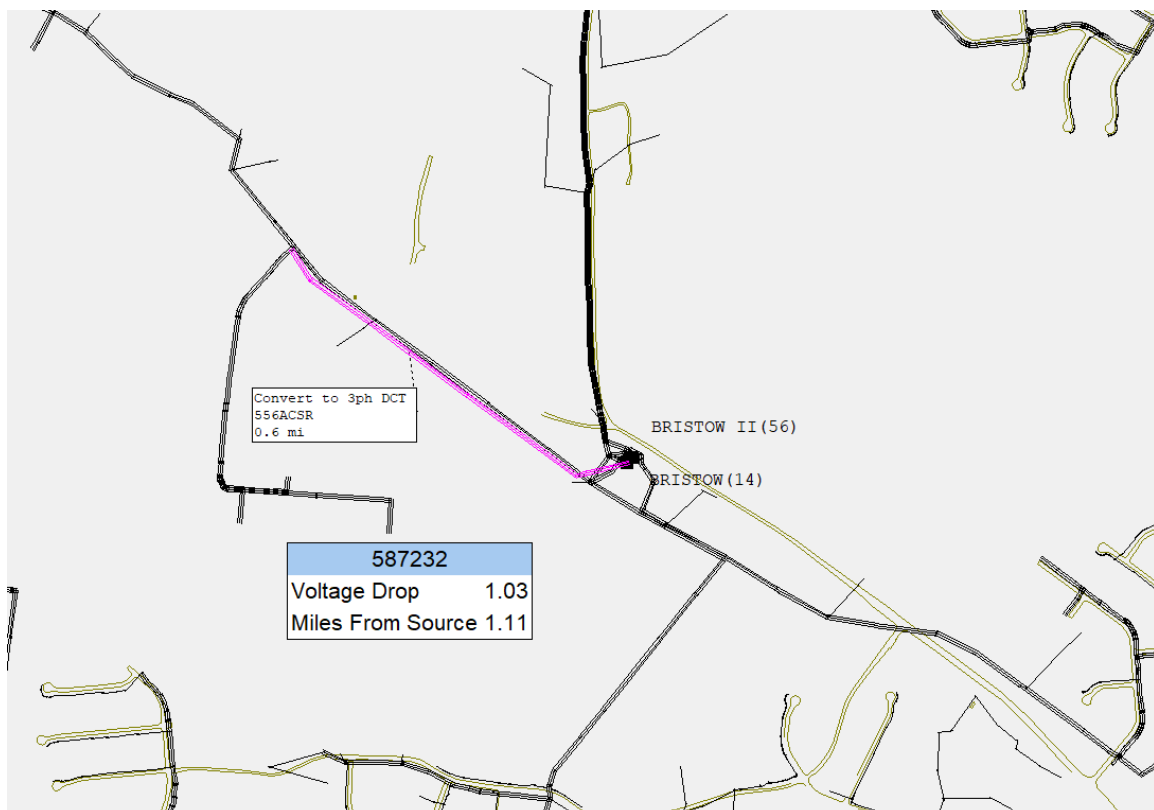
This project was selected to serve new loads based on Design Criteria (DC) item 2.

Results of Proposed Construction

DC Item 2 will be met.

Alternative Corrective Plan Investigated

The alternative would be to increase the existing conductor size beyond our normal standard largest conductor. The preferred provides opportunities for providing some isolation of our C&I loads from one another by separating them between two feeders.



SYSTEM IMPROVEMENTS – RUS CODE 300

Bullittsville Substation

Code 322

Estimated Cost: \$135,000

Year: 2025

Description of Proposed Construction

Section getaways – Replace existing substation feeder getaways with the construction of the new substation. EKPC will be replacing the existing aged substation with a new split-substation design. As part of the construction a second low bay will be added to accommodate optimal future feeder expansion. This project will consist of two underground and two aerial feeder getaways.

Reason For Proposed Construction

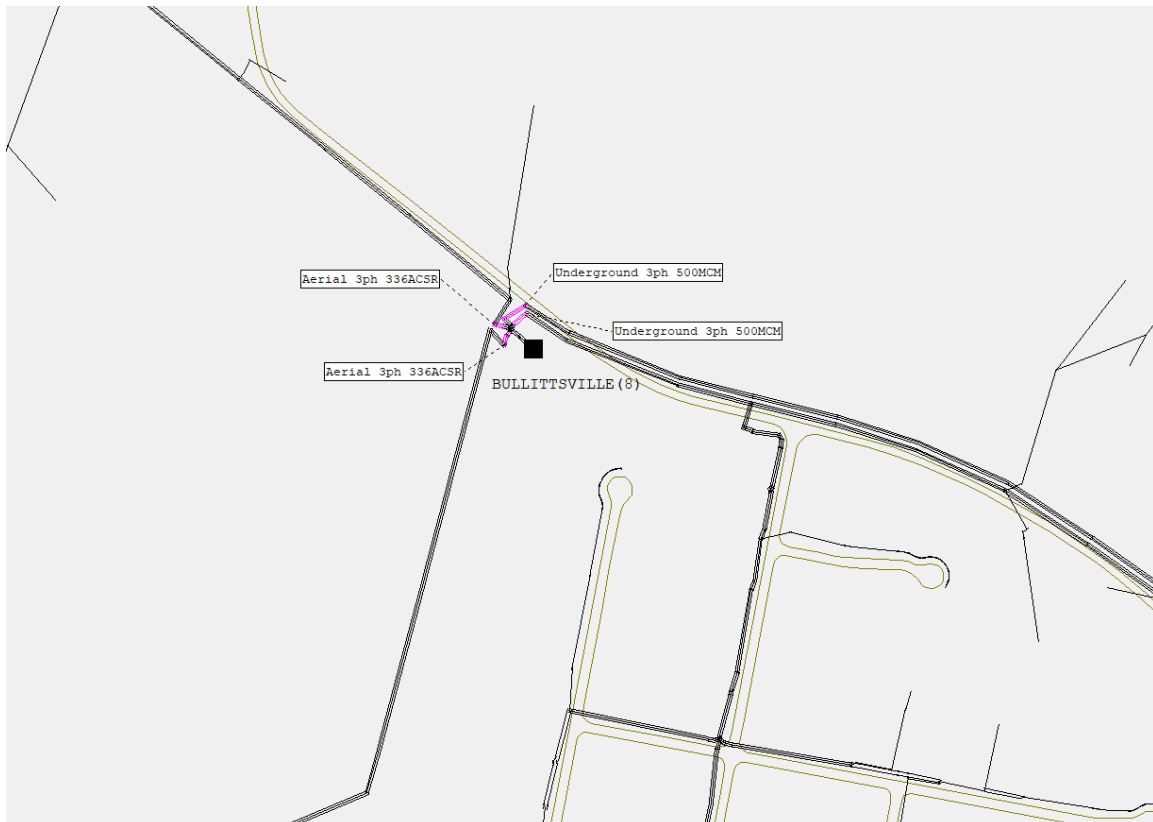
Design Criteria (DC) Item 5.

Results of Proposed Construction

DC Item 5 will be met.

Alternative Corrective Plan Investigated

Since this project is part of an EKPC substation rebuild, no alternatives were considered. Due to space considerations two of the feeders will need to be constructed as underground.



SYSTEM IMPROVEMENTS – RUS CODE 300

Burlington Substation

Code 303 Carryover

Estimated Cost: \$500,000
Year: 2024

Description of Proposed Construction

Section 65040 – Construct 0.6 mile of three-phase 500MCM ALUG. This line section follows an easement along North Bend Road and Gateway Blvd. beginning at 62-485-13-7139. This project is needed to feed into a new planned industrial/commercial park known as CVG7 near the Greater Cincinnati airport.

Reason For Proposed Construction

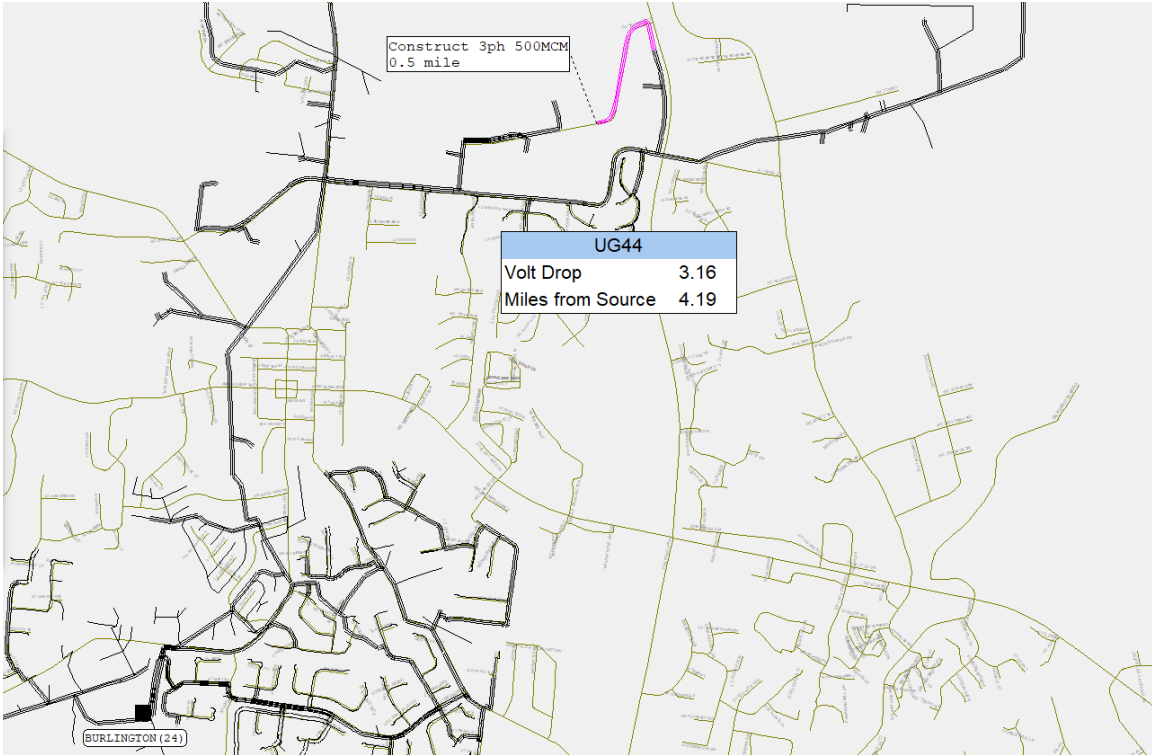
This project was selected to serve new loads based on Design Criteria (DC) item 6.

Results of Proposed Construction

DC Item 6 will be met.

Alternative Corrective Plan Investigated

Since this is needed to serve new load no alternatives were considered. As the industrial/commercial park expands to the west an additional feed from Bullitsville may be needed as well.



SYSTEM IMPROVEMENTS – RUS CODE 300

Downing II Substation

Code 374 Carryover

Estimated Cost: \$990,000

Year: 2024

Description of Proposed Construction

Downing II to Hebron substations – Construct a new feeder from Downing II substation to Hebron substation by constructing 3.0 miles of 3-phase 795 ACSR. This will be an underbuild distribution on a new EKPC Hebron to Mineola 69 kV transmission line. This line will be tapped to feed the South Park commercial area (project 323). A new low side addition to Hebron substation will be necessary for this project.

Reason For Proposed Construction

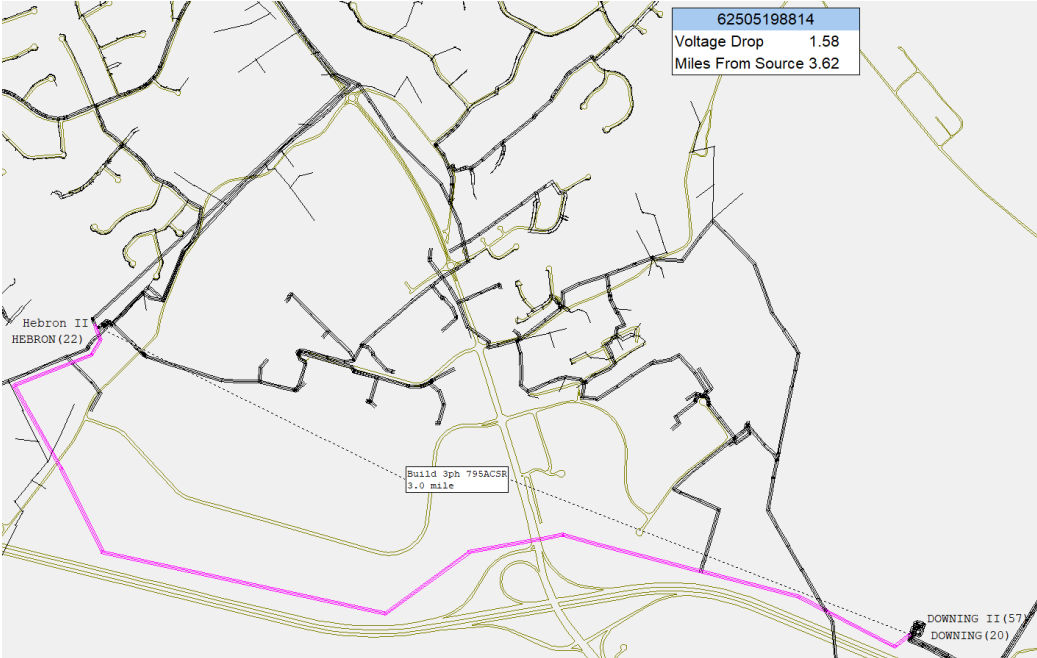
This project was selected based on Design Criteria (DC) items 2 and 5. The existing line that feeds South Park is through very difficult right-of-way that is prone to flooding. Additionally, once complete this will relieve loading on Downing feeder 2001 and more evenly distribute load between the two Downing transformers. This also provides an ability to transfer load to Hebron in the event of a Downing outage.

Results of Proposed Construction

DC items 2 and 5 will be met. Overall reliability will be improved in this area.

Alternative Corrective Plan Investigated

This project improves reliability between the Downing Substation into the Hebron feeder 2202 and 2203 area. A 0.7 mile section of 3-Ph 336 ACSR will eventually be removed which traverses an unmanageable creek bottom that is prone to flooding and uncooperative members. An alternative through South Park was explored, but was costlier because of UG constraints.



SYSTEM IMPROVEMENTS – RUS CODE 300

Downing II Substation

Code 323

Estimated Cost: \$90,000

Year: 2025

Description of Proposed Construction

Section 44510 – Construct a three phase 4/0URD tap into the back of South Park commercial park utilizing project 374 and existing utility easements.

Reason For Proposed Construction

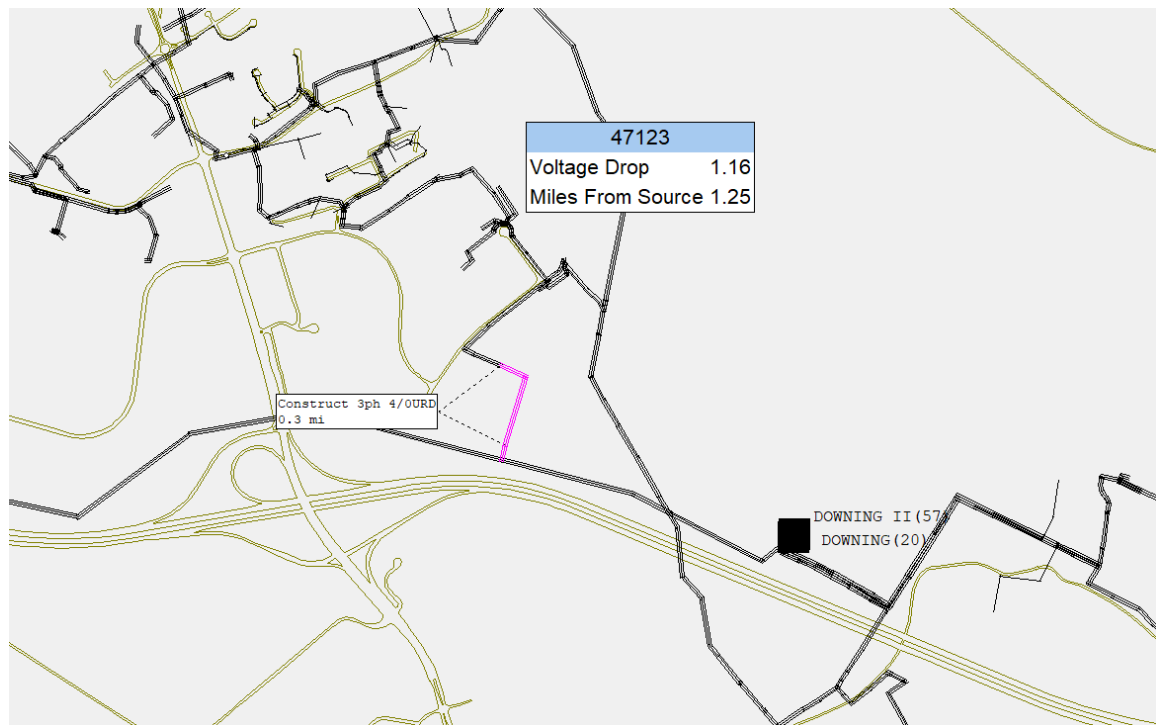
This project was selected based on Design Criteria (DC) item 5. The existing line that feeds South Park is through very difficult right-of-way that is prone to flooding.

Results of Proposed Construction

DC item 5 will be met. Overall reliability will be improved in this area.

Alternative Corrective Plan Investigated

This project in conjunction with project 374 improves reliability of the existing Downing feeder. A 0.7 mile section of 3-Ph 336 ACSR will eventually be removed which traverses an unmanageable creek bottom that is prone to flooding and uncooperative members. An alternative through South Park was explored, but was costlier because of UG constraints.



SYSTEM IMPROVEMENTS – RUS CODE 300

Hebron Substation

Code 312 Carryover

Estimated Cost: \$1,200,000

Year: 2025

Description of Proposed Construction

Sections Sub to 15063 – Convert 1.7 miles of three phase 336 ACSR to three phase DCT 336 ACSR along Graves and North Bend Roads. Additionally 0.2 mile of three phase 500 MCM underground will serve as an exit out of the substation and across Graves Road. EKPC will add a second low bay to be served from the existing station to accommodate the new feeder. This low bay will eventually be fed from a new Hebron II high side. These line sections begin at the substation and end at 62-504-22-4647. This new feeder will serve as an express feed to the northern part of Boone County. The existing feeder will serve everything up to and including Thornwilde Drive.

Reason For Proposed Construction

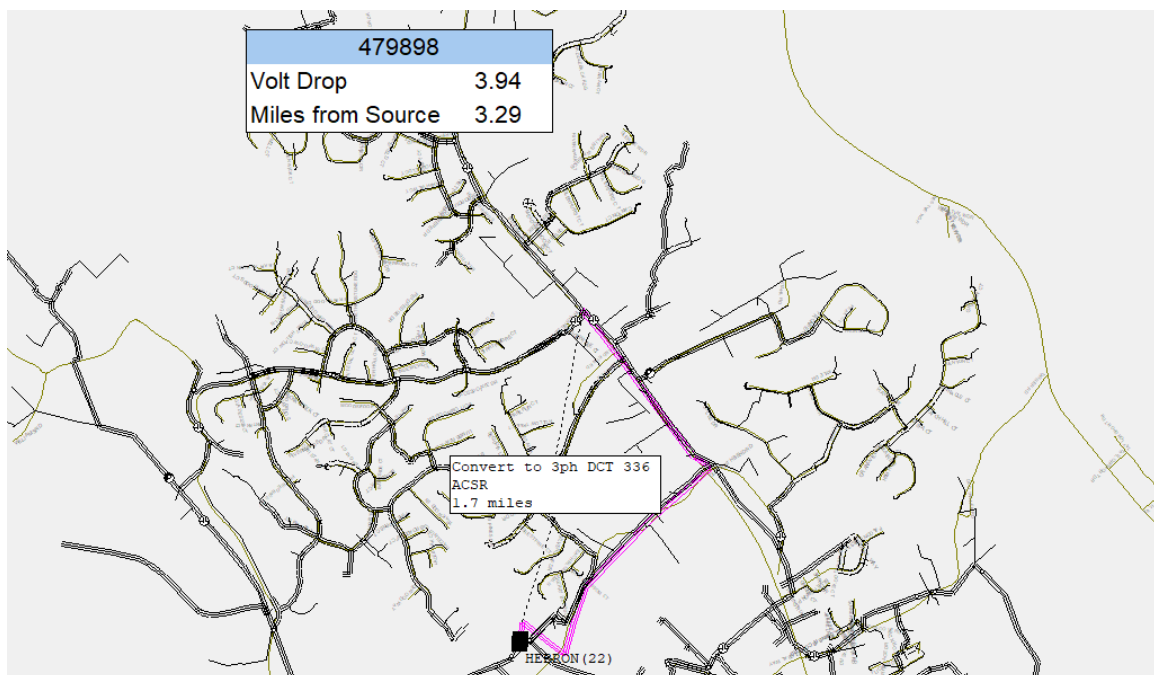
This project was selected based on Design Criteria (DC) item 2.

Results of Proposed Construction

DC item 2 will be met.

Alternative Corrective Plan Investigated

This project is needed due to the continual growth in northern Boone County. The existing Hebron substation was designed to accommodate a split substation to provide more capacity for the area. The alternative would be to build a new substation in the northern portion of the county. There is little transmission available and the cost to build transmission and new substation would far exceed this proposed solution.



SYSTEM IMPROVEMENTS – RUS CODE 300

Hebron Substation

Code 324

Estimated Cost: \$160,700

Year: 2024

Description of Proposed Construction

Sections 13868 to 13697 – Relocate 0.7 miles of three-phase 336 ACSR with 3ph 336 ACSR to run along Williams Road. These line sections begin at 62-499-15-5568 and end at 62-499-14-0330 and is needed to accommodate future land use for new growth in the area. This line will be constructed along existing telephone right of way.

Reason For Proposed Construction

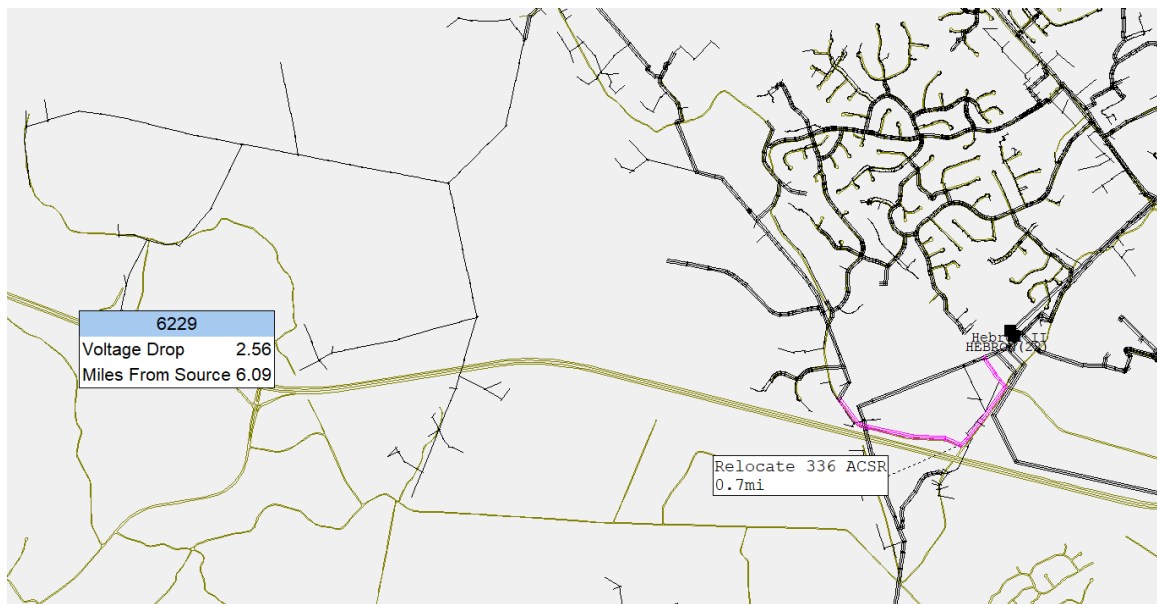
This project was selected based on Design Criteria (DC) item 5.

Results of Proposed Construction

DC item 5 will be met with improved access to pole line.

Alternative Corrective Plan Investigated

Since this project was chosen in consideration of new development and to improve access to OEC infrastructure, no alternatives were considered.



SYSTEM IMPROVEMENTS – RUS CODE 300

Hebron Substation

Code 325

Estimated Cost: \$42,000

Year: 2024

Description of Proposed Construction

Sections 14101 to 13200 – Relocate 0.1 miles of three-phase #2 ACSR with three-phase 1/0 ACSR to run along Williams and Graves Road. These line sections begin at 62-499-15-5568 and end at 62-499-15-8477 and is needed to accommodate future land use for new growth in the area. This line will be constructed along existing road right of way.

Reason For Proposed Construction

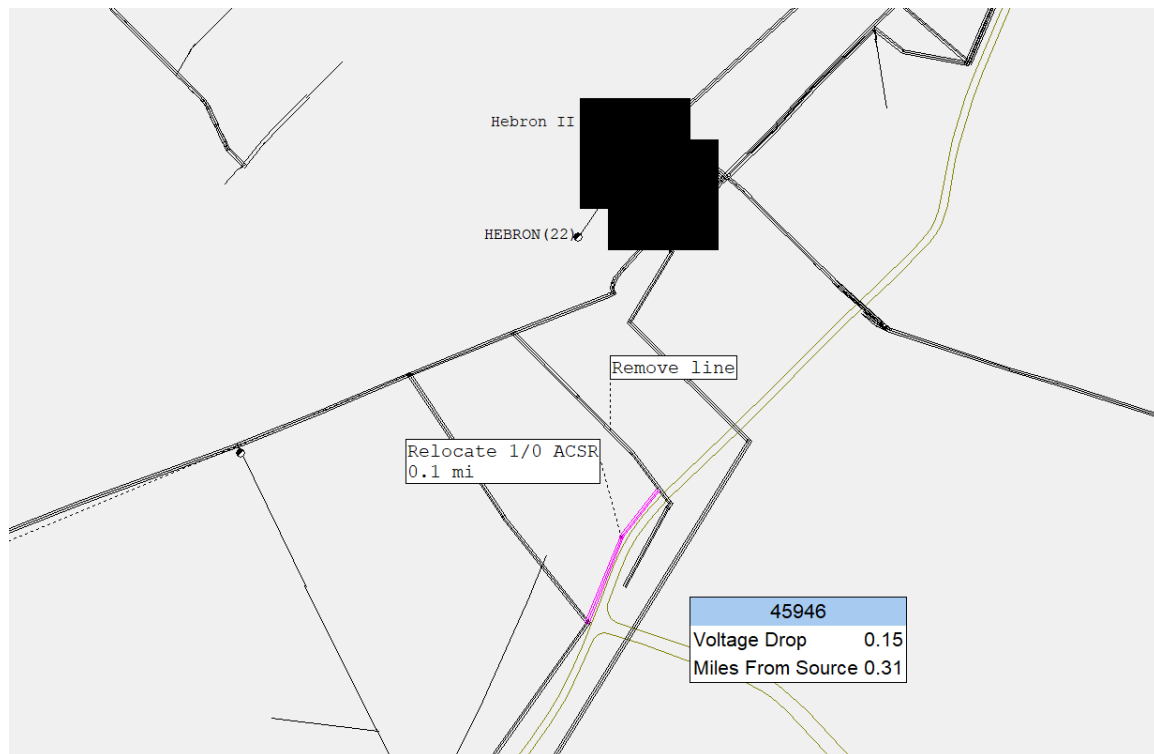
This project was selected based on Design Criteria (DC) item 5.

Results of Proposed Construction

DC item 5 will be met with improved access to pole line.

Alternative Corrective Plan Investigated

Since this project was chosen in consideration of new development and to improve access to OEC infrastructure, no alternatives were considered.



SYSTEM IMPROVEMENTS – RUS CODE 300

Keith Substation

Code 326

Estimated Cost: \$127,400

Year: 2025

Description of Proposed Construction

Sections 511108 to 511120 – Convert 1.0 mile of two-phase 6A CWC to three-phase 1/0 ACSR along Breck Road. These line sections begin at 12-102-04-8031 and end at 12-102-22-4444. Service transformers and taps along the way should be fed from C phase. Mussel Shoals Road at the end of conversion should be fed from A phase with the continuation along Breck to be fed B phase. Additional 6A replacement in this area could be considered for ordinary 608 replacement.

Reason For Proposed Construction

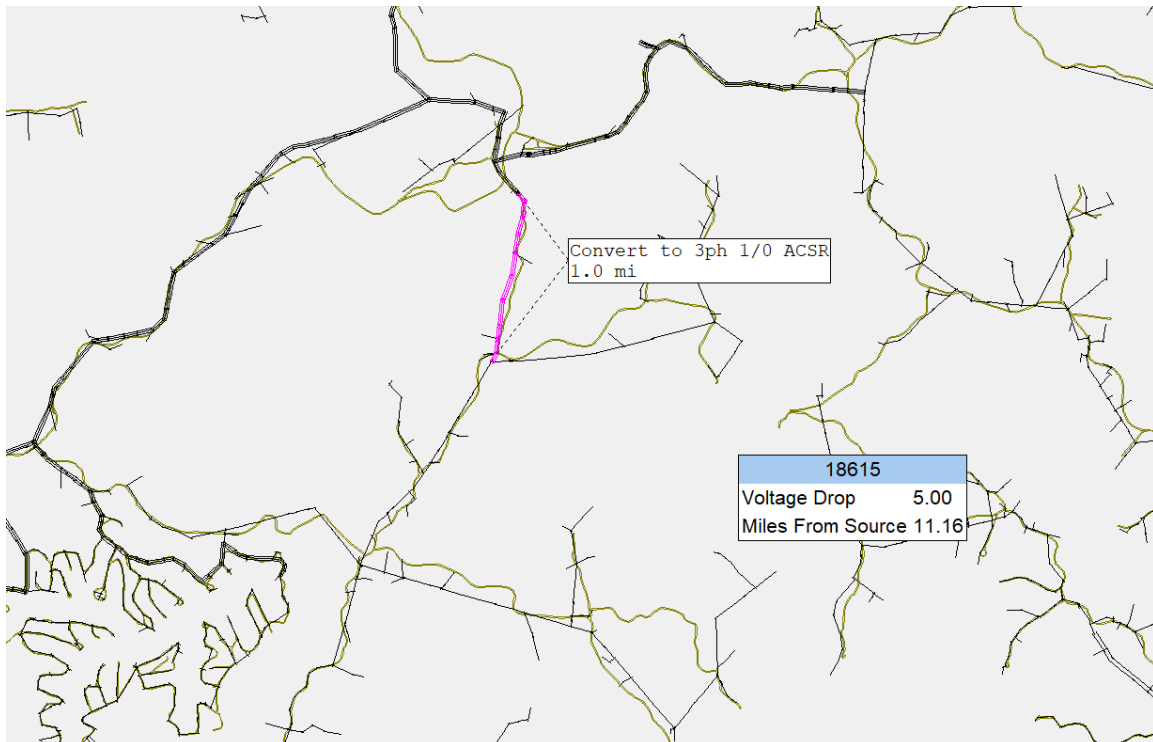
This project was selected based on Design Criteria (DC) item 5.

Results of Proposed Construction

DC item 5 will be met.

Alternative Corrective Plan Investigated

Since this project was chosen for aged conductor replacement no other alternatives were considered. Converting to three-phase as opposed to leaving as two-phase will provide for more balancing opportunities.



SYSTEM IMPROVEMENTS – RUS CODE 300

Mineola Substation

Code 327

Estimated Cost: \$80,000

Year: 2024

Description of Proposed Construction

Section getaways – Build feeder getaways as part of the construction of a new substation. This will include two new feeders intersecting the existing three-phase line along Pt. Pleasant Road. A third circuit will be constructed as project 328.

Reason For Proposed Construction

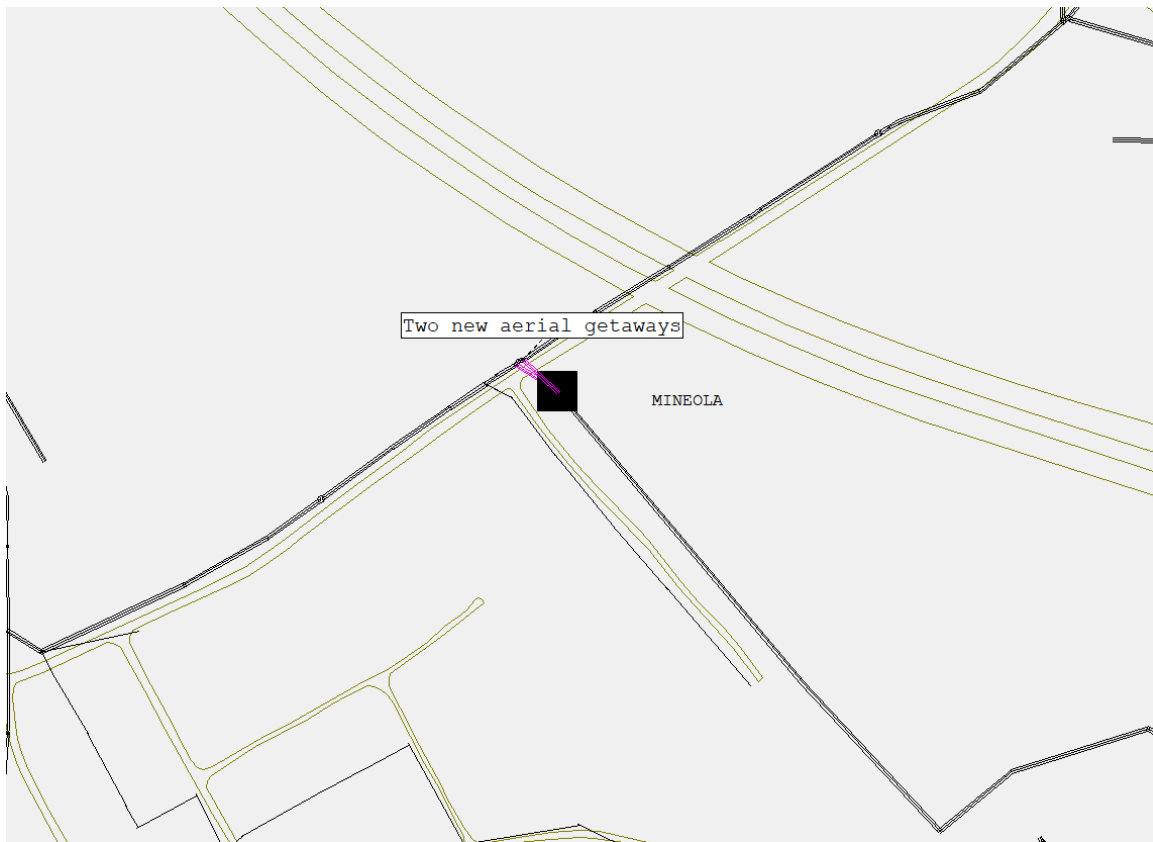
Design Criteria (DC) Item 5. The Mineola substation is being constructed to improve reliability in the area surrounding CVG (airport) and to relieve loading on Smith I.

Results of Proposed Construction

DC Item 5 will be met.

Alternative Corrective Plan Investigated

Since this project is part of an EKPC substation build, no alternatives were considered.



SYSTEM IMPROVEMENTS – RUS CODE 300

Mineola Substation

Code 328

Estimated Cost: \$240,000

Year: 2024

Description of Proposed Construction

Sections Substation to 49721 – Convert single phase 6A CWC to 0.4 mile of three phase 336 ACSR to three phase 500MCM along Pleasant Drive to Olympic Blvd. These line sections begin at the new substation and end at the switch cabinet at 62-486-05-6195. This will create a third feeder out of the new Mineola substation and feed the Circleport commercial park.

Reason For Proposed Construction

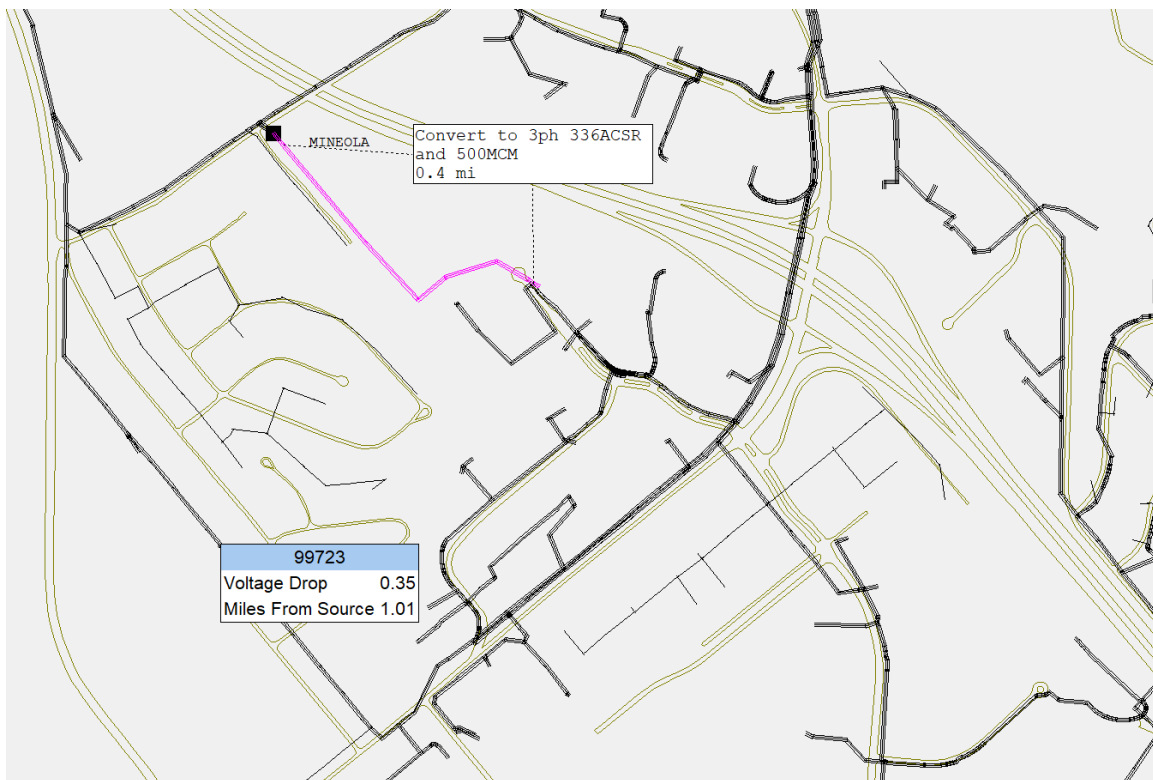
This project was selected based on Design Criteria (DC) item 4.

Results of Proposed Construction

DC item 4 will be met.

Alternative Corrective Plan Investigated

This project utilizes the added capacity and closer proximity of the new Mineola substation to this commercial area. The new feeder will improve reliability to the area and therefore no alternatives were considered.



MISCELLANEOUS DISTRIBUTION EQUIPMENT – RUS CODE 600's

Transformers – RUS Code 601

500 new underground transformers are projected at a cost of \$1,684,808.

1,700 new overhead transformers are projected at a cost of \$3,204,862.

40 new 3-phase underground transformers are projected at a cost of \$1,276,727.

Meters – RUS Code 601

4,490 new single-phase AMI meters are projected at a cost of \$1,588,725.

The 4,490 meters are for standard residential AMI meters for new connects which include several high-density apartments anticipated over the work plan period. These meters will be Radio Frequency (RF) meters and will cover new installations, temporary and replacement meters.

128 poly-phase AMI capable meters are projected at a cost of \$252,688.

These 128 poly-phase meters will have RF communications and used for new installation and any replacements. This total also includes projected instrument transformers for new poly-phase meters that do not have internal potential and current transformers inside the meters (i.e. self-contained).

Historical data was gathered for meters and transformers and is included in Table III-B-1.

Service Upgrades – RUS Code 602

There are 140 service upgrades projected at a total cost of \$487,991. Historical data is included in Table III-B-1.

Sectionalizing – RUS Code 603

Overcurrent analysis is performed on an ongoing basis. Device changeouts, additional substation feeders, conductor multiphasing and load shifts require overcurrent device purchases.

Reclosers, fuses and switches are included in this category. A base cost of \$500,000 for each of the two years has been allocated.

The total projected cost for sectionalizing is \$1,000,000.

MISCELLANEOUS DISTRIBUTION EQUIPMENT – RUS CODE 600's -
continued

Voltage Regulators – RUS Code 604

There are two locations identified to add voltage regulators to support downline voltage levels. The total cost for voltage regulators in this CWP is \$88,000.

CFR CODE	SUBSTATION	SECT/RATING	YEAR	COST
604-1	Griffin Feeder 901	Section 42963 3-150A	2025	\$45,000
604-2	Penn Feeder 701	Section 20653 3-150A	2024	\$43,000

- 604-1: Add 3-150A voltage regulators on David Road at 31-286-03-8326 to boost voltage at end of feeder 901 around Concord Caddo Road. Remove voltage regulators at Menzie Bottoms location 31-286-07-9635.
- 604-2: Add 3-150A voltage regulators on Natlee Slatin Road at location 11-059-00-9514 to boost end-of-line voltage.
- Note: The voltage regulators on Bavarian 2301 will need to be taken off of bypass as loading in the Walton Towne Center increases to support end of line voltage.

Capacitor Banks – RUS Code 605

There are no capacitors projected for this CWP.

Pole Changes – RUS Code 606 Including Clearance Poles

There are 1,200 projected pole changes in the CWP. This includes all poles identified as part of the normal operational practice for maintenance and clearance poles required for the safe and reliable operation of the OEC system. Priority poles that pose a safety or clearance risk are changed out immediately. The cost for the “ordinary” pole changes is projected to be \$6,852,516.

With the on-going major push for broadband expansion across the OEC footprint there will be numerous pole changeouts required to accommodate communication companies’ pole attachments. Any pole changeouts that are being performed for the sole purpose of new communication attachments are being funded by the requesting communication companies, and therefore will not be accounted for as part of the requested RUS loan funds. A total projection for the two-year workplan is unknown as attachment requests will be made continuously throughout the period. As of the date of this submittal there are more than 300 poles in the queue for changeout for communication attachments on the OEC system.

Historical cost data for pole changes may be found in Table III-B-1.

MISCELLANEOUS DISTRIBUTION EQUIPMENT – RUS CODE 600's -
continued**Miscellaneous Replacements – RUS Code 607**

An amount of \$4,400,000 is projected in the CWP for miscellaneous replacements.

The 607 category consists of replacing existing equipment such as cross arms, insulators, guys, etc. It also includes changeout of hardware due to targeted hardening initiatives at OEC that will serve to improve the overall reliability of the OEC system. This initiative includes inspecting and replacing, if needed, hardware and cross arms by pole in areas where there is a noticeable trend of increasing outages or voltage blinks. Historical cost data for all miscellaneous replacements may be found in Table III-B-1.

Conductor Replacements – RUS Code 608

The total cost for aged conductor replacement projected for the CWP is \$4,000,000. This includes replacement of overhead or underground conductor due to age, deterioration, and operation and maintenance recommendations. This covers an estimated 20 miles of mostly single-phase replacement projected for this CWP. OEC has over 180 miles of aged overhead conductor remaining on the system, mostly single phase. The increase in projected miles of replacement is reflective of an effort toward replacing the remaining spans of aged conductor. Conductor replacement cost history and projections are shown in Table III-B-1.

Line relocations –Code 611

The total cost for line relocations due to road projects is projected to be \$2,161,000. There are six known road relocation projects for the 2024-2025 CWP period. Costs shown in Section I-C reflect total costs of projects after any projected DOT reimbursements are applied.

RUS CODE 700

Outdoor Lighting – RUS Code 701

A total of 500 new outdoor lights are anticipated. The projected cost is \$755,632.

Outdoor lighting cost history and projections are shown in Table III-B-1.

SCADA / DA - Hardware and Communication Equipment – RUS Code 704

The total projected cost for SCADA and communications in this CWP is \$638,616.

This cost includes:

- \$22,000 for associated hardware for two substations scheduled to be constructed in the workplan period.
- \$616,616 for associated hardware and software costs in implementing next generation SCADA system.

The current OEC SCADA system was first introduced in 1988. The system has undergone several iterations and upgrades throughout the past 35 years since it was originally installed. While it has served its function well through the years, the technology is outdated and is limited on any future enhancements. Additionally, the technical support from the existing vendor has been challenging as their focus on new product development is not centered on the electric utility industry. With the changes in the electric industry with the advent of EV and more DER deployments, it will be to OEC's advantage to migrate the SCADA system to a new vendor that will provide a platform that can adapt to the future needs for SCADA and distribution management. OEC is seeking grant funding opportunities to help offset the cost of the next generation SCADA system. The timing of the purchase of the next system will be dependent on the awarding of any grant funds. If no funds are awarded the SCADA implementation will be deferred until next workplan.

SCADA hardware and software cost projections are shown in Table III-B-1.

AMI Equipment – RUS Code 705

An amount of \$204,980 is projected for this CWP for AMI equipment and associated costs.

This includes communications equipment such as relays and gateways for developing and improving a radio frequency RF mesh.