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May 15, 2023

VIA ELECTRONIC FILING

Rosemary Chiavetta, Secretary
Pennsylvania Public Utility Commission
Commonwealth Keystone Building
400 North Street, 2nd Floor North
P.O. Box 3265
Harrisburg, PA 17105-3265

Re: Letter Of Notification Of PPL Electric Utilities Corporation, Filed Pursuant To 52 Pa. Code Chapter 57 Subchapter G, For Approval To Rebuild Approximately 0.9 Mile of The Existing Siegfried-Frackville 230 kV, Eldred-Frackville 230 kV, and Columbia-Frackville 230 kV Transmission Lines in Butler Township, Schuylkill County, Pennsylvania
Docket No. A-2023-_____

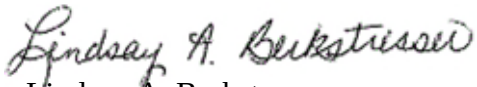
Dear Secretary Chiavetta:

Attached for filing is the Letter of Notification of PPL Electric Utilities Corporation in the above-referenced proceeding. As indicated on the Certificate of Service, copies of the Letter of Notification are being served by certified mail, return receipt requested, upon the involved governmental agencies, municipalities and property owners. Construction of the Project will commence upon the Commission's approval of this filing, with an estimated construction start date of July 2023 with an anticipated in-service date of November 2025.

If you have any questions concerning this matter, please contact me at the address or telephone numbers provided above.

The associated $350.00 filing fee has been paid by Post & Schell, P.C. as of the time of filing.

Respectfully submitted,



Lindsay A. Berkstresser

LAB/dmc
Enclosures

cc: Renardo Hicks, Esquire
Paul T. Diskin
Jordan Van Order
Certificate of Service

CERTIFICATE OF SERVICE

I hereby certify that a true and correct copy of the foregoing has been served upon the following persons, in the manner indicated, in accordance with the requirements of 52 Pa. Code § 1.54 (relating to service by a participant).

VIA CERTIFIED MAIL: RETURN RECEIPT REQUESTED

Pennsylvania Bureau of Investigation and Enforcement
Pennsylvania Public Utility Commission
Commonwealth Keystone Building
400 North Street
2nd Floor, Room-N201
Harrisburg, Pennsylvania 17120
Attn: Richard Kanaskie

Pennsylvania Department of Environmental Protection
400 Market Street, 10th Floor
Rachel Carson State Office Building
Harrisburg, Pennsylvania 17101
Attn: Regional Permit Coordination Office

Pennsylvania Department of Transportation
Commonwealth Keystone Building
400 North Street, Fifth Floor
Harrisburg, Pennsylvania 17120
Attn: Donald J. Smith, Acting Chief Counsel

Pennsylvania Historical and Museum Commission
Bureau for Historic Preservation
Commonwealth Keystone Building
Second Floor
400 North Street
Harrisburg, Pennsylvania 17120-0053
Attn: Mr. Douglas C. McLearen, Chief

Pennsylvania Department of Conservation and Natural Resources
Rachel Carson State Office Building
400 Market Street
Harrisburg, Pennsylvania 17105-8767
Attn: Rebecca Bowen, Ecological Services Section Chief

Pennsylvania Game Commission
2001 Elmerton Avenue
Harrisburg, Pennsylvania 17110-9797
Attn: David J. Gustafson, Director, Bureau of Wildlife Habitat Management

Pennsylvania Fish and Boat Commission
Centre Region Office
595 East Rolling Ridge Drive
Bellefonte, Pennsylvania 16823-9620
Attn: Christopher A. Urban, Chief, Natural Diversity Section

Pennsylvania Office of Consumer Advocate
555 Walnut Street, 5th Floor Forum Place
Harrisburg, Pennsylvania 17101-1923
Attn: Patrick Cicero, Consumer Advocate

Pennsylvania Office of Small Business Advocate
555 Walnut Street
1st Floor Forum Place
Harrisburg, Pennsylvania 17101
Attn: Steven Gray, Senior Supervising Assistant Small Business Advocate

U.S. Army Corps of Engineers
Baltimore District Corporate Communication Office
2 Hopkins Plaza
Baltimore, Maryland 21201
Attn: Planning Division

U.S. Fish and Wildlife Service
Pennsylvania Field Office
110 Radnor Road, Suite 101
State College, Pennsylvania 16801
Attn: Lesa Lindsay

Schuylkill County Planning Commission
401 North 2nd Street, Second Floor
Pottsville, Pennsylvania 17901
Attn: Susan A. Smith, Planning Director

Schuylkill County Conservation District
1206 AG Center Drive
Pottsville, Pennsylvania 17901
Attn: Jenna St. Clair, Conservation District Manager

Schuylkill County Municipal Authority
221 South Center Street
Pottsville, Pennsylvania 17901
Attn: Franklin K. Schoeneman, Chairman

Butler Township
211 Broad Street
Ashland, Pennsylvania 17921

Ashland Area Municipal Authority
Ashland Borough Office
401 South 18th Street
Ashland, Pennsylvania 17921
Attn: Francis Menne, Chairman

Mt. Laurel Entreprises
15 Main Street
Port Carbon, PA 17965
Attn: Dan Blaschak

Date: May 15, 2023

Lindsay A. Berkstresser

Lindsay A. Berkstresser

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

Letter Of Notification Of PPL Electric Utilities Corporation, Filed Pursuant To 52 Pa. Code Chapter 57 Subchapter G, For Approval To Rebuild Approximately 0.9 Mile of The Existing Siegfried-Frackville 230 kV, Eldred-Frackville 230 kV, and Columbia-Frackville 230 kV Transmission Lines in Butler Township, Schuylkill County, Pennsylvania	:	Docket No. A-2023-_____

LETTER OF NOTIFICATION

TO THE PENNSYLVANIA PUBLIC UTILITY COMMISSION:

PPL Electric Utilities Corporation ("PPL Electric") hereby files this Letter of Notification pursuant to Section 57.72(d)(1)(vi) of the Pennsylvania Public Utility Commission's ("Commission") regulations, 52 Pa. Code § 57.72(d)(1)(vi), to rebuild a total of approximately 0.9 mile of the existing Eldred – Frackville 230 kilovolt ("kV"), Siegfried – Frackville 230 kV, and Columbia – Frackville 230 kV Transmission Lines located in Butler Township, Schuylkill County, Pennsylvania to re-terminate them into the new Frackville Substation (the "Frackville 230/69 kV Substation Rebuild Project" or "Project").

The proposed Project will address reliability, asset health, and safety concerns that are being driven by the need to replace most of the substation assets at the Existing Frackville Substation that have reached their end-of-life. The proposed Project will also address certain contingency and risk issues at the Existing Frackville Substation and surrounding regions due to N-1-1 conditions, as explained in Attachment 1 – Necessity Statement. To address these issues, PPL Electric plans to construct a new 230 kV/69 kV substation (the "Rebuilt Frackville

Substation") adjacent to the Existing Frackville Substation[1] on the same property, which will require PPL Electric to rebuild approximately 0.9 mile of the existing Eldred – Frackville 230 kV, Siegfried – Frackville 230 kV, and Columbia – Frackville 230 kV Transmission Lines and to re-terminate them into the Rebuilt Frackville Substation.

This project will be constructed in Butler Township, Schuylkill County, Pennsylvania. PPL Electric has provided information regarding this Project to all identified political subdivisions, and none of them have objected to the Project. Construction of the Project will commence upon the Commission's approval of this filing, with an estimated construction start date of July 2023[2]. and an anticipated in-service date of November 2025. Accordingly, PPL Electric is seeking the Commission's decision by no later than September 30, 2023.

In support thereof, PPL Electric states as follows:

[1] A temporary 230 kV tie line would be built between both yards until construction of the Rebuilt Frackville Substation is complete.

[2] PPL Electric anticipates starting preliminary construction activities on the Rebuilt Frackville Substation in July 2023. The Company will not perform any work on the 230 kV transmission lines until, and if it receives PUC approval.

I. INTRODUCTION

1. This Letter of Notification is filed by PPL Electric, a public utility that provides electric distribution, transmission, and provider of last resort services in Pennsylvania subject to the regulatory jurisdiction of the Commission.

2. PPL Electric's address is as follows:

PPL Electric Utilities Corporation
Two North Ninth Street
Allentown, Pennsylvania 18101

3. PPL Electric's attorneys are:

Michael J. Shafer (I.D. # 205681)
PPL Services Corporation
Two North Ninth Street
Allentown, PA 18101
Voice: 610-774-2599
Fax: 610-774-4102
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David B. MacGregor (I.D. # 28804)
Lindsay A. Berkstresser (I.D. # 318370)
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Fax: 717-731-1985
E-mail: dmacgregor@postschell.com
E-mail: lberkstresser@postschell.com
E-mail: mrulli@postschell.com

PPL Electric's attorneys are authorized to receive all notices and communications regarding this Letter of Notification.

4. PPL Electric furnishes electric service to approximately 1.4 million customers throughout its certificated service territory, which includes all or portions of twenty-nine counties and encompasses approximately 10,000 square miles in eastern and central Pennsylvania. PPL Electric is a "public utility" and an "electric distribution company" as defined in Sections 102 and 2803 of the Pennsylvania Public Utility Code, 66 Pa.C.S. §§ 102, 2803.

5. PPL Electric owns approximately 5,000 miles of transmission lines operating at 69 kV or higher, approximately 375 substations with a capacity of 10 MVA (megavolt amperes) or more, and approximately 43,000 miles of distribution lines operating at less than 69 kV.

6. The Existing Frackville Substation is one of the largest substations owned by PPL Electric and serves more than 275 megawatts ("MW") of load to over 49,000 customers in Schuylkill, Carbon, Northumberland, Luzerne, and Columbia counties.

7. This Letter of Notification includes the following accompanying Attachments:

- Attachment 1 Necessity Statement.
- Attachment 2 Engineering Description.
- Attachment 3 Description of Project Area.
- Attachment 4 PPL Electric Design Criteria and Safety Practices.
- Attachment 5 Landowners And Agencies List.

8. This Letter of Notification and accompanying Attachments, which are incorporated herein by reference, contain all the information required by 52 Pa. Code § 57.72(d)(4).

II. THE PROJECT

A. NEED FOR THE PROJECT

9. PPL Electric has a responsibility to provide transmission assets and maintain them in a manner that is safe, reliable, and resilient to meet the needs of the electric system and the service expectations of its customers. To meet this duty, PPL Electric applies its transmission asset management planning procedure, which includes system performance and condition assessments. These performance and condition assessments identify system needs and prioritize projects based on several variables such as equipment age, condition, maintenance schedule, and

impact on system reliability and performance to ensure a reliable electric grid and reasonable service to its customers.

10. PPL Electric is also required to comply with the Consolidated Transmission Owners Agreement ("CTOA") Rate Schedule - FERC No. 42, which requires transmission systems to "[b]e kept in place and maintained in good operating condition in accordance with Good Utility Practice and principles, guidelines and standards of the applicable Regional Reliability Council and [North American Electric Reliability Corporation] NERC."[3] The CTOA is an agreement among (1) individual Transmission Owners operating within the PJM Interconnection LLC ("PJM") Region and (2) between the Transmission Owners and PJM. The CTOA facilitates the planning and operation of the Transmission Grid within the PJM region and establishes the rights and responsibilities of each party to the CTOA.

11. The Project is necessary for PPL Electric to maintain its transmission assets in a safe and reliable manner and avoid violating its obligations under the CTOA to maintain its transmission facilities in good operating condition and avoid public safety concerns caused by failed assets. As explained in greater detail below and in Attachment 1 – Necessity Statement, this Project is necessary to replace aged substation equipment that has reached the end of its useful life and address several N-1-1 contingency risks that have been identified at the Existing Frackville Substation and surrounding regions.

12. In addition to the existing substation equipment exceeding its useful life and the identified contingency risks, good planning practices also support replacing the existing antiquated substation with a new substation. In accordance with PJM minimum planning and design standards, the use of three terminal lines and radial bus station configurations are discouraged in

[3] *See* https://www.pjm.com/directory/merged-tariffs/toa42.pdf.

new Bulk Electric System substation construction because of the considerable potential for detrimental effects on transmission system reliability.[4] Acceptable standards for substations are noted as ring bus configurations or breaker and a half arrangements. Breaker and a half arrangements are the preferred design because as more transmission elements are added to a ring bus, the probability that the substation could become fragmented into multiple sections during planned or unplanned maintenance outages increases. Specifically, the PJM standards state that "two circuits that feed a common location should not be supplied from a common breaker and a half bay or a common bus such that a single stuck breaker operation would trip both circuits."[5] Since the Existing Frackville Substation 230 kV and 69 kV yards were originally constructed before the PJM minimum planning and standards were implemented, the existing layout does not adhere to these standards and needs to be redesigned to comply with this Good Utility Practice.

13. The Project as proposed addresses these concerns in a cost-efficient manner, as compared to the alternative of replacing the equipment in place and undertaking mitigation work. Unlike the alternative, the Project as proposed resolves all of the identified operational and reliability issues, and it is the lowest cost option. Therefore, and for the reasons more fully explained below, the Commission should approve the Project as proposed.

1. Existing System

14. The Existing Frackville Substation was built as a 230/69 kV substation with a single bus design for both the 230 kV and 69 kV yards. The 230 kV system consists of three transmission lines and three 230/69 kV step-down transformers which feed into the 69 kV yard. The 69 kV system then supplies eleven 69 kV transmission lines.

[4] See PJM Substation Bus Configurations and Substation Design: https://www.pjm.com/~/media/planning/design-engineering/maac-standards/section-iii-sub-bus-config.ashx

[5] *Id.*

15. The Existing Frackville Substation is connected to the electric grid by the Eldred – Frackville 230 kV, Siegfried – Frackville 230 kV, and Columbia – Frackville 230 kV Transmission Lines. The Columbia – Frackville 230 kV and Eldred – Frackville 230 kV Transmission Lines are transformer tapped lines, while the Siegfried – Frackville 230 kV Transmission Line connects only to the single 230 kV bus.

16. Beyond the need of supplying load, the Existing Frackville Substation also provides a critical north-south tie in PPL Electric's transmission system, which allows the rural generation rich areas in Central Pennsylvania to provide power to the more urban load-rich areas of the Lehigh Valley.

17. A map of the existing system configuration is provided as Figure 1-1, in Attachment 1 – Necessity Statement.

2. Description of the Problem

18. The useful life of critical equipment in the Existing Frackville Substation has come to an end, and PPL Electric needs to replace this substation to guarantee the continued safe provision of electric service to its customers. Most of the substation assets at the Existing Frackville Substation are operating well beyond the average age of the equipment in the PPL Electric fleet. Per the manufacturer's recommendations, PPL Electric has treated the circuit breakers as an asset with a 30-year lifespan and the 230/69 kV power transformers as having a 50-year lifespan. The three transformers at the Existing Frackville Substation average 50 years old and show considerable material concern. Transformer 2 has had fifteen emergent trouble orders in the past five years, while Transformer 3 has had nine emergent trouble orders in the past five years.

19. The Existing Frackville Substation also contains twelve circuit breakers that are over 30 years old and three oil circuit breakers that are over 45 years old. For environmental and reliability concerns, it is necessary to replace the oil circuit breakers and the Siemens SP-72 circuit

breakers, which have experienced known sulfur hexafluoride gas ("SF_6") leaks and maintenance issues. Three 230 kV line circuit breakers are less than 10 years old, and PPL Electric will pursue reusing these circuit breakers at the Rebuilt Frackville Substation or another project to save on replacement costs.

20. The majority of the yard equipment is in a similar aged condition. Three motor-operated disconnects are over 45 years old, the ground operated disconnects are an average of 42 years old, and the various other yard equipment (i.e., capacitor coupled voltage transformers ("CCVTs") and pothead devices) are an average of 44 years old. The majority of the electromechanical vintage relaying is 45 years old and severely outdated.

21. In March 2022, the Existing Frackville Substation experienced a 69 kV bus section failure from an older SF_6 circuit breaker failure after attempting to clear a line fault. The protective relay trip in turn isolated another 69 kV transmission line on the bus section, resulting in a five-minute interruption to over 14,000 customers, and it took approximately 18 minutes to restore 5,200 customers.

22. Additionally, because two of the three 230/69 kV transformers at the Existing Frackville Substation directly connect to 230 kV transmission lines without any fault-interrupting device, the current 230 kV switchyard is not in compliance with the current PPL Electric design standards. The existing single 230 kV bus design is an operational risk to the entire region and surrounding substations. The connected transformer tapped lines, Eldred and Columbia, are stations with only one other 230 kV source each. During a 230 kV bus outage at the Existing Frackville Substation, a loss of the Montour – Columbia 230 kV Transmission Line at Columbia Substation or the Sunbury – Eldred 230 kV Transmission Line at Eldred Substation would drive excessive flow up and down the 230/69 kV transformers at the Existing Frackville Substation and,

depending on load and local generation dispatch conditions, could result in either low voltage, or voltage collapse and loss of load for the entire Columbia, Eldred, and Frackville load area.

23. The Existing Frackville Substation has three 230/69 kV transformers that step down voltage to supply a single sectionalized 69 kV operating bus, which includes eleven 69 kV feeds that leave the substation. These eleven 69 kV transmission lines feed over 53,000 customers, including eight critical customers: Ridgeview Healthcare and Rehab, Shenandoah Nursing, Priority Healthcare Group, Resthaven Operations, Schuylkill Medical Center, Schuylkill Medical Center HCF, Schuylkill County Prison, and Schuylkill County Office of Public Safety. Also connected to these lines are five independent power producer (IPP) generators: Gilberton (85 MW), Schuylkill Energy (90 MW), Pennsylvania Solar (20 MW), Locust Ridge Wind Farm #1 (26 MW), and Locust Ridge Wind Farm #2 (104 MW).

24. These eleven 69 kV lines have extremely limited transfer capabilities to other substations. Two of the eleven lines have an available tie to the Eldred Substation that can support the load on the lines, and two other lines have a tie to the Siegfried substation. However, the Siegfried Substation cannot support the entire load on the lines because of the significant line distance and loading. As such, low voltage and relay protection are limitations when trying to pick up load from Siegfried. The majority of Frackville area customers are dependent on the Existing Frackville Substation to provide them service.

25. Through the PJM RTEP 2026 Summer Peak base case, it was determined that there are several contingency risks and issues at the Existing Frackville Substation and surrounding regions that are due to N-1-1 conditions, which include the following:

- An outage of the non-standard 230 kV Bus during maintenance or fault conditions would create several significant reliability risks. Loss of the Frackville 230 kV Bus during a Montour – Columbia 230 kV Transmission Line outage (or vice versa) will cause the 69 kV stations in the Columbia, Frackville and Eldred area to suffer voltage

collapse and blackout the entire region. This would result in the loss of 28,680 customers in the Columbia area, 31,334 customers in the Eldred area, and 49,891 customers in the Existing Frackville Substation load area, resulting in a grand total of 109,905 customers. This load pocket that would be affected is on the order of approximately 500 MW. Such a blackout would affect numerous critical customers. Additionally, the resulting 69 kV voltage would fall below 0.75 per unit ("pu") (*i.e.*, 52 kV) at Columbia, Frackville, and Eldred, which would trip all the relays and 242 MW of 69 kV generation on undervoltage conditions.[6] The blackout would affect customers in the following cities, towns and boroughs and the surrounding regions: Northumberland, Danville, Bloomsburg, Berwick, Orangeville, Millville, Benton, Catawissa, Mifflinville, Elysburg, Mount Carmel, Shamokin, Ashland, Frackville, Shenandoah, Mahanoy City, Hometown, Tamaqua, Tuscarora, Delano, New Philadelphia, Port Carbon, Pottsville, Minersville, Schuylkill Haven, Orwigsburg, Cressona, Fridensburg, Pine Grove, Ravine, Hegins, and Tremont. The 109,905 customers in these communities would be subjected to prolonged outages.

- Loss of a Frackville 230/69 kV transformer during a 230 kV bus outage will overload the remaining transformer to 128% of summer emergency rating.

- During a 69 kV Bus Section 1 Outage, loss of an additional Frackville transformer will overload the remaining transformer to 128% of summer emergency rating, and loss of the Frackville – Shenandoah #2 69 kV Transmission Line would put 14,000 customers out of power that could not be restored due to the loss of the Frackville – Shenandoah #2 69 kV Transmission Line.

- A 69 kV Bus Section 2 Outage would result in a "split bus" condition where the loss of 69 kV Bus Section 1 or Transformer 1 will result in stranded load for customers off of this Bus Section. Over 14,000 customers of the 19,000 customers are not transferable on Bus Section 1.

- A 69 kV Bus Section 3 Outage would result in limited load transfer capability to the Eldred Substation. With Bus Section 3 out of service, plus an additional 69 kV line outage, the following stations will be under the 89.3% voltage threshold and would trip from service due to undervoltage protection: Auburn, Cass, Extrudo, Fishbach, Marlin, Oak Hill, and Schuylkill Haven. These substations serve three transmission customers and 12,328 PPL Electric customers. There are also five critical customers on these feeds that include Priority Healthcare Group, Schuylkill Medical Center, Schuylkill Medical Center HCF, Schuylkill County Prison, and Schuylkill County Office of Public Safety.

26. Given that the Existing Frackville Substation plays a vital role in PJM's bulk electric system, it cannot be taken out of service and decommissioned. Thus, the Existing

[6] Note that the minimum acceptable voltage on the 69 kV system is 61.6 kV.

Frackville Substation needs to stay in service while the replacement substation is constructed. Once the new substation is operational, it will be placed in service and the existing substation will be decommissioned.

B. THE PROPOSED PROJECT

27. In order to resolve the degrading health of the Existing Frackville Substation, as well as the resulting operational and reliability concerns and stranded load, PPL Electric proposes to construct the Rebuilt Frackville Substation adjacent to the Existing Frackville Substation on the PPL Electric property. PPL Electric will reuse the control house on site, as well as the 230 kV cap bank as a cost savings measure.

28. The Project will require approximately 0.9 mile of rebuilt 230 kV transmission lines (Eldred – Frackville 230 kV, Siegfried – Frackville 230 kV, and Columbia – Frackville 230 kV Transmission Lines) to connect to the new substation to the existing 230 kV transmission lines.

29. The Rebuilt Frackville Substation will be built to current PPL Electric standards, which include multiple buses for both the 230 and 69 kV yards as well as breaker and a half design for both yards, upgrading from the current single bus design. The rebuilt substation will provide a modern, well-designed final layout and provide easier cutovers as compared to completing cutovers in the existing outdated yard. This yard can be completely built and available immediately for cutovers, dramatically reducing outage duration and risk. This design will also allow dual circuit 69 kV lines to be broken up into different bus sections increasing reliability. Additionally, the Rebuilt Frackville Substation will include hardened safety and protective facilities that are designed to reduce vulnerability in the event of a malicious act. These features are not present on the Existing Frackville Substation.

30. The proposed Rebuilt Frackville Substation would be constructed on the same PPL Electric-owned parcel and adjacent to the west side of the existing substation. Building the

replacement substation will increase both local and regional reliability while reducing the risk of significant power outages due to construction challenges presented by rebuilding the substation in its current location. Building on the existing substation parcel is optimal since it will reduce impacts and the 230 and 69 kV transmission lines already traverse the property, thus reducing the amount of transmission line construction necessary to connect the new substation to the grid. Furthermore, cost savings will be achieved by utilizing the existing control cubicle and the 230 kV cap bank, which were both installed in the mid-2010s.

31. The Rebuilt Frackville Substation will resolve all of the issues identified in this Letter of Notification and in Attachment 1 – Necessity Statement. The estimated cost of the Project is $5.1 million, and the cost of the Project will be paid by PPL Electric.[7]

32. Importantly, as explained in Attachment 1 – Necessity Statement, the Project as proposed also avoids the additional costs and uncertainties surrounding the alternative considered by PPL Electric. As an alternative to the proposed Project, PPL Electric considered replacing the equipment at the Existing Frackville Substation in place and undertaking mitigation work. This alternative would require PPL Electric to replace several existing assets as described in Attachment 1 – Necessity Statement at a cost of approximately $21 million, as well as to construct approximately 3 miles of tie lines to mitigate the operational risk of taking outages to perform the replacements and necessary cutover work at a cost of $32 million. Not only is this alternative much more costly, it does not resolve all of the operational and reliability problems with the Existing Frackville Substation. For example, the alternative would not resolve an identified 500 MW load pocket voltage collapse exposure, nor would it eliminate the heightened chance of an

[7] The estimated cost was developed using averages of recent costs for similar projects and without an in-depth analysis of field investigation. The cost is subject to change as the constructability of the Project, sequence of construction, and other factors that may affect cost are identified and analyzed as the Project progresses.

Electric System Event ("ESE") risk that could happen while performing complex cutover work at the Existing Frackville Substation. Additionally, the alternative would not correct the non-standard designed substation. For these reasons, PPL Electric rejected the alternative of replacing equipment in place and undertaking mitigation work.

III. HEALTH AND SAFETY

33. The proposed lines will not create any unreasonable risk of danger to public health or safety. The proposed lines will be designed, constructed, operated, and maintained in a manner that meets or surpasses all applicable National Electrical Safety Code ("NESC") minimum standards and all applicable legal requirements. Descriptions of the NESC standards, PPL Electric's design criteria, and PPL Electric's safety practices are provided in Attachment 4 to this Letter of Notification.

34. Attachment 4 accompanying this Letter of Notification also explains PPL Electric's standards for Magnetic Field Management. Ground clearances for the proposed Project will be at least three feet higher than those required by the NESC standard in order to reduce the magnetic field exposure. The proposed rebuild of the Eldred – Frackville 230 kV, Siegfried – Frackville 230 kV, and Columbia – Frackville 230 kV Transmission Lines will continue to allow for double-circuit operation, which will allow for reverse phasing. A reduction in magnetic field exposure is anticipated due to the higher ground clearances and reverse phasing.

IV. DESCRIPTION OF THE PROJECT AREA

35. The PPL Electric Frackville Substation property is located approximately 1 mile northwest of the State Route 61 ("SR 61") and Interstate 81 ("I-81") interchange, outside the incorporated borough of Frackville. As explained in Attachment 1 – Necessity Statement, PPL Electric plans to build a new 230/69 kV substation located immediately adjacent to the current Frackville 230/69 kV Substation site. Both the new and existing substations will be located on the same PPL Electric fee-owned parcel of land. The new Frackville 230/69 kV Substation will occupy approximately 7 acres of the 61-acre PPL Electric Frackville Substation property.

36. The wires for the existing Eldred – Frackville 230 kV, Siegfried – Frackville 230 kV, and Columbia – Frackville 230 kV Transmission Lines are supported by a series of transmission line structures that include two double-circuit lattice towers, three two-pole H-frame structures, and one three-pole angle structure. The proposed relocation of approximately 0.9 mile of the existing 230 kV transmission lines is a consequence of moving the bay positions at the Rebuilt Frackville Substation. The new 230 kV yard will be located several hundred yards to the west of the current position. Therefore, the 230 kV transmission lines need to be shifted to the west to re-terminate. Due to the new alignment, the existing structures cannot be re-used. Along the rebuild Project, there are currently six existing structures that will be replaced by seven new structures comprised of single circuit steel monopoles, double circuit steel monopoles, single circuit H-frame, and single circuit 3-pole structures. The Project will require the building of one new structure to maintain clearance over the adjacent 69 kV transmission lines.

37. The approximately 0.9 mile of new 230 kV transmission lines will be located entirely within either existing right-of-way ("ROW") or PPL Electric fee-owned property. Since the transmission lines are contained to the Frackville Substation property or existing ROW, no new ROW will be required. All but one structure will be on PPL Electric fee-owned property.

38. A detailed aerial exhibit of the Project alignment is provided as Figure 3-1 in Attachment 3 – Engineering Description.

39. The existing structure heights range between 85 to 160 feet, with an average height of 105 feet. The new proposed structures will range in height from between approximately 60 to 170 feet with an average height of approximately 130 feet. PPL Electric does not use lattice structures due to increased labor cost to install. Instead, PPL Electric uses steel monopoles because they are a more economical solution.

40. Two aerial plot plans are provided at the end of Attachment 1 – Necessity Statement to this Letter of Notification. Figure 1-1 depicts the location of the existing transmission facilities associated with this Project. Figure 1-2 depicts the location of the proposed transmission facilities associated with this Project.

V. LAND USE AND ENVIRONMENTAL EVALUATION

41. The proposed Project will take place entirely within the existing ROW or within PPL Electric fee-owned property. Therefore, it is anticipated that the proposed rebuilt portion of the Transmission Lines will have minimal incremental impacts on land use in the area.

42. PPL Electric will use and update previously established access roads for construction to the extent practical to further reduce interference with existing uses and minimize land use impacts. A detailed description of the route of each individual component of the Project can be found in Attachment 3.

43. Land uses immediately surrounding the PPL Electric Frackville Substation property predominantly consist of vacant forested land or developed residential land. The new substation will be located further from the Englewood development, which is located to the east of the existing substation.

44. The closest communications tower is located approximately 0.5 mile northeast of the Project. No pipelines or railroads are in proximity to the Project. The Project crosses other PPL Electric electrical utility ROWs adjacent to the south of the Existing Frackville Substation.

45. The closest active airport relative to the Project Area is the Schuylkill County Airport, a publicly owned facility, located approximately 8 miles southwest of the Project. Additionally, two private heliports (St. Catherine Medical Center and SCI-Mahanoy) are located approximately 4 miles southwest and northeast of the Project, respectively. PPL Electric does not anticipate any interference with airport or heliport operations because the Project consists of new electrical facilities that are of a similar height as the existing electrical facilities and within existing ROW. However, PPL Electric will file any required documentation with the Federal Aviation Administration.

46. The proposed Project will not affect any national parks, state parks, local parks, recreational areas, or natural landmarks, as none are located within the Project Area.

47. PPL Electric conducted an online review of the Project Area and surrounding landscape through the Pennsylvania Historical and Museum Commission ("PHMC") State Historic and Archaeological Resource Exchange site. No State Historic Preservation Office ("SHPO") listed or eligible properties are crossed by the Project.

48. PPL Electric is in the initial stage of coordination with the PHMC for the modifications being made to the transmission lines. This coordination will be required to receive permits to construct the Project and will be conducted in the near future. PPL Electric does not anticipate any impacts to SHPO eligible properties or any other PHMC related properties. However, PPL Electric will perform any reviews and field survey/sampling work required by the

PHMC to avoid, minimize, and mitigate impacts to archaeological or historic architectural resources that may be located within the Project Area.

49. No unique geological, scenic, or natural areas are located within the Project Area, according to the Pennsylvania Department of Conservation and Natural Resources ("DCNR").

50. Erosion and Sedimentation ("E&S") control plans will be developed and implemented for the Project to minimize the displacement of soils. These plans will require prior approval from the Schuylkill County Conservation District. National Pollutant Discharge Elimination System ("NPDES") permits will also be required from the Pennsylvania Department of Environmental Protection ("PADEP") as needed. During construction, PPL Electric will adhere to all conditions specified in the NPDES permit. Impacts to local soil resources are anticipated to be minimal.

51. PPL Electric retained an environmental consultant to identify and delineate all waterways and wetlands within the Project Area. Four wetlands and one stream (Little Mahanoy Creek) were identified in the Project Area. Of these features, none are crossed by the proposed rebuilt Eldred – Frackville, Columbia – Frackville, and Siegfried – Frackville 230 kV Transmission Lines. One freshwater emergent ("PEM") wetland was delineated adjacent south of the current Frackville Substation. Additionally, one PEM wetland and one PEM/freshwater forested ("PFO") wetland complex were delineated adjacent west of the proposed rebuilt Frackville Substation. The Little Mahanoy Creek and an adjacent PEM/freshwater scrub-shrub ("PSS") wetland complex were identified north of the Project Area.

52. PPL Electric will avoid impacts to wetlands and streams where possible by aerially spanning these features. PPL Electric will obtain all necessary permits from PADEP and the United States Army Corps of Engineers ("USACE") and will comply with all the terms and conditions

placed on those permits. PPL Electric also will consult with the Schuylkill County Conservation District, prepare any required soil erosion and sedimentation control plans, and obtain NPDES permits and comply with any conditions placed on those permits.

53. The National Flood Hazard Layer for Schuylkill County, Pennsylvania was obtained through the Federal Emergency Management Agency ("FEMA") Flood Map Service Center website and analyzed for 100-year floodplains and regulatory floodways within the Project Area and surrounding landscape. Based on review of this data, the Project crosses no FEMA 100-year floodplain nor FEMA regulatory floodway. Little Mahanoy Creek is within FEMA Zone A, a 100-year floodplain, and has a 1-percent-annual-chance of inundation due to a flood event.

54. No impacts to the floodplain area of Little Mahanoy Creek are anticipated by the proposed Project activities because the proposed 230/69 kV yards and 230 kV structures will be constructed outside the 100-year floodplain of Little Mahanoy Creek. PPL Electric will coordinate with local agencies for regulated floodplain activities where required.

55. Vegetative cover in the Project Area primarily consists of maintained ROW or undeveloped forest. Minimal vegetation clearing is anticipated along the rebuilt Eldred – Frackville, Columbia – Frackville, and Siegfried – Frackville 230 kV Transmission Lines because they are located within or adjacent to existing ROW. PPL Electric will apply its "Specifications for Transmission Vegetation Management LA-79827" to minimize potential impacts.

56. A Pennsylvania Natural Diversity Inventory ("PNDI") was run for the Project on January 1, 2022, to assess the potential presence of threatened and endangered species and/or special concern species. The following agencies reviewed the Project: Pennsylvania Game Commission, Pennsylvania Fish and Boat Commission, Pennsylvania Department of Conservation and Natural Resources, and United States Fish and Wildlife Service. None of the agencies reported

any known impacts to threatened and endangered species and/or special concern species and resources within the Project Area. PPL Electric will continue to consult with the jurisdictional agencies regarding potential impacts to protected species, complete all required surveys, obtain all necessary approvals and permits for Project construction, and comply with all conditions placed on those permits.

VI. NOTICE

57. PPL Electric has reached out to residents located immediately adjacent to PPL Electric's fee owned parcels and owners of properties that are crossed by the proposed Rebuilt Transmission Lines. Copies of the Letter of Notification will be served upon landowners in accordance with 52 Pa. Code § 57.72(d)(3). A list of the landowners impacted by this project is provided in Attachment 5.

58. PPL Electric has provided information regarding the Project to representatives of Butler Township, Schuylkill County Planning Commission, Schuylkill County Conservation District, and Schuylkill County Municipal Authority. These entities have not objected to the proposed Project. Copies of this Letter of Notification will be served on the governmental agencies, municipalities, and other public entities and organizations in accordance with 52 Pa. Code § 57.72(d)(3). A list of these entities and organizations is also provided in Attachment 5.

VII. LETTER OF NOTIFICATION

59. PPL Electric is proceeding by means of a Letter of Notification, instead of a full Application, pursuant to the Commission's regulations at 52 Pa. Code § 57.72(d)(1)(vi).

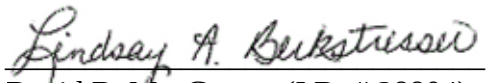
60. The proposed Project qualifies for use of a Letter of Notification because it has a proposed route of two miles or less.

61. This Letter of Notification is filed on the date set forth below. As provided in 52 Pa. Code § 57.72(d)(5), the Commission will review and, by order, approve or disapprove this Letter of Notification. If the Commission approves this Letter of Notification, the proposed Project will be constructed as proposed herein without the formal application process set forth at 52 Pa. Code §§ 57.71, *et seq*.

VIII. CONCLUSION

WHEREFORE, PPL Electric Utilities Corporation respectfully requests that the Pennsylvania Public Utility Commission approve the proposed Project located in Butler Township, Schuylkill County, Pennsylvania, that is explained above and in the Attachments hereto, by no later than September 30, 2023.

Respectfully submitted,



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Date: May 15, 2023

Attorneys for PPL Electric Utilities Corporation

PPL ELECTRIC
ATTACHMENT 1

FRACKVILLE 230/69 KV SUBSTATION REBUILD PROJECT

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1.0 INTRODUCTION

PPL Electric Utilities Corporation ("PPL Electric") is requesting Pennsylvania Public Utility Commission ("PUC" or "Commission") approval to rebuild a total of approximately 0.9 mile of the existing Eldred – Frackville 230 kilovolt ("kV"), Siegfried – Frackville 230 kV, and Columbia – Frackville 230 kV Transmission Lines in Butler Township, Schuylkill County, Pennsylvania to re-terminate them into the new Frackville Substation (the "Frackville 230/69 kV Substation Rebuild Project" or "Project").

As explained below, equipment within the existing Frackville 230/69 kV Substation ("Existing Frackville Substation") have reached an age and condition that the facilities must be replaced in order to ensure safe and reliable service to electric customers in Schuylkill, Carbon, Northumberland, Luzerne, and Columbia counties. As a result, PPL Electric plans to construct a new 230 kV/69 kV substation adjacent (the "Rebuilt Frackville Substation") to the Existing Frackville Substation[1] on the same property. PPL Electric herein seeks Commission approval for the construction of the rebuilt 230 kV transmission lines necessary to interconnect the Rebuilt Frackville Substation to the electric grid.[2]

In addition, the Project is also required to comply with:

- The Consolidated Transmission Owners Agreement ("CTOA") Rate Schedule - FERC No. 42 (FERC ER10-2713-000), which requires transmission systems to "[b]e kept in place and maintained in good operating condition in accordance with Good Utility Practice and principles, guidelines and standards of the applicable Regional Reliability Council and NERC."

[1] A temporary 230 kV tie line would be built between both yards until construction of the Rebuilt Frackville Substation is complete.

[2] Because Commission approval is not needed to relocate or construct overhead transmission lines with voltages below 100 kV, PPL Electric has excluded discussion regarding re-termination of approximately ten existing 69 kV transmission lines into the new substation from this Letter of Notification.

The Project is necessary for PPL Electric to avoid violating its obligations under the CTOA to maintain its transmission facilities in good operating condition and avoid public safety concerns caused by failed assets.

Moreover, in order for PPL Electric's transmission facilities to be considered in good operating condition, they must be maintained in a manner consistent with the standards of the North American Electric Reliability Corporation ("NERC"), Reliability First Corporation, and Good Utility Practice as defined by the CTOA.

Failure to complete the Project and resolve these issues would be contrary to PPL Electric's responsibility to provide transmission assets and service that is adequate, efficient, safe, reliable, and reasonable.

Importantly, the Project as proposed represents the only alternative that allows PPL Electric to resolve all reliability concerns with a single project. Neither the remediation, nor the replacement alternatives considered by PPL Electric resolve all these issues by themselves; rather, they would require additional measures to be taken (i.e., construction of a new substation/switchyard, removal of load at the Existing Frackville Substation) to solve all issues, at additional expense. The Project as proposed represents the most cost-effective solution to address each of the identified issues.

Subject to the Commission's approval, construction will begin in July 2023 to support an in-service date of November 2025. PPL Electric will continue to own, operate, and maintain the Rebuilt Frackville Substation. The total estimated cost of this Project, as described below, is approximately $5.1 Million, and the cost for the Project will be paid by PPL Electric.[3]

2.0 BACKGROUND

PPL Electric has a responsibility to provide transmission assets and maintain them in a manner that is adequate, efficient, safe, reliable, and reasonable to meet the needs of the electric system

[3] The estimated cost was developed using averages of recent costs for similar projects and without an in-depth analysis of field investigation. The cost is subject to change as the constructability of the Project, sequence of construction, and other factors that may affect cost are identified and analyzed as the Project progresses.

and the expectations of its customers. To meet this duty, PPL Electric applies its transmission asset management planning procedure as part of its system performance and condition assessment process. These performance and conditions assessments identify system needs and prioritize projects based on several variables such as equipment age, condition, maintenance schedule, and impact on system reliability and performance to ensure a reliable electric grid and service to its customers.

The transmission system is the backbone of the electric grid. Failure to maintain the system in accordance with Good Utility Practice and reliability practices and standards can decrease overall transmission system reliability and increase the risk of customer outages.

PPL Electric is a public utility that provides electric service to an estimated 1.4 million customers throughout 29 central and eastern Pennsylvania counties. The Existing Frackville Substation is one of the largest substations owned by PPL Electric and serves more than 275 megawatts ("MW") of load to over 49,000 customers in Schuylkill, Carbon, Northumberland, Luzerne, and Columbia counties.

The Existing Frackville Substation was built as a 230/69 kV substation with a single bus design for both the 230 kV and 69 kV yards. The 230 kV system consists of three transmission lines and three 230/69 kV step-down transformers which feed into the 69 kV yard. The 69 kV system then supplies eleven 69 kV transmission lines. The proposed and Existing Frackville Substation are located in Butler Township, Schuylkill County, which adjoins the borough of Frackville.

The useful life of critical equipment in the Existing Frackville Substation has come to an end, and PPL Electric needs to replace this substation to guarantee the continued safe provision of electric service to its customers. Additionally, because two of the three 230/69 kV transformers at the Existing Frackville Substation directly connect to 230 kV transmission lines without any fault-interrupting device, the current 230 kV switchyard is not in compliance with the current PPL Electric design standards. However, given that the Existing Frackville Substation plays a vital role in PJM's bulk electric system, it cannot be taken out of service and decommissioned. Additionally, since the existing substation cannot be taken out of service, the existing substation needs stay in

service while the replacement substation is constructed. Once the new substation is operational, it will be placed in service and the existing substation will be decommissioned.

The proposed Rebuilt Frackville Substation would be constructed on the same PPL Electric-owned parcel and adjacent to the existing substation on its west side. Building the replacement substation will increase both local and regional reliability while reducing the risk of significant power outages due to construction challenges presented by rebuilding the substation in its current location. Building on the existing substation parcel is optimal since it will reduce impacts and the 230 and 69 kV transmission lines already traverse the property, thus reducing the amount of transmission line construction necessary to connect the new substation to the grid. Furthermore, cost savings will be achieved by utilizing the existing control cubicle and the 230 kV cap bank which were both installed in the mid-2010s.

The Project will require approximately 0.9 mile of rebuilt 230 kV transmission lines (Eldred – Frackville 230 kV, Siegfried – Frackville 230 kV, and Columbia – Frackville 230 kV Transmission Lines) to connect to the new substation to the existing 230 kV transmission lines.

3.0 TRANSMISSION SYSTEM PLANNING PROCESS

The nation's interconnected transmission grid ("Transmission Grid") serves as the backbone for the safe and reliable delivery of large amounts of electricity from generating stations over substantial distances to customers served by transmission and local distribution systems. It is critical that the Transmission Grid be planned and designed to ensure reliable electric service is provided under all loading conditions or when certain elements of the Transmission Grid are out of service (system contingencies) due to planned or unplanned outages.

Robust Transmission Planning assures that the transmission system can supply electricity to all customer loads in a manner that is reliable and economical. This System Planning process ensures

that both the Bulk Electric System ("BES")[4] and non-Bulk Electric System (non-BES)[5] are planned and constructed so that:

- They can accommodate forecasted system flows during summer and winter peak load;
- They can adequately serve each customer's need regarding capacity, voltage, and reliability for all load levels throughout the daily load cycle;
- They can sustain probable contingencies and disturbances with minimal customer service interruptions; and
- They are in conformance with NERC, PJM Interconnection, LLC ("PJM"), and the Transmission Owner's reliability criteria for all normal and emergency operating conditions.

PJM is a Federal Energy Regulatory Commission ("FERC")-approved Regional Transmission Organization ("RTO") charged with ensuring the reliability of the electric transmission system under its functional control (100 kV and above) and coordinating the movement of electricity in all or parts of thirteen states and the District of Columbia, including Pennsylvania. In order to ensure reliable transmission service, PJM prepares an annual Regional Transmission Expansion Plan ("RTEP")[6] to identify system reinforcements that are required to, among other things, meet the NERC Reliability Standards, PJM reliability planning criteria, and Transmission Owner reliability criteria.

PPL Electric's Transmission Asset Management Procedure involves identifying system needs and determining the best available solution to address those needs. This process includes asset evaluation, asset condition and system risk assessments, analysis of alternative solutions and

[4] Bulk Electric System (BES) – Includes transmission facilities operated at voltages of 100 kV or higher.

[5] Non-Bulk Electrical System (non-BES) – Includes transmission facilities operated at voltages less than 100 kV.

[6] PJM's RTEP process is currently set forth in Schedule 6 of PJM's Amended and Restated Operating Agreement ("Schedule 6"). Schedule 6 governs the process by which PJM's members rely on PJM to prepare an annual regional plan for the enhancement and expansion of the transmission facilities to ensure long-term, reliable electric service consistent with established reliability criteria. In addition, Schedule 6 addresses the procedures used to develop the RTEP, the review and approval process for the RTEP, the obligation of transmission owners to build transmission upgrades included in the RTEP, and the process by which interregional transmission upgrades will be developed.

project initiation and scheduling. System needs are identified based on the overarching goals of reducing outage frequency and duration, improving system reliability, decreasing system maintenance cost, and maintaining operational flexibility to ensure safe and reliable electric service of the transmission system and to PPL Electric's customers.

When transmission owning utilities (including PPL Electric) set up PJM as an RTO, they agreed to bind themselves to maintaining their existing transmission systems using Good Utility Practice. The CTOA is an agreement among (1) individual Transmission Owners operating within the PJM Region and (2) between the Transmission Owners and PJM. The CTOA facilitates the planning and operation of the Transmission Grid within the PJM region and establishes the rights and responsibilities of each party to the CTOA. Section 4.6 of the CTOA requires that transmission systems "[b]e kept in place and maintained in good operating condition in accordance with Good Utility Practice and principles, guidelines and standards of the applicable Regional Reliability Council and NERC." This Project is required to fulfil PPL Electric's obligations under the CTOA.

Per PJM minimum planning and design standards, Section III refers to Substation Bus Configurations and Substation Design Recommendations[7]. In this document, three terminal lines and radial bus station configurations are both discouraged for use in new Bulk Electric System substation construction because of the considerable potential for detrimental effects on transmission system reliability. Acceptable standards for substations are noted as ring bus configurations or breaker and a half arrangements. Breaker and a half arrangements are the preferred design because as more transmission elements are added to a ring bus, the probability that the substation could become fragmented into multiple sections during planned or unplanned maintenance outages increases. Section 4 of the PJM document describes functional criteria that lead PJM to the identification of the aforementioned transmission planning design Best Practices. Item 2 in Section 4 specifically notes that "two circuits that feed a common location should not be supplied from a common breaker and a half bay or a common bus such that a single stuck breaker operation would trip both circuits." Since the Existing Frackville Substation 230 kV and 69 kV

[7] PJM Substation Bus Configurations and Substation Design: https://www.pjm.com/~/media/planning/design-engineering/maac-standards/section-iii-sub-bus-config.ashx

yards were originally constructed before the PJM minimum planning and standards were implemented, the layout does not adhere to them and needs to be redesigned to comply with this Good Utility Practice. So, in addition to the existing substation equipment exceeding its useful life, good planning practices also support replacing the existing antiquated substation with a new substation. More specifically, the existing substation location does not have enough space to allow for the replacement of the existing bus configuration with a more reliable breaker and a half arrangement, hence another reason to build the new substation in the adjacent location on the same parcel of land.

4.0 THE NEED FOR THE PROJECT

4.1 Existing System

The Existing Frackville Substation is connected to the electric grid by the Eldred – Frackville 230 kV, Siegfried – Frackville 230 kV, and Columbia – Frackville 230 kV Transmission Lines. The Columbia – Frackville 230 kV and Eldred – Frackville 230 kV Transmission Lines are transformer tapped lines, while the Siegfried – Frackville 230 kV Transmission Line connects only to the single 230 kV bus. Beyond the need of supplying load, the Existing Frackville Substation also provides a critical north-south tie in PPL Electric's transmission system, which allows the rural generation rich areas in Central Pennsylvania to provide power to the more urban load-rich areas of the Lehigh Valley.

As mentioned above, the single 230 kV bus is an operational risk to the entire region and surrounding substations. The connected transformer tapped lines, Eldred and Columbia, are stations with only one other 230 kV source each. During a 230 kV bus outage at the Existing Frackville Substation, a loss of the Montour – Columbia 230 kV Transmission Line at Columbia Substation or the Sunbury – Eldred 230 kV Transmission Line at Eldred Substation would drive excessive flow up and down the 230/69 kV transformers at the Existing Frackville Substation and, depending on load and local generation dispatch conditions, could result in either low voltage, or voltage collapse and loss of load for the entire Columbia, Eldred, and Frackville load area.

The Existing Frackville Substation has three 230/69 kV transformers that step down voltage to supply a single sectionalized 69 kV operating bus, which includes eleven 69 kV feeds that leave the substation. These eleven 69 kV transmission lines feed over 53,000 customers, including eight critical customers: Ridgeview Healthcare and Rehab, Shenandoah Nursing, Priority Healthcare Group, Resthaven Operations, Schuylkill Medical Center, Schuylkill Medical Center HCF, Schuylkill County Prison, and the Schuylkill County Office of Public Safety. Also connected to these lines are five independent power producer (IPP) generators: Gilberton (85 MW), Schuylkill Energy (90 MW), Pennsylvania Solar (20 MW), Locust Ridge Wind Farm #1 (26 MW), and Locust Ridge Wind Farm #2 (104 MW).

These eleven 69 kV lines have extremely limited transfer capabilities to other substations. Two of the eleven lines have an available tie to the Eldred Substation that can support the load on the lines, and two other lines have a tie to the Siegfried substation. However, the Siegfried Substation cannot support the entire load on the lines because of the significant line distance and loading. As such, low voltage and relay protection are limitations when trying to pick up load from Siegfried. The majority of Frackville area customers are dependent on the Existing Frackville Substation to provide them service.

A listing of operational risks and contingencies is listed in **Section 4.3**. A map of the existing system configuration is provided as **Figure 1-1**.

4.2 Project Need

4.2.1 Asset Health

Most of the substation assets at the Existing Frackville Substation have reached their end-of-life and are operating well beyond the average age of the equipment in the PPL Electric fleet. Per the manufacturer's recommendations, PPL Electric has treated the circuit breakers as an asset with a 30-year lifespan and the 230/69 kV power transformers having a 50-year lifespan.

The three transformers average 50 years old and show considerable material concern. Transformer 2 has had fifteen emergent trouble orders in the past five years, while transformer 3

has had nine emergent trouble orders in the past five years. PPL Electric intends to update the General Electric and McGraw Edison transformers with 170 megavolt-ampere ("MVA") transformers that are used in other substations across the system, which will simplify the maintenance and repair strategy. The Existing Frackville Substation also contains twelve circuit breakers that are over 30 years old and three oil circuit breakers that are over 45 years old. For environmental and reliability concerns, replacing the oil circuit breakers and the Siemens SP-72 circuit breakers with known sulfur hexafluoride gas ("SF_6") leak histories and maintenance issues is among the highest priorities for this project. The three 230 kV line circuit breakers are less than 10 years old, and PPL Electric will pursue reusing these circuit breakers at the Rebuilt Frackville Substation or another project to save on replacement costs. The existing 69 kV and 230 kV lines around the substation will also need to be re-terminated into the new substation dead-ends.

The majority of the yard equipment is in a similar condition. Three motor-operated disconnects are over 45 years old, the ground operated disconnects are an average of 42 years old, and the various other yard equipment (i.e., capacitor coupled voltage transformers ("CCVTs") and pothead devices) are an average of 44 years old. The majority of the electromechanical vintage relaying is 45 years old and severely outdated. PPL Electric will install new Schweitzer Engineering Laboratories (SEL) microprocessor relaying that provides a significant improvement in operational capabilities, including redundant primary and backup protection schemes, improved load flow analysis, predictive falling conductor isolation, and significantly reduced maintenance and human performance error-prone operation.

In March 2022, the Existing Frackville Substation experienced a 69 kV bus section failure from an older SF_6 circuit breaker failing after attempting to clear a line fault. The protective relay trip in turn isolated another 69 kV transmission line on the bus section, resulting in a five-minute interruption to over 14,000 customers, and it took approximately 18 minutes to restore 5,200 customers. Increasing the network capabilities inside the yard adds significant flexibility to the regional network and can drastically reduce outage durations, such as was experienced in this recent equipment casualty.

4.3 Contingency Risks/Issues

PPL Electric is committed to operating a safe and reliable transmission system. The contingency risks and issues at the Existing Frackville Substation and surrounding regions are due to N-1-1 conditions. The studies below were completed using the PJM RTEP 2026 Summer Peak base case. From the analysis, the risks are severe enough to not grant the necessary maintenance and capital improvement outages.

1) **During a 230 kV Bus Outage:** The Existing Frackville 230/69 kV Substation has a non-standard single operating bus design. Outage of this bus during maintenance or fault conditions creates significant reliability risks as listed below:

   a) Complete voltage collapse with a Montour-Columbia 230 kV line outage

   Loss of the Frackville 230 kV Bus during a Montour – Columbia 230 kV Transmission Line outage (or vice versa) will cause the 69 kV stations in the Columbia, Frackville and Eldred area to suffer voltage collapse and blackout the entire region. This would result in the loss of 28,680 customers in the Columbia area, 31,334 customers in the Eldred area, and 49,891 customers in the Existing Frackville Substation load area, resulting in a grand total of 109,905 customers. This load pocket that would be affected is on the order of approximately 500 MW. Such a blackout would affect six critical customers off of the Columbia Substation:

   - Four accounts for Bloomsburg Hospital, Alliance Health Care and Columbia County;
   - Eight critical customers off of the Frackville Substation: Ridgeview Healthcare and Rehab, Shenandoah Nursing, Priority Healthcare Group, Resthaven Operations, Schuylkill Medical Center, Schuylkill Medical Center HCF, Schuylkill County Prison, the Schuylkill County Office of Public Safety;
   - Three critical customers off of the Eldred Substation: two accounts for Geisinger Health, Evangelical Community and Geisinger Danville as a 69 kV customer.

   The resulting 69 kV voltage would fall below 0.75 per unit ("pu") (*i.e.*, 52 kV) at Columbia, Frackville, and Eldred, which would trip all the relays and 242 MW of 69 kV generation on undervoltage conditions. Note that the minimum acceptable voltage on the 69 kV system is

61.6 kV. The blackout would affect customers in these following cities, towns and boroughs and the surrounding regions: Northumberland, Danville, Bloomsburg, Berwick, Orangeville, Millville, Benton, Catawissa, Mifflinville, Elysburg, Mount Carmel, Shamokin, Ashland, Frackville, Shenandoah, Mahanoy City, Hometown, Tamaqua, Tuscarora, Delano, New Philadelphia, Port Carbon, Pottsville, Minersville, Schuylkill Haven, Orwigsburg, Cressona, Fridensburg, Pine Grove, Ravine, Hegins, and Tremont. The 109,905 customers in these communities would be subjected to prolonged outages.

b) Thermal Violation on 230/69 kV transformer

Loss of a Frackville 230/69 kV transformer during the 230 kV bus outage will overload the remaining transformer to 128% of summer emergency rating.

2) During a 69 kV Bus Section 1 Outage:

a) Thermal overload

Loss of an additional Frackville transformer will overload the remaining transformer to 128% of summer emergency rating.

b) Stranded customer risk

Loss of the Frackville – Shenandoah #2 69 kV Transmission Line would put 14,000 customers out of power that could not be restored due to the loss of the Frackville – Shenandoah #2 69 kV Transmission Line.

3) During a 69 kV Bus Section 2 Outage:

a) Stranded customer risk

Creates a “split bus” condition where the loss of 69 kV bus section 1 or transformer 1 will result in stranded load for customers off of this bus section. Over 14,000 customers of the 19,000 customers are not transferable on bus section 1.

4) During a 69 kV Bus Section 3 Outage:

a) Stranded customer risk

With bus section 3 out, there is limited load transfer capability to the Eldred Substation. With bus section 3 out of service, plus an additional 69 kV line outage, the following stations will be under the 89.3% voltage threshold and would trip from service due to undervoltage protection:

- Auburn
- Cass
- Extrudo
- Fishbach
- Marlin
- Oak Hill
- Schuylkill Haven

These substations serve three transmission customers and 12,328 PPL Electric customers. There are also five critical customers on these feeds that include Priority Healthcare Group, Schuylkill Medical Center, Schuylkill Medical Center HCF, Schuylkill County Prison, and the Schuylkill County Office of Public Safety.

5.0 ALTERNATIVES

PPL Electric evaluated the following alternative to address the degrading health of the Existing Frackville Substation, operational flexibility, and customer reliability concerns in the Frackville Area. The following alternative was considered and compared based on cost and its ability to resolve the asset health conditions and reliability concerns identified by PPL Electric.

Alternative 1 – Replace equipment in place plus mitigation work

The alternative considered by PPL Electric to address the Frackville Substation concerns was to replace the majority of substation equipment inside of Existing Frackville Substation, but prior to the replacement of equipment, implement targeted mitigation projects to address the contingency issues listed above. The following equipment would have to be replaced:

- Replace three transformers

- Replace nine motor operated disconnects (MODs)
- Replace 11 69 kV circuit breakers
- Replace 27 gang operated disconnects (GODs)
- Replace 17 pothead devices
- Replace 12 CCVTs
- Replace additional 230 kV breaker and set of MODs for Transformer 1
- Install a new bus conductor for both 230 and 69 kV
- Install a new Trenwa trench in the substation
- Construct a full relay replacement

The cost of replacing the above aging assets is approximately $45 million. However, due to the operational risks associated with taking outages to perform these replacements, it will be extremely challenging to take outages to perform the necessary cutover work.

To mitigate this risk, PPL Electric would need to perform additional work with incremental costs and additional operational risks. To alleviate issues on bus sections 1 and 2, two 69 kV tie lines would be constructed to tie lines from Harwood substation to lines that leave Frackville substation. The first would tie the Harwood – Humboldt 69 kV Transmission Line from Humboldt Substation to Girard Manor Substation connecting the Frackville – Siegfried #2 69 kV Transmission Line. This line would be approximately 4.2 miles long. The second line would tie the Harwood – East Hazleton #2 Transmission Line to either the Frackville – Hauto #1 or #3 Transmission Lines. This line would be approximately 3 miles long. The total estimated cost for these necessary transmission lines is $32 million.

This alternative would alleviate stranded load out of the Existing Frackville Substation for the 69 kV bus outage critical contingency scenarios described in **Section 4.3**, but the 230 kV bus outage scenario involving 109,905 customers, 500 MW load pocket voltage collapse exposure (also described in **Section 4.3**) would not be resolved. The mitigation measures required by this alternative also would not eliminate the heightened chance of an Electric System Event (“ESE”)

risk that could happen while performing complex cutover work at an existing substation. Additionally, this alternative would not address all reliability concerns or correct the non-standard designed substation. Both 230 kV and 69 kV yards will still have the non-standard single operating bus design. The existence of non-standard line tap transformer design will continue to pose risk to the Frackville – Columbia and Eldred – Frackville 230 kV Transmission Lines. These lines are part of the heavily loaded PPL Electric's Bulk Electric backbone system and provide outlets to export generation from the Susquehanna and Central regions. In the current design, the 230/69 kV transformers are directly connected to these lines without any protective device in between. A 69 kV bus section fault will trip the respective transformer and will cause tripping of the respective 230 kV Bulk Electric line.

Conversely, a new 230/69 kV substation (see **Section 6.0**) will be built to the current design standards with no reliability risk. This design would meet the minimum design standards set forth in the PJM reference listed in **Section 3.0**. Minimal outage time will be required for cutting over transmission lines from the old to the new substation. The probability of an ESE is much lower for a greenfield substation cutover, further reducing risks to our customers. Therefore, PPL Electric is proposing to rebuild the existing transmission lines to accommodate the proposed Rebuilt Frackville Substation.

6.0 PROPOSED SOLUTION

To resolve asset health condition, operational flexibility, stranded load and reliability issues as explained above, PPL Electric proposes to rebuild the existing Eldred – Frackville 230 kV, Siegfried – Frackville 230 kV, and Columbia – Frackville 230 kV Transmission Lines. This rebuilt substation will reuse the control house on site, as well as the 230 kV cap bank as a cost savings measure. The rebuilt station will be built to current PPL Electric standards, which include multiple buses for both the 230 and 69 kV yards as well as breaker and a half design for both yards, upgrading from the current single bus design. The rebuilt substation will provide a modern, well-designed final layout and provide easier cutovers as compared to completing cutovers in the existing outdated yard. This yard can be completely built and available immediately for cutovers,

dramatically reducing outage duration and risk. This design will also allow dual circuit 69 kV lines to be broken up into different bus sections increasing reliability.

Recent events in Washington State and North Carolina have demonstrated that malicious acts at substations could have significant impacts to electrical reliability and system operation. In recent years, PPL Electric has been incorporating additional safety and protective facilities at its new substations and has been retrofitting some existing substations to help protect against malicious activities. Since the new substation will include hardened safety and protective facilities, there will be reduced vulnerability at the new substation as compared to the existing substation facilities.

This design will meet the minimum design standards set forth in the PJM reference listed in **Section 3.0**. This solution will also resolve all issues listed in **Section 4.3**. The estimated cost of the Project is $5.1 million.

A map of the proposed system alignment is provided as **Figure 1-2**. A one-line diagram of the proposed Frackville Substation is provided in **Figure 1-3**.

Figure 1-1: Existing System Configuration

- Existing 230 kV Structure
- Existing Substation Fenceline
- Existing 230 kV Transmission Line
- Existing 69 kV Transmission Line
- PPL Parcel

Roads, Railroads, Municipalities (PASDA 2022)
Local Parks (Schuylkill Co. 2022)
Rivers (USGS 2022)

Coordinate System:
State Plane Pennsylvania South
Datum: North American 1983

October 19, 2022

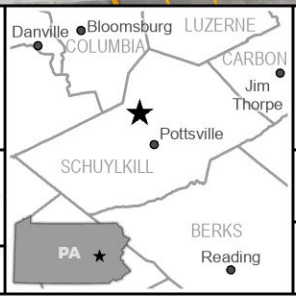
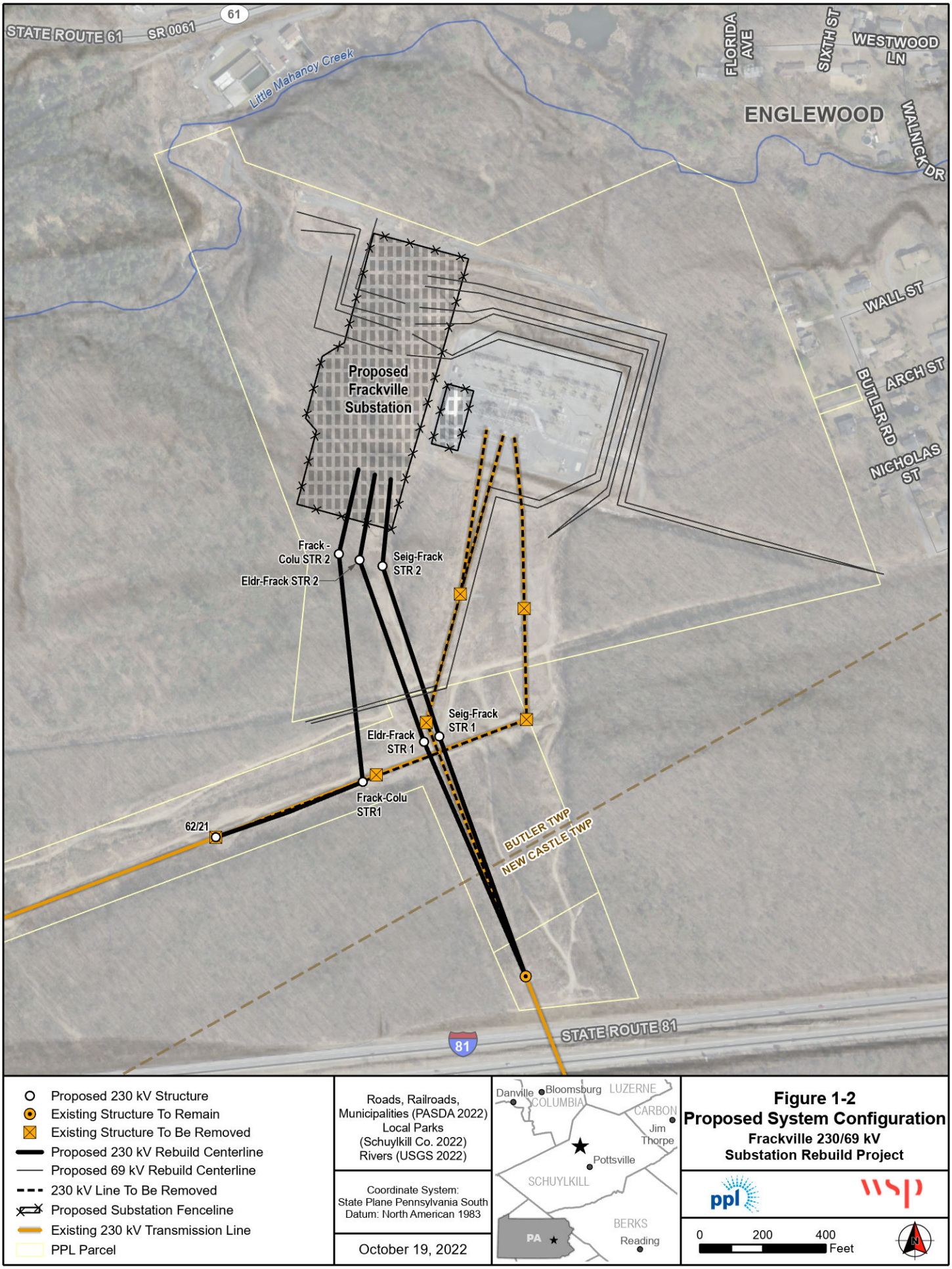


Figure 1-1
Existing System Configuration
Frackville 230/69 kV
Substation Rebuild Project

0 200 400 Feet

Figure 1-2: Proposed System Configuration



- Proposed 230 kV Structure
- Existing Structure To Remain
- Existing Structure To Be Removed
- Proposed 230 kV Rebuild Centerline
- Proposed 69 kV Rebuild Centerline
- 230 kV Line To Be Removed
- Proposed Substation Fenceline
- Existing 230 kV Transmission Line
- PPL Parcel

Roads, Railroads, Municipalities (PASDA 2022)
Local Parks (Schuylkill Co. 2022)
Rivers (USGS 2022)

Coordinate System:
State Plane Pennsylvania South
Datum: North American 1983

October 19, 2022

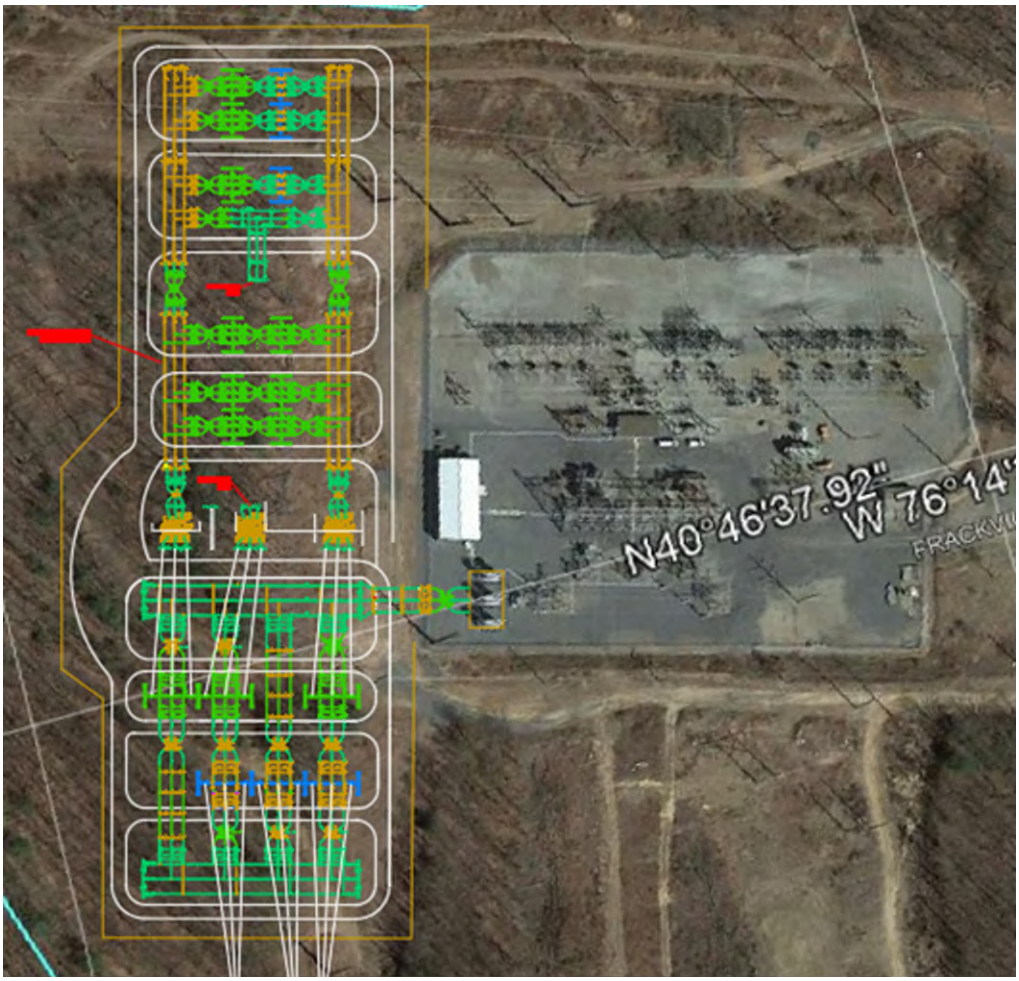
Figure 1-2
Proposed System Configuration
Frackville 230/69 kV Substation Rebuild Project

ppl wsp

0 200 400 Feet

N

Figure 1-3: Proposed Frackville 230/69 kV Substation



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PPL ELECTRIC
ATTACHMENT 2

FRACKVILLE 230/69 KV SUBSTATION REBUILD PROJECT

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1.0 INTRODUCTION

As explained in Attachment 1, PPL Electric Utilities Corporation ("PPL Electric") seeks Pennsylvania Public Utility Commission ("PUC" or the "Commission") approval to rebuild a total of approximately 0.9 mile of the existing Eldred – Frackville 230 kilovolt ("kV"), Siegfried – Frackville 230 kV, and Columbia – Frackville 230 kV Transmission Lines necessary to interconnect the new Frackville Substation 230 kV switchyards to the electric grid (the "Project").

The proposed transmission line system will be designed according to, and generally exceed, all National Electrical Safety Code ("NESC") standards. Design specifications and safety rules adhered to by PPL Electric are included as **Attachment 4**.

2.0 DESCRIPTION OF THE EXISTING AND PROPOSED 230 KV LINES AND STRUCTURES

Existing conductor for the Eldred – Frackville 230 kV and Siegfried – Frackville 230 kV transmission lines contain 795 kcmil[1], 30/19 stranding, "Mallard" ACSR[2]. Existing conductor for the Columbia – Frackville 230 kV Transmission Line is 1590 kcmil[3], 45/7 stranding, "Lapwing" ACSR[4]. These conductor and ground wires are supported by a series of transmission line structures that include two double-circuit lattice towers, three two-pole H-frame structures, and one three-pole angle structure. The arrangement also includes overhead ground wires ("OHGW"). The relocations of the 230 kV transmission lines are a consequence of moving the bay positions at the substation. The new 230 kV yard will be located several hundred yards to the west of the current position. Therefore, the 230 kV transmission lines need to be shifted to the west to re-terminate. Due to the new alignment, the existing structures cannot be re-used.

[1] A kcmil is a thousand circular mils. A circular mil is the cross-sectional area of a wire one mil in diameter, where 1 kcmil = 0.5067 mm^2.
[2] ACSR stands for aluminum conductor steel reinforced.
[3] A kcmil is a thousand circular mils. A circular mil is the cross-sectional area of a wire one mil in diameter, where 1 kcmil = 0.5067 mm^2.

A detailed aerial exhibit of the Project alignment is provided as **Figure 3-1** in **Attachment 3**.

The existing structure heights range between 85 to 160 feet, with an average height of 105 feet. The new proposed structures will range in height from between approximately 60 to 170 feet with an average height of approximately 130 feet. **Table 2-1** provides a summary of the number and heights of the existing and proposed structures. PPL Electric does not use lattice structures due to increased labor cost to install; instead steel monopoles are used since they are a more economical solution. **Figures 2-1** through **2-4** depict structure types that will be used for the Eldred – Frackville 230 kV, Siegfried – Frackville 230 kV, and Columbia – Frackville 230 kV Transmission Lines.

Table 2-1. Existing and New Transmission Line Structures

Transmission Line	No. of Existing Structures	Existing Structure Height Range (feet)	Proposed No. of New Structures	Proposed Structure Height Range (feet)	Applicable Framing/ Specifications
Eldred – Frackville 230 kV	2[5]	85 to 160	2	60 to 170	7-009-005
Siegfried – Frackville 230 kV			2		7-009-005
Columbia – Frackville 230 kV	4		3		7-009-013 7-009-013-Mod 1 7-009-040
Total	**6**		**7**		

Along the rebuild Project, there are currently six existing structures that will be replaced by seven new structures comprised of single circuit steel monopoles, double circuit steel monopoles, single circuit H-frame, and single circuit 3-pole structures. The Project will result in an increase of one structure to maintain clearance over the adjacent 69 kV transmission lines (**Figure 1-2 in**

[5] The existing Eldred – Frackville 230 kV and Siegfried – Frackville 230 kV Transmission Lines share the same structures.

Attachment 1). As explained in **Attachment 1**, the approximately 0.9 mile of new 230 kV transmission lines will be located entirely within either existing right-of-way ("ROW") or PPL Electric fee-owned property. Since the transmission lines are contained to the Frackville Substation property or existing ROW, no new ROW will be required (see **Attachment 3**). All but one structure will be on PPL Electric fee-owned property.

The rebuilt 230 kV transmission lines circuit will utilize three power conductors and two fiber optic ground wires. The power conductors for Frackville – Siegfried and Eldred – Frackville will be 1590 kcmil[6], 54/19 stranding, aluminum conductor steel supported ("ACSS"). The power conductors for Frackville – Columbia will be double bundle 1590 kcmil, 54/19 stranding, ACSR. The fiber optic ground wire will be 0.791-inch diameter optical ground wires ("OPGW").

The proposed lines will be designed according to, and generally exceed, all NESC minimum standards. The minimum conductor-to-ground clearance will be approximately 25.5 feet, which occurs at a maximum conductor temperature of 250°C (482°F) for ACSS conductors, and at a maximum conductor temperature of 125°C (257°F) for ACSR conductors. The design minimum conductor clearances and conductor thermal ratings for the proposed 230 kV lines are shown in **Tables 2-2** through **2-4**. Design specifications and safety rules practiced by PPL Electric are included in **Attachment 4**.

[6] A kcmil wire size is the equivalent cross sectional area in thousands of circular mils. A circular mil is the area of a circle with a diameter of one thousandth (0.001) of an inch.

Table 2-2. Design for Minimum Conductor Clearances for Selected Conductor[7]	
Condition	**230kV Transmission Line Design Clearance-to-Ground**
Heavy Ice (1" Ice at 0°C ambient temperature)	25.5 feet
Predicted extreme thermal load (250°C ACSS, 125°C ACSR)	25.5 feet
Predicted blowout (15 psf, 16°C ambient temperature)	25.5 feet

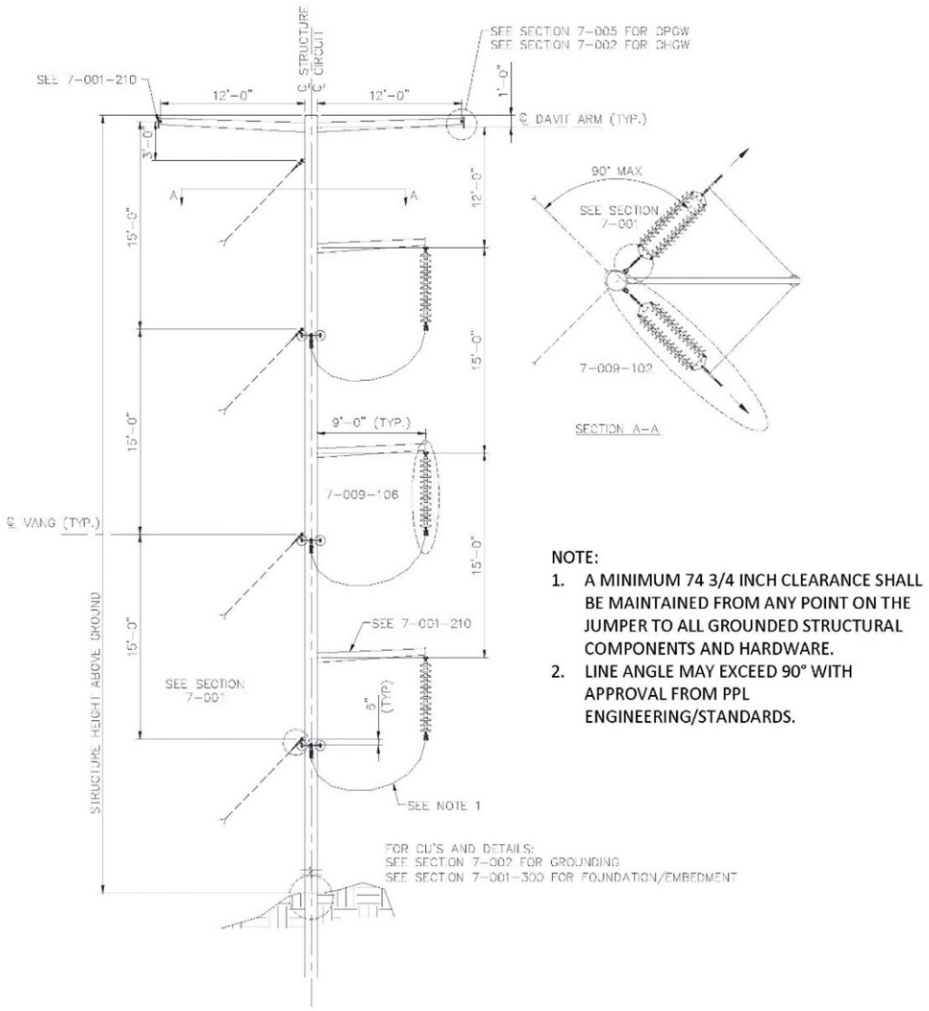
Table 2-3. Conductor Thermal Rating 1590 kcmil 54/19 Stranding Falcon ACSS – 200°C Normal Maximum Conductor (250°C Emergency)			
Condition	**Ambient Temperature (°C)**	**Wind Speed (Ft./sec)**	**Ampacity (Amps)**
Summer Normal	35	0	2,344
Winter Normal	10	0	2,506
Summer Emergency	35	2.53	3,074
Winter Emergency	10	2.53	3,201

Table 2-4. Conductor Thermal Rating 1590 kcmil 45/7 Stranding Lapwing ACSR Double Bundle – 125°C Normal Maximum Conductor			
Condition	**Ambient Temperature (°C)**	**Wind Speed (Ft./sec)**	**Ampacity (Amps)**
Summer Normal	35	0	3,342
Winter Normal	10	0	3,850
Summer Emergency	35	2.533	4,126
Winter Emergency	10	2.533	4,646

[7] Clearances are based on an initial maximum tension of 6,000-10,000 pounds at 0.5 inch ice, 0°F, 4# wind and maximum ruling span of 200-1,250 feet.

Figure 2-3. Typical Single-Circuit 230kV Steel Monopole Structure

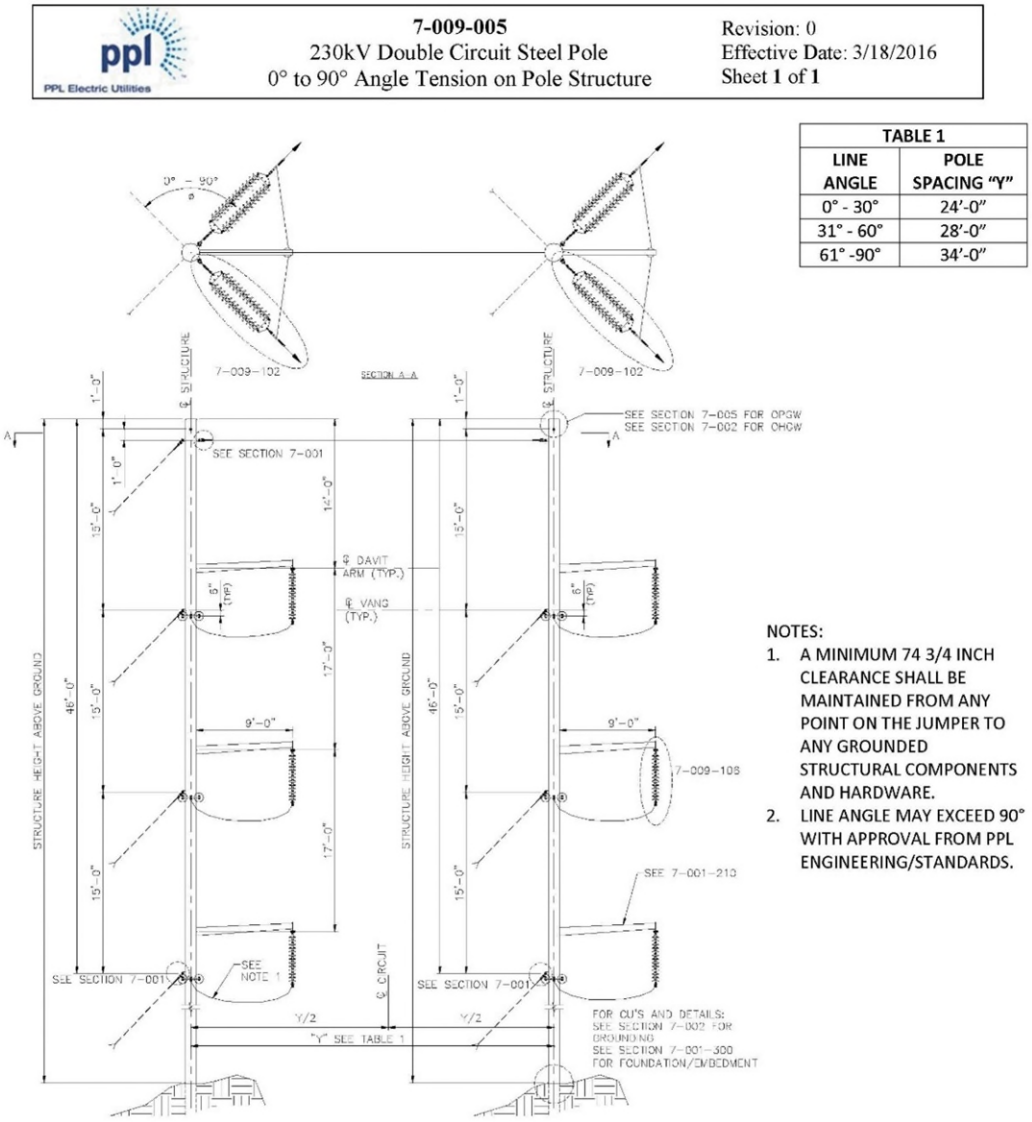
PPL Electric Utilities	**7-009-013** 230kV Single Circuit Steel Pole 0° to 90° Angle Tension on Pole Structure	Revision: 0 Effective Date: 3/18/2016 Sheet 1 of 1



REV	Date	Sponsor	Reviewer	Transmission Construction Standards PPL Electric Utilities Corporation
0	3/18/16	MSD	SDS	
				Approved T. P. Hinson
				Manager Standards

Approved: E154693 Hinson, Todd P

Figure 2-4. Typical Double-Circuit 230kV Steel Monopole Pole Structures

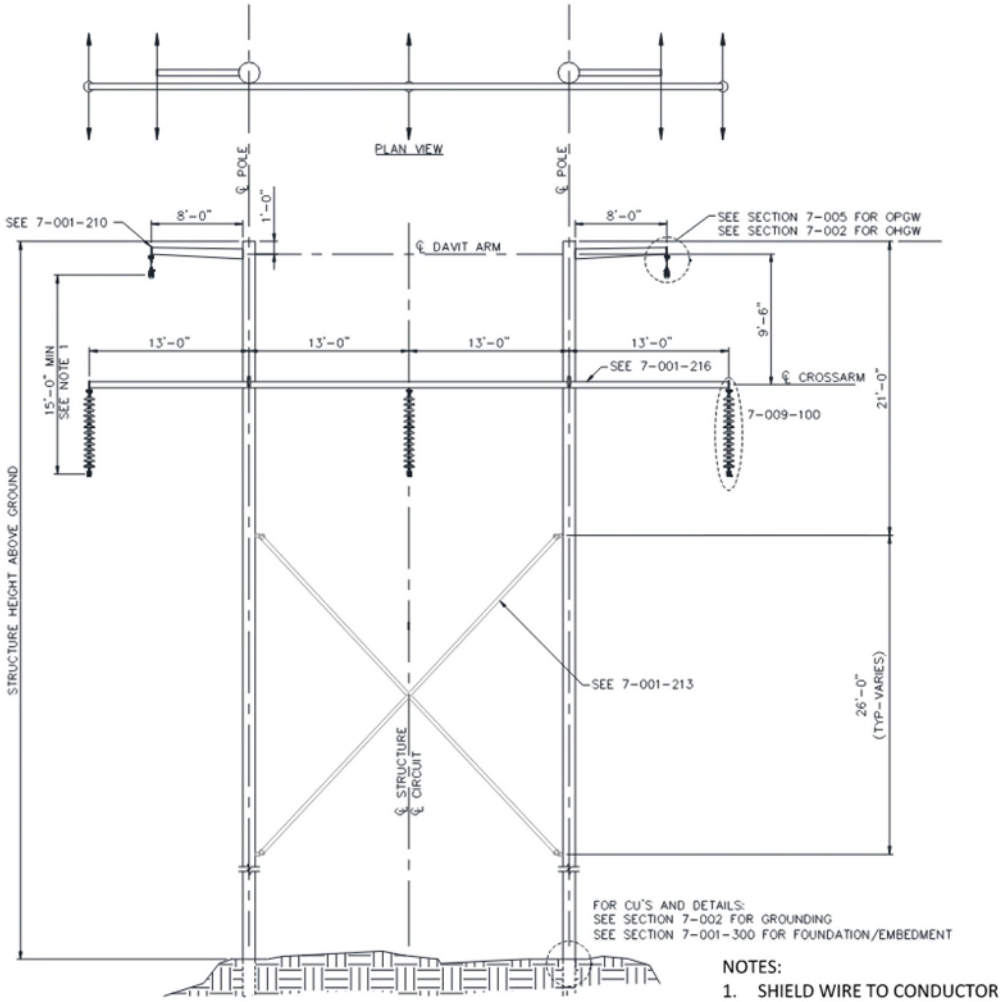


REV	Date	Sponsor	Reviewer	Transmission Construction Standards PPL Electric Utilities Corporation
0	3/18/16	MSD	SDS	
				Approved T. P. Hinson
				Manager Standards

Approved: E154693 Hinson, Todd P

Figure 2-3. Typical Single-Circuit 230kV Steel H-Frame Structure

PPL Electric Utilities	**7-009-040** 230kV Single Circuit Steel H-Frame 0° to 1° Suspension Structure	Revision: 0 Effective Date: 3/18/2016 Sheet **1** of **1**



NOTES:
1. SHIELD WIRE TO CONDUCTOR SPACING VARIES DEPENDING ON SHIELD WIRE SUPPORT ASSEMBLY. SEE SPECIFIC JOB INSTRUCTIONS.

REV	Date	Sponsor	Reviewer	Transmission Construction Standards PPL Electric Utilities Corporation
0	3/18/16	MSD	SDS	
				Approved T. P. Hinson Manager Standards

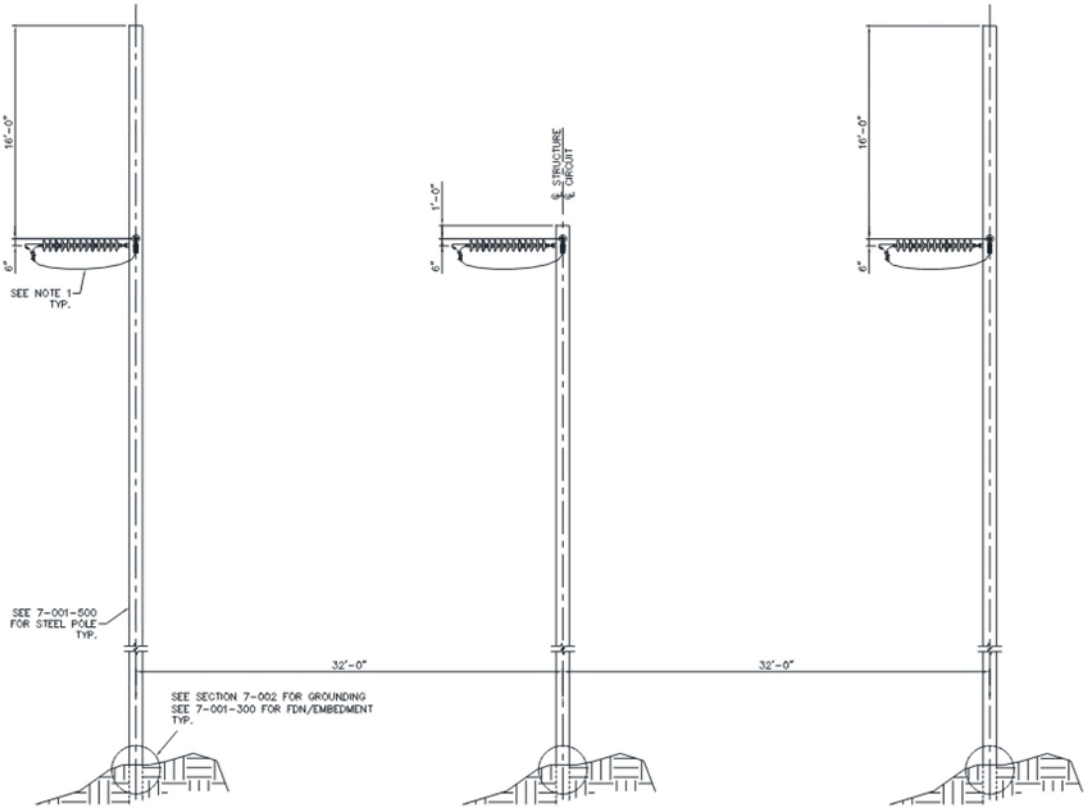
Approved: E154693 Hinson, Todd P

Figure 2-4. Typical Single-Circuit 230kV Steel 3-Pole Structure

PPL Electric Utilities

7-009-013-Mod 1
230kV Single Circuit Steel Three Pole
0° to 90° Angle Tension on Pole Structure

Revision: 00
Effective Date: 03/01/2023
Sheet 1 of 1



Notes:
1. A MINIMUM 74 3/4 INCH CLEARANCE SHALL BE MAINATINED FROM ANY POINT ON THE JUMPER TO ALL GROUNDED STRUCTURAL COMPONENTS AND HARDWARE.
2. LINEA NGLE MAY EXCEED 90° WITH APPROVAL FROM PPL ENGINEERING/STANDARDS.

Rev	Date	ECN	Sponsor	Reviewer
00	02/29/2016	ECN-6231	MSD	JJM
01	08/27/2021	ECN-15150	JAK	MHP

Transmission Construction Standards
PPL Electric Utilities Corporation

Approved: Kyle Supinski
Manager T&S Standards

PPL ELECTRIC
ATTACHMENT 3

FRACKVILLE 230/69 KV SUBSTATION REBUILD PROJECT

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1.0 INTRODUCTION

PPL Electric Utilities Corporation ("PPL Electric") herein seeks approval from the Pennsylvania Public Utility Commission ("PUC" or the "Commission") to rebuild approximately 0.9 mile of existing 230 kilovolt ("kV") transmission lines to re-terminate them into the new Frackville Substation, located directly adjacent to the existing Frackville 230/69 kV Substation (the "Frackville 230/69 kV Substation Rebuild Project" or "Project"). Specifically, the Project requires rebuilding 0.3 mile of the existing Eldred – Frackville 230 kV Transmission Line, 0.3 mile of the existing Siegfried – Frackville 230 kV Transmission Line, and 0.3 mile of the existing Columbia – Frackville 230 kV Transmission Line. Additionally, a temporary 230 kV tie-in will be built between the 230 kV and 69 kV yards until the new substation is constructed. The entire Project is located within Butler Township, Schuylkill County, Pennsylvania. PPL Electric has provided information about the proposed Project to representatives from Butler Township, Schuylkill County, and the Ashland Area Municipal Authority.

The PPL Electric Frackville Substation property is located approximately 1 mile northwest of the State Route 61 ("SR 61") and Interstate 81 ("I-81") interchange, outside the incorporated borough of Frackville. As explained in Attachment 1, PPL Electric plans to build a new 230/69 kV substation located immediately adjacent to the current Frackville 230/69 kV Substation site. Both the new and existing substation will be located on the same PPL Electric fee-owned parcel of land. The new Frackville 230/69 kV Substation will occupy approximately 7 acres of the 61-acre PPL Electric Frackville Substation property.

As described in **Attachment 1**, the rebuilt Eldred – Frackville, Columbia – Frackville, and Siegfried – Frackville 230 kV Transmission Lines will be constructed adjacent to and south of the rebuilt Frackville 230/69 kV Substation, located either within the existing right-of-way ("ROW") or within PPL Electric fee-owned property. The temporary 230 kV tie-in will also be constructed entirely within the PPL Electric Frackville Substation property.

The Project requires using six existing structures and installing seven new structures. All new and re-used structures will be located entirely within existing ROW or PPL Electric fee-owned

properties, as described in **Attachment 2**. A network of existing access roads or temporary roads will be utilized during construction of the rebuilt transmission lines. Detailed maps of the proposed rebuilt Frackville 230/69 kV Substation and rebuilt 230 kV transmission lines are provided in **Figure 3-1.**

2.0 LAND USE

The Project Area is generally bounded to the north by SR 61 and Little Mahanoy Creek; to the east by residential properties within the community of Englewood; to the south by existing PPL Electric ROW and the I-81 corridor; and to the west by vacant land owned by the Ashland Area Municipal Authority. Land uses immediately surrounding the PPL Electric Frackville Substation predominantly consist of vacant forested land or developed residential land. The new substation will be located further from the Englewood development located to the east of the existing substation.

The closest communications tower is located approximately 0.5 mile northeast of the Project. No pipelines or railroads are in proximity to the Project. The Project crosses other PPL Electric electrical utility ROWs adjacent south of the existing Frackville Substation. 3

The closest active airport relative to the Project Area is the Schuylkill County Airport, a publicly owned facility, located approximately 8 miles southwest of the Project. Additionally, two private heliports (St. Catherine Medical Center and SCI-Mahanoy) are located approximately 4 miles southwest and northeast of the Project, respectively. PPL Electric does not anticipate any interference with airport or heliport operations because the Project consists of new electrical facilities that are of a similar height as the existing electrical facilities and within existing ROW. However, PPL Electric will file any required documentation with the Federal Aviation Administration.

Conserved Lands

The proposed Project will not affect any national parks, state parks, local parks, recreational areas, or natural landmarks, as none are located within the Project Area.

3.0 CULTURAL RESOURCES

An online review of the Project Area and surrounding landscape was conducted through the Pennsylvania Historical and Museum Commission ("PHMC") State Historic and Archaeological Resource Exchange site. State Historic Preservation Office ("SHPO") eligible and listed structures and districts within 1 mile of the Project Area are listed in **Table 3-1** below.

Table 3-1. Cultural Resources Located in the Project Area

Resource Name	Resource Type	Eligibility	Location
Philadelphia & Reading Railroad	District	Eligible	Old railroad corridor crossing eastside of Frackville
A.S. Seasman Drygoods Store	Building	Undetermined	1 South Lehigh Avenue
Broad Mountain Nursing and Rehabilitation Center	Building	Undetermined	500 West Laurel Street
Good Will Hose Company	Building	Eligible	Adjacent southeast of Oak Street and Mahanoy Street
Mount Laurel Dam – Valve House	Building	Not Eligible	Mud Run Reservoir (southwest of SR 61 and I-81)
Roosevelt School Building	Building	Demolished	Southwest of Frack Street and Penn Street
Sanners Bakery	Building	Not Eligible	2 North Lehigh Avenue
Sanners Store	Building	Eligible	2 North Lehigh Avenue
Thomas Brothers Cleaners	Building	Not Eligible	8 North Lehigh Avenue
Zetusky, Walter, Building	Building	Undetermined	21 South Lehigh Avenue
Unnamed Bridge	Bridge	Not Eligible	Southeast of Middle Street and Spruce Street
Mahanoy Plane	Historical Marker	Listed	Gold Star Highway (SR 924)

None of these historic structures or districts are crossed or spanned by the Project. PPL Electric is in the initial stage of coordination with the PHMC for the modifications being made to the transmission lines. This coordination will be required to receive permits to construct the Project

and will be conducted in the near future. PPL Electric does not anticipate any impacts to SHPO listed or eligible structures or districts. PPL Electric will perform any reviews and field survey/sampling work required by the PHMC to avoid, minimize, and mitigate impacts to archaeological or historic architectural resources that may be located within the Project Area.

4.0 NATURAL FEATURES

Unique Natural Features

No unique geological, scenic, or natural areas are located within the Project Area, according to the Pennsylvania Department of Conservation and Natural Resources ("DCNR").

Soils

The Project Area is located on gradually undulating land, primarily surrounded by undeveloped forest. Topography within the Project Area ranges between approximately 1,400 feet to approximately 1,670 feet above mean sea level ("msl"). Soils present within the Project Area predominantly consist of silt loams, ranging between 3 to 25 percent slopes.

Erosion and Sedimentation ("E&S") control plans will be developed and implemented for the Project to minimize the displacement of soils. These plans will require prior approval from the Schuylkill County Conservation District. National Pollutant Discharge Elimination System ("NPDES") permits will also be required from the Pennsylvania Department of Environmental Protection ("PADEP") as needed. During construction, PPL Electric will adhere to all conditions specified in the NPDES permit. Impacts to local soil resources are anticipated to be minimal.

Waterways and Wetlands

PPL Electric retained an environmental consultant to identify and delineate all waterways and wetlands within the Project Area. Four wetlands and one stream (Little Mahanoy Creek) were identified in the Project Area. Of these features, none are crossed by the proposed rebuilt Eldred – Frackville, Columbia – Frackville, and Siegfried – Frackville 230 kV Transmission Lines. One freshwater emergent ("PEM") wetland was delineated adjacent south of the current Frackville

Substation. Additionally, one PEM wetland and one PEM/freshwater forested ("PFO") wetland complex were delineated adjacent west of the proposed rebuilt Frackville Substation. The Little Mahanoy Creek and an adjacent PEM/freshwater scrub-shrub ("PSS") wetland complex were identified north of the Project Area.

PPL Electric will avoid impacts to wetlands and streams where possible by aerially spanning these features. PPL Electric will obtain all necessary permits from PADEP and the United States Army Corps of Engineers ("USACE") and will comply with all the terms and conditions placed on those permits. PPL Electric also will consult with the Schuylkill County Conservation District, prepare any required soil erosion and sedimentation control plans, and obtain NPDES permits and comply with any conditions placed on those permits.

100-Year Floodplains and Regulatory Floodway

The National Flood Hazard Layer for Schuylkill County, Pennsylvania was obtained through the Federal Emergency Management Agency ("FEMA") Flood Map Service Center website and analyzed for 100-year floodplains and regulatory floodway within the Project Area and surrounding landscape. Based on review of this data, the Project crosses no FEMA 100-year floodplain nor FEMA regulatory floodway. Little Mahanoy Creek is within FEMA Zone A, a 100-year floodplain, and has a 1-percent-annual-chance of inundation due to a flood event.

No impacts to the floodplain area of Little Mahanoy Creek are anticipated by the proposed Project activities because the proposed 230/69 kV yards and 230 kV structures will be constructed outside the 100-year floodplain of Little Mahanoy Creek. PPL Electric will coordinate with local agencies for regulated floodplain activities where required.

Vegetation

Vegetative cover in the Project Area primarily consists of maintained ROW or undeveloped forest. Minimal vegetation clearing is anticipated along the rebuilt Eldred – Frackville, Columbia – Frackville, and Siegfried – Frackville 230 kV Transmission Lines because they are located within

or adjacent to existing ROW. PPL Electric will apply its "Specifications for Transmission Vegetation Management LA-79827" to minimize potential impacts.

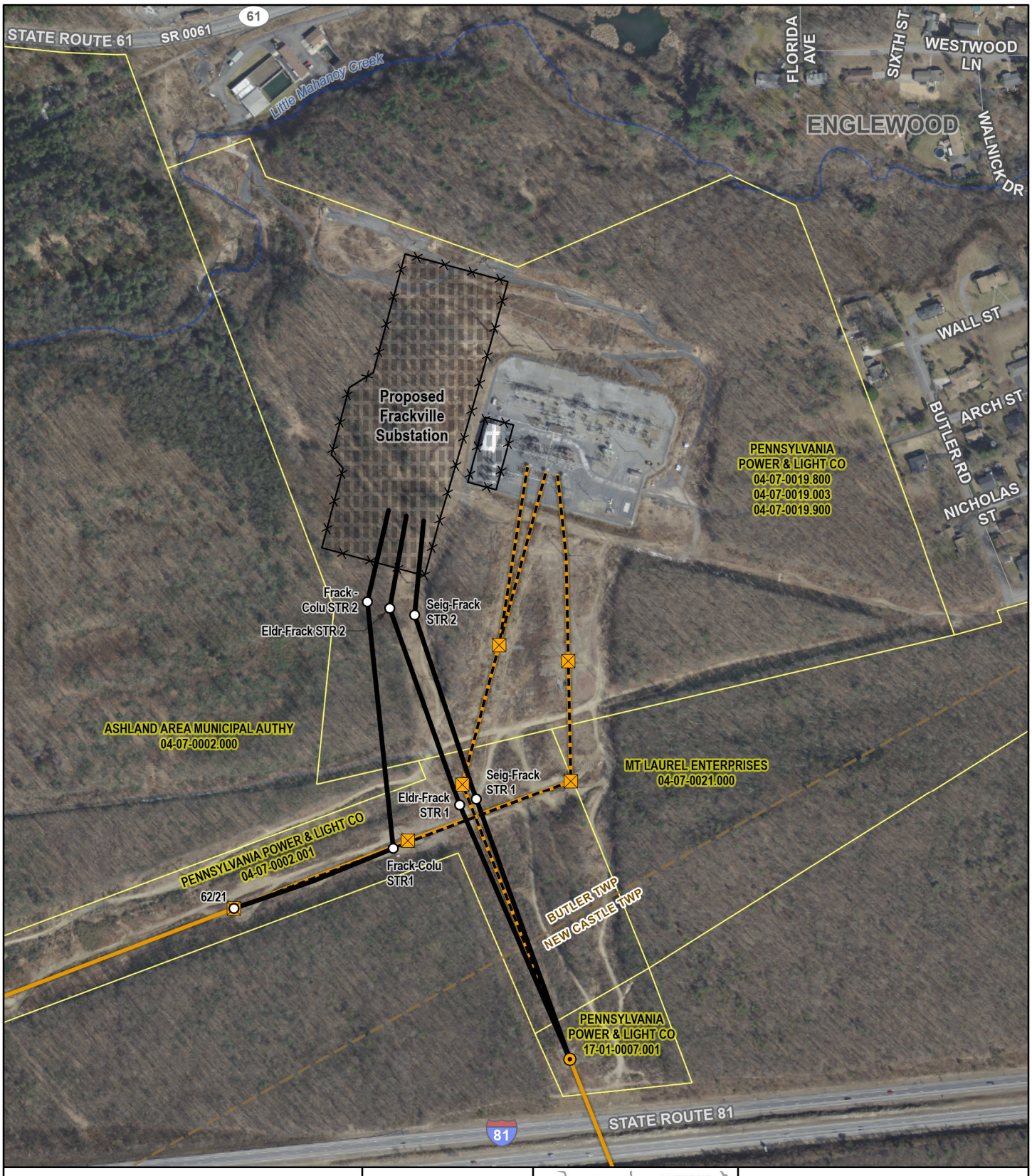
5.0 THREATENED AND ENDANGERED SPECIES

A Pennsylvania Natural Diversity Inventory ("PNDI") was run for the Project on January 1, 2022, to assess the potential presence of threatened and endangered species and/or special concern species. Specific agencies reviewing the Project included the following:

- Pennsylvania Game Commission;
- Pennsylvania Fish and Boat Commission;
- Pennsylvania Department of Conservation and Natural Resources; and
- United States Fish and Wildlife Service.

None of the agencies reported any known impacts to threatened and endangered species and/or special concern species and resources within the Project Area. PPL Electric will continue to consult with the jurisdictional agencies regarding potential impacts to protected species, complete all required surveys; obtain all necessary approvals and permits for Project construction; and comply with all conditions placed on those permits.

Figure 3-1. Aerial Map of the Project



- Proposed 230 kV Structure
- Existing Structure To Remain
- Existing Structure To Be Removed
- Proposed 230 kV Rebuild Centerline
- 230 kV Line To Be Removed
- Proposed Substation Fenceline
- Existing 230 kV Transmission Line
- Parcel Boundary

Roads, Railroads, Municipalities (PASDA 2022)
Local Parks (Schuylkill Co. 2022)
Rivers (USGS 2022)

Coordinate System:
State Plane Pennsylvania South
Datum: North American 1983

October 19, 2022

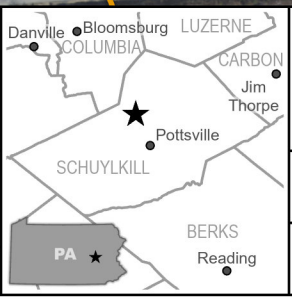


Figure 3-1
Aerial Map
Frackville 230/69 kV Substation Rebuild Project

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0 200 400 Feet

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PPL ELECTRIC

ATTACHMENT 4

FRACKVILLE 230/69 KV SUBSTATION REBUILD PROJECT

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1.0. DESIGN CONSIDERATIONS

PPL Electric Utilities Corporation's ("PPL Electric") new and rebuilt transmission lines are designed according to, and generally exceed, all National Electric Safety Code ("NESC") minimum standards. The NESC is a set of rules guiding safety standards during the installation, operation, and maintenance of electric power lines. The NESC contains the basic provisions considered necessary for the safety of employees and the public. Although the NESC is not intended as a design specification, its provisions establish minimum design requirements. PPL Electric has developed design specifications and safety rules which meet or surpass all requirements specified by the NESC.

The NESC includes loading requirements and clearances for the design, construction, and operation of power lines. The "loads" on conductors and supporting structures are the mechanical forces that develop from the weight of the conductors, the weight of ice on the conductors, plus wind pressure on the conductors and supporting structures. Loading requirements are the loads on the conductors and structures that are anticipated assuming certain ice and wind conditions. Loading requirements always contain "safety factors" to allow for unknown or unanticipated contingencies. The clearances and loading requirements contained in the NESC are designed to maintain public safety.

The NESC specifies strength and loading rules based on three different "grades of construction" for conductors and supporting structures:

- Grade B – This grade of construction provides the highest margin of safety and is required when the pole supports spans that cross limited access highways, railroads, and waterways.
- Grade C – This grade of construction is most common and provides a basic margin of safety. It is often utilized for the typical power and joint-use distribution pole.
- Grade N – This is the lowest grade of construction and is most often used for emergency and temporary construction.

PPL Electric designs all its transmission lines for Grade B construction. The use of Grade B design and construction translates to higher levels of structural reliability and safety to withstand the environmental conditions of ice and/or wind loading.

PPL Electric's rigorous design standards are further incorporated into the parameters utilized to account for ice and wind loadings on the wires and structure. Structure loading and line designs must accommodate a variety of operating conditions as different ice and wind combinations can impact the conductor sags and tensions of the line. PPL Electric's transmission lines are designed to exceed NESC requirements by accounting for additional load cases due to various ice and wind loading conditions beyond what is required by NESC. This means that PPL Electric lines are designed to operate safely and reliably during extreme inclement weather. In addition, PPL Electric design standards include a clearance to ground buffer in excess of NESC required clearances to account for construction and design tolerances and the filling or grading of land within the right-of-way by property owners. This buffer also significantly reduces the risk of a property owner inadvertently contacting a transmission line. This has occurred on PPL Electric's system in the past and higher clearances minimize the likelihood of future occurrences.

Table 4-1. 69 kV Vertical Clearance to Ground

Surface Underneath Conductors	NESC Standard Clearance	PPL Electric Clearances
Roads, streets, and other areas subject to truck traffic	19.2 Ft.	22.2 Ft.
Other land traversed by vehicles such as cultivated grazing, forest, orchards, etc.	19.2 Ft.	22.2 Ft.
Spaces and ways subject to pedestrians or restricted traffic only	15.2 Ft.	22.2 Ft.
Track rails of railroads (except electrified railroads using overhead trolley conductors)	27.2 Ft.	30.2 Ft.

Table 4-2. 138 kV Vertical Clearance to Ground		
Surface Underneath Conductors	**NESC Standard Clearance**	**PPL Electric Clearances**
Roads, streets, and other areas subject to truck traffic	20.6 Ft.	23.6 Ft.
Other land traversed by vehicles such as cultivated grazing, forest, orchards, etc.	20.6 Ft.	23.6 Ft.
Spaces and ways subject to pedestrians or restricted traffic only	16.6 Ft.	23.6 Ft.
Track rails of railroads (except electrified railroads using overhead trolley conductors)	28.6 Ft.	31.6 Ft.

Table 4-3. 230 kV Vertical Clearance to Ground		
Surface Underneath Conductors	**NESC Standard Clearance**	**PPL Electric Clearances**
Roads, streets, and other areas subject to truck traffic	22.5 Ft.	25.5 Ft.
Other land traversed by vehicles such as cultivated grazing, forest, orchards, etc.	22.5 Ft.	25.5 Ft.
Spaces and ways subject to pedestrians or restricted traffic only	18.5 Ft.	25.5 Ft.
Track rails of railroads (except electrified railroads using overhead trolley conductors)	30.5 Ft.	33.5 Ft.

Table 4-4. 500 kV Vertical Clearance to Ground		
Surface Underneath Conductors	**NESC Standard Clearance**	**PPL Electric Clearances**
Roads, streets, and other areas subject to truck traffic	28.4 Ft.	31.4 Ft.
Other land traversed by vehicles such as cultivated grazing, forest, orchards, etc.	28.4 Ft.	31.4 Ft.
Spaces and ways subject to pedestrians or restricted traffic only	24.4 Ft.	31.4 Ft.
Track rails of railroads (except electrified railroads using overhead trolley conductors)	36.4 Ft.	39.4 Ft.

A relay protection system is also used on PPL Electric's transmission lines to protect public safety, as well as the equipment on the transmission system. The purpose of relay protection is to automatically de-energize the line in the unlikely event that the line or supporting structure fails and the line contacts the ground.

2.0. PERIODIC MAINTENANCE PROGRAM ON ALL TRANSMISSION LINES

To ensure continued public safety and integrity of service, a periodic maintenance and inspection program is implemented for every transmission line. The program is administered using helicopter patrols, with supplemental foot patrols as needed. Helicopter patrols are performed on all lines on a predetermined frequency, depending on voltage level. The two-man helicopter crew flies parallel to and above the line so that the observer can look for signs of line damage or deterioration and observe clearances between vegetation and conductors. The observations are included in a report that is forwarded to the appropriate department for corrective action.

3.0. PERSONNEL SAFETY RULES

Overall, PPL Electric designs and constructs projects with high regard to both public and employee safety and follows or exceeds all codes and requirements. The following are a few examples of PPL Electric's safety rules that demonstrate its dedication to employee and contractor safety:

- Procedures have been developed to allow work to be performed on energized facilities in a safe manner. When lines or apparatus are removed from service to be worked on, the Energy Control Process system is applied. This system provides that a red tag must be physically placed on the control handle of the de-energized equipment.
- The red tag may be removed only after proper authorization to energize the equipment has been received.
- Various other tags are used for limited operations and informational purposes.
- Employees or contractors will not apply or remove a tag or change the status of tagged equipment unless authorized.

- Temporary safety grounds are used on de-energized facilities for employee lineman safety during maintenance, construction, or reconstruction work. Safety grounds are wires connecting the de-energized facility to an electrical ground. If the facility should be energized, the safety grounds will divert the current directly to ground and reduce the likelihood of personal injury.
- Before applying grounds, a test is done to confirm that the line is de-energized. The voltage test device is checked before and after use to assure reliability.
- Poles or structures are inspected and examined for structural integrity before climbing. If there is any reason to believe that a pole is unsafe, it is stabilized before work is performed. Appropriate safety gear in the form of body belts, safety straps, hard hats, gloves, etc., is worn by linemen during line work activity.

4.0 MAGNETIC FIELD MANAGEMENT PLAN

PPL Electric's Magnetic Field Management Program is applied to new and reconstructed transmission line projects. Although there is no current scientific evidence demonstrating that magnetic fields cause any adverse health effects or pose a health or safety threat to the public, PPL Electric has established a policy to design its new and rebuilt transmission lines to reduce magnetic fields. To lower magnetic field exposures, the program generally prescribes the use of a line design that provides ground clearances higher than the required minimum NESC ground clearance and reverse phasing of new double circuit lines where it is feasible to do so at low or no cost. The implementation of additional modifications to reduce magnetic field levels is considered, provided those modifications can be made at low or no cost and will not interfere with the operation of the line.

The program will be applied to this Project and the Project is designed with clearances that are at least 3 feet higher than NESC standards.

PPL ELECTRIC
ATTACHMENT 5

FRACKVILLE 230/69 KV SUBSTATION REBUILD PROJECT

State Agencies

Pennsylvania Bureau of Investigation and Enforcement
Pennsylvania Public Utility Commission
Commonwealth Keystone Building 400 North Street
2nd Floor, Room-N201 Harrisburg, Pennsylvania 17120
Attn: Richard Kanaskie

Pennsylvania Department of Environmental Protection
400 Market Street
10th Floor Rachel Carson State Office Building
Harrisburg, Pennsylvania 17101
Attn: Regional Permit Coordination Office

Pennsylvania Department of Transportation
Commonwealth Keystone Building
400 North Street, Fifth Floor
Harrisburg, Pennsylvania 17120
Attn: Donald J. Smith, Acting Chief Counsel

Pennsylvania Historical and Museum Commission
Bureau for Historic Preservation
Commonwealth Keystone Building, Second Floor 400
North Street Harrisburg, Pennsylvania 17120-0053
Attn: Mr. Douglas C. McLearen, Chief

Pennsylvania Department of Conservation and Natural Resources
Rachel Carson State Office Building
400 Market Street Harrisburg, Pennsylvania 17105-8767
Attn: Rebecca Bowen, Ecological Services Section Chief

Pennsylvania Game Commission
2001 Elmerton Avenue
Harrisburg, Pennsylvania 17110-9797
Attn: David J. Gustafson, Director, Bureau of Wildlife Habitat Management

Pennsylvania Fish and Boat Commission
Centre Region Office
595 East Rolling Ridge Drive
Bellefonte, Pennsylvania 16823-9620
Attn: Christopher A. Urban, Chief, Natural Diversity Section

Pennsylvania Office of Consumer Advocate
555 Walnut Street 5th Floor Forum Place
Harrisburg, Pennsylvania 17101-1923
Attn: Patrick Cicero, Consumer Advocate

Pennsylvania Office of Small Business Advocate
555 Walnut Street
1st Floor Forum Place
Harrisburg, Pennsylvania 17101
Attn: Steven C. Gray, Senior Supervising Assistant Small Business Advocate

Federal Agencies

U.S. Army Corps of Engineers
Baltimore District Corporate Communication Office
2 Hopkins Plaza
Baltimore, Maryland 21201
Attn: Planning Division

U.S. Fish and Wildlife Service
Pennsylvania Field Office
110 Radnor Road, Suite 101
State College, Pennsylvania 16801
Attn: Lesa Lindsay

County Agencies

Schuylkill County Planning Commission
401 North 2nd Street, Second Floor
Pottsville, Pennsylvania 17901
Attn: Susan A. Smith, Planning Director

Schuylkill County Conservation District
1206 AG Center Drive
Pottsville, Pennsylvania 17901
Attn: Jenna St. Clair, Conservation District Manager

Schuylkill County Municipal Authority
221 South Center Street
Pottsville, Pennsylvania 17901
Attn: Franklin K. Schoeneman, Chairman

Municipalities

Butler Township
211 Broad Street
Ashland, Pennsylvania 17921

Landowners

Ashland Area Municipal Authority
Ashland Borough Office
401 South 18th Street
Ashland, Pennsylvania 17921
Attn: Francis Menne, Chairman

Mt. Laurel Entreprises
15 Main Street
Port Carbon, PA 17965
Attn: Dan Blaschak

VERIFICATION

I, JOSEPH B. LOOKUP, being the Director of Asset Management at PPL Services Corporation, hereby state that the facts above set forth are true and correct to the best of my knowledge, information and belief and that I expect PPL Electric Utilities Corporation to be able to prove the same at a hearing held in this matter. I understand that the statements herein are made subject to the penalties of 18 Pa.C.S. § 4904 relating to unsworn falsification to authorities.

Date: 05/15/2023

Joseph Lookup (May 15, 2023 10:58 EDT)

Joseph B. Lookup