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June 28, 2016

VIA HAND DELIVERY

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 3.2 Miles of the Hosensack - South Allentown #1 and #2 138/69 kV Tap Lines in Lehigh County, Pennsylvania - Docket No. A-2016-

Dear Secretary Chiavetta:

Enclosed for filing is the Letter of Notification of PPL Electric Utilities Corporation in the above-referenced proceeding. A CD containing a copy of the Letter of Notification and Attachments in Support of the Letter of Notification is also enclosed.

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.

Subject to Commission approval, construction is scheduled to begin in September 2016 to support an in-service date of May 2017.

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

Respectfully submitted,

Christopher T. Wright

CTWjl
Enclosures

cc: Certificate of Service
Office of Consumer Advocate
Office of Small Business Advocate
Bureau of Investigation & Enforcement
Robert F. Young
Paul T. Diskin
Yasmin Snowberger
Kimberly Hafner

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 3.2 miles of the Hosensack - South Allentown #1 and #2 138/69 kV Tap Lines in Lehigh County, Pennsylvania	:	Docket No. A-2016-_____

LETTER OF NOTIFICATION

TO THE PENNSYLVANIA PUBLIC UTILITY COMMISSION:

PPL Electric Utilities Corporation ("PPL Electric") hereby files, pursuant to 52 Pa. Code § 57.72(d), this Letter of Notification to request approval from the Pennsylvania Public Utility Commission ("Commission") to rebuild approximately 3.2 miles of the existing Hosensack – South Allentown #1 and #2 138/69 kV Tap Lines (the "Project"). As explained below, the existing Hosensack – South Allentown #1 and #2 138/69 kV Tap Lines have exceeded their useful life and must be rebuilt in order to continue to provide reliable service into the future. The entire Project is located within the existing rights-of-way. The proposed Project is located in the City of Allentown and Salisbury Township, Lehigh County, Pennsylvania. PPL Electric has provided information regarding this Project to these political subdivisions, which have not objected to the Project.

Subject to the Commission's approval, construction is scheduled to begin in September 2016 to support the in-service date of May 2017. In support thereof, PPL Electric states as follows:

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

3. PPL Electric's attorneys are:

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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 (kilovolts) or higher, approximately 417 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. This Letter of Notification includes the following accompanying attachments:

- Attachment 1 Necessity Statement
- Attachment 2 Engineering Description
- Attachment 3 Description of the Right-of-Way
- Attachment 4 PPL Electric's Design Criteria and Safety Practices

7. 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. EXISTING SYSTEM

8. Under normal operating conditions, the Hosensack – South Allentown #1 138/69 kV Tap Line serves the South Allentown 69-12 kV Substation, which supplies approximately 2,800 customers. During abnormal operating conditions, the South Allentown 69-12 kV Substation load can be transferred from the Hosensack – South Allentown #1 138/69kV Tap Line to the Hosensack-South Allentown #2 138/69kV Tap Line.

9. From the South Allentown 69-12 kV Substation, the Hosensack-South Allentown #1 and #2 138/69 kV Tap Lines extend southeast for approximately 0.6 mile as a double-circuit 138/69 kV Transmission Line before the lines split to traverse in opposite directions (the "split point").

10. From the split point, the single-circuit Hosensack – South Allentown #1 138/69 kV Tap Line continues northeast for approximately 1.1 miles where it taps into the Hosensack – Quarry #1 138/69 kV Transmission Line north of Black River Road in Salisbury Township.

11. From the split point, the single-circuit Hosensack – South Allentown #2 138/69 kV Tap Line continues southwest for approximately 2.1 miles where it taps into the Hosensack – Wescosville #2 138/69 kV Transmission Line south of Interstate 78 (I-78) in the City of Allentown.

12. These lines are described in Attachment 1 to this Letter of Notification. A map and one-line diagram of the existing system are provided in the Necessity Statement included as Attachment 1 to this Letter of Notification.

B. NEED FOR THE PROJECT

13. The Hosensack – South Allentown #1 and #2 138/69 kV Tap Lines have been in service since 1923. The existing conductors and wood monopole structures do not meet current design or height standards.

14. PPL Electric has analyzed the Hosensack – South Allentown # 1 and #2 138/69 kV Tap Lines. Based on this analysis, PPL Electric concluded that the conductors, hardware, splices, and tower structures of the existing Hosensack – South Allentown #1 and #2 138/69 kV Tap Lines have reached the end of their useful lives and should be rehabilitated or replaced in order to continue to provide safe and reliable service to the approximately 2,800 customers served from the South Allentown 69-12 kV Substation.

15. The need for this Project is further explained in Attachment 1 to this Letter of Notification.

C. THE PROPOSED PROJECT

16. PPL Electric determined that the total cost to rehabilitate the Hosensack – South Allentown #1 and #2 138/69 kV Tap Lines would be greater than the cost to rebuild the lines in place. Therefore, rebuilding the existing Hosensack – South Allentown #1 and #2 138/69 kV Tap Lines was identified as the most prudent and effective option.

17. PPL Electric proposes to rebuild the double-circuit segment of the South Allentown #1 and #2 138/69 kV Tap Lines that extends approximately 0.6 miles from the South Allentown 69-12 kV Substation to the split point. This segment will require 13 new tower structures, which will be located in close proximity to the existing tower structures, and no new structures will be located on any property that currently does not have an existing tower structure.

18. PPL Electric also proposes to rebuild an approximately 0.5 mile segment[1] of the Hosensack – South Allentown #1 138/69 kV Tap Line that will extend from the split point to a new tap point with the Hosensack – Quarry #1 138/69 kV Transmission Line located south of the intersection of Honeysuckle Road and Black River Road in Salisbury Township. This segment of the Hosensack - South Allentown #1 138/69 kV Tap Line will be designed to double-circuit 138 kV standards, but will initially operate at single-circuit 69 kV until the load growth in the area makes it appropriate to increase the operating voltage and/or add a second circuit. This segment will require 7 new tower structures. A total of 4 tower structures along this segment will be relocated by an average distance of approximately 13 feet from the existing structure in order to avoid constructability issues and environmental constraints, such as rocky outcrops, streams and wetlands. The new structure locations will provide greater flexibility to optimize

[1] The remaining approximately 0.6-mile segment of the existing Hosensack – South Allentown #1 138/69 kV Tap Line will be removed.

span lengths and reduce the total number of structures. No new poles will be placed on any property that currently does not have an existing pole.

19. PPL Electric also proposes to rebuild the approximately 2.1-mile segment of the Hosensack – South Allentown #2 138/69 kV Tap Line that extends from the split point to a tap point with Hosensack – Wescosville #2 138/69 kV Transmission Line located south of Interstate 78 (I-78) in the City of Allentown. This segment of the Hosensack - South Allentown #2 138/69 kV Tap Line will be designed to single-circuit 138 kV standards, but will initially operate at single-circuit 69 kV until the load growth in the area makes it appropriate to increase the operating voltage. This segment will require 35 new tower structures. A total of 14 tower structures along this segment will be relocated by an average distance of approximately 23 feet from the existing structure in order to avoid constructability issues and environmental constraints, such as rocky outcrops, streams and wetlands. The new structure locations will provide greater flexibility to optimize span lengths and reduce the total number of structures. No new poles will be placed on any property that currently does not have an existing pole.

20. A map and one-line diagram of the proposed system are provided in the Necessity Statement included as Attachment 1 to this Letter of Notification.

21. The existing, outdated wood structures range in height from 55 to 90 feet. The existing transmission structures will be replaced with self-weathering steel monopoles that will range between 65 and 105 feet in height, with an average height of approximately 79 feet. All new poles will be self-supported, either direct embedded or on concrete caisson foundations.

22. Depictions of the type of monopoles used for this Project are provided in Attachment 2 to this Letter of Notification.

23. The rebuilt 138/69 kV design will utilize three power conductors per circuit and two overhead ground wires. The power conductors will be 556.5 kcmil[2] 24/7 stranding ACSR[3] conductors. The overhead ground wires will be 0.567-inch diameter optical ground wires. A detailed engineering description is provided in Attachment 2 to this Letter of Notification.

24. The total estimated cost of the proposed Project is $8.1 million.[4]

25. Upon Commission approval, the Project has a scheduled construction start date of September 2016 to support the in-service date of May 2017.

III. HEALTH AND SAFETY

26. The proposed Project will not create any unreasonable risk of danger to the public health or safety.

27. The Project 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 PPL Electric's design criteria and safety practices are provided in Attachment 4 to this Letter of Notification.

28. As explained in Attachment 2 to this Letter of Notification, PPL Electric's Magnetic Field Management Program has been developed to reduce magnetic fields on new and rebuilt transmission lines when it can be done at low or no cost and consistent with functional requirements. The rebuilt Hosensack-South Allentown #1 and #2 138/69 kV Transmission Line will be designed with clearances that are five feet higher than NESC standards. Also, the

[2] The term "kcmil" stands for thousand circular mils. 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 on thousandth (0.001) of an inch.

[3] "ACSR" stands for aluminum conductor steel reinforced.

[4] The estimated cost for the proposed Project is an order-of-magnitude estimate developed using averages of recent costs for similar projects and without an in-depth analysis of field investigation. The estimated 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.

double-circuit segment of the rebuilt Hosensack-South Allentown #1 and #2 138/69 kV Transmission Line will be reverse phased. These measures will reduce the potential for exposure to magnetic fields.

IV. DESCRIPTION OF RIGHT-OF-WAY

29. As explained above, PPL Electric proposes to rebuild approximately 3.2 miles of the existing Hosensack – South Allentown #1 and #2 69 kV Tap Lines in order to ensure they continue to provide reliable service into the future.

30. As explained in Attachment 3, the existing right-of-way generally varies from centerline rights (with no specified ROW width) to 100 feet in width. However, as explained in Attachment 2, PPL Electric has designed the rebuilt Hosensack – South Allentown #1 and #2 138/69 kV Tap Lines to fit within the existing rights-of-way. In areas with less than 100 feet of right-of-way, PPL Electric is using shorter arms and/or use of deadend structures to reduce blow-out and meet NESC standards.

31. The existing rights-of-way are sufficient to accommodate the construction, operation, and maintenance of the rebuilt Hosensack – South Allentown #1 and #2 138/69 kV Tap Line as explained in Attachment 3 to this Letter of Notification. Therefore, no additional rights-of-way are required for the construction and operation of these new transmission lines.

32. An aerial plot plan is provided in Attachment 3 to this Letter of Notification.

33. Land use impacts are anticipated to be minimal due to the fact that the Project will be constructed entirely within the existing rights-of-way and in close proximity to existing transmission facilities. Where practical, PPL Electric will use previously established access roads for construction to further reduce interference with existing land uses.

34. The Project area previously has been cleared of vegetation. As a result, limited vegetation management will be required for this project. In areas where vegetation management is required to complete the project, PPL Electric will apply its "Specifications for Initial Clearing and Control of Vegetation On or Adjacent to Electric Line Right-of-Way Through Use of Herbicides, Mechanical and Hand Clearing Techniques" to mitigate any impacts.

35. No communication towers, pipelines, or other utilities will be affected by the proposed Project.

36. The closest airport is the Queen City Airport, which is located approximately 1 mile west of the Project area. PPL Electric does not anticipate any interference with airport operations because of the distance from the Project area, the presence of existing electrical facilities in the Project area, and the similar height of the new facilities and the existing facilities. However, PPL Electric will file all required documentation with the Federal Aviation Administration and the Pennsylvania Department of Transportation, Bureau of Aviation.

37. The Project area contains no state lands, national parks, state parks, or local parks.

38. The Project will not traverse or affect any unique geological, scenic, or natural areas.

39. The Project will not affect any recreational areas or natural landmarks.

40. PPL Electric will coordinate with the Pennsylvania Historical and Museum Commission ("PHMC") to ensure that the Project will have no adverse impacts to cultural and archaeological resources.

41. The proposed Project will span three streams. The rebuilt transmission lines will span these streams, which will minimize any impacts.

42. The Project will span three wetlands. It is anticipated the Project will have no impacts on streams or wetlands because the entire Project will be built within the existing right-of-way, and because the new tower structures will be located to avoid impacts to wetland and streams. PPL Electric will obtain all necessary permits from the United States Army Corps of Engineers ("USACE") or the Pennsylvania Department of Environmental Protection ("PADEP"), and will comply with all of the terms and conditions placed on any permits required.

43. PPL Electric will acquire any required soil erosion and sedimentation control permits and will comply with any conditions placed on those permits.

44. PPL Electric completed a Pennsylvania Natural Diversity Inventory records review. Based on this review, the Pennsylvania Game Commission, Pennsylvania Fish and Boat Commission, and the U.S. Fish and Wildlife Service reported that the Project will not impact any threatened and endangered species, or special concern species and resources located within the Project area as explained in Attachment 3.

45. The Pennsylvania Department of Conservation and Natural Resources (DCNR) indicated that the Project is located within range of west hairy rock-cress (*Arabis hirsute*), a special concern plant species, and an unnamed sensitive species. It is anticipated that the Project will not have any on these plant species as explained in Attachment 3. PPL Electric will conduct botanical surveys in late-spring 2016, and coordinate with state and federal agencies to obtain information regarding endangered and threatened species in close proximity to the Project.

46. PPL Electric will obtain all necessary permits from these state and federal agencies, and will comply with all of the terms and conditions placed on any permits required.

V. NOTICE

47. PPL Electric has provided information regarding the Project to representatives of City of Allentown, Salisbury Township, and Lehigh County. These entities have not objected to the proposed Project.

48. Copies of this Letter of Notification will be served on the governmental agencies, municipalities, and other public entities agencies in accordance with 52 Pa. Code § 57.72(d)(3).

49. Copies of this Letter of Notification will be served on the owners of land subject to the right-of-way and easement in accordance with 52 Pa. Code § 57.72(d)(3).

VI. LETTER OF NOTIFICATION

50. 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) (v).

51. As explained above, PPL Electric herein seeks Commission approval to rebuild approximately 3.2 miles of the existing Hosensack – South Allentown #1 and #2 138/69 kV Tap Lines entirely within the existing right-of-way. PPL Electric submits that this proposed Project qualifies for use of a Letter of Notification because the project will not substantially alter the right-of-way.

52. 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.*

VII. CONCLUSION

WHEREFORE, PPL Electric Utilities Corporation respectfully requests that the Pennsylvania Public Utility Commission approve the rebuild of approximately 3.2 miles of the existing Hosensack – South Allentown #1 and #2 138/69 kV Tap Lines in in the City of Allentown and Salisbury Township, Lehigh County, Pennsylvania, as explained above and in the Attachments hereto.

Respectfully submitted,

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Date: June 28, 2016

Attorneys for PPL Electric Utilities Corporation

VERIFICATION

I, STEPHANIE R. RAYMOND, being the VICE PRESIDENT-TRANSMISSION AND SUBSTATIONS at PPL Electric Utilities 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: 6/27/16

Before the
Pennsylvania Public Utility Commission

HOSENSACK – SOUTH ALLENTOWN #1 AND #2 138/69 KV TAP TRANSMISSION LINE REBUILD

ATTACHMENTS IN SUPPORT OF THE
Letter of Notification

Application Docket No._____

Submitted by: PPL Electric Utilities Corporation

ATTACHMENT 1
HOSENSACK – SOUTH ALLENTOWN #1 AND #2 138/69 KV
TAP TRANSMISSION LINES REBUILD
NECESSITY STATEMENT

TABLE OF CONTENTS

LIST OF FIGURES

ATTACHMENT 1
HOSENSACK – SOUTH ALLENTOWN #1 AND #2 138/69 KV
TAP TRANSMISSION LINES REBUILD
NECESSITY STATEMENT

A. INTRODUCTION

PPL Electric Utilities Corporation ("PPL Electric") is requesting Pennsylvania Public Utility Commission ("PUC" or the "Commission") approval to rebuild approximately 3.2 miles of the existing Hosensack – South Allentown #1 and #2 138/69 kV Tap Lines in order to improve electric reliability in the region (the "Project"). As explained below, the existing Hosensack – South Allentown #1 and #2 138/69 kV Tap Lines have reached an age and condition that the facilities must be replaced in order to provide safe and reliable service into the future. The Project is part of PPL Electric's Asset Optimization Strategy, and involves rebuilding the lines to meet all current design and lightning protection standards. The modernization of the line will help ensure reasonably continuous and reliable service.

The rebuilt Hosensack – South Allentown #1 and #2 138/69 kV Tap Lines will be located in the City of Allentown and Salisbury Township, Lehigh County, Pennsylvania. The estimated cost to design and construct the Project is approximately $9.1 million. Subject to the Commission's approval, the Project has a scheduled construction start date of September 2016 to meet an in-service date of May 2017.

B. TRANSMISSION SYSTEM PLANNING PROCESS

The nation's interconnected 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 critically important that this interconnected transmission system (transmission grid) be planned and designed to be highly reliable so that electric service can be provided under

peak and all loading conditions and when certain elements of the system are out of service (system contingencies) due to planned or unplanned outages.

System Planning is the process that assures that the transmission system can supply electricity to all customer loads in a manner that is reliable and economical. This System Planning process assures that both the Bulk Electric System (BES)[1] and non-Bulk Electric System (non-BES)[2] are planned and constructed so that:

- They are able to accommodate forecasted system flows during summer and winter peak load;
- They can adequately serve each customer's need with regard to 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 North American Electric Reliability Corporation ("NERC"), PJM Interconnection, LLC ("PJM"), and the Transmission Owner's reliability criteria for all normal and emergency operating conditions.

PJM is a 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 most of Pennsylvania. In order to ensure reliable transmission service, PJM prepares an annual Regional Transmission Expansion Plan ("RTEP")[3] to identify system reinforcements that are required to, among

[1] Bulk Electric System (BES) – Includes transmission facilities operated at voltages of 100 kV or higher.
[2] Non-Bulk Electrical System (non-BES) – Includes transmission facilities operated at voltages less than 100 kV.
[3] 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

other things, meet the NERC Reliability Standards, PJM reliability planning criteria, and Transmission Owner reliability criteria.

PJM conducts RTEP studies in conjunction with its Transmission Owners and applies NERC, regional, and Transmission Owner reliability criteria to specific conditions on the transmission system. PJM's RTEP is an annual process that encompasses a comprehensive series of detailed analyses to ensure power continues to flow reliably to customers under stringent reliability criteria set by NERC. PJM's manual 14B[4] outlines the RTEP process and reliability criteria use for this process. As mentioned in manual 14B, every year PJM performs various reliability tests such as Baseline Thermal, Baseline Voltage, Load Deliverability, Generation Deliverability and Baseline Stability to ensure safe, reliable operation of the electric grid.

When the studies show an inability of the transmission system to meet specific reliability criteria under these conditions, PJM opens an RTEP Window in accordance with FERC Order 1000[5] to identify the optimal solution to resolve the criteria violation.

PPL Electric, as a Transmission Owner and member of PJM, undertakes an independent analysis of both its BES transmission facilities, and its non-BES transmission facilities in concert with the PJM RTEP process. PPL Electric identifies all conditions where the future system does not meet the NERC criteria, PJM reliability criteria, or PPL Electric Transmission Owner criteria. In this way, PPL Electric actively participates in the PJM RTEP process, and through this participation PPL Electric provides results of its independent studies to PJM for consideration and inclusion in the PJM RTEP.

obligation of transmission owners to build transmission upgrades included in the RTEP, and the process by which interregional transmission upgrades will be developed.

[4] PJM Manual 14B is available at http://www.pjm.com/~/media/documents/manuals/m14b.ashx

[5] http://www.ferc.gov/industries/electric/indus-act/trans-plan.asp

Alternatives that can mitigate violations to the reliability criteria are developed and analyzed to ensure that the PPL Electric transmission system meets the reliability criteria. Estimated costs and lead times to implement the reinforcements are prepared. PPL Electric then proposes solutions to PJM through an RTEP window. If the project is awarded to PPL Electric, it then becomes a baseline RTEP project.

PPL Electric's Transmission Owner criteria address thermal, voltage, short circuit, and stability limits specific to the PPL Electric zone and also ensure compliance with NERC and PJM reliability criteria. These criteria ensure adequate and appropriate levels of electric service to PPL Electric customers in accordance with good utility practices. In addition to these criteria, PPL Electric plans the system according to its own Transmission System Development Standards.

In addition to NERC, PJM, and Transmission Owner criteria-based projects, PPL Electric also initiates projects based on the Transmission System Development Standards. These projects address local load growth, provide load restoration flexibility, and replace poor performing transmission assets in order to provide an advanced level of reliability on the local system.

PPL Electric has developed an Asset Optimization Strategy that is incorporated into the Transmission System Development Standards. A significant portion of the system infrastructure is either approaching the end of or has exceeded its expected or useful life. The Asset Optimization Strategy was developed to systematically identify and modernize these aging facilities. The measures used to identify and prioritize the equipment and lines that qualify for this work include, but are not limited to: age, condition, operational issues, maintainability of the equipment, criticality of the equipment or line, line loading, and circuit performance. Once equipment has been identified and assessed under the above measures, it will be put into the Capital Budget for replacement under the Asset Optimization Strategy.

Projects created to support PPL Electric's Transmission System Development Standards are presented to PJM stakeholders at either a TEAC or Sub-Regional RTEP meeting and are assigned a Supplemental project number in the RTEP. PJM incorporates these projects into the power flow model which they use to perform various reliability analyses for the RTEP.

As explained below, the proposed Project is necessary to address the asset health according to PPL Electric Transmission System Development Standards. The proposed Project has been presented at a PJM Mid-Atlantic Sub-Regional RTEP stakeholder meeting and has been approved as supplemental project s0957.2 in PJM's RTEP.

C. EXISTING SYSTEM

Under normal operating conditions, the Hosensack – South Allentown #1 138/69 kV Tap Line serves the South Allentown 69-12 kV Substation, which supplies approximately 2,800 customers. During abnormal operating conditions, the South Allentown 69-12 kV Substation load can be transferred from the Hosensack – South Allentown #1 138/69kV Tap Line to the Hosensack – South Allentown #2 138/69kV Tap Line by performing a series of switch moves. From the South Allentown 69-12 kV Substation, the South Allentown #1 and #2 138/69 kV Tap Lines extend southeast for approximately 0.6 mile as a double-circuit 138/69 kV Transmission Line before the lines split to traverse in opposite directions (the "split point"). From the split point, the single-circuit Hosensack – South Allentown #1 138/69 kV Tap Line continues northeast for approximately 1.1 miles where it taps into the Hosensack – Quarry #1 138/69 kV Transmission Line north of Black River Road in Salisbury Township. From the split point, the single-circuit Hosensack – South Allentown #2 138/69 kV Tap Line continues southwest for approximately 2.1 miles where it taps into the Hosensack – Wescosville #2 138/69 kV Transmission Line south of Interstate 78 (I-78) in the City of Allentown.

Figure 1-1 provides a one-line diagram of the existing facilities. Figure 1-2 provides a map of the existing facilities.

D. DEFINITION OF THE PROBLEM

The Hosensack – South Allentown #1 and #2 138/69 kV Tap Lines have been in service since 1923 with varying line construction vintages with a majority of the lines being 1950s vintage. The existing conductors are a mix of 4/0 copper and 556.5 kcmil[6] aluminum-conductor steel-reinforced (ACSR) conductors. A majority of the existing structures are wooden monopole structures that do not meet current design or height standards.

PPL Electric has analyzed the Hosensack – South Allentown # 1 and #2 138/69 kV Tap Lines. The assessment found deterioration of the structural components, foundations, insulators, line hardware, shield wire, grounding, and signage, as well as an outdated structure design. Based on this analysis, PPL Electric concluded that the conductors, hardware, splices, and tower structures of the existing Hosensack – South Allentown #1 and #2 138/69 kV Tap Lines have reached the end of their reliable service life and should be rehabilitated or replaced.

E. PROPOSED SOLUTION

PPL Electric evaluated the cost to rehabilitate the Hosensack – South Allentown #1 and #2 138/69 kV Tap Lines and concluded that the total cost to rehabilitate the lines would be greater than the cost to rebuild the lines in place. Therefore, rebuilding the existing Hosensack – South Allentown #1 and #2 138/69 kV Tap Lines was identified as the most prudent and effective option.

[6] 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.

As explained above, from the South Allentown 69-12 kV Substation, the Hosensack – South Allentown #1 and #2 138/69 kV Tap Lines extend southeast for approximately 0.6 mile as a double-circuit 138/69 kV transmission line, at which point the South Allentown #1 and #2 138/69 kV Tap Lines split and traverse in opposite directions. PPL Electric proposes to rebuild the double-circuit segment of the South Allentown #1 and #2 138/69 kV Tap Lines. The approximately 0.6-mile segment of South Allentown #1 and #2 138/69 kV Tap Lines will initially operate as a double-circuit 69 kV until the load growth in the area makes it appropriate to increase the operating voltage.

From the split point, the Hosensack – South Allentown #1 138/69 kV Tap Line currently extends approximately 1.1 miles to a tap point with the Hosensack – Quarry #1 138/69 kV Transmission Line. The rebuilt Hosensack – South Allentown #1 138/69 kV Tap Line will extend approximately 0.5 miles from the split point to a tap point with the Hosensack – Quarry #1 138/69 kV Transmission Line located south of the intersection of Honeysuckle Road and Black River Road in Salisbury Township. The remaining approximately 0.6-mile segment of the existing Hosensack – South Allentown #1 138/69 kV Tap Line will be removed. The rebuilt Hosensack – South Allentown #1 138/69 kV Tap Line will be designed to double-circuit 138 kV standards, but will initially operate as single-circuit 69 kV until the load growth in the area makes it appropriate to increase the operating voltage.

As explained above, from the split point, the Hosensack – South Allentown #2 138/69 kV Tap Line extends approximately 2.1 miles to a tap point with Hosensack – Wescosville #2 138/69 kV Transmission Line located south of Interstate 78 (I-78) in the City of Allentown. PPL Electric proposes to rebuild the approximately 2.1-mile Hosensack – South Allentown #2 138/69 kV Tap Line as a single-circuit 138 kV transmission line, which will initially operate as single-circuit 69 kV until the load growth in the area makes it appropriate to increase the operating voltage.

In total, PPL Electric proposes to rebuild approximately 3.2 miles of the Hosensack – South Allentown #1 and #2 138/69 kV Tap Lines (0.6 miles of the existing double-

circuit, 0.5 miles of the Hosensack – South Allentown #1 Tap, and 2.1 miles of the Hosensack – South Allentown #2 Tap). The one-line diagram for the proposed facilities is shown in Figure 1-3. A map of the proposed facilities is provided in Figure 1-4.

The proposed rebuild of the Hosensack – South Allentown #1 and #2 138/69 kV Tap Lines will bring the lines into compliance with current design standards. This would include increased vertical ground clearance, increased phase spacing for galloping[7] loop consideration, and installation of steel monopole structures for optimal structure longevity. The rebuild of the Hosensack – South Allentown #1 and #2 138/69 kV Tap Lines will also provide increased lightning protection of the lines to reduce the frequency of momentary outages experienced by customers through an increased Critical Impulse Flash Over (CIFO) level,[8] installation of dual optical ground wire (OPGW) shielding cables and decreased footing impedances. As a part of the rebuild, PPL Electric will be installing MOLBAB (motor-operated load break air break) switches that will allow for remote sectionalizing of the transmission system. This allows PPL Electric to restore service to customers in instances of sustained outages or during various operating scenarios.

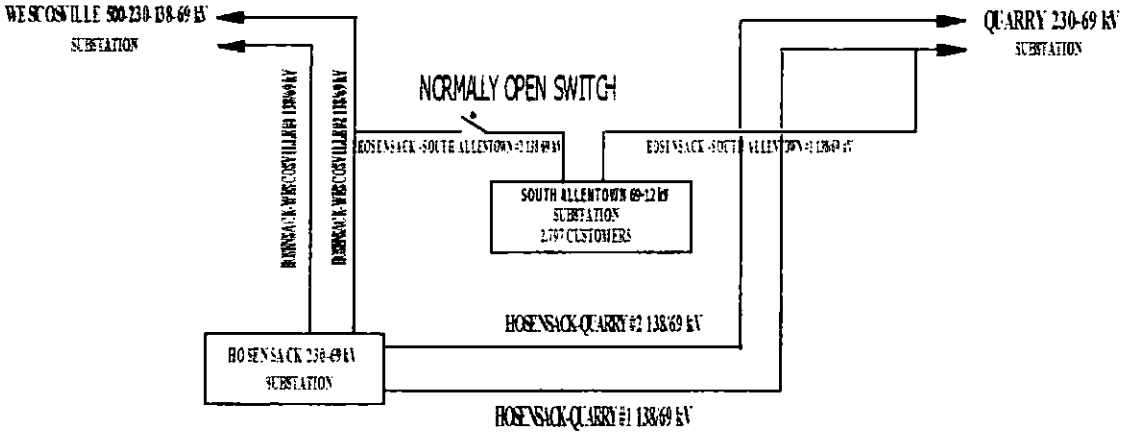
The rebuilt configuration will have higher ampacity conductors for operating in peak conditions and supporting future load growth. After completion of this Project, the customers served from these lines will experience improved service reliability. The higher lines capacity will allow for improved operational flexibility and increased transfer capability, thereby contributing to a higher level of reliability for the customers served from these lines.

[7] Galloping is a wind-induced oscillation of the wires which could potentially cause the wires to come into contact or flashover causing an outage. The consequences of galloping are mitigated by providing adequate wire-to-wire and wire-to-object clearances.

[8] CIFO is a measure of the insulation level of a line as it relates to the protection level of an insulator to the impulse voltage across an insulator during a lightning strike.

For all the foregoing reasons, this Project is necessary to enable PPL Electric to continue to provide reliable service now and into the future and therefore requests approval of the Commission to complete this Project.

Figure 1-1. One-Line Diagram of Existing Transmission Facilities



Populated Place
Substation
Stream
Local Park
Municipality Boundary

Existing Transmission

69kV

South Allentown Tap
Figure 1-2: Map of Existing Facilities

N
W E
S

0 0.5 Miles

ppl Louis Berger

Projected Coordinate System: PA State Plane, South.
Datum: North American Datum of 1983 (NAD83).
Projection: Lambert Conformal Conic.
Linear Unit: Feet.
Ellipsoid: Geodetic Reference System 80.

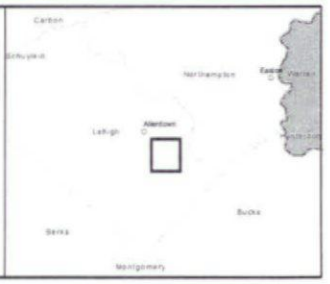
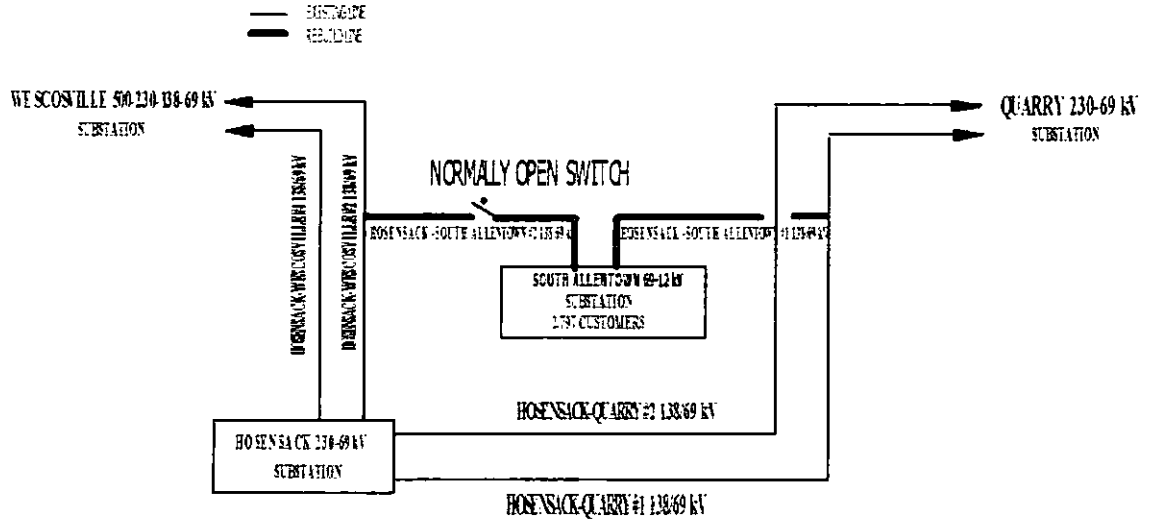
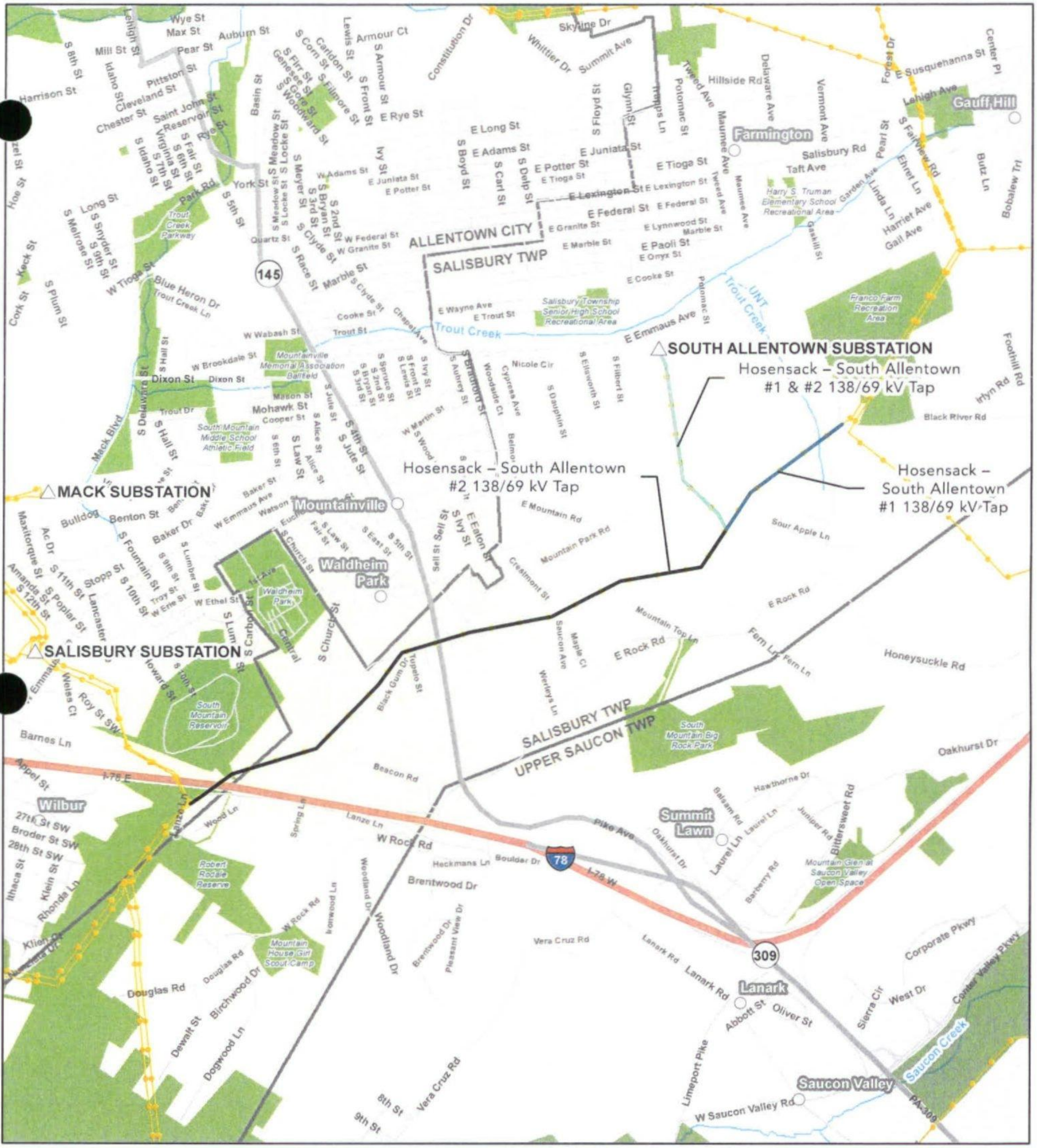


Figure 1-3. One-Line Diagram of Proposed Transmission Facilities





○	Populated Place
△	Substation
(light blue line)	Hosensack – South Allentown #1 & #2 138/69 kV Tap
(blue line)	Hosensack – South Allentown #1 138/69 kV Tap
(black line)	Hosensack – South Allentown #2 138/69 kV Tap
(thin blue line)	Stream
(green)	Local Park
(grey outline)	Municipality Boundary

Existing Transmission

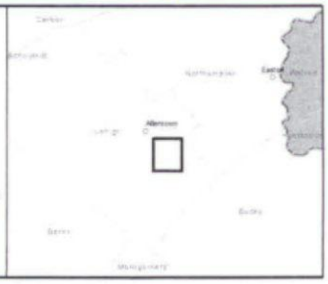
- 69kV

South Allentown Tap

Figure 1-4: Map of Proposed Facilities

0 — 0.5 Miles

Projected Coordinate System: PA State Plane, South
Datum: North American Datum of 1983 (NAD83).
Projection: Lambert Conformal Conic.
Linear Unit: Feet.
Ellipsoid: Geodetic Reference System 80.



ATTACHMENT 2
HOSENSACK – SOUTH ALLENTOWN #1 AND #2 138/69 KV
TAP TRANSMISSION LINES REBUILD
ENGINEERING DESCRIPTION

TABLE OF CONTENTS

LIST OF FIGURES

ATTACHMENT 2
HOSENSACK – SOUTH ALLENTOWN #1 AND #2 138/69 KV
TAP TRANSMISSION LINES REBUILD
ENGINEERING DESCRIPTION

A. INTRODUCTION

As explained in Attachment 1, PPL Electric Utilities Corporation ("PPL Electric") proposes to rebuild approximately 3.2 miles of the existing Hosensack – South Allentown #1 and #2 138/69 kV Tap Lines located in the City of Allentown and Salisbury Township, Lehigh County, Pennsylvania in order to improve electric reliability in the region (the "Project"). The existing Hosensack – South Allentown #1 and #2 138/69 kV Tap Lines have exceeded their useful life and cannot be relied upon to continue to provide reliable service into the future. The Project is part of PPL Electric's Asset Optimization Strategy, and involves rebuilding the line to meet all current design and lightning protection standards. The modernization of the line will help ensure continuous and reliable service as further described in Attachment 1.

B. DESCRIPTION OF THE PROPOSED LINES

As explained in Attachment 1, PPL Electric proposes to rebuild approximately 3.2 miles of the existing Hosensack – South Allentown #1 and #2 138/69 kV Tap Line within the existing right-of-way. The rebuilt Hosensack – South Allentown #1 and #2 138/69 kV Tap Line will be reconstructed with new steel monopoles, high capacity conductors and two optical ground wires.

From the South Allentown 69-12 kV Substation, the Hosensack – South Allentown #1 and #2 138/69 kV Tap Lines extend southeast for approximately 0.6 mile as a double-circuit 138/69 kV transmission line, at which point the South Allentown #1 and #2 138/69 kV Tap Lines split and traverse in opposite directions (the "split point"). As explained in Attachment 1, PPL Electric proposes to rebuild this segment of the line to

meet modern, double-circuit 138/69 kV transmission line standards. This segment will require 13 new monopole structures, which will be located in close proximity to the existing structures, and no new structures will be located on any property that currently does not have an existing structure.

As explained in Attachment 1, PPL Electric also proposes to rebuild an approximately 0.5-mile segment of the Hosensack – South Allentown #1 138/69 kV Tap Line that will extend from the split point to a new tap point with the Hosensack – Quarry #1 138/69 kV Transmission Line located south of the intersection of Honeysuckle Road and Black River Road in Salisbury Township. This segment of the Hosensack - South Allentown #1 138/69 kV Tap Line will be designed to double-circuit 138 kV standards, but will initially operate at single-circuit 69 kV until the load growth in the area makes it appropriate to increase the operating voltage. This segment will require seven new monopole structures. A total of four monopole structures along this segment will be relocated by an average distance of approximately 12.6 feet from the existing structure in order to avoid constructability issues and environmental constraints, such as rocky outcrops, streams and wetlands. The new structure locations will provide greater flexibility to optimize span lengths and reduce the total number of structures. No new structures will be placed on any property that currently does not have an existing structure.

As explained in Attachment 1, PPL Electric also proposes to rebuild approximately 2.1 miles of the Hosensack – South Allentown #2 138/69 kV Tap Line that extends from the split point to a tap point with Hosensack – Wescosville #2 138/69 kV Transmission Line located south of Interstate 78 (I-78) in the City of Allentown. This segment of the Hosensack – Quarry #1 138/69 kV Transmission Line will be designed to meet modern single-circuit 138 kV standards, but will initially operate at 69 kV until the load growth in the area makes it appropriate to increase the operating voltage. This segment will require 35 new monopole structures. A total of 14 monopole structures along this segment will be relocated by an average distance of approximately 22.6 feet from the existing structure

in order to avoid constructability issues and environmental constraints, such as rocky outcrops, streams and wetlands. The new structure locations will provide greater flexibility to optimize span lengths and reduce the total number of structures. No new structures will be placed on any property that currently does not have an existing structure.

The existing Hosensack – South Allentown #1 and #2 138/69 kV Tap Lines consist of mainly outdated wood poles that have reached the end of their useful life and do not meet current design standards. The existing structures range in height from 55 to 90 feet. The existing transmission structures will be replaced with self-weathering steel monopoles equipped with steel arms and glass 138 kV insulator assemblies. All new poles will be self-supported, either direct embedded or on concrete caisson foundations. The new structures for the entire line will consist of steel monopoles and are expected to range between 65 and 105 feet in height, with an average height of approximately 79 feet. Figures 2-1 through 2-14 depict typical structure types that will be used for the Project.

The Project will utilize six power conductors and two overhead ground wires for the rebuilt double-circuit segment, and three power conductors and two overhead ground wires for the rebuilt single-circuit segments. The power conductors will be 556.5 kcmil[1], 24/7 stranding, ACSR[2] conductors. The overhead ground wires will be 0.567-inch diameter Optical Ground Wires (OPGW).

The rebuilt lines will be designed according to, and generally exceed, all National Electrical Safety Code (NESC) minimum standards. Design specifications and safety rules practiced by PPL Electric are included in Attachment 4. The existing right-of-way generally varies from centerline rights (with no specified ROW width) to 100 feet in

[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] Aluminum conductor steel reinforced.

width. PPL Electric has designed the rebuilt Hosensack – South Allentown #1 and #2 138/69 kV Tap Lines to fit within the existing right-of-way. In areas with less than 100 feet of right-of-way, PPL Electric is using shorter arms and/or use of deadend structures to reduce blow-out and meet NESC standards.

The minimum conductor-to-ground clearance will be 31 feet which occurs at a maximum thermal conductor temperature of 125°C (257°F). The design minimum conductor clearances and conductor thermal ratings for the reconstructed lines are shown in Tables 2-1 and 2-2.

Table 2-1. Design for Minimum Conductor Clearances for 556.5 kcmil 24/7 strand ACSR[3]	
Condition	**Transmission Double-Circuit Design Clearance-to-Ground**
Heavy Ice (1" ice at 0°C ambient temperature)	31 feet
Predicted extreme thermal load (125°C conductor temperature)	31 feet
Predicted blowout (6 lbs., 16°C, ambient temperature)	31 feet

Table 2-2. Conductor Thermal Rating 556.5 kcmil 24/7 Stranding ACSR 125°C Maximum Conductor			
Condition	**Ambient Temperature (°C)**	**Wind Speed (Ft./sec)**	**Ampacity (Amps)**
Summer Normal	35	0	800
Winter Normal	10	0	923
Summer Emergency	35	2.533	1047
Winter Emergency	10	2.533	1180

The estimated cost to design and construct the Project is approximately $8.1 million. Subject to the Commission's approval, the Project has a scheduled construction start date of September 19, 2016 to meet an in-service date of May 19, 2017.

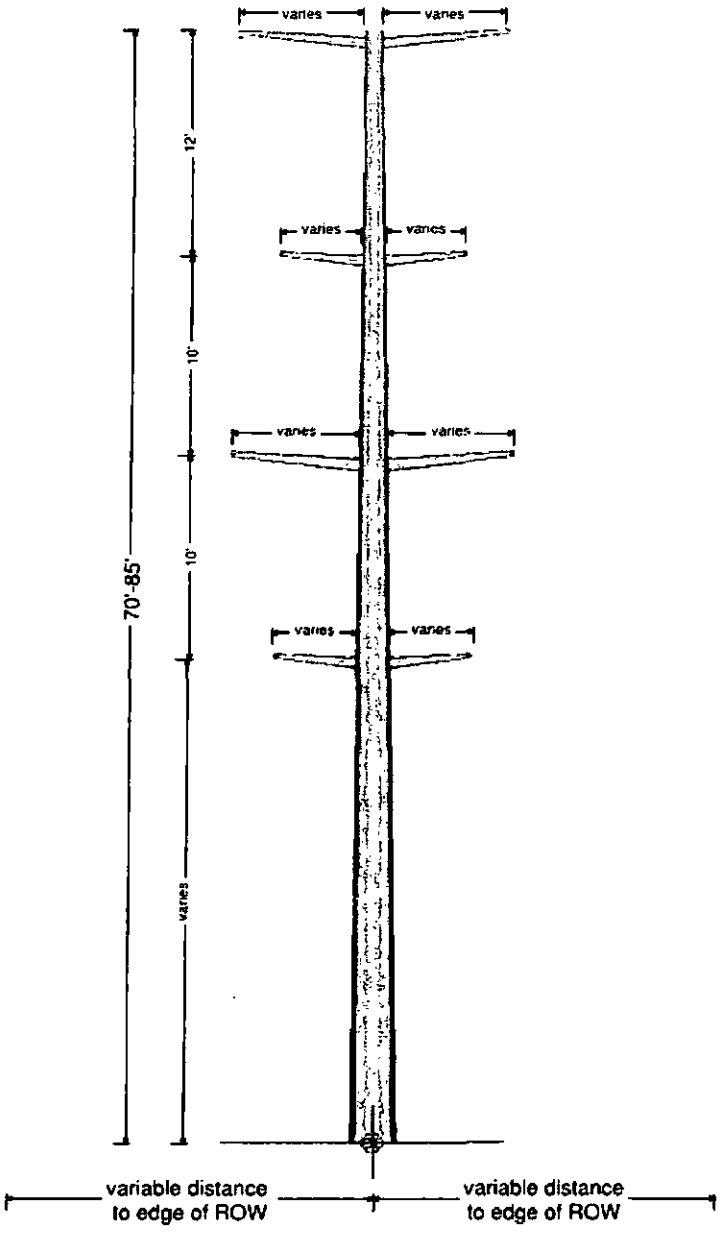
[3] Clearances based on an initial maximum tension of 6,000-10,000 pounds at ½ inch ice, 0°F, 4# wind and maximum ruling span of 200-1250 feet.

C. MAGNETIC FIELD MANAGEMENT

PPL Electric's Magnetic Field Management Program is applied to new and reconstructed transmission line projects. The company does not believe that the current scientific evidence demonstrates that magnetic fields cause any adverse health efforts or pose a health or safety danger to the public. Nevertheless, PPL Electric has determined, as a matter of policy, to design its new and rebuilt transmission lines to reduce magnetic fields when that can be done at low or no cost and consistent with functional requirements. PPL Electric's Magnetic Field Management Program has been developed to implement that policy decision. To reduce magnetic field exposures, the program generally prescribes the use of a line design with ground clearance that is five feet higher than NESC standards and reverses phasing of new double-circuit lines where it is feasible to do so at low or no cost. The rebuilt Hosensack-South Allentown #1 and #2 138/69 kV Transmission Line will be designed with clearances that are five feet higher than NESC standards. Also, the double-circuit segment of the rebuilt Hosensack-South Allentown #1 and #2 138/69 kV Transmission Line will be reverse phased.

Figure 2-1. Typical Double-Circuit 138/69 kV Single Deadend Structure

NEW STRUCTURE WILL HAVE TWO ARMS AT THE TOP OF THE POLE TO SUPPORT TWO OVERHEAD GROUNDWIRES



CONDUCTOR SPACING: 10'

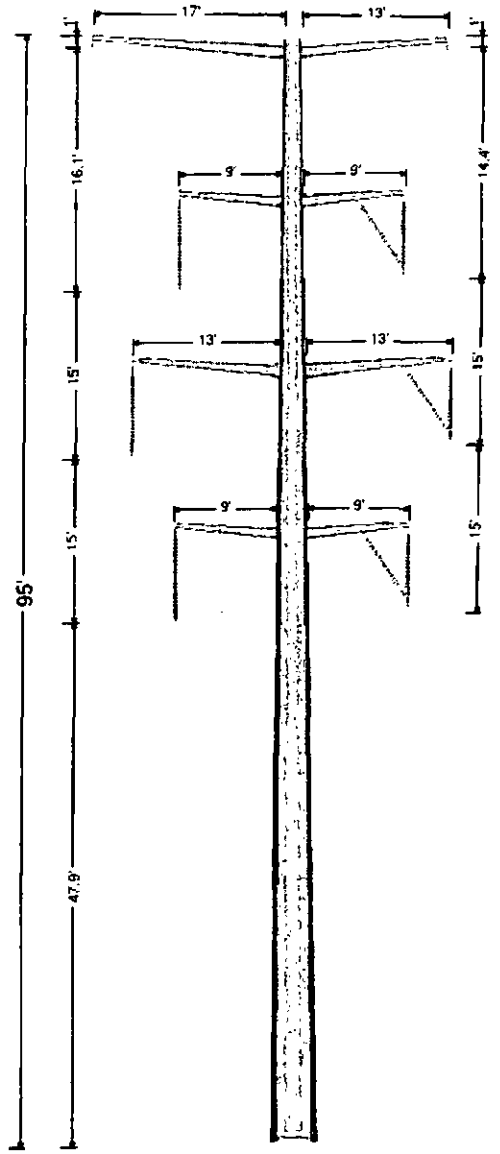
OHGW TO TOP CONDUCTOR SPACING: 12'

ARM LENGTHS: 7' TO 14'

ALL HEIGHTS ARE APPROXIMATE; DRAWING NOT TO SCALE

Figure 2-2. Typical Double-Circuit 138/69 kV Angle Suspension with Struts

NEW STRUCTURE WILL HAVE TWO ARMS AT THE TOP OF THE POLE TO SUPPORT TWO OVERHEAD GROUNDWIRES



CONDUCTOR SPACING: 15'

OHGW TO TOP CONDUCTOR SPACING (LEFT SIDE): 16.1

OHGW TO TOP CONDUCTOR SPACING (RIGHT SIDE): 14.4'

ARM LENGTHS (TOP LEFT OHGW ARM): 17'

ARM LENGTHS (TOP RIGHT OHGW ARM): 13'

ARM LENGTHS (TOP & BOTTOM CONDUCTOR ARMS): 9'

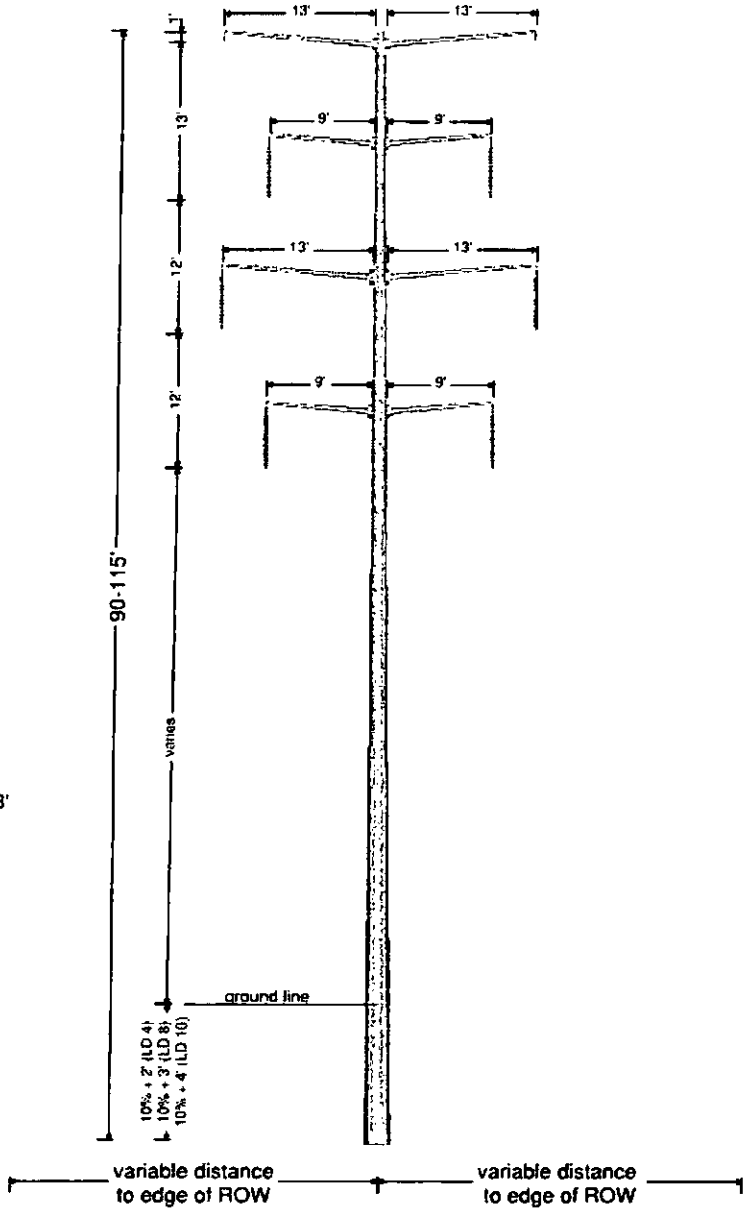
ARM LENGTHS (MIDDLE CONDUCTOR ARMS): 13'

variable distance *to edge of ROW* — variable distance *to edge of ROW*

ALL HEIGHTS ARE APPROXIMATE: DRAWING NOT TO SCALE

Figure 2-3. Typical Double-Circuit 138/69 kV Tangent Suspension

NEW STRUCTURE WILL HAVE TWO ARMS AT THE TOP OF THE POLE TO SUPPORT TWO OVERHEAD GROUNDWIRES



CONDUCTOR SPACING: 12'

OHGW TO TOP CONDUCTOR SPACING: 13'

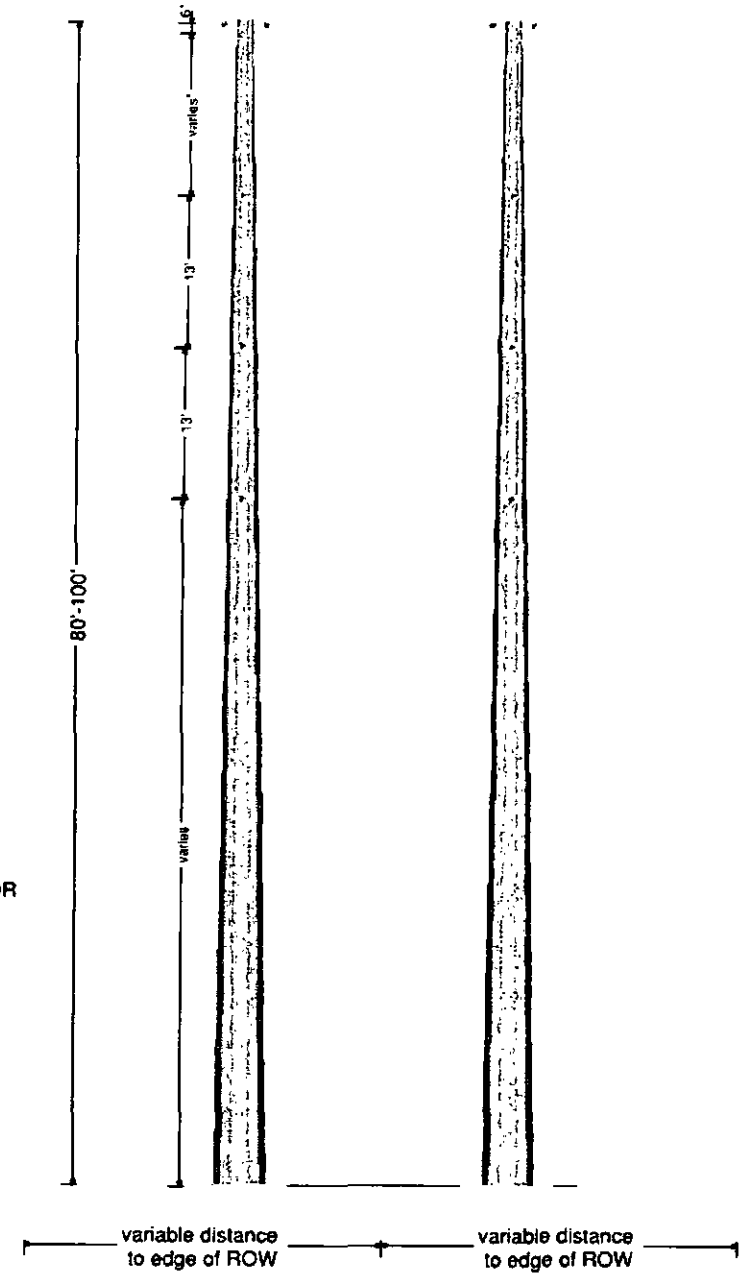
ARM LENGTHS (OHGW AND MIDDLE CONDUCTOR ARMS): 13'

ARM LENGTHS (TOP & BOTTOM CONDUCTOR ARMS): 9'

ALL HEIGHTS ARE APPROXIMATE; DRAWING NOT TO SCALE

Figure 2-4. Typical Double-Circuit 138/69 kV 2-Pole Switch Structure

NEW STRUCTURES WILL HAVE ATTACHMENTS AT THE TOP OF EACH POLE FOR OVERHEAD GROUNDWIRES



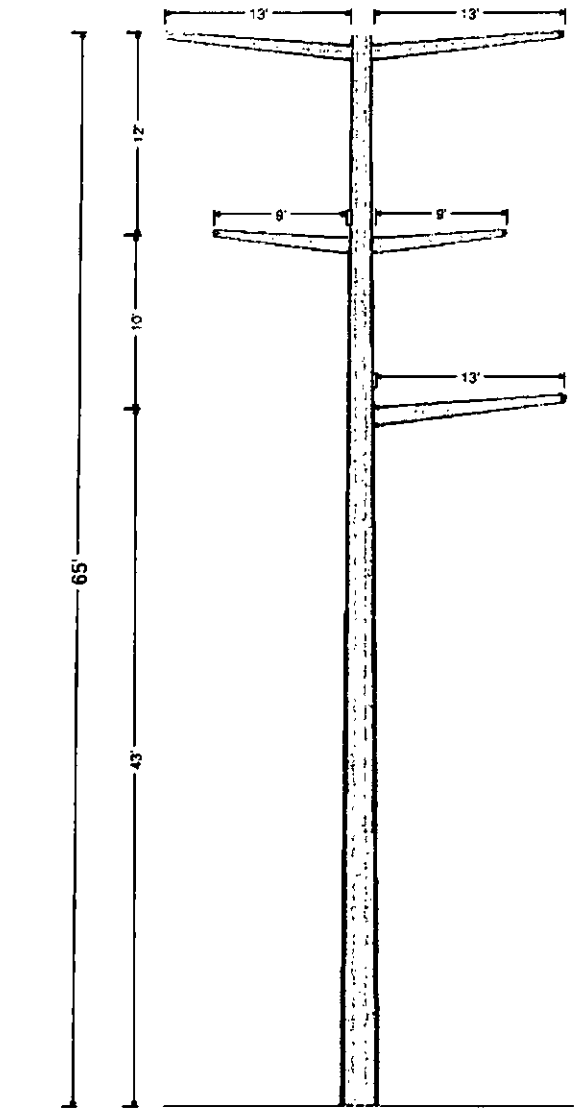
CONDUCTOR SPACING: 13'

OHGW TO TOP CONDUCTOR SPACING: 10.5'- 14.5'

ALL HEIGHTS ARE APPROXIMATE; DRAWING NOT TO SCALE

Figure 2-5. Typical Single-Circuit 138/69 kV Single Pole Deadend

NEW STRUCTURE WILL HAVE TWO ARMS AT THE TOP OF THE POLE TO SUPPORT TWO OVERHEAD GROUNDWIRES



CONDUCTOR SPACING: 9'

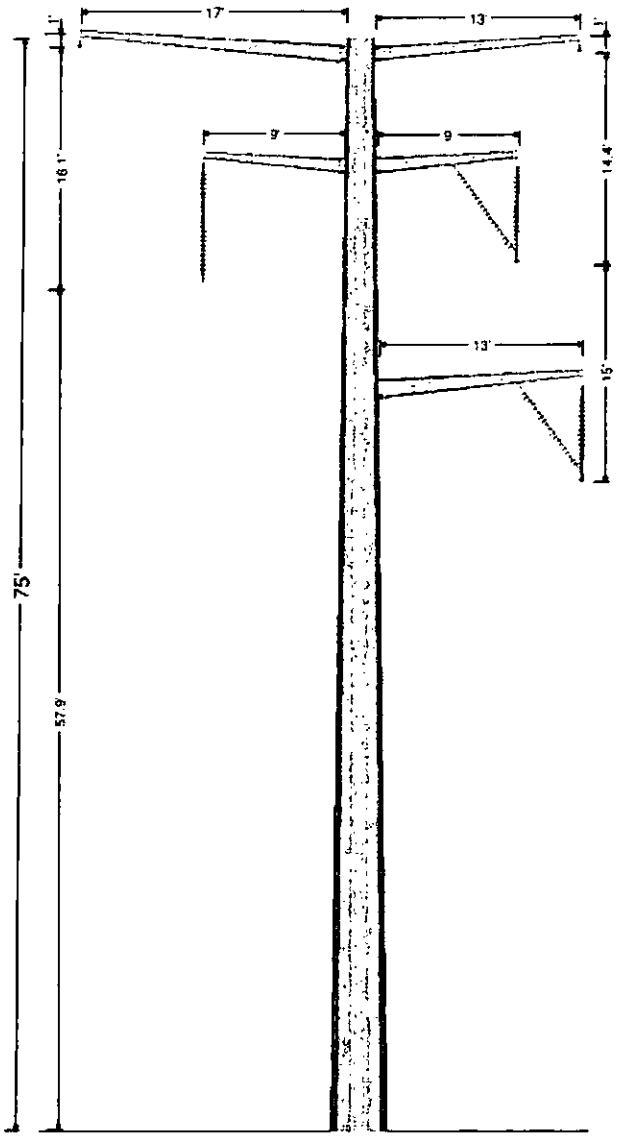
OHGW TO TOP CONDUCTOR SPACING: 12'

ARM LENGTHS: 7' TO 14'

ALL HEIGHTS ARE APPROXIMATE; DRAWING NOT TO SCALE

Figure 2-6. Typical Single-Circuit 138/69 kV Angle Suspension with Struts

NEW STRUCTURE WILL HAVE TWO ARMS AT THE TOP OF THE POLE TO SUPPORT TWO OVERHEAD GROUNDWIRES



CONDUCTOR SPACING: 15'

OHGW TO TOP CONDUCTOR SPACING (LEFT SIDE): 16.1'

OHGW TO TOP CONDUCTOR SPACING (RIGHT SIDE):14.4'

ARM LENGTHS (TOP LEFT OHGW ARM): 17'

ARM LENGTHS (TOP RIGHT OHGW ARM): 13'

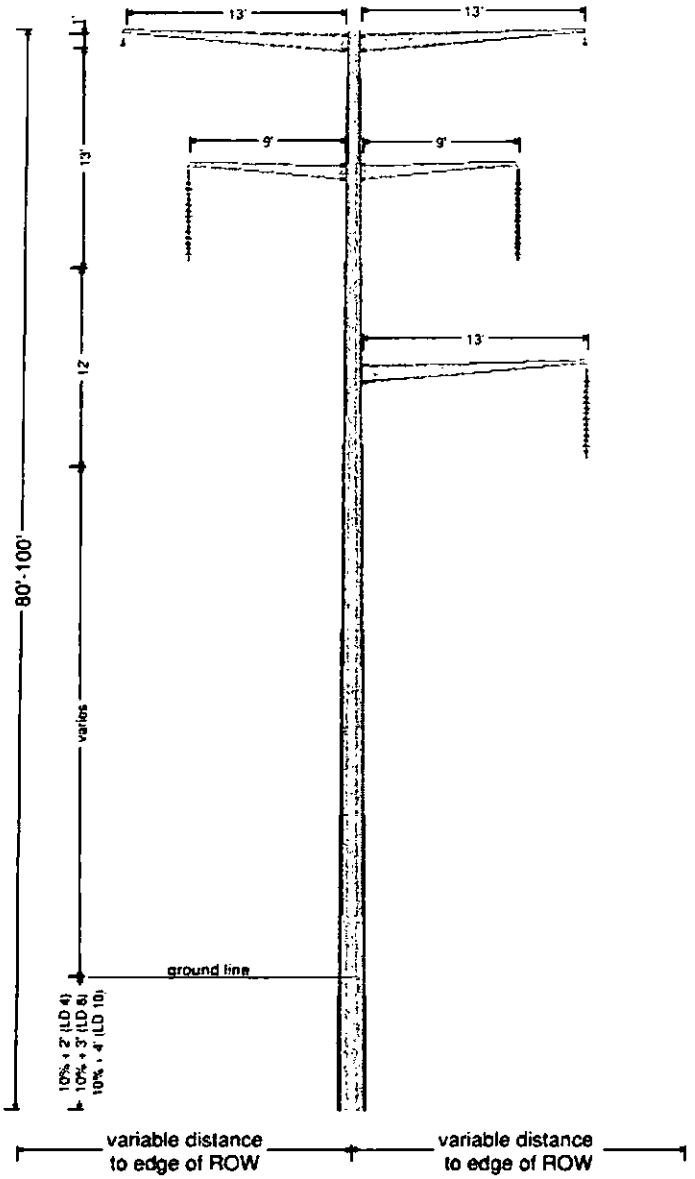
ARM LENGTHS (TOP CONDUCTOR ARMS): 9'

ARM LENGTHS (BOTTOM CONDUCTOR ARM): 13'

ALL HEIGHTS ARE APPROXIMATE; DRAWING NOT TO SCALE

Figure 2-7. Typical Single-Circuit 138/69 kV Tangent Suspension

NEW STRUCTURE WILL HAVE TWO ARMS AT THE TOP OF THE POLE TO SUPPORT TWO OVERHEAD GROUNDWIRES



CONDUCTOR SPACING: 12'

OHGW TO TOP CONDUCTOR SPACING: 13'

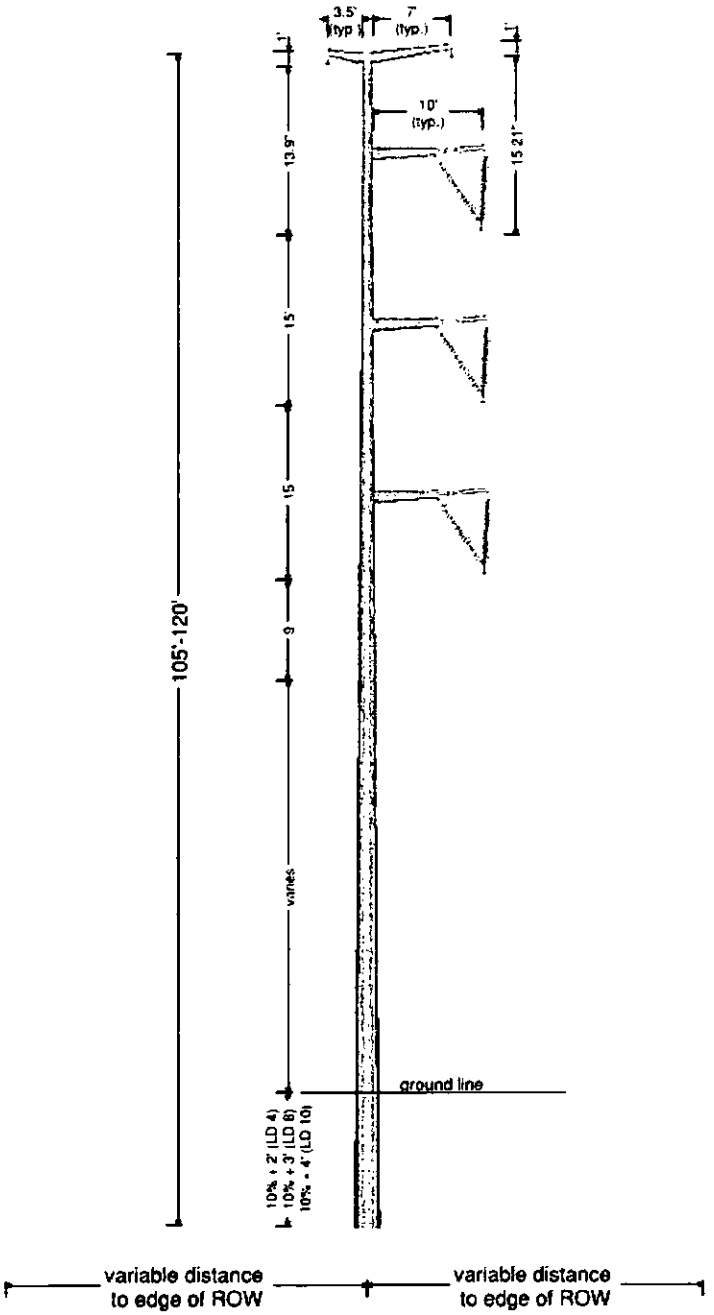
ARM LENGTHS (OHGW AND BOTTOM CONDUCTOR ARM): 13'

ARM LENGTHS (TOP CONDUCTOR ARMS): 9'

ALL HEIGHTS ARE APPROXIMATE; DRAWING NOT TO SCALE

Figure 2-8. Typical Single-Circuit 138/69 kV with Restrained Insulator

NEW STRUCTURES WILL HAVE ATTACHMENTS AT THE TOP OF EACH POLE FOR OVERHEAD GROUNDWIRES



CONDUCTOR SPACING: 15'

OHGW TO TOP CONDUCTOR SPACING: 15.21'

JUMPER ARM LENGTHS: 7'

ALL HEIGHTS ARE APPROXIMATE; DRAWING NOT TO SCALE

ATTACHMENT 3
HOSENSACK – SOUTH ALLENTOWN #1 AND #2 138/69 KV
TAP TRANSMISSION LINES REBUILD
DESCRIPTION OF THE RIGHT-OF-WAY

TABLE OF CONTENTS

LIST OF FIGURES

ATTACHMENT 3
HOSENSACK – SOUTH ALLENTOWN #1 AND #2 138/69 KV
TAP TRANSMISSION LINES REBUILD
DESCRIPTION OF THE RIGHT-OF-WAY

A. INTRODUCTION

As explained in Attachment 1, PPL Electric Utilities Corporation (PPL Electric) proposes to rebuild approximately 3.2 miles of the existing Hosensack – South Allentown #1 and #2 69 kV Tap Lines in order to improve electric reliability in the region (the "Project"). The existing Hosensack – South Allentown #1 and #2 138/69 kV Tap Lines have exceeded their useful life and cannot be relied upon to continue to provide reliable service into the future. The Project is part of PPL Electric's Asset Optimization Strategy, and involves rebuilding the lines to meet all current design and lightning protection standards. The modernization of the lines will help ensure reasonably continuous and reliable service as further described in Attachment 1.

B. DESCRIPTION OF THE RIGHT-OF-WAY

The Project is located within Salisbury Township and the City of Allentown in Lehigh County, Pennsylvania. PPL Electric has discussed the proposed Project with representatives from Lehigh County, Salisbury Township and the City of Allentown, none of which had any objection to the Project. Figures 3-1a and Figure 3-1b are aerial maps of the Project that identify property owners crossed by the Project.

From the South Allentown 69-12 kV Substation, the Hosensack – South Allentown #1 and #2 138/69 kV Tap Lines extend southeast for approximately 0.6 mile as a double-circuit 138/69 kV transmission line at which point the South Allentown #1 and #2 138/69 kV Tap Lines split and traverse in opposite directions (the "split point"). PPL Electric proposes to rebuild this segment of the line to meet modern, double-circuit 138/69 kV transmission line standards. PPL Electric also proposes to rebuild an approximately 0.5-mile segment of the Hosensack – South Allentown #1 138/69 kV Tap Line that extends from the split point to a new tap point with the Hosensack – Quarry #2 138/69 kV Transmission Line located south of the intersection of Honeysuckle Road

and Black River Road in Salisbury Township. Finally, PPL Electric proposes to rebuild approximately 2.1 miles of the Hosensack – South Allentown #2 138/69 kV Tap Line that extends from the split point to a tap point with Hosensack – Wescosville #2 138/69 kV Transmission Line located south of Interstate 78 (I-78) in the City of Allentown. The rebuilt segments of the Hosensack – South Allentown #1 and #2 138/69 kV Tap Lines are explained in detail in Attachment 1. As explained in Attachment 2, the Hosensack – South Allentown #1 and #2 138/69 kV Tap Lines will be rebuilt entirely within the existing rights-of-way.

As shown on Figure 3-1b, the first 0.6 mile of the Hosensack – South Allentown #1 and #2 138/69 kV Transmission Lines from the South Allentown Substation traverse through generally forested areas. The right-of-way for this 0.6-mile segment is approximately 100 feet in width, and no new right-of-way would be required to build this segment of the line.

The rebuilt 0.5-mile Hosensack – South Allentown #1 138/69 kV Transmission Line traverses within the existing right-of-way through a forested area before tapping the Hosensack – South Allentown #2 138/69 kV Tap Line. The existing right-of-way through this segment is 70 to 100 feet in width. No new right-of-way is required to build this segment of line.

As shown on Figure 3-1a, the existing right-of-way for the Hosensack – South Allentown #2 138/69 kV Transmission Line traverses small portions of the City of Allentown's South Mountain Reservoir and Robert Rodale Reserve (140 feet and 350 feet, respectively). Approximately 1.9 miles of the existing right-of-way for this segment of the Project is generally 100 feet wide and traverses through forested areas. The remaining 0.2-mile section of the Hosensack – South Allentown #2 line traverses more densely developed land utilizing center-line rights-of-way. As explained in Attachment 2, no new rights are required for the construction, operation, or maintenance for the entire Project.

The existing right-of-way is currently maintained in accordance with PPL Electric's Vegetation Management Program. All vegetation management will occur within PPL Electric's existing

right-of-way. Only limited tree clearing within the right-of-way is anticipated as part of this Project. In areas where any vegetation management is required, PPL Electric will apply its "Specifications for Initial Clearing and Control of Vegetation On or Adjacent to Electric Line Right-of-Way Through Use of Herbicides, Mechanical and Hand Clearing Techniques" to minimize any potential impacts.

C. CULTURAL RESOURCES

PPL Electric conducted a review of the online Pennsylvania Historical and Museum Commission (PHMC) Bureau for Historic Preservation (BHP) Cultural Resources Geographic Information System (CRGIS) database to determine if National Register of Historic Places (NRHP)-listed or eligible historic properties are located in the Project vicinity. Based on this review, no NRHP-listed historic architectural resources are located within 1 mile of the Project. St. Andrew's Lutheran Church is located approximately 0.4 mile from the Project, and is the only NRHP-eligible site within 1 mile of the Project.

The Project is located within 1 mile of five previously recorded archaeological sites, all of which have insufficient data necessary to determine whether these sites are eligible for the NRHP. Of these five sites, two sites are located within 0.5 mile of the Project. No previously recorded archaeological resources are crossed by the Project.

PPL Electric submitted a review letter to the PHMC on December 4, 2015. The PHMC Office replied on January 5, 2016, indicating that no archaeological resources will be affected by the Project. PHMC has advised that if a new structure height is more than 20 feet above the existing average structure height, PPL Electric should assess the visual impact of those structures. PPL Electric will continue to consult with the PHMC throughout the engineering and construction of the Project.

D. LAND USE AND NATURAL FEATURES

Impacts to land use are anticipated to be minimal because the Project will be constructed within the existing right-of-way and no additional property will be required to complete the Project. 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.

No communication towers, pipelines, or other utilities will be affected by the proposed Project. The closest airport is the Queen City Airport, a Lehigh-Northampton Airport Authority-owned facility, located approximately 1 mile west of the Project. PPL Electric does not anticipate any interference with airport operations because the Project is located in an area where there are existing electrical facilities and because the new facilities will be a similar height as the existing facilities. However, PPL Electric will file any required documentation with both the Federal Aviation Administration and the Pennsylvania Department of Transportation, Bureau of Aviation.

A Natural Area Inventory (NAI) has been prepared by The Nature Conservancy in association with the Pennsylvania Natural Heritage Program (PNHP) for Lehigh County (2013). The Project is located approximately 240 feet northeast of one natural area that was identified within the NAI. The Robert Rodale Reserve NAI area consists of forested slopes of South Mountain that separate the densely urban areas of Allentown from the more sparsely populated rural and suburban areas to the south. The forested landscape contains scattered bedrock outcrops and seeps, which provide a variety of habitats for several plant species of concern. The Pennsylvania Natural Diversity Index (PNDI) review identified two plant species that are known to occur within this NAI area. PPL Electric will coordinate with the City of Allentown to minimize any potential impacts to Robert Rodale Reserve. In addition, the Project is located approximately 0.8 mile south of the Lehigh Mountain NAI area. This area consists of the north-facing forested slope of Lehigh Mountain and the adjacent Lehigh River and its floodplain, which provide a

variety of habitats for several plant species of concern. PPL Electric will coordinate with Salisbury Township to minimize any potential impacts to the Lehigh Mountain area.

The rebuild will occur within the existing right-of-way and does not cross any NAI areas. Therefore, no significant impacts to the two NAI areas are anticipated. No other NAI areas are located within 1 mile of the Project. The Project will not affect any other unique geological, scenic, or natural areas.

The PPL Electric retained an environmental consultant to identify and delineate all wetlands and watercourses within the Project Area. The proposed Project will span three wetlands and three streams. However, it is anticipated the Project will have no impacts on streams or wetlands because the entire Project will be built within the existing right-of-way, and because the new tower structures will be located to avoid impacts to wetland and streams. PPL Electric will obtain all necessary permits from the Pennsylvania Department of Environmental Protection and the United States Army Corps of Engineers and will comply with all of the terms and conditions placed on those permits. PPL Electric also will prepare any required soil erosion and sedimentation control plans and obtain National Pollutant Discharge Elimination System (NPDES) permits and will comply with any conditions placed on those permits.

E. THREATENED AND ENDANGERED SPECIES

PPL Electric conducted an online PNDI database review on October 5, 2015[1]. Based on this review, the Pennsylvania Game Commission (PGC), Pennsylvania Fish and Boat Commission (PFBC), and the U.S. Fish and Wildlife Service (USFWS) reported that the Project will not impact any threatened and endangered species, or special concern species and resources located within the Project area.

[1] PNDI Project Search ID: 20151005534126

Because Lehigh County is located within the known range of the federally threatened bog turtle (*Clemmys muhlenbergii*), PPL Electric retained a qualified bog turtle surveyor to conduct a Phase I bog turtle survey for wetlands delineated within the Project Area. Based on the survey, no potential bog turtle habitat was identified. PPL Electric submitted the Phase I survey report to the USFWS and the USFWS confirmed no potential bog turtle habitat would be impacted by the Project.

The Pennsylvania Department of Conservation and Natural Resources (DCNR) indicated that the Project is located within range of west hairy rock-cress (*Arabis hirsute*), a special concern plant species, and an unnamed sensitive species. According to the Lehigh County NAI, west hairy rock-cress has been found on dry cliffs and rocky ledges in the Lehigh Mountain NAI Area. The unnamed sensitive species is known to use forested areas as its primary habitat. The third concern noted by the DCNR is an erosional remnant feature located in the vicinity of the Project. This erosional remnant is likely comprised of a portion of the Reading Prong[2] that makes up the mountain ranges. DCNR subsequently provided a response letter requesting survey review for the western hairy rock-cress. PPL Electric will conduct botanical surveys in late-spring 2016. The proposed Project will not have any construction or disturbance in rocky ledge or dry cliff habitat; therefore, no impacts to the west hairy rock-cress are anticipated.

[2] The Reading Prong is a physiographic subprovince of the New England Uplands section of the New England province of the Appalachian Highlands. The prong consists of mountains made up of crystalline metamorphic rock.

Label	Owner
1	CITY OF ALLENTOWN
2	FARRELL MARY LOU
3	CITY OF ALLENTOWN
4	CITY OF ALLENTOWN
5	SALISBURY TWP
6	J & D BROTHERS INC
7	TRAUB RICKY & TRAUB CHARLENE
8	SCHMOYER DAVID G & SCHMOYER GAIL D
9	BORGER JESSE KIRK & BORGER ANGELIQUE
10	MERON DALE A & MERON MARSHA G
11	MILLER JEFFREY LYNN & MILLER MARIE ELAINE
12	HUNSINGER MARVIN & HUNSINGER ANGELINE A
13	SAGAT JOSEPH G & SAGAT SHIRLEY ANN
14	GREENRICHARD E
15	GERYJOHN D
16	GERYHELEN A
17	FENZAMYRA A
18	STANLEY G KEVIN & STANLEY JILL E
19	STANLEY G KEVIN & STANLEY JILL
20	PENNA POWER & LIGHT CO & PPL-REAL ESTATE TAXES GENTW2
21	FORMICA LAUREN L & BEALER JOSEPH L
22	WILLIAMS THOMAS P
23	MC AULIFFE ASPHALT PAVING INC
24	NIPPERT CHARLES R & NIPPERT CAROLYN C
25	GARINJOSEPH
26	MOYER JOHN & MOYER LISA
27	LAZOWICKI JOSEPH R & LAZOWICKI LINDA D
28	LAZOWICKI JOSEPH R & LAZOWICKI LINDA D

Route
ROW
Parcel Crossed
Parcel Boundary
Municipality Boundary

Existing Transmission
69kV

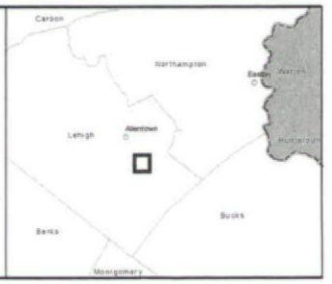
South Allentown Tap
Figure 3-1a: Aerial Map

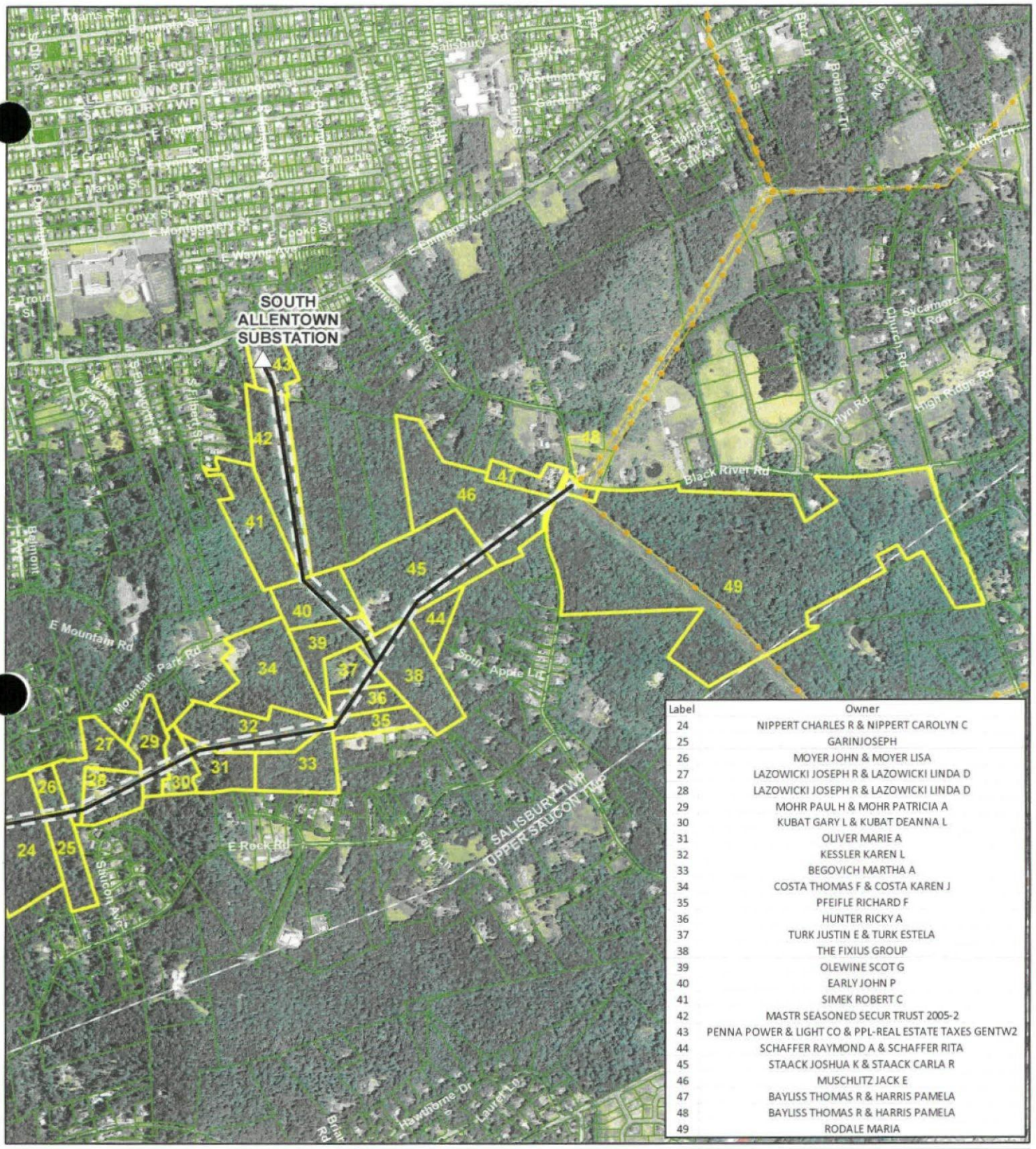
N
W E
S

0 0.25 Miles 0.5

ppl Louis Berger

Projected Coordinate System: PA State Plane, South.
Datum: North American Datum of 1983 (NAD83).
Projection: Lambert Conformal Conic.
Linear Unit: Feet.
Ellipsoid: Geodetic Reference System 80.





Label	Owner
24	NIPPERT CHARLES R & NIPPERT CAROLYN C
25	GARINJOSEPH
26	MOYER JOHN & MOYER LISA
27	LAZOWICKI JOSEPH R & LAZOWICKI LINDA D
28	LAZOWICKI JOSEPH R & LAZOWICKI LINDA D
29	MOHR PAUL H & MOHR PATRICIA A
30	KUBAT GARY L & KUBAT DEANNA L
31	OLIVER MARIE A
32	KESSLER KAREN L
33	BEGOVICH MARTHA A
34	COSTA THOMAS F & COSTA KAREN J
35	PFEIFLE RICHARD F
36	HUNTER RICKY A
37	TURK JUSTIN E & TURK ESTELA
38	THE FIXIUS GROUP
39	OLEWINE SCOT G
40	EARLY JOHN P
41	SIMEK ROBERT C
42	MASTR SEASONED SECUR TRUST 2005-2
43	PENNA POWER & LIGHT CO & PPL-REAL ESTATE TAXES GENTW2
44	SCHAFFER RAYMOND A & SCHAFFER RITA
45	STAACK JOSHUA K & STAACK CARLA R
46	MUSCHLITZ JACK E
47	BAYLISS THOMAS R & HARRIS PAMELA
48	BAYLISS THOMAS R & HARRIS PAMELA
49	RODALE MARIA

△ Substation
Route
ROW
Parcels Crossed
Parcel Boundary
Municipality Boundary

Existing Transmission
69kV

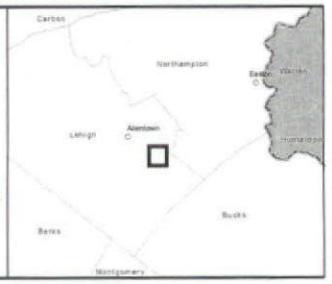
South Allentown Tap
Figure 3-1b: Aerial Map

N W E S

0 0.25 0.5 Miles

ppl Louis Berger

Projected Coordinate System: PA State Plane, South. Datum: North American Datum of 1983 (NAD83). Projection: Lambert Conformal Conic. Linear Unit: Feet. Ellipsoid: Geodetic Reference System 80.



ATTACHMENT 4
HOSENSACK – SOUTH ALLENTOWN #1 AND #2 138/69 KV
TAP TRANSMISSION LINES REBUILD
PPL DESIGN CRITERIA AND SAFETY PRACTICES

The National Electrical Safety Code (NESC) is a set of rules to safeguard people 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 it is not intended as a design specification, its provisions establish minimum design requirements. PPL Electric Utilities Corporation (PPL Electric) has developed design specifications and safety rules which meet or surpass all requirements specified by the NESC.

Engineering Design Criteria and Parameters

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 were developed to ensure public safety and welfare.

PPL transmission line design standards meet or surpass the NESC standards. For example, the relative order of grades of construction for conductors and supporting structures is B, C, and N; Grade B being the highest. According to the NESC standards, construction Grades B, C, or N may be used for transmission lines (except at crossings of railroad tracks and limited access highways where Grade B construction is specified). However, PPL designs all of its transmission lines for Grade B construction. The use of Grade B design and construction specifies enhancements such as larger-minimum crossarm dimensions, larger-minimum conductor size, and increased safety factors.

Another example is the design parameters utilized to account for ice and wind loadings on the overhead ground wire (OHGW) and power conductors. The NESC standard ice and wind design magnitudes for the PPL territory are 0.5 inch thickness of radial ice combined with four pounds per square foot horizontal wind pressure (equivalent to 40-mile per hour wind velocity). The conductor sags and tensions used in line designs are the result of various ice and wind combinations, depending on the elevation at the line location and line design voltage. The conductor sags and tensions used in the design of all PPL transmission lines are at least 0.5-inch ice combined with eight pounds wind pressure (equivalent to 57 miles per hour wind velocity). This means that PPL lines are designed to operate safely and reliably during inclement weather even more severe than assumed by the NESC. In addition, PPL transmission lines are designed with more clearance to the ground than required by the NESC. The tables below compare PPL and NESC ground clearances for lines of various voltages.

138 kV

	Vertical Clearance to Ground	
Surface Underneath Conductors	NESC Standard	PPL Design
Roads, streets, alleys	21 Ft.	30 Ft.
Other land traversed by vehicles (such as cultivated field, forest, etc.)	21 Ft.	30 Ft.
Spaces accessible to pedestrians only	17 Ft.	30 Ft.
Railroad tracks	31 Ft.	35 Ft.

230 kV

Surface Underneath Conductors	Vertical Clearance to Ground NESC Standard	PPL Design
Roads, streets, alleys	23 Ft.	32 Ft.
Other land traversed by vehicles (such as cultivated field, forest, etc.)	23 Ft.	32 Ft.
Spaces accessible to pedestrians only	19 Ft.	32 Ft.
Railroad tracks	31 Ft.	36 Ft.

500 kV

Surface Underneath Conductors	Vertical Clearance to Ground NESC Standard	PPL Design
Roads, streets, alleys	28 Ft.	53 Ft.
Other land traversed by vehicles (such as cultivated field, forest, etc.)	28 Ft.	53 Ft.
Spaces accessible to pedestrians only	24 Ft.	53 Ft.
Railroad tracks	38 Ft.	53 Ft.

A relay protection system is used to protect the public safety and welfare as well as equipment and the transmission system. Relay protection is installed for all transmission lines to automatically de-energize the line in the unlikely event that the line or supporting structure fails and the line contacts the ground.

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 through the use of helicopter patrols, with supplemental foot and structure climbing patrols. A number of helicopter patrols are performed on all lines annually. The

two-man helicopter crew flies parallel, to the left, 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.

Foot and structure climbing patrol programs for a transmission line begin approximately three to five years after the line is energized, unless a helicopter patrol reports a need for earlier action. The frequency of foot patrols varies from once every year to once every several years depending on line type and age.

An assigned foot patroller checks right-of-way conditions, including access roads, bridges, pole washouts, tower footers, vegetation height and clearance to conductors, pole and tower deterioration and, with the use of binoculars, insulators, and condition of hardware. Identified problems are included in a report that is forwarded to the appropriate department for corrective action.

A scheduled line outage is required to perform an overhead patrol because of "hands-on" inspection of hardware. Overhead patrols are conducted on a schedule determined by line age, operating record, and observed general condition. The necessary repairs are also done during the inspection outage.

Personnel Safety Rules

The following are a few of the PPL safety rules that demonstrate the Company's concern for employee safety:

- Work 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. Various other tags are used for limited

operations and informational purposes. Employees 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 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. The conductor size and attachment clamps of temporary safety grounds must be capable of conducting anticipated fault currents. Rubber gloves, rubber sleeves, and additional rubber protective equipment are used as required when applying or removing temporary safety grounds to or from the lines or apparatus to be grounded. An approved nonconductive working stick of sufficient length to allow workers to maintain the following required minimum clearances is used to test that the line has been de-energized and to apply temporary safety grounds:

Voltage-kV	Minimum Clearance
138	3'-7"
230	5'-3"
500	11'-3"

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. When ground pins are used to establish proper ground points, they are driven to a depth of not less than four feet as near vertical as possible.

- 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.

CERTIFICATE OF SERVICE

I hereby certify that a true and correct copy of the foregoing **Letter of Notification** 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 Historical
and Museum Commission
Bureau for Historic Preservation
Commonwealth Keystone Building
400 North Street, 2nd Floor
Harrisburg, PA 17120-0053
Attn: Mr. Douglas C. McLearen, Chief

Pennsylvania Department of Transportation
Honorable Barry Schoch, P.E., Secretary
c/o Office of Chief Counsel
Commonwealth Keystone Building
400 North Street, 8th Floor
Harrisburg, PA 17120
Attn: William J. Cressler

Pennsylvania Department
of Environmental Protection
P.O. Box 2063
Market Street State Office Building
Harrisburg, PA 17105-2063
Attn: Office of Field Operations

Lehigh Valley Planning Commission
961 Marcon Boulevard - Suite 310
Allentown, PA 18109
Attn: Mr. Michael Kaiser, AICP

Lehigh County Board of Commissioners
17 South Seventh Street
Allentown, PA 18101-2400
Attn: Mr. Brad Osborne, Chairman

Salisbury Township Planning Commission
1714 Crownwood Street
Allentown, PA 18103
Attn: Mr. James Brown, President

Salisbury Township
2900 South Pike Avenue
Allentown, PA 18103
Attn: Mr. Randy Soriano,
Township Manager

Salisbury Township Planning,
Zoning and Code Enforcement
2900 South Pike Avenue
Allentown, PA 18103
Attn: Ms. Cynthia Sopka, Director,
Planning and Zoning

City of Allentown
435 Hamilton Street
Allentown, PA 18101
Attn: Mayor Ed Pawlowski

City of Allentown, City Council
435 Hamilton Street
Allentown, PA 18101
Attn: Mr. Ray O'Connell, President

City of Allentown, Planning and Zoning
435 Hamilton Street
Allentown, PA 18101
Attn: Ms. Shannon Calluori, Director

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Allentown, PA 18103

Robert C. Simek
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Lansdale, PA 19446

Scot G. Olewine
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Lehigh Valley, PA 18002

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Bethlehem, PA 18015

Joshua K. & Carla R. Staack
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Allentown, PA 18103

Jack E. Muschlitz
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Bath, PA 18014

Thomas R. & Pamela Harris Bayliss
2510 Honeysuckle Rd.
Bethlehem, PA 18015

Maria Rodale
2807 Honeysuckle Rd.
Bethlehem, PA 18015

McAuliffe Asphalt Paving Inc.
2937 Pike Ave.
Allentown, PA 18103

John & Lisa Moyer
240 Mountain Park Rd.
Allentown, PA 18103

Joseph R. & Linda D Lazowicki
302 Mountain Park Rd.
Allentown, PA 18103

J & D Brothers Inc.
7785 Spring Creek Rd.
Macungie, PA 18062

Marvin & Angeline A. Hunsinger
606 Erney St.
Allentown, PA 18103

Jeffrey Lynn & Marie Elaine Miller
608 Erney St.
Allentown, PA 18103

David G. & Gail D. Schmoyer
2840 Black Gum Dr.
Allentown, PA 18103

Jesse Kirk & Angelique Borger
2860 Black Gum Dr.
Allentown, PA 18103

Ricky & Charlene Traub
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Allentown, PA 18103

Thomas P Williams
822 Hamilton St.
Allentown, PA 18101

Myra A. Fenza
2830 Pike Ave.
Allentown, PA 18103

G Kevin & Jill E. Stanley
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Allentown, PA 18103

Dale A. & Marsha G. Meron
2825 Black Gum Dr.
Allentown, PA 18103

City Of Allentown
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Allentown, PA 18101

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515 Erney St.
Allentown, PA 18103

Joseph Garin
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Bethlehem, PA 18018

Salisbury Twp
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Allentown, PA 18103

Richard E. Green
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Allentown, PA 18103

John D. Gery
433 Erney St.
Allentown, PA 18103

Helen A. Gery
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Allentown, PA 18103

Mary Lou Farrell
2720 Lanze Ln.
Allentown, PA 18103

The Fixius Group
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Center Valley, PA 18034

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Allentown, PA 18103

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2510 Honeysuckle Rd.
Bethlehem, PA 18015

Justin E. & Estela Turk
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Allentown, PA 18103

Master Seasoned Security Trust
3232 Newmark Dr.
Miamisburg, OH 45342

Gary L. & Deanna L. Kubat
455 Rock Rd.
Allentown, PA 18103

Karen L. Kessler
412 Grenham Rd.
Greensboro, NC 27455

Marie A. Oliver
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Allentown, PA 18103

Thomas F. & Karen J Costa
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Allentown, PA 18103

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Bethlehem, PA 18017

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Sanatoga, PA 19464

Joseph R. & Linda D. Lazowicki
302 Mountain Park Rd.
Allentown, PA 18103

Paul H. & Patricia A. Mohr
348 Mountain Park Rd.
Allentown, PA 18103

Martha A. Begovich
3320 Chaucer Ln.
Bethlehem, PA 18017

Date: June 28, 2016

Christopher T. Wright