EXECUTIVE SUMMARY
HONEY BROOK – TWIN VALLEY 138/69 KV LINE

This Siting Application is submitted by PPL Electric Utilities Corporation (PPL Electric) pursuant to the Pennsylvania Public Utility Commission's (PUC or the Commission) regulations at 52 Pa. Code §§ 57.71 through 57.77 for PUC approval to site and construct a new 138/69 kV transmission line, known as the Honey Brook – Twin Valley 138/69 kV Transmission Line (the "Honey Brook – Twin Valley Line"). As explained in the Attachments and Testimony filed with this Application, the Honey Brook – Twin Valley 138/69 kV Transmission Line Project is needed to reinforce the 138/69 kV systems in Chester, Berks and Lancaster counties by providing an additional 138/69 kV source into the Twin Valley and Honey Brook Substations.

To reinforce the 138/69 kV system, PPL Electric is proposing to build a new, 5.3-mile long 138/69 kV transmission line between the existing line just north of the Honey Brook Substation located in Honey Brook Township in Chester County, Pennsylvania and the existing line just north of the Twin Valley Substation located in Caernarvon Township in Berks County, Pennsylvania. The proposed new transmission line will traverse Honey Brook Township, Chester County; Caernarvon Township, Berks County; and Caernarvon Township, Lancaster County. The estimated cost of this Project is $10.5 million. Subject to Commission approval, construction is scheduled to begin in the August 2014 to meet a March 2015 system in-service date.

Need for the Project

Currently, the only source of supply to the Honey Brook 69-12 kV Substation is provided by a single 69 kV tap line. Similarly, the only source of supply to the Twin Valley 69-12 kV Substation is provided by another tap, with the flexibility of transferring load to a second line through a switch. There has been substantial load growth over time, including load increases at a large industrial facility in Morgantown. Based on PPL Electric's transmission planning studies, the loss of the Twin Valley 69 kV tap would disrupt electric service to approximately 1,700 customers and a double circuit loss of the South Akron – Morgantown 69 kV Transmission Lines

would disrupt service to approximately 11,200 customers. These customers are vulnerable to long duration outages for loss of the transmission circuit which serves them. The ability to restore service to these customers is limited due to the lack of 69 kV transmission sources in the area. The RP&P violations explained in the Attachments filed with this Application demonstrate that the local transmission system does not meet PPL Electric's reliability standards.

PPL Electric's transmission system studies of the area revealed that, starting in 2014, an outage of any one of the following facilities would result in violations of PPL Electric's RP&P for maximum allowable load interruption due to a contingency (unplanned outage): (1) single circuit outage of the Twin Valley 69 kV Transmission Line Tap; or (2) single or double circuit outage of the South Akron – Morgantown 69 kV Transmission Lines.

The Honey Brook – Twin Valley Project is required to resolve the violations of the RP&P practices and to reinforce the existing 138/69 kV transmission system serving Chester, Berks, and Lancaster counties by providing a new 138/69 kV supply source. The proposed new transmission line will provide improved reliability of service for approximately 20,500 customers in Honey Brook and Caernarvon townships in Chester, Berks and Lancaster counties. With improved operating flexibility, customer load will be restored more quickly by using this new line to transfer interrupted load to an alternate source after transmission facility outage. Therefore, the new line will reduce the duration of customer load interruption after a transmission facility outage occurs.

Siting Analysis

A comprehensive route selection study was conducted to establish a Preferred Route for the Honey Brook – Twin Valley 138/69 kV Transmission Line. Using established routing guidelines, the Routing Team identified constraints and opportunity features within the Study Area that would minimize impacts to the natural and human environment and take advantage of existing corridors to the extent practicable.

The Routing Team acquired environmental and engineering data from various sources and assembled the information into a geographic information system (GIS) database superimposed

on aerial photography. Potential Routes were field checked from publically accessible locations to validate the aerial imagery and assess the viability of the Potential Routes based on conditions observed in the field. Based on information gathered in the field, the Routing Team adjusted the Potential Routes as necessary.

The Routing Team evaluated the advantages and disadvantages of the Potential Routes based on the established routing criteria, an inventory of land use, environmental, and cultural factors along each of the routes, and additional local knowledge and past experience. Less favorable Potential Routes were eliminated and four potentially viable Alternative Routes were retained for further consideration. The developed Alternative Route Network was presented at public meetings for comment. Following this public input process, the Routing Team conducted additional field reconnaissance to review comments collected at the public meetings and finalize routing decisions. This iterative process resulted in the identification of the Preferred Route.

Based on an assessment of the advantages and disadvantages of the four Alternative Routes under consideration, the Routing Team selected Alternative Route A as the Preferred Route. The Routing Team believes that the cumulative social, environmental, and financial impacts associated with constructing Alternative Route A will be less than any other Alternative Route.

The Attachments for the Certification Application, which describes the need for the Project and discusses the engineering and environmental analysis for the proposed construction, includes the following:

Attachment 1	PUC Regulation Cross Reference Matrix
Attachment 2	Necessity Statement
Attachment 3	Environmental Setting
Attachment 4	Siting Analysis
Attachment 5	Design and Engineering Description
Attachment 6	List of Owners of Property Within the Right-of-Way
Attachment 7	Agency Permit Requirements
Attachment 8	List of Governmental Agencies, Municipalities and Other Public Entities Receiving the Application

Attachment 9	List of Government Agencies, Municipalities, and Other Public Entities Contacted
Attachment 10	List of Public Locations Where Application can be Examined
Attachment 11	PPL Electric Magnetic Field Management Program
Attachment 12	Vegetation Management
Attachment 13	PPL Design Criteria and Safety Practices
Attachment 14	Agency Coordination (PNDI/Wetlands)
Attachment 15	Cultural Resources Report
Attachment 16	Public Notice Requirements

PPL ELECTRIC UTILITIES SERVICE TERRITORY

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ATTACHMENT 1
HONEY BROOK – TWIN VALLEY 138/69 KV LINE
PUC REGULATION CROSS-REFERENCE MATRIX

Administrative Code Section or Statute	PUC Regulation Requirement	Location
57.72	Form and content of application	
57.72(a)	Applications shall be in conformity with Section 1.31 (relating to form of documentary filings generally). Supporting exhibits such as maps, photographs and other engineering materials may be on paper not exceeding 28 inches by 40 inches.	Attachments 1 – 16 Attachment 3 – Environmental Maps Attachment 4 – Siting Analysis Maps Attachment 4 – Aerial Maps
57.72(b)	The application shall be signed by a person having authority with respect thereto and having knowledge of the matters herein set forth and shall be verified under oath.	Certification Application
57.72(c)	An application shall contain:	
57.72(c)(1)	The name of the applicant and the address of its principal business office	Certification Application
57.72(c)(2)	The name, title and business address of the attorney of the applicant and the person authorized to receive notice and communications with respect to the application if other than the attorney of the applicant.	Certification Application
57.72(c)(3)	A general description – not a legal or metes and bounds description – of the proposed route of the HV line, to include the number of route miles, the right-of-way width and the location of the proposed HV line within each city, borough, town and township traversed.	Certification Application Attachment 4 – Section 3.2 Attachment 4 – Tables 4-4 and 4-5
57.72(c)(4)	The names and addresses of known persons, corporations and other entities of record owning property within the proposed right-of-way, together	Attachment 4 – Aerial Maps

Administrative Code Section or Statute	PUC Regulation Requirement	Location
	with an indication of HV line rights-of-way acquired by the applicant.	Attachment 6
57.72(c)(5)	A general statement of the need for the proposed HV line in meeting identified present and future demands for service, of how the proposed HV line will meet that need and of the engineering justifications for the proposed HV line.	Attachment 2
57.72(c)(6)	A statement of the safety considerations which will be incorporated into the design, construction and maintenance of the proposed HV line.	Attachment 5 – Section 3.0 Attachment 11 Attachment 12
57.72(c)(7)	A description of studies which had been made as to the projected environmental impact of the HV line as proposed and of the efforts which have been and which will be made to minimize the impact of the HV line upon the environmental and upon scenic and historic areas, including but not limited to impacts, where applicable, upon land use, soil and sedimentation, plant and wildlife habitats, terrain, hydrology and landscape.	Attachment 3 Attachment 4 – Section 5.0 Attachment 14 Attachment 15
52.72(c)(8)	A description of the efforts of the applicant to locate and identify archaeologic, geologic, historic, scenic or wilderness areas of significance within 2 miles of the proposed right-of-way and the location and identity of the areas discovered by the applicant.	Attachment 3 – Sections 2.0 through 3.0, Figures 3-2 through 3-6 Attachment 4 – Section 5.0 Attachment 4 – Figures 4-6 through 4-10 Attachment 15

Administrative Code Section or Statute	PUC Regulation Requirement	Location
57.72(c)(9)	The location and identity of airports within 2 miles of the nearest limit of the right-of-way of the proposed HV line.	Attachment 3 – Section 2.1.3 Attachment 4 – Section 5.2.4 Attachment 4 – Figures 4-6a and 4-6b
57.72(c)(10)	A general description of reasonable alternative routes to the proposed HV line, including a description of the corridor planning methodology, a comparison of the merit and detriments of each route, and a statement of the reasons for selecting the proposed HV line route.	Attachment 4
57.72(c)(11)	A list of the local, State and Federal governmental agencies which have requirements which shall be met in connection with the construction or maintenance of the proposed HV line and a list of documents which have been or are required to be filed with those agencies in connection with the siting and construction of the proposed HV line.	Attachment 7
57.72(c)(12)	The estimated cost of construction of the proposed HV line, and the projected date for completion.	Certification Application Attachment 2 – Section 1.0 Attachment 4 – Section 5.1.3
57.72(c)(13)	The following exhibits:	
57.72(c)(13)(i)	A depiction of the proposed route on aerial photographs and topographic maps of suitable detail.	Attachment 4 – Aerial Maps, Figures 4-6a and 4-6b
57.72(c)(13)(ii)	A description of the proposed HV line, including the length of the line, the design voltage, the size, number and materials of conductors, the design of the	Certification Application

Administrative Code Section or Statute	PUC Regulation Requirement	Location
	supporting structures and their height, configuration and materials of construction, the average distance between supporting structures, the number of supporting structures, the line to structure clearances and the minimum conductor to ground clearances at mid-span under normal load and average weather conditions and under predicted extreme load and weather conditions.	Attachment 5
57.72(c)(13)(iii)	A simple drawing of a cross section of the proposed right-of-way of the HV line and any adjoining rights-of-way showing the placement of the supporting structures at typical locations, with the height and width of the structures, the width of the right-of-way and the lateral distance between the conductors and the edge of the right-of-way indicated	Attachment 5 – Figures 5-1 through 5-4
57.72(c)(13)(iv)	A system map which shows in suitable detail the location and voltage of existing transmission lines and substations of the applicant and the location and voltage of the proposed HV line and associated substations.	Attachment 2
57.72(c)(14)	A statement identifying litigation concluded or in progress which concerns property or matter relating to the proposed HV line, right-of-way route or environmental matters.	Certification Application
57.72(c)(15)	Additional information as the Commission may require.	N/A
57.74(a)	(a) *Filing.* The applicant shall file with the Commission the original and six copies of the application. An affidavit of service showing the identity of those served under subsections (b) and (c) shall accompany the original and the copies of the application filed with the Commission.	Attachment 6 Attachment 8 Notice of Filing Certificate of Service
57.74(b)	(b) *Copies.* At the time of filing, the applicant shall serve a copy of the application by registered or certified mail, return receipt requested, upon the following: (1) The chief executive officer, the governing body and the body charged with the duty of	Attachment 8

Administrative Code Section or Statute	PUC Regulation Requirement	Location
	planning land use in each city, borough, town, township and county in which any portion of the HV line is proposed to be located. (2) The president of the public utility, other than the applicant, in whose service territory any portion of the HV line is proposed to be located. (3) The Department of Environmental Resources, Attention: Bureau of Environmental Planning; Post Office Box 2357, 101 S. Second Street, Harrisburg, Pennsylvania, 17120. (NOTE: now Department of Environmental Protection at different Harrisburg office).	
57.74(c)	(c) *Notice.* (1) At the time of filing, the applicant shall serve a notice of filing and a map of suitable detail showing the proposed route of the proposed facility by registered or certified mail, return receipt requested, upon the following: (i) The Secretary of the Department of Transportation, Room 1200 Transportation and Safety Building, Harrisburg, Pennsylvania 17120. (ii) The Chairman of the Historical and Museum Commission, Post Office Box 1026, Harrisburg, Pennsylvania 17120. (iii) Other local, State or Federal agencies designated in § 57.72 (c)(11)(relating to form and content of application). (iv) The persons, corporations, and other entities designated in § 57.72(c)(4), unless they are served with a copy of the application under § 57.75(i) (relating to hearing and notice).	Notice of Filing Attachment 6 Attachment 8
57.74(c)	(2) The notice of filing shall contain a statement identifying the filing, the date on which the filing was or is to be made, a description of the proposed line, the design voltage, the number of route miles, the right-of-way width and the location of the proposed HV line within each township traversed and a statement that a copy of the application is available for public examination as provided in subsection (d).	Notice of Filing Certification Application Attachment 10 (Township Buildings)

Administrative Code Section or Statute	PUC Regulation Requirement	Location
57.74(d)	(d) *Examination.* On the day of filing of the application, the applicant shall make a copy of the application available for public examination during ordinary business hours at a convenient location within a county in which any part of the proposed HV will be located.	Attachment 10
57.74(e)	(e) *Additional notice.* The applicant shall provide an additional notice and shall serve such additional copies of the application without cost as the Commission may require.	N/A
69.3102(a)	(a) Applications for electric transmission siting authority should provide the following information with the initial application for siting approval demonstrating its efforts to fully notify landowners who are either owners of land that will be purchased for the transmission project or will be subject to right of way/easement requirements: (1) A Code of Conduct/Internal Practices governing the manner in which public utility employees or their agents interact with landowners along proposed rights of way. (2) Copies of information provided to landowners by the public utility of any publicly disseminated notices advising landowners to contact the Commission or the Office of Consumer Advocate (OCA) in the event of improper land agent practices. (3) Copies of all notices sent under § 57.91 (relating to disclosure of eminent domain power of electric utilities).	Attachment 16
69.3102(b)	(b) Applicants for transmission siting authority should serve a copy of the Code of Conduct on all landowners along the proposed route whose property is to be purchased, subject to easement rights or borders the transmission corridor. The Code of Conduct should also be available on the applicant's website.	Attachment 16
69.3102(c)	(c) Applicants for transmission siting authority should provide prior notice to the Commission's Office of	N/A

Administrative Code Section or Statute	PUC Regulation Requirement	Location
	Communications of informational presentations to community groups by the public utility scheduled after the filing of the transmission siting application so that the Commission, OCA and other interested parties can attend meetings or obtain copies of information being disseminated at the presentations.	
69.3103	Applicants for eminent domain authority should follow the following requirements and provide the following information as part of the application: (1) Applicants for transmission siting authority should file applications for all known eminent domain authority as separate filings, but simultaneously with the associated transmission siting applications. Testimonial evidence in support of an eminent domain application should be filed with the application. Subsequent eminent domain authority applications should be filed as soon as reasonably known during the course of the transmission siting application. (2) As part of an eminent domain application, the public utility applicant should present, for those properties subject to condemnation at the time the transmission siting application is filed or later in the siting proceeding, the reason for the exercise of condemnation power for each property and the precise location of the affected property. Supporting maps or legal descriptions of the property to be condemned should be supplied to the extent feasible. Submission of information pursuant to this guideline should be consistent with the filing requirements for the exercise of eminent domain powers under 26 Pa.C.S. § 302(b)(5) (relating to declaration of taking). (3) A public utility transmission siting application should include a summary status report for those properties along the proposed transmission route where negotiations for either property acquisition or rights of way/easements may be ongoing. This information should be supplemented as requested by the administrative law judge or the parties during the course of the transmission siting proceeding.	N/A

Administrative Code Section or Statute	PUC Regulation Requirement	Location
69.3104	Applications for exemption from municipal zoning requirements should provide the following information with the application: (1) Copies of comprehensive land use plans, zoning ordinances and other documentation relevant to the buildings affected by the exemption request. This information may be filed in either hard copy or electronic format. (2) Provision of metes and bounds or site maps of building sites. (3) A procedure for providing notice to affected municipalities of the request for exemption.	N/A
69.3105(1)	Applications for the siting of electric transmission lines should provide the following information as part of the § 57.72(c) (relating to form and content of application) requirements: (1) Transmission applicants should utilize a combination of transmission route evaluation procedures including high-level GIS data, traditional mapping (including United States Geological Survey data and compilation), aerial maps and analysis of physical site specific constraints raised by affected landowners.	Attachment 3 Attachment 4
69.3105(2)	Applications for the siting of electric transmission lines should provide the following information as part of the § 57.72(c) (relating to form and content of application) requirements: (2) Transmission applicants should summarize the status of property acquisitions (including fee simple acquisitions and rights of way/easements) as part of the application. The applicant should provide the current status and continuing updates on property acquisition litigation or settlements during the course of the siting proceeding.	Attachment 5
69.3105(3)	Applications for the siting of electric transmission lines should provide the following information as part of the § 57.72(c) (relating to form and content of	Attachment 3 Attachment 4

Administrative Code Section or Statute	PUC Regulation Requirement	Location
	application) requirements: (3) In providing information regarding the reasonable alternative routes, the utility actively considered in its final phase of the route selection process, and the relative merits of each, in accordance with § 57.72(c)(10), the applicant should include the following information: (i) The environmental, historical, cultural and aesthetic considerations of each route. (ii) The proximity of these alternative routes to residential and nonresidential structures. (iii) The applicant's consideration of relevant existing rights of way. (iv) The comparative construction costs associated with each route.	
69.3106	Applications for siting of electric transmission lines should include as part of the filing requirement under § 57.72(e)(7) the following information: A matrix or list showing all expected Federal, state and local government regulatory permitting or licensing approvals that may be required for the project at the time the application is filed, the issuing agency, approximate timeline for approval and current status. The applicant should provide an update on the status of the regulatory permitting/licensing approvals as the case progresses.	Attachment 7
69.3107(a)	(a) *Interim guidelines for the use of herbicides and pesticides.* Applicants for transmission line siting authority should provide a detailed vegetation management plan that includes the following components: (1) A general description of the utility's vegetation management plan. (2) Factors that dictate when each method, including aerial spraying, is utilized. (3) Vegetation management practices near aquatic	Attachment 12

Administrative Code Section or Statute	PUC Regulation Requirement	Location
	and other sensitive locations. (4) Notice procedures to affected landowners regarding vegetation management practices. (5) Provision of a copy of a landowner maintenance agreement that describes the duties and responsibilities of landowners and the utility for vegetation management to the extent utilized.	
69.3107(b)	(b) *Interim guidelines for Electromagnetic Field (EMF) impacts.* Transmission siting applications should include the following: A description of the EMF mitigation procedures that the utility proposes to utilize along the transmission line route. This description should include a statement of policy approach for evaluating design and siting alternatives and a description of the proposed measures for mitigating EMF impacts.	Attachment 11 Attachment 13

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ATTACHMENT 2
HONEYBROOK – TWIN VALLEY 138/69 kV LINE
NECESSITY STATEMENT

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LIST OF FIGURES

1.0 INTRODUCTION

PPL Electric Utilities Corporation (PPL Electric) proposes to install a 5.3-mile 138/69 kV transmission line between the existing Honey Brook and Twin Valley distribution substation taps in Chester, Berks and Lancaster counties. The new line, named the Honey Brook – Twin Valley 138/69 kV Transmission Line (the "Project"), will be constructed for future double-circuit 138 kV but will initially operate as a single-circuit 69 kV transmission line until load growth in the area makes it appropriate to increase the operating voltage.

The proposed new transmission line will provide improved reliability of service for approximately 20,500 customers in Honey Brook and Caernarvon townships in Chester, Berks, and Lancaster counties. The new line will also allow for improved operating flexibility for the Transmission System Operators to restore customer load more quickly after a facility outage.

This Project is needed to:

(i) Prevent the extended interruption of customer load that would exceed PPL Electric's Reliability Principles and Practices (RP&P) if the existing Twin Valley 69 kV line were interrupted.

(ii) Prevent the extended interruption of customer load that would exceed PPL Electric's RP&P if the existing South Akron – Morgantown #1 & #2 69 kV at South Akron Substation were interrupted.

The estimated cost to site, design, and construct the proposed Honey Brook – Twin Valley 138/69 kV Transmission Line is $10.5 million. Construction is scheduled to begin in August 2014 to support the Project's scheduled system in-service date of March 2015. The required in-service date for this Project was originally May 2016. However, the in-service date was accelerated due to the rapid increase in load levels primarily resulting from accelerated industrial development in the area. The required in-service date for this Project is defined as the date that the proposed facility must be placed in-

service to minimize extended service interruptions to customers. Due to the rapid increase in load levels, the new required in-service date for this Project is May 2014. However, due to the long lead time required for siting such projects, the scheduled in-service date is March 2015.

A PPL Electric system map showing existing transmission facilities with a design voltage of 35 kV or greater is included in map pocket at the end of this Attachment. This filing addresses only the existing and proposed transmission system in this portion of Chester, Berks, and Lancaster counties.

2.0 SYSTEM PLANNING PROCESS

System Planning is the process which assures that the transmission system can supply electricity to all customer loads in a reliable and economic manner. This System Planning process assures that both the Bulk Electric System (BES) and non-Bulk Electric System (non-BES)[1] 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 needs 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 conform to PPL Electric's transmission planning reliability principles, practices, and standards for all normal and emergency operating conditions.

The process of planning the transmission system requires PPL Electric to look into the future to develop a reinforcement plan far enough in advance to be able to complete a project when it is needed. Ideally, transmission facility upgrades are planned such that the in-service date corresponds with the time frame that the facility is required to meet

[1] The BES includes transmission facilities operating at 100 kV or higher. Non-BES transmission facilities are those operated at less than 100 kV.

the planning criteria established by the RP&P. Significant lead times are needed to site, design and install new line and substation facilities, especially where new sites and/or rights-of-way (ROW) must be acquired.

The reliable and economical operation of PPL Electric's transmission system requires planning standards for system expansion and reinforcement. The principles upon which these planning practices are based recognize that:

- The system expansion should be coordinated to achieve the most economical balance of construction and operating expenditures;
- The system should maintain a proper balance between the degree of risk, amount and type of load interrupted, and the cost of providing the expansion; and
- The system reliability should be maintained to prevent large scale, long term, or frequent service interruptions to avoid adverse effects and hazards to the public.

PPL Electric undertakes an independent analysis of both its BES transmission facilities and its non-BES transmission system facilities. The BES includes transmission facilities operated at voltages of 100 kV or higher. The non-BES includes transmission facilities operated at voltages less than 100 kV. The PPL Electric planning practices are outlined in the RP&P, which was developed to ensure adequate and appropriate levels of electric service to its customers consistent with good utility practice.

The fundamental purpose of the RP&P is to provide PPL Electric planning engineers with a comprehensive set of planning practices and criteria that enable them to plan for reliable transmission and distribution systems for PPL Electric's customers. The RP&P is reviewed periodically by PPL Electric engineers and planners. The document is updated as required to reflect current standards and practices. Updates to the document are approved by PPL Electric's senior management. PPL Electric's RP&P is consistent

with good utility practices and with the reliability criteria and standards used by similarly situated distribution and transmission utilities.

In accordance with these practices and PPL Electric's Reliability Criteria, PPL Electric's transmission system is planned so that it can be operated at all projected load levels and during normal scheduled outages and to withstand specific unscheduled contingencies without exceeding the equipment capability, causing system instability or cascade tripping, or exceeding voltage tolerances. The transmission system is required to have adequate capability so that it can be operated normally and can withstand the following unscheduled contingencies and other system conditions:

1. Normal operation of the system will not load any electric facility beyond its normal continuous rating.
2. The loss of any single transmission line, generating unit, power transformer, substation bus, circuit breaker, or double-circuit line due to the outage of a single tower or pole, does not result in any system electric facility being operated beyond its applicable emergency rating.
3. No customer load should remain interrupted for routine maintenance of non-BES transmission facilities.
4. The loss of any single facility should not result in a voltage drop of more than 5% on the non-BES transmission system.
5. Stability of the electric system should be maintained from a permanent three-phase transmission line fault cleared by normal primary relay action. In addition to this, system stability should also be maintained for a permanent single phase to ground line fault and the failure of the protective devices to operate properly resulting in a failed circuit breaker.
6. No large-scale, long-term, or frequent interruptions may cause excessive load loss due to their adverse effects on, and hazard to, the public.
7. Load in excess of the specified limits as defined in the RP&P is not interrupted for the loss of a single-circuit 69 kV line or double-circuit 69 kV line.

These principles are incorporated in the PPL Electric Utilities Transmission Planning RP&P document.

The planning process begins with the development of a computer model of the future system. A specific study year is chosen, and the future system model is developed using the existing system plus any planned modifications to the transmission system scheduled to be completed prior to the study year. Load levels used in the system model are based on the latest forecast prepared annually by PJM.

Once the system model is complete, comprehensive power flow simulations are performed to determine the ability of the system to comply with the PPL Electric transmission planning reliability criteria. This determination is accomplished by simulating the contingency conditions outlined above. All conditions where the system is not in conformance with the reliability criteria are identified and system reinforcements are added to bring the system into compliance. Also identified are estimated costs and lead-times to implement the required reinforcements. Computer simulations of the system with the identified reinforcement alternatives are completed to identify the best overall reinforcement that will meet the needs of the region in a reliable and economic manner.

3.0 PJM'S ROLE IN THE PROJECT

PJM Interconnection, L.L.C. (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 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) to identify system reinforcements that are required to, among other things, meet the North American

Electric Reliability Corporation (NERC) Reliability Standards,[2] PJM reliability planning criteria, and transmission owner (TO) reliability criteria. The RTEP is a FERC-approved transmission planning process that results from a comprehensive analysis to identify existing and forecasted violations of the NERC Reliability Standards on the transmission systems within PJM's service territory.[3]

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. The NERC reliability standards, TO criteria, and PJM reliability planning criteria are used by PJM and the transmission owners to analyze the system and to determine the specific transmission upgrade projects, as part of the overall reliability solution, that are needed to ensure long-term reliable electric service to customers and competitive power markets.

With respect to the BES, PJM conducts RTEP studies in conjunction with its transmission owners and applies NERC or PJM reliability criteria to specific conditions on the transmission system. When the studies show an inability of the transmission system to meet a specific reliability standard under these conditions, solutions such as construction of one or more new transmission lines or one or more upgrades to existing transmission facilities may be necessary. PPL Electric, an owner of transmission facilities in Pennsylvania, is a member of PJM and actively participates in the PJM transmission planning process.

[2] On February 3, 2006, FERC certified the NERC as the organization required to establish and enforce reliability standards for the BES. Thereafter, NERC develops and enforces reliability standards, which define the reliability requirements for planning and operating transmission systems in North America. The NERC Reliability Standards apply to all users, owners, and operators of the nation's interconnected transmission grid, including PPL Electric.

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

The proposed Honey Brook – Twin Valley 138/69 kV Transmission Line Project will resolve reliability criteria violations of PPL Electric's local planning criteria (RP&P) on the 69 kV transmission (i.e., non-BES) System. For non-BES system reliability violations, the local TO, in this case PPL Electric is responsible for identifying the reliability violations and correcting any violations to meet its own local transmission planning criteria. PPL's local transmission planning criteria for ensuring the reliability of the non-BES transmission system are based on the principles of the NERC and PJM reliability criteria for the BES. PJM relies on the local TOs to ensure the reliability of their non-BES system by meeting their own local transmission planning criteria. Projects that are necessary to resolve either NERC criteria, PJM reliability criteria, or the transmission owners' own local transmission planning criteria are included as baseline projects in PJM's RTEP.

To meet the objective of FERC Order 890 for a more open and transparent transmission planning process, PJM has taken a more active role in ensuring that the transmission owners communicate their plans for the development of their lower voltage transmission systems. In order to comply with FERC Order 890, TOs began submitting their lower voltage reliability projects to PJM in the 2009 time frame so that they can be presented before the PJM stakeholders at the Sub-Regional RTEP Committee meetings.

The PJM Sub-Regional RTEP Committee review includes, but is not limited to, the review of the TO criteria, assumptions and models used to identify reliability criteria violations and proposed solutions prior to finalizing the Local Plan. The Committee members are provided an opportunity to review and provide written comments to the transmission owners on the criteria, assumptions, and models used in local planning activities prior to finalizing the Local Plan. Once the Local Plan is finalized, the Committee is provided an opportunity to review and provide written comments to the TOs on the Local Plans as they are integrated into the RTEP. The transmission owners' Local Plans, that were reviewed and endorsed by the Committee, are then included in the final draft RTEP, which is sent to the PJM Board for review and approval. Once the PJM Board approves the RTEP that includes the TO Local Plans, the TOs then move forward

to implement the RTEP BES transmission and the non-BES facilities as they are obligated to do under the PJM Tariff and Operating Agreements.

The purpose of the Honey Brook – Twin Valley 138/69 kV Transmission Line Project is to resolve reliability violations that occur on the non-BES system serving the eastern portion of the Lancaster Region of PPL Electric's service territory. PPL Electric submitted the proposed Project to PJM for review and inclusion in the RTEP in November 2010. The Project was presented before stakeholders at the Mid-Atlantic Sub-Regional RTEP meeting on March 2, 2011, approved by the PJM Board, and included in the 2011 RTEP Report as baseline project b1526.

4.0 EXISTING SYSTEM

The existing Honey Brook 69-12 kV Substation is supplied from a 69 kV tap off the South Akron – Morgantown #2 69 kV Transmission Line. This tap is approximately 3.3 miles long and is the only source of supply for the Honey Brook Substation. The Morgantown 69-12 kV Distribution Substation is supplied by the double-circuit #1 and #2 South Akron – Morgantown 69 kV Transmission Line. From the Morgantown Substation, the existing Twin Valley 69-12 kV Substation is supplied from a 1.7-mile tap off of the South Akron – Morgantown #1 69 kV Transmission Line with the flexibility of transferring to the South Akron – Morgantown line #2 69 kV Transmission Line through a switch in abnormal conditions. This tap provides the only source of supply for the Twin Valley Substation. A portion of this tap, approximately 0.4 mile, is buried (underground facilities).

5.0 DEFINITION OF THE PROBLEM

Due to increasing customer load growth at 1.3% per year in the area, including the large increasing customer load at Titanium Metals Corporation (TIMET) in Morgantown, the transmission planning studies project that for 2014 and beyond the loss of the Twin Valley 69 kV Taps would interrupt approximately 40 MW of load, which equates to approximately 1,700 customers, including large industrial loads. Moreover, an outage on

any portion of the approximately 0.4-mile underground line section of the Twin Valley tap could result in substantially longer outages for the customers served from the Twin Valley Substation in case of an interruption.

There are currently no alternate 69 kV ties to the Twin Valley 69 kV Taps to restore customer load in the event of an interruption. PPL Electric's RP&P states that the maximum allowable load loss is 30 MW for a single-circuit outage. This is a violation of that practice.

Furthermore, a loss of the double circuit South Akron – Morgantown #1 & #2 69 kV circuits would interrupt approximately 71 MW of load or 11,200 customers, including large industrial load. The Transmission System Operator would be able to sectionalize the transmission system to restore a portion of this load within a few hours. However, after all switching moves are made to restore customer load, approximately 54 MW of load, or 3,700 customers, would remain interrupted for extended periods of time until repairs are made. The RP&P states that the maximum allowable load loss is 45 MW for a double circuit outage. This is a violation of that planning practice.

History has shown that during particular severe weather events that resulted in interrupted transmission facilities, a backup or alternate transmission supply line would have enabled PPL Electric to restore more customer load in a shorter period of time. Load restoration is key to customer satisfaction. The South Akron – Morgantown #1 & #2 69 kV circuits have experienced 16 interruptions over the past 20 years which resulted in extended outages for the customers served from these circuits. If a different source of supply had been available, service to additional customers could have been restored more quickly.

Load growth in the eastern Lancaster County, southwestern Berks County and western Chester County areas served by the South Akron – Morgantown #1 & #2 69 kV circuits has been significant. The South Akron – Morgantown #1 & #2 69 kV circuits have experienced a 1.4% average annual increase in electric peak demand over the past 10 years. PJM projects a 1.3% annual future summer growth rate of peak demand for the

overall PPL zone for the next 10 years (2013-2023). In addition, this area is experiencing significant industrial development that could result in an acceleration of load growth. Improvements to the local transmission facilities are necessary to maintain reliable service that PPL Electric customers have come to expect over the years.

6.0 PROPOSED SOLUTION

To resolve the issues described above, PPL Electric, following approval from the PUC, plans to construct a new double-circuit 138/69 kV transmission tie line, the Honey Brook – Twin Valley 138/69 kV Transmission Line, initially operated as a single circuit 69 kV line, between the Honey Brook 69 kV Tap (near the Honey Brook 69-12 kV Substation) northeast to the Twin Valley 69 kV Tap (near Twin Valley 69-12 kV Substation), a distance of approximately 5.3 miles. PPL Electric will design the new line to current 138 kV standards, but will operate the line at 69 kV initially.

PPL Electric determined that this proposed new Honey Brook – Twin Valley 138/69 kV Transmission Line will resolve the two RP&P transmission violations in the area because it will provide load transfer capability. After this reinforcement Project is constructed and in service, service to customer load will be able to be restored through load sectionalizing moves within acceptable RP&P criteria limits in the event of an outage of the Twin Valley 69 kV Tap. Similarly, after this reinforcement Project is completed and in service, service to customer load will be able to be restored through load sectionalizing moves within acceptable RP&P criteria limits in the event of an outage of the double-circuit South Akron – Morgantown #1 & #2 69 kV Transmission Line near the Morgantown Substation.

Additionally, this reinforcement will provide a backup supply line to the Honey Brook Substation in the event that the 69 kV tap to Honey Brook is interrupted. Although the Honey Brook Substation load has not surpassed 30 MW yet, it is expected to reach this level in the next 10 to 15 years.

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ENVIRONMENTAL SETTING

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Acronyms and Abbreviations

ASAs	Agricultural Security Areas
BHP	Bureau of Historic Preservation
CRGIS	Cultural Resource Geographic Information System
EPA	U.S. Environmental Protection Agency
CWF	Cold water fishery
DCNR	Pennsylvania Department of Conservation and Natural Resources
DEP	Pennsylvania Department of Environmental Protection
GIS	Geographic information system
HQ-CWF	High quality cold water fishery
kV	Kilovolt
Louis Berger	The Louis Berger Group, Inc.
NAI	Natural Areas Inventory
NHD	National Hydrography Dataset
NLCD	National Land Cover Database
NRCS	National Resources Conservation Service of the U.S. Department of Agriculture
NRHP	National Register of Historic Places
NSSH	National Soil Survey Handbook
NWI	National Wetlands Inventory
PEM	Palustrine emergent marsh (wetland)
PennDOT	Pennsylvania Department of Transportation
PFBC	Pennsylvania Fish and Boat Commission
PFO	Palustrine forested (wetland)
PGC	Pennsylvania Game Commission
PHMC	Pennsylvania Historical and Museum Commission
PNDI	Pennsylvania Natural Diversity Inventory
PNHP	Pennsylvania Natural Heritage Program
POW	Palustrine open water (ponds)
PPL Electric	PPL Electric Utilities Corporation
PSS	Palustrine scrub shrub (wetland)
PUC	Pennsylvania Public Utility Commission
ROW	Right-of-way
SSURGO	Soil Survey Geographic Database
T&E	Threatened and endangered (species)
TNC	The Nature Conservancy
UNT	Unnamed tributary
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WWF	Warm water fishery

1.0 INTRODUCTION

PPL Electric Utilities Corporation (PPL Electric) seeks approval from the Pennsylvania Public Utility Commission (PUC) to site and construct a new 138/69 kV transmission line, the Honey Brook – Twin Valley 138/69 kV Transmission Line (the "Project"). As described in Attachment 2, PPL Electric has identified the need to construct a new, double-circuit 138/69 kV transmission line from an existing line just north of the Honey Brook Substation in Chester County, Pennsylvania to the existing line just north of the Twin Valley Substation in Berks County, Pennsylvania.

The purpose of this Attachment is to provide background information on the natural and built environment located within the Project Study Area (Study Area), which provides the basis for the comprehensive route selection study discussed in Attachment 4. The routing process involved a series of steps, including identification of a suitable Study Area; Potential Route development, analysis, and refinement; Alternative Route development; public outreach activities; and identification of Preferred and Alternate routes. The routing process is described in more detail in Attachment 4.

The Routing Team identified a Study Area encompassing approximately 10,715 acres (16.7 square miles) within Chester, Berks and Lancaster counties, Pennsylvania (Figure 3-1). The Project Study Area is bounded generally by the intersection of the Pennsylvania Turnpike (I-76) and State Route 23 to the north; Robert G. Struble Lake, Chestnut Tree Road, and Township Line Road to the east; Honey Brook Borough and U.S. Route 322 (Horseshoe Pike) to the south; and the intersection of Maxwell Hill Road and Conestoga Creek Road west of State Route 10 to the west. Table 3-1 identifies the municipalities located within the Study Area.

Table 3-1. Municipalities within the Study Area

County	Municipalities
Chester	Honey Brook Township, West Nantmeal Township, Honey Brook Borough
Berks	Caernarvon Township
Lancaster	Caernarvon Township

3.2.3 100-year Floodplains

Floodplains are typically associated with streams and wetland complexes. Within the Study Area, floodplains are generally concentrated to the north along the Conestoga River, West Branch of the Conestoga River, and their respective tributaries in Caernarvon Township, Berks County and Caernarvon Township, Lancaster County; and to the south along the West and East Branches of Brandywine Creek and their respective tributaries in West Nantmeal and Honey Brook townships, Chester County; (see Figure 3-6). Approximately half of the palustrine and lacustrine wetlands in are located within these floodplains. No floodplains are located in the central portion of the Study Area, which includes Welsh Mountain.

3.3 Vegetation

All three routes cross one level III ecoregion (EPA, 1999), the Northern Piedmont ecoregion. Level III ecoregions are ecological areas or divisions small enough to enhance regional environmental monitoring, assessment and reporting, as well as decision-making. Because level III ecoregions are smaller (i.e., compared to level I and II ecoregions), they allow locally defining characteristics to be identified, and more specific management strategies to be formulated. The natural vegetation of the Northern Piedmont Section primarily consisted of Appalachian Oak Forest (dominated by white and red oaks [*Quercus* sp.]) (EPA, 1999). Much of the land within the Study Area has been farmed. Forested areas can be characterized as Mixed Oak Forest and typically consist of various species of oak, tulip poplar (*Liriodendron tulipifera*), red maple (*acer rubrum*), and beech trees (*Fagus,* sp.) (Chester County NAI, 1994).

According to the National Land Cover Database (NLCD, 2006) and as shown in Table 3-2, the Study Area is dominated by grassland/pasture (40 percent), with lesser amounts of forest (25 percent) and cultivated croplands (24 percent). Grassland/pasture and cultivated croplands comprise the northern and southern portions of the Study Area, whereas forest cover concentration is located in a northeast to southwest linear path, generally along the Welsh Mountain ridge. Welsh Mountain is located within the Pennsylvania Highlands region. The Pennsylvania Highlands region encompasses approximately 1.9 million acres of forest and farmland located

along the eastern-most ridges of the Appalachian Mountains (Appalachian Mountain Club, no date).

3.4 Special Natural Areas

A Natural Areas Inventories (NAI) has been prepared by The Nature Conservancy in association with the Pennsylvania Natural Heritage Program (PNHP) for Lancaster, Berks, and Chester counties. The NAI includes information on the locations of rare, threatened, and endangered species and the highest quality natural areas located within the counties.

Two natural areas within the Study Area were identified in the NAIs: Conestoga River Headwaters (Caernarvon Township, Berks County; Caernarvon Township, Lancaster County; and Honey Brook Township) and West Branch Brandywine Creek (Honey Brook Township). The Conestoga River Headwaters NAI is primarily located within Berks County, but also includes small areas in Chester and Lancaster counties. This NAI contains a diversity of habitats within a landscape formerly dominated by agriculture. Riparian habitats along the Conestoga River and its tributaries provide habitat for a species of concern. The NAI indicates that a species of concern may be present in this area, but is not specifically identified. In the West Branch Brandywine Creek area, most of the historic wetlands of this watershed were drained or dammed to create fields or farm ponds for agricultural production. Four species of concern are currently known from these habitats: Pennsylvania rare bushy bluestem (*Andropogon glomeratus*), Pennsylvania threatened sweet bay magnolia (*Magnolia virginiana*), Pennsylvania endangered swamp lousewort (*Pedicularis lanceolata*), and a specific plant species of concern not identified in the NAI.

3.5 Threatened, Endangered and Rare Species

On April 27, 2012, PPL Electric submitted a Large Project Review Pennsylvania Natural Diversity Inventory (PNDI) request to the three agencies responsible for the protection of rare wildlife species in Pennsylvania: U.S. Fish & Wildlife Service (USFWS), Pennsylvania Game Commission (PGC), and Pennsylvania Fish and Boat Commission (PFBC). On June 5, 2012, PPL Electric received a response letter from USFWS indicating that the Project is located within the range of the federally threatened bog turtle (*Clemmys muhlenbergii*). Bog turtles usually occur in small, discrete populations, generally occupying open-canopy, herbaceous sedge meadows and fens

bordered by wooded areas. These wetlands are a mosaic of micro-habitats that include dry pockets, saturated areas, and areas that are periodically flooded. Bog turtles depend upon this diversity of micro-habitats for foraging, nesting, basking, hibernation, and shelter (USFWS, 2001). No specific locations of recorded bog turtle habitat were identified in the letter. The PFBC's May 20, 2012 response letter indicated that no adverse impacts to state rare, candidate, threatened or endangered fish, reptiles, amphibians or aquatic invertebrates are anticipated.

The PGC's July 13, 2012 response indicated that the Project is located in the vicinity of a state bat species of special concern, the northern myotis (*Myotis septentrionalis*). Northern myotis hunt at night over small ponds, in forest clearings, at tree top level and along forest edges. This species uses caves and underground mines for hibernation and individuals may travel up to 35 miles from their summer habitat for hibernation. Maternity roosts are located in tree cavities, under exfoliating tree bark and in buildings (PNHP, 2013). No specific locations of recorded northern myotis habitat were identified in the PGC letter.

PPL Electric sent an initial and follow-up letter to the Pennsylvania Department of Conservation and Natural Resources (DCNR) on April 27, 2012 and January 17, 2013, requesting current information on federal, state, and rare plant species that may occur in proximity to the Study Area. A preliminary response was not received from DCNR. However, DCNR's February 11, 2013 response indicated that no impact is anticipated if Route A (the Preferred Route; see Attachment 4) is selected. However, if Route D (the Alternate Route, identified as Route B in the letter; see Attachment 4) is selected, DCNR requests surveys for the state-threatened sweet bay magnolia (*Magnolia virginiana*). The DCNR letter is included in Attachment 8.

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ALTERNATIVES AND SITING ANALYSIS

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Acronyms and Abbreviations

BHP	Bureau of Historic Preservation
CRGIS	Cultural Resource Geographic Information System
EHV	Extra-high voltage
EPA	U.S. Environmental Protection Agency
ESRI	Environmental Systems Research Institute
FAQs	Frequently asked questions
CNHI	County Natural Heritage Inventories
CWF	Coldwater fishery
DBH	Diameter at breast height
DCNR	Pennsylvania Department of Conservation and Natural Resources
GIS	Geographic information system
GPS	Global positioning system
HQ-CWF	High Quality Cold Water Fisheries
HUC	Hydrologic unit code
kV	Kilovolt
mcf	Million cubic feet
msl	Mean sea level
Louis Berger	The Louis Berger Group, Inc.
MRLC	Multi-resolution land characteristics
NAI	Natural Areas Inventory
NAIP	National Agricultural Inventory Project
NERC	North American Electric Reliability Corporation
NGOs	Non-government agencies
NHD	National Hydrography Dataset
NLCD	National Land Cover Database
NPDES	National Pollutant Discharge Elimination System
NRCS	National Resources Conservation Service of the U.S. Department of Agriculture
NRHP	National Register of Historic Places
NWI	National Wetlands Inventory
OHV	Off-highway vehicle
OPGW	Optical ground wire
PE	Potentially eligible
PFBC	Pennsylvania Fish and Boat Commission
PGC	Pennsylvania Game Commission
PHMC	Pennsylvania Historical and Museum Commission
PNDI	Pennsylvania natural diversity inventory
PNHP	Pennsylvania natural heritage program
PPL Electric	PPL Electric Utilities Corporation
PUC	Pennsylvania Public Utility Commission
ROW	Right-of-way
SHPO	State historic preservation office
SSURGO	Soil Survey Geographic Database
T&E	Threatened and endangered (species)

UNT	Unnamed tributary
USACE	United States Army Corps of Engineers
USDA	U.S. Department of Agriculture
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WWF	Warm water fishery

EXECUTIVE SUMMARY

PPL Electric Utilities Corporation (PPL Electric) has identified the need to construct a new, double-circuit 138/69 kV transmission line between an existing transmission line just north of the existing Honey Brook Substation located in Chester County, Pennsylvania and the existing line just north of the Twin Valley Substation located in Berks County, Pennsylvania. The Louis Berger Group, Inc. (Louis Berger) was retained by PPL Electric to support the route selection study process for the proposed Honey Brook – Twin Valley 138/69 kV Transmission Line Project (the "Project").

A multi-disciplinary Routing Team (see Section 2.1 below), consisting of members of PPL Electric and Louis Berger, conducted a comprehensive route selection study to establish a Preferred Route for the Honey Brook – Twin Valley 138/69 kV Transmission Line. Using established routing guidelines, the Routing Team identified constraints and opportunity features within the study area that would minimize impacts to the natural and human environment and take advantage of existing corridors to the extent practicable. The Routing Team acquired environmental and engineering data from various sources and assembled the information into a geographic information system (GIS) database superimposed on aerial photography. Potential Routes were field checked from publically accessible locations to validate the aerial imagery and assess the viability of the Potential Routes based on conditions observed in the field. Based on information gathered in the field, the Routing Team adjusted the Potential Routes as appropriate.

The Routing Team evaluated the advantages and disadvantages of the Potential Routes based on the established routing criteria, an inventory of land use, environmental, and cultural factors along each of the routes, and additional local knowledge and past experience. Less favorable Potential Routes were eliminated and four potentially viable Alternative Routes were retained for further consideration. The developed Alternative Route Network was presented at public meetings for comment. Following this public input process, the Routing Team conducted additional field reconnaissance to review comments collected at the public meetings and finalize routing decisions. This iterative process resulted in the identification of the Preferred Route.

Based on an assessment of the advantages and disadvantages of the four Alternative Routes under consideration, the Routing Team selected Alternative Route A as the Preferred Route. This selection is based on the following factors:

- Shortest length compared to the other Alternative Routes
- Less impact to forested areas and cultivated crops
- Fewer property crossings
- Fewer residences within 500 feet of the center line
- Less right-of-way access purchase required
- Crosses fewer steep slopes
- Fewer potential impacts to plant species of concern

The Routing Team believes that the cumulative social, environmental, and financial impacts associated with constructing Alternative Route A will be less than any other Alternative Route.

1.0 INTRODUCTION

PPL Electric has identified the need to construct a new, double-circuit 138/69 kV transmission line between an existing transmission line just north of the existing Honey Brook Substation located in Chester County, Pennsylvania and the existing transmission line just north of the existing Twin Valley Substation located in Berks County, Pennsylvania. The Louis Berger Group, Inc. (Louis Berger) was retained by PPL Electric to support the route selection study process for the proposed Honey Brook – Twin Valley 138/69 kV Transmission Line Project (the "Project").

1.1 Project Overview

This Project is part of the PPL Electric 15-year plan for the Lancaster Region. Electric customers in eastern Lancaster County, southwestern Berks County, and western Chester County are now served by a network of 69 kV transmission lines fed by a substation in the south Akron area. The Honey Brook and Morgantown regions are served from a single 69-kilovolt circuit each, making these regions vulnerable to extended power outages during emergency conditions. The new transmission line from Honey Brook to Twin Valley will provide an alternate supply of electricity to these regions in case of an emergency.

1.2 Project Timeline

PPL Electric initiated a 9-month transmission siting process in January 2012. Initial Potential Routes were developed in early 2012 and presented to the public in April 2012 at a public open house meeting. Based on the results of the route selection process, PPL Electric announced the selection of the Preferred Route in October 2012 and held a subsequent public meeting. Minor routing adjustments occurred after October 2012 based on discussions with individual property owners. Subject to Pennsylvania Public Utility Commission approval, construction is scheduled to begin in August 2014 to meet a March 2015 system in-service date.

1.3 Goal of the Route Selection Study

The goal of the route selection study is to gain a detailed understanding of the opportunities and constraints in the Project Study Area to facilitate the development of Alternative Routes, evaluate potential impacts associated with the Alternative Routes, and, ultimately, identify a Proposed Route for the Project. The Proposed Route is defined as the route that minimizes the effect of the transmission line on the natural and human environment, while avoiding unreasonable and circuitous routes**,** extreme costs, and non-standard design requirements. This document describes the Alternative Route identification, evaluation, and selection process for the proposed Honey Brook – Twin Valley 138/69 kV Transmission Line Project.

1.4 Project Description

PPL Electric proposes to provide a second source of electric power into the Twin Valley Substation by constructing a new, double-circuit 138/69 kV transmission line between existing lines in the vicinity of the Honey Brook Substation located in Honey Brook Township in Chester County and the Twin Valley Substation located in Caernarvon Township in Berks County. The line will be constructed for double-circuit 138 kV operation, but will be initially operated as a single 69 kV circuit until load growth in the area increases.

1.4.1 Project Study Area

The Study Area is that territory in which line route alternatives can be sited to feasibly meet the Project's functional requirements and, at the same time, minimize environmental impacts and Project costs. The boundaries of the Study Area were determined by the geographic area encompassing the two end points (the Honey Brook Substation to the south and the Twin Valley Substation to the north). As discussed in Section 1.1, the goal of the Project is to provide another 138/69 kV transmission source into the Twin Valley Substation. The Study Area was intended to encompass all reasonable Potential Routes between the two endpoints.

Given these considerations, the Routing Team identified a Study Area encompassing approximately 10,715 acres (16.7 square miles) within Chester, Berks, and Lancaster counties, Pennsylvania (see Figure 3-1). The Project Study Area is bounded generally by the intersection of the Pennsylvania Turnpike (I-76) and State Route 23 to the north; Robert G.

Struble Lake, Chestnut Tree Road, and Township Line Road to the east; Honey Brook Borough and U.S. Route 322 (Horseshoe Pike) to the south; and the intersection of Maxwell Hill Road and Conestoga Creek Road west of State Route 10 to the west. Using this established Study Area, the Routing Team began its efforts to determine Potential Routes for the line.

1.4.2 Line Characteristics and Right-Of-Way Requirements

The proposed double-circuit design will consist of single-shaft steel poles equipped with steel conductor support arms. Angle structures, where required by the severity of the angle, will consist of a steel monopole on concrete foundation or a two-pole steel structure with guy wires. All poles will be installed on concrete foundations or directly embedded into the ground. Some angle structures may be guyed. Altogether, this Project requires the installation of approximately 52 structures averaging 100 feet high. Average span lengths will be approximately 540 feet. Additional detail on the engineering considerations for this Project is included in Attachment 5.

2.0 ROUTING PROCESS

The Routing Team conducted a Route Selection Study to identify a Proposed Route for a new 138/69 kV transmission line between the existing line just north of the Honey Brook Substation and the existing line just north of the Twin Valley Substation. This section describes the Alternative Route identification, evaluation, and selection process.

2.1 Routing Team Members

A multi-disciplinary Routing Team performed the routing study. Team members were selected to bring wide experience to the routing study to achieve a thorough review of all aspects of developing the route. Members of the Routing Team have experience in transmission line routing, impact assessment for a wide variety of natural resources and the human environment, impact mitigation, engineering, and construction management. The team's objective was to identify a route that provided a reasonable balance between impacts on local communities and the natural environment, as determined through application of appropriate siting criteria and subject to technical guidelines, as addressed in detail below.

The team worked together during the route selection study to define the study area, develop routing criteria, identify routing constraints and opportunities, collect and analyze environmental and design data, solicit public input and concerns, consult with resource and permitting agencies, develop and revise the siting alternatives, and analyze and report on the selection of a Proposed Route. Table 4-1 identifies the Routing Team members and their areas of responsibility.

Table 4-1. Routing Team Members

Routing Team Member	Company	Title	Role
Doug Grossman	PPL Electric	Senior Siting Specialist	Siting Project Manager
Ken Kuhns	PPL Electric	Manager, Bulk Power Siting	Siting Oversight
Joe Nixon	PPL Electric	Communications Specialist	Corporate Communications
Luis Rodriguez-Ruiz	PPL Electric	Transmission Planner	Transmission Planning

Table 4-1. Routing Team Members			
Routing Team Member	**Company**	**Title**	**Role**
John Levitski	PPL Electric	Regional Community Relations Director	Community Outreach
Adam Morse	PPL Electric	Project Manager	Project Management
Colleen Kester	PPL Electric	Manager, Land/Land Rights Acquisition	Real Estate
Kyle Swartzentruber	PPL Electric	Transmission Designer	Engineering
Peter Sparhawk	Louis Berger	Manager, Transmission Services	Siting Lead, Project Manager
Andrew Burke	Louis Berger	GIS Specialist	GIS Analysis and Mapping
Heather Unger	Louis Berger	Environmental Scientist/Planner	Siting Support, Deputy Project Manager
Susan Davis	Louis Berger	Senior Permitting Specialist	Threatened and Endangered Species
Eric Voigt, RPA	Louis Berger	Senior Archaeologist	Siting, Cultural Resources Lead
Ray Germann	Henry & Germann	Principal and Owner	Public Outreach

2.2 Data Collection

Multiple sources of information were consulted to develop data for the Route Selection Study.

2.2.1 Aerial Photography

The following sources for aerial photography were used:

- Imagery from the National Agricultural Inventory Project (NAIP) was obtained from the United States Department of Agriculture that covered the entire Study Area in Pennsylvania (dated 2011)
- Environmental Systems Research Institute (ESRI) imagery, which is provided through Aerials Express (dated 2011)
- Imagery from the PAMAP Program was obtained for the entire Study Area (dated 2008). The PAMAP program is a statewide Department of Conservation and Natural Resources program run by the Bureau of Topographic and Geologic Survey.
- Bing Maps imagery, which ranges in date depending on location.

The PAMAP photography was formatted electronically at a scale of 1 inch to 500 feet as a set of 22-inch by 34-inch map sheets covering the Study Area. Updated information such as the location of residences and other buildings was annotated on the photography or electronically as database notes, as discovered and verified during field inspections.

2.2.2 GIS Data Sources

Extensive use was made during the Route Selection Study of information from existing GIS data. This information was obtained from many sources, including federal, state, and county governments. Much of this information was obtained through official agency GIS data access websites, some was provided directly by government agencies, and some was created by the Routing Team by either digitizing information from paper-based maps or through aerial photo interpretation.

The use of GIS data allows for the consideration and efficient use of a wide variety of information that would otherwise be unavailable or impractical to consider for a planning effort of this scope. GIS information is a highly effective tool when utilized for broad level planning studies, identifying and characterizing landscape level constraints and features, and developing environmental inventory information useful for comparisons between planning alternatives.

However, GIS data sources vary widely with respect to their accuracy and precision, and presentation, analysis, and calculations derived from these data sources require careful consideration when used for planning purposes. Therefore, GIS-based calculations and maps presented in this Application should be considered reasonable approximations of the resource or geographic feature they represent, and not absolute measures or counts. They are presented to allow for general comparisons between alternatives with the assumption that the level of any inherent errors or inaccuracies would be generally equal across all alternatives. A list of the major GIS data sources gathered, used, or otherwise considered in this routing study is presented in Table 4-2.

Table 4-2. GIS Data Sources	
Category	**Data Source**
Aerial Imagery	
Aerial Imagery	Imagery was obtained from the following sources: the NAIP was obtained from the U.S. Department of Agriculture (USDA) covering the entire Study Area (dated 2011); ESRI imagery, which is provided through Aerials Express (dated 2011); and Bing Maps imagery, which ranges in date depending on location.
Administrative	
County Boundaries	2012 ESRI file containing boundaries and census data for all counties in the United States.
Municipality Boundaries	This dataset consists of county and municipal boundaries aggregated by the PAMAP Program from data supplied by various Pennsylvania county governments.
Hydrology	
Rivers and Lakes	National Hydrography Dataset (NHD) - The NHD is a comprehensive set of digital spatial data prepared by the USGS and USEPA that contains information about surface water features such as lakes, ponds, streams, rivers, springs and wells.
Water Quality Standards	The Pennsylvania Department of Environmental Protection (PADEP) has designated water quality use designations, high and exceptional value quality waters and recreation waters. This information was obtained from PADEP (2013).
Wetlands	The National Wetlands Inventory (NWI) of the U.S. Fish & Wildlife Service (USFWS). The NWI produces information on the characteristics, extent, and status of the Nation's wetlands and deepwater habitats. The National Wetlands Inventory information is used by federal, state, and local agencies, academic institutions, U.S. Congress, and the private sector for reviewing general wetland distribution for planning purposes.
100-Year Flood Hazard	Data on 100-year flood hazard areas was acquired from the Office of Remote Sensing for Earth Resources, Penn State University (1996).
Watershed Boundaries	Hydrologic Unit Code (HUC)-8 boundaries were obtained from the U.S. Department of Agriculture Natural Resource Conservation Service (USDA-NRCS).

Table 4-2. GIS Data Sources	
Category	**Data Source**
Conservation Lands	
Public Lands	A combination of data sources was used to determine lands owned by federal, state, and local governments; non-government agencies (NGOs); and private conservation easements. The Protected Areas Database of the United States (PAD-US) (2011) forms the majority of the data. Additional data representing federal lands, public parks, and landmark areas were incorporated from ESRI (2012), Redlands, California.
State Parks, Forests, and Game Lands	Data for State Parks (2011), Forests (2010) and Game Lands (2009) located within Pennsylvania prepared by the PA DCNR and the PA Game Commission.
Easements	Private conservation easements from the National Conservation Easement Database which is comprised of voluntarily reported conservation easement information from land trusts and public agencies. Agricultural easements and assessment areas were also obtained from Lancaster, Berks, and Chester counties.
Human Environment	
Points of Interest	The locations of various points of interest were derived from Institutions layer from ESRI, (2012) Redlands, California, and the U.S. Geological Survey's GNIS. This dataset includes the locations of cemeteries, churches, hospitals, parks, and schools.
Residences and Commercial Buildings	Residential and other buildings were identified through a combination of aerial imagery and field observations.
Parcel Boundaries, Ownership Information and Subdivisions	Parcel boundaries and property ownership information were obtained from Lancaster, Berks and Chester counties GIS or Assessor's offices (2012).
Airfields and Heliports	Airfields and heliports were identified through the U.S. Geological Survey's GNIS and ESRI (2012) and the Federal Aviation Administration (FAA) database (2012).
Transportation	U.S. road and railroad data prepared by ESRI (2012), Redlands, California.
Existing Transmission Lines and Substations	Existing transmission line and substation information provided by PPL and adjusted based on aerial photography.

Table 4-2. GIS Data Sources	
Category	**Data Source**
Historic Resources	
Historic Sites and Districts	Sites and districts listed or eligible on the National Register of Historic Places (NRHP) acquired through the database maintained by the Pennsylvania Historical & Museum Commission (PHMC) (2012).
Land Use	
Land Use/Land Cover	The National Land Cover Database 2006 (NLCD 2006) compiled by the Multi-Resolution Land Characteristics (MRLC) Consortium (including the U.S. Geological Survey, Environmental Protection Agency, U.S. Forest Service, National Oceanographic and Atmospheric Association, National Aeronautics and Space Administration, Bureau of Land Management, National Park Service, Natural Resource Conservation Service, and the USFWS). NLCD 2006 products include 20 classes of land cover from Landsat satellite imagery.
Sensitive Species	
Natural Heritage Inventory	The County Natural Heritage Inventory effort within PA is a cooperative program undertaken by the Pennsylvania Natural Heritage Program (PNHP) partnership. The County Natural Heritage Inventories (CNHI) have been systematic studies of the critical biological resources of the state, county by county (2013)
Geology and Soils	
Geology	Identification and descriptions of physiographic regions and bedrock were obtained from the PA Department of Natural Resources, Division of Geological Survey.
Topographic Contours	U.S. Geologic Survey 7.5 24:000 topographic quadrangle maps (various dates).
Soils	Soil associations crossed by the routes were extracted from the United States Department of Agriculture, Natural Resources Conservation Service Soil Survey Geographic (SSURGO) Database (2002).

2.2.3 Ancillary Data Sources

Maps reviewed for the Route Selection Study include U.S. Geological Survey (USGS) 7.5-minute topographic quadrangle maps, existing County-level and park-level natural resource maps, state and county road maps, transmission line map information and land ownership maps.

2.2.4 Route Reconnaissance

Routing Team members conducted field inspections throughout the Study Area. The team members examined potential routes by automobile from points of public access and correlated observed features to information shown on aerial photography, USGS 7.5 minute topographic maps, road maps, locally available development sketch maps, and other information. Relevant features were viewed, verified, and recorded on laptop computers displaying aerial photography using GIS software supported by real-time Global Positioning System (GPS) tracking for positional information in each vehicle. A preliminary field review was conducted in May 2011 to identify major constraints and to familiarize the Routing Team with the Study Area. Detailed field reconnaissance was conducted in February and April 2012 to review the Potential Routes and identify constraints. Subsequent field visits were conducted in December 2012.

2.3 Process Steps and Terminology

The route development process is inherently iterative, with frequent modifications made throughout the study as a result of the identification of new constraints, input from agencies, landowners, and other stakeholders, periodic re-assessments of routes with respect to the routing criteria, and adjustments to the overall route network. As a result of the evolving nature of the route development process, the Routing Team uses specific vocabulary to describe the routes at different stages in the process. Routes that are first identified and investigated by the Routing Team are referred to as "Potential Routes" (Figure 4-1A).

Where Potential Routes intersect, links are formed as the segment of the route between two intersections (Figure 4-1B). Together, the Potential Routes and their intersecting links are referred to as the Potential Route network (Figure 4-1C).

As the route development process progresses, the Routing Team continues to evaluate new data and modifies, if necessary, the links of the Potential Route Network. Eventually, formal Alternative Routes are developed by assembling the links that best meet the routing criteria into individual routes for analysis (Figure 4-1D). The Routing Team then identifies a "Proposed Route" for review and approval, along with the other Alternative Route(s).

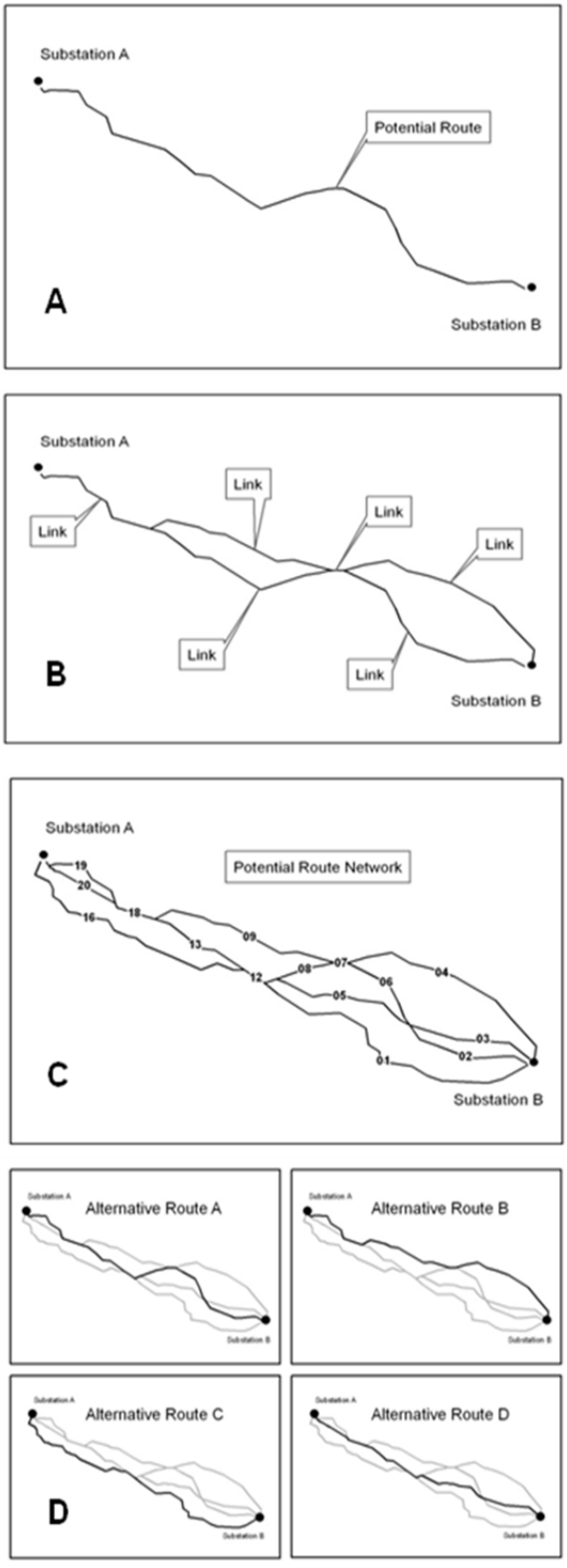

Figure 4-1. Routing Steps

2.4 Routing Guidelines

The primary objective in identifying a suitable route for the Project was to minimize effects of the line on natural resources, humans, land uses, cultural resources, and recreational resources, while providing safe, reliable and economic service to the local region.

Identifying a route that optimizes all constraints and opportunities requires a balancing and prioritization of many factors and can therefore be challenging. For example, a route with minimal impacts on wildlife habitat may have increased impacts on residential resources than other alternatives, and vice versa. In addition, federal and state laws and input from federal, state, and sometimes local regulatory agencies may impact siting decisions.

2.4.1 General Guidelines

Once the Study Area was identified, the Routing Team met in February 2012 to develop basic route selection criteria that would be used to select and analyze potential Alternative Routes. The recommendations for Project siting contained in this Application are based on the primary objective stated above and the following criteria and technical guidelines (the listed criteria are not in order of importance or weight). The Routing Team developed basic route selection criteria to select and analyze Potential Routes during the routing study. The Routing Team attempted to minimize:

- Route length, circuity, cost, and special design requirements.
- The removal or substantial interference with the use of existing residences.
- The removal of existing barns, garages, commercial buildings, and other nonresidential structures.
- Substantial interference with the use and operation of existing schools, recognized places of worship, cemeteries, and facilities used for cultural, historical, and recreational purposes.
- Substantial interference with economic activities, including agricultural activities.
- Crossing of designated public resource lands such as national and state forests and parks, large camps and other recreation lands, designated battlefields, nature preserves or other designated historic resources and sites, and conservation areas.

- Crossing of large lakes and large wetland complexes, critical habitat, and other unique or distinct natural resources.
- Substantial visual impact on residential areas and public resources.

2.4.2 Technical Requirements

The proposed line generally requires a 100-foot ROW to meet North American Electric Reliability Corporation (NERC) safety guidelines and PPL Electric's design criteria. As indicated previously, the line will be designed for future double-circuit 138 kV operation. Based on system planning requirements, the new 138/69 kV transmission line will be designed to connect to the existing Honey Brook Tap 138/69 kV Transmission Line, which exits the Honey Brook Substation to the northwest.

2.5 Routing Constraints

The Routing Team identified and mapped routing constraints in the Study Area. Constraints were defined as specific areas that should be avoided to the extent feasible during the route selection process. Constraints are generally divided into two groups based on the size of the geographic area encompassed by the constraint: large area constraints and small area constraints. The first group (large area constraints) includes constraints that cover large areas of land in the study area. Large area constraints are avoided to the extent practicable and are considered unfavorable by the Routing Team for developing Potential Routes.

The final list of large area constraints consisted of:

- Urban areas, including towns, small villages, and other high concentrations of commercial and industrial development areas, including Morgantown
- National Register Historic Districts and adjacent areas
- U.S. Department of Defense sites
- Recreational areas such as parks and large recreational reservoirs, including Robert G. Struble Lake
- Large streams, wetlands, or unique natural resource features
- Large mining areas including Martin Limestone, Inc.

- Critical habitat areas
- Designated State Forests, State Parks, State Game Lands, and other natural and conservation areas.

After the Potential Routes had been initially developed to avoid large area constraints to the extent practicable, the alignments were adjusted where feasible to avoid and maximize distance from small area constraints. Small area constraints encompass other feature types that are found within smaller geographic areas, or site-specific locations. Small area constraints generally consist of:

- Individual residences (including houses, anchored mobile homes, and multi-family buildings) and residential curtilage, which is interpreted in Pennsylvania as the area up to 100 meters (328 feet) immediately surrounding a residence, and used for domestic purposes. Curtilage does not extend beyond the individual's parcel boundaries and may also be "broken" by road or railroad ROWs or changes in land use.
- Commercial and industrial buildings
- Tree farms
- Cemeteries
- Places of worship
- Schools
- Hospitals
- Recorded sites of designated historic buildings and sites, including any specified buffer zone around each site
- Small wetlands
- Specific recreational sites, facilities, and trails
- Communications towers
- Designated scenic vista points.

The Routing Team attempted to keep the routes and all areas of the required ROW from passing over these point-specific constraints. However, in some instances complete avoidance of small area constraints (e.g., small wetlands) was not possible because of the large numbers or location

of these constraints in some areas of the Project. The Routing Team also considers alignments parallel to parcel boundaries and tree lines where practical to avoid bisecting properties.

2.6 Routing Opportunities

The Routing Team defined routing opportunities as locations where the proposed transmission line might be located with the least or minimal impact. Routing opportunities were identified and evaluated by:

- Reviews of aerial photography and other available mapping data
- Incorporation and consideration of available GIS data
- Field investigation of the Project area
- Public meetings with landowners and other stakeholders
- Federal, state, and local agency consultations
- Project input from PPL Electric staff
- Routing Team experience with similar projects.

Practical routing opportunities considered in the Study Area included sharing and/or paralleling existing rights-of-way and linear features, including:

- 69 and 138 kV transmission circuits
- Gas pipelines
- Railroads
- Major roads.

Existing transmission infrastructure did not provide significant routing opportunities, as few existing transmission lines are located within the Study Area. The Twin Valley Substation is supplied from a 1.7-mile tap off of the South Akron – Morgantown #1 69 kV line, which crosses and follows the Pennsylvania Turnpike and enters the substation from the west. This existing transmission line was not identified as a routing opportunity because there is insufficient space to construct a parallel route, and rebuilding the line for double-circuit operation would not resolve the reliability issue or provide capacity for a future double-circuit 138 kV line.

An existing underground natural gas pipeline bisects the northern portion of the Study Area. One potential link paralleled a portion of this pipeline through a forested area. In the vicinity of the Twin Valley Substation to the south, the pipeline traverses the Mountain View residential neighborhood. In this area, there is not sufficient space to continue paralleling the pipeline.

The Pennsylvania Turnpike, located adjacent to the Twin Valley Substation to the north, is the only major road that traverses the Study Area. Although the Pennsylvania Turnpike Commission allows transmission lines to cross the Turnpike, it does not permit utilities to construct transmission lines within the road ROW. Due to the proximity of the Morgantown Business Park, there is not sufficient space to parallel just outside of the Turnpike ROW and enter the Twin Valley Substation from the east. Local roads were not considered opportunities in this area because the team determined they would result in greater aesthetic and residential impacts than other opportunities in the Study Area.

3.0 ROUTE DEVELOPMENT

The Routing Team developed an array of Potential Routes. Potential Routes are an early iteration of the routing process that involves the development of conceptually based routes and general consideration of these routes with respect to constraints and opportunity features in the Study Area.

Once the initial Potential Route network was developed, the Routing Team reviewed each route in the field. Field efforts included reviewing the Potential Routes from public points of access and documenting locations of residences and other small area constraints. The Routing Team digitally recorded photographs, comments, and routing notes on laptops over aerial photography using GIS software supported by real-time GPS tracking for positional information.

The Potential Route identification effort resulted in a network of approximately 12 potential links that could be considered to route the new line from the Honey Brook Substation to the Twin Valley Substation. As the process continued, the route network was modified, as routes were adjusted, links were removed, and new links were added. Figure 4-2 shows the resulting network of Potential Routes evaluated by the Routing Team.

3.1 Potential Route Development

The Routing Team developed initial Potential Routes to avoid large area constraints and maximize the distance between small area constraints while avoiding circuitous routes and sharp angles. Where feasible, Potential Routes were sited to parallel property boundaries and tree lines rather than bisect these areas. The Routing Team developed Potential Routes that would enter the Twin Valley Substation from the east and west. The northernmost Potential Routes were generally developed to avoid crossing the active Martin Limestone Quarry while the southernmost Potential Routes were generally developed to avoid crossing Robert G. Struble Lake and minimize impacts to a large tree farm. Potential Routes were developed to connect the “northern” and “southern” links to provide additional options.

One of the Potential Routes paralleled an existing buried gas pipeline for a short distance through a wooded area and another paralleled Talbotville Road in Honey Brook Township. Potential Routes entering the Twin Valley Substation were sited to minimize impacts to the Mountain View residential development, Morgantown Business Park and a solar energy farm located in the immediate vicinity of the substation.

After the initial Potential Routes were identified, key members of the Routing Team conducted field inspections of the routes. These inspections involved the visual examination of the Potential Routes from road crossings and other points of public access. The initial link network was examined in the field in February 2012. Subsequent field inspections were conducted in April 2012. After selecting the Preferred Route, the ROW was reviewed in detail in December 2012 and February 2013.

The team utilized a GPS unit, along with the mapped coordinates of the potential routes superimposed on road/street mapping software, to track precise locations and record the path of the field work. Residences (single family, multi-family, modular homes, and mobile homes), outbuildings (garages, sheds, barns, etc.), commercial buildings, and other potentially sensitive receptors (e.g., cemeteries, churches, and schools) within 500 or 1,000 feet of each Potential Route center line were identified and recorded using database software. At various points, e.g., in locations where homes or structures are near the existing or proposed ROW, areas of environmental concern were noted, and various other routing challenges were identified. Photographs were taken at selected or representative locations throughout the potential route network.

The Honey Brook Substation is surrounded by commercial buildings to the east, south, and west. Therefore, only one option was identified to exit the Honey Brook Substation from the north until the route crosses State Route 10. From this point, the Routing Team identified a feasible "northern" and "southern" alternative that minimized potential impacts to the built and natural environment. The Siting Team created various links for these conceptual routes to identify options in particularly challenging areas. Similarly, due to the presence of constraints surrounding the Twin Valley Substation, including residential development and I-76, two

feasible options were identified to connect into the Twin Valley Substation. The "northern" option parallels the headwaters to the Conestoga River through commercially zoned property adjacent to the Morgantown Business Park and a solar farm to connect to the substation from the north. The "southern" option parallels Mountain View Road in between the Morgantown Business Park and the Mountain View residential community to enter the substation from the south. Additional options farther east into West Nantmeal Township were evaluated but were found to be circuitous without providing any real advantages over the other alternatives. In the area between Talbotville Road and White School Road, the Routing Team evaluated a few routes that traversed west-east. The Routing Team retained a potential link located in this central portion of the Study Area that connects the northern and southern Potential Routes. In addition, two options on the northern route were evaluated for crossing Best Road near the Lancaster-Berks County border.

The field investigations resulted in changes to the Potential Route alignments. Additional changes resulted from efforts to avoid residences and other buildings, such as garages, barns, and commercial structures, or other similar constraints discovered in the field that were not identifiable on the aerial imagery, such as new residences. Based upon these field investigations, some links were dropped altogether as they did not conform to the routing objectives or criteria. The Routing Team identified these changes and updated the Potential Route Network accordingly.

The Routing Team subsequently discussed the remaining Potential Routes in March 2012. During this meeting, comparative data, aerial photos, and notes taken during the field reconnaissance were reviewed. The major environmental and land use factors considered in this evaluation were: incremental aesthetic impact, proximity of residences and other buildings, known or suspected historic sites, threatened and endangered species sites, wetlands and other stream crossings, tree clearing requirements, unique or sensitive habitat, and length of new ROW required. Engineering factors were also considered during the link evaluation, including extent of ROW overlapping opportunities, identification of areas where rebuilding existing transmission structures to accommodate a new 138/69 kV line may be feasible, and areas that presented engineering and construction challenges (e.g., the number of angle structures required and the

need to "thread" the route through developed or otherwise difficult areas). The remaining links were assembled into Potential Routes labeled A through F and presented to the public for comment during an open house meeting held in April 2012. The format and content of the open house meeting is described in Section 4. The Potential Routes presented at the open house meeting are shown in Figure 4-3.

3.2 Development of Alternative Routes

Once the Potential Routes were developed, the Routing Team considered additional information provided by agency outreach, field review, data analysis, and public comment. A qualitative and quantitative screening process was employed to eliminate or modify route links from the Potential Route network that were not considered suitable for additional study to narrow down the network and focus on refining the more preferable links to establish Alternative Routes. In some cases, these eliminations or adjustments were based on the likelihood of impacts on residential developments, natural resources, or other developed infrastructure. Link C was significantly adjusted due to information received concerning a tree farm, a historic residence, and proximity to Struble Lake. The remaining route adjustments consisted of refinements based on public outreach and discussions with individual property owners. The Routing Team had discussions in May 2012 to evaluate the proposed links and select Alternative Routes.

The Routing Team developed four Alternative Routes from the remaining Potential Route network (Routes A through D). The Alternative Routes are summarized below and shown on Figure 4-4.

All four Alternative Routes traverse two Natural Area Inventory (NAI) areas identified by The Nature Conservancy: the Conestoga River Headwaters and the West Branch Brandywine Creek (see Figure 4-10). As discussed in Attachment 3, the Conestoga River NAI is a large natural area encompassing the Twin Valley Substation, both sides of I-76, Morgantown, and land north of I-176. This NAI is described as containing a diversity of habitats within a landscape formerly dominated by agriculture that provide habitat for an unidentified species of concern. The Conestoga River NAI is traversed by the Alternative Routes as they enter the Twin Valley Substation. Because Routes A and C enter the Twin Valley Substation from the west, they traverse about 400 additional acres of the Conestoga River Headwaters NAI.

The West Branch Brandywine Creek NAI is a larger area encompassing the Honey Brook Substation, the Borough of Honey Brook and both sides of Route 322 and Route 10. This natural area has historically supported four plant species of concern: Pennsylvania rare bushy bluestem (*Andropogon glomeratus*), Pennsylvania threatened sweet bay magnolia (*Magnolia virginiana*), Pennsylvania endangered swamp lousewort (*Pedicularis lanceolata*), and one unidentified species of concern. The West Branch Brandywine Creek NAI is traversed by the Alternative Routes shortly after they exit the Honey Brook Substation. Routes C and D cross about 30 more acres of this NAI compared to Routes A and B. The portions of the NAI areas crossed by the Alternative Routes are generally agricultural or developed land. Therefore, permanent impacts to these areas are anticipated to be limited to the structure footprints.

As stated in Section 4.1, DCNR indicated that Route D may have potential habitat for the state-threatened sweet bay magnolia. Sweet bay magnolia is typically found in moist, mostly acidic woods and swamps in sandy peaty soils, especially in association with red maple-black gum wet woods. DCNR does not anticipate impacts to sweet bay magnolia from Route A[7].

[7] The January 10, 2013 consultation letter to DCNR only requested information on the Preferred Route (Route A) and the Alternate Route (Route D).

5.3.4 Wildlife

As stated in Section 4.1, USFWS indicated that the entire Project is located within the range of the state and federally threatened bog turtle. The USFWS has requested wetland delineations within the Project area and that all wetlands identified within this area should be evaluated for potential suitability as bog turtle habitat. In March 2013, PPL Electric retained a qualified bog turtle surveyor to conduct Phase I bog turtle surveys for each delineated wetland identified along the Preferred Route. Based on the results of the survey, four wetlands located within the Project Area were identified as potential bog turtle habitat. PPL Electric submitted a formal Phase I bog turtle survey report in April 2013. The USFWS response dated May 22, 2013 concurred with the conclusions in the Phase I report. In accordance with USFWS guidelines, four Phase II bog turtle surveys were conducted at each of the four wetlands between April 15th and June 15th, 2013. No bog turtles or indicators of bog turtle presence were identified during these surveys. Based on the results of the Phase I and II surveys, no impacts to the bog turtle are anticipated. PPL Electric will submit a Phase II bog turtle report to the USFWS for concurrence. PPL Electric will adhere to any resulting USFWS Phase 2 or 3 surveying or permitting requirements.

Potential impacts to the federally-threatened bog turtle pose the greatest potential risk to known threatened and endangered species located within the Project Area. None of the Alternative Routes traverse NWI wetlands. However, it is expected that formal wetland delineations will result in the identification of multiple wetlands along any of the routes. Therefore, without information on wetlands along each route, potential bog turtle impacts are challenging to compare. PPL Electric will minimize in-stream and wetland impacts, regardless of the route selected, by spanning or avoiding them.

The PGC indicated that the entire Project is located within the range of the northern myotis, a state species of special concern. PGC suggests that, in these portions of these routes, clearing of trees greater than 5-inch diameter at breast height (DBH) be conducted between November 1 and March 31. Because routes A and C have fewer trees that need to be cleared, potential impacts to northern myotis are expected to be fewer from these routes than from Routes B and D.

In conclusion, Routes B and D are slightly preferred over Routes A and C from a natural environment perspective primarily because Routes A and C parallel, and at times are located within the floodplain of, the Conestoga River and the headwaters to the Conestoga River for 1.5 miles. Routes A and C also traverse a greater distance through identified natural areas. Conversely, Routes A and C are expected to result in fewer impacts to vegetation and associated forest habitat and wildlife. Field wetland delineations were conducted for the Preferred Route and engineered access roads to determine the exact location of any wetlands or waterways. PPL Electric anticipates that Project engineering can minimize wetland and stream impacts through spanning and avoidance. However, if impacts are unavoidable, PPL Electric will obtain and adhere to all required state and federal permits.

5.4 Selection of the Preferred Route

Based on a qualitative and quantitative review of information obtained from GIS data, existing easements, field reconnaissance, and extensive public outreach as well as engineering and financial estimates for this Project, the Routing Team selected **Alternative Route A** as the Preferred Route and Alternative Route D as the Alternate Route.

Although Alternative Route A will traverse within 100 feet of one residence, the Routing Team believes that the cumulative social, environmental, and financial impacts associated with constructing Alternative Route A will be less than any other Alternative Route. Alternative Route A is the shorter of the two final routes considered, and therefore, requires fewer acres of ROW. Alternative Route A also traverses fewer properties and the transmission center line crosses within 500 feet of fewer residences. No non-condemnable properties without an existing ROW agreement are crossed by Alternative Route A, which reduces risks to Project completion. From an environmental and engineering perspective, Alternative Route A will require fewer acres of forest clearing and cross fewer areas of steep slopes. Alternative Route A will also traverse fewer acres of cultivated crops compared to most alternatives. While any route selected would result in changes to the existing viewshed, Alternative Route A maximizes the distance between the proposed route and Robert G. Struble Lake, which was identified by several property owners as a scenic area.

The PUC defines an Alternate Route as a reasonable ROW which includes not more than 25 percent of the ROW of the Applicant's proposed route. Based on the amount of overlap between the Alternative Routes, selecting Route A as the Preferred Route eliminates Routes B and C as potential Alternate Routes. Therefore, Route D was identified as PPL Electric's Alternate Route.

After announcing the selection of the Preferred Route in October 2012, PPL Electric initiated real estate discussions with property owners. Based on these meetings, several property owners requested route alignment modifications through their property. Where the re-alignment request did not result in impacts to other property owners, PPL Electric accommodated individual property owners' requests to the maximum extent practical. In cases where a re-alignment would impact adjacent property owners, PPL Electric considered accommodating the request if reasonable and mutually agreed upon by all affected parties. These discussions resulted in a number of minor changes to the final Preferred Route. The resulting changes are reflected in all figures and calculations included in this Attachment.

6.0 AERIAL EXHIBITS

A set of three "D Size" (i.e., 22 inches by 34 inches) aerial photographs detailing the Preferred Route are included at the end of this Attachment. A guide map "grid" showing each of the three drawings is also included to assist the reader in finding a particular area of interest. The aerial photographs show the Preferred Route centerline, proposed edge of ROW, property boundaries, property owners along the ROW with property ID numbers corresponding to each owner, and other information required under 52 Pa. Code § 57.72(c)(13)(i).

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LIST OF FIGURES

1.0 INTRODUCTION

PPL Electric Utilities Corporation (PPL Electric) proposes to construct a new 138/69 kV transmission line between the existing Honey Brook and Twin Valley distribution substation taps to reinforce the transmission system in Chester, Berks and Lancaster counties, Pennsylvania. The new line will improve electric reliability for 20,500 customers and allow for improved operating flexibility for the Transmission System Operators to restore customer load more promptly after a facility outage. As explained in Attachment 2, PPL Electric has identified multiple violations of its Reliability Principles and Practices (RP&P) on its 138/69 kV circuits in this area. To resolve the identified violations, PPL Electric proposes to construct the new, approximately 5.3-mile, Honey Brook – Twin Valley 138/69 kV Transmission Line (the "Project"), which is the subject of this filing.

The total estimated cost to site, design, and construct the Honey Brook – Twin Valley 138/69 kV Transmission Line Project is approximately $10.5 million. This cost includes the siting, design, right-of-way (ROW) acquisition and construction of the proposed transmission line. Subject to the Commission's approval, construction of this project is scheduled to begin in August 2014 to meet a required in-service date of May 2015.

All figures and costs are estimated and subject to change based on actual conditions, and final design and engineering of the proposed transmission line.

2.0 PROPOSED LINE DESIGN

PPL Electric proposed to construct a new 5.3-mile long transmission line to strengthen the electrical delivery system and improve reliability of service in the region.

The Project will begin northwest of PPL Electric's Honey Brook 69-12 kV Substation in Honey Brook Township, Chester County and will terminate near the existing Twin Valley 69-12 kV Substation in Caernarvon Township, Berks County. The preferred route for the new transmission line will generally travel in a northeasterly direction between the two substations through Honey Brook and Caernarvon townships in Lancaster, Chester, and Berks counties.

The Project involves the installation of a new double-circuit 138/69 kV transmission line. Initially, only one circuit will be installed on the new transmission line, and it will operate at 69 kV until load growth in the area warrants the addition of the second circuit and an increase in the operating voltage. The transmission line will be installed on new single-shaft steel poles. The tangent structures[1] for the proposed new transmission line will be equipped with steel arms. Angle structures will be single-pole or two-pole steel structures, depending on the severity of the line angle. The majority of poles will be direct embedded. However, some poles will be installed on concrete foundations in agricultural areas to avoid installing guy wires that could interfere with farming operations, in floodplains to elevate the steel structures above the floodplain, and in other areas as needed based on geotechnical considerations or structure tension. In addition, some direct embedded angled structures may be guyed instead of concrete foundations due to accessibility and terrain. There will also be two direct embedded transmission sectionalizing switch poles on the line. Based on preliminary engineering, this Project requires the installation of approximately 52 structures, ranging from 88 to 120 feet in height. The average pole height will be approximately 100 feet. The average span length will be approximately 540 feet. The proposed structure types are shown in Figures 5-1 through 5-4.

3.0 DESIGN CONSIDERATIONS

The proposed double circuit line described above will be designed and constructed to meet, and generally exceed, all National Electrical Safety Code (NESC) minimum standards. Design specifications and safety rules practiced by PPL Electric are included in Attachment 13. The line will consist of three power conductors and two overhead ground wires, but will be designed for six power conductors. Each conductor will be 556.5 kcmil,[2] 24/7 stranding aluminum conductor steel reinforced (ACSR). The overhead ground wires will be a 48 fiber 0.567-inch diameter Optical Ground Wire (OPGW). The overhead ground wire will provide lightning protection for the proposed tie line.

The minimum conductor to ground clearance for the proposed 138/69 kV line will be 30 feet, which occurs at a maximum conductor temperature of 125°C. Table 5-1 and Table 5-2 identify

[1] A tangent structure is a pole with no line angle.

the designed minimum conductor clearances and the conductor thermal ratings of the conductors, respectively.

Table 5-1.Design Minimum Conductor Clearances for 556.5 kcmil 24/7 stranding acsr*

Condition	Double Circuit Design Clearance-to-Ground
Normal load; average weather (16°C ambient temperature)	35.4 feet
Predicted extreme thermal load (125°C conductor temperature)	30.0 feet
Predicted NESC Extreme wind load (90 mph, 16°C)	32.6 feet
Predicted extreme weather conditions (1 inch ice, 0 lbs. wind, -18°C)	32.9 feet

* Clearances based on a maximum tension of 9,000 pounds at 1 inch ice, 0°F, 4 lbs. wind and a ruling span of 560 feet.

Table 5-2.Conductor Thermal Rating556.5 kcmil 24/7 Stranding ACSR(257°F) 125°C Maximum Conductor Temperature

Condition	Ambient Temperature (°C)	Wind Speed (Knots)	Ampacity (Amps)
Summer Normal	35	0	815
Winter Normal	10	0	926
Summer Emergency	35	1.5	1,041
Winter Emergency	10	1.5	1,163

[2] A circular mil is the cross-sectional area of a wire one mil in diameter, where 1 kcmil = 0.5067 mm².

4.0 MAGNETIC FIELD MANAGEMENT PLAN

PPL Electric's Magnetic Field Management Program is summarized in Attachment 11 and 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 effects 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. In order to lower magnetic field exposures, the program generally prescribes the use of line design that provides five feet higher ground clearances and reverses phasing of new double circuit lines where it is feasible to do so at low or no cost. The implementation of additional modifications will be considered, provided those modifications can be made at low or no cost and are consistent with functional requirements.

Consistent with the program, the conductors for this Project will have ground clearances that are a minimum of five feet higher than the required NESC minimum ground clearance for 138/69 kV lines to reduce magnetic field exposures. In addition, PPL Electric will reverse phase the two circuits, thus further reducing the magnetic field.

5.0 RIGHT-OF-WAY REQUIREMENTS

PPL Electric's current standard ROW width for a double-circuit 138/69 kV transmission line is 100 feet. The ROW width is determined by the structure type, design tensions, span length, and conductor "blowout" (the distance the wires are moved by a crosswind). A cross section of PPL Electric's current standard ROW for double-circuit 138/69 kV is illustrated in Figure 5-3. The aerial maps provided at the end of Attachment 4 identify the location of the proposed ROW.

Status of Right-of-Way Negotiations

There are a total of 19 different owners of 29 parcels along the route selected for the proposed Honey Brook – Twin Valley Line. At the time of this filing, formal easement and right-of-way agreements have been executed by 18 of the 19 property owners. PPL Electric has reached an

agreement with the final property owner and anticipates that the easement and right-of-way agreement will be executed in the near future. In the event that the final easement and right-of-way agreement is not executed, PPL Electric will file a Condemnation Application, pursuant to Section 1511(c) of the Business Corporation Law of 1988, 15 Pa.C.S. § 1511(c), if necessary.

6.0 CONSTRUCTION TECHNIQUES AND EXECUTION FOR TYPICAL SINGLE POLE 138 KV TRANSMISSION STRUCTURES

The following is a summary, non-technical explanation of the typical construction activity that is associated with new transmission line construction for single poles, which are either directly embedded into the ground or installed on a concrete foundation. This is not to be misconstrued as all-encompassing and may vary based on specific site/service conditions at each project. Actual construction steps may not necessarily occur in this particular order:

- The project manager will review the construction plans with PPL Electric personnel that will be constructing the line, including all permits and conditions that apply (such as erosion and sediment control, wetland encroachments, and storm water management), as well as any agreements made with specific property owners for work done on their lands.
- Professional land surveyors will stake the locations of all poles to be constructed, as well as the edge of ROWs and locate any wetland or streams previously sited during field work.
- All wetlands/waters are delineated in the field, located by land surveyors, and specifically shown to the construction manager prior to work commencing.
- During the installation of access roads, poles, and hanging of the wire, approved “best management practices” are implemented to assure that the soil will be stabilized and not erode during storm events while the Project is under construction. Any temporary wetland encroachments (usually roads) will be removed according to the permit conditions. Whenever practical, PPL Electric will utilize timber matting in wetland areas to minimize disturbance to the wetland vegetation and topography.
- Construction roads will be constructed, approximately 14 to 16 feet in width, with a stone surface to support the equipment that will be transporting materials to the pole sites. Those vehicles are usually cranes, concrete trucks (if foundations are involved), boom trucks, and pickups. The roads will be built as provided for in the construction drawings

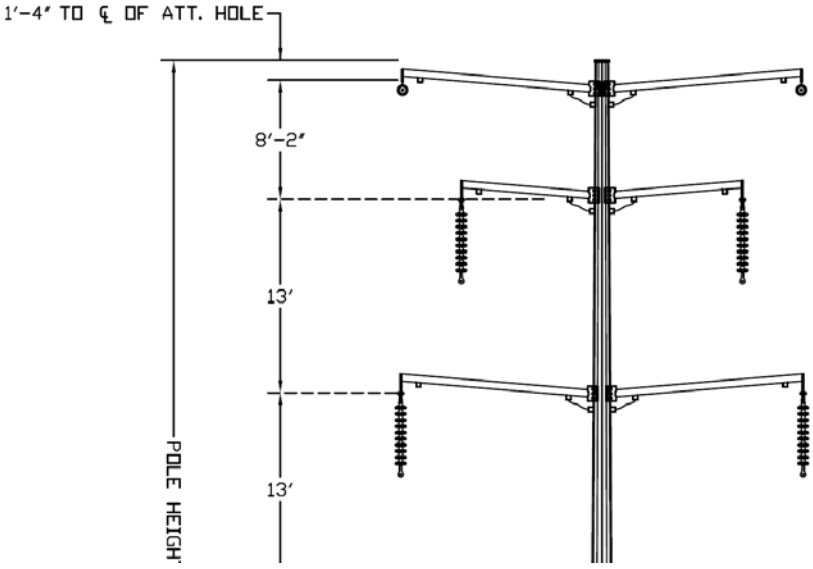
as per the erosion and sediment control plan, the NPDES permit plan, and/or the wetland encroachment permit plan. The plan may require these roads to be temporary in nature, returning to vegetative cover when the work is complete. Landowners may wish to have the roads remain intact for shared use between PPL Electric for line inspection and maintenance and property owner use. Much of the routine maintenance to the line, once built, will be by helicopter or 4 wheel drive pickup truck.

- The direct embedded poles will be installed by the use of auger and then a crane. After the hole is drilled, usually 4 to 6 feet in diameter, the bottom section of pole is placed directly into the hole and backfilled with native soil or engineered material, and then the remaining sections are installed along with any cross arms. A pole that is at an angle in the line, or for another specialized reason, may be required to have a concrete foundation. These foundations are seldom more than 12 feet in diameter and are filled with reinforced concrete. The top of the foundation may extend an average of 1 foot above the ground.
- Once the poles are in place along the line route, the wires will be installed using bucket trucks to attach the wires to each pole and equipment and manpower will be used to pull the wires along from pole to pole. Helicopter stringing/pulling may be utilized in restricted access or environmental sensitive areas.
- The project manager will oversee the stabilization of the site including the successful establishment of vegetation on all previously disturbed areas during construction.

Typical examples of the proposed structures are depicted in Figures 5-1 through 5-4.

FIGURE 5-1

Double-Circuit 138/69 kV Tangent Structure. New tangent structure will have two arms at the top of the pole to support two overhead wires.



POLE STATISTICS

Height Range: 90-120 feet
Arm Length (Middle): 11 feet
Arm Length (Top & Bottom): 7 feet
Conductor Spacing: 13 feet
Overhead Ground Wire to Top Phase: 13 feet
Phase to Phase: 13 feet

FIGURE 5-2

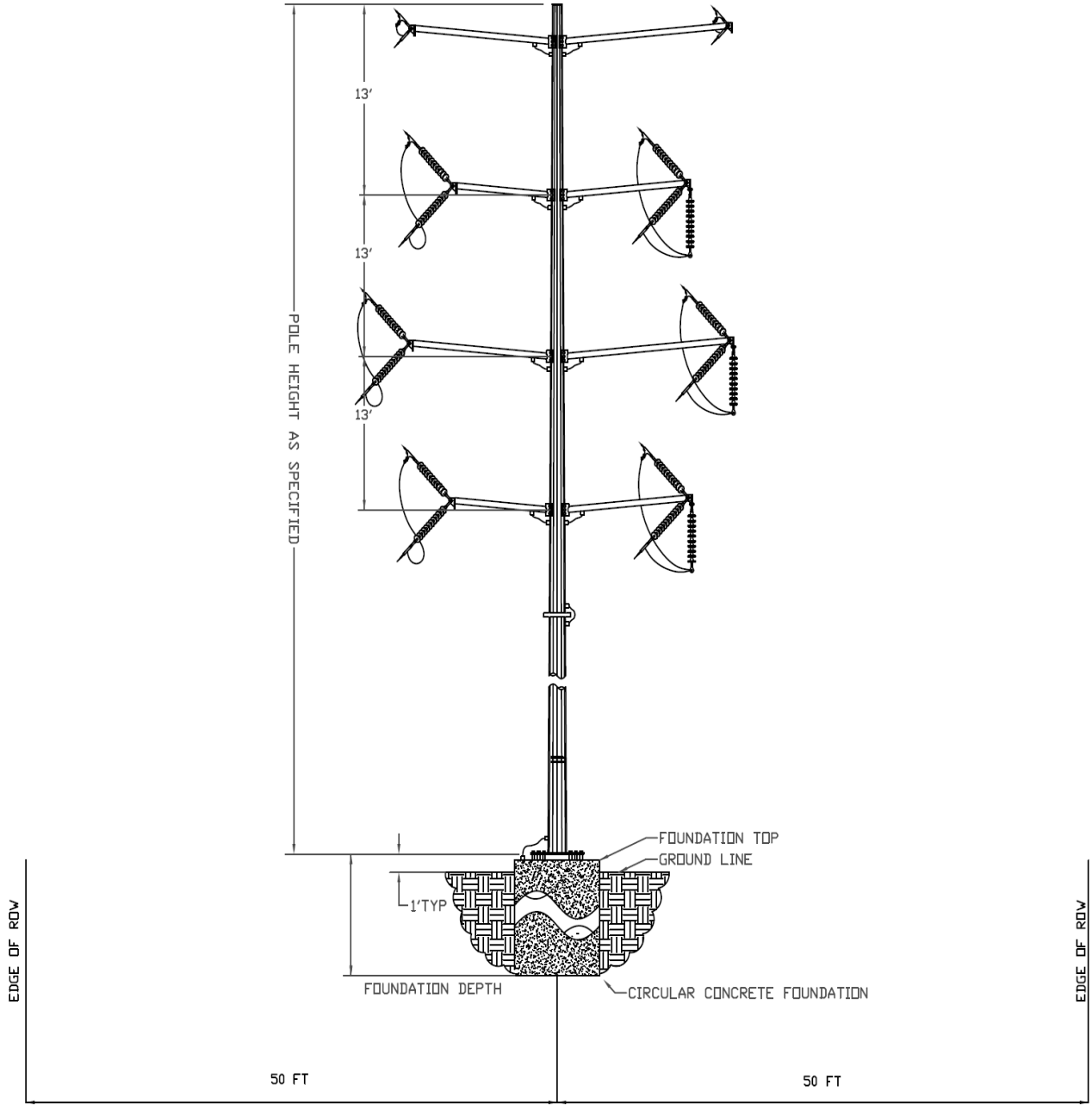
Double-Circuit 138/69 kV Two-Pole Angle Structure

POLE STATISTICS

Height Range: 90 - 110 feet

Conductor Spacing: 13 feet
Overhead Ground Wire to Top Phase: 13 feet
Phase to Phase: 13 feet

FIGURE 5-3
Double-Circuit 138/69 kV Cross Section – This figure shows a typical tension angle structure on a concrete foundation. Also depicted is our typical right of way width of 100'.



POLE STATISTICS

Height Range: 100 - 115 feet

Conductor Spacing: 13 feet
Overhead Ground Wire to Top Phase: 13 feet
Phase to Phase: 13 feet

FIGURE 5-4
Single-Circuit 138/69 kV Cross Section – This figure shows a typical direct embedded switch structures.

Height Range: 90-100 feet

Conductor Spacing: 9 feet
Overhead Ground Wire to Top Phase: 10 feet
Phase to Phase: 9 feet

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INSERT TAB 6

ATTACHMENT 6
HONEY BROOK – TWIN VALLEY 138/69 KV TRANSMISSION LINE
LIST OF OWNERS OF PROPERTY WITHIN THE RIGHT-OF-WAY

Property Owner/Address	Parcel Number
Ivan S and Anna Mae Stoltzfus 749 Todd Road Honey Brook, PA 19344	1
John Omar Jr. and Nancy Mae Stoltzfus 32169 County Road 337 Advance, MO 63730	2
Gideon E Jr. and Rose Marie Stoltzfus 330 Todd Road Honey Brook, PA 19344	3
Samuel J Jr. and Mary B Stoltzfus 115 Todd Road Honey Brook, PA 19344	4
Jonas B and Deborah Ann Stoltzfus 355 White School Road Honey Brook, PA 19344	5
Benuel E and Sara B Stoltzfus 245 Given Road Honey Brook, PA 19344	6
Keith L and Malinda E Mast 191 Given Road Honey Brook, PA 19344	7
Mark E And Linda M Stoltzfus Field Stone Road Honey Brook, PA 19344	8
Benuel E and Sara B Stoltzfus et al 245 Given Road Honey Brook, PA 19344	9
Benuel E and Sara B Stoltzfus et al 245 Given Road Honey Brook, PA 19344	10

Property Owner/Address	Parcel Number
Helen Rovinski Westwood 4H PO Box 125 Cornwall, PA 17016	11
William D and Marlene A Oatman 830 Talbotsville Road Honey Brook, PA 19344	12
Jeffrey A & Roberta K Metzler[1] 2894 Oak Lane Morgantown, PA 19543	13
Jeffrey A & Roberta K Metzler[1] 2894 Oak Lane Morgantown, PA 19543	14
Elizabeth J Means 257 Supplee Road Honey Brook, PA 19344	15
Paul N and Barbara M Brubacher 2910 Best Road Morgantown, PA 19543	16
Raymond Z and Darla J Brubacher 2970 Best Road Morgantown, PA 19543	17
Raymond Z and Darla J Brubacher 2970 Best Road Morgantown, PA 19543	18
Raymond Z and Darla J Brubacher 2970 Best Road Morgantown, PA 19543	19
Glenn Z & Nancy K Brubacher 32 Limekiln Lane Morgantown, PA 19543	20
Glenn Z & Nancy K Brubacher 32 Limekiln Lane Morgantown, PA 19543	21

[1] PPL Electric signed an option on July 16, 2013 to purchase parcels labeled 13 and 14 from the current property owners.

Property Owner/Address	Parcel Number
Glenn Z & Nancy K Brubacher 32 Limekiln Lane Morgantown, PA 19543	22
Caernavon Township Municipal Sewer Authority PO Box 291 Morgantown, PA 19543	23
Caernavon Township Authority PO Box 188 Morgantown, PA 19543	24
Bernard and Henrietta Hankin PO Box 562 Exton, PA 19341	25
Bernard and Henrietta Hankin PO Box 562 Exton, PA 19341	26
Bernard and Henrietta Hankin PO Box 562 Exton, PA 19341	27
Bernard and Henrietta Hankin PO Box 562 Exton, PA 19341	28
Bernard and Henrietta Hankin PO Box 562 Exton, PA 19341	29

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INSERT TAB 7

ATTACHMENT 7
HONEY BROOK – TWIN VALLEY 138/69 KV LINE
AGENCY PERMIT REQUIREMENTS

Agency	Permits, Approvals, or Documentation	Anticipated Approval Date	Status of Permit or Approval	Regulated Activity
Local Agencies				
County Conservation Districts (CCDs) • Berks • Chester • Lancaster	Erosion & Sedimentation Control (E&SC) and Post-Construction Stormwater Management Plan (PCSM) set approvals (coordinated through the PADEP)	CCD Approval anticipated by June/May 2014	Not yet submitted	Activities that require earth disturbance must institute practices that minimize accelerated erosion and resulting sediment pollution to the waters of the Commonwealth or US
Commonwealth of Pennsylvania Agencies				
PA Department of Conservation & Natural Resources (DCNR) – Bureau of Forestry (plants)	State rare threatened & endangered species (T&E) consultation and approvals	DCNR clearance received for transmission right-of-way; Clearance for access roads anticipated by Winter 2013	DCNR clearance received for transmission right-of-way; Follow-up PNDI response to be submitted for access roads once finalized	Determination of potential impact to state listed and candidate threatened and endangered species and habitat if present and impacted
PA Fish & Boat Commission (PFBC) (fish, reptiles, amphibians)	State rare, threatened and endangered species consultation and approvals	PFBC clearance received for transmission right-of-way; Clearance for access roads anticipated by Winter 2013	PFBC clearance received for transmission ROW; Follow-up PNDI response to be submitted for access roads once finalized	Determination of potential impact to state listed and candidate threatened and endangered species and habitat if present and impacted
PA Game Commission (PGC) (birds and mammals)	State rare, threatened and endangered species consultation and approvals; tree clearing conservation measure recommended for state species of concern, northern myotis (bat)	PGC consultation completion anticipated by Winter 2013	PNDI response received for transmission right-of-way; Follow-up PNDI response to be submitted for access roads once finalized	Determination of potential impact to state listed and candidate threatened and endangered species and habitat if present and impacted.

Agency	Permits, Approvals, or Documentation	Anticipated Approval Date	Status of Permit or Approval	Regulated Activity
PA Department of Environmental Protection (PADEP)	Waters/wetland obstruction and encroachment permits or waivers (Chapter 105) • §105.12(a)(3) waivers for clear span aerial crossings of wetland and streams using monopole structures on either side; • §105.12(a)(3) waivers for monopole structure placement in wetlands; • General Permit-8 for construction of temporary access roads in streams (such as new culvert placement); • General Permit-7 for construction of minor road crossings Approval of Coverage Under National Pollutant Discharge Elimination System (NPDES) Permit for Stormwater Discharges Associated with Construction Activities (Chapter 102) (Individual NPDES due to HQ watershed)	Approval anticipated by May 2014	Not yet submitted	• Activities in watercourses, floodways, bodies of water (incl. wetlands) (25 Pa. Code §105) • Floodplains obstructed by highways and public utilities (25 Pa. Code §106) • Discharge of storm water associated with construction activities (25 Pa. Codes § 92, National Pollutant Discharge Elimination System; § 93, Water Quality Standards; and §102, Erosion and Sediment Control)
PA Historical and Museum Commission (PHMC)	Federal and state listed or eligible cultural resource consultation and approvals; PHMC clearance obtained for historic architecture; PHMC recommended Phase I archeological surveys.	PHMC clearance anticipated in Spring 2014	PHMC clearance letter received for historic architecture; consultation on-going for archeological surveys	Historic and cultural resources listed or eligible for listing on the State and/or Federal National Register of Historic Places
PA Department of Transportation (PennDOT)	State Route 10 highway occupancy permit	PennDOT permits anticipated by Spring 2014	Not yet submitted	Road crossings by utilities

Agency	Permits, Approvals, or Documentation	Anticipated Approval Date	Status of Permit or Approval	Regulated Activity
PennDOT Bureau of Aviation (BOA)	PennDOT Notice of Proposed Construction or Alteration (Form AV-57)	PennDOT BOA approval anticipated by Spring 2014	Not yet submitted	Notify BOA of transmission towers greater than 200 feet or within 20,000 feet of an airport
PA Public Utility Commission (PUC)	Application for permission to site and construct transmission line	PUC approval anticipated by Fall 2014	To be submitted October 2013	Construction of new transmission line
Federal Agencies				
U.S. Army Corps of Engineers (USACE) – Baltimore and Philadelphia Districts	Clean Water Act Section 404/401 permits for regulated waters/wetlands encroachments (State Programmatic General Permits [PASPGP-4] from PADEP and USACE) Bog turtle screening required in all three counties	USACE permits anticipated by September 2014	Not yet submitted	Discharge of dredged or fill material into waters of the US
Federal Aviation Administration (FAA)	FAA notice of proposed construction or alteration, 14 CFR Part 77 compliance (FAA Form 7460-1)	FAA approval anticipated by Summer 2014	Not yet submitted	Notify FAA of transmission towers greater than 200 feet or within 20,000 feet of airport
U.S. Fish & Wildlife Service (USFWS)	Consultation ongoing – Federal threatened & endangered species reporting and compliance with Section 7 of Endangered Species Act for federal permits; Phase I bog turtle habitat surveys; Phase II bog turtle surveys required in some areas;	USFWS clearance anticipated by Winter 2013	Initial PNDI response received requesting Phase I bog turtle surveys; Phase I surveys completed in March 2013; Phase II completed in June 2013	Determination of potential impact to Federal listed and candidate threatened and endangered species and habitat if present and impacted

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INSERT TAB 8

ATTACHMENT 8
HONEY BROOK – TWIN VALLEY 138/69 KV LINE
LIST OF GOVERNMENTAL AGENCIES, MUNICIPALITIES AND OTHER PUBLIC ENTITIES RECEIVING THE APPLICATION

Copy Recipients

State Agencies

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

Pennsylvania Historical and Museum Commission
Bureau for Historic Preservation
Commonwealth Keystone Building, 2nd Floor
400 North Street
Harrisburg, PA 17120-0053
Attn: Mr. Douglas C. McLearen, Chief

The Honorable Barry J. Schoch, PE
Secretary, Pennsylvania Department of Transportation
Commonwealth Keystone Building
400 North Street, 8th Floor
Harrisburg, PA 17120
Attn: William J. Cressler, Chief Counsel

Bureau of Investigation and Enforcement
Pennsylvania Public Utility Commission
P.O. Box 3265
Commonwealth Keystone Building
400 North Street
Harrisburg, PA 17105-3265

Office of Consumer Advocate
555 Walnut Street
5th Floor, Forum Place
Harrisburg, PA 17101-1925

Office of Small Business Advocate
Commerce Building
300 North Street, Suite 1102
Harrisburg, PA 17101

Counties

Berks County Board of Commissioners
Berks County Services Center
633 Court Street, 13th Floor
Reading, PA 19601
Attn: Christian Y. Leinbach, Chairman

Berks County Planning Commission
633 Court Street, 14th Floor
Reading, PA 19604
Attn: Glenn R. Knoblauch, Executive Director

Chester County Board of Commissioners
313 West Market Street
Suite 6202
P.O. Box 2748
West Chester, PA 19380
Attn: Terence Farrell, Chairman

Chester County Planning Commission
601 Westtown Road
Suite 270
P.O. Box 2747
West Chester, PA 19380
Attn: Ronald T. Bailey, Executive Director

Lancaster County Board of Commissioners
Lancaster County Government Center
150 North Queen Street
7th Floor, Suite 715
Lancaster, PA 17603
Attn: Scott Martin, Chairman

Lancaster County Planning Commission
150 North Queen Street
Suite 320
Lancaster, PA 17603
Attn: James Cowhey, AICP, Executive Director

Municipalities

Berks County

Caernarvon Township Board of Supervisors
3307 Main Street
P.O. Box 294
Morgantown, PA 19543
Attn: Charles Byler, Chairman

Caernarvon Township Planning Commission
3307 Main Street
P.O. Box 294
Morgantown, PA 19543
Attn: Creeden Coulson, Chairman

Chester County

Honey Brook Township Board of Supervisors
500 Suplee Road
Honey Brook, PA 19344
Attn: Joe Fenstermacher, Chairman

Honey Brook Township Planning Commission
500 Suplee Road
Honey Brook, PA 19344

Lancaster County

Caernarvon Township Board of Supervisors
2112 Main Street
Narvon, PA 17555
Attn: Gary Van Dyke, Chairman

Caernarvon Township Planning Commission
2147 Main Street
Narvon, PA 17555
Attn: Frank Diem, Chairman

Public Utilities

None

Notice Recipients

Federal Agencies

U.S. Army Corps of Engineers
Philadelphia District
Regulatory Branch
Wanamaker Building, 100 Penn Square East
Philadelphia, Pennsylvania 19107-3390
Attn: Wayne Poppich

U.S. Army Corps of Engineers
Baltimore District
State College Field Office
1631 South Atherton Street, Suite 102
State College, PA 16801
Attn: Amy Elliott

US Fish and Wildlife Service
315 South Allen Street, Suite 322
State College, PA 16801-4850
Attn: Bonnie Dershem

State Agencies

PA Department of Conservation and Natural Resources
Rachel Carson State Office Building
PO Box 8767
400 Market Street
Harrisburg, PA 17105-8767
Attn: Rebecca Bowen

Pennsylvania Game Commission
2001 Elmerton Avenue
Harrisburg, PA 17110-9797
Attn: Olivia Mowery

Pennsylvania Fish and Boat Commission
450 Robinson Lane
Bellefonte, PA 16823-9620
Attn: Christopher A. Urban

County Agencies

Berks County Conservation District
1238 County Welfare Road, Suite 200
Leesport, PA 19533
Attn: Dan Greig, District Executive

Chester County Conservation District
688 Unionville Road, Suite 200
Kennett Square, PA 19348
Attn: Christian E. Strohmaier, Manager

Lancaster County Conservation District
1383 Arcadia Road, Room 200
Lancaster, PA 17601
Attn: Rebecca Buchanan – E&S Project Manager

Elected Officials

Pennsylvania State Senate

Senator Mike Folmer
48th District
400 South 8th Street
101 Municipal Building
Lebanon, PA 17042

Senator Mike Brubaker
36th District
301 East Main Street
Lititz, PA 17543

Pennsylvania House of Representatives

Hon. Mark M. Gillen
128th District
29 Village Center Drive
Suite A-7
Reading, PA 19607

Hon. Scott Perry
26th District
1038 East Lincoln Highway
Coatesville, PA 19320

Hon. Gordon Denlinger
99th District
390 East Main Street
Suite 301
Ephrata, PA 17522

Property Owners

See list in Attachment 6

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INSERT TAB 9

ATTACHMENT 9
HONEY BROOK – TWIN VALLEY 138/69 KV LINE
LIST OF GOVERNMENTAL AGENCIES, MUNICIPALITIES AND OTHER PUBLIC ENTITIES CONTACTED

Federal Agencies

US Fish and Wildlife Service
315 South Allen Street, Suite 322
State College, PA 16801-4850
USFWS Project # 2012-0789
Contact: Clinton Riley

State Agencies

Pennsylvania Historical and Museum Commission
Bureau for Historic Preservation
Commonwealth Keystone Building, 2nd Floor
400 North Street
Harrisburg, PA 17120-0053
Contact: Douglas C. McLearen, Chief

Pennsylvania Game Commission
2001 Elmerton Avenue
Harrisburg, PA 17110-9797
Contact: Olivia Mowery

Pennsylvania Fish and Boat Commission
450 Robinson Lane
Bellefonte, PA 16823-9620
Contact: Christopher A. Urban

Pennsylvania Department of Conservation and Natural Resources
Rachel Carson State Office Building
PO Box 8767
400 Market Street
Harrisburg, PA 17105-8767
Contact: Rebecca Bowen

PA Department of Environmental Protection – Lancaster District Office
1661 Old Philadelphia Pike
Lancaster, PA 17602
Contact: Lynn Scheetz, Manager

County/Municipal Agencies

Berks County Board of Commissioners
Berks County Services Center
633 Court Street, 13th Floor
Reading, PA 19601
Contact: Christian Y. Leinbach – Chairman

Berks County Planning Commission
633 Court Street, 14th Floor
Reading, PA 19604
Contact: Glenn Knoblauch – Executive Director

Chester County Board of Commissioners
313 West Market Street, Suite 6202
P.O. Box 2748
West Chester, PA 19380
Contact: Terence Farrell – Chairman

Chester County Planning Commission
601 Westtown Road, Suite 270
P.O. Box 2747
West Chester, PA 19380
Contact: Ronald Bailey – Executive Director

Lancaster County Board of Commissioners
Lancaster County Government Center
150 North Queen Street, 7th Floor, Suite 715
Lancaster, PA 17603
Contact: Scott Martin – Chairman

Lancaster County Planning Commission
150 North Queen Street, Suite 320
Lancaster, PA 17603
Contact: James Cowhey, AICP – Executive Director

Berks County Conservation District
1238 County Welfare Road, Suite 200
Leesport, PA 19533
Contact: Dan Greig – District Executive

Chester County Conservation District
688 Unionville Road, Suite 200
Kennett Square, PA 19348
Contact: Christian E. Strohmaier – Manager

Lancaster County Conservation District
1383 Arcadia Road, Room 200
Lancaster, PA 17601
Contact: Rebecca Buchanan – E&S Project Manager

Elected Officials

In early 2012, PPL contacted the following local, State and Federal officials about the project through phone calls, letters and in-person meetings:

Federal Representatives

U.S. House of Representatives

U.S. Representative Joseph Pitts
150 N. Queen St. Suite 716
Lancaster, PA 17603

U.S. Representative Jim Gerlach
Berks/Lehigh County
840 N. Park Road
Wyomissing, PA 19610

U.S. Senate

U.S. Senator Robert Casey, Jr.
Harrisburg Office
22 S. Third Street, Suite 6A
Harrisburg, PA 17101

U.S. Senator Pat Toomey
Harrisburg Office
United States Federal Building
228 Walnut St.
Suite 1104
Harrisburg, PA 17101

State Representatives

Pennsylvania House of Representatives

State Representative Mark M. Gillen
128th District
29 Village Center Drive
Suite A-7
Reading, PA 19607

State Representative Scott Perry
26th District
1038 East Lincoln Highway
Coatesville, PA 19320

State Representative Gordon Denlinger
99th District
390 East Main Street
Suite 301
Ephrata, PA 17522

Rep. Tom C. Creighton
416 Irvis Office Building
PO Box 202037
Harrisburg, PA 17120-2037

Rep. David S. Hickernell
B12 Main Capitol Building
PO Box 202098
Harrisburg, PA 17120-2098

Rep. Tim Hennessey
209 Ryan Office Building
P.O. Box 202026
Harrisburg, PA 17120-2026

Pennsylvania Senate

Senator Mike Folmer
48th District
400 South 8th Street
101 Municipal Building
Lebanon, PA 17042

Senator Mike Brubaker
36th District
301 East Main Street
Lititz, PA 17543

Municipal Officials

Berks County

Charles Byler, Chairman
Caernarvon Township Board of Supervisors
3307 Main Street
P.O. Box 294
Morgantown, PA 19543

Creeden Coulson, Chairman
Caernarvon Township Planning Commission
3307 Main Street
P.O. Box 294
Morgantown, PA 19543

Chester County

Joe Fenstermacher, Chairman
Honey Brook Township Board of Supervisors
500 Suplee Road
Honey Brook, PA 19344

David Sarley, Chairman
Penn Township Board of Supervisors
97 N. Penryn Road
Manheim, PA 17545

Honey Brook Township Planning Commission
500 Suplee Road
Honey Brook, PA 19344

Mayor Mike Shuler
Honey Brook Borough
71 Pequea Avenue
P.O. Box 249
Honey Brook, PA 19344

Lancaster County

Gary Van Dyke, Chairman
Caernarvon Township Board of Supervisors
2112 Main Street
Narvon, PA 17555

Grant Wise, Chairman
Brecknock Township Board of Supervisors
1026 Dry Tavern Rd. (Rt. 897)
Denver, PA 17517

Sara Gibson, Township Manager
Rapho Township
971 N. Colebrook Rd.
Manheim, PA 17545

Mayor Mary S. Ginder
Mount Joy Borough
21 East Main Street
Mount Joy, PA 17552

Allen D. Esbenshade, Chairman
East Donegal Township Board of Supervisors
190 Rock Point Road
Marietta, PA 17547

Jacque Smith, Chairman
West Cocalico Township Board of Supervisors
156B W. Main Street
Reinholds, PA 17569

Ralph E. Mowen, Mayor
Borough of Ephrata
124 South State Street
Ephrata, PA 17522

Douglas B. Mackley, Chairman
East Cocalico Township Supervisors
100 Hill Road
Denver, PA 17517

Frank Diem, Chairman
Caernarvon Township Planning Commission
2147 Main Street
Narvon, PA 17555

Matt Knepper, Director
Lancaster County Agricultural Preserve Board
150 N. Queen Street, Suite 325
Lancaster, PA 17603

Thomas Baldridge, President
Lancaster Chamber of Commerce & Industries
100 South Queen Street
Lancaster, PA 17603

OTHER ENTITIES

Berks

Tami Hildebrand, Executive Director
Berks County Agricultural Land Preservation Board
1238 County Welfare Road, Suite 260
Leesport, PA 19533-9199

Dan Greig, District Executive
Berks County Conservation District
1238 County Welfare Rd., Suite 200
Leesport, PA 19533

Ellen Horan, President and CEO
Greater Reading Chamber of Commerce & Industry
201 Penn Street, Suite 501
Reading, PA 19601

Kimberly J. Murphy, CFRE - President
Berks County Conservancy
25 North 11th Street
Reading, PA 19601

Historic Preservation Trust of Berks County
P.O. Box 245
Douglassville, PA 19518

Chester County

William Gladden, Executive Director
County of Chester Open Space Preservation
601 Westtown Road, Suite 390
P.O. Box 2747
West Chester, PA 19380-0990

Nancy Keefer, President & CEO
Chester County Chamber of Business and Industry
1600 Paoli Pike
Malvern, PA 19355

Howard Winey, President
Martin Limestone Inc.
199 Quarry Road
Honey Brook, PA 19344

Bruce Knapp, President
Chester County Historic Preservation Network
P.O. Box 174
West Chester, PA 19381

Lancaster County

Ralph Goodno, President and CEO
Lancaster County Conservancy
117 South West End Avenue
P.O. Box 716
Lancaster, PA 17608

Matthew W. Kofroth, Watershed Specialist
Lancaster County Conservation District's Watershed Program
1383 Arcadia Road, Rm. 200
Lancaster, PA 17601

Karen Martynick, Executive Director
Lancaster Farmland Trust
125 Lancaster Avenue
Strasburg, PA 17579

Additional Contacts

Additionally, PPL Electric Utilities held a constituent meeting at the Leola Inn located at 38 Deborah Drive in Leola, Lancaster, Pennsylvania on April 2, 2012 to inform officials about the project.

State Elected Officials in Attendance

- Jeremy Kiehl on behalf of PA Representative Gordon Denlinger's Office (99th District)
- Jenn Frees on behalf of PA Senator Michael Brubaker's Office (36th District)
- Nicholas Cammauf and John Bortle on behalf of U.S. Representative Joseph Pitts Office (16th District)

County/Municipal Officials in Attendance

- Lancaster County Board of Supervisors
- Kyle Guie on behalf of Karen Martynick, Executive Director, Lancaster County Farmland Trust
- Kathy Norris, Secretary, Caernarvon Township (Lancaster County)
- Mark Hiester, Manager, East Cocalico Township
- Carol Martin, Secretary, Brecknock Township
- David Sarley, Board of Supervisors Chairman, Penn Township

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INSERT TAB 10

ATTACHMENT 10
HONEY BROOK – TWIN VALLEY 138/69 KV LINE
LIST OF PUBLIC LOCATIONS WHERE APPLICATION CAN BE EXAMINED

Honey Brook Township
500 Suplee Road
Honey Brook, Chester County, PA 19344

Caernarvon Township
3307 Main Street
Morgantown, Berks County, PA 19543

Caernarvon Township
2147 Main Street
Narvon, Lancaster County, PA 17555

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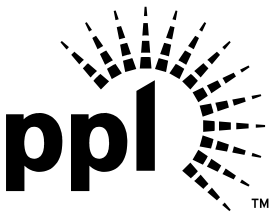
ATTACHMENT 11
HONEY BROOK – TWIN VALLEY 138/69 KV LINE
PPL ELECTRIC MAGNETIC FIELD MANAGEMENT PROGRAM



MAGNETIC FIELD MANAGEMENT

PPL Electric Utilities Corporation

DECEMBER 2004

TABLE OF CONTENTS

INTRODUCTION

At PPL Electric Utilities Corp. (PPL EU), magnetic field management means investigating and implementing methods at low or no cost to reduce magnetic fields in new or rebuilt transmission and distribution lines. This document explains PPL EU's Magnetic Field Management Program, which is part of PPL EU's larger Electric and Magnetic Fields (EMF) policy.

PPL EU's View

Some people are worried that electric and magnetic fields are harming their health. Others think the scientific research does not show a problem at all, and still others believe there's just too much scientific uncertainty to draw any conclusions.

Here's what we do know now. Various panels of scientists that have reviewed the EMF research generally have drawn two main conclusions. First, the large body of evidence does not demonstrate that EMF are harmful. Second, additional research is recommended to explore questions raised in some studies.

Given these conclusions, PPL EU is taking a reasoned approach in responding to the EMF issue. PPL EU's approach to the EMF issue consists of five elements:

- Providing EMF information to customers and employees
- Providing magnetic field measurements
- Establishing and implementing a magnetic field management program to reduce magnetic fields in new or rebuilt facilities when it can be done at no, or low, cost
- Integrating EMF in the public involvement process that PPL EU undertakes in the siting of transmission lines
- Have supported additional research

EMF Are All Around Us

Electric and magnetic fields occur in nature and in all living things. The earth, for instance, has a magnetic field, which makes the needle on a compass point north.

Electric fields and magnetic fields of a different type also surround every wire that carries electricity. In everyday life, these EMF arise from several basic sources, including power lines, electrical appliances, home and building wiring, other utility lines and cables, and currents flowing on water pipes. Though they often occur together, EMF are made up of two separate components:

Electric Fields

Electric fields are produced by the voltage—or electrical pressure—on a wire. The higher the voltage, the higher the electric field. As long as a wire is energized—has voltage present—an electric field is present (see Figure 1). In other words, an appliance, or an electric power line, doesn't actually have to be turned on to create an electric field. It just has to be plugged in. Electric fields diminish with distance and can be blocked or partially shielded by objects such as trees and houses.

Magnetic Fields

Magnetic fields are created by the current or flow of electricity through a wire. Generally speaking, the higher the current, the higher the magnetic field. Because they only occur when current is flowing, magnetic fields are present only when the power is turned on (see Figure 1). Magnetic fields also diminish with distance, but—unlike electric fields—are not blocked by common objects. In recent years, public and scientific interest has turned toward the magnetic field component of EMF because of some scientific studies regarding these fields.

Figure 1

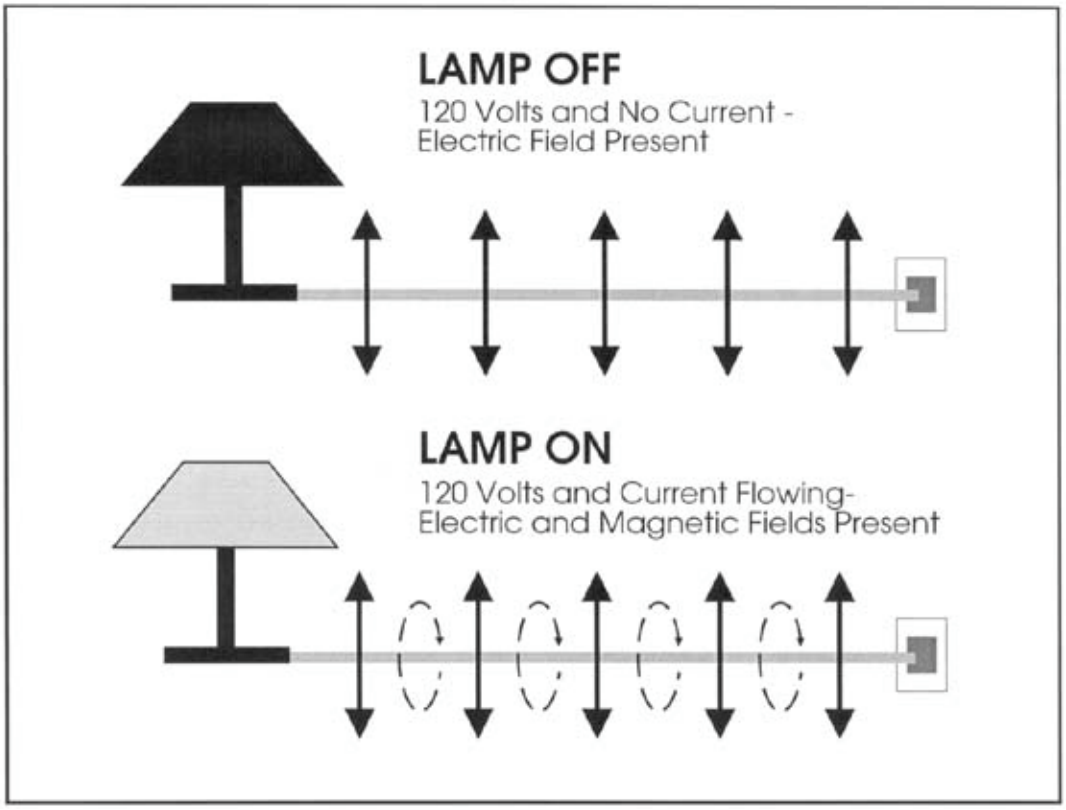

LAMP OFF
120 Volts and No Current -
Electric Field Present
LAMP ON
120 Volts and Current Flowing-
Electric and Magnetic Fields Present

Figure 2

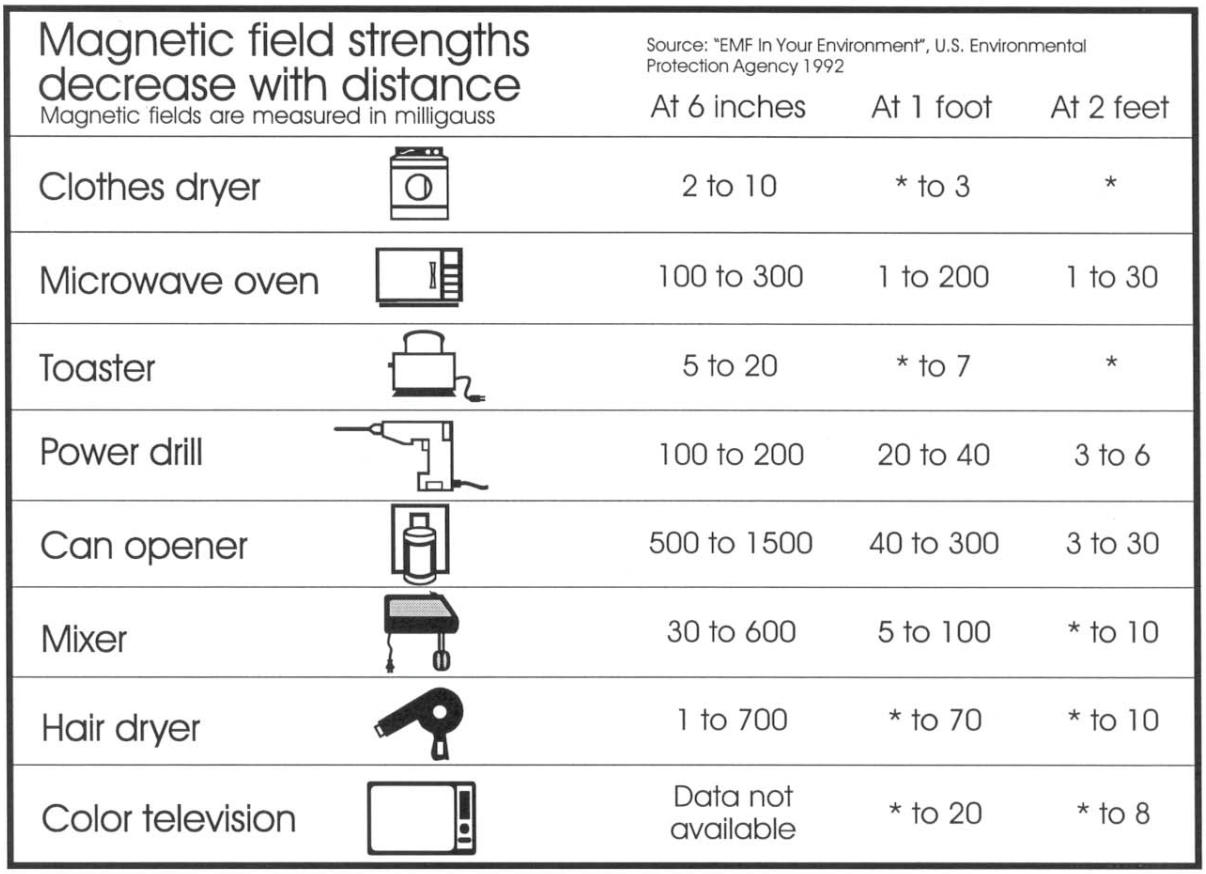


FIGURE 2 * The magnetic field measurement at this distance from the operating appliance could not be distinguished from background measurements taken before the appliance had been turned on.

Measuring Magnetic Fields

Magnetic fields usually are measured in a unit called a milligauss. Magnetic field levels found in the living areas of homes typically range from less than 1 milligauss to about 4 milligauss according to the U.S. Environmental Protection Agency. They can be higher in some cases. The levels next to appliances can exceed 1,000 milligauss (1 gauss). Figures 2 and 3 show how the strength of the field falls off as you move away from the source, just as the heat of a campfire grows weaker as you walk away from it. For overhead power lines, the strength of the magnetic fields is dependent upon a number of factors that will be explained later. Those factors produce a magnetic field that drops off rapidly as you move away from the power line.

Figure 3

Sample Magnetic Field Levels in Milligauss				
Type of Overhead Power Line	**Distance from the line**			
	Under the line	**50 ft.**	**100 ft.**	**200 ft.**
220 kV and 500 kV	5-400	5-250	1-75	0.5-20
69 kV and 138 kV	3-80	0.5-2.5	0.1-10	0.1-3
12 kV and below	0.4-20	0.1-1	-	-

The magnetic field values provided in this table represent a general range of values associated with the types of overhead power lines listed and are provided for illustration. There will be circumstances in which there will be magnetic field levels above or below the range of values provided due to variations in such factors as height of the wires, current flow and so on.

DEVELOPMENT OF PPL EU's MAGNETIC FIELD MANAGEMENT PROGRAM

One element of our response to EMF concerns expressed by some of our customers is PPL EU's Magnetic Field Management Program. The program was initiated in March 1991 because PPL EU believes it makes good sense, as a matter of policy, to respond to the concerns expressed by some of our customers and to reduce magnetic fields in new and rebuilt facilities where it can be done with either no-cost or low-cost design changes.

This document updates the original program which has been revised several times since 1991. These guidelines were developed by PPL EU's EMF Working Group.

VARIABLES THAT AFFECT MAGNETIC FIELDS

Magnetic fields from transmission and distribution lines are a function of a number of design variables. The following parameters affect the magnetic field levels produced by transmission and distribution lines:

- Current
- Height of conductors above ground
- Configuration of conductors
- Distance from the line

EFFECT OF PHASE CURRENT ON MAGNETIC FIELDS

At power frequencies (i.e., 60 hertz), the magnetic field level is a function of the current or flow of electricity through a wire. Keeping all other parameters the same, the magnetic field is proportional to the current. Hence, if the current increases by 25 percent, the resulting magnetic field level will increase by 25 percent.

The overall load current on any line varies with the demand for power. It's usually highest during daytime hours and lowest at night. There also are weekly, monthly, seasonal and yearly variations.

The difference in the currents between each phase in a multiphase line also can affect the magnetic field. This difference is called phase unbalance. For a constant load, a statistical analysis of this phase unbalance can be made to determine its effect on the magnetic field. Close to the line, there is very little effect. However, the phase unbalance slows the rate at which the magnetic field decreases with distance from the line.

EFFECT OF CONDUCTOR CONFIGURATION ON MAGNETIC FIELDS

In the transmission and distribution of power, utilities like PPL EU presently use both three-phase and single-phase lines. Each phase on a three-phase power line has either a single conductor or a bundle of two or more conductors. In a three-phase system, the ground-level magnetic field is a result of the fields produced by the currents in each of the phases. Placing the three phases as close together as possible (compaction) creates some field cancellation, and the ground-level magnetic field is reduced. However, appropriate phase separation is required for the reliable operation of the line. In addition, the arrangement of the phases can create some; field cancellation and reduction of the ground-level magnetic field.

EFFECT OF DISTANCE FROM THE MAGNETIC FIELD SOURCE

Magnetic field strength diminishes with the vertical and lateral distances from the magnetic field source. Increasing the height of the conductors above ground is useful for magnetic field reduction at ground level, but may result in increased structure costs and increased aesthetic impact of the structures. Another possible method of increasing the distance to the magnetic field source is to increase the right-of-way requirements. By keeping buildings off increased rights of way, thereby requiring the public to live and work further away from lines, exposure to magnetic fields produced by the lines can be reduced. Increases in right of way are not always practical and may increase costs significantly, however.

SUMMARY OF PPL EU's
MAGNETIC FIELD MANAGEMENT PROGRAM

Under its Magnetic Field Management Program, PPL EU has changed the way it builds and rebuilds some of its transmission and distribution lines. These design changes reduce magnetic field levels (assuming balanced circuit loadings and phase currents) by up to 69 percent in most of the company's new transmission lines. These guidelines now are being applied to new and reconstructed transmission facilities, based on this program.

The distribution component of the program focuses on 12 kV lines, the company's standard distribution voltage. It concentrates on the three-phase, primary 12 kV lines, since these are the most heavily loaded facilities and often are located in densely populated areas. The guidelines in this program are being applied to these three-phase, primary 12 kV lines.

A maximum 3-5 percent change in estimated cost was used as the limit for the guidelines since this value is consistent with low cost, is within estimating accuracy and is likely to have little impact on overall line costs.

The magnetic field calculations used in this document for the design of PPL EU's overall magnetic field management plan assume balanced load conditions among the phases and a fixed level of current, not necessarily representative of specific transmission or distribution lines. These levels were calculated using the Electric Power Research Institute’s ENVIRO computer program. Under actual operating conditions, the magnetic field levels that result may vary due to such things as actual load per circuit, overall current on each phase conductor and the electrical configuration and operation of each line.

MAGNETIC FIELD MANAGEMENT PROGRAM GUIDELINES

The guidelines for magnetic field management are noted below, with discussion points for each.

OVERHEAD LINES

NEW OR REBUILT TRANSMISSION LINES

1. Balance transmission circuit loads and phase currents as much as possible.

- PPL EU should continue to make every effort to balance loadings between the two circuits of a double circuit line when planning new or rebuilt facilities to maximize the effects of reverse phasing.
- PPL EU should continue the practice of balancing single-phase loads across the three phases of the distribution system. (Unbalanced phase currents on the distribution system are reflected through to the transmission system.)
  - Unbalanced phase currents result in higher magnetic fields that do not drop off as quickly with distance as do the fields resulting from balanced phase currents.
  - For a 5 percent phase current unbalance, the magnetic field 50 feet from the centerline of a single circuit 138 kV line could be more than twice the value than if the same line had balanced phase circuits.
- Balanced phase currents on each three-phase distribution circuit also reduce magnetic fields from the distribution circuits themselves. In addition, they reduce magnetic fields on the transmission system from which the distribution system circuits are supplied and connected through substations.
- Apart from magnetic field considerations, balanced phase currents on each three-phase distribution circuit also reduce line losses and improve the system voltage.

2. Continue with the present practice of using long-span construction as the PPL EU 138/69 kV standard

- Structure designs for short-span and long-span construction are illustrated on Charts I and II, respectively.
  - Short-span design does not significantly reduce magnetic fields when compared to long-span design even though it is more compact than long-span design. Comparison of the magnetic field values from Chart III indicates essentially the same values. Therefore, short-span design should not be used solely to reduce magnetic fields.
  - PPL EU will continue to use long-span construction for 138/69 kV double-circuit lines and for single-circuit/future-double-circuit lines.
  - For single-circuit/future-double-circuit lines, PPL EU will continue to install two conductors on the top positions and one in the middle position as shown in Chart IV.
    - This arrangement minimizes magnetic fields as shown in Chart V by placing the three initial conductors higher on the structure, which increases the ground clearances, and by placing the conductors in a triangular configuration.

3. Compact design structures are not a low-cost alternative and should be used for magnetic field reduction only in special applications.

Chart VI illustrates the compact design structure.

- The compact design increases the initial installation costs by 79 percent when compared to the long-span design but reduces the magnetic field from 9 mG to 3 mG (about 67 percent) at the edge of the 100-foot-wide right of way as shown on Chart III.

4. Reverse phase new or rebuilt double-circuit transmission lines for all voltage levels.

- Reverse phasing was adopted by PPL EU in March 1991 for double-circuit 138/69 kV transmission lines and in April 1992 for all other double circuit transmission lines. Reverse phasing is shown in Chart VII. Reverse phasing will reduce the magnetic fields when the current flow on both circuits is in the same

direction. Calculated values contained here are based on balanced and equal phase currents on both circuits.

  - Reverse phasing reduces the magnetic field of a double circuit 138 kV single pole transmission line from 29 mG to 9 mG (about 69 percent) at the edge of the 100-foot-wide right of way as shown on Chart III.
  - Reverse phasing reduces the magnetic field of a double circuit 230 kV single pole transmission line from 49 mG to 16 mG (about 67 percent) at the edge of the 150-foot-wide right of way as shown on Chart VIII.
  - Reverse phasing reduces the magnetic field of a double-circuit 500 kV single pole transmission line from 37 mG to 21 mG (about 43 percent) at the edge of the 200-foot-wide right of way as shown on Chart IX.

- When new or rebuilt double-circuit lines require tapping existing double-circuit lines, PPL EU will review the existing lines to determine if reverse phasing can be provided at low cost.
- Computer modeling is required to develop the optimum phasing and overall conductor arrangements for lines added to, or rebuilt in, multiple-line corridors.
  - Merely adding a reverse-phase double-circuit line to an existing transmission line corridor or reverse phasing a rebuilt line in the multiple-line corridor will not necessarily produce lower magnetic field levels at the edge of the corridor right of way.
  - The corridor must be computer modeled with all the lines, existing phase conductor locations and currents. Then, magnetic field calculations must be made varying the phase arrangements of the new or reconstructed line to determine the appropriate phasing arrangement.
  - Current flow direction on a line also must be considered. For example, a reverse-phased line should have the current flowing in the same direction on both circuits. If the current flow is in the opposite direction for one circuit, reverse phasing will not produce the lowest magnetic field and another phase arrangement that produces lower fields may need to be utilized.

5. Increase the minimum ground clearance for all new transmission lines.

138/69 kV Transmission Lines

- Increasing the minimum line design ground clearance from 25 feet to 30 feet may add up to about 5 percent to the installed cost of a new double-circuit single pole 138/69 kV line. For a given project, such cost may be substantially less, however. In fact, PPL EU frequently uses higher-than-minimum ground clearances due to such features as road crossings, line crossings and site-specific terrain. With long-span reverse-phase design, the, magnetic field is reduced from 9 mG to 7 mG (about 22 percent) at the edge of a 100-foot-wide right of way as shown in Chart X.
  - In the actual design of transmission lines to include higher minimum ground clearances, there may be limited segments (such as highway crossings, severe slopes and transmission line crossing locations) where National Electrical Safety Code (NESC) minimum ground clearances may need to be used. The NESC minimum ground clearances are less than the increased ground clearance discussed previously.

230 kV Transmission Lines

- Increasing the minimum line design ground clearances from 27 feet to 32 feet may add up to about 5 percent to the cost of a single-circuit single-pole line (current standard). For a given project, such cost may be substantially less, however. In fact, PPL EU frequently uses higher-than-minimum ground clearances due to such features as road crossings, line crossings and site-specific terrain. By increasing the clearances, the magnetic field is reduced from 30 mG to 28 mG (about 7 percent) at the edge of a 150-foot-wide right of way.
- Increasing clearances from 27 feet to 32 feet could theoretically add up to about 2.8 percent to the cost of a double-circuit single-pole line (current standard) and reduce the magnetic field of a reverse-phase line from 16 mG to 15 mG (about 6 percent) at the edge of a 150-foot-wide right of way. Chart XI is a summary of this data.
- Studies are required for each new 230 kV line to determine optimum structure types, ground clearances, configurations and designs to reduce field levels. Such

studies could include analysis of reduction measures such as additional minimum ground clearances, increasing conductor tensions, using reduced phase spacing (a "Delta" configuration on a single-circuit line), installing the second circuit initially, and/or adding a second set of conductors that are reverse phased and operated in parallel with the first set (bundled/split phase).

500 kV Transmission Lines

- Increasing ground clearances from 33 feet to 53 feet may add up to about 4.5 percent to the cost of a single-circuit "H-frame" line (current standard). For a given project, such cost may be substantially less, however. In fact, PPL EU frequently uses higher-than-minimum ground clearances due to such features as road crossings, line crossings and site-specific terrain. By increasing the clearances, the magnetic field is reduced from 42 mG to 35 mG (about 17 percent) at the edge of a 200-foot-wide right of way.
- Increasing ground clearances from 33 feet to 53 feet could theoretically add up to 2.8 percent to the cost of a double-circuit "H-frame" line (current standard) and reduces the magnetic field of a reverse-phase line from 21 mG to 16 mG (about 24 percent) at the edge of a 200-foot-wide right of way. Chart XII is a summary of this data.
- Studies are required for each new 500 kV line to determine optimum structure types, ground clearances, configurations and designs to reduce field levels. Such studies could include analysis of reduction measures such as additional minimum ground clearances, increasing conductor tensions, using reduced-phase spacing (a "Delta" configuration on a single circuit line), installing the second circuit initially, and/or adding a second set of conductors that are reverse phased and operated in parallel with the first set (bundled/split phase).

RECONDUCTORING OR ADDING ADDITIONAL CIRCUITS TO EXISTING TRANSMISSION LINES

When reconductoring or adding additional circuits to existing transmission lines, PPL EU will evaluate low-cost or no-cost options for magnetic field management on a case-by-case basis.

When reconductoring existing transmission lines or adding additional circuits, low-cost alternatives may not exist; however, the following steps will be taken:

- For a single-circuit line, the use of a Delta arrangement or other modifications on the existing structure, with reduced-phase spacing, will be evaluated.
- For double-circuit lines, application of reverse phasing may reduce the magnetic field under the line and within the right of way and will be evaluated.
- For single- and double-circuit lines, evaluate using higher conductor tensions that can increase the minimum line design ground clearance.

DISTRIBUTION LINES

At the 12 kV distribution level, new main three-phase lines will continue to be constructed with five feet of additional ground clearance.

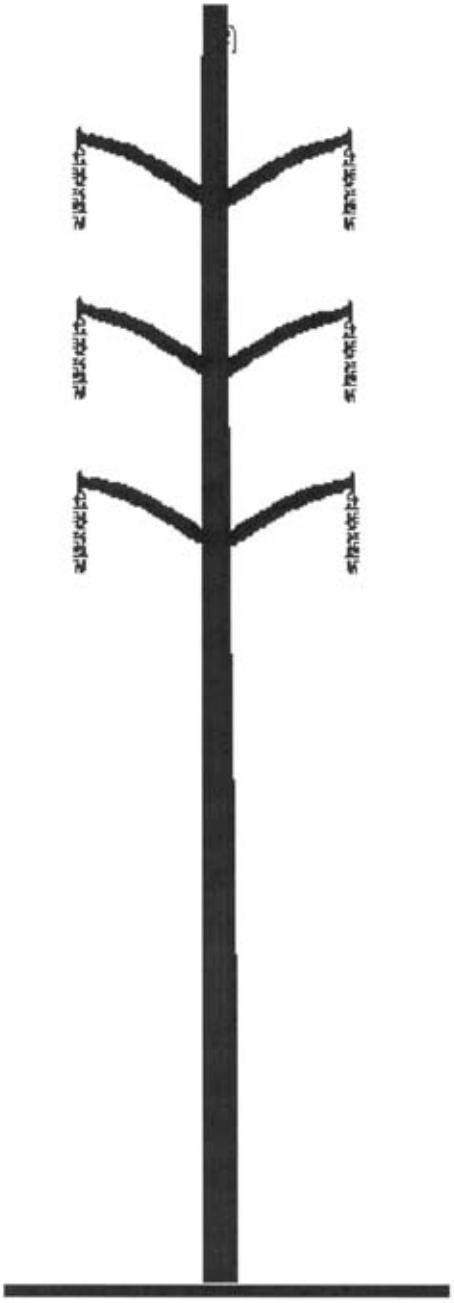
- Main lines are the most heavily loaded sections of a distribution line and therefore have the highest magnetic fields associated with them.
- Increasing the ground clearance by five feet reduces the magnetic field under the line from 14 mG to 11 mG using the standard eight-foot crossarm design. These values are based on increasing pole heights from 45 feet to 50 feet and a typical operating current of 300 amps per phase.
- Chart XIII is a summary of this data. Increasing ground clearance by five feet could theoretically add about 5 percent to the cost of a typical distribution line.

UNDERGROUND TRANSMISSION LINES

Underground transmission lines are required due to environmental or land use factors or restrictions on available clearances, PPL EU will evaluate options for magnetic field management techniques on a case-by-case basis.

- The phase arrangement that produces the lowest field will be determined.
- The depth of burial of the line will be determined considering the cost of excavation and the location of other buried utilities in the area.
- The use of steel pipe ferromagnetic shielding that reduces magnetic fields will be evaluated.

Short-Span Construction



- **More compact design**
- **Should not be used solely to reduce magnetic fields**
- **Typical conductor data:**

1 3/8" HS steel overhead ground wire - 7.3 feet sag
6-556.5 KCMIL 24/7 ACSR power conductors - (PARAKEET) 10.0 feet sag
Average span - 400 feet

Long-Span Construction Remains
PPL EU 138 kV Standard

- **Lower cost alternative**
- **Reduces magnetic fields due to higher structures**
- **Typical conductor data:**

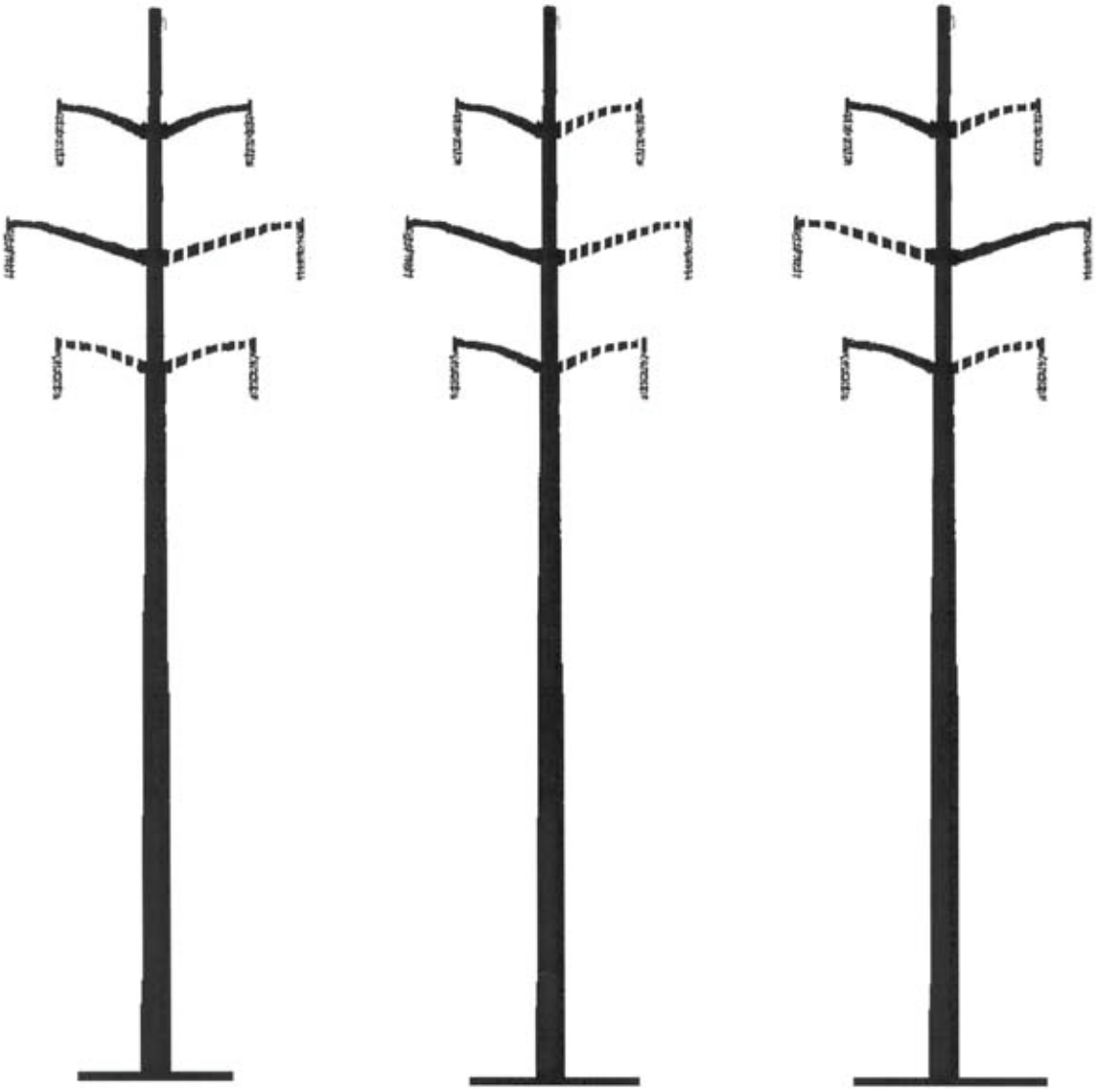
  1 3/8" HS steel overhead ground wire - 17.3 feet sag
  6-556.5 KCMIL 24/7 ACSR power conductors - (PARAKEET) 23.0 feet sag
  Average span - 600 feet

138/69 kV REVERSE-PHASE TRANSMISSION LINES
CALCULATED MAGNETIC FIELDS AT 400 AMPERES

TYPE CONSTRUCTION	MAGNETIC FIELD IN MILLLIGAUSS AT THE EDGE OF THE RIGHT OF WAY
SHORT SPAN (CHART I)	30
SHORT SPAN (REVERSE PHASE)	8
LONG SPAN (CHART II)	29
LONG SPAN (REVERSE PHASE)	9
COMPACT (CHART VI)	14
COMPACT (REVERSE PHASE)	3

The edge of right of way is 50 feet from the line centerline.
The 400 ampere phase current is balanced between phases.
Calculations are based on a minimum ground clearance of 25 feet.
LONG SPAN, SHORT SPAN and COMPACT are double-circuit lines.

Typical Single-Circuit Structure Designs

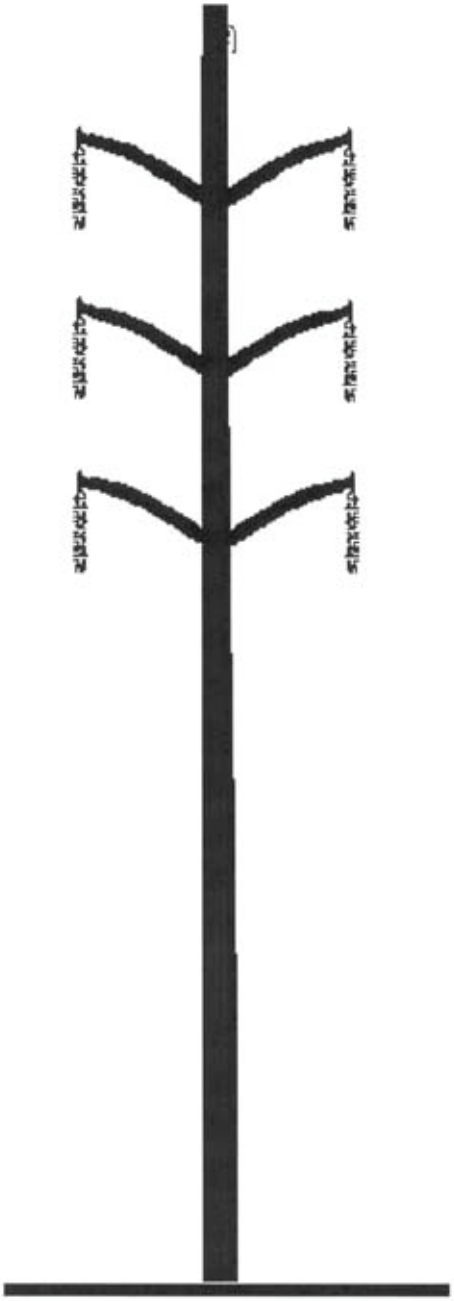


138/69 kV SINGLE CIRCUIT TRANSMISSION LINES
CALCULATED MAGNETIC FIELDS AT 400 AMPERES

TYPE CONSTRUCTION	MAGNETIC FIELD IN MILLIGAUSS AT THE EDGE OF THE RIGHT OF WAY
TOP/MIDDLE/BOTTOM	20
VERTICAL	17
TOP/MIDDLE	12

The edge of right of way is 50 feet from the line centerline.
The 400 ampere phase current is balanced between phases.
Calculations are based on a minimum ground clearance of 25 feet.

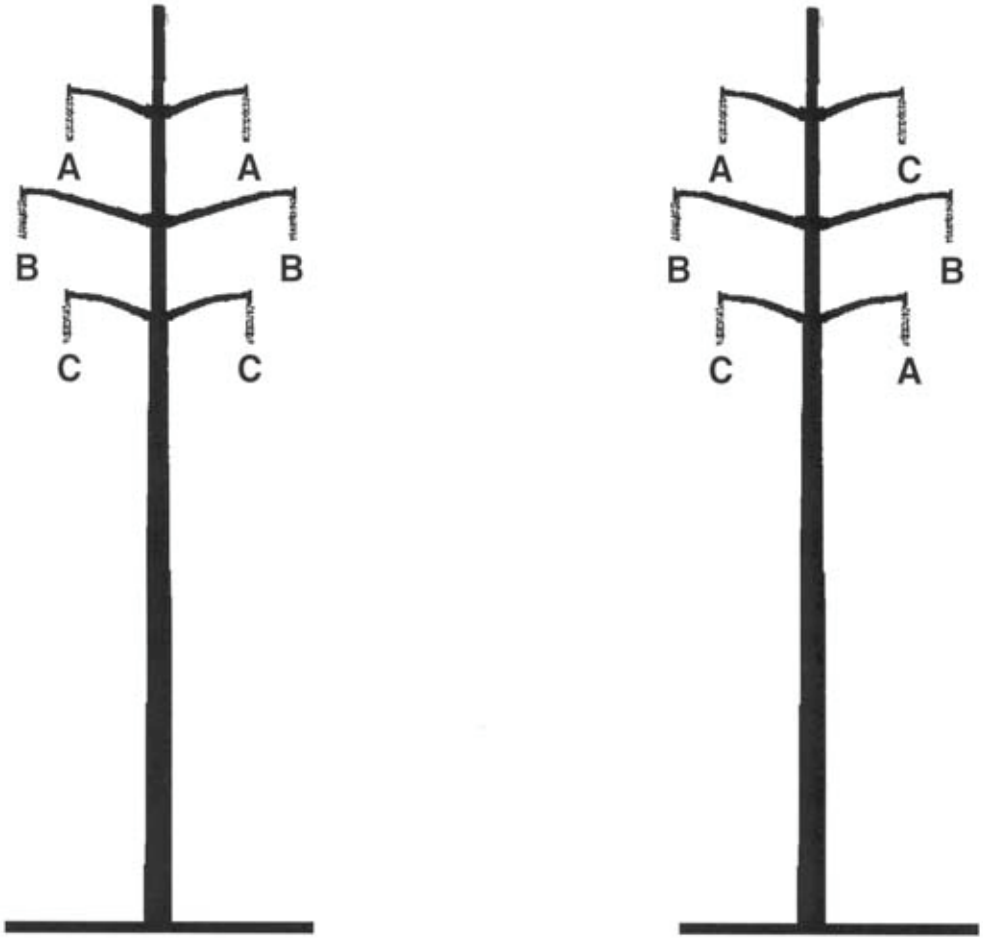
Compact Design Structure



- **Minimize magnetic fields due to compact design**
- **Not a low-cost alternative**
- **Typical conductor data:**

  1 3/8" HS steel overhead ground wire - 9.0 feet sag
  6-556.5 KCMIL 24/7 ACSR power conductors - (PARAKEET) 9.0 feet sag
  Average span - 300 feet

Reverse Phasing of Double-Circuit Transmission Lines



From: → → → → **To:**

Reverse phasing also can be one of the following phase arrangements:

A	**B**		**B**	**A**		**B**	**C**		**C**	**A**		**C**	**B**
C	**C**	**or**	**C**	**C**	**or**	**A**	**A**	**or**	**B**	**B**	**or**	**A**	**A**
B	**A**		**A**	**B**		**C**	**B**		**A**	**C**		**B**	**C**

CHART VIII

230 kV REVERSE-PHASE TRANSMISSION LINES
CALCULATED MAGNETIC FIELDS AT 800 AMPERES

TYPE CONSTRUCTION	MAGNETIC FIELD IN MILLIGAUSS AT THE EDGE OF THE RIGHT OF WAY
DOUBLE CIRCUIT POLE	49
DOUBLE CIRCUIT POLE (REVERSE-PHASE)	16

The edge of right of way is 75 feet from the line centerline.
The 800 ampere phase current is balanced between phases.
Calculations are based on a minimum ground clearance of 27 feet.

CHART IX

500 kV REVERSE-PHASE TRANSMISSION LINES
CALCULATED MAGNETIC FIELDS AT 1100 AMPERES

TYPE CONSTRUCTION	MAGNETIC FIELD IN MILLIGAUSS AT THE EDGE OF THE RIGHT OF WAY
DOUBLE CIRCUIT POLE	37
DOUBLE CIRCUIT POLE (REVERSE PHASE)	21

The edge of right of way is 100 feet from the line centerline.
The 1,100 ampere phase current is balanced between phases.
Calculations are based on a minimum ground clearance of 33 feet.

CHART X

INCREASED 138/69 kV MINIMUM GROUND CLEARANCE CALCULATED MAGNETIC FIELDS AT 400 AMPERES

TYPE CONSTRUCTION	MINIMUM GROUND CLEARANCE FEET	MAGNETIC FIELD IN MILLIGAUSS AT THE EDGE OF THE RIGHT OF WAY
SINGLE CIRCUIT TOP/MIDDLE	25	12
SINGLE CIRCUIT TOP/MIDDLE	30	10
LONG SPAN	25	29
LONG SPAN	30	26
LONG SPAN (REVERSE PHASE)	25	9
LONG SPAN (REVERSE PHASE)	30	7

The edge of right of way is 50 feet from the line centerline.
The 400 ampere phase current is balanced between phases.

CHART XI

INCREASED 230 kV MINIMUM GROUND CLEARANCE CALCULATED MAGNETIC FIELDS AT 800 AMPERES

TYPE CONSTRUCTION	MINIMUM GROUND CLEARANCE FEET	MAGNETIC FIELD IN MILLIGAUSS AT THE EDGE OF THE RIGHT OF WAY
SINGLE CIRCUIT TOP/MIDDLE	27	30
SINGLE CIRCUIT TOP/MIDDLE	32	28
DOUBLE CIRCUIT POLE	27	49
DOUBLE CIRCUIT POLE	32	46
DOUBLE CIRCUIT POLE (REVERSE PHASE)	27	16
DOUBLE CIRCUIT POLE (REVERSE PHASE)	32	15

The edge of right of way is 75 feet from the line centerline.
The 800 ampere phase current is balanced between phases.

CHART XII

INCREASED 500 kV MINIMUM GROUND CLEARANCE
CALCULATED MAGNETIC FIELDS AT 1,100 AMPERES

TYPE CONSTRUCTION	MINIMUM GROUND CLEARANCE FEET	MAGNETIC FIELD IN MILLIGAUSS AT THE EDGE OF THE RIGHT OF WAY
SINGLE CIRCUIT "H" STRUCTURE	33	42
SINGLE CIRCUIT "H" STRUCTURE	53	35
DOUBLE CIRCUIT POLE	33	37
DOUBLE CIRCUIT POLE	53	31
DOUBLE CIRCUIT POLE (REVERSE PHASE)	33	21
DOUBLE CIRCUIT POLE (REVERSE PHASE)	53	16

The edge of right of way is 100 feet from the line centerline.
The 1,100 ampere phase current is balanced between phases.

12 kV DISTRIBUTION LINES
CALCULATED MAGNETIC FIELDS AT 300 AMPERES

TYPE CONSTRUCTION	POLE HEIGHT FEET	MAGNETIC FIELD IN MILLIGAUSS*	
		AT CENTERLINE	AT 30 FEET FROM CENTERLINE
STANDARD CROSSARM	45	14	7
STANDARD CROSSARM	50	11	6

***** Field level under the line at mid-span based on 300 amps, balanced loading, one meter above ground level.

Siting/Magnetic Field Management.doc/mlt

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INSERT TAB 12

Specification For
Transmission Vegetation Management

LA-79827-9

PPL ELECTRIC UTILITIES CORPORATION
Allentown, Pennsylvania

Prepared: Stephen J. Dahl — 9/23/13
Stephen J. Dahl — **Date**
Regional Forester

Approved: William P. Klokis — 9/23/13
William P. Klokis — **Date**
Manager – Vegetation Management

Revision 4	Date: 12/31/1993
Writer	Unknown
Approver	PPL Division Ops
Reason Written	• Update specification to more current vegetation management practices and materials.

Revision 5	Date: 05-01-2007 – 3-01-2008
Writer	William Taylor, Earl Burnside
Approver	Gerald R. Diehl – Manager System Maintenance
Reason Written	• Update specification for NERC FAC-003-1 compliance requirements of defined clearance 1 and 2 as applicable to lines operated at 200kV or above. • Updated acceptable use herbicides, adjuvants and mixture alternatives. • Added additional contractor requirement in event of work related interruption or identification of imminent threat. • Remove references to PP&L throughout and replace with PPL Electric Utilities.

Revision 6	Date: 03-2009
Writer	Earl V. Burnside – System Forester
Approver	Kenneth L. Armstrong – Manager Vegetation Management
Reason Written	• Specification update to add clarification footnotes to Section II – Clearing Requirements, Section III Clearing Procedures, and Table 1 Right-of-Way Clearing Widths and Conductor-to Vegetation Clearances to note: "No corrective remediation pruning actions required for encroachments of WSZ (only) where maximum-sag conductor conditions have been identified, species acceptability- per PPL EU Specification LA-79827-6 confirmed, and vegetation growth has been determined to be maximized or vegetation is dead."

Revision 7	Date: July-2009
Writer	Earl V. Burnside – System Forester
Approver	Kenneth L. Armstrong – Manager Vegetation Management
Reason Written	• Section III updated to add Wire Zone-Border Zone Management technique to be used where applicable. • Herbicide Alternative 6 amended to remove Oust and Replace with Escort into mix. • Amended applicable footnotes to reference current Specification, LA-79827-7, for species acceptability.

Revision 8	Date: December 2010
Writer	Earl V. Burnside – System Forester
Approver	Phil Walnock – Manager Vegetation Management
Reason Written	• Section III, Part A updated to add Wire Zone-Border Zone management technique to be used where applicable and not sole management technique. • Section III, Part A, sections 2 and 3 updated to clarify acceptable/noncompatible. species and possible exceptions to WZ-BZ. • Acceptable Species Table 3 specified as to not include horticultural plant varieties. • Section III, Part A, section 4 amended to reflect pruning is not preferred for trees under wires. All pruning to be completed with PPL authorization • Section V, parts A & B amended to reflect new herbicide application techniques (cut-stubble). • Table 4 Amended to reflect updates to approved herbicide mix alternatives. • Section IV, remove reference to PPL Specification A-118231 as it no longer exists. • Amended applicable footnotes to reference current Specification, LA-79827-8, for species acceptability.

Revision 9	Date: September 2013
Writer	Stephen J. Dahl – Regional Forester
Approver	William P. Klokis – Manager Vegetation Management
Reason Written	• Simplified Document Title • Section I, Updated scope to include compliance with all permits and • Section II, Added "Initial Clearing of a New Right of Way" spec. • Section II, Added specific definition of a Danger Tree. • Section III, Updated verbiage. • Table 3, Removed American Chestnut as a Compatible Species • Section IV, Added Drop and Lop as the preferred debris disposal method in wet areas. • Section IV, Removed references to burning brush as an acceptable method of debris disposal. • Section V, Non-Aquatic use herbicide buffer from water bodies decreased from 50' to 35' in accordance with NPDES. • Table 4, Updated list of Approved Herbicides and Spray Mixtures • Section VI, Removed references to burning brush. • Section VI, Updated instructions for reporting Electrical System Events and on the job injuries.

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I. SCOPE

This document describes methods and procedures for all transmission (69 kV and above) line right-of-way vegetation management practices, including: clearing, timber and slash disposal, use of herbicides, and specifying means of line access.

Vegetation Management Contractors shall ensure compliance with all federal, state, and local permits including but not limited to National Pollutant Discharge Elimination System (NPDES) permits and Erosion and Sedimentation (E&S) Control Plans.

II. CLEARING REQUIREMENTS

A. Initial Clearing of a New Right of Way

For initial clearing of new transmission rights-of-way (69kV and above), all vegetation shall be removed from the limits of the right of way with the exception of grasses and herbaceous or non-woody plants. This is necessary to both establish the extent of the new right-of-way and to accommodate the many construction activities that will occur within the right-of-way to install new foundations, tower structures, and conductors. After the initial clearing of a new right-of-way, PPL Electric then maintains the right-of-way through the removal of non-compatible species as well as the application of herbicides. All work shall be completed in accordance with all applicable federal, state, and local laws and regulations. All work will conform to all regulatory permitting requirements

Initial clearing of a new right of way must adhere to these requirements:

1. All vegetation shall be removed from the limits of the right of way with the exception of herbaceous or non-woody plants. Exceptions for ravine crossings can be found on page 15 of this document. Instructions for disposition of brush can be found in chapter IV of this document.

2. The edge of the right of way shall be trimmed “Ground to Sky”. Ground to sky means that all branches overhanging into the easement area shall

be removed. All required tree pruning shall conform to the latest approved edition of ANSI Z133 Safety Standards, ANSI A-300 Plant Maintenance, and OSHA 1910.269 as a minimum to assure safety and industry standards are maintained.

3. All off corridor danger trees shall be removed including edge trees which cannot be properly pruned to the standards outlined above.

4. All stumps and hardwood brush which have not been mechanically removed shall be treated with herbicides to prevent the growth and regrowth of non-compatible vegetation. All applications shall be made under the direction of PA Certified Commercial Pesticide Applicators and done in accordance with product labels and all applicable laws.

5. When required, vegetated off Right of Way access roads and structure pad sites shall be cleared of all vegetation. This clearing shall be specified by project management personnel.

6. The contractor shall ensure compliance with all federal, state, and local permits including but not limited to National Pollutant Discharge Elimination System (NPDES) permits and Erosion and Sedimentation Control Plans (E&S).

B. Conductor-to-Vegetation Clearances and Right-of-Way Widths

PPL Electric Utilities Corporation ("PPL Electric") has established minimum conductor-to-vegetation clearances and right-of-way widths to be cleared for each transmission line voltage (Table 1). These conductor-to-vegetation clearances are defined by the conductor positions between maximum vertical sag ("max sag") and a 30° conductor blowout.

Any clearing or chemical treatment performed on the right-of-way must adhere to these requirements:

1. The entire right-of-way width, as listed in Table 1, shall be treated.

2. Any vegetation, which could grow into the wire security zone (defined in Table1), shall be treated to remove this hazard[1]. As more fully discussed in Section III, the treatment could involve cutting to ground line, pruning, or applying herbicides, depending on the type of clearing specified. However, in any case, sufficient vegetation shall be removed to create an additional space beneath the wire security zone (defined in Table 1) to allow for growth that would occur between scheduled treatments.

Figures 1 and 2 illustrate the security zone concept and how the right-of-way should be cleared or maintained to keep the zone intact.

C. Danger Trees (Figure 2 and Table 2)

To ensure line reliability, vegetation management operations must extend to trees located outside the clearing widths given in Table 1, which present a hazard to the line. These "danger trees" are those that, in falling, would either strike the conductor or pass within the minimum conductor clearances noted in Table 2 and shown on Figure 2. Danger trees should be removed as specified at the time of treatment. The PPL Electric representative will work with vegetation contractors to approve the removal of danger trees during line clearing/maintenance operations.

A danger tree is defined as a tree having one or more of the following characteristics:

A. Decay, cankers, hollows-present in the main trunk of the tree and must show visible signs of decay.

B. Animal and mechanical damage-Present in the main trunk of the tree showing visible signs of decay to the extent that it affects its structural integrity.

[1] No corrective remediation pruning actions required for encroachments of WSZ (only) where maximum-sag conductor conditions have been identified, species acceptability- per PPL EU Specification LA-79827-9 confirmed, and vegetation growth has been determined to be maximized or vegetation is dead.

C. Disease and insect damage-Has affected the tree to such an extent that the tree's survival to the next tree maintenance cycle is in doubt.

D. Root system-Is exposed to such an extent that the support system of the tree is reduced.

E. Leaning trees-Trees that have such a lean toward the right-of-way that they cannot be pruned without removing their tops and slanting the tree back.

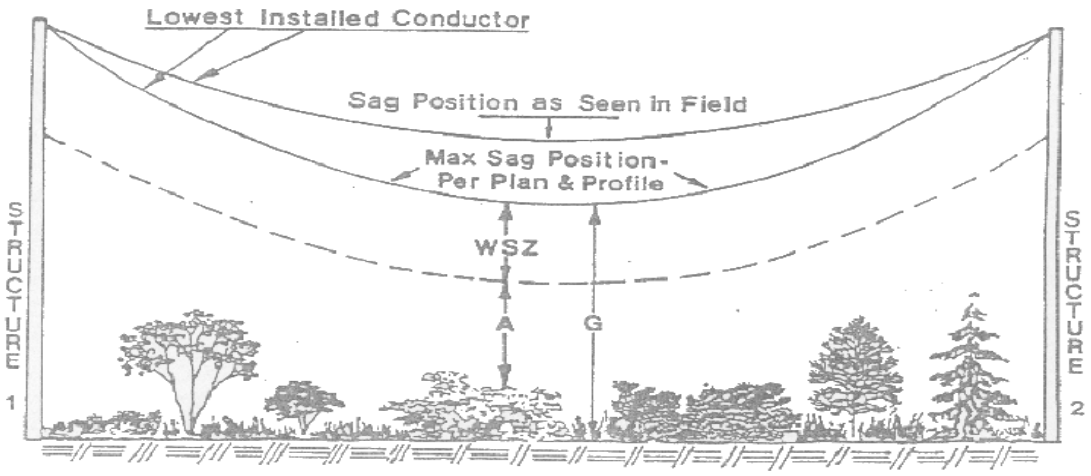
F. Splits-That are to such an extent that the splitting is affecting the stability of the tree.

G. Overcrowned trees-Trees that are overcrowned to such an extent that their growth is toward the right-of-way.

H. Dead or dying trees-All dead or dying trees that can hit the conductor or pass within the minimum conductor clearances shall be removed.

I. All co-dominant stems should be considered for removal.

TRANSMISSION LINE PROFILE
WIRE SECURITY ZONE AND VEGETATION CLEARING

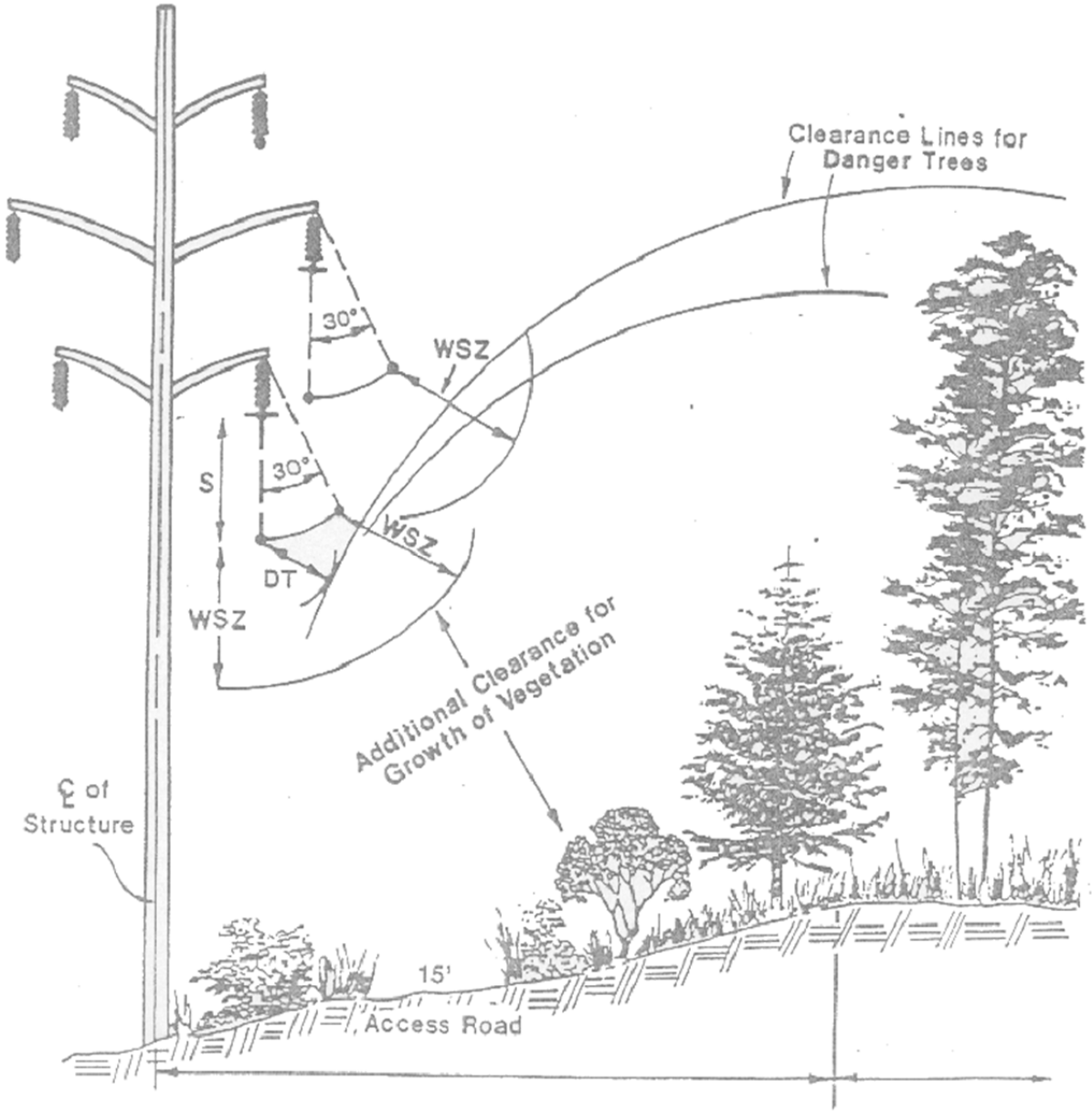


G = Max Sag Ground Clearance – Determined from Line Plan & Profile
WSZ = Wire Security Zone (Table 1)
A = Additional Clearance to allow for Growth of Vegetation
A = 5’ per year apical (Under), 2’ per year lateral (Around)
(WSZ + A) = Minimal Acceptable Clearance from Vegetation to Conductor at Time of Maintenance (Table 1)

Figure 1

TRANSMISSION LINE CROSS SECTION[1]
WIRE SECURITY ZONE AND DANGER TREE CLEARING

S = Maximum Sag of Conductor
WSZ = Wire Security Zone (Table 1)
DT = Danger Tree Clearance (Table 2)



Required R/W Clearing Width (Table 1)
[1]To avoid repetition only one-half of the R/W is shown.

Danger Tree Width Limit

Figure 2

Table 1
Right-of-Way Clearing Widths
And
Conductor-to-Vegetation Clearances

Line Voltage	Clearing Width[1]	IEEE Distance[2]	Wire Security Zone (Figure 1, "WSZ)	Minimum Acceptable Clearance from Vegetation to Conductor at Time of Maintenance[3][4] Figure 1, (WSZ + A) Under / Around
69-138 kV	100'		7'	22'/ 13'
230 kV	150'	5.2'	10'	25'/ 16'
500 kV	200'	8.9'	17'	32'/ 23'

(1) Older lines may have right-of-way agreements specifying different widths. These agreements shall either be followed as written or renegotiated to meet the tabled clearing widths given above.

(2) Radial clearance to be maintained between vegetation and conductors under all rated electrical operating conditions.

(3) Clearance to be achieved at the time of vegetation maintenance work wherever possible (see Table 1, WSZ and 'A' in Figure 1). This distance is necessary to allow for vegetation growth until the next maintenance cycle and to maintain the minimum wire security zone separation. Compatible vegetation (defined in Table 3) that will never grow into the Wire Security Zone is excluded from this minimum clearance requirement.

(4) No corrective remediation pruning actions required for encroachments of WSZ (only) where maximum-sag conductor conditions have been identified, species acceptability- per PPL EU Specification LA-79827-9 confirmed, and vegetation growth has been determined to be maximized or vegetation is dead.

Table 2
Clearance for Danger Trees

Line Voltage	Danger Tree Clearance (Minimum Conductor Clearance – Falling Vegetation)
69-230 kV	5’
500 kV	10’

III. CLEARING PROCEDURES

A. Specific Procedures for Each Clearing Method

1. Wire Zone/Border Zone

The Wire Zone/ Border Zone (WZ/BZ) method of managing transmission rights of way is the preferred vegetation management method of PPL Electric Utilities. This method of vegetation management is to be applied where practical and is not meant to be the sole management technique used on the transmission facilities.

I. Changes to Incorporate WZ/BZ:

Clearing requirements as defined below are to be applied to those Right-of-Way conditions that are currently being treated with herbicide and re-clearing treatment applications.

II. Wire Zone – Figure 1&2 (above) and WZ/BZ diagram below

- Defined as that area of the right of way corridor that extends from the centerline to a distance ten (10) feet from the outer most conductors. Native Grasses, Ferns, and Herbaceous Plants shall be preserved to the greatest extent possible in the Wire Zone.

III. Border Zone – Figure 1&2 (above) and WZ/BZ diagram below

- Defined as that area of the right of way corridor that extends from the limits of the Wire Zone to the cleared limits of the established right of way.

- All compatible species (Table 3) or other species noted to not pose a clearance threat shall be preserved where possible. Those, which would violate the wire security zone before the next scheduled treatment, shall be removed.

- As can be seen from Figures 1 and 2, in most cases, more of the taller compatible species can be retained at the right-of-way edges and closer to the line structure locations, where distance to the lowest conductor is usually greatest.

- All "non-compatible" or other species that exhibit growth characteristics that pose clearance concerns species shall be removed to the greatest extent possible.

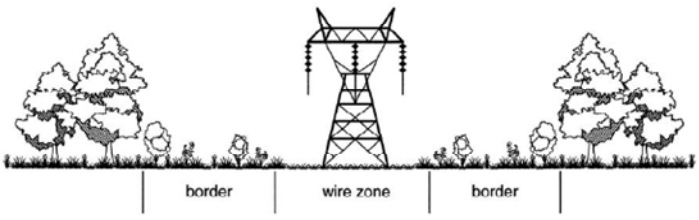
Wire Zone-Border Zone Vegetation Management

- With the Wire Zone-Border Zone VM, the typical right of way is show as below. Two distinct zones are identified:

1. The wire zone is typically defined as that area from centerline to 10' past the outer most set of conductors in either direction. The total width of the wire zone will vary by voltage class and easement definitions.
2. The border zone is that area of the right of way that extends from the wire zone to the limits of the defined width row.
3. The areas outside of the border zone are managed for hazard trees.

UTILITY VEGETATION MANAGEMENT FINAL REPORT

Bramble and Byrnes Wire Zone – Border Zone
(From Yahner, Bramble and Byrnes, 2000)



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Where wire zone/ border zone cannot be applied due to existing documented easement restrictions or other limitations such as documented site or environmental concerns, the following procedures may be utilized as appropriate to the site conditions present:

2. Selective Clearing

- All compatible species (Table 3) shall be preserved to the greatest extent possible. Those, which would violate the wire security zone before the next scheduled treatment, shall be removed[1].

- All "noncompatible" or other species that exhibit growth characteristics that pose clearance concerns species shall be removed to the greatest extent possible.

- All trees and brush—both compatible and noncompatible species—shall be removed from access roads (15' width); in work areas (stringing cuts, vegetation disposal areas, structure erection areas); and within a 15' perimeter of a tower or immediately adjacent to any structure location.
  Exceptions may occur where landscaped plantings have been propagated adjacent to facilities and these plantings do not interfere with accessibility to such facilities.

3. Restricted Clearing

- All compatible species shall be preserved, wherever possible. Those which would violate the wire security zone before the next scheduled treatment shall be pruned or removed to obtain required "Desired Clearance from Vegetation to Conductor at Time of Maintenance" (defined in Table 1).

[1] No corrective remediation pruning actions required for encroachments of WSZ (only) where maximum-sag conductor conditions have been identified, species acceptability- per PPL EU Specification LA-79827-9 confirmed, and vegetation growth has been determined to be maximized or vegetation is dead.

- Any non-compatible species, which have violated or would violate the wire security zone before the next scheduled treatment shall be removed[1].

- The remaining non-compatible species shall be preserved until the time comes when they can be removed without causing adverse impacts. This means that smaller (young) trees of noncompatible species are temporarily retained. As an adequate compatible cover becomes established over time, these non-compatible species may be removed.

The only exception to the above applies to non-compatible trees growing in ravines or gullies or on side hills, where topography is such that they will never reach the wire security zone. In these areas, the non-compatibles may be retained when approved by PPL Vegetation Management.

- All trees and brush—both compatible and non-compatible—shall be removed from access roads, work locations, or near structures, as described under Selective Clearing.

[1] No corrective remediation pruning actions required for encroachments of WSZ (only) where maximum-sag conductor conditions have been identified, species acceptability- per PPL EU Specification LA-79827-9 confirmed, and vegetation growth has been determined to be maximized or vegetation is dead.

Table 3

Compatible Species List[1] (does not include Horticultural plant varieties)

I. SMALL TREES

a) Flowering Dogwood *(Cornus florida)*

b) Redbud *(Cercis canadensis)*

c) Hawthorn *(Crataegus spp.)*

d) Blue Beech (American Hornbearn) *(Carpinus caroliniana)*

e) Shadbush (Juneberry, Serviceberry) *(Amelanchier spp.)*

f) Eastern Red Cedar *(Juniperus virginia)**

g) Northern White Cedar *(Thuja occidentalis)**

h) Dwarf Willow *(Salix spp.)*

i) Deciduous Holly (Winterberry) (Ilex *verticillata)*

* These species shall be evaluated on an individual basis. Over mature specimens have the ability to exceed 40' in height and must be removed if they become a clearance threat.

II. LARGE SHRUBS

a) Alder (Alnus spp.)

b) Witch-hazel *(Hamamelis virginiana)*

c) Spicebush *(Lindera benzoin)*

[1] This list is not all inclusive and is meant to be a guideline. These species are to be preserved as appropriate in accordance with LA-79827-9. Some of the taller trees and shrubs may be removed to establish the "Minimum Acceptable Clearance from Vegetation to Conductor at Time of Maintenance" as defined in Table 1. Woody growth must also be removed around structures, on access roads, and in construction activity areas (e.g., vegetation disposal areas. stringing cuts, structure erection areas).

d) Common Chokecherry *(Prunus* virginiana)

e) Elderberry *(Sambucus spp.)*

f) Rhododendron *(Rhododendron maximum)*

g) Virburnum *(Viburnum spp.)*

h) Dogwood *(Cornus spp.)*

i) Smooth (Dwarf) Sumac *(Rhus glabra)*

j) Staghorn Sumac *(Rhus typhina)*

k) Chokeberry *(Pyrus arbutifolia)*

III. SMALL SHRUBS (does not include horticultural varieties)

a) Mountain Laurel *(Kalmia latifolia)*

b) American Yew-Ground Hemlock (Taxus *canadensis)*

c) Sweetfern *(Comptonia peregrina)*

d) Honeysuckle *(Lonicera spp.)*

e) Huckleberries *(Gaylussacia spp.)*

f) Blueberries *(Vaccinium spp*.)

g) Viburnum *(Viburnum spp.)*

h) Meadowsweet *(Spirea spp*.)

i) Wintergreen *(Gaultheria procumbens)*

j) Trailing Arbutus *(Epigaea repens)*

k) Blackberry *(Rubus allegheniensis)*

l) Raspberry *(Rubus occidentalis)*

m) Hazlenut or Filbert *(Corylus spp.)*

n) Scrub Oak *(Quercus spp*.)

IV. ALL NATIVE GRASSES, FERNS AND HERBACEOUS PLANTS

4. Tree Pruning

Tree pruning for apical clearance is only considered when specified within the language of pre-existing right of way agreements. Removal of vegetation that poses a clearance concern is the preferred method of management.

All trees will be pruned by the guidelines detailed in the most current revision of the American National Standard for Tree Care Operations-Tree, Shrub and Other Woody Plant Maintenance – Standard Practices (ANSI A300). All pruning cuts should be made back to lateral branches at least one-third the diameter of the limb being removed or to the branch collar at the parent stem.

No dead wood shall be removed unless it either endangers the reliability of the line or such action is authorized by PPL Electric's designated representative.

Every effort shall be made during the pruning process, to prevent damage to surrounding property and/or the tree itself. Tree gaffs or hooks will not be permitted in any maintained yard tree to be pruned. They will, however, be permitted in any tree to be removed or in forest trees to be pruned, unless objected to by the property owner.

Every effort shall be made to prune trees by the following acceptable methods:

- Directional Pruning (only to be completed with PPL EU authorization)

  This is the preferred pruning technique to be utilized when a tree is located directly under the conductor or located within the right of way corridor. In order to achieve “Minimum Acceptable Clearance from Vegetation to Conductor at Time of Maintenance” (defined in Table 1), entire branches and/or branches that have laterals growing towards the conductor(s) should be removed. All cuts should be made back to lateral branches that grow away from the conductor(s).

- Crown Reduction (only to be completed with PPL EU authorization)

  This technique is to be utilized when a tree is located under the conductors and directional pruning is not feasible. In this situation, all top branches must be pruned back to lower the crown of the tree to achieve the "Minimum Acceptable Clearance from Vegetation to Conductor at Time of Maintenance" (defined in Table 1). When feasible, entire branches that have sprouts from old topping cuts growing towards the lines should be removed.

- Side Pruning (only to be completed with PPL EU authorization)

  This method of pruning is utilized when a tree grows adjacent to the conductors. In this situation, it is necessary to remove the side branches extending into the right of way zone. When the parent stem of a tree is at the edge of the right-of-way, limbs protruding into the right-of-way should be removed at the branch bark collar on the main stem.

  Any exceptions to the above methods of pruning will only be performed at the discretion of and with the approval of the appropriate Company representative.

B. General Procedures for All Clearing Methods

For all types of clearing specified, the following procedures should be followed:

- Trees shall be felled in a manner to minimize damage to those trees and/or shrubs, which are to be preserved. This is particularly essential when performing Restricted Clearing.

- All stumps shall be cut as low to the ground as possible. Stump heights should not exceed 3" for smaller trees (less than 12" diameter), while stump heights of 6" or less are acceptable for larger trees or where physical obstructions prevent cutting next to the ground (e.g., rocks, fencing). Stumps shall be cut parallel to the ground, with no sharp splinters or points remaining.

- Special care shall be taken in clearing near ornamentals or any type of cultivated tree, shrub, or vine.

- If areas are encountered that have already been cut over, any tree stubs of an excessive height shall be re-cut to the heights specified above.

- Danger trees shall be removed, as previously described under "Clearing Requirements".

IV. DISPOSAL OF CLEARED VEGETATION

All work in wetlands shall be completed in accordance with state and federal environmental regulations and policies.

Wetlands are defined as areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.

In wet areas “drop and lop” shall be the preferred method for the disposal of woody debris. The intention of drop and lop is to minimize earth disturbance by leaving woody debris where it falls. Special care will be made to ensure that felled trees, logs, slash, brush, and chips do not impede any running water or seasonally dry waterways or drainage culverts. Slash will be compacted in such a manner that it will not be carried away by high water

A. Specific Procedures for Each Disposal Method

1. Piling (Wind Rowing)

(a) Timber (6" or larger in diameter).

- All timber shall be placed in neat piles along the edge of the right-of-way, away from areas of preserved compatible vegetation. Under normal conditions timber piles will be interspersed with slash piles.

- Timber shall be stacked in tree length piles unless otherwise specified, in piles not greater in length than the longest tree length. A separation of at least 10' shall be provided on either side of each pile.

- All access roads, trails and streams (including their banks) shall be kept clear. Piling shall not be done where piles would be highly visible from any improved road.

(b) Slash

- All slash (i.e., trees less than 6" in diameter, tree tops, and limbs) shall be stacked in flattened mounds along the edge of the right-of-way, away from areas of preserved compatible vegetation.

- Slash piles shall be dressed of excessively protruding limbs and compacted to keep visual obstruction to a minimum. Generally, they should not exceed 5-6' in height, except where site conditions are such that higher piles are acceptable (e.g., depressions, rough terrain in remote areas). Compaction of piles may be facilitated by use of equipment employed in the associated clearing operation.

- The length of a slash pile should not be any greater than a tree length timber pile, and its width limited so as not to interfere with access road construction or conductor stringing. A separation of at least 10' shall be provided on either side of each pile.

- All roads, trails, and streams (including their banks) shall be kept clear. No piling shall be undertaken where piles would be highly visible from any improved roads, at other locations involving high public visibility, or near tower or pole sites.

2. Drop and Lop

- All noncompatible vegetation shall be cut so that it falls toward the edge of the right-of-way, away from any designated access paths. After trees are felled, all long limbs shall be removed from the trunk, and the tree shall be bucked in order to keep the vegetation as close to the ground as possible.

- If necessary, trees and/or slash shall be moved to create a clear way for access and wire stringing, as needed.

3. Chipping

- All timber shall be stacked, according to the procedure described under "Piling," above.

- All slash shall be fed through a mechanical chipper immediately after cutting.

- Unless otherwise specified, chips shall be randomly scattered on the right-of-way, except in the following areas: fields, along city streets, park areas, on the banks of streams or ponds. In such areas, chips must be disposed of at an acceptable site, either on or off the right-of-way.

B. General Procedures for all Disposal Methods

- The procedure and equipment used should minimize disturbance to both the right-of-way soil cover and to the vegetation that is to remain on the right-of-way.

- All disposal operations shall closely follow (by no more than 3 days) clearing operations to keep work confined to one area and to prevent unsightly and unsafe conditions.

V. HERBICIDE APPLICATION

A. Methods of Application

1. Four methods are currently accepted by PPL Electric as tools in its vegetation management program: Stump Treatment, Basal Application, Foliage Application, and Cut –Stubble application.

B. Procedures

1. Specific Procedures and Precautionary Measures for Each Treatment Method

I. Stump Treatment

Used for the prevention of re-sprouting, stump treatment involves treating cut stumps with either an oil-based mixture or a ready-mixed non-oil solution. This type of treatment is prescribed when vegetation is cut to ground line. Therefore, its primary use is for initial clearing where it is applied to stumps of selectively cleared noncompatible species. However, it is also used for maintenance clearing, when trees have grown too tall for foliage application, and a decision is made to re-cut them to ground line.

- Oil-based Stump Treatment

  Using hand-held applicators, all newly cut stumps and all exposed roots shall be thoroughly treated as soon as possible after the tree is cut; or, if the label includes this method, all basal bark and root crowns of the trees shall be treated prior to cutting (at least one hour but not more than one day before the tree is cut). In either case, the stump, bark, and exposed roots shall be thoroughly wet to the ground line, unless the label directs otherwise. This type of stump treatment may be done any time during the year, except when snow or ice prevents contact of the herbicide with the stump as required for effective treatment.

- Ready-Mix Non-Oil Stump Treatment

  Using a hand-held applicator, the sapwood and cambium area of all newly cut stumps shall be thoroughly wet immediately after the tree is cut.

  This type of stump treatment may be done any time during the year, except when snow or ice prevents contact of the herbicide with the stump.

II. Foliage Treatment

All foliage and stems of noncompatible vegetation shall be thoroughly wet to the point of runoff, unless the label directs otherwise.

For most applications, treatment must be done from the time the plant is fully developed until it begins dormancy. For any foliage treatment which acts as a growth inhibitor (e.g., prevents budding), treatment must be made during late summer or early fall.

Adequate precautions shall be taken when wind direction is toward non-target vegetation, especially sensitive crops. Foliage application shall not be done during high or gusty winds, which will cause drift problems.

To minimize drift of foliage application the applicator shall:

- Stand as close as possible to the target vegetation, keeping the spray nozzle low. If necessary, the target species should be bent over to avoid applying the herbicide solution high into the air.

- Use a thickening agent to produce a coarse spray.

- Use appropriate nozzle type and pressure to produce a coarse spray.

- Application will be parallel to or toward the center of the right-of-way, not toward right-of-way edges.

III. Basal Treatment

The lower 12" to 15” of the stem and all the root crowns of non-compatible vegetation shall be completely saturated with the solution, unless the label directs otherwise.

Basal treatment may be done any time during the year, except when snow or ice prevent contact of the herbicide with the roots or stems as required for effective treatment

IV. Cut-Stubble Treatment

This method of application is primarily applied following mechanical mowing operations, but may follow hand-cutting operation as well. Treatment may include low volume Thinvert applications or low volume basal treatment applications with Brown-Brush monitor type equipment.

2. General Procedures and Precautionary Measures for all Treatment Methods.

- Ensure that herbicides are applied correctly and safely, all label instructions and precautions must be followed.

- Ensure effective treatment. The target areas of noncompatible species shall be thoroughly treated, as previously described for each treatment method.

- Herbicides shall not be applied during inclement weather, preventing the need for reapplication and reducing the chance of runoff into non-target areas. If rain does occur, application shall not begin until one hour after runoff has stopped. Early morning dew shall be allowed to dry before application.

- Herbicides shall not be applied in the following areas (with the exceptions as noted):

    (1) Pasture areas.

(2) Within 35' of any water body, except for herbicides approved for watershed/aquatic use.

(3) Within any actively maintained orchard or cultivated planting.

(4) Near susceptible crops or other non-target vegetation, where drift, runoff, or vapors can cause injury. Exact safety distances shall be determined based on wind conditions, topography, soil type, vegetation (crop) type, and label instructions.

(5) In cases where weather conditions create excessive drift, applications will be temporarily suspended until improved conditions warrant the continuation of the application.

(6) On rights-of-way under jurisdiction of the Pennsylvania Department of Conservation and Natural Resources, Pennsylvania Game Commission, Pennsylvania Fish and Boat Commission, and the U.S. National Park Service unless prior approval is granted by the Department or Commission.

(7) On watershed properties, or in the vicinity of springs, irrigation ditches, or other potable water sources, unless prior approval is granted by the property owner for use of a watershed/aquatic approved herbicide.

(8) In gullies or ravines where tree clearing is minimal.

- Contractor shall have sample or extra labels and material safety data sheets (MSDS)[1] for all herbicides and surfactants being used at the job site at all times.

[1] The term MSDS will be replaced by "Safety Data Sheet" (SDS) as outlined in OSHA's HAZCOM revision of 2012.

- Contractor shall be responsible for maintaining a current copy of and adhering to the requirements of the Commonwealth of Pennsylvania Department of Agriculture Pesticide Hypersensitivity Registry.

- Only herbicide application alternatives approved by PPL EU will be used by the Contractor in any given situation.

- For all treatments, used herbicide containers (other than returnable/refillable containers) shall be properly disposed of, in accordance with label instructions and/or applicable regulations.

Table 4

Approved Herbicides and Spray Mixtures

Trade Name	Common Name	Carrier
Garlon 3A	Triclopyr	Water
Garlon 4 Ultra	Triclopyr	Arborchem Basal Oil
		or water
Tordon 101	Picloram/2,4-D	Water
Pathway	Picloram/2,4-D	RTU
Escort XP	Metsulfuron	Water
	Methyl	
Streamline	Metsulfuron	Water
	Methyl	
	Aminocyclopyrachlor	
Krenite	Fosamine	
	Ammonium	Water
Rodeo	Glyphosate	Water
Accord XRT II	Glyphosate	Water
Arsenal Powerline	Imazapyr	Water
Polaris	Imazapyr	Water
		or Arborchem Basal oil
Stalker	Imazapyr	Water
		or Arborchem Basal oil
Pathfinder	Triclopyr	RTU
Milestone	Aminopyralid	Water
Viewpoint	Metsulfuron	
	Methyl	
	Aminocyclopyrachlor	
	Imazapyr	Water

II. SPRAY MIXTURE ALTERNATIVES

Alternative 1

Hydraulic (High Volume stem foliar) Application - Selective

AL#1a	Garlon 3A	1/2% (2 qts)
	Tordon 101	1/2% (2 qts)
	Arborchem Clean Cut	1/4% (1 qt.)
	Water	98 3/4 gallons
	Drift Control	
Remember Tordon 101 is a Restricted Use Herbicide and notification is very important.		

AL#1b	Garlon 3A	1/2% (2 qts)
	Streamline	7 1/2 oz. per 100 gal.
	Arborchem Clean Cut	1/2% (2 qt.)
	Water	99 gallons
	Drift Control	
This mix can be used up to water's edge but not into water.		

AL#1c	Garlon 3A	1/2% (2 qts)
	Streamline	4.25 oz. per 100 gal
	Milestone	5 oz. per 100 gal
	Arborchem Clean Cut	1/2% (2 qt.)
	Water	99 gallons
	Drift Control	
The best mix is the third one (1c) for all species and for use after grasses have been established. This would work BEST for a second application. If for some reason the first cut stubble and treatment was poor, you may want to re-cut and treat again. The application would have to be selective if you have grasses established.		

Backpack (Low Volume) Application – Selective

AL#1d	Garlon 3A	3%
	Tordon 101	3%
	Arborchem Clean Cut	1%
	Water	93%

AL#1e	Garlon 3A	2%
	Streamline	40 oz. per 100 gal
	Arborchem Clean Cut	1%
	Water	98%
The second treatment (AL#1e) is a better low volume mix. This application can be used up to water's edge, very selective (non-restricted). More to come on a (Buffer Law), NPDS (National Pollution Discharge System) was talking about a state reg. for 30 feet set back.		

Alternative 2

Hydraulic (High Volume foliar) Application – Non Selective

AL#2a	Krenite S	1.5% (6 qts)
	Arsenal Powerline	4 oz./100 gal
	Arborchem Clean Cut	1/4% (1 qtr.)
	Water	98 1/4 gal.
	Drift Control Agent	
Good application for heavy pine.		

Backpack (Low Volume) Application – Non Selective/Selective

AL#2b	Krenite S	5% (5 gallons)
	Arsenal Powerline	1/2 % (2 qts)
	Arborchem Clean Cut	1% (4 qts)
	Water	93 1/2 gallons

AL#2c	Krenite S	4% (4 gallons)
	Viewpoint	52 oz. per 100 gallons
	Arborchem Clean Cut	1% (4 qts)
	Water	95 gallons
Good for all species: Ex. ailanthus, sassafras, birch, locust.		

Ultra Low Volume Thinvert Backpack Application – Non Selective/Selective

AL#2d	Krenite S	7% (7 gallons)
	Arsenal - Polaris	1 % (4 qts)
	Escort XP	4 oz./ 100 gal
	Thinvert RTU	92 gallons

AL#2e	Krenite S	7% (7 gallons)
	Viewpoint	100 oz./ 100 gal
	Thinvert RTU	93 gallons
Good for all species: Ex. ailanthus, sassafras, birch, locust.		

Alternative 3

Low Volume Basal

AL#3a	Garlon 4 Ultra	25% (25 gallons)
	Stalker	1% (1 Gallon)
	Arborchem Basal oil	74 Gallons
Just remember that Stalker is Arsenal, beware along the ROW edge.		

Alternative 4

Hydraulic (High Volume) Application – Non Selective - Aquatic approved

AL#4a	Rodeo	1% (4 Quarts)
	Polaris	4 oz./100 gal
	Chemsurf 90 (aquatic surfactant)	1/2% (2 Quarts)
	Water	98 1/2 Gallons
	Drift Control Agent	
This is approved for aquatic use, but may require a permit from DEP. This will kill all species. Not good to do High Volume.		

Backpack (Low Volume) Application – Non Selective/Selective - Aquatic approved

AL#4b	Rodeo	5% (5 Gallons)
	Polaris	1/2% (2 Quarts)
	Chemsurf 90 (aquatic surfactant)	1% (4 Quarts)
	Water	93 1/2 Gallons

Backpack (Ultra Low Volume) Thinvert Application – Non Selective/Selective - Wetland approved

AL#4c	Rodeo	7% (7 Gallons)
	Polaris	1% (4 Quarts)
	Escort XP	4 oz./100 gal
	Thinvert RTU	92 Gallons
With the Escort XP the mix, it will pick up most species; again with a Thinvert mixture you must be selective. This is wetland approved not aquatic approved. (Do not apply to standing water) PPL does not want any herbicide applied directly into water.		

Alternative 5

Thinvert Application – (Applied at 5 GPA) – Non Selective

AL#5a	Tordon K	2 Quarts
	Arsenal – Polaris	1 pint
	Milestone	7 oz.
	Thinvert RTU	4.3 Gallons

AL#5b	Viewpoint	12 oz.
	Streamline	4.25 oz.
	Milestone	7 oz.
	Thinvert RTU	99.8%

Thinvert Application – (Applied at 5 GPA) – Selective

AL#5c	Tordon K	2 Quarts
	Milestone	7 oz.
	Streamline	4.25 oz.
	Thinvert RTU	4.7Gallons
After cut stubble treatment, this application should not be required again, except: If right-of-way needs to be mowed again or if results were poor due to application too late after mowing. Make sure the application is done with the Thinvert wide-cast nozzle mounted on an ATV vehicle. All applications must be completed soon after mowing and before any significant regrowth occurs.		
If your cut-stubble was successful, the subsequent herbicide treatments can be made by selective treatment of AL#1c.		

Hydraulic (High Volume) Application

AL#5d	Garlon 3A	¾% (3 Quarts)
	Escort XP	1 Ounce/100 gal
	Arborchem Clean Cut or Approved Equivalent	¼% (1 Quart)
	Water	99 Gallons
	Drift Control Agent	

Back Pack – Power/Hand Operated (Low Volume)

AL#5e	Garlon 3A	4% (4 Gallons)
	Escort XP	2 Ounces
	Arsenal – Powerline	½% (2 Quarts)
	Chemsurf 90 or Approved Equivalent	1% (4 Quarts)
	Water	94-1/2 Gallons
	Drift Control Agent	
Approximate Spray Season: On about the first week of June until the beginning of fall leaf coloration. Application: Apply as a full coverage spray to foliage, stems, and limbs or all undesirable species of trees.		

Alternative 6

Hydraulic (High Volume) Application – Non Selective

AL#6	Viewpoint	4.5 oz.
	Streamline	4.0 oz.
	Attach	0.125%
	Drift Control (Sharpshooter)	0.039%

VI. CONTRACTOR RESPONSIBILITIES

Contractor shall:

- Conduct all work as specified by PPL Electric (in the Clearing Plan and accompanying information) and as documented in right-of-way agreements.

- Notify the Company representative of any changes that may be required in the Clearing Plan, including requests made by property owners.

- Make changes to Clearing Plan only upon Company written authorization.

- Provide all supervision, labor and equipment necessary for execution of the work. All personnel must be adequately trained in the vegetation management techniques they practice, including species identification skills.

- Notify all property owners prior to start of any work involving initial clearing and maintenance procedures on previously cleared lines.

- Contractor personnel directly involved in contacting customers are required to have identification, complete with photograph, associating them with their employer. This identification will be prominently displayed while engaged in customer contact activities.

- Begin operations only after notification to proceed is received from PPL Electric. (The Company representative reserves the right to reject any personnel or equipment that does not meet Company's standards.)

- Maintain copies of all permits required by regulatory agencies at the job site, as provided by PPL Electric.

- Confine all activities to the limits shown on the Clearing Plan, or as detailed by PPL Electric, except for approved off-line access and Company approved danger tree clearing. This includes storage of equipment and materials, and exercise of proper care to avoid damage and litter outside these limits.

- Keep all roads open to traffic, as per the most recent revision of Pennsylvania Department of Transportation's "Temporary Traffic Control Guidelines" Publication 213.

- Keep PPL Electric apprised of the progress of work on a daily basis, either verbally and/or through a daily work activity report as required by the Company representative.

- Re-grade and seed any deep cuts, ruts, stump holes, mounded areas, or general soil disturbance caused by the vegetation management operations when, in the opinion of the Company Representative, they could cause future ground erosion or interfere with line access.

- Clean up all slash and rubbish resulting from work as the work progresses, leaving the area in a condition satisfactory to the Company representative.

Clearing

- Remove all danger trees as directed by a Company representative.

- Take precautions to preserve all survey stakes, hubs, and property corners. Those destroyed shall be replaced at Contractor's expense.

Herbicide Applications

- Possess an appropriate Commercial Applicator/Technician certification and pesticide application business license, in compliance with the Pennsylvania Pesticide Control Act of 1973 (3 P. S. § § 111.21—111.61)

- Maintain a record of all required property owner contacts on log sheets. These records will be submitted to the appropriate Company representative at: (1) his/her request and (2) the completion of each line.

- Mix herbicide solutions according to Company specifications and label instructions.

- All target species will be adequately treated to produce the necessary control. A responsible Contractor Representative will review all prior

year herbicide applications for quality control. The Contractor shall re-treat at their own expense until the desired results are obtained.

- Vehicles used for application and property owner contacts must have Contractor identification of suitable size lettering as approved by the Company representative.

Line Access

- Comply with all pertinent provisions of applicable local, state, and federal environmental regulations whenever using/constructing access roads.

- Access roads along the right-of-way shall stay as close to the centerline as possible, to avoid clearing larger vegetation that may remain at the right-of-way edges.

- Access roads shall attempt to avoid springs, seeps, or other bodies of water found along the right-of-way.

- If temporary access is required prior to the completion of permanent access construction, all work shall be done so as to minimize erosion, ground disturbance, and siltation. Temporary bridges or culverts shall be constructed across streams, and corduroy roads used in wet areas.

- Review with the Company representative all existing roads, culverts, or bridges (either private or public) that form a portion of Contractor's means of access to the right-of-way. The Contractor shall take whatever steps the Company representative deems necessary to ensure that these facilities are restored to at least as good a condition after the Contractor's use as they were originally. At the request of the Company representative, contractor shall immediately repair damaged roads or bridges that would hinder or prevent the owner's or tenant's use.

- Immediately repair or replace all fences or gates damaged by Contractor at Contractor's expense. Any required addition of fence wire, brace posts, gate posts, or associated fence material shall be of new quality and of similar design as existing fence material.

- Where existing usable fences are attached to trunks of trees to be felled, the trees shall be cut at a length approximately 6" above the top wire strand, unless otherwise specified. The continuity of all electric fences shall be maintained.

- Adequate care shall be taken to assure that gates are not left open or fences left in such condition that the property owner's livestock can escape. If existing fences or gates along a right-of-way are in a state of disrepair prior to the start of clearing and could allow livestock to escape, the property owner shall be so notified.

- The Contractor will take the necessary safety precautions to prevent injury to human life or damage to property and shall carry on his operations with a minimum of interference to traffic or inconvenience to the public. All applicable rules and regulations of OSHA and the Pennsylvania Department of Transportation shall be strictly adhered to. Any and all accidents or incidents resulting in injury to workmen or the public or damages to Company facilities (whether causing an interruption or not) will be reported to PPL Electric immediately.

- In the event of a work related interruption or in the event of an on the job injury, the contractor shall follow the procedures outlined in the most recent version of the following documents:

    - Vegetation Management Contractor Reporting Requirements for Safety Incidents or Property Damage

    or

    - Vegetation Management Contractor Reporting Requirements for Electrical System Events

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ATTACHMENT 13
HONEY BROOK – TWIN VALLEY 138/69 KV LINE
PPL ELECTRIC 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 Corp. (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 Electric 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 Electric 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 Electric 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 Electric 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 Electric lines are designed to operate safely and reliably during inclement weather even more severe than assumed by the NESC. In addition, PPL Electric transmission lines are designed with more clearance to the ground than required by the NESC. The tables below compare PPL Electric and NESC ground clearances for lines of various voltages.

138 kV

	Vertical Clearance to Ground	
Surface Underneath Conductors	NESC Standard	PPL Electric 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 Electric 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 Electric 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 Electric 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.

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ATTACHMENT 14
HONEY BROOK – TWIN VALLEY 138/69 KV LINE
AGENCY COORDINATION (PNDI/WETLANDS)

On April 27, 2012, initial information identifying several alternative links for the Honey Brook – Twin Valley 138/69 kV Transmission Line Project was provided to the U.S Fish and Wildlife Service (USFWS), the Pennsylvania Fish and Boat Commission (PFBC), the Pennsylvania Game Commission (PGC), and the Pennsylvania Department of Conservation and Natural Resources (DCNR). This information was provided in accordance with the Pennsylvania Natural Heritage Program's Pennsylvania Natural Diversity Inventory (PNDI) program, which provides information on the location and status of important ecological resources such as plants, mammals, fish, insects, and natural communities. Based on the Route Selection Study, a follow-up request was provided to the USFWS, PFBC, PGC, and DCNR on January 17, 2013, indicating the selection of a Preferred Route and an Alternate Route. PPL Electric submitted an initial consultation letter to the Pennsylvania Historical and Museum Commission (PHMC) on February 21, 2013. Correspondences from these agencies regarding the potential presence of these ecological and cultural resources within the project area are provided in this attachment.

Wetlands and waterways within the right-of-way of the Honey Brook – Twin Valley 138/69 kV Transmission Line Project have been delineated using PADEP- and USACE-approved methodologies. The findings from the delineation are being developed into a Wetland Delineation Report that will be filed with the PADEP and USACE as part of permit applications for construction of this Project. Information on the location of these features has been used by project engineers in the placement of transmission poles and alignment of access roads. Through the use of this information, only 3 poles of an estimated 52 total poles would be located in a wetland area based on preliminary design. Evaluation of the development of temporary versus permanent access roads through wetlands and across waterways is being conducted by project engineers. Unavoidable impacts to these features will be reviewed with PADEP and USACE to determine the form and level of mitigation that will be required. PPL Electric will coordinate pre-application meetings with these agencies.

Initial Agency Consultation Letters

THE Louis Berger Group, INC.

April 27, 2012

Department of Conservation and Natural Resources
Bureau of Forestry, Ecological Services Section
400 Market Street, PO Box 8552
Harrisburg, Pennsylvania 17105

Re: Honey Brook – Twin Valley 138/69 kV Transmission Line Project
Request for Project Review for Pennsylvania Natural Diversity Inventory
Large Project

The Louis Berger Group, Inc. (LBG) has been contracted by PPL Electric Utilities (PPL Electric) to conduct a siting study for the proposed Honey Brook – Twin Valley 138/69 kV Transmission Line Project (Project). The Project will begin at PPL Electric's Honey Brook substation in Honey Brook Township, Chester County, Pennsylvania and terminate in at PPL Electric's Twin Valley substation in Caernarvon Township, Berks County, Pennsylvania. This project is proposed to increase electric reliability within the region. PPL Electric and its consultants have identified several alternative links for further consideration (labeled A through F). PPL Electric respectfully requests that your agency provide a preliminary Pennsylvania Natural Diversity Inventory (PNDI) review for current state listed rare, threatened, and endangered species and habitats that are known to occur, or that could potentially occur, in the vicinity of the alternative routes.

The alternative routes under consideration are identified on the attached overview map. Information received from your agency will be used as part of the route evaluation process. As shown on the attached map, the alternative routes are located in Chester, Berks and Lancaster counties and may traverse the townships of Honey Brook, West Nantmeal, Caernarvon (Berks County), and Caernarvon (Lancaster County). The alternatives traverse the following USGS 7.5-minute quadrangle maps: Honey Brook, Morgantown, Elverson, and Wagontown.

We have attached the completed PNDI Form. Please email Sue Sutter at ssutter@louisberger.com if you would like a copy of the project GIS shapefile. If you are able to provide the locations of any records you find during your PNDI search on a GIS shapefile for us, we would appreciate that as well. Please provide the requested information in writing and by email or fax at your earliest convenience to me at ssutter@louisberger.com or 1001 Elm Street, Suite 203, Manchester, NH 03101. If you have any questions please do not hesitate to contact me at this email address, by phone at 781-707-7445, or by fax at 603-644-5220.

Sincerely,

Sue Sutter
Senior Environmental Scientist
The Louis Berger Group, Inc.

THE Louis Berger Group, INC.

April 27, 2012

Pennsylvania Fish and Boat Commission
Natural Diversity Section
450 Robinson Lane
Bellefonte, Pennsylvania 16823

Re: Honey Brook – Twin Valley 138/69 kV Transmission Line Project
Request for Project Review for Pennsylvania Natural Diversity Inventory
Large Project

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The alternative routes under consideration are identified on the attached overview map. Information received from your agency will be used as part of the route evaluation process. As shown on the attached map, the alternative routes are located in Chester, Berks and Lancaster counties and may traverse the townships of Honey Brook, West Nantmeal, Caernarvon (Berks County), and Caernarvon (Lancaster County). The alternatives traverse the following USGS 7.5-minute quadrangle maps: Honey Brook, Morgantown, Elverson, and Wagontown.

We have attached the completed PNDI and SIR forms. Please email Sue Sutter at ssutter@louisberger.com if you would like a copy of the project GIS shapefile. If you are able to provide the locations of any records you find during your PNDI search on a GIS shapefile for us, we would appreciate that as well. Please provide the requested information in writing and by email or fax at your earliest convenience to me at ssutter@louisberger.com or 1001 Elm Street, Suite 203, Manchester, NH 03101. If you have any questions please do not hesitate to contact me at this email address, by phone at 781-707-7445, or by fax at 603-644-5220.

Sincerely,

Sue Sutter
Senior Environmental Scientist
The Louis Berger Group, Inc.

PFBC-DES-NDS-1 (5/2/03)

COMMONWEALTH OF PENNSYLVANIA

FISH AND BOAT COMMISSION

NATURAL DIVERSITY SECTION

SPECIES IMPACT REVIEW (SIR) REQUEST FORM

A. This form provides the site information necessary to perform a computer database search for species of special concern listed under the Endangered Species Act of 1973, the Wild Resource Conservation Act, the Pennsylvania Fish and Boat Code or the Wildlife Code.

B. Use only ***one form*** for each proposed project or location. Complete the information below and **mail** form to:

Natural Diversity Section
Division of Environmental Services
PA Fish and Boat Commission
450 Robinson Lane
Bellefonte, PA 16823
Fax: (814) 359-5175

C. This form, a cover letter including a project narrative, and accompanying maps should be sent to the above address for environmental reviews that ***only*** concern ***reptiles, amphibians, fishes and aquatic invertebrates.*** Reviews for other natural resources must be submitted to other appropriate agencies.

D. The absence of recorded information from our databases and files does not necessarily imply actual conditions on site. Future field investigations could alter this determination. The information contained in our files is routinely updated. A review is valid for one year.

E. ***Please send us only one (1) copy of your request*** – either by fax or by mail – not both. Mail is preferred to improve legibility of maps. Facsimile submission will not improve our response turn-around time.

F. ***Allow 30 days for completion of the review from the date of PFBC receipt.*** Large projects and workload may extend this review timeframe.

G. ***In any future correspondence with us following your receipt of the SIR response, please refer to the assigned SIR number at the top left of our cover letter.***

H. **FORMS THAT ARE NOT COMPLETED IN FULL WILL NOT BE REVIEWED.**

PLEASE PRINT OR TYPE: If available, provide the potential conflict **PNDI Search Number:** _____

PFBC response should be sent to:

Company/Agency: The Louis Berger Group, Inc. Form Preparer: Sue Sutter

Address: 100 Commercial St, 2nd Floor North, Manchester, NH 03101

Phone (8:00 AM to 4:00 PM): 610.774.5956

Project Description: PPL Electric plans to site and construct a new 138/69 kV transmission line between the Honey Brook and Twin Valley substations. See attached letter for additional detail.

Indicate if the project is: Transportation ☐ or Non-transportation ☒ (check one)

Will the proposed project encroach directly or indirectly (e.g., runoff) upon wetlands or waterways? Circle one for each:

Wetlands: (Yes) No Unknown Waterways: (Yes) No Unknown

County: Chester, Berks, Lancaster Township/Municipality: Multiple

Name of the United States Geological Survey (U.S.G.S.) 7.5 Minute Quadrangle Map where project is located:

Honey Brook, Morgantown, Elverson, Wagontown Project size (in acres): Unknown

Attach an 8.5" by 11" photocopy (**DO NOT REDUCE**) of the section of the U.S.G.S. Quadrangle Map which identifies the project location. On this map, indicate the location of the project center (if linear, depict both ends) and outline the approximate boundaries of the project area.

Specify latitude/longitude of the project center. **Latitude:** 40 °/ 07 '/ 24.41" N

Indicate latitude/longitude in degrees-minutes-seconds format only. **Longitude:** 75 °/ 53 '/ 12.41" W

Three steps are needed to convert from decimal degrees to degrees-minutes-seconds: (1) Degrees will be the whole number. (2) To get minutes, multiply the decimal degree portion by 60. (3) Multiply the decimal minute portion by 60 to get seconds.

Example: (Latitude) 40.93748 = **40°**; 0.93748 x 60 = 56.2488'= **56**'; 0.2488 x 60 = 14.928 = **15**" = **40°56'15" N**

(Longitude) 75.94740 = **75°**; 0.94740 x 60 = 56.844' = **56**'; 0.844 x 60 = 50.64 = **51**" = **75°56'51" W**

FOR PFBC USE ONLY

SIR#	Quad Name	Data Source	Search Result-Potential Species Conflict	Action

THE Louis Berger Group, INC.

April 27, 2012

Pennsylvania Game Commission
Bureau of Land Management
2001 Elmerton Avenue
Harrisburg, Pennsylvania 17110-9797

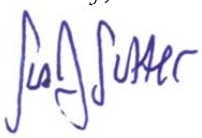
Re: Honey Brook – Twin Valley 138/69 kV Transmission Line Project
Request for Project Review for Pennsylvania Natural Diversity Inventory
Large Project

The Louis Berger Group, Inc. (LBG) has been contracted by PPL Electric Utilities (PPL Electric) to conduct a siting study for the proposed Honey Brook – Twin Valley 138/69 kV Transmission Line Project (Project). The Project will begin at PPL Electric's Honey Brook substation in Honey Brook Township, Chester County, Pennsylvania and terminate in at PPL Electric's Twin Valley substation in Caernarvon Township, Berks County, Pennsylvania. This project is proposed to increase electric reliability within the region. PPL Electric and its consultants have identified several alternative routes for further consideration (labeled A through F). PPL Electric respectfully requests that your agency provide a preliminary Pennsylvania Natural Diversity Inventory (PNDI) review for current state listed rare, threatened, and endangered species and habitats that are known to occur, or that could potentially occur, in the vicinity of the alternative routes.

The alternative routes under consideration are identified on the attached overview map. Information received from your agency will be used as part of the route evaluation process. As shown on the attached map, the alternative routes are located in Chester, Berks and Lancaster counties and may traverse the townships of Honey Brook, West Nantmeal, Caernarvon (Berks County), and Caernarvon (Lancaster County). The alternatives traverse the following USGS 7.5-minute quadrangle maps: Honey Brook, Morgantown, Elverson, and Wagontown.

We have attached the completed PNDI Form. Please email Sue Sutter at ssutter@louisberger.com if you would like a copy of the project GIS shapefile. If you are able to provide the locations of any records you find during your PNDI search on a GIS shapefile for us, we would appreciate that as well. Please provide the requested information in writing and by email or fax at your earliest convenience to me at ssutter@louisberger.com or 1001 Elm Street, Suite 203, Manchester, NH 03101. If you have any questions please do not hesitate to contact me at this email address, by phone at 781-707-7445, or by fax at 603-644-5220.

Sincerely,



Sue Sutter
Senior Environmental Scientist
The Louis Berger Group, Inc.

THE Louis Berger Group, INC.

April 27, 2012

United States Fish and Wildlife Service
Endangered Species Biologist
315 South Allen Street, Suite 322
State College, PA 16801

Re: Honey Brook – Twin Valley 138/69 kV Transmission Line
Request for Project Review for Pennsylvania Natural Diversity Inventory
Large Project

The Louis Berger Group, Inc. (LBG) has been contracted by PPL Electric Utilities (PPL Electric) to conduct a siting study for the proposed Honey Brook – Twin Valley 138/69 kV Transmission Line Project (Project). The Project will begin at PPL Electric's Honey Brook substation in Honey Brook Township, Chester County, Pennsylvania and terminate in at PPL Electric's Twin Valley substation in Caernarvon Township, Berks County, Pennsylvania. This project is proposed to increase electric reliability within the region. PPL Electric and its consultants have identified several alternative links for further consideration (labeled A through F). PPL Electric respectfully requests that your agency provide a preliminary Pennsylvania Natural Diversity Inventory (PNDI) review for current federal listed threatened and endangered species and habitats that are known to occur, or that could potentially occur, within the project study area.

The alternative routes under consideration are identified on the attached overview map. Information received from your agency will be used as part of the route evaluation process. As shown on the attached map, the alternative routes are located in Chester, Berks and Lancaster counties and may traverse the townships of Honey Brook, West Nantmeal, Caernarvon (Berks County), and Caernarvon (Lancaster County). The alternatives traverse the following USGS 7.5-minute quadrangle maps: Honey Brook, Morgantown, Elverson, and Wagontown.

We have attached the completed PNDI and SIR forms. Please email Sue Sutter at ssutter@louisberger.com if you would like a copy of the project GIS shapefile. If you are able to provide the locations of any records you find during your PNDI search on a GIS shapefile for us, we would appreciate that as well. Please provide the requested information in writing and by email or fax at your earliest convenience to me at ssutter@louisberger.com or 1001 Elm Street, Suite 203, Manchester, NH 03101. If you have any questions please do not hesitate to contact me at this email address, by phone at 781-707-7445, or by fax at 603-644-5220.

Sincerely,

Sue Sutter
Senior Environmental Scientist
The Louis Berger Group, Inc.

Pennsylvania Natural Diversity Inventory

Project Planning & Environmental Review Form

This form provides site information necessary to perform an Environmental Review for special concern species and resources listed under the Endangered Species Act of 1973, the Wild Resource Conservation Act, the Pennsylvania Fish and Boat code or the Pennsylvania Game and Wildlife Code.

Applicant Information

Name: Ppl Electric Utilities, Ken Kuhns
Address: Two North Ninth St (Genn4) Allentown, Pa 18101
Phone Number: 610.774.2540 Fax Number: 610.774.6239

Contact Person Information - if different from applicant

Name: Sue Sutter The Louis Berger Group, Inc.
Address: 100 Commercial St, 2nd Floor N, Manchester, NH 03101
Phone Number: 781-707-7445 Fax Number: 603-644-5220

Project Information

Project Name: Honey Brook - Twin Valley 138/69 Kv Transmission
Project Location: Chester, Berks, And Lancaster Counties, PA
Municipality: Multiple, See Letter County: Multiple, See Letter
☒ Attach a copy of a U.S.G.S. 7 ½ Minute Quadrangle Map with Project Boundaries clearly marked.
U.S.G.S. Quad Name: Multiple, See Letter

Project Description

Proposed Project Activity (including ALL earth disturbance areas and current conditions)

To increase electric reliability in the region, PPL Electric intends to site and construct a new 138/69 kV transmission line between the Honey Brook substation in Honey Brook Township, Chester County, PA and the Twin Valley substation in Caernarvon Township, Berks County, PA. PPL Electric has identified several alternative links for further consideration (labeled A through F). The routes under consideration may traverse the townships of Honey Brook, West Nantmeal, and Caervarvon.

Total Acres of Property: Unknown Acreage to be Impacted: Unknown

1. Will the entire project occur in or on an existing building, parking lot, driveway, road, maintained road shoulder, street, runway, paved area, railroad bed, or maintained lawn? Yes ☐ No ☒
2. Are there any waterways or waterbodies (intermittent or perennial rivers, streams, creeks, tributaries, lakes or ponds) in or near the project area, or on the land parcel? If so, how many feet away is the project?
   Yes ☒ Aerial xin Feet No ☐
3. Are wetlands located in or within 300 feet of the project area? Yes ☒ No ☐ If No, is this the result of a wetland delineation?

If you have a "PNDI Project Environmental Review Receipt" with potential impacts, please send a receipt copy, this completed form, and a USGS Quad Map to the agency/agencies noted on the receipt. If you are unable to generate a PNDI Receipt because you do not have Internet access, complete this form, attach a USGS Quad Map, and send them to your local DEP or County Conservation District. For review of a "Large Project," please send form and map to all the agencies listed below. See page 2 for more information.

Dept. of Conservation and Natural Resources
Bureau of Forestry, Ecological Services Section
400 Market St., PO Box 8552
Harrisburg, PA 17105
fax: 717-772-0271

PA Fish and Boat Commission
Natural Diversity Section
450 Robinson Lane
Bellefonte, PA 16823
fax 814-359-5175

PA Game Commission
Bureau of Land Management
2001 Elmerton Avenue
Harrisburg, PA 17110-9797
fax: 717-787-6957

US Fish and Wildlife Service
Endangered Species Biologist
315 South Allen St., Suite 322
State College, PA 16801
no faxes please

Initial Agency Consultation Responses

FAX to: 603-644-5220

Pennsylvania Fish & Boat Commission

established 1866

Division of Environmental Services
Natural Diversity Section
450 Robinson Lane
Bellefonte, PA 16823-9620
(814) 359-5237 Fax: (814) 359-5175

May 30, 2012

IN REPLY REFER TO
SIR # 38668

SUE SUTTER
THE LOUIS BERGER GROUP
100 COMMERCIAL STREET
SECOND FLOOR
MANCHESTER, NH 03101

RE: Species Impact Review (SIR) - Rare, Candidate, Threatened and Endangered Species
HONEY BROOK - TWIN VALLEY 138/69 Kv TRANSMISSION
PNDI Search Number (if available): LARGE PROJECT REVIEW
MULTIPLE MUNICIPALTIES, MULTIPLE COUNTIES County, Pennsylvania

This responds to your inquiry about a Pennsylvania Natural Diversity Inventory (PNDI) Internet Database search "potential conflict" or a threatened and endangered species impact review. These projects are screened for potential conflicts with rare, candidate, threatened or endangered species under Pennsylvania Fish & Boat Commission jurisdiction (fish, reptiles, amphibians, aquatic invertebrates only) using the Pennsylvania Natural Diversity Inventory (PNDI) database and our own files. These species of special concern are listed under the Endangered Species Act of 1973, the Wild Resource Conservation Act, and the Pennsylvania Fish & Boat Code (Chapter 75), or the Wildlife Code. The absence of recorded information from our files does not necessarily imply actual conditions on site. Future field investigations could alter this determination. The information contained in our files is routinely updated. A Species Impact Review is valid for one year only.

_X_ ***NO ADVERSE IMPACTS EXPECTED FROM THE PROPOSED PROJECT***

_X_ Except for occasional transient species, rare, candidate, threatened or endangered species under our jurisdiction are not known to exist in the vicinity of the project area. Therefore, no biological assessment or further consultation regarding rare species is needed with the Commission. Should project plans change, or if additional information on listed or proposed species becomes available, this determination may be reconsidered.

___ An element occurrence of a rare, candidate, threatened, or endangered species under our jurisdiction is known from the vicinity of the proposed project. However, given the nature of the proposed project, the immediate location, or the current status of the nearby element occurrence(s), no adverse impacts are expected to the species of special concern.

If you have any questions regarding this review, please contact the biologist indicated below:

___	Chris Urban	814-359-5113	_X_	Kathy Gipe	814-359-5186
___	Douglas Fischer	814-359-5195	___	Bob Morgan	814-359-5129

Thank you in advance for your cooperation and attention to this important matter of species conservation and habitat protection.

SIGNATURE: _____ DATE: May 30, 2012

Christopher A. Urban
Chief, Natural Diversity Section

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Pennsylvania Field Office
315 South Allen Street, Suite 322
State College, Pennsylvania 16801-4850

June 5, 2012

Sue Sutter
The Louis Berger Group, Inc.
100 Commercial Street
2nd Floor North
Manchester, NH 03101

RE: USFWS Project #2012-0789

Dear Ms. Sutter:

This responds to your letter of April 27, 2012, requesting information about federally listed and proposed endangered and threatened species within the area affected by PPL Electric Utilities proposed Honey Brook to Twin Valley 138/69 kV transmission line project located in Honey Brook Township, Chester County; and, Caernarvon Township, Berks County, Pennsylvania. The following comments are provided pursuant to the Endangered Species Act of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*) to ensure the protection of endangered and threatened species.

The proposed project is within the known range of the bog turtle (*Clemmys muhlenbergii*), a species that is federally listed as threatened. Bog turtles inhabit shallow, spring-fed fens, sphagnum bogs, swamps, marshy meadows, and pastures characterized by soft, muddy bottoms; clear, cool, slow-flowing water, often forming a network of rivulets; high humidity; and an open canopy. Bog turtles usually occur in small, discrete populations occupying suitable wetland habitat dispersed along a watershed. The occupied "intermediate successional stage" wetland habitat is usually a mosaic of micro-habitats ranging from dry pockets, to areas that are saturated with water, to areas that are periodically flooded. Some wetlands occupied by bog turtles are located in agricultural areas and are subject to grazing by livestock.

Because wetlands occur within the project area, their potential suitability as bog turtle habitat should be assessed, as described under "*Bog Turtle Habitat Survey*" (Phase 1 survey) of the enclosed *Guidelines for Bog Turtle Surveys*. This Phase 1 survey should evaluate all wetlands within the project action area. The project "action area" includes all areas that will be directly or indirectly affected by the proposed project (including all phases of multi-phased projects) and all project-associated features, such as roads, water and sewer lines, utility lines, stormwater and sedimentation basins, buildings and other structures, driveways, parking lots, yards/lawns, and wells.

Due to the skill required to correctly identify potential bog turtle habitat, we recommend that the Phase 1 survey be done by a qualified surveyor (see enclosed list). Survey results should be submitted to the Service for review and concurrence. *If the Phase 1 survey is done by someone who is not on this list, it is likely that a site visit by a Fish and Wildlife Service biologist will be*

necessary to verify their findings. Due to the limited availability of staff from this office, such a visit may not be possible for some time. Use of a qualified surveyor will expedite our review of the survey results.

If potential bog turtle habitat is found in the project action area, efforts should be made to avoid any direct or indirect impacts to those wetlands (see enclosed *Bog Turtle Conservation Zones*). Avoidance of direct and indirect effects means no disturbance to or encroachment into the wetlands (e.g., filling, ditching or draining) for any project-associated features or activities. Adverse effects may also be anticipated to occur when lot lines include portions of the wetland; when an adequate upland buffer is not designated around the wetland (see *Bog Turtle Conservation Zones*); or when roads, stormwater/sedimentation basins, impervious surfaces, or wells affect the hydrology of the wetland.

If potential habitat is found, submit (along with your Phase 1 survey results) a detailed project description and detailed project plans documenting how direct and indirect impacts to the wetlands will be avoided. If adverse effects to these wetlands cannot be avoided, a more detailed and thorough survey will be necessary, as described under "*Bog Turtle Survey*" (Phase 2 survey) of the *Guidelines*. The Phase 2 survey should be conducted by a qualified biologist with bog turtle field survey experience (see enclosed list of qualified surveyors). Submit survey results to the Service for review and concurrence.

In cases where adverse effects to federally listed species cannot be avoided, further consultation with the Service would be necessary to avoid potential violations of section 9 (prohibiting "take" of listed species) and/or section 7 (requiring federal agencies to consult) of the Endangered Species Act. Information about the section 7 and section 10 consultation processes (for federal and non-federal actions, respectively) can be obtained by contacting this office or accessing the Service's Endangered Species Home Page (http://endangered.fws.gov).

This response relates only to endangered and threatened species under our jurisdiction, based on an office and/or field review of the proposed project. Consequently, this letter is not to be construed as addressing potential Service concerns under the Fish and Wildlife Coordination Act or other authorities. A compilation of certain federal status species in Pennsylvania is enclosed for your information.

To avoid potential delays in reviewing your project, please use the above-referenced USFWS project tracking number in any future correspondence regarding this project.

Please contact Bonnie Dershem of my staff at 814-234-4090 if you have any questions regarding this matter.

Sincerely,

Clinton Riley
Field Office Supervisor

Enclosures

COMMONWEALTH OF PENNSYLVANIA
Pennsylvania Game Commission

2001 ELMERTON AVENUE
HARRISBURG, PA 17110-9797

"To manage all wild birds, mammals and their habitats for current and future generations."

ADMINISTRATIVE BUREAUS:

ADMINISTRATION.....717-787-5670
HUMAN RESOURCES.....717-787-7836
FISCAL MANAGEMENT.....717-787-7314
CONTRACTS AND PROCUREMENT.....717-787-6594
LICENSING.....717-787-2084
OFFICE SERVICES.....717-787-2116
WILDLIFE MANAGEMENT.....717-787-5529
INFORMATION & EDUCATION.....717-787-6286
WILDLIFE PROTECTION.....717-783-6526
WILDLIFE HABITAT MANAGEMENT.....717-787-6818
REAL ESTATE DIVISION.....717-787-6568
AUTOMATED TECHNOLOGY SERVICES.....717-787-4076

www.pgc.state.pa.us

Division of Environmental Planning and Habitat Protection
717-783-5957

July 13, 2012

Large Project PNDI Review

Ms. Sue Davis
The Louis Berger Group
100 Commercial Drive, 2nd Floor North
Manchester, New Hampshire 03101

Re: Honey Brook-Twin Valley 138/69 kV Transmission Line – Proposed Transmission Line
Honey Brook and West Nantmeal Townships, Chester County, Pennsylvania
Caernarvon Township, Berks County, Pennsylvania
Caernarvon Township, Lancaster County, Pennsylvania

Dear Ms. Davis,

Thank you for submitting your Pennsylvania Natural Diversity Inventory (PNDI) Large Project Environmental Review request. The Pennsylvania Game Commission (PGC) screened this project for potential impacts to species and resources of concern under PGC responsibility, which includes birds and mammals only.

Potential Impact Anticipated

PNDI records indicate species or resources of concern are located in the vicinity of the project. The PGC has received and thoroughly reviewed the information that you provided to this office, as well as PNDI data, and has determined that there are no known occurrences of state listed **threatened or endangered** bird or mammal species associated with your project. However, potential impacts to **species of special concern** may be associated with your project, and as a result, additional measures are recommended to avoid potential impacts to the species listed below.

Conservation Measure

The following is a mammal species that was also identified within the vicinity of the project. This species is of special concern, and therefore, are not a target species for a survey:

Scientific Name	Common Name
Myotis septentrionalis	Northern myotis

However, because of their ecological significance, the following seasonal restriction is suggested for all alternatives (identified as A through F) to avoid potential impacts to *Myotis septentrionalis* and other tree roosting bats within the area:

- *To the best extent practicable, all trees or dead snags greater than 5 inches in diameter at breast height that need to be harvested to facilitate the project shall be cut between November 1 and March 31.*

This response represents the most up-to-date summary of the PNDI data files and is valid for two (2) years from the date of this letter. An absence of recorded information does not necessarily imply actual conditions on site. Should project plans change or additional information on listed or proposed species become available, this determination may be reconsidered.

Should the proposed work continue beyond the period covered by this letter, please resubmit the project to this agency as an "Update" (including an updated PNDI receipt, project narrative and accurate map). If the proposed work has not changed and no additional information concerning listed species is found, the project will be cleared for PNDI requirements under this agency for two additional years.

This finding applies to impacts to birds and mammals only. To complete your review of state and federally-listed threatened and endangered species and species of special concern, please be sure that the U.S. Fish and Wildlife Service, the PA Department of Conservation and Natural Resources, and/or the PA Fish and Boat Commission have been contacted regarding this project as directed by the online PNDI ER Tool found at www.naturalheritage.state.pa.us.

Sincerely,

Olivia A. Mowery
Environmental Planner
Division of Environmental Planning & Habitat Protection
Bureau of Wildlife Habitat Management
Phone: 717-787-4250, Extension 3128
Fax: 717-787-6957
E-mail:OMowery@pa.gov

A PNHP Partner

OAM/oam

cc: File

Commonwealth of Pennsylvania
Pennsylvania Historical and Museum Commission
Bureau for Historic Preservation
Commonwealth Keystone Building, 2nd Floor
400 North Street
Harrisburg, PA 17120-0093
www.phmc.state.pa.us

March 14, 2013

Heather Unger, LEED AP
The Louis Berger Group, Inc.
350 Eagleview Boulevard, Suite 250
Exton, PA 19341-1178

TO EXPEDITE REVIEW US
BHP REFERENCE NUMBER

Re: File No. ER 2013-0969-042-A
PUC: PPL Electric Utilities, Honey Brook-Twin Valley 138/69 kV Transmission Line Construction, Berks, Chester & Lancaster Counties

Dear Ms. Unger:

Thank you for submitting information concerning the above referenced project. The Bureau for Historic Preservation (the State Historic Preservation Office) reviews projects in accordance with state and federal laws. Section 106 of the National Historic Preservation Act of 1966, and the implementing regulations (36 CFR Part 800) of the Advisory Council on Historic Preservation, is the primary federal legislation. The Environmental Rights amendment, Article 1, Section 27 of the Pennsylvania Constitution and the Pennsylvania History Code, 37 Pa. Cons. Stat. Section 500 et seq. (1988) is the primary state legislation. These laws include consideration of the project's potential effects on both historic and archaeological resources.

Archaeology

Known archaeological resources are located in your project area and others are likely to exist. The P.A.S.S. numbers for these archaeological resources are listed below. A Phase I archaeological survey of the project area to verify the extent of known sites and to locate any other potentially significant archaeological resources that may exist is recommended but not required. Guidelines and instructions for conducting Phase I archaeological surveys are available on our web site or from our office upon request.

P.A.S.S. #36 Ch 0547

Historic Structures

In our opinion no historic buildings, structures, districts, or objects will be affected by this project.

FOR YOUR INFORMATION

The Pennsylvania Historical and Museum Commission will keep the Determination Notice and the materials you submitted in its files. Please attach this letter to your copy of the Notice and materials then submit the entire package of materials to DEP.

If this project will require any federal permits or will receive federal funding, the federal agency, under the National Historic Preservation Act of 1966, may require the appropriate surveys to be conducted. If the project will need a U.S. Army Corps of Engineers permit, this would be a **Category III** activity. We suggest that you consider conducting the survey early in the development or planning process to avoid delays in the future.

If you need further information in this matter please consult Mark Shaffer at (717) 783-9900.

Sincerely,

Douglas C. McLearen, Chief
Division of Archaeology &
Protection

cc: Honey Brook Township
Caernarvon Township, Berks County
Caernarvon Township, Lancaster County

DCM/tmw

Follow-up Agency Consultation Letters

THE Louis Berger Group, INC.

January 17, 2013

Department of Conservation and Natural Resources
Bureau of Forestry, Ecological Services Section
400 Market Street, PO Box 8552
Harrisburg, Pennsylvania 17105

Re: Honey Brook – Twin Valley 138/69 kV Transmission Line Project
Request for Pennsylvania Natural Diversity Inventory Project Review Update

The Louis Berger Group, Inc. (LBG) has been contracted by PPL Electric Utilities (PPL Electric) to conduct a siting study for the proposed Honey Brook – Twin Valley 138/69 kV Transmission Line Project (Project). The Project will begin at PPL Electric's Honey Brook substation in Honey Brook Township, Chester County, Pennsylvania and terminate in at PPL Electric's Twin Valley substation in Caernarvon Township, Berks County, Pennsylvania. On April 27, 2012, we submitted an initial Pennsylvania Natural Diversity Inventory (PNDI) request for this Project. The previous letter included a detailed topographic map identifying several alternative links under consideration. Based on the Route Selection Study, PPL Electric has selected a Preferred Route (Route A) and an Alternate Route (Route B). The revised routes are identified on the attached topographic map. PPL Electric respectfully requests that your agency provide an updated PNDI review for current state listed rare, threatened, and endangered species and habitats that are known to occur, or that could potentially occur in the vicinity of the alternative routes. Please indicate if your comments are specific to one or both of the Alternate Routes.

We have attached the completed PNDI Form. Please email Sue Davis at sjdavis@louisberger.com if you would like a copy of the project GIS shapefile. If you are able to provide the locations of any records you find during your PNDI search on a GIS shapefile for us, we would appreciate that as well. Please provide the requested information in writing and by email or fax at your earliest convenience to me at sjdavis@louisberger.com or 100 Commercial Street, 2nd Floor, North Manchester, NH 03101. If you have any questions please do not hesitate to contact me at this email address, by phone at 781-707-7445, or by fax at 603-644-5220.

Sincerely,

Sue Davis
Senior Environmental Scientist
The Louis Berger Group, Inc.

THE Louis Berger Group, INC.

January 17, 2013

Olivia Mowery
Pennsylvania Game Commission
Bureau of Land Management
2001 Elmerton Avenue
Harrisburg, Pennsylvania 17110-9797

Re: Honey Brook – Twin Valley 138/69 kV Transmission Line Project
Request for Pennsylvania Natural Diversity Inventory Project Review Update

The Louis Berger Group, Inc. (LBG) has been contracted by PPL Electric Utilities (PPL Electric) to conduct a siting study for the proposed Honey Brook – Twin Valley 138/69 kV Transmission Line Project (Project). The Project will begin at PPL Electric's Honey Brook substation in Honey Brook Township, Chester County, Pennsylvania and terminate in at PPL Electric's Twin Valley substation in Caernarvon Township, Berks County, Pennsylvania. On April 27, 2012, we submitted an initial Pennsylvania Natural Diversity Inventory (PNDI) request for this Project. The previous letter included a detailed topographic map identifying several alternative links under consideration. Based on the Route Selection Study, PPL Electric has selected a Preferred Route (Route A) and an Alternate Route (Route B). The revised routes are identified on the attached topographic map. PPL Electric respectfully requests that your agency provide an updated PNDI review for current state listed rare, threatened, and endangered species and habitats that are known to occur, or that could potentially occur, in the vicinity of the Alternative Routes.

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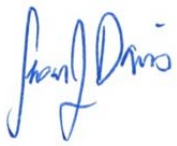
Sincerely,



Sue Davis
Senior Environmental Scientist
The Louis Berger Group, Inc.

THE Louis Berger Group, INC.

January 17, 2013

Bonnie Dershem
United States Fish and Wildlife Service
Endangered Species Biologist
315 South Allen Street, Suite 322
State College, PA 16801

Re: Honey Brook – Twin Valley 138/69 kV Transmission Line Project
USFWS Project#2012-0789
Request for Pennsylvania Natural Diversity Inventory Project Review Update

The Louis Berger Group, Inc. (LBG) has been contracted by PPL Electric Utilities (PPL Electric) to conduct a siting study for the proposed Honey Brook – Twin Valley 138/69 kV Transmission Line Project (Project). The Project will begin at PPL Electric's Honey Brook substation in Honey Brook Township, Chester County, Pennsylvania and terminate in at PPL Electric's Twin Valley substation in Caernarvon Township, Berks County, Pennsylvania. On April 27, 2012, we submitted an initial Pennsylvania Natural Diversity Inventory (PNDI) request for this Project. The previous letter included a detailed topographic map identifying several alternative links under consideration. Based on the Route Selection Study, PPL Electric has selected a Preferred Route (Route A) and an Alternate Route (Route B). The revised routes are identified on the attached topographic map. PPL Electric respectfully requests that your agency provide an updated PNDI review for current federal listed threatened and endangered species and habitats that are known to occur, or that could potentially occur, in the vicinity of the alternative routes. Please indicate if your comments are specific to one or both of the Alternate Routes.

We have attached the completed PNDI Form. Please email Sue Davis at sjdavis@louisberger.com if you would like a copy of the project GIS shapefile. If you are able to provide the locations of any records you find during your PNDI search on a GIS shapefile for us, we would appreciate that as well. Please provide the requested information in writing and by email or fax at your earliest convenience to me at sjdavis@louisberger.com or 100 Commercial Street, 2nd Floor, North Manchester, NH 03101. If you have any questions please do not hesitate to contact me at this email address, by phone at 781-707-7445, or by fax at 603-644-5220.

Sincerely,

Sue Davis
Senior Environmental Scientist
The Louis Berger Group, Inc.

THE Louis Berger Group, INC.

January 17, 2013

Kathy Gipe
Pennsylvania Fish and Boat Commission
Natural Diversity Section
450 Robinson Lane
Bellefonte, Pennsylvania 16823

Re: Honey Brook – Twin Valley 138/69 kV Transmission Line Project
SIR No. 38668 Request for Pennsylvania Natural Diversity Inventory Project Review Update

The Louis Berger Group, Inc. (LBG) has been contracted by PPL Electric Utilities (PPL Electric) to conduct a siting study for the proposed Honey Brook – Twin Valley 138/69 kV Transmission Line Project (Project). The Project will begin at PPL Electric's Honey Brook substation in Honey Brook Township, Chester County, Pennsylvania and terminate in at PPL Electric's Twin Valley substation in Caernarvon Township, Berks County, Pennsylvania. On April 27, 2012, we submitted an initial Pennsylvania Natural Diversity Inventory (PNDI) request for this Project. The previous letter included a detailed topographic map identifying several alternative links under consideration. Based on the Route Selection Study, PPL Electric has selected a Preferred Route (Route A) and an Alternate Route (Route B). The revised routes are identified on the attached topographic map. PPL Electric respectfully requests that your agency provide an updated PNDI review and Species Impact Review (SIR) for current state listed rare, threatened, and endangered species and habitats that are known to occur, or that could potentially occur, in the vicinity of the alternative routes. Please indicate if your comments are specific to one or both of the Alternate Routes.

We have attached the completed PNDI Form. Please email Sue Davis at sjdavis@louisberger.com if you would like a copy of the project GIS shapefile. If you are able to provide the locations of any records you find during your PNDI search on a GIS shapefile for us, we would appreciate that as well. Please provide the requested information in writing and by email or fax at your earliest convenience to me at sjdavis@louisberger.com or 100 Commercial Street, 2nd Floor, North Manchester, NH 03101. If you have any questions please do not hesitate to contact me at this email address, by phone at 781-707-7445, or by fax at 603-644-5220.

Sincerely,

Sue Davis
Senior Environmental Scientist
The Louis Berger Group, Inc.

PFBC-DES-NDS-1 (5/2/03)

COMMONWEALTH OF PENNSYLVANIA

FISH AND BOAT COMMISSION

NATURAL DIVERSITY SECTION

SPECIES IMPACT REVIEW (SIR) REQUEST FORM

A. This form provides the site information necessary to perform a computer database search for species of special concern listed under the Endangered Species Act of 1973, the Wild Resource Conservation Act, the Pennsylvania Fish and Boat Code or the Wildlife Code.

B. Use only ***one form*** for each proposed project or location. Complete the information below and **mail** form to:

Natural Diversity Section
Division of Environmental Services
PA Fish and Boat Commission
450 Robinson Lane
Bellefonte, PA 16823
Fax: (814) 359-5175

C. This form, a cover letter including a project narrative, and accompanying maps should be sent to the above address for environmental reviews that ***only*** concern ***reptiles, amphibians, fishes and aquatic invertebrates.*** Reviews for other natural resources must be submitted to other appropriate agencies.

D. The absence of recorded information from our databases and files does not necessarily imply actual conditions on site. Future field investigations could alter this determination. The information contained in our files is routinely updated. A review is valid for one year.

E. ***Please send us only one (1) copy of your request*** – either by fax or by mail – not both. Mail is preferred to improve legibility of maps. Facsimile submission will not improve our response turn-around time.

F. ***Allow 30 days for completion of the review from the date of PFBC receipt.*** Large projects and workload may extend this review timeframe.

G. ***In any future correspondence with us following your receipt of the SIR response, please refer to the assigned SIR number at the top left of our cover letter.***

H. **FORMS THAT ARE NOT COMPLETED IN FULL WILL NOT BE REVIEWED.**

PLEASE PRINT OR TYPE: If available, provide the potential conflict **PNDI Search Number:** _____

PFBC response should be sent to:

Company/Agency: The Louis Berger Group, Inc. Form Preparer: Sue Sutter

Address: 100 Commercial St, 2nd Floor North, Manchester, NH 03101

Phone (8:00 AM to 4:00 PM): 610.774.5956

Project Description: PPL Electric plans to site and construct a new 138/69 kV transmission line between the Honey Brook and Twin Valley substations. See attached letter for additional detail.

Indicate if the project is: Transportation ☐ or Non-transportation ☒ (check one)

Will the proposed project encroach directly or indirectly (e.g., runoff) upon wetlands or waterways? Circle one for each:

Wetlands: (Yes) No Unknown Waterways: (Yes) No Unknown

County: Chester, Berks, Lancaster Township/Municipality: Multiple

Name of the United States Geological Survey (U.S.G.S.) 7.5 Minute Quadrangle Map where project is located:

Honey Brook, Morgantown, Elverson, Wagontown Project size (in acres): Unknown

Attach an 8.5" by 11" photocopy (**DO NOT REDUCE**) of the section of the U.S.G.S. Quadrangle Map which identifies the project location. On this map, indicate the location of the project center (if linear, depict both ends) and outline the approximate boundaries of the project area.

Specify latitude/longitude of the project center. **Latitude:** 40 °/ 07 '/ 24.41" N

Indicate latitude/longitude in degrees-minutes-seconds format only. **Longitude:** 75 °/ 53 '/ 12.41" W

Three steps are needed to convert from decimal degrees to degrees-minutes-seconds: (1) Degrees will be the whole number. (2) To get minutes, multiply the decimal degree portion by 60. (3) Multiply the decimal minute portion by 60 to get seconds.

Example: (Latitude) 40.93748 = **40°**; 0.93748 x 60 = 56.2488'= **56**'; 0.2488 x 60 = 14.928 = **15**" = **40°56'15" N**

(Longitude) 75.94740 = **75°**; 0.94740 x 60 = 56.844' = **56**'; 0.844 x 60 = 50.64 = **51**" = **75°56'51" W**

FOR PFBC USE ONLY

SIR#	Quad Name	Data Source	Search Result-Potential Species Conflict	Action

Pennsylvania Natural Diversity Inventory

Project Planning & Environmental Review Form

This form provides site information necessary to perform an Environmental Review for special concern species and resources listed under the Endangered Species Act of 1973, the Wild Resource Conservation Act, the Pennsylvania Fish and Boat code or the Pennsylvania Game and Wildlife Code.

Applicant Information

Name: Ppl Electric Utilities, Ken Kuhns
Address: Two North Ninth St (Genn4) Allentown, Pa 18101
Phone Number: 610.774.2540 Fax Number: 610.774.6239

Contact Person Information - if different from applicant

Name: Sue Davis The Louis Berger Group, Inc.
Address: 100 Commercial St, 2nd Floor N, Manchester, NH 03101
Phone Number: 781-707-7445 Fax Number: 603-644-5220

Project Information

Project Name: Honey Brook - Twin Valley 138/69 Kv Transmission
Project Location: Chester, Berks, And Lancaster Counties, PA
Municipality: Multiple, See Letter County: Multiple, See Letter
☒ Attach a copy of a U.S.G.S. 7 ½ Minute Quadrangle Map with Project Boundaries clearly marked.
U.S.G.S. Quad Name: Multiple, See Letter

Project Description

Proposed Project Activity (including ALL earth disturbance areas and current conditions)

To increase electric reliability in the region, PPL Electric intends to site and construct a new 138/69 kV transmission line between the Honey Brook substation in Honey Brook Township, Chester County, PA and the Twin Valley substation in Caernarvon Township, Berks County, PA. Based on the Route Selection Study, PPL Electric has selected a Preferred Route (Route A) and an Alternate Route (Route B). The routes under consideration traverse the townships of Honey Brook and Caervarvon.

Total Acres of Property: Unknown Acreage to be Impacted: Unknown

1. Will the entire project occur in or on an existing building, parking lot, driveway, road, maintained road shoulder, street, runway, paved area, railroad bed, or maintained lawn? Yes ☐ No ☒
2. Are there any waterways or waterbodies (intermittent or perennial rivers, streams, creeks, tributaries, lakes or ponds) in or near the project area, or on the land parcel? If so, how many feet away is the project?
   Yes ☒ Aerial xin Feet No ☐
3. Are wetlands located in or within 300 feet of the project area? Yes ☒ No ☐ If No, is this the result of a wetland delineation?

If you have a "PNDI Project Environmental Review Receipt" with potential impacts, please send a receipt copy, this completed form, and a USGS Quad Map to the agency/agencies noted on the receipt. If you are unable to generate a PNDI Receipt because you do not have Internet access, complete this form, attach a USGS Quad Map, and send them to your local DEP or County Conservation District. For review of a "Large Project," please send form and map to all the agencies listed below. See page 2 for more information.

Dept. of Conservation and Natural Resources
Bureau of Forestry, Ecological Services Section
400 Market St., PO Box 8552
Harrisburg, PA 17105
fax: 717-772-0271

PA Fish and Boat Commission
Natural Diversity Section
450 Robinson Lane
Bellefonte, PA 16823
fax 814-359-5175

PA Game Commission
Bureau of Land Management
2001 Elmerton Avenue
Harrisburg, PA 17110-9797
fax: 717-787-6957

US Fish and Wildlife Service
Endangered Species Biologist
315 South Allen St., Suite 322
State College, PA 16801
no faxes please

Follow-up Agency Consultation Responses

pennsylvania
DEPARTMENT OF CONSERVATION
AND NATURAL RESOURCES

BUREAU OF FORESTRY

February 11, 2013 **PNDI large project #: 022101**

Sue Davis, Senior Environmental Scientist
The Louis Berger Group, Inc.
100 Commercial Street, 2nd floor
Manchester, NH 03101
Email: sjdavis@louisberger.com (Hard copy not to follow)

Re: Honey Brook–Twin Valley 138/69 kV Transmission
Multiple Townships, Chester, Berks, and Lancaster Counties, PA

Dear Ms. Davis,

Thank you for the submission of the Pennsylvania Natural Diversity Inventory (PNDI) Environmental Review Large Project # 022101 for review. PA Department of Conservation and Natural Resources screened this project for potential impacts to species and resources of concern under DCNR's responsibility, which includes plants, terrestrial invertebrates, natural communities, and geologic features only.

Potential Impact Anticipated if Alternate Route (Route B) is selected, No impact anticipated per conditions if Preferred Route (Route A) is selected –

1) If Preferred Route (Route A) is selected, the following paragraph is applicable:
PNDI records indicate species or resources under DCNR's jurisdiction are located in the vicinity of the project. However, based on the information you submitted concerning the nature of the project, the immediate location, and our detailed resource information, DCNR has determined that no impact is likely. No further coordination with our agency is needed for this project. As a voluntary measure, please clean all construction equipment before it is brought on site; this will remove invasive plant seeds from the equipment that has been picked up from other sites and will help control invasive plant spread into adjacent riparian habitats. As a voluntary measure, if revegetating an area, please use seed mixtures that do not contain invasive species, including crown vetch.

2) If Alternate Route (Route B) is selected, the following is applicable:
PNDI records indicate species or resources of concern under DCNR jurisdiction are located in the project vicinity. Based on a detailed PNDI review, DCNR determined potential impacts to the following threatened or endangered species or species of special concern. Please note our new survey protocols are available at http://www.gis.dcnr.state.pa.us/hgis-er/Login.aspx.

Scientific Name	Common Name	PA Current Status	PA Proposed Status
Magnolia virginiana	Sweet bay magnolia	Threatened	Threatened

Survey Request

DCNR requests a survey for the following species:

- ***Magnolia virginiana* (sweet bay magnolia)**–moist, mostly acidic woods & swamps in sandy peaty soils, especially in association with red maple-black gum wet woods–flowers late May-June-

- A survey for the above species should be conducted by a qualified botanist *at the appropriate time of year and then submitted to our office for review*. **Your botanist should carefully review the new DCNR Botanical Survey Protocols available at http://www.gis.dcnr.state.pa.us/hgis-er/Login.aspx. These protocols are recommended to ensure that the all necessary information is collected and that survey reports are prepared properly. It is the expectation of DCNR that these protocols will be followed when conducting surveys for species under our jurisdiction.**
- Your botanist should *fill out the field survey form while performing their survey*: http://www.gis.dcnr.state.pa.us/hgis-er/hgis/Internet%20Field%20Survey%20Form_2007.pdf. Contact our office prior to the survey for detailed information about the species, or for a list of qualified surveyors.
- Any target and non-target state-listed species found during the site visit should be reported to our office. Mitigation measures and monitoring may be requested if species or communities of special concern are found on or adjacent to site.
- **If more information becomes available and/or a habitat assessment is conducted, and potential suitable habitat for the above species is not present in the project site or will not be impacted, then contact me at c-frsechle@pa.gov or 717-705-2819 and I can reissue a no impact letter.**
- If the land type(s) does not exist onsite a survey may not be necessary; please submit a habitat assessment report which describes the current land cover, habitat types and species found onsite.

This response represents the most up-to-date review of the PNDI data files and is valid for **two years** only. If project plans change or more information on listed or proposed species becomes available, our determination may be reconsidered. For PNDI project updates, please see the PNHP website at www.naturalheritage.state.pa.us for guidance. As a reminder, this finding applies to potential impacts under DCNR's jurisdiction only. Visit the PNHP website for directions on contacting the Commonwealth's other resource agencies for environmental review. Should you have any questions or concerns, please don't hesitate to contact me at 717.705.2819 or c-frsechle@pa.gov.

Sincerely,

Frederick C. Sechler, Jr, Ecological Information Specialist
Pennsylvania Natural Heritage Program
Bureau of Forestry, Ecological Services Section

Rebecca H. Bowen, Section Chief
Pennsylvania Natural Heritage Program
Bureau of Forestry, Ecological Services Section

FAX to: 603-644-5220

Pennsylvania Fish & Boat Commission

established 1866

Division of Environmental Services
Natural Diversity Section
450 Robinson Lane
Bellefonte, PA 16823-9620
(814) 359-5237 Fax: (814) 359-5175
February 5, 2013

IN REPLY REFER TO SIR # 40161

SUE DAVIS
THE LOUIS BERGER GROUP
100 COMMERCIAL STREET, 2ND FLOOR, NORTH
MANCHESTER, NH 03101

RE: Species Impact Review (SIR) - Rare, Candidate, Threatened and Endangered Species
HONEY BROOK - TWIN VALLEY 138/69 KV TRANSMISSION LINE PROJECT
UPDATE TO SIR #38668
PNDI Search Number (if available): LARGE PROJECT REVIEW
MULTIPLE MUNICIPALTIES, CHESTER BERKS LANCASTER County, Pennsylvania

This responds to your inquiry about a Pennsylvania Natural Diversity Inventory (PNDI) Internet Database search "potential conflict" or a threatened and endangered species impact review. These projects are screened for potential conflicts with rare, candidate, threatened or endangered species under Pennsylvania Fish & Boat Commission jurisdiction (fish, reptiles, amphibians, aquatic invertebrates only) using the Pennsylvania Natural Diversity Inventory (PNDI) database and our own files. These species of special concern are listed under the Endangered Species Act of 1973, the Wild Resource Conservation Act, and the Pennsylvania Fish & Boat Code (Chapter 75), or the Wildlife Code.

X *NO ADVERSE IMPACTS EXPECTED FROM THE PROPOSED PROJECT*

X Except for occasional transient species, rare, candidate, threatened or endangered species under our jurisdiction are not known to exist in the vicinity of the project area. Therefore, no biological assessment or further consultation regarding rare species is needed with the Commission. Should project plans change, or if additional information on listed or proposed species becomes available, this determination may be reconsidered.

___ An element occurrence of a rare, candidate, threatened, or endangered species under our jurisdiction is known from the vicinity of the proposed project. However, given the nature of the proposed project, the immediate location, or the current status of the nearby element occurrence(s), no adverse impacts are expected to the species of special concern.

This response represents the most up-to-date summary of the PNDI data and our files and is valid for two (2) years from the date of this letter. An absence of recorded species information does not necessarily imply species absence. Our data files and the PNDI system are continuously being updated with species occurrence information. Should project plans change or additional information on listed or proposed species become available, this determination may be reconsidered, and consultation shall be re-initiated.

If you have any questions regarding this review, please contact the biologist indicated below:

___	Chris Urban	814-359-5113	X	Kathy Gipe	814-359-5186
___	Douglas Fischer	814-359-5195	___	Bob Morgan	814-359-5129

Thank you in advance for your cooperation and attention to this important matter of species conservation and habitat protection.

SIGNATURE: _____ DATE: February 5, 2013
Christopher A. Urban
Chief, Natural Diversity Section

COMMONWEALTH OF PENNSYLVANIA
Pennsylvania Game Commission

2001 ELMERTON AVENUE
HARRISBURG, PA 17110-9797

"To manage all wild birds, mammals and their habitats for current and future generations."

ADMINISTRATIVE BUREAUS:

ADMINISTRATION.....717-787-5670
HUMAN RESOURCES.....717-787-7836
FISCAL MANAGEMENT.....717-787-7314
CONTRACTS AND PROCUREMENT.....717-787-6594
LICENSING.....717-787-2084
OFFICE SERVICES.....717-787-2116
WILDLIFE MANAGEMENT.....717-787-5529
INFORMATION & EDUCATION.....717-787-6286
WILDLIFE PROTECTION.....717-783-6526
WILDLIFE HABITAT MANAGEMENT.....717-787-6818
REAL ESTATE DIVISION.....717-787-6568
AUTOMATED TECHNOLOGY SERVICES.....717-787-4076

www.pgc.state.pa.us

Division of Environmental Planning and Habitat Protection
717-783-5957

February 20, 2013 **Large Project PNDI Review**

Ms. Sue Davis
The Louis Berger Group
100 Commercial Drive, 2nd Floor North
Manchester, New Hampshire 03101

Re: Honey Brook-Twin Valley 138/69 kV Transmission Line - **REVISED**
Proposed Transmission Line – Preferred Route (Route A) and Alternate Route (Route B)
Honey Brook and West Nantmeal Townships, Chester County, Pennsylvania
Caernarvon Township, Berks County, Pennsylvania
Caernarvon Township, Lancaster County, Pennsylvania

Dear Ms. Davis,

Thank you for submitting your Pennsylvania Natural Diversity Inventory (PNDI) Large Project Environmental Review request. The Pennsylvania Game Commission (PGC) screened this project for potential impacts to species and resources of concern under PGC responsibility, which includes birds and mammals only. It should be noted that this letter is a revision to that issued by the PGC on July 13, 2012 based on additional information provided by the project proponent.

Potential Impact Anticipated

PNDI records indicate species or resources of concern are located in the vicinity of the project. The PGC has received and thoroughly reviewed the information that you provided to this office, as well as PNDI data, and has determined that there are no known occurrences of state listed **threatened or endangered** bird or mammal species associated with your project. However, potential impacts to **species of special concern** may be associated with your project, and as a result, additional measures are recommended to avoid potential impacts to the species listed below.

Conservation Measure

The following is a mammal species that was also identified within the vicinity of the project. This species is of special concern, and therefore, are not a target species for a survey:

Scientific Name	Common Name
Myotis septentrionalis	Northern myotis

However, because of their ecological significance, the following seasonal restriction is suggested for both the preferred and alternate routes (identified as Route A and Route B) to avoid potential impacts to *Myotis septentrionalis* and other bat species:

- *To the best extent practicable, all trees or dead snags greater than 5 inches in diameter at breast height that need to be harvested to facilitate the project shall be cut between November 1 and March 31.*

This response represents the most up-to-date summary of the PNDI data files and is valid for two (2) years from the date of this letter. An absence of recorded information does not necessarily imply actual conditions on site. Should project plans change or additional information on listed or proposed species become available, this determination may be reconsidered.

Should the proposed work continue beyond the period covered by this letter, please resubmit the project to this agency as an "Update" (including an updated PNDI receipt, project narrative and accurate map). If the proposed work has not changed and no additional information concerning listed species is found, the project will be cleared for PNDI requirements under this agency for two additional years.

This finding applies to impacts to birds and mammals only. To complete your review of state and federally-listed threatened and endangered species and species of special concern, please be sure that the U.S. Fish and Wildlife Service, the PA Department of Conservation and Natural Resources, and/or the PA Fish and Boat Commission have been contacted regarding this project as directed by the online PNDI ER Tool found at www.naturalheritage.state.pa.us.

Sincerely,

Olivia A. Mowery

Olivia A. Mowery
Environmental Planner
Division of Environmental Planning & Habitat Protection
Bureau of Wildlife Habitat Management
Phone: 717-787-4250, Extension 3128
Fax: 717-787-6957
E-mail:OMowery@pa.gov

A PNHP Partner

OAM/oam

cc: File

2012-0789

THE Louis Berger Group, INC.

January 17, 2013

Bonnie Dershem
United States Fish and Wildlife Service
Endangered Species Biologist
315 South Allen Street, Suite 322
State College, PA 16801

Re: Honey Brook – Twin Valley 138/69 kV Transmission Line Project
USFWS Project#2012-0789
Request for Pennsylvania Natural Diversity Inventory Project Review Update

The Louis Berger Group, Inc. (LBG) has been contracted by PPL Electric Utilities (PPL Electric) to conduct a siting study for the proposed Honey Brook – Twin Valley 138/69 kV Transmission Line Project (Project). The Project will begin at PPL Electric's Honey Brook substation in Honey Brook Township, Chester County, Pennsylvania and terminate in at PPL Electric's Twin Valley substation in Caernarvon Township, Berks County, Pennsylvania. On April 27, 2012, we submitted an initial Pennsylvania Natural Diversity Inventory (PNDI) request for this Project. The previous letter included a detailed topographic map identifying several alternative links under consideration. Based on the Route Selection Study, PPL Electric has selected a Preferred Route (Route A) and an Alternate Route (Route B). The revised routes are identified on the attached topographic map. PPL Electric respectfully requests that your agency provide an updated PNDI review for current federal listed threatened and endangered species and habitats that are known to occur, or that could potentially occur, in the vicinity of the alternative routes. Please indicate if your comments are specific to one or both of the Alternate Routes.

We have attached the completed PNDI Form. Please email Sue Davis at sjdavis@louisberger.com if you would like a copy of the project GIS shapefile. If you are able to provide the locations of any records you find during your PNDI search on a GIS shapefile for us, we would appreciate that as well. Please provide the requested information in writing and by email or fax at your earliest convenience to me at sjdavis@louisberger.com or 100 Commercial Street, 2nd Floor, North Manchester, NH 03101. If you have any questions please do not hesitate to contact me at this email address, by phone at 781-707-7445, or by fax at 603-644-5220.

Sincerely,

Sue Davis
Senior Environmental Scientist
The Louis Berger Group, Inc.

U.S. FISH AND WILDLIFE SERVICE
Pennsylvania Field Office
315 South Allen Street, Suite 322
State College, Pennsylvania 16801-4850

It appears there have been no changes in the project or on-site biological information; therefore, the agency's comments, as detailed in our letter of June 5, 2012, remain unchanged.

_____, Supervisor 1/31/13

100 Commercial Street | 2nd Floor, North | Manchester, NH 03101 | USA
Tel 603.644.5200 | Fax 603.644.5220 | www.louisberger.com

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Pennsylvania Field Office
315 South Allen Street, Suite 322
State College, Pennsylvania 16801-4850

May 22, 2013

Stan Boder
Wildlife Specialists, LLC
2785 Hills Creek Road
Wellsboro, PA 16901

RE: USFWS Project #2012-0789

Dear Mr. Boder:

This responds to your letter dated April 17, 2013, which provided the U.S. Fish and Wildlife Service with information regarding PPL Electric Utilities proposed Honey Brook – Twin Valley 138/69 kV Transmission Line Project, located in Caernarvon and Honey Brook Townships, Chester, Lancaster, and Berks Counties, Pennsylvania. The following comments are provided pursuant to the Endangered Species Act of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*) to ensure the protection of endangered and threatened species.

The proposed project involves construction for a single-circuit 138 kV operation, which initially will operate as a single-circuit, 69 kV transmission line. Several existing access roads are proposed for site access, as well as several new roads.

In response to our June 5, 2012, letter, you submitted a Phase 1 bog turtle habitat assessment, which was conducted on March 13, 2013, indicating that twelve, palustrine emergent, scrub-shrub, and forested wetland areas were investigated for suitable bog turtle habitat.

Based on a review of the information supplied to this office, wetlands identified as KCA, KCC/KCB-s, KCH, KCG, KCF/BKCC, JBH, KCI, and BKCH do not contain the combination of hydrology, soils, and vegetation characteristic of suitable bog turtle habitat.

However, you determined that wetlands indentified as BKCE, JBD, JBG, and JBF do contain habitat characteristics suitable for bog turtles. If direct or indirect adverse effects to these wetlands cannot be avoided, a more detailed and thorough survey will be necessary, as described under Phase 2 of the *Guidelines for Bog Turtle Surveys*. Avoidance of direct and indirect effects means no disturbance to or encroachment into the wetlands (e.g., filling, ditching or draining) for project-associated activities such as roads, sewer lines, utility lines, storm water or sedimentation basins, residences, driveways, parking lots and other structures. Adverse effects may also be anticipated to occur when lot lines include portions of the wetland, an adequate upland buffer is not designated around the wetland (recommended buffer is 300 feet wide), or roads or storm

water/sedimentation basins affect the hydrology of the wetland.

The Phase 2 survey should be conducted by a qualified biologist with bog turtle field survey experience (see enclosed list of qualified surveyors). Submit survey results to the U.S. Fish and Wildlife Service (Service) for review and concurrence. If project activities might adversely affect bog turtles, additional consultation with the Service will be required, pursuant to the Endangered Species Act.

Please advise this office as to the course of action you intend to pursue regarding bog turtle surveys of, or avoidance of project impacts to, wetlands in the project area. This information, and appropriate supporting information (*e.g.*, bog turtle survey results, project plans documenting no encroachment into wetlands) will be necessary before the Service can concur that no federally listed species will be adversely affected by the project.

This response relates only to endangered and threatened species under our jurisdiction, based on an office review of the proposed project's location. No field inspection of the project area has been conducted by this office. Consequently, this letter is not to be construed as addressing potential Service concerns under the Fish and Wildlife Coordination Act or other authorities.

To avoid potential delays in reviewing your project, please use the above-referenced USFWS project tracking number in any future correspondence regarding this project.

Please contact Kayla Easler of this office at (814) 234-4090 if you have any questions or require further assistance regarding this matter.

Sincerely,

Roberta E. Hylton
Acting Project Leader

Enclosures (2)

REMOVE PAGE

INSERT TAB 15

ATTACHMENT 15
HONEY BROOK – TWIN VALLEY 138/69 KV LINE
CULTURAL RESOURCES REPORT

The following tables identify National Register of Historic Places (NRHP) listed, eligible and potentially eligible or unevaluated cultural resources located within 2 miles of the Alternative Routes. Ineligible resources are not included in this Attachment. Previously identified cultural resources located within the Study Area are discussed in Attachment 3, Section 2.3 and resources located within 1-mile of the Alternative Routes are discussed in Attachment 4, Section 5.2.3.

Table 15-1
Historic Architectural Sites Within 2 Miles of the Alternative Routes

Key #	Name	County	Municipality	Type	NRHP Status	Evaluation or Listing Date	Within Study Area[1]
092673	Kurtz, J. Limekiln	Berks	Caernarvon Township	Structure	Eligible	06/09/1987	Yes
092674	Zager, Donald, Farm	Berks	Caernarvon Township	Building	Eligible	06/09/1987	Yes
093386	Morgantown Historic District; Old Main Street Historic District	Berks	Caernarvon Township	District	Listed	11/07/1995	Yes
096897	Kurtz-Beiler Farmstead	Berks	Caernarvon Township	Building	Eligible	08/30/1990	Yes
097860	Hertler House	Berks	Caernarvon Township	Building	Eligible	03/25/1992	Yes
122695	Pennsylvania Turnpike: Philadelphia [Eastern] Extension (Carlisle to Valley Forge)	Berks	Multi-Municips	Structure	Eligible	10/25/2002	Yes
079537	General Wayne Inn; Honey Brook Hotel	Chester	Honey Brook Borough	Building	Eligible	02/13/1981	Yes
119527	Honey Brook Historic District	Chester	Honey Brook Borough	District	Eligible	03/15/2002	Yes
155649	Wilmington & Northern Railroad (aggregate file)	Chester	Multi-Municips	District	Aggregate file	N/A	Yes

[1] Some previously identified cultural resources are located outside of the project Study Area, but within 2 miles of the Alternative Routes.

Table 15-1
Historic Architectural Sites Within 2 Miles of the Alternative Routes

Key #	Name	County	Municipality	Type	NRHP Status	Evaluation or Listing Date	Within Study Area[1]
155399	Wilmington & Northern Railroad (aggregate file)	Chester	Multi-Munips	District	Aggregate File with 155649	N/A	No
97463	Elverson Historic District	Chester	Elverson Borough	District	Listed	4/29/1993	No
156043	Grace Mine	Berks	Multi-Munips		Eligible	7/19/2010	No
82631	Morgan, Col. Jacob Homestead	Berks	Caernarvon Township	Building	Eligible	8/20/1985	No
156146	Pequea North Rural Historic District Boundary Increase	Lancaster	Salisbury Township	District	Eligible	6/1/2010	No

Table 15-2
Archaeological Sites Within 2 Miles of the Alternative Routes

Site Number	Name	County	Municipality	Type	NRHP Status	Evaluation or Listing Date	Within Study Area[1]
36BK0581	Kurtz Farm	Berks	Caernarvon Township	Open Habitation, Prehistoric	Insufficient Data Available to Make a Decision	N/A	Yes
36BK0587	Site #1	Berks	Caernarvon Township	Unknown Function Surface Scatter Less than 20M Radius	Listed or Determined Eligible by Keeper of N.R.	11/05/1991	Yes
36BK0589	Site #3	Berks	Caernarvon Township	Unknown Function Surface Scatter Less than 20M Radius	Insufficient Data Available to Make a Decision	N/A	Yes
36BK0597		Berks	Caernarvon Township	Open Prehistoric Site, Unknown Function	Considered Eligible by Submitter	04/20/1988	Yes
36BK0612	The Clover Mill/The Mill Property	Berks	Caernarvon Township	Historic Industrial Site	Insufficient Data Available to Make a Decision	N/A	Yes

Table 15-2
Archaeological Sites Within 2 Miles of the Alternative Routes

Site Number	Name	County	Municipality	Type	NRHP Status	Evaluation or Listing Date	Within Study Area[1]
36BK0626	Joanna Furnace Casting House	Berks	Caernarvon Township	Open Prehistoric Site, Unknown Function	Insufficient Data Available to Make a Decision	N/A	Yes
36BK0627	Locus 6	Berks	Caernarvon Township	Open Prehistoric Site, Unknown Function	Insufficient Data Available to Make a Decision	N/A	Yes
36BK0628	Locus 7	Berks	Caernarvon Township	Open Prehistoric Site, Unknown Function	Insufficient Data Available to Make a Decision	N/A	Yes
36BK0629	Locus 9	Berks	Caernarvon Township		Insufficient Data Available to Make a Decision	N/A	Yes
36BK0645	Mill Road Site	Berks	Caernarvon Township	Historic Industrial Site	Insufficient Data Available to Make a Decision	N/A	Yes
36BK0646	Caernarvon Lime Kiln	Berks	Caernarvon Township	Historic Industrial Site	Considered Eligible by Submitter	03/06/1992	Yes
36BK0653		Berks	Caernarvon Township	Open Prehistoric Site, Unknown Function	Insufficient Data Available to Make a Decision	N/A	Yes
36BK0669	Pike Kilns	Berks	Caernarvon Township	Historic Industrial Site	Considered Eligible by Submitter	06/21/1993	Yes
36BK0688	Lanfair	Berks	Caernarvon Township	Historic Industrial Site	Insufficient Data Available to Make a Decision	N/A	Yes
36BK0703	Timber	Berks	Caernarvon Township	Historic Industrial Site	Insufficient Data Available to Make a Decision	N/A	Yes

Table 15-2
Archaeological Sites Within 2 Miles of the Alternative Routes

Site Number	Name	County	Municipality	Type	NRHP Status	Evaluation or Listing Date	Within Study Area[1]
36BK0715	King Road	Berks	Caernarvon Township	Historic Industrial Site	Insufficient Data Available to Make a Decision	N/A	Yes
36CH0064	CHHB-15	Chester	Honey Brook Township	Open Habitation, Prehistoric	Insufficient Data Available to Make a Decision	N/A	Yes
36CH0067	CHHB-19	Chester	Honey Brook Township	Open Habitation, Prehistoric	Insufficient Data Available to Make a Decision	N/A	Yes
36CH0131	Clyde Kiefer Site	Chester	Honey Brook Township	Open Habitation, Prehistoric	Insufficient Data Available to Make a Decision	N/A	Yes
36CH0133	CHHB-2	Chester	Honey Brook Township	Open Habitation, Prehistoric	Insufficient Data Available to Make a Decision	N/A	Yes
36CH0134	CHHB-3	Chester	Honey Brook Township	Open Habitation, Prehistoric	Insufficient Data Available to Make a Decision	N/A	Yes
36CH0135	CHHB-4	Chester	Honey Brook Township		Insufficient Data Available to Make a Decision	N/A	Yes
36CH0138	CHHB-9	Chester	Honey Brook Township	Open Habitation, Prehistoric	Insufficient Data Available to Make a Decision	N/A	Yes
36CH0139	CHHB-10	Chester	Honey Brook Township	Open Habitation, Prehistoric	Insufficient Data Available to Make a Decision	N/A	Yes
36CH0140	CHHB-12	Chester	Honey Brook Township	Open Habitation, Prehistoric	Insufficient Data Available to Make a Decision	N/A	Yes

Table 15-2
Archaeological Sites Within 2 Miles of the Alternative Routes

Site Number	Name	County	Municipality	Type	NRHP Status	Evaluation or Listing Date	Within Study Area[1]
36CH0141	CHHB-13	Chester	Honey Brook Township	Open Habitation, Prehistoric	Insufficient Data Available to Make a Decision	N/A	Yes
36CH0142	CHHB-14	Chester	Honey Brook Township	Open Habitation, Prehistoric	Insufficient Data Available to Make a Decision	N/A	Yes
36CH0159	CHHB-11	Chester	Honey Brook Township	Open Habitation, Prehistoric	Insufficient Data Available to Make a Decision	N/A	Yes
36CH0266	Dutt #19	Chester	Honey Brook Township	Open Habitation, Prehistoric	Insufficient Data Available to Make a Decision	N/A	Yes
36CH0267	Dutt #21	Chester	Honey Brook Township	Open Habitation, Prehistoric	Insufficient Data Available to Make a Decision	N/A	Yes
36CH0270	Dutt #24	Chester	Honey Brook Township	Open Habitation, Prehistoric	Insufficient Data Available to Make a Decision	N/A	Yes
36CH0271	Dutt #25	Chester	Honey Brook Township	Open Habitation, Prehistoric	Insufficient Data Available to Make a Decision	N/A	Yes
36CH0272	Dutt #26	Chester	Honey Brook Township	Open Habitation, Prehistoric	Insufficient Data Available to Make a Decision	N/A	Yes
36CH0274	Dutt #18	Chester	Honey Brook Township	Open Habitation, Prehistoric	Insufficient Data Available to Make a Decision	N/A	Yes
36CH0353	CHHB-21	Chester	Honey Brook Township	Open Habitation, Prehistoric	Insufficient Data Available to Make a Decision	N/A	Yes

Table 15-2
Archaeological Sites Within 2 Miles of the Alternative Routes

Site Number	Name	County	Municipality	Type	NRHP Status	Evaluation or Listing Date	Within Study Area[1]
36CH0514	CHHB-29	Chester	Honey Brook Township	Open Habitation, Prehistoric	Insufficient Data Available to Make a Decision	N/A	Yes
36CH0547		Chester	Honey Brook Borough	Open Prehistoric Site, Unknown Function	Insufficient Data Available to Make a Decision	N/A	Yes
36CH0584	Miller Overpass	Chester	Honey Brook Township	Historic - Unknown/Other/ Multiple Types	Insufficient Data Available to Make a Decision	N/A	Yes
36CH074	ChHb-33 Struble Lake #2	Chester	Honey Brook Township	Open Habitation, Prehistoric	Insufficient Data Available to Make a Decision	N/A	Yes
36CH0740	ChHb-30	Chester	Honey Brook Township	Open Habitation, Prehistoric	Insufficient Data Available to Make a Decision	N/A	Yes
36CH0741	ChHb-31	Chester	Honey Brook Township	Open Habitation, Prehistoric	Insufficient Data Available to Make a Decision	N/A	Yes
36CH0751	ChHb-35	Chester	Honey Brook Township	Open Habitation, Prehistoric	Insufficient Data Available to Make a Decision	N/A	Yes
36CH0752	ChHb-36	Chester	Honey Brook Township	Open Habitation, Prehistoric	Insufficient Data Available to Make a Decision	N/A	Yes
36CH0754	Suplee 1 (CHHB-17)	Chester	Honey Brook Township	Open Habitation, Prehistoric	Insufficient Data Available to Make a Decision	N/A	Yes
36CH0755	Suplee 2 (CHHB-18)	Chester	Honey Brook Township	Open Habitation, Prehistoric	Insufficient Data Available to Make a Decision	N/A	Yes

Table 15-2
Archaeological Sites Within 2 Miles of the Alternative Routes

Site Number	Name	County	Municipality	Type	NRHP Status	Evaluation or Listing Date	Within Study Area[1]
36CH0756	Suplee 3 (CHHB-19)	Chester	Honey Brook Township	Open Habitation, Prehistoric	Insufficient Data Available to Make a Decision	N/A	Yes
36LA0024		Lancaster	Caernarvon Township	Open Habitation, Prehistoric	Insufficient Data Available to Make a Decision	N/A	Yes
36LA0025		Lancaster	Caernarvon Township	Open Habitation, Prehistoric	Insufficient Data Available to Make a Decision	N/A	Yes
36LA0315	LACN-7	Lancaster	Caernarvon Township	Open Habitation, Prehistoric	Insufficient Data Available to Make a Decision	N/A	Yes
36LA1070	Unit 466, Site B	Lancaster	Caernarvon Township	Lithic Reduction	Insufficient Data Available to Make a Decision	N/A	Yes
36LA1249	LACA-5	Lancaster	Caernarvon Township	Open Prehistoric Site, Unknown Function	Insufficient Data Available to Make a Decision	N/A	Yes
36LA1330	LACA-1	Lancaster	Caernarvon Township	Open Prehistoric Site, Unknown Function	Insufficient Data Available to Make a Decision	N/A	Yes
36CH0375		Chester	Honey Brook Township	Open Habitation, Prehistoric	Insufficient Data Available to Make a Decision	N/A	No
36CH0377		Chester	Honey Brook Township	Open Habitation, Prehistoric	Insufficient Data Available to Make a Decision	N/A	No
36CH0511	CHHB-26	Chester	Honey Brook Township	Open Habitation, Prehistoric	Insufficient Data Available to Make a Decision	N/A	No

Table 15-2
Archaeological Sites Within 2 Miles of the Alternative Routes

Site Number	Name	County	Municipality	Type	NRHP Status	Evaluation or Listing Date	Within Study Area[1]
36CH0543	FS 1 (Plus FS 2 & 6)	Chester	Honey Brook Borough	Open Habitation, Prehistoric	Insufficient Data Available to Make a Decision	N/A	No
36CH0544	FS 3& 5	Chester	Honey Brook Township	Lithic Reduction	Insufficient Data Available to Make a Decision	N/A	No
36CH0545	FS 4 (Zimmerman)	Chester	Honey Brook Township	Open Habitation, Prehistoric	Insufficient Data Available to Make a Decision	N/A	No
36CH0513	CHHB-28	Chester	Honey Brook Township	Open Habitation, Prehistoric	Insufficient Data Available to Make a Decision	N/A	No
36CH0065	CHHB-17	Chester	Honey Brook Township	Open Habitation, Prehistoric	Insufficient Data Available to Make a Decision	N/A	No
36CH0066	CHHB-18	Chester	Honey Brook Township	Open Habitation, Prehistoric	Insufficient Data Available to Make a Decision	N/A	No
36CH0136	CHHB-7	Chester	Honey Brook Township	Open Habitation, Prehistoric	Insufficient Data Available to Make a Decision	N/A	No
36CH0137	CHHB-8	Chester	Honey Brook Township	Open Habitation, Prehistoric	Insufficient Data Available to Make a Decision	N/A	No
36CH0589	McConnell Site	Chester	Honey Brook Borough	Historic Domestic Site	Insufficient Data Available to Make a Decision	N/A	No
36CH0273	Dutt #27	Chester	Honey Brook Township	Open Habitation, Prehistoric	Insufficient Data Available to Make a Decision	N/A	No

Table 15-2
Archaeological Sites Within 2 Miles of the Alternative Routes

Site Number	Name	County	Municipality	Type	NRHP Status	Evaluation or Listing Date	Within Study Area[1]
36CH0157	CHHB-5	Chester	Honey Brook Township	Open Habitation, Prehistoric	Insufficient Data Available to Make a Decision	N/A	No
36CH0296	Dutt #30	Chester	Honey Brook Township	Open Habitation, Prehistoric	Insufficient Data Available to Make a Decision	N/A	No
36CH0431	CHHB 25	Chester	Honey Brook Township	Open Habitation, Prehistoric	Insufficient Data Available to Make a Decision	N/A	No
36CH0432	CHHB 23	Chester	Honey Brook Township	Open Habitation, Prehistoric	Insufficient Data Available to Make a Decision	N/A	No
36CH0367	King Site	Chester	Honey Brook Township	Open Habitation, Prehistoric	Insufficient Data Available to Make a Decision	N/A	No
36BK0666	Valley Ca. Pre-1890	Berks	Caernarvon Township	Historic-Unknown/Other/ Multiple Types	Insufficient Data Available to Make a Decision	N/A	No
36BK0903	Route 10	Berks	New Morgan Township	Farmstead	Considered Not Eligible by Submitter	N/A	No
36BK0618	Site 6	Berks	Caernarvon Township	Historic Domestic Site	Eligible	8/10/1992	No
36BK0588	Site 2	Berks	Caernarvon Township	Unknown Function Surface Scatter Less than 20m radius	Listed or Determine Eligible by Keeper of National Register	11/5/1991	No
36BK0620	Site 4 (Gaul Site)	Berks	Caernarvon Township	Open Prehistoric Site, Unknown Function	Ineligible	N/A	No

Table 15-2
Archaeological Sites Within 2 Miles of the Alternative Routes

Site Number	Name	County	Municipality	Type	NRHP Status	Evaluation or Listing Date	Within Study Area[1]
36BK0619	Site 5	Berks	Caernarvon Township	Open Prehistoric Site, Unknown Function	Ineligible	N/A	No
36LA0317	LACN-9	Lancaster	Caernarvon Township	Open Habitation, Prehistoric	Insufficient Data Available to Make a Decision	N/A	No
36LA0312	LACN-4	Lancaster	Caernarvon Township	Open Habitation, Prehistoric	Considered Not Eligible by Submitter	N/A	No
36LA1461	A. Stoltzfus 2	Lancaster	Caernarvon Township	Open Habitation, Prehistoric	Insufficient Data Available to Make a Decision	N/A	No
36LA1467	A. Stoltzfus 1	Lancaster	Caernarvon Township	Open Habitation, Prehistoric	Considered Not Eligible by Submitter	N/A	No
36LA1465	Red School	Lancaster	Caernarvon Township	Open Habitation, Prehistoric	Considered Not Eligible by Submitter	N/A	No
36LA1069	Unit 466, Site A	Lancaster	Caernarvon Township	Lithic Reduction	Insufficient Data Available to Make a Decision	N/A	No
36CH0742	ChHB-32	Chester	Honey Brook Township	Open Habitation, Prehistoric	Insufficient Data Available to Make a Decision	N/A	No
36CH0068	ChHB-20	Chester	Honey Brook Township	Open Habitation, Prehistoric	Insufficient Data Available to Make a Decision	N/A	No
36CH0483	Stoltzfus	Chester	Honey Brook Township	Open Habitation, Prehistoric	Insufficient Data Available to Make a Decision	N/A	No

Table 15-2
Archaeological Sites Within 2 Miles of the Alternative Routes

Site Number	Name	County	Municipality	Type	NRHP Status	Evaluation or Listing Date	Within Study Area[1]
36LA0170	LASA-21	Lancaster	Salisbury Township	Open Habitation, Prehistoric	Insufficient Data Available to Make a Decision	N/A	No
36LA1210	LASA-8	Lancaster	Salisbury Township	Lithic Reduction	Insufficient Data Available to Make a Decision	N/A	No

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INSERT TAB 16

ATTACHMENT 16
HONEY BROOK – TWIN VALLEY 138/69 KV LINE
PUBLIC NOTICE REQUIREMENTS

PPL Electric Utilities Corporation (PPL Electric) proposes to reinforce the 138/69 kV transmission system in Berks, Chester and Lancaster counties, Pennsylvania by providing a second source into the Twin Valley Substation. The proposed new transmission line will provide improved reliability of service for approximately 20,500 customers in Honey Brook and Caernarvon townships in Chester, Berks and Lancaster counties. The new line will also allow for improved operating flexibility to restore customer load more quickly after a facility outage.

The estimated cost to site, design, and construct this Project is approximately $10.5 million. Construction of this Project is scheduled to begin in August 2014 to meet an in-service date of March 2015.

Pursuant to Subchapters G and I of the Commission regulations, 52 Pa. Code §§ 57.71-57.77, 57.91-57.93, and the Commission's Interim Siting Guidelines, 52 Pa. Code §§ 69.3101-69.3107, PPL Electric has provided a packets of information to fully notify landowners that will be subject to the rights-of-way and easements for the proposed Project. These packets of information included the following:

- A Cover Letter from a PPL Electric Senior Real Estate Specialist
- A Disclosure of Eminent Domain Power of Electric Utilities Required by 52 Pa. Code § 57.91
- Notification of Right-of-Way Maintenance Practices Required by 52 Pa. Code § 57.91
- PPL Electric's Internal Practices for Dealing with the Public on Power Line Project Required by 52 Pa. Code § 69.3102
- Notification to Contact the Commission or Office of Consumer Advocate for Improper Land Agent Practices
- A Brochure on Electromagnetic Fields
- A Brochure on Vegetation Management
- A Glossary of Real Estate Terms.

Following this Attachment are the forms of the information that were sent to all landowners that will be subject to the rights-of-way and easements for the Project. In addition, copies of the Application and supporting Attachments or Notice of Filing are being served in accordance with the provisions of Section 57.74 of the Commission's regulations, 52 Pa. Code 57.74.

INFORMATION PACKET

Agents Name
Agents Title
Agent's Address Line 1
Agent's Address Line 2
Agent's contact number

PPL Electric Utilities Corporation
Two North Ninth Street
Allentown, PA 18101-1179

Letter Date

Recipient Name
Recipient Address Line 1
Recipient Address Line 2

Dear Property Owners:

PPL Electric Utilities Corporation (PPL) is planning to build an electric transmission line, Honey Brook to Twin Valley 138/69 KV, in Caernarvon and Honey Brook Townships, Chester, Lancaster and Berks Counties, Pennsylvania. The new transmission line is needed to meet increased demands and ensure reliable electric service to customers in this region. I am writing to notify you of the proposed project as required by the Pennsylvania Public Utility Commission.

PPL plans to negotiate with the applicable landowners to acquire right-of-way to accommodate the new transmission line. Where the new line is proposed, PPL will negotiate to acquire 100 feet of right-of-way.

Since the proposed right-of-way needs of this project may involve your property, enclosed are notices required by the Pennsylvania Public Utility Commission that provide important information regarding eminent domain, right-of-way maintenance practices, and land agents conduct. Also enclosed is PPL's Internal Practices for Dealing with the Public on Power Line Projects. The Pennsylvania Public Utility Commission's regulations require that PPL provide you with this information at least 15 days in advance of our discussions. For your convenience, I also have enclosed information on electromagnetic fields and a brochure on vegetation management, as well as a glossary of real estate terms.

If you have any questions on any of the enclosed information, please contact me at xxx-xxx-xxxx.

I kindly request that you sign in the space provided below to indicate that you have received this information.

Very truly yours,

Agents name

PPL Senior Real Estate Specialist

I acknowledge receiving the information referred to in the letter above and understand that it does not obligate me in any way.

_____

Date _____

Phone _____

Attachments:
- Disclosure of Eminent Domain Power
- Notification of Right-of-Way Maintenance Practices
- Internal Practices for Dealing with the Public on Power Line Project
- Notification Regarding Land Agent Practices
- Information on Electromagnetic Fields
- Brochure on Vegetation Management
- Glossary of Real Estate Terms

NOTICE
EMINENT DOMAIN POWER

The Pennsylvania Public Utility Commission requires that PPL Electric Utilities Corporation give you the following information:

PPL Electric Utilities Corporation is presently planning to construct its 138/69 kV electric transmission line to be known as the Honey Brook to Twin Valley Line in Caernarvon and Honey Brook Townships in Chester, Lancaster and Berks Counties, Pennsylvania.

Since a field survey and detailed engineering has not been completed, the physical dimensions of the proposed lines and the type and height of supporting structures to be used cannot be precisely determined at this time. However, based on past experience it is expected that the structures normally will be 90 to 100 feet in height. There may be isolated physical conditions that would require either higher or lower structures than those mentioned above. At this time, we do not know the number of structures to be placed on any properties. PPL Electric's current 138/69kv standard right of way width is 100 feet.

Since the route could affect your property, a representative of the utility will contact you in the near future to discuss the utility's plans as they may affect your property. In order to better prepare you for these discussions and to avoid possible misunderstandings, we want to take this opportunity to inform you of your legal rights and the legal rights of PPL Electric Utilities Corporation with regard to this Project. You have the right to have legal counsel represent you in these negotiations. You do not have to sign any agreement without the advice of counsel. If you do not know an attorney, you may contact your local bar association.

MUST YOU ACCEPT AN OFFER MADE BY THE UTILITY FOR YOUR PROPERTY?

No. You may refuse to accept it. However, the utility has the power to take property by eminent domain, subject to the approval of the Public Utility Commission, for the construction of transmission lines if the utility is unable to negotiate an agreement to buy a right of way. If your property is condemned, you must be paid "just compensation". "Just compensation" has been defined by the courts in Pennsylvania as the difference between the fair market value of your property before condemnation, unaffected by the condemnation, and the fair market value of your remaining property after condemnation, as affected by the condemnation.

CAN THE UTILITY CONDEMN YOUR HOUSE?

The company cannot condemn your house or a reasonable "curtilage" around your house. Generally, "curtilage" includes the land or buildings within 100 meters of your

house which are used for your domestic purposes. However, the 100 meters limit does not automatically extend beyond the homeowner's property line.

DO YOU HAVE A RIGHT TO A PUBLIC HEARING WHEN THE UTILITY SEEKS TO CONDEMN YOUR PROPERTY?

Yes. When an electric utility seeks to have your property condemned, the utility must first apply to the Pennsylvania Public Utility Commission for a certificate finding the condemnation to be necessary or proper for the service, accommodation, convenience, or safety of the public. The Commission will then hold a public hearing. As the landowner whose property may be condemned, you are a party to the proceeding and may retain counsel, present evidence, and/or testify yourself in opposition to the application for a certificate. If you wish to testify at the public hearing, you should make your intention known by letter to Secretary, Pennsylvania Public Utility Commission, P.O. Box 3265, Harrisburg, PA 17120.

If the Commission approves the utility's application for a certificate finding the condemnation in the public interest, then the utility may proceed before the local Court of Common Pleas to condemn your land. If the Commission denies the utility's application, the utility cannot condemn your land. If you retain an attorney to represent you before the Commission, you must do so at your own expense.

The Commission will not decide how much money you should receive if your land is condemned. The only issue the Commission will decide is whether the condemnation serves the public interest. If the Commission approves the utility's application for condemnation, the amount of money to which you are entitled will be determined by a local Board of View of the Court of Common Pleas. However, you may at any time make an agreement with the utility as to the amount of damages you are to be paid.

NOTICE
RIGHT OF WAY MAINTENANCE PRACTICES

The Pennsylvania Public Utility Commission requires that PPL Electric Utilities Corporation give you the following information on the RIGHT OF WAY MAINTENANCE PRACTICES for the 138/69kv line:

The methods currently used by PPL Electric Utilities Corporation are set forth in PPL Electric Utilities Corporation "Program for Vegetation Management", which will be made available to you for your inspection upon request. If you wish further information concerning right of way maintenance methods, you may contact the person named on the cover letter. You may discuss with this person, either before or during negotiation of the right of way agreement, these methods and any other questions you may have about right of way maintenance.

Once a utility has constructed an electric transmission line on a right of way across your land, the utility must maintain the right of way free of tall growing trees and brush which might impair the reliability of electric service, the safety of the line, and access to the line or its towers. The utility or its contractors may remove and control tall growing trees and brush by several methods: handcutting of trees, limbs and brush; mechanical cutting with chain saws or motorized cutting machines; application of herbicides, either from the ground or from a helicopter. The utility must confine its maintenance activities to the approved right of way across your land, except where tall growing trees or brush or their root systems grow into the right of way from adjoining land and constitute a threat to the electric transmission line and its structures.

If you believe that the maintenance method(s) used by the company would raise problems with your use of your land adjacent to the right of way, it is your responsibility as the landowner to bring this to the attention of the utility before you sign the right of way agreement.

The utility company has the responsibility to maintain its right of way, and regular maintenance must occur. Although you as the landowner cannot determine whether or not maintenance will occur, your right of way agreement may specify certain conditions on the performance of the maintenance program which are important to you. These conditions can be part of the negotiations between you and the utility company for your land, since a right of way agreement is a legal contract between a landowner and a utility company. It is important for you to understand also that the maintenance methods used by the utility company may change over time as the costs of maintenance or the methods of performing maintenance change. You may want to specify in your right of way agreement that the utility company inform you of changes in its maintenance methods or in the maintenance schedule for your land.

The provisions of the right of way agreement are enforceable in the local Court of Common Pleas. The right of way agreement cannot be enforced by the Pennsylvania Public Utility Commission. Any claims for damages resulting from improper maintenance of the right of way must be settled with the utility, its contractors, or in the local Court of Common Pleas at your own expense. The Commission cannot award damages for violations of the right of way agreement.

Internal Practices for Dealing with the Public on Power Line Projects
PPL Electric Utilities

PPL Corporation has a long-standing commitment to conducting business in an honest and ethical manner. Consistent with the expectations for our employees and representatives laid out in the PPL Standards of Conduct and Integrity, and in the Standards of Conduct and Integrity for Suppliers, PPL Electric Utilities Corporation's employees, contractors and agents who interact with members of the public (including landowners along proposed rights of way) in activities such as planning; real estate and right-of-way transactions; siting; and construction of power lines and other facilities will:

- Act with integrity at all times.
- Treat people courteously and in a professional manner.
- Be forthright and honest in all actions and communications.
- Comply with applicable laws and regulations.
- Seek to avoid conflicts of interest.
- Accept responsibility for actions and decisions.
- Be responsible stewards of the environment.
- Place a high priority on the safety of the public and our representatives and employees.

NOTICE
LAND AGENT PRACTICES

PPL Electric Utilities Corporation is presently planning to construct a 138/69 kV electric transmission line to be known as the Honey Brook to Twin Valley 138/69kv line through Caernarvon and Honey Brook Townships in Chester, Lancaster and Berks Counties, Pennsylvania. Since the route could affect your property, a representative from PPL Electric Utilities Corporation will contact you in the near future to discuss the utility's plans as they may affect your property.

The Pennsylvania Public Utility Commission requires that PPL Electric Utilities Corporation provide you the following contact information for concerns regarding the practices of the land agents acting on behalf of PPL Electric Utilities Corporation in connection with the proposed construction of the proposed Honey Brook to Twin Valley 138/69kv line:

James P. Melia, Esquire
Pennsylvania Public Utility Commission
400 North Street
Harrisburg PA 17105
717-787-1859
jmelia@state.pa.us

Pennsylvania Office of Consumer Advocate
555 Walnut Street
5th Floor Forum Place
Harrisburg, PA 17101-1923
Phone: 717-783-5048 or toll free 800-684-6560 (PA only)
Fax: 717-783-7152
Email: consumer@paoca.org

BROCHURE ON ELECTROMAGNETIC FIELDS

PPL's Position on EMF

PPL takes a reasoned, prudent approach in responding to the EMF issue. PPL has a magnetic field management program to design and build new lines when practicable in ways that allow us to reduce magnetic fields at low cost to our customers. For instance, we reverse the phases of new overhead double-circuit transmission lines, which results in some cancellation of magnetic fields from the line and lowers the magnetic fields at the edge of the right of way. PPL also is increasing ground clearances for transmission lines.

On distribution lines, we're reducing magnetic fields at ground level by using taller poles. Magnetic field management is considered in the process we use to site new facilities, balancing cost and function with land use and environmental concerns. PPL has supported EMF research, both through financial contributions to national organizations and actual participation by PPL employees and customers.

We're also providing information to customers and others interested in the subject. EMF coordinators have been assigned to serve as local contact points for EMF inquiries. PPL representatives are available to talk with groups interested in EMF. PPL also has an EMF issue manager who directs all aspects of the company's EMF program.

Frequently Asked Questions about EMF

From time to time, some of our customers ask us about EMF — electric and magnetic fields. We have compiled common questions and answers, which we hope you will find helpful. If you have additional questions, please don't hesitate to ask us.

Q. What are electric and magnetic fields?
A. Electric and magnetic fields are present wherever there is a flow of electric current, whether in wires in the home, electrical appliances or power lines. Electric fields are produced by the voltage or electrical pressure in a wire and are present as long as an appliance is connected to a source of electricity — even if an appliance is turned off. Magnetic fields are produced whenever there is a flow of electric current through a wire. Electric and magnetic fields are not visible, like other fields such as a gravitational field or a temperature field.

Q. Are EMF the same as X-rays or microwaves?
A. No. Electric and magnetic fields are very low in energy compared with much stronger X-rays or microwaves. X-rays have enough power to dislodge electrons, and microwaves can be strong enough to heat objects. Electric power EMF do not have enough energy to do those things. EMF from power lines, electrical wiring and appliances have a frequency of 60 hertz, which means they alternate, or go back and forth, 60 times a second. On the other hand, microwaves alternate billions of times a second, and X-rays alternate even faster than that.

Q. How do magnetic fields associated with power lines compare with fields from other sources in our everyday environments?
A. The chart shows some typical magnetic field levels around power lines and other common sources. The standard unit of measurement is called a milligauss, or mG. Common indoor sources of magnetic fields include appliances, electronic equipment, household wiring and currents that may flow on water pipes or telephone cables. Fields from some sources inside a home can be higher than the fields from power lines outside. Note how the strength of the field becomes lower as you move away from the source.

Q. Does putting power lines underground reduce magnetic field exposures?
A. Yes and no. It depends on distance from the line and how the line is configured — the earth itself does not shield magnetic fields. Magnetic field levels directly above a typical underground line may be about twice the levels from a typical overhead line carrying the same electrical load. This is because an underground line is usually buried only a few feet below the surface of the ground and is closer than an overhead line that is suspended well above the ground. The wires of an underground line usually are closer to each other than the wires of an overhead line, and thus cancel the magnetic fields to some extent. Some underground designs can reduce magnetic field levels further. All underground options can cost up to 10 times more than overhead construction.

Q. What about EMF and health?
A. Since the 1970s, many credible scientific panels, government agencies and public health entities have reviewed the scientific research on electric and magnetic fields. Evaluations have been conducted by the U.S. National Academy of Sciences, the U.S. National Institute of Environmental Health Sciences, the U.K. National Radiological Protection Board, the International Agency for Research on Cancer and the World Health Organization, among others. None of these review groups has found that there is a demonstrated cause and effect relationship between exposure to EMF and cancer or other diseases.

In 1999, the director of U.S. NIEHS sent a detailed report on EMF and health to the U.S. Congress. The NIEHS Report concluded that "the scientific evidence suggesting that extremely low frequency (ELF)-EMF exposures pose any risk is weak." The NIEHS report noted that while some epidemiology studies showed associations with some leukemias, there was no support for these findings in laboratory research. The NIEHS report concluded that "this finding is insufficient to warrant an aggressive regulatory concern." The NIEHS in 2002 issued updated information, which concluded that for most health outcomes there is no evidence of EMF causing adverse effects. However, the NIEHS said there is some evidence of an association with childhood leukemia, which is difficult to interpret without supporting laboratory evidence. The NIEHS 2002 update concludes that "although questions remain about the possibility of health effects related to EMF, recent reviews have substantially reduced the level of concern." NIEHS did not recommend regulatory action to reduce EMF levels. The NIEHS information about EMF can be found online at http://www.niehs.nih.gov/health/topics/agents/emf/.

Q. What does the latest research show on EMF?

A. The World Health Organization conducted an extensive review of EMF in 2007. This review concluded that there is "inadequate evidence" that EMF causes or contributes to almost all health endpoints, that based on "limited evidence" of an association from epidemiology studies, there is a "possible" relationship with childhood leukemia, and that a cause and effect relationship has not been established. On its Web site, WHO further emphasizes that: "Based on a recent in-depth review of the scientific literature, the WHO concluded that current evidence does not confirm the existence of any health consequences from exposure to low level electromagnetic fields."

Q. Do EMF affect livestock, wildlife, crops or other plant life?

A. Many studies have been conducted in the laboratory and in the field to study the effects of EMF exposures on plants and wildlife. Research and years of operating experience have not shown that electric and magnetic fields cause any adverse effects in livestock, wildlife or plants. A group of researchers from Westinghouse Electric Co. and the Pennsylvania State University exposed more than 80 species of plants to power line electric fields at high intensities. No statistically significant differences were found between exposed and unexposed plants in seed germination, seedling emergence, seedling growth, leaf area for plant, flowering, seed production, biomass production and longevity. One response, damage to the leaf tips of sharp-pointed plants, was observed. Near the leaf tip of a sharply pointed plant, an electric field can be very high and can cause drying of the leaf tips. An extensive series of field experiments on plant responses has been carried out near 765,000-volt transmission lines and a variety of farm crops developed normally.

Q. How can a fluorescent light glow under a transmission line, even if it's not plugged into an electrical source?

A. If the electric field is sufficiently strong, it will stimulate the phosphors from the chemicals that coat the inside of the tube and cause them to glow slightly. A fluorescent tube also will glow when held near a car ignition or a radio transmitter, which typically produce enough electric field to cause a glow in a fluorescent light. Fluorescent lights sometimes can be made to glow by rubbing them with a glove or a dry hand, or by carrying them when sliding your feet across a rug.

Q. Have some states set exposure standards for EMF?
A. A few states have established limits for electric fields on transmission line right-of-ways: Florida, Minnesota, Montana, New Jersey, New York, North Dakota and Oregon. Only New York and Florida have established right-of-way limits for magnetic fields from new transmission lines. In 1990, New York established a 200-milligauss limit for transmission lines. In 1989, Florida established a 150-milligauss limit for 230,000-volt lines and smaller, and a 250-milligauss limit for 500,000-volt double-circuit transmission lines. Both the New York and Florida limits for new transmission lines were based on the maximum fields from the existing lines in those states at the time. Pennsylvania has not adopted any electric or magnetic field exposure limits.

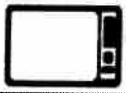
Q. What is PPL doing about EMF?
A. PPL has a magnetic field management program to design and build new lines when practicable in ways that allow us to reduce magnetic fields at low cost to our customers. For instance, we reverse the phases of new overhead double-circuit transmission lines, which results in some cancellation of magnetic fields from the line and lowers the magnetic fields at the edge of the right of way. PPL also is increasing ground clearances for transmission lines. On distribution lines, we're reducing magnetic fields at ground level by using taller poles. Magnetic field management is considered in the process we use to site new facilities, balancing cost and function with land use and environmental concerns. PPL has supported EMF research, both through financial contributions to national organizations and actual participation in research by PPL employees and customers. We're also providing information to customers and others interested in the subject. EMF coordinators have been assigned to serve as local contact points for EMF inquiries. PPL representatives are available to talk with groups interested in EMF. PPL also has an EMF issue manager who directs all aspects of the company's EMF program.

Q. Where can I get additional information on EMF?
A. PPL has an EMF coordinator near you who can provide additional technical background. Call 1-800-DIAL-PPL (1-800-342-5775), and you'll be referred to the coordinator in your area or to PPL's EMF issue manager, Jay Keeler. In addition to the NIEHS Web site http://www.niehs.nih.gov/health/topics/agents/emf/), other responsible organizations provide information about EMF, including the World Health Organization (www.who.int/peh-emf).

Magnetic field strengths decrease with distance

Magnetic fields are measured in milligauss

Source: National Institute of Environmental Health Sciences (2002)

	At 6 inches	At 1 foot	At 2 feet
Clothes dryer 	2 to 10	* to 3	*
Microwave oven 	100 to 300	1 to 200	1 to 30
Toaster 	5 to 20	* to 7	*
Power drill 	100 to 200	20 to 40	3 to 6
Can opener 	500 to 1500	40 to 300	3 to 30
Mixer 	30 to 600	5 to 100	* to 10
Hair dryer 	1 to 700	* to 70	* to 10
Color television 	Data not available	* to 20	* to 8

BROCHURE ON VEGETATION MANAGEMENT

A new approach

Transmission power lines are the backbone of the regional electric grid, vital to our economic health and nation's security.

The Northeast blackout of 2003 demonstrated how closely managed the nation's transmission system needs to be operated and maintained.

As a result, PPL Electric Utilities developed changes to its transmission vegetation management program to safeguard system reliability and to comply with recently enacted federal reliability standards. These standards assume a "zero tolerance" for tree-related outages involving transmission lines and for tree "encroachments" near the overhead high-voltage power lines.

Keeping trees away from transmission lines is essential. So the utility industry's best practices require a more proactive approach to ensuring clearance under our transmission facilities. This brochure will outline what PPL Electric Utilities must do to keep trees from causing a problem on the electric grid, so we can maintain the quality of electric service our customers expect.

Our commitment

We have a longstanding respect for the environment in how we operate as a business and in our community involvement. We respect the rights of property owners, will keep customers informed about any planned work and will perform only work that we believe is absolutely necessary.

Compliance with federal reliability standards

Under federal reliability standards, certain clearances must be maintained between overhead power lines and any vegetation. In response, PPL Electric Utilities agreed to follow an industry best practice referred to as Wire Zone-Border Zone.

While we may have only selectively pruned tall-growing trees away from the transmission lines in the past, tree species that may have been allowed in certain locations previously will be cleared so no trees are allowed to grow directly under the lines.

What is Wire Zone-Border Zone?

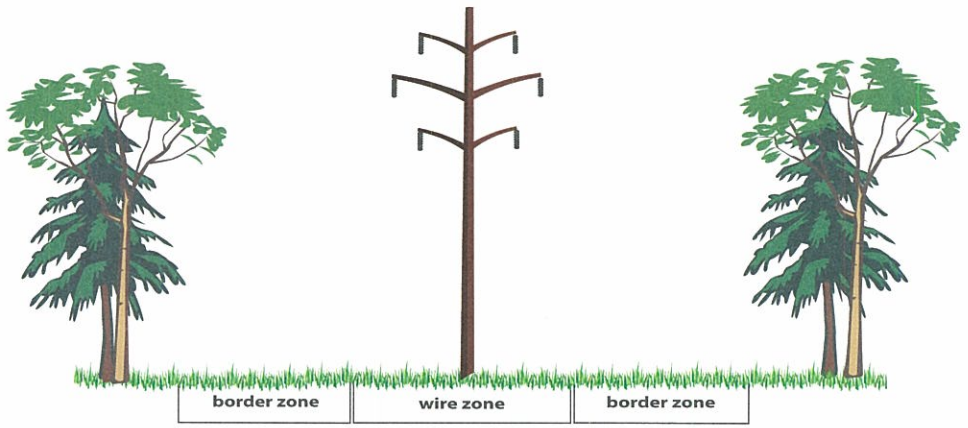
The wire zone is the area directly under the power lines. Trees are typically removed from the wire zone because they are incompatible with high-voltage wires. Over time, low-growing grasses and other species native to the area will be permitted.

In the border zone, small trees and certain shrubs will be allowed to grow back over time if they do not pose a risk to power reliability.

PPL Electric Utilities does not remove or dispose of any vegetation from transmission rights of way after cutting. These materials are left for the property owner. In some areas, like hillsides, leaving cut vegetation can protect against erosion.

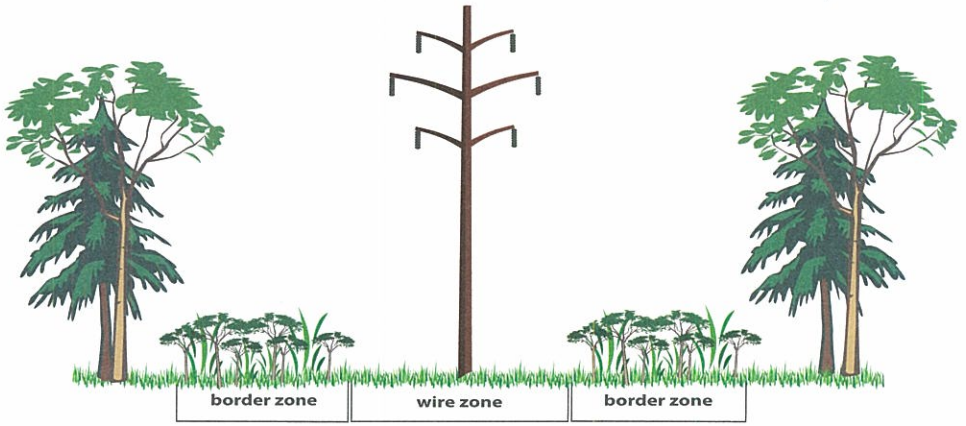
In some areas, we use herbicides to effectively manage undesirable vegetation conditions along our power lines. We only use herbicide products that have been approved for use by the U.S. Environmental Protection Agency. Some of the materials our contractors will use are the same as those commonly used by homeowners.

Property immediately after work



The wire zone extends 10 feet from the outermost wire. The border zone extends from the edge of the wire zone to the edge of our right of way. Initially, we are clearing vegetation from both zones.

Property over time



However, we will permit small trees and certain shrubs to grow back in the border zone in coming years if they do not pose a reliability risk.

An award-winning program

PPL Electric Utilities is a proud recipient of the Tree Line USA® award from the Arbor Day Foundation and the National Association of State Foresters. The groups seek to promote proper utility arboriculture and public education through the following five areas: annual worker training; quality tree care; tree planting and public education; energy conservation; and collaboration with community groups. For information about planting the right tree in the right place, visit *www.arborday.org*.

TREE LINE USA.
Arbor Day Foundation

A number of state and federal agencies have established sound integrated vegetation management practices as the standard for utility rights of way. These practices involve regular surveying, tree pruning, mowing and herbicides to control invasive plant species and promote greater plant diversity.

The desired outcome is the development of areas with native grasses and low-lying shrubs that cannot interfere with overhead power lines.

Likewise, PPL Electric Utilities works with state and local conservation, land management and environmental groups to advance common goals of electric reliability and environmental stewardship.

Vegetation management is critical to electric reliability

Our customers depend on reliable power, and vegetation management is a critical part of maintaining the reliability of our delivery system.

PPL Electric Utilities operates 1,351 miles of higher-voltage transmission lines that are considered part of the nation's "bulk electric system." Our maintenance of these power lines falls under the jurisdiction of the Federal Energy Regulatory Commission, or FERC, and its enforcement arm, the North American Electric Reliability Corporation, known as NERC. Following the massive blackout in 2003, these two authorities developed strict new reliability standards and stiff penalties for utilities that do not comply.

Transmission lines are interconnected regionally, so power can move long distances from power plants to local communities. It is vital that trees cannot pose any threat to the transmission lines. Tree contact with high-voltage lines can result in widespread power outages.

Now, PPL Electric Utilities' vegetation management program is intended to ensure reliability as well as compliance with these federal reliability standards.

For more information, call 1-877-528-2889, e-mail us at *PPLVegetationManagement@pplweb.com* or visit *www.pplweb.com/vegetation.*

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Transmission Line Vegetation Management

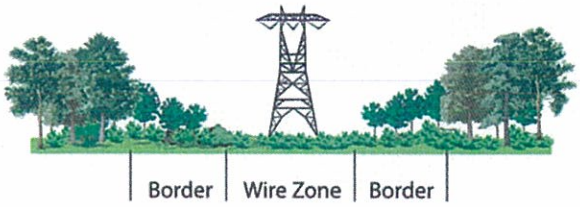
Keeping electricity reliability strong

Audubon PENNSYLVANIA

PPL Rights-of-way as Bird Habitat

Golden-winged Warbler. Photo ©Laurie Smaglick Johnson

Federal guidelines make it necessary to clear the areas under power lines (Wire Zone) in utility rights-of-way, but the area bordering the wire zone (the "Border Zone") can be planted with plants compatible with those guidelines and managed to control vegetation while providing critical habitat to birds and other wildlife. With the right plants and targeted management, Border Zones can become and remain early successional scrubland (scrub-shrub), a habitat that is important to several bird species of conservation concern in Pennsylvania and other parts of the northeast.

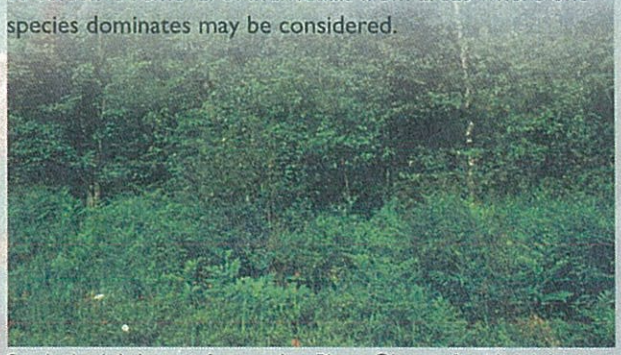


Scrub-Shrub Habitat

When an old field is left unmanaged, woody shrubs become established, which eventually give way to small trees and, ultimately, forest. Scrub-shrub or "successional" habitat refers to the middle time period when shrubs and small trees dominate. A host of bird species, including ruffed grouse, brown thrasher, eastern towhee, field sparrow, and golden-winged warbler, are dependent on these transitional habitats.

Planting and Managing Scrub-Shrub Habitat

Typically scrub-shrub habitat is only a temporary condition before conversion to forest. In areas near power lines, however, it is necessary to keep vegetation height low in perpetuity. This can be accomplished by planting compatible species and selectively removing saplings of large trees. Removing invasive plants like multiflora rose and honeysuckle will allow native shrubs (see compatible list below), which provide nutritious berries and seeds, to flourish. Habitat that includes a variety of species and heights will produce the best habitat for many bird species, so selective removal of individuals from areas where one species dominates may be considered.



Scrub-shrub habitat at forest edge. Photo ©Laurie Smaglick Johnson

Compatible Plant Species

The following list of native plants are appropriate for planting in Border Zones and provide cover and food to desirable birds and native plants noted above.

Small trees
Flowering dogwood
Redbud
Hawthorn
American Hornbeam
Serviceberry
Eastern Red Cedar
American Chestnut
Dwarf Willow
Winterberry Holly

Large shrubs
Alder
Witch-hazel
Spicebush
Common Chokecherry
Elderberry
Rhododendron
Viburnum
Dogwood
Sumac species
Chokeberry

Small shrubs
Mountain laurel
American Yew
Sweetfern
Trumpet Honeysuckle
Huckleberries
Blueberries
Viburnums
Meadowsweet (Spirea)
Wintergreen
Trailing Arbutus
Blackberry (Allegheny)
Raspberry
Hazelnut
Scrub Oak species

All native grasses, ferns, herbaceous plants

For more information, go to http://pa.audubon.org/habitat

GLOSSARY OF REAL ESTATE TERMS

GLOSSARY OF COMMON REAL ESTATE TERMS

ABSTRACT OF TITLE – The condensed history of ownership to a particular parcel of real estate, consisting of a summary of ownership from a given time to the present owner.

ACRE – A measure of land equal to 43,560 square feet.

APPRAISAL – An estimate of the value of property. The process through which conclusions of property value are reached.

APPRECIATION – An increase in the worth or value of a property.

CHAIN OF TITLE – A history of ownership of a particular property (see abstract of title).

CONDEMNATION – A judicial or administrative proceeding to exercise the power of eminent domain through which private property is taken for public use.

CONDUCTOR – The wire which carries electric energy.

CONVEYANCE – A transfer of property ownership.

DEED – A written document that, when executed and delivered, conveys title to or an interest in real estate.

DEED RESTRICTIONS – Clauses in a deed limiting the use of the property.

DEPRECIATION – A loss of value in property.

EASEMENT – A right to use the land of another for a specific purpose. (Such as a right of way for utilities.)

EGRESS – The right to exit a tract of land.

EMINENT DOMAIN – The right of a government, municipal body or public utility to acquire property for public use. (See condemnation)

ENCROACHMENT – An intrusion, such as a house, sign, wall or fence, that intrudes on another's property or right of way.

FAIR MARKET VALUE – The highest price which a willing buyer would pay and the lowest price a willing seller would accept.

FEE OR FEE SIMPLE – The complete and absolute ownership of real estate.

GRANT – The transfer of property rights through a legal document.

GRANTEE – One who acquires property or any property rights from another person.

GRANTOR – One who transfers property or any property rights to another person.

INGRESS – The right to enter a tract of land.

KV – Kilovolt or 1000 volts (138 KV = 138 x 1000)

LIEN – A claim against real or personal property for satisfaction of a debt.

METES-AND-BOUNDS DESCRIPTION – A legal description of a parcel of land that begins at a well – marked point and follows the boundaries, using directions and distances.

MONUMENT – A fixed natural or artificial object used to establish real estate boundaries.

OPTION – The right to purchase a certain property at stated terms, price and time.

RECORDING – The act of entering documents in the Recorder of Deeds office established in each county.

RIGHT OF WAY – Used interchangeably with the word easement. (See easement)

SURVEY – the process of scientifically measuring the quantity and location of a parcel of land.

TAX MAP – Maps used by the county Tax Assessment office showing the locations of properties.

TITLE – The evidence of ownership of land.

ZONING – The regulation of the use of land and/or buildings.