

Before the
Pennsylvania Public Utility Commission

**MANOR – GRACETON 230 kV
LINE RECONSTRUCTION**

**ATTACHMENTS IN SUPPORT OF THE
Letter of Notification**

Application Docket No. _____

Submitted by: PPL Electric Utilities Corporation

SUMMARY

A Letter of Notification is being 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 approval to reconstruct the single-circuit Manor – Graceton 230 kV Transmission Line. This transmission line is being reconstructed as part of PPL Electric's Vintage Conductor program that was developed to address deteriorated facilities within PPL Electric's system that were initially constructed in the mid-1920s through the 1930s. The Vintage Conductor Program is further described in Attachment 1.

The Manor – Graceton 230 kV project described in this, the first filing for the Vintage Conductor Program, will rebuild approximately 14.5 miles of the single-circuit Manor – Graceton 230 kV Transmission Line. This transmission line begins at PPL Electric's substation located in Manor Township, Lancaster County, crosses the Susquehanna River below the Safe Harbor Dam and terminates near the Maryland border. The line continues to the Graceton substation in Maryland. The portion of the line in Maryland is owned and operated by Baltimore Gas and Electric Company and is not subject to this Letter of Notification. The project will be contained on existing PPL Electric right-of-way that traverses portions of Manor Township in Lancaster County and Chanceford, Lower Chanceford, and Peach Bottom Townships in York County, PA. The proposed reconstructed line will be designed for two circuits, although only one circuit will initially be installed.

This project does not include the replacement of the existing tower in the Susquehanna River and the two spans directly above the Susquehanna River which were replaced in the early 1970s after the previous tower was damaged by ice flows. The tower located in the river and the two spans above the river will be replaced in the future when warranted. To maintain system operational requirements, one of the existing overhead ground wires on the two spans over the Susquehanna River will be replaced with fiber optic overhead ground wire.

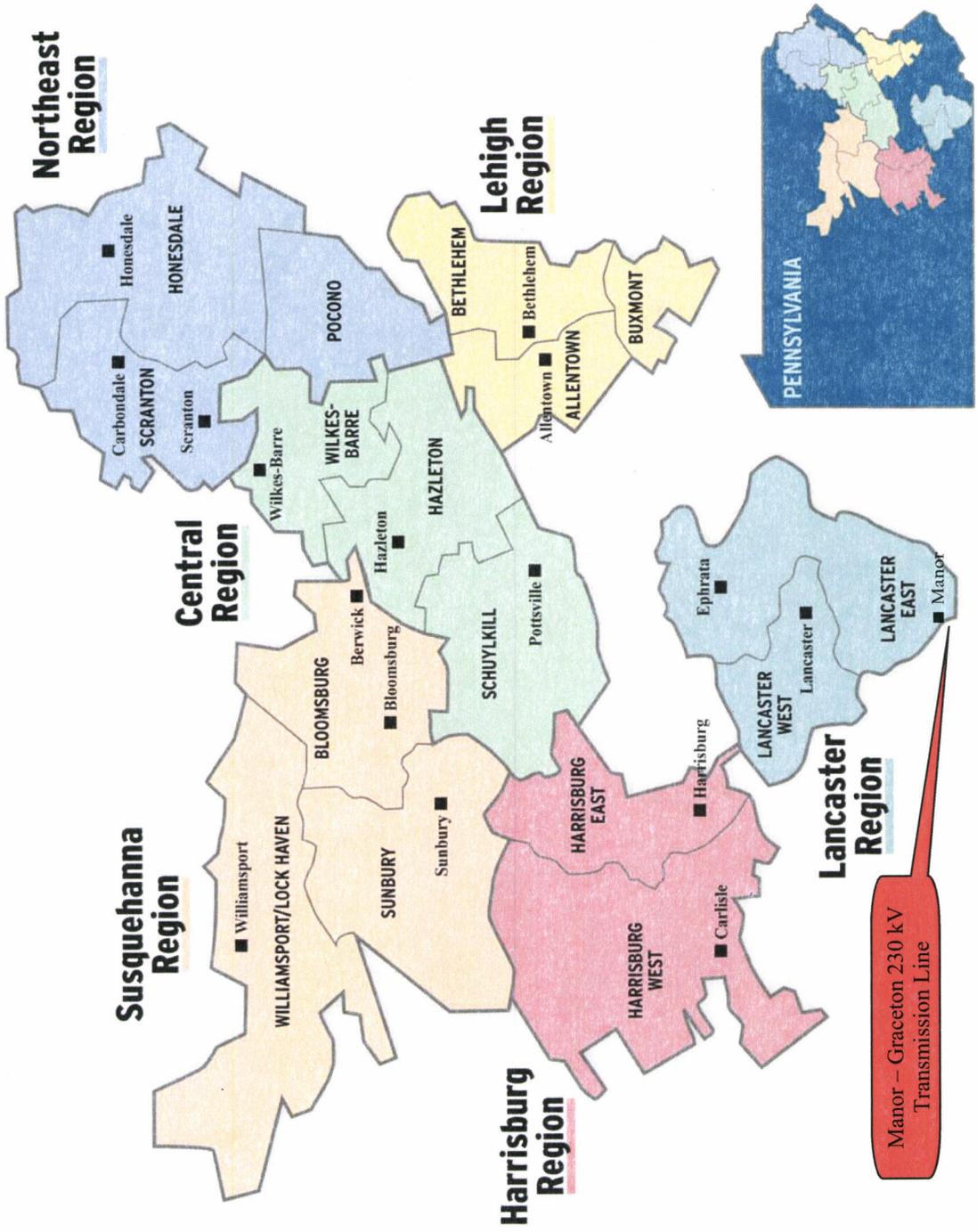
The reconstruction of this transmission line will include the removal of the existing lattice towers and conductors which will be replaced with new single shaft steel poles and new conductors. No new right-of-way will be required because the proposed line will be rebuilt within the existing right-of-way between the Manor Substation and the last tower in Pennsylvania. Due to the deteriorated condition of the Manor – Graceton transmission line and towers, PPL Electric is expeditiously moving forward with this project before failure of this line occurs.

The total estimated cost of the proposed transmission work is approximately \$22,722,216. This project has a scheduled construction start date of September 2011, in order to meet an in-service date of November 2012.

This document, which describes the need for the project and explains the engineering and siting analysis for the proposed construction, consists of the following:

Attachment “1”	Necessity Statement
Attachment “2”	Engineering Description
Attachment “3”	Siting Analysis and Environmental Assessment
Attachment “4”	PPL Electric Design Criteria and Safety Practices
Attachment “5”	PPL Electric Magnetic Field Management Program
Attachment “6”	List of Involved Governmental Agencies, Municipalities
Attachment “7”	List of Property Owners within the Right-of-Way
Attachment “8”	Environmental Inventory Guidelines
Attachment “9”	Land Use and Comprehensive Plan Assessment
Attachment “10”	Historic Architectural and Archeological Sites
Attachment “11”	References

PPL ELECTRIC UTILITIES SERVICE TERRITORY



Attachment 1

ATTACHMENT "1"
MANOR – GRACETON 230 kV TRANSMISSION LINE
NECESSITY STATEMENT

TABLE OF CONTENTS

<u>SECTION</u>	<u>TOPIC</u>	<u>PAGE</u>
A.	INTRODUCTION.....	1
B.	OVERVIEW OF VINTAGE CONDUCTOR PROGRAM.....	2
C.	PROPOSED SOLUTION.....	5

LIST OF TABLES

TABLE 1	VINTAGE CONDUCTOR PROGRAM.....	4
TABLE 2	PPL ELECTRIC COST ANALYSIS OF REBUILD VS REHABILITATION.....	6

ATTACHMENT "1"
MANOR – GRACETON 230 kV TRANSMISSION LINE
NECESSITY STATEMENT

A. INTRODUCTION

PPL Electric is requesting PUC approval to rebuild the seventy-three (73) year-old Manor-Graceton 230 kV Transmission Line. This transmission line begins at the Manor substation located in Manor Township, Lancaster County, crosses the Susquehanna River below the Safe Harbor Dam, and crosses the Maryland border where ownership changes from PPL Electric to Baltimore Gas and Electric (BG&E). This proposed project is part of PPL Electric's Vintage Conductor Program (described in detail below) that was developed to address deteriorated facilities in PPL Electric's transmission system. The proposed project will be designed to accommodate double circuit 230 kV operation. However, it will be initially constructed and operated for a single 230 kV circuit. As explained in detail below, reconstruction of the transmission line is required to maintain system reliability.

The estimated cost to design and rebuild the transmission line is \$22,722,216. Construction is scheduled to begin in September 2011 to support the in-service date of June 2012.

A PPL Electric system map showing the existing transmission facilities with design voltage of 35 kV or greater is included in the Attachment "1" map pocket. Although this Necessity Statement provides a broad discussion of the Vintage Conductor Program, this filing addresses only the portion of the Manor - Graceton Transmission Line located between the Manor Substation and the tower on the east side of the Susquehanna River and the section between the tower on the west side of the Susquehanna River and the last tower in Pennsylvania. The two spans directly above the Susquehanna River and the lattice tower located on an island in the Susquehanna River will not be rebuilt as part of this project because the island tower is in better condition¹ than the remaining sections of the transmission line.

B. OVERVIEW OF VINTAGE CONDUCTOR PROGRAM

The PPL Electric transmission system includes multiple 230 kV line segments that are approximately 80 years old. These line segments were installed in the mid-1920s through the 1930s. Lines that operate at 230 kV are part of the bulk electric system. These lines serve as major pathways for the flow of large amounts of electrical power: (a) from one bulk substation or switchyard to other bulk stations within the electric utility's territory, or (b) between one electric utility and another (tie line). At the bulk substations, that power is transformed to lower voltage levels for delivery to residential, commercial, or industrial customers. PPL Electric owns approximately 1,000 miles of transmission lines that operate at 230 kV. The Manor – Graceton Transmission Line connects the PPL Electric territory with the BG&E territory in Maryland, and is one of multiple outlets for the generation facilities located along the lower Susquehanna River.

As a result of a review process, PPL Electric's Transmission Engineering group informed the Transmission Planning group of the deteriorated facilities existing on the 230 kV line located between the Bushkill 230 kV switchyard and Wallenpaupack hydroelectric plant. Transmission Engineering subsequently identified other 230 kV lines dating to the same construction era with similarly designed structures and conductor². Those conversations between the Planning and Engineering groups resulted in the identification of eleven line segments that contained aged and deteriorated facilities. Those segments, totaling approximately 140 miles, were grouped into a program that PPL Electric has referred to as the Vintage Conductor Program. The process of identifying aged and deteriorated facilities is on-going. Three more line segments have been identified for further analysis.

In 1983, PPL Electric tested a portion of this "vintage conductor" – specifically those line segments located between the Wallenpaupack, Blooming Grove, Bushkill, and Siegfried electric stations. At the time of this testing, the steel core of the "795" conductor was showing deterioration, but the greatest concern to PPL Electric personnel was the deterioration occurring at the conductor splices.

¹ River structure and the two adjacent spans were rebuilt in the late 1970s after ice floes on the river toppled the previous tower.

² 795 thousand circular mils (kcmil), aluminum conductor steel reinforced (ACSR), 54/7 stranding, and variations of that stranding.

Consequently, most splices in the line between Wallenpaupack and Siegfried stations were replaced. Based upon Transmission Engineering judgment, the line conductor was expected to last another 10 to 15 years. That time frame has been exceeded, and no follow up examination or similar major repair work has been performed on the other segments. PPL Electric, however, has and continues to perform aerial inspections of these facilities on average every four years. Specific maintenance tasks are identified from this inspection and PPL Electric prioritizes, schedules, and completes these tasks in a timely manner.

In early 2010, PPL Electric hired an outside engineering consultant³ to perform an independent field investigation and assessment of the line segments⁴.

The engineering consultant reported on the degree of deterioration of the structural components, foundations, insulators, line hardware, shield wire, grounding, signage, paint, and galvanizing. The state of right-of-way encroachment and adjacent land features were also reported.

Other than the removal and examination (laboratory and visual) of the loop and insulator string used to connect two spans of conductor at tension towers, from four of the eleven line segments, overhead line conductor was not examined or tested to determine its physical condition or its tensile strength. Tensile strength testing would have required a line outage in order to physically remove multiple samples from the span (i.e.; conductor located between two adjacent towers) at numerous locations along the identified line segments. Furthermore, an examination of the conductor would be an unnecessary initial step if the other tower-line components (i.e.; structures, foundations, etc.) were found to be significantly deteriorated, as was expected from the findings in 1983. Sampling of overhead conductor will only be initiated if deteriorated tower-line components can be remedied by rehabilitation. The independent external engineering consultant, DiGioia Gray & Associates, identified a statistically significant number of structures for each line segment. The identified structures, and associated foundations and associated line

³ DiGioia Gray & Associates; Monroeville, PA 15146

⁴ Two of the line sections, specifically the Bushkill – Blooming Grove and Blooming Grove – Wallenpaupack line segments, were excluded from the field investigation performed by the engineering consultant because those segments are to be completely rebuilt as part of the proposed Susquehanna – Roseland 500 kV line project. A recent Pa PUC decision approved the Susquehanna – Roseland project and associated rebuilding of these two line segments. Appeals from that decision are pending.

equipment, were then inspected in the field by DiGioia Gray & Associates. Results of the evaluations were summarized in line-specific assessment reports.

Based upon the issues that were identified in 1983 and the recent findings of the independent external engineering consultant, these identified line segments are now at an increased exposure to failing, thus creating a safety concern for both the public and PPL Electric field personnel. Further, if this issue is left unresolved, the potential for degradation in grid reliability will exist due to an increased risk to line equipment outages. Therefore, a program to systematically upgrade these line segments is required and the Vintage Conductor Program has been established to perform the upgrades.

The original nine segments included in the Vintage Conductor Program, which total approximately 90 miles, and the two projects that are included in the Susquehanna-Roseland 500 kV project are identified in Table 1. Review of PPL Electric’s transmission system to determine whether additional segments need to be replaced is on-going.

**Table 1
Vintage Conductor Program**

Super Project No.	Project Name / Line Segment	Line Segment Miles	Original In-Service Date
9056	Manor – Graceton	14.52	1937
9057	Otter Creek – Conastone	11.98	1933
9054	Martins Creek – Siegfried # 2	10.69	1926
9049	Hosensack – Wescosville # 3	9.76	1928
9053	Whitpain – Buxmont	7.72	1928
9050	Shawnee – Bushkill	2.20	1926
9051	Fox Hill – Shawnee	8.27	1926
9052	Martins Creek – Monroe	16.14	1926
9055	Hummelstown – Middletown Junction # 1	7.00	1954
N/A	Bushkill – Blooming Grove (note 1)	21.80	1926
N/A	Blooming Grove – Wallenpaupack (note 1)	29.40	1926

N/A – not applicable.

(note 1) – Line segments to be upgraded as part of the Susquehanna-Roseland 500 kV Line project.

C. PROPOSED SOLUTION

Permanent removal of the Manor – Graceton line from service would weaken the 230 kV system in southern Pennsylvania. When the line is temporarily removed from service to perform line maintenance, an unplanned outage of any nearby 230 kV line would cause the remaining lines in the Manor, Otter Creek, and Brunner Island area to become overloaded. Abandonment of the Manor – Graceton line is not an option.

The PPL Electric Transmission Planning and Transmission Engineering groups stated their objectives for resolving the deteriorated equipment issue in a PPL Electric document on “vintage conductor” recommendations, dated October 19, 2009. That document contains a description of and background on the program, along with recommendations and desired outcomes. PPL Electric contracted with an outside engineering consultant experienced in transmission structure inspection, and the detailed findings and conclusions of those field inspections on the nine line segments are summarized in its 2010 Condition Assessment Reports.

Technical solutions to resolving the deteriorated components inherent to the “vintage conductor” line segments would be to either:

- (a) rehabilitate the components (i.e.; structures, foundations, conductor, insulators, and line hardware), or,
- (b) completely rebuild those line segments.

PPL Electric prepared a cost analysis and determined that a complete rebuild of the Manor – Graceton Transmission Line was a cheaper alternative than rehabilitation. Specifically, the PPL Electric cost analysis summarized in Table 2 concluded that rehabilitation costs would be 101 percent of the total rebuild cost for a given line segment.

**Table 2
PPL Electric Cost Analysis of Rebuild vs. Rehabilitation**

Scope	Labor & Material Cost (x 1000)		Ratio of Costs; Rehabilitation to Rebuild
	Rebuild	Rehabilitation	Percent
Labor and materials related to structures, foundations, insulators, line hardware and paint.	\$10,054	\$10,340	1.03
Common elements (includes labor and materials related to conductor, design and engineering, project management, acquisition of additional right-of-way, permitting, siting, PUC certification, environmental, and general overhead costs).	\$12,668	\$12,668	1.00
Total	\$22,722	\$23,008	1.01

In addition, Burns & McDonnell (B&McD) prepared a cost evaluation on an individual line segment basis and compared rehabilitation of conductor, structures, foundations, and associated line equipment against a complete rebuild. The results of the B&McD evaluation for the Manor – Graceton line were consistent with the PPL cost evaluation.

The independent external engineering consultant, DiGioia Gray & Associates, also stated the following with regard to the Manor – Graceton line:

“Given that eight of fourteen structures inspected have severe foundation conditions, we do not advise that this line be rehabilitated. Repairing the majority of structures for severe section loss at the base plate and at ground line is not economically feasible and would result in a reliability index significantly lower than a newly constructed transmission line.”

To further support the decision to completely rebuild rather than rehabilitate the Manor – Graceton Transmission Line, the following issues were also considered:

- Bent or missing steel components on the existing towers would require removal and/or replacement, or the installation of additional bracing, to correct the structural deficiency.

Depending on the number of crews assigned to the project, that work will either be one tower at a time, or multiple towers grouped together for the repair work. On the other hand, the rebuild option will require only the erection of a single monopole structure after a new single concrete foundation has been poured and cured.

- All insulator sets at the top of each tower should be replaced because of their age, the condition of the insulating material within the insulator, and the heavy contamination with pollutants from long-term exposure.
- Line hardware and related attachment steel on each tower should be removed and replaced, because of the wear on the material at the connecting points. Metal against metal degradation was observed during the field inspections.
- Splices in the conductor would likely be replaced, due to the age, older design, and early manufacturing processes that were used to make these devices in the 1920s and 1930s.
- Conductor should be replaced based on its age.
- To meet current standards, grounding at each structure or tower leg would require upgrading by adding counterpoise.
- The overhead shield wires would require replacement due to age and condition of the material, and possible repositioning in order to bring the tower-line structure up to current lightning standards. In its assessment reports, the independent external engineering consultant notes that some line segments do not have the appropriate shielding angle, which makes the tower-line more susceptible to lightning strikes.

In addition to the economic advantage gained from choosing a complete rebuild of the line segments, PPL Electric will experience technical, safety, and environmental benefits that would not exist if the rehabilitation option is chosen. Those benefits are discussed in more detail, below.

For example, rebuilding a line segment will result in a new structure that is capable of supporting an initial single-circuit line that would meet current NESC safety standards with regard to mechanical loading, including improved clearances above the ground. The new structures will enable PPL Electric to attain its modern magnetic field policy and will improve the magnetic field values within and at the edge of the right-of-way. The new structure will have an expected life that will exceed that of a reconditioned structure.

The initial line design, when using new structures, will allow for the future installation of a second circuit, ultimately providing a double-circuit capability on the same right-of-way footprint that the existing “vintage conductor” now occupies. Designing for ultimately two circuits on the same transmission line right-of-way maximizes the use of that right-of-way, and minimizes the impact of the rebuilt tower-line on the environment now and in the future, and is an economical method to allow for future expansion of the transmission system. Planning now for a future double-circuit line eliminates the need for new right-of-way at a future date, and minimizes or even mitigates future tree clearing for that second circuit. Future double-circuit design also has the potential to employ “reverse phasing,” which would further reduce the EMF levels. The identified line segments (Table 1) now exist as single-circuit designs, and have no capability to be converted to future double-circuit operation.

Furthermore, each new single circuit line will be designed to use 1590 kcmil ACSR conductor instead of the existing 795 kcmil ACSR. As stated in the PPL Electric “Reliability Principles and Practices (RP&P) document, the larger-sized conductor is standard for new 230 kV line construction. The 1590 kcmil ACSR conductor will provide an ampacity of 653 MVA summer normal, instead of the 425 MVA ampacity of the deteriorated line. While line loadings today on these deteriorated segments are not the driver for the Vintage Conductor Program, as the regional loads on the 230 kV electrical network grow over time, the rebuilt line segments will have the capability to support greater electrical loads because of the proposed upgrade.

The larger-sized conductor also will reduce system losses when compared to the existing smaller conductor and may reduce system constraint on power flows.

The existing structures are not capable of supporting 1590 kcmil ACSR without additional reinforcement. Using a smaller sized conductor, such as is currently on the tower-line, would place PPL Electric in the position of spending substantial dollars to repair a 230 kV line that will not meet current PPL Electric design practices nor be capable of supporting future load growth in that line corridor.

If PPL Electric elected to use a rehabilitation option for the Manor – Graceton Transmission Line that the independent external engineering consultant identified as being in a state of severe or poor condition, that option will require longer construction periods to perform the numerous repairs on a tower by tower basis. Most of the structures on these “vintage conductor” line segments have four foundations (steel lattice tower). Where major foundation repairs are required, the individual tower will require temporary structural support while each foundation is replaced. One or more towers likely would be grouped together for foundation repair work. A period of weeks will need to pass as the old concrete is removed and new concrete is placed and cured prior to placing the mechanical load back onto the new foundations. Foundation replacement would impede the speed at which crews move onto the next series of structures and associated foundations. This method of foundation repair under a rehabilitation option would prolong the construction period significantly as compared to a rebuild option which completely removes the existing line and structures and installs new foundations and monopoles in the existing right-of-way.

Furthermore, today, in the rebuilding or reconductoring of lines, PPL Electric installs optical ground wire (i.e.; OPGW or “fiber”) instead of steel ground wire. Non-conductive strands of optical fiber material are surrounded by one or more layers of steel and/or aluminum wire to create the OPGW. This design change is employed so that protective relay schemes do not depend on less reliable hard-wired telephone circuits, or on power line carrier equipment that uses the line conductors for the communication path. The OPGW provides that relaying and communication path with improved reliability.

Extensive rehabilitation, as described above, is similar to taking a 1920s refrigerator, replacing the original components with new equipment, and then expecting the refrigerator to perform like

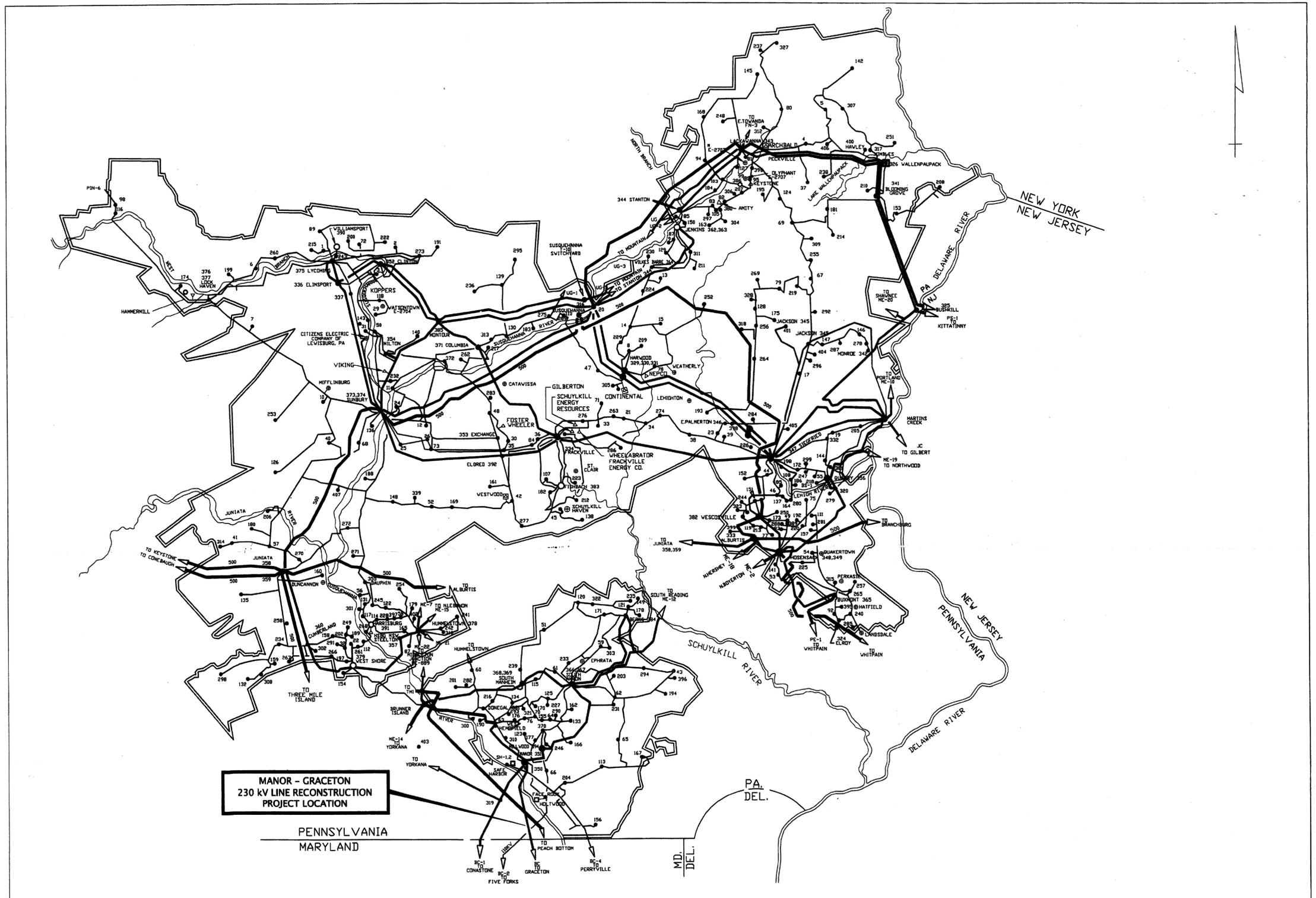
a newly manufactured product – but at an upgrade cost nearly equal to or even more than the cost of a new refrigerator.

The completion date for each specific Vintage Conductor Program will be coordinated with the timing of the overall Asset Optimization Strategy (AOS) program, which is scheduled to conclude by 2020. Because of the physical condition of the Manor – Graceton line segment, its in-service date has been established as June 2012. The in-service date of 2012 enables PPL Electric to budget, acquire resources, and schedule the Manor – Graceton line segment among the other line segments that also require rebuilding.

SUBSTATION LISTING

1	WEST WILLIAMSPORT	151	CRACKERSPORT	301	CENTER CITY
2	FAIRFIELD	152	SCHNECKSVILLE	302	NEW KINGSTOWN
3	MONTGOMERY	153	HEMLECK	303	REAMSTOWN
4	VARDEN	154	MT. ALLEN	304	DUPONT
5	HONE DALE	155	PRINCE	305	HUMBOLDT
6	JERSEY SHORE	156	WAKEFIELD	306	CEDAR AVE.
7	LOGANTON	157	COOPERSBURG	307	INDIAN ORCHARD
8	VALMONT	158	VERTZVILLE	308	NOTTINGHAM
9	RIVER	159	N. BETHLEHEM	309	NORTH COOLBAUGH
10	LIMESTONE	160	BENVENUE	310	LETORT
11	NORTHUMBERLAND	161	HEGINS	311	EAST MOUNTAIN
12	REED	162	LEDA	312	JERMYN
13	WRIGHT	163	YATESVILLE	313	BLOOMSBURG
14	ST. JOHNS	164	CENTRAL ALLENTOWN	314	MIFFLINTOWN
15	FREELAND	165	DBERLIN	315	RIDGE ROAD
16	GILBERT	166	STRASBURG	316	SUSQUEHANNA
17	*	167	ATGLEN	317	T-10 SW. YD.
18	*	168	BROOKSIDE	318	KIMBES
19	CHERRY HILL	169	VILLIAMSTOWN	319	CHRISTMANS
20	SUSQUEHANNA 230KV	170	E. PETERSBURG	320	OTTIE CREEK
21	TAMANEND	171	VERNERSVILLE	321	STEVEN CITY
22	WHITE HILL	172	N. BETHLEHEM	322	ROBESONIA
23	PALMERTON	173	V. ALLENTOWN	323	SFOGELSVILLE
24	HAMILTON	174	FLEMINGTON	324	ELROY
25	HUNTER	175	NECKESVILLE	325	BUSHKILL
26	FAIRVIEW	176	DONERSVILLE	326	WALLENPAUPACK
27	*	177	MILLERSVILLE	327	ELK MOUNTAIN
28	*	178	SHILLINGTON	328	JACK FRIST
29	MONTOUR PUMP	179	MCALLISTERVILLE	329	HARWOOD 230/69KV
30	MT. CARMEL	180	NEWFOUNDLAND	330	HARWOOD CTG
31	KELL	181	WEST BERWICK	331	HARWOOD 69/12KV
32	SPRING HILL	182	KEYSER AVENUE	332	NAZARETH
33	MAHANY CITY	183	MOCKEYS	333	ALBURTIS
34	GREENWOOD	184	EAST ALLENTOWN	334	FRACKVILLE
35	MOHAWY	185	PIKE RIDGE	335	*
36	ALTA MOUNT	186	DALMATIA	336	ELMSPORT
37	HAMLIN	187	NORTH COLUMBIA	337	ALLENWOOD
38	SHIPLEY	188	HUGHESVILLE	338	*
39	SOUTH SLATINGTON	189	SOUTH ALLENTOWN	339	GRATZ
40	SOUTH MIDDLEBURG	190	WEISSPORT	340	HOCKERSVILLE
41	WALKER	191	HONEYBROOK	341	BLOOMING GROVE
42	FRILEY	192	MONROE	342	MONROE
43	MORGANTOWN	193	ROSSMOYNE	343	LACKAWANNA #
44	EGYPT	194	NORTHAMPTON	344	STANTON
45	CRESSONA	195	WOLDRICH	345	JACKSON
46	SOUTH WHITEHALL	196	FAXON	346	EAST PALMERTON
47	EAST TOMPHICKEN	197	ENGLA	347	SIEGFRIED
48	BEAR GAP	198	TERRE HILL	348	HOSENSACK 230/69KV
49	SALISBURY	199	BUCK	349	HOSENSACK 500KV
50	SOUTH MILTON	200	MACADA	350	CONE STODGA
51	HEIDELBERG	201	MACADA	351	MANDR
52	LYKES	202	SCRANTON	352	CLINTON
53	UPPER HANDOVER	203	TWIN LAKES	353	EXCHANGE
54	RICHLAND	204	HARLEIGH	354	MILTON
55	MACADA	205	TAPTON	355	DALPHIN
56	ROCKVILLE	206	BEAR CREEK	356	QUARRY SUB.
57	THOMPSONTOWN	207	DRWIGSBURG	357	STEELTON
58	PAXTON	208	EAST TEXAS	358	JUNIATA 500/230KV
59	COCALCO	209	CANDENSIS	359	JUNIATA 230/69KV
60	EAST ELIZABETHTOWN	210	KINZIER	360	CUMBERLAND
61	WARWICK	211	LINDEN	361	DONEGAL
62	EARLY	212	WEST BLOOMSBURG	362	JENKINS 230/69KV
63	HEMPFIELD	213	MT. JOY	363	JENKINS CTG
64	EAST LANCASTER	214	MINI TRAIL	364	WILKES-BARRE
65	EAST LANCASTER	215	LAKE NAOMI	365	BUXMONT
66	MT. NEBO	216	LANARK	366	SOUTH AKRON 230/138/69KV
67	MT. POCONO	217	MONTOURSVILLE	367	SOUTH AKRON 69/12KV
68	PENAS	218	PORT CARBON	368	SOUTH MANHEIM 69/12KV
69	COULDSBORO	219	BLITHEBURN	369	SOUTH MANHEIM 230/69KV
70	DILLERVILLE	220	MILFORD	370	ENGLISIDE
71	GIRARD MANOR	221	TREICHLERS	371	COLUMBIA
72	KENMAR	222	ROSEVILLE	372	DANVILLE
73	GOWEN CITY	223	RUTHERFORD	373	SUNBURY
74	*	224	HARTLAND	374	HUMMEL'S WHARF
75	ELLIOT HEIGHTS	225	COLUMBIA	375	LYCOMING
76	ROHRERSTOWN	226	DANVILLE	376	LOCK HAVEN CTG
77	MACUNGIE	227	POINT	377	LOCK HAVEN 69/12KV
78	EAST HAZLETON	228	MIDDLETON	378	HUMMELSTOWN
79	WAGNERS	229	MILKVILLE	379	WEST SHORE
80	EVYND	230	TIMBER	380	MONTAGE
81	MINDOKA	231	LAKEVILLE	381	SOUTH FARMERSVILLE
82	DLD FORGE	232	NORTH MANHEIM	382	WESCOVILLE
83	FOUNTAIN SPRINGS	233	HATFIELD	383	FISHBACH
84	SULLIVAN TRAIL	234	HERSHEY	384	BERKS
85	S VATARA	235	S. HERSHEY	385	MONTOUR
86	*	236	S. WILLIAMSPORT	386	SUBURBAN YARD
87	HEPBURN	237	FOGELSVILLE	387	*
88	*	238	WINDSOR	388	*
89	*	239	W. WILLOW	389	MACK
90	FRANCONIA	240	WESTGATE	390	WILLIAMSPORT
91	EMMAUS	241	EDELA	391	HARRISBURG
92	MERIAN	242	SUMMERDALE	392	ELDRED
93	THROOP	243	DORNEYVILLE	393	*
94	*	244	BOHEMIA	394	MILLWOOD
95	*	245	WHITE HAVEN	395	TELFORD
96	*	246	LINGLESTOWN	396	TWIN VALLEY
97	CASS	247	POCONO FARMS	397	DEVONSHIRE
98	CATAWAQUA	248	HICKORY RUN	398	BELTZVILLE
99	*	249	BLOOMING GLEN	399	SCHONECK
100	SUSQUEHANNA 500KV	250	SHERMANS DALE	400	HAWLEY
101	SEIDERSVILLE	251	MUNCI	401	EFFORT MOUNTAIN
102	ROSEMONT	252	HARRYS CREEK	402	COPPERSTONE
103	QUARRYVILLE	253	SPANGLER MILLS	403	RED FRONT
104	LAWNTON	254	E. DANVILLE	404	APPENZELL
105	LITITZ	255	DELAND	405	BLUE MOUNTAIN
106	RENOVO	256	CARBON	406	DAPPERS 69-12KV
107	WALNUT	257	SELLERSVILLE	407	MEISERSVILLE
108	WATSON	258	MECHANICSBURG		
109	TREXLETTOWN	259	CARLISLE		
110	LAVINE	260	CEDAR		
111	SPRING	261	ARROWHEAD		
112	COLONIAL PARK	262	NEWPORT		
113	WEST LANCASTER	263	MILFAX		
114	MADISONVILLE	264	MILLERSBURG		
115	NEFFSVILLE	265	MUNDI		
116	BEAVERTOWN	266	HAUTO		
117	BELMONT	267	BERWICK		
118	LAKE HARMONY	268	SHENANDOAH		
119	GEORGETOWN	269	PINE GROVE		
120	SCOTT	270	STROUDSBURG		
121	N. HARRISBURG	271	FREEMANSBURG		
122	MOUNT ROCK	272	ALLENTOWN		
123	GREENLAND	273	BINGEN		
124	LANDISVILLE	274	RHEIMS		
125	GREEN PARK	275	CLEVELAND		
126	SELINSGRÖVE	276	LITTLE GAP		
127	SUNNER	277	DRVILLA		
128	AUBURN	278	TUSCARORA		
129	REHRSBURG	279	BARTONSVILLE		
130	DERY	280	ALTON PARK		
131	WEST GREENVILLE	281	SALEM		
132	GREEN DAMASCUS	282	NORTH BRIDGEPORT		
133	NEW COLUMBIA	283	HAMPDEN		
134	FARMERSVILLE	284	CAMEL BACK		
135	GREENFIELD	285	SILVER SPRING		
136	NORTH STROUDSBURG	286	BRECKNOCK		
137	TANNERSVILLE	287	MCNIDON		
138	ELIZABETHVILLE	288	MCMICHAELS		
139	WYOMISSING	289	HUGHSTOWN		
140	EXETER	290	NEWVILLE		
141		291	PAINTED NORTH		
142		292	HARRIETTA		

* - SUBSTATIONS THAT HAVE BEEN RETIRED.
 ## - SITE OF THE EXISTING 230KV SUBSTATION AND PROPOSED 500KV SUBSTATION



**MANOR - GRACETON
 230 kV LINE RECONSTRUCTION
 PROJECT LOCATION**

INTERCONNECTIONS

- PS PUBLIC SERVICE ELECTRIC AND GAS CO. OF N.J.
- PE METROPOLITAN EDISON CO. (FIRST ENERGY)
- PE PHILADELPHIA ELECTRIC CO. (PECO ENERGY)
- BC BALTIMORE GAS AND ELECTRIC CO.
- SH SAFE HARBOR WATER POWER CORPORATION
- UP THE UNITED GAS IMPROVEMENT CO. - LUZERNE ELECTRIC DIVISION
- PN PENNSYLVANIA ELECTRIC CO. (FIRST ENERGY)
- JC JERSEY CENTRAL POWER AND LIGHT CO. (FIRST ENERGY)

- COMBUSTION TURBINE
- HYDRO ELECTRIC
- COMBINATION
- FIRM SALES
- SUBSTATION / SWITCHING STATION
- STEAM ELECTRIC
- NON-UTILITY GENERATION
- INDEPENDENT POWER PRODUCERS

- 500KV OPERATION
- 230KV OPERATION
- 138KV OPERATION
- 69KV OPERATION

ACCT - 805201	ELECTRICAL SYSTEM MAP		
SCALE - NONE	MANOR - GRACETON 230KV LINE		
BY - CDW	LINE RECONSTRUCTION		
REVIEWED	APPROVED G. HAKUN III	DATE 7/17/85	PPL ELECTRIC UTILITIES
REVIEWED	PPL DRAWING NO.	SHEET NO.	REV.
	D191830		1 76
	BY	REVIEWED	APPROVED
	#6000	LOCATION CODES	PLAN & PROFILE NO.
			TRANSMISSION MAP NO.
			SQRTS.

PPL E.U. FORM 4877 (7/80)

D191830_5001.DWG

Attachment 2

ATTACHMENT “2”
MANOR – GRACETON 230 kV TRANSMISSION LINE
ENGINEERING DESCRIPTION

TABLE OF CONTENTS

<u>SECTION</u>	<u>TOPIC</u>	<u>PAGE</u>
A.	DESCRIPTION OF PROPOSED LINE	1
B.	MAGNETIC FIELD MANAGEMENT.....	3
C.	RIGHT-OF-WAY STATUS.....	4

LIST OF TABLES

TABLE 1	DESIGN MINIMUM CONDUCTOR CLEARANCES.....	3
TABLE 2	CONDUCTOR THERMAL RATINGS	3

LIST OF FIGURES

FIGURE 1	PROPOSED 230 kV SINGLE CIRCUIT TANGENT STRUCTURE.....	5
FIGURE 2	PROPOSED 230 kV ANGLE STRUCTURE.....	6
FIGURE 3	PROPOSED 230 kV DOUBLE CIRCUIT TANGENT STRUCTURE.....	7
FIGURE 4	PROPOSED 230 kV DOUBLE CIRCUIT ANGLE STRUCTURE.....	8

LIST OF MAPS

AERIAL EXHIBITS

ATTACHMENT “2” MAP POCKETS

ATTACHMENT “2”
MANOR – GRACETON 230 kV TRANSMISSION LINE
ENGINEERING DESCRIPTION

A. PROPOSED LINE DESIGN

PPL Electric proposes to rebuild 14.5 miles of the Manor – Graceton 230 kV Transmission Line. This transmission line begins at the Manor Substation located in Manor Township, Lancaster County, crosses the Susquehanna River below the Safe Harbor Dam and terminates at the Maryland border. The section of the line to be rebuilt traverses a portion of Manor Township in Lancaster County and Chanceford, Lower Chanceford and Peach Bottom Townships in York County. This project includes the reconstruction of the entire transmission line from Manor Substation to the Pennsylvania – Maryland state line with the exception of the two spans located above the Susquehanna River and the lattice tower on an island within the Susquehanna River. The existing tower on the island and the conductors above the river will not be replaced since they were previously replaced in the 1970s after the previous lattice tower failed after being damaged during an ice floe. However, one overhead ground wire located above the river will be replaced during this project. A dead end transition structure will be constructed at the demarcation point on the Pennsylvania side of the state border to transition the new vertical arrangement to the existing horizontal arrangement. The remaining portion of the existing transmission line located south of the dead end structure is Baltimore Gas and Electric Company’s (BG&E) responsibility.

As previously discussed in Attachment “1,” this project is part of PPL Electric’s Vintage Conductor Program that was developed to address aged, deteriorated facilities. This project involves the removal of the existing transmission line, including the steel lattice towers and conductors, which was built in 1937. The existing single circuit 230 kV transmission line is supported by lattice towers with an average height of approximately 85 feet and average span of approximately 1,100 feet. The proposed rebuilt transmission line will be designed to accommodate a future 230 kV double circuit; however, it will be initially constructed and operated with a single circuit. The proposed new transmission line will mostly consist of single-shaft steel poles equipped with upswept steel arms (Figure 1). Angle structures may consist of

single, two- or three-pole structures depending on the severity of the angle (Figure 2). Initially, only one to two poles on the multiple pole angle structures will be installed to accommodate single circuit operation. The additional poles will be installed only when a second circuit is added to the line.

All poles will be installed on concrete foundations. Additionally, some angle structures may be guyed. Altogether, this project requires the installation of approximately 70 structures with an average height of 145 feet. The average span length will be 1,100 feet. It is PPL Electric's intention to place the new poles adjacent to the existing lattice towers along the centerline of the right-of-way. However, to reduce environmental impacts, the location of some poles may be shifted or adjusted.

The rebuilt transmission line will be designed to meet, and generally exceed, National Electrical Safety Code ("NESC") minimum standards. Additional design criteria and safety rules practiced by PPL Electric are included in Attachment "4." Three power conductors and one optical ground wire (OPGW) will initially be installed (single circuit operation initially). The power conductors will be 1590 KCMIL 45/7 stranding ACSR. The OPGW will be 0.752-inch diameter OPGW with 48 single mode fibers. When a second circuit is installed in the future, there will be three additional conductors and an overhead shield wire which will consist of ½-inch extra high-strength steel.

The minimum conductor-to-ground clearance will be 32 feet for the rebuilt transmission line. This minimum clearance occurs at a maximum thermal conductor temperature of 125°C. Table 1 shows the designed minimum conductor clearances and Table 2 shows the conductor thermal ratings of the proposed transmission line.

TABLE 1
DESIGN MINIMUM CONDUCTOR CLEARANCES
FOR 1590 KCMIL 45/7 STRAND ACSR¹

<u>Condition</u>	<u>Single-circuit Design Clearance-to-Ground</u>
Normal load, average weather (16°C ambient temperature)	40 feet
Predicted extreme thermal load (125°C conductor temperature)	32 feet
Predicted extreme weather conditions, 0°F (1-inch ice, 4 lbs. wind, -18°C)	38 feet

¹ Clearances based on a maximum tension of 16,880 pounds and a ruling span of 1,000 feet.

TABLE 2
CONDUCTOR THERMAL RATING
1590 KCMIL 45/7 ACSR
125°C MAXIMUM CONDUCTOR TEMPERATURE

<u>Condition</u>	<u>Ambient Temperature (°C)</u>	<u>Wind Speed (Knots)</u>	<u>Ampacity (Amps)</u>
Summer Normal	35	0	1626
Winter Normal	10	0	1873
Summer Emergency	35	1.5	2013
Winter Emergency	10	1.5	2267

B. MAGNETIC FIELD MANAGEMENT

PPL Electric’s Magnetic Field Management Program is summarized in Attachment “5” and will be applied to reconstruction and new line projects including this reconstruction of the Manor – Graceton Transmission Line. In order to reduce magnetic field exposures, the program generally prescribes a line design that provides 5 feet higher ground clearances than required under the NESC and reverse phasing of new double-circuit lines where it is feasible to do so at low or no

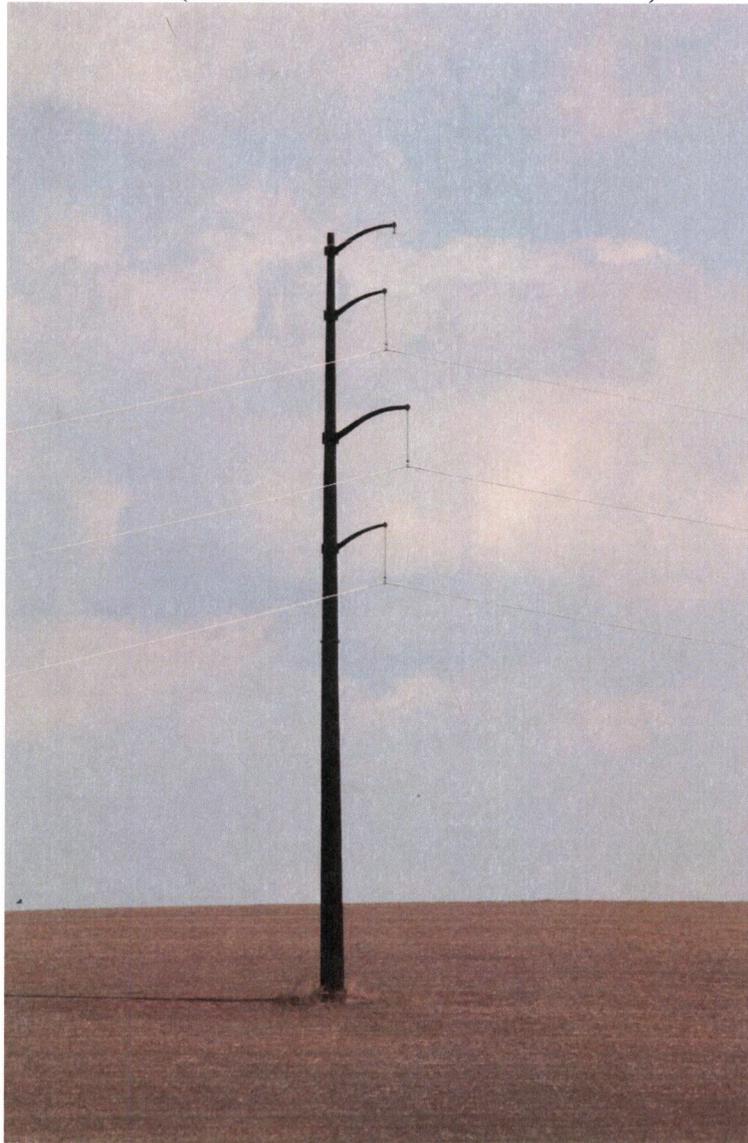
cost. The implementation of additional modifications will be considered, provided those modifications can be made at low or no cost and will not interfere with the operation of the line.

Since the rebuilt Manor – Graceton Transmission Line is being constructed for future double circuit operation, but will initially be operated as a single circuit line, reducing magnetic fields by reverse phasing is not possible at this time. However, pursuant to PPL Electric’s Magnetic Field Management Program, some reduction in magnetic field levels will be attained through the use of structures that are higher than the existing lattice towers. PPL Electric will evaluate the use of reverse phasing when a second circuit is added.

C. RIGHT-OF-WAY STATUS

The entire length of the Manor – Graceton line will be rebuilt within the existing 150-foot wide PPL Electric right-of-way and acquisition of additional right-of-way is not anticipated. A list of all owners of property within the right-of-way is included in Attachment “7” and shown on the aerial photographs contained in Attachment “2” map pockets.

**PROPOSED 230 kV SINGLE CIRCUIT
TANGENT SUSPENSION STRUCTURE
(CURRENT PHASE OF PROJECT)**



POLE STATISTICS

Average Height – 145 Feet

Shield Wire Arm Length – 14.5 ft

Top Phase Arm Length – 12 ft

Middle Phase Arm Length – 17.5 ft

Bottom Phase Arm Length – 12 ft

Vertical Spacing:

Overhead Shield Wire to Top Phase – 19.5 ft

Conductor Attachment Spacing – 20 ft

FIGURE 1

**PROPOSED 230 kV SINGLE CIRCUIT
ANGLE TENSION STRUCTURE
(CURRENT PHASE OF PROJECT)**



POLE STATISTICS

Average Height – 145 Feet

Shield Wire Arm Length* – 14.5 to 15.5 ft

Top Phase Arm Length* – 12 to 13 ft

Middle Phase Arm Length* – 17.5 to 18.5 ft

Bottom Phase Arm Length* – 12 to 13 ft

*** Arm length varies based on severity of horizontal angle**

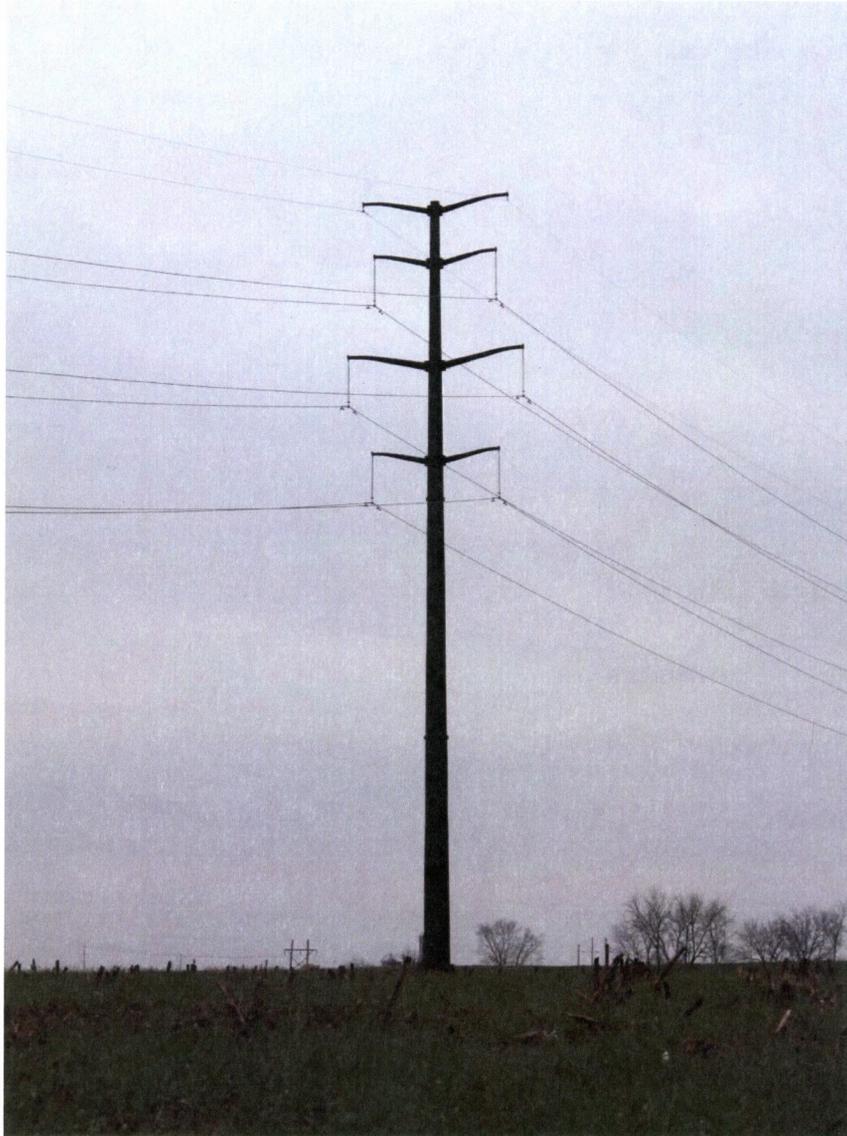
Vertical Spacing:

Overhead Shield Wire to Top Phase – 19.5 ft

Conductor Attachment Spacing – 20 ft

FIGURE 2

**PROPOSED 230 kV DOUBLE CIRCUIT
TANGENT SUSPENSION STRUCTURE
(FUTURE PHASE OF PROJECT)**



POLE STATISTICS

Average Height – 145 Feet

Shield Wire Arm Length – 14.5 ft

Top Phase Arm Length – 12 ft

Middle Phase Arm Length – 17.5 ft

Bottom Phase Arm Length – 12 ft

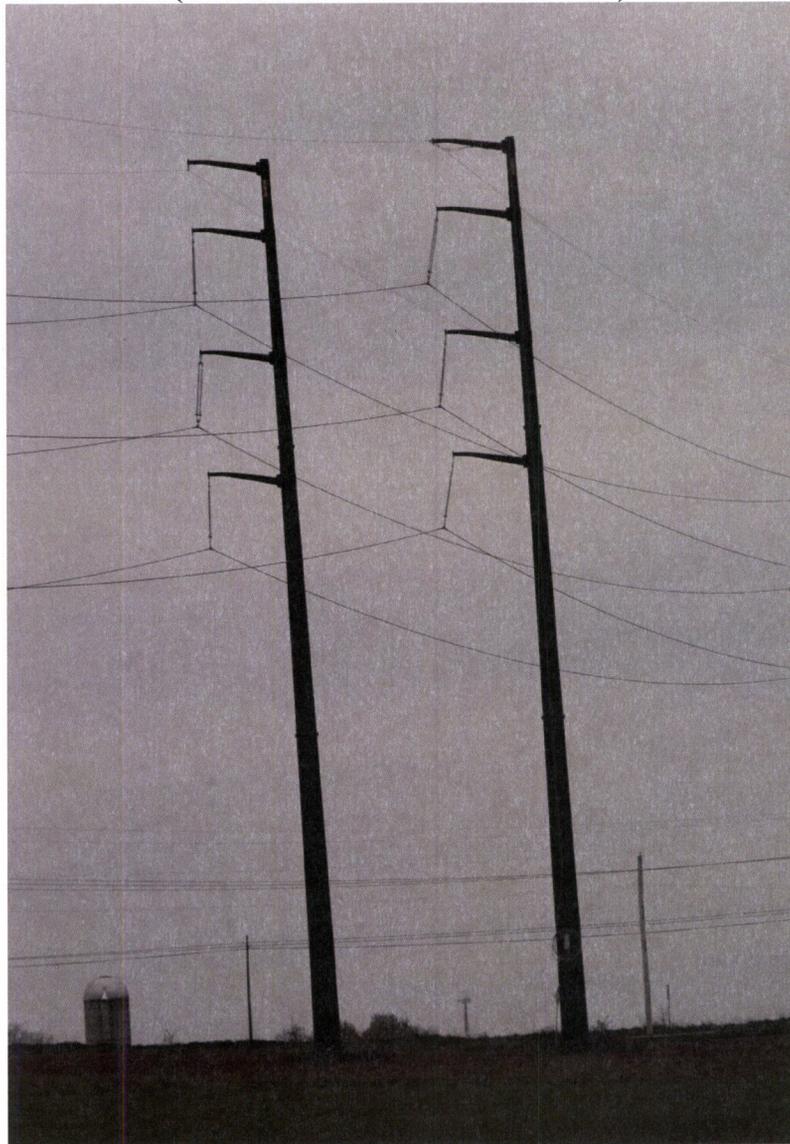
Vertical Spacing:

Overhead Shield Wire to Top Phase – 19.5 ft

Conductor Attachment Spacing – 20 ft

FIGURE 3

**PROPOSED 230 kV DOUBLE CIRCUIT
ANGLE TENSION STRUCTURE
(FUTURE PHASE OF PROJECT)**



POLE STATISTICS

Average Height – 145 Feet

Shield Wire Arm Length* – 14.5 to 15.5 ft

Top Phase Arm Length* – 12 to 13 ft

Middle Phase Arm Length* – 17.5 to 18.5 ft

Bottom Phase Arm Length* – 12 to 13 ft

Vertical Spacing:

Overhead Shield Wire to Top Phase – 19.5 ft

Conductor Attachment Spacing – 20 ft

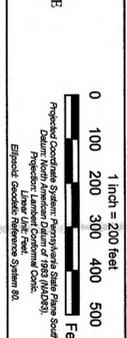
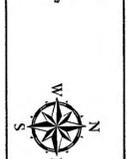
*** Arm length varies based on severity of horizontal angle**

FIGURE 4

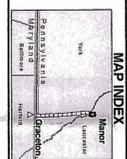


- Legend**
- Substations
 - Existing Transmission
 - State GameLand
 - Wetland (WMA)
 - Parish Boundary
 - Municipality Boundary
 - State Boundary
 - County Boundary

Make Minor Corrections as shown on PDM as a white dashed line



Proposed Conestoga System Phasors/Phase Shift Power South
 Datum: North American Datum of 1983 (NAD83)
 Projection: UTM Zone 18T
 Spheroid: Everest
 Reference System: 80



Manor-Graceton 230kV Project
 PPL Electric Utilities
 December 21, 2010



Legend

- Substations
- Existing Transmission
 - 500kV
 - 230kV
 - Below 230kV
- State Gameland
- Wildland (NM)
- Parcel Boundary
- Municipality Boundary
- State Boundary
- County Boundary
- Note: Manor-Graceton route represented as a white dashed line with orange dots

North Arrow

Scale: 1 inch = 200 feet

0 100 200 300 400 500 Feet

Source: Paragon/Map Systems Data Account (PMSDA), United States Geological Survey (USGS), United States Fish and Wildlife Service (USFWS), 2008 Census

Map Index

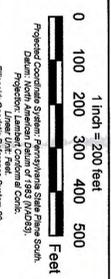
Manor-Graceton 230kV Project
 PPL Electric Utilities
 December 21, 2010

Tile 2 of 13

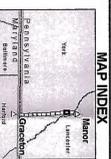


- Legend**
- Substations
 - Existing Transmission
 - 500kV
 - 230kV
 - Below 230kV
 - State Landmark
 - Water (NYS)
 - Parcel Boundary
 - Municipal Boundary
 - State Boundary
 - County Boundary

Note: Approximate location as shown on the RCU as a white dashed line.



Source: Pennsylvania State Data Access (PASDA), Environmental Systems Research Institute (ESRI), United States Fish and Wildlife Service (USFWS), York County.





Title 5 of 13

Legend

- Substations
- Existing Transmission
 - 50kV
 - 230kV
 - Between 230kV
- State Ownership
 - Watered (W/W)
 - Parcel Boundary
 - Municipality Boundary
- State Boundary
- County Boundary

Note: Water Ownership routes represented as white lines, ROW as a blue shaded area.

1 inch = 200 feet

0 100 200 300 400 500 Feet

Proposed Coordinate System: Pennsylvania State Plane South
 Datum: North American Datum of 1983 (NAD83)
 Elevation: Geoid Reference System 80

Source: Pennsylvania Spatial Data Access (PASDA),
 United States Geological Survey (USGS),
 United States Fish and Wildlife Service (USFWS),
 US Census

MAP INDEX

Manor-Gracetown 230kV Project
 PPL Electric Utilities
 December 21, 2010



Legend

- Substation
- Existing Transmission
 - 500kV
 - 230kV
 - Below 230kV
- State Generalized Wetland (NW)
- Parcel Boundary
- Municipality Boundary
- State Boundary
- County Boundary

Note: Municipalities shown as they appear on the 2008 Census TIGER files.

North Arrow

Scale: 1 inch = 200 feet

0 100 200 300 400 500 Feet

Projected Coordinate System: Pennsylvania State Plane South
Datum: North American Datum of 1983 (NAD83)
Units: U.S. Feet
Ellipsoid: Geoid; Reference System: 83

MAP INDEX

Manor
Berkshire
Map Index

Manor-Graceton 230kV Project
PPL Electric Utilities
December 21, 2010



Legend

- Substations
- Existing Transmission
 - 600KV
 - 230KV
 - Below 230KV
- State GameLand
- Wetland (WMA)
- Parcel Boundary
- Municipality Boundary
- State Boundary
- County Boundary

NOTE: All parcel/ownership as shown on the OS/AV as a white outlined line.

1 inch = 200 feet

0 100 200 300 400 500 Feet

Source: Pennsylvania Spatial Data Access (PASDA), United States Geological Survey (USGS), United States Fish and Wildlife Service (USFWS), USGS, etc.

Projection: Lambert Conformal Conic
Datum: North American Datum 1983
Spheroid: Geoid System 83

MAP INDEX

Manor-Gracetown 230KV Project
PPL Electric Utilities
December 21, 2010

Tile 8 of 13



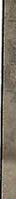
Legend

- Substation
- Existing Transmission
- State General Land
- Waterland (GWL)
- Parcel Boundary
- Municipality Boundary
- State Boundary
- County Boundary

Note: All information shown on this map is as a reference only.



Source: Pennsylvania State Data Access (PASA), Environmental Systems Research Institute (ESRI), United States Fish and Wildlife Service (USFWS), 10th County.



Manor-Gracetown 230KV Project
 PPL Electric Utilities
 December 21, 2010

Title 9 of 13

LOWER CHAN CREEK
 TWP

Ocean Run

Muddy Creek
 PEACH BOTTOM
 TWP

46

45

44

43

38

42

41

40

38

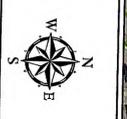
38

ARKANSAS RD



- Legend**
- △ Substations
 - Existing Transmission
 - 500kV
 - 230kV
 - Below 230kV
 - State Owned
 - Parcel (NW)
 - Parcel Boundary
 - Municipality Boundary
 - State Boundary
 - County Boundary

Note: Approximate location as shown on map is not a warranty of accuracy or a representation of any kind.



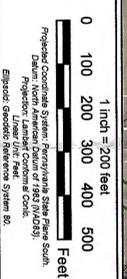
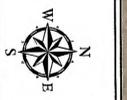
Source: Pennsylvania State Data Access Resource, Environmental Systems Research Institute (ESRI), United States Fish and Wildlife Service (USFWS), York County.



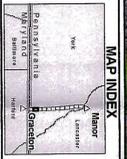
Manor-Graceton 230kV Project
 PPL Electric Utilities
 December 21, 2010



- Legend**
- Substations
 - Existing Transmission
 - 500kV
 - 230kV
 - 230kV
 - State GameLand
 - Wetland (NVA)
 - Parcel Boundary
 - Municipality Boundary
 - State Boundary
 - County Boundary
 - Note: Municipalities shown as they are, not as a legal subdivision.



Source: Parcel Data from the State Parcel Data System (SPDS) and the State Geographical Survey (USGS).
 Legend: Land Use and Parcel Boundaries (USGS/USDA)
 Projection: Lambert Conformal Conic
 Ellipsoid: Clarke 1866
 Datum: North American 1983



Manor-Gracetown 230kV Project
 PPL Electric Utilities
 December 21, 2010



Legend

- Stations
- Existing Transmission
 - 500KV
 - 230KV
 - Below 230KV
- State General
- Water (NW)
- Parcel Boundary
- Municipality Boundary
- State Boundary
- County Boundary
- New Transmission route represented as written, 230KV as a dashed line, 115KV as a solid line

1 inch = 200 feet

0 100 200 300 400 500 Feet

Source: Pennsylvania Spatial Data Access (PASDA), Geospatial Information Systems, Pennsylvania State University, University Park, PA; Pennsylvania State University, University Park, PA; United States Fish and Wildlife Service (USFWS), 104 County; Elipsoid: Geoid Reference System 82

MAP INDEX

Manor-Graceton 230KV Project
PPL Electric Utilities
December 21, 2010

Tile 13 of 13

Attachment 3

ATTACHMENT “3”
MANOR – GRACETON 230 kV TRANSMISSION LINE
SITING ANALYSIS AND ENVIRONMENTAL ASSESSMENT

TABLE OF CONTENTS

<u>SECTION</u>	<u>TOPIC</u>	<u>PAGE</u>
A.	INTRODUCTION.....	1
B.	ALTERNATIVE ROUTING ANALYSIS.....	2
I.	Identification of Routing Constraints.....	3
II.	GIS Data Sources	5
III.	Field Inspections	7
IV.	Agency Consultation/Notification.....	7
V.	Alternative Routing Analysis Conclusion.....	9
C.	LAND USE	9
I.	Forest Lands.....	11
II.	Agricultural and Preservation Lands.....	11
III.	Developed Uses.....	12
IV.	Zoning	13
V.	Land Use and Comprehensive Plans.....	14
D.	CULTURAL RESOURCES.....	15
I.	Historic Architecture.....	16
II.	Archaeological Sites.....	18
E.	NATURAL FEATURES	22
I.	Geology and Soils	22
II.	Surface Water Resources and Aquatic Species/Habitats	27
III.	Wetlands.....	30
IV.	Vegetation	32
V.	Wildlife.....	41

List of Tables

Table 1.	GIS Data Sources.....	6
Table 2.	Summary of Land Use Types	10
Table 3.	Developed Uses in the Vicinity of the Route	13
Table 4.	Archaeological Sites Within Approximately 1,000 Feet of Right-Of-Way	19
Table 5.	Soil Series Crossed by the Existing Route.....	24
Table 6.	Number of Drainage Crossings and Designated Uses	28
Table 7.	Summary of Wetlands Crossed.....	31
Table 8.	Requested Threatened, Endangered, and Rare Plant Species Surveys	39
Table 9.	Federal and State Threatened and Endangered Wildlife Species	43

ATTACHMENT “3”
MANOR – GRACETON 230 kV TRANSMISSION LINE
SITING ANALYSIS AND ENVIRONMENTAL ASSESSMENT

TABLE OF CONTENTS (continued)

List of Figures

Figure 1: Project Study Area.....	45
Figure 2A: Topography.....	46
Figure 2B: Topography.....	47
Figure 3: Land Use.....	48
Figure 4: Zoning	49
Figure 5A: Cultural Resources.....	50
Figure 5B: Cultural Resources.....	51
Figure 6A: Soils	52
Figure 6B: Soils	53
Figure 7A: Natural Features.....	54
Figure 7B: Natural Features.....	55

ATTACHMENT “3”
MANOR – GRACETON 230 kV TRANSMISSION LINE
SITING ANALYSIS AND ENVIRONMENTAL ASSESSMENT

A. INTRODUCTION

PPL Electric proposes to rebuild approximately 14.5 miles of the existing single-circuit Manor – Graceton Transmission Line for single-circuit operation. The existing transmission line and the steel lattice structures will be removed and replaced with single-shaft steel poles capable of accommodating two circuits. To minimize social, economic, engineering, and environmental impacts, PPL Electric has elected to rebuild this transmission line entirely within the existing right-of-way.

Although not required for preparation of a letter of notification, PPL Electric and its routing consultant team, The Louis Berger Group, Inc. (Berger), undertook a program of evaluating potential alternative routes for the Manor – Graceton Transmission Line. The goal of the alternative siting analysis was to identify whether an alternative route for this transmission line could be identified which provided fewer overall social, environmental, engineering, and economic impacts. This program involved a comprehensive siting analysis through reviewing maps, Geographic Information Systems (GIS) data sets, and aerial photography; conducting field reviews; and subsequently identifying and evaluating potential alternative routes.

The alternative analysis included the determination of a Study Area, the compilation of an environmental inventory, identification and analysis of potential alternative line routes and finally, selection of a preferred line route corridor. 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 Manor Substation on the north and the last PPL Electric-owned Manor – Graceton structure in Pennsylvania before the line enters Baltimore Gas & Electric (BGE) territory in Maryland on the south). The Study

Area was intended to encompass all reasonable Potential Alternative Routes between the two end points.

After a detailed alternative routing analysis (described below), PPL Electric determined that there are no feasible alternative routes that would cause fewer overall social, environmental, engineering and economic impacts than the original route. Since PPL Electric does not require additional right-of-way to rebuild the existing transmission line and the right-of-way is currently cleared to the width needed for the rebuilt line, including a future double circuit, use of the existing route would not require additional clearing or acquisition of additional right-of-way and possible property condemnations.

B. ALTERNATIVE ROUTING ANALYSIS

The Routing Team conducted a detailed alternative routing analysis to determine the possibility of alternative locations for siting the Manor – Graceton Transmission Line. The goal of the routing analysis was to identify whether an alternative route existed for the Manor – Graceton transmission line between the Manor Substation and the existing line at the Pennsylvania-Maryland border. An appropriate alternative route was defined as an alternative route that would have a lesser impact than rebuilding within the exiting right-of-way on all factors of the natural and human environment, while avoiding unreasonable routes, high or unnecessary costs, and non-standard design requirements to the extent practical.

Given these considerations, the routing team identified the initial Study Area within Lancaster and York Counties, Pennsylvania for consideration of Potential Alternative Routes. The initial Study Area is shown in Figure 1. The initial Study Area encompasses an area of approximately 90 square miles (57,415 acres) within Lancaster and York Counties. The Study Area is generally bounded by PPL Electric’s Manor Substation east of York along the Susquehanna River to the north; the Lancaster side of the Susquehanna River to the east; the Pennsylvania-Maryland border along the existing line to the south; and approximately 1 mile west of the intersection of State Highway 425 and PA-74 to the west. Using this established Study Area, the routing team began its efforts to identify Potential Alternative Routes for the line.

Once the initial Study Area was identified, the routing team met in June 2010 to develop basic route selection criteria that would be used to select and analyze Potential Alternative Routes. The following route selection criteria were established and considered in the routing process:

- Minimize impacts to the natural and human environment
- Minimize route length and cost
- Use general line design parameters specified by PPL Electric
- Maximize the use of or paralleling of existing rights-of-way or easements
- Avoid residences
- Minimize the removal of barns, garages, or other appurtenant structures
- Maximize distance from residences, schools, cemeteries, historical resources, recreation areas, and other important cultural sites
- Minimize new crossings of designated natural resource lands such as state forests, national and state parks, wildlife management areas, designated game lands and wildlife areas, and conservation areas
- Avoid crossing large lakes.

I. Identification of Routing Constraints

Routing constraints in the Study Area were identified and mapped by the routing team. The constraints were defined as specific areas that should be avoided to the extent feasible during the route selection process. The constraints were divided into two groups based on the size of the geographic area encompassed by the constraint. The first group included constraints covering large areas of land (or water) in the Study Area. Large area constraints were used to eliminate to the extent practical areas in the Study Area that were considered unfavorable by the routing team for developing Potential Alternative Routes. The second group of constraints encompassed many other types of features covering smaller geographic areas or specific points. The large and small area constraints consisted of the following:

Large Area Constraints

- Urban areas
- National Register Historic Districts and adjacent areas
- Large recreational sites
- Large wetlands
- Critical habitat areas
- Large water bodies
- Designated State Forests, State Parks, State Game Lands, Wildlife Management Areas, natural and conservation areas, Natural Lands Trust Preserves
- Wind energy facilities.

Small Area Constraints

- Individual residences (including houses, permanently established mobile homes, and multi-family buildings)
- Barns, garages, and other outbuildings
- Commercial and industrial buildings
- Recorded, designated historic buildings and sites, including any specified buffer zone around each site
- Recorded threatened, endangered, and other rare species sites or unique natural areas, including any specified buffer zone around each site
- Small wetlands and water bodies, including transition areas/buffer zones
- Small recreational sites or facilities
- Communication towers
- Designated scenic areas (e.g., overlooks, vistas, trails, corridors, highways)
- Orchards and vineyards
- Active surface mines.

Furthermore, the routing team also considered PPL's general Environmental Inventory Guidelines, which are included as Attachment "8."

After the Potential Alternative Routes had been initially developed to avoid large area constraints, the alignments were adjusted to the extent practical to avoid small area constraints. The constraint list was updated as the routing team developed greater familiarity with the project area. The intent of the routing effort was to attempt to keep the Potential Alternative Routes and all areas of new or expanded right-of-way from affecting these constraints to the extent feasible.

II. GIS Data Sources

Extensive use of GIS data was made in the study. 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. Presentation, analysis, and calculations derived from these data sources require careful consideration when used for planning purposes. Therefore, GIS based calculations and maps presented herein should be considered reasonable approximations of the resource or geographic feature they represent, and not absolute measures or counts.

A list of the major GIS data sources gathered, used, or otherwise considered in this routing study is provided in Table 1.

**Table 1. GIS Data Sources
Manor – Graceton Transmission Line**

Name	Owner	Resolution	Date of Source Data
GNIS for PA 2007	USGS	1:24,000	2007
Wild and Natural Areas	PA DCNR	1-5 meters	2006
State Forest Lands	PA DCNR	1-5 meters	2006
State Park Boundaries	PA DCNR	-	2006
Environmental Protection Areas	PA DEP	-	2005
State Game Lands	PGC	-	2004, 2006
GAP Conservation Stewardship	PSU	1:24,000	1998
Unsuitable Mining Areas 2002	PA DEP	1:24,000	2002
Longwall Mine Panels 2002	PA DEP	1:24,000	2002
Abandoned Mine Land Inventory	PA DEP	1:24,000	2007
Forestry Districts	PA DCNR	-	2003
Fishing & Boating Access Points	PFBC	-	2008
State Fish Hatcheries	PFBC	-	2007
Municipality Boundaries	PennDOT	1:24,000	2007
Oil and Gas Fields	PA DEP	1:24,000	1996
PADEP Oil and Gas Locations	PA DEP	-	2007
Water Trails	PFBC	1:24,000	2006
USGS DEM	USGS	10 meters	varies
National Wetlands Inventory	USFWS	1:80,000	2005
National Hydrography Dataset	USGS	1:24,000	2004
Flowline/Waterbodies	USGS	1:24,000	2004
Scenic Rivers	PA DEP	1:24,000	1996
Small Watersheds	PA DEP	1:24,000	1997
High Value Watersheds	PA DEP	-	1996
Floodplains	PA DEP	1:24,000	1996
Major Rivers	PA DEP	1:24,000	1997
PAMAP 2008 Orthoimagery	PA DCNR	1 foot	2008
Local Roads	PennDOT	1:24,000	2007
State Roads	PennDOT	1:24,000	2007

**Table 1. GIS Data Sources
Manor – Graceton Transmission Line**

Name	Owner	Resolution	Date of Source Data
Unpaved Roads	PA DEP	-	2002
Active Railroads	PA DEP	1:24,000	1996
Existing Transmission Lines	PPL Electric	-	-
Future Transmission Lines	PPL Electric	-	-
Gas Pipelines	USGS	-	-
Substations	PPL Electric	-	-
Impervious Cover	Natural Lands Trust	1:24,000	2000
USGS Quads	USGS	1:24,000	varies

USFWS: U.S. Fish & Wildlife Service; USGS: U.S. Geological Survey; PFBC: Pennsylvania Fish and Boat Commission; PGC: Pennsylvania Game Commission; PennDOT: Pennsylvania Department of Transportation; PA DCNR: Pennsylvania Department of Conservation and Natural Resources; PA DEP: Pennsylvania Department of Environmental Protection; PSU: Pennsylvania State University

III. Field Inspections

After the Potential Alternative Routes were identified, routing team members participated in a field reconnaissance trip throughout the Study Area on July 15 and 16, 2010. The team members examined the area and the Potential Alternative Routes 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. Precise locations were identified in the field using a portable Global Positioning System (GPS). The team took photographs at various locations along the Potential Alternative Routes to further help identify potential routing concerns and opportunities.

IV. Agency Consultation/Notification

In addition to using federal, state, and local agency data and maps obtained in the environmental data collection process explained above, PPL Electric and the routing team consulted with or

otherwise notified various agencies to gather initial information for the route planning process. Additional information was requested from state and federal agencies regarding threatened and endangered species, cultural resources, and other environmental and land use considerations. The following agencies and groups were consulted or notified of the project:

Federal Agencies

- U.S. Army Corps of Engineers, Baltimore District
- U.S. Fish and Wildlife Service, Pennsylvania Field Office (State College)

State Agencies

- Pennsylvania Department of Environmental Protection
- Pennsylvania Department of Conservation and Natural Resources
- Pennsylvania Game Commission
- Pennsylvania Fish and Boat Commission
- Pennsylvania Historical and Museum Commission (State Historic Preservation Office)

Regional/Local Agencies

- York County Conservation District
- York County Planning Department
- York County Commissioners
- Lancaster County Conservation District
- Lancaster County Planning Department
- Lancaster County Commissioners
- Chanceford Township Supervisors
- Lower Chanceford Township Supervisors
- Peach Bottom Township Supervisors
- Manor Township Supervisors

V. Alternative Routing Analysis Conclusion

Based on a comprehensive evaluation of potential alternative routes within the Study Area, PPL Electric determined that no feasible alternatives exist to re-site the existing Manor – Graceton Transmission Line that would have a lesser impact than the existing route. Following the existing Manor – Graceton route does not require the acquisition of additional right-of-way and makes use of an existing right-of-way that is currently cleared of vegetation to the width needed for the rebuilt line. Additionally, the use of the existing right-of-way would not require condemnation of additional properties and would not result in new environmental impacts. Although the current route traverses conservation areas, natural features, and cultural areas, as shown on Figures 4, 5a/5b, and 7a/7b, these resources are located throughout the study area and any reasonable alternative routes through the study area would have similar or greater impacts. Most importantly, the most significant environmental resources run along the Susquehanna River. The Manor – Graceton Transmission Line must cross the Susquehanna River. Crossing the river at any location other than the existing route would cause far greater impacts to the environmental resources along the river. Therefore, PPL Electric proposes to rebuild the existing Manor – Graceton single-circuit 230 kV transmission line with a double-circuit 230 kV transmission line within its current right-of-way.

An analysis of the proposed route and buffer areas demonstrates that rebuilding the Manor – Graceton Transmission Line on the existing route will produce minimal incremental impacts.

C. LAND USE

There are many types of land uses throughout the Study Area, including suburban and rural development, forest land, farmland, open space and fields, state park lands, and water and wetlands. The use of such lands and the public's general desire to develop or protect areas are often managed by federal, state and, especially local plans, policies, and zoning.

U.S. Geological Survey (USGS) topographic maps of the Manor – Graceton line and the project Study Area are shown in Figure 2. A breakdown of the general classifications of land use (i.e., barren land, cultivated crops, grassland/pasture, developed lands, forest, and wetlands) within 1,000 feet of the existing route is presented in Table 2. General land uses in the Study Area are depicted graphically in Figure 3.

**Table 2. Summary of Land Use Types
Manor – Graceton Transmission Line**

Land Use Type	Percentage of Route¹
Barren Land (Rock/Sand/Clay)	1.0
Cultivated Crops	24.6
Grassland/Pasture	22.6
Developed, Low, Medium, and High Intensity	1.4
Forest	43.9
Water/Wetlands	6.4

¹ Percentage of land use type within 1,000 feet of each side of the route centerline.

Source: 2001 National Land Cover Dataset (NLCD).

The proposed line reconstruction will result in little land use impact. In fact, land use impacts are expected to decrease because the footprint of the proposed single-shaft steel poles and their support foundations is considerably less than the footprints of existing four-legged lattice steel towers.

No pipelines, communication towers, or other utilities will be affected by the proposed project. No major roadways are traversed by the project. Several state or local roads are crossed. All are easily spanned and will not be impacted by the operation of the line. However, during construction, the State Police or responsible local officials may be requested to stop traffic for short amounts of time to allow PPL Electric to install the transmission line. PPL Electric will obtain all required road crossing and use permits prior to construction and will comply with all conditions imposed in conjunction with required permits.

I. Forest Lands

According to the York County Environmental Inventory, approximately 35 percent of York County is forested. In general, the northern portion of York County has more concentrated forested areas while the southern portion has scattered forest.

According to the Lancaster County Greenscapes Report, approximately 17 percent of Lancaster County is forested. The largest concentration of forest cover is located in areas with steep slopes or shallow soils, including Furnace Hills, Welsh Mountains, and the Susquehanna River Gorge.

Forest cover is the dominant land use along the existing route, accounting for approximately 44 percent of the route corridor. No additional tree clearing will be required in the existing right-of-way as the line will be reconstructed in existing right-of-way that is currently maintained free of tree growth. However, some limited tree clearing may be required to create access points along the right-of-way. Use of any other route would require substantial tree clearing and create far greater environmental impacts.

The route traverses approximately 2 miles of State Game Land No. 83. In a letter dated November 16, 2010 (see Attachment 6), the Pennsylvania Game Commission (PGC) indicated that the project may result in potential impacts to State Game Land No. 83. The project would not significantly impact this State Game Land beyond existing conditions. The only expected impacts are that some limited areas of Game Land 83 could be temporarily closed or otherwise restricted for hunting or recreating while project facilities are under construction. As requested by PGC, PPL Electric will contact the Land Management Supervisor for Game Land No. 83 regarding potential impacts within this area.

II. Agricultural and Preservation Lands

Agricultural uses constitute the largest land use type in the two counties. Agriculture is the largest industry in Pennsylvania and farms within the state produce a wide variety of food and

fiber products worth over \$45 billion annually (USDA, 2007). According to the York County Open Space Plan, approximately 67 percent of York County is agricultural land. The Lancaster County Greenscapes Plan indicates that agriculture represents approximately 54 percent of existing land use in the County.

Based on maps included in the *York County Open Space and Greenways Plan* (York County, 2006), the Manor – Graceton line crosses approximately 0.5 mile of conservation easements and approximately 0.5 mile of land of the York County Agricultural Land Preserve Board (which is substantially identical to the conservation easements crossed). The line does not cross any York County Farm and Natural Lands Trust lands.

The project would not have any incremental negative impacts on agricultural, conservation, or preservation lands. Moreover, replacement of the existing structures with new towers will benefit farmers as the proposed monopole structures will have smaller footprints than the existing steel lattice structures, thereby increasing the workable area around the structures compared to current conditions. Lattice towers require a footprint of approximately 900 square feet while monopole structures require only approximately 64 square feet.

III. Developed Uses

Developed uses represent only approximately 4 percent of the existing route. No high density developed areas are located in the vicinity of the Study Area. There are a few scattered low- to medium-density developed areas. The most densely populated area along the existing transmission line is located in the vicinity of the Susquehanna Trails community. Table 3 summarizes the number of residences, schools, churches, and cemeteries (i.e., sensitive receptors) located in the vicinity of the Manor – Graceton right-of-way.

**Table 3. Developed Uses in the Vicinity of the Route
Manor – Graceton Transmission Line**

Developed Uses	Number
Residences within 75 feet of centerline	2
Residences within 100 feet of centerline	4
Residences within 250 feet of centerline	29
Residences within 500 feet of centerline	77
Schools within 1,000 feet of centerline	0
Churches within 1,000 feet of centerline	1
Cemeteries within 1,000 feet of centerline	0

No new significant impacts on developed uses would occur. None of the properties identified in Table 3 are located within the right-of-way. Furthermore, no properties would need to be condemned as part of the rebuild, as the rebuild would not require the acquisition of additional right-of-way. No schools or cemeteries are located within 1,000 feet of the project centerline; only one church (Pleasant Home Baptist Church, located near the corner of Salisbury Road and Reinecke Road in Airville, PA) is located within 1,000 feet of the centerline. Views of the line and structures from homes and other sensitive receptors would change as the existing lattice structures would be replaced with monopoles, but the location of the structures would essentially remain the same. Although the monopole towers are taller (approximately 145 feet high compared to 85 feet high), the footprint of the structures would be significantly reduced from approximately 900 square feet to 64 square feet, representing a 93% decrease in the footprint area.

IV. Zoning

PPL Electric collected and reviewed available zoning maps and ordinances for the Pennsylvania municipalities through which the existing transmission line crosses (Manor, Chanceford, Lower Chanceford, and Peach Bottom Townships). Generalized zoning in the project area is shown in Figure 4.

Public utility facilities are exempt from local zoning ordinances. Nevertheless, electric transmission lines by public utilities are typically addressed in municipal zoning codes as an “essential service,” “public utility” or similar categorization. For example, Chanceford Township defines Public Utility or Similar Building or Facility as the erection, construction alteration, or maintenance by private utilities...providing gas, electrical, telephone, steam or water transmission or distribution...including poles, wires...other other similar equipment and accessories and services in connection therewith.” The Township specifically allows public utilities in any district as a special exception. Lower Chanceford and Manor Townships have similar definitions. Peach Bottom Township does not specifically address public utilities. All uses not specifically permitted in each zoning district may be allowed by special exception.

Although not required to comply with local zoning ordinances, PPL Electric will work with each of the affected municipalities as appropriate to minimize any potential impacts of the rebuilt line within the various zoning districts which the Manor – Graceton 230 kV line crosses. PPL has sent letters to Chanceford, Lower Chanceford and Peach Bottom Townships to provide information concerning the planned work and to offer to meet with them to discuss the project in detail. To date, PPL has not received a request for additional information or a meeting. Additionally, PPL sent letters to each of the affected property owners to inform them of the planned work.

V. Land Use and Comprehensive Plans

PPL Electric collected and reviewed all County-level land use or comprehensive plans for York and Lancaster Counties. Each county has adopted a comprehensive plan to guide development within the county. In addition, each of the townships crossed by the line has adopted its own comprehensive plans. Manor Township is part of the *Central Lancaster County Growing Together Comprehensive Plan*. Peach Bottom Township has adopted a multi-municipal plan with the Borough of Delta. Chanceford and Lower Chanceford Townships have also adopted a multi-municipal plan. A more detailed review of the comprehensive and land use plans for areas crossed by the Manor – Graceton 230 kV line rebuild is included in Attachment 9.

Electric transmission lines are not normally addressed in county or municipal comprehensive and land use plans. Regardless, the proposed transmission line would not conflict with the goals and policies of the various comprehensive and land use plans adopted in the counties and municipalities which the Manor – Graceton line traverses. The purpose of the respective county and municipal comprehensive plans is to direct development in appropriate areas in the region and protect or conserve sensitive environmental areas (i.e., steep slopes, floodplains, wetlands), conserve open space and farmland. Rebuilding the Manor – Graceton Transmission Line in its current location would result in fewer conflicts with comprehensive planning goals, as the proposed rebuild would be constructed on existing rights-of-way. Any reasonable alternative would likely result in crossing currently undisturbed areas (especially in the vicinity of the Susquehanna River and Muddy Creek riparian areas), areas designated as open space, and farmland. PPL Electric will continue to work with the local planning commissions and departments to respect adopted comprehensive land use plans and policies to the extent reasonably feasible.

D. CULTURAL RESOURCES

Resources of historic architectural and archaeological significance are located in the vicinity of the Manor – Graceton Transmission Line. Initial analysis of the line’s potential to affect cultural resources involved a review of the Pennsylvania Historical and Museum Commission (PHMC)/Bureau of Historic Preservation (BHP) Cultural Resource Geographic Information System (CRGIS) on-line inventory of cultural resources. The review involved identifying all known prehistoric and historic period archaeological sites and all historic architectural resources within 2-miles of the right-of-way in accordance with PUC regulations (52 Pa. Code § 57.72).

Review of the PHMC/BHP CRGIS inventory yielded numerous cultural resources within the search parameters. The inventory of recorded cultural resources in the northern portion of the Study Area is understandably higher than the inventories for the southern portion because more surveys have been conducted in the vicinity of the Susquehanna River. Based on the CRGIS database, historic architectural sites are dispersed relatively uniformly across the area, while archaeological sites are concentrated in close proximity to the Susquehanna River. No

archaeological or historic architectural sites were recorded within the existing Manor – Graceton right-of-way. Historic architectural and archaeological sites and the potential for the Manor – Graceton 230 kV rebuild to have an impact on these resources are discussed in the following sections.

I. Historic Architecture

Ninety-four previously recorded historic architectural sites were identified within 2 miles of the centerline of the transmission line ROW: 16 in Lancaster County, 76 in York County and 2 in multiple counties. Two of the sites in Lower Chanceford Township, York County (the Indian Steps Museum/Cabin and the McCalls Ferry Farm, located approximately 1 mile and 1.7 miles from the right-of-way, respectively), are listed on the National Register of Historic Places. The status of each site on the National Register of Historic Places is shown in Attachment 10. While a large number of recorded sites are located within 2 miles of the right-of-way, the majority of these are located more than 1 mile away from the Study Area. Recorded historic architectural sites in the Study Area are shown in Figure 5.

Effects to any historic architectural properties (buildings, structures, and historic districts) will primarily be visual, created by installation of higher structures where shorter towers now exist. Potential adverse visual impacts are those which would modify the viewsheds from properties for which the viewshed is a contributing characteristic of the property's historic importance. The extent of areas that might contain historic architectural properties potentially affected by the appearance of taller structures will vary depending on the relief of the surrounding terrain and the height of vegetation between particular structures and cleared areas and particular historic architectural properties. Any direct (physical) effects to historic architectural properties will be minimized, where practical, by relocating access roads and staging areas. Such physical effects, if not avoided, will be only temporary.

To assess the project's potential impacts on historic architecture, the PHMC must first establish an area of potential effect (APE) for the project. The APE will be the area within an agreed-upon distance from the rebuilt Manor – Graceton line in which PPL Electric will need to

determine which of the historic resources identified in the Table in Attachment 10 and others found in the field could potentially be affected by the proposed project facilities. This will likely include buildings, structures, districts, and objects 50 years of age or older (the general threshold for determining significance of historic properties) within the viewshed/vistas of the route and structure locations.

On December 3, 2010, The Louis Berger Group contacted Ann Safely (Historic Building Reviewer, Archaeology and Protection) at the PHMC/BHP on behalf of PPL Electric regarding protocols for historic architectural studies for the proposed project. Ms. Safely indicated that in her opinion, the architectural APE for the Manor-Graceton line should consist of a 2-mile radius of the centerline of the right-of-way, filtered with a viewshed analysis. However, official PHMC/BHP concurrence on the appropriate level of effort for above-ground cultural resources requires first preparing and submitting a PHMC/BHP Environmental Review Form (Request to Initiate Consultation in Compliance with the State History Code and Section 106 of the National Historic Preservation Act). This form is being prepared and will be submitted to the PHMC/BHP in the near future. After the PHMC/BHP has had an opportunity to review the Environmental Review Form, PPL Electric and its consultants will arrange a meeting with the PHMC/BHP to discuss the project and generate concurrence on all cultural resources work associated with this project.

Preliminary reconnaissance level historic architectural surveys will likely be required. These surveys are intended to provide a general overview of the history of the project area and preliminary assessment of the built (i.e., man-made) environment. Examination of the files maintained at PHMC and the Pennsylvania State Archives, examination of cartographic sources and documents at county and local historical societies, and a reconnaissance (“windshield”) survey to assess the character and extent of the built environment (historic architectural resources) within the APE for historic architectural resources would be conducted as part of the identification survey. Any historic architectural properties identified within the APE that have been previously documented and evaluated prior to 2006 and historic architectural resources that have not been previously evaluated will require the completion of PHMC historic architectural survey forms, an evaluation of their eligibility for inclusion in the NRHP, and the assessment of

direct and indirect project effects to each resource. The PHMC requires that resources that were documented more than four years ago will require re-evaluation to ensure that intervening modifications have not altered the resource's characteristics. Adverse effects to unavoidable eligible resources will be mitigated according to plans developed in consultation with the PHMC/BHP.

At the present time it is not possible to definitely determine the numbers of historic architectural resources that may be adversely affected by the proposed transmission line replacement as the mitigation effects of terrain relief and forested areas will have to be assessed in the field on a case-by-case basis. The new taller structures will be visible from more locations than the existing steel lattice towers. However, rebuilding the Manor – Graceton line on the existing right-of-way where a transmission line already exists will result in lesser visual impacts on any of these historic resources than if a new line were constructed in an area where a line and cleared right-of-way does not exist. PPL Electric will consult with the PHMC throughout the planning, design, and construction process and conduct field work and surveys as necessary as part of the project permitting process to minimize potential impacts to historic architectural properties in accordance with the requirements of Section 106 of the National Historic Preservation Act of 1966 as amended. Where effects to historic properties listed on or assessed by the PHMC as eligible for listing on the National Register of Historic Places cannot be avoided, and where the effects are assessed as adverse, a mitigation plan will be prepared in consultation with PPL Electric and the PHMC.

II. Archaeological Sites

Eight archaeological sites were noted within approximately 1,000 feet of the centerline of the right-of-way. None of the sites is located within the project right-of-way, but two sites (prehistoric open habitations in Manor Township, Lancaster County, and Chanceford Township, York County) are located within approximately 0.1 mile. None of these sites have been evaluated for eligibility for inclusion in the National Register of Historic Places (NRHP) by the PHMC/BHP. These sites are shown in Table 4.

In addition, a total of 39 previously recorded archaeological sites were identified within a 2-mile radius of the ROW. The listing status of each of these sites on the National Register of Historic Places is shown in the expanded tables in Attachment 10. Known archaeological sites are not mapped in this Letter of Notification in order to protect those resources.

The PHMC has established specific requirements for the identification, evaluation, and preservation of significant archaeological resources and historic architectural properties. Archaeological surveys in Pennsylvania are guided by the PHMC's *Guidelines for Archaeological Investigations (PHMC 1991)* and Act 70 (*Pennsylvania State History Code*). These guidelines complement the *Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation*.

Table 4. Archaeological Sites Within Approximately 1,000 Feet of Right-Of-Way Manor – Graceton Transmission Line

Site #	County	Municipality	Resource Type	NRHP Status	Evaluation or Listing Date	Distance from C/L (miles)
36LA0064	Lancaster	Manor	Prehistoric Open Habitation	Not Evaluated	N/A	0.10
36LA1255	Lancaster	Conestoga	Petroglyph/ Pictograph	Not Evaluated	N/A	0.25
36YO0229	York	Chanceford	Prehistoric Open Habitation	Not Evaluated	N/A	0.20
36YO0231	York	Chanceford	Prehistoric Open Habitation	Not Evaluated	N/A	0.10
36YO0084	York	Chanceford	Prehistoric Open Habitation	Not Evaluated	N/A	0.25
36YO0232	York	Chanceford	Prehistoric Open Habitation	Not Evaluated	N/A	0.20
36YO0035	York	Chanceford	Prehistoric Open Habitation	Not Evaluated	N/A	0.25
36YO0331	York	Lower Chanceford	No data	Not Evaluated	N/A	0.20

On September 30, 2010, The Louis Berger Group contacted the PHMC/BHP on behalf of PPL Electric regarding protocols for cultural resource studies for the proposed Manor-Graceton Transmission Line replacement project. These protocols are in accordance with PHMC 1991 guidelines for archaeological surveys in Pennsylvania and are as follows:

- The Area of Potential Effect (APE) for archaeological resources will include all areas of proposed ground disturbance.
- The APE for archaeological resources will be surveyed to identify and record all archaeological resources present.
- Archaeological surveys will be required in all areas where direct impacts (ground disturbances) will occur, unless previous ground disturbance can be confirmed. For example, archaeological survey will not be required in areas where the replacement poles will be located within the exact footprint of an existing structure.
- The intensity of archeological investigations of the APE will vary based on the potential to contain archaeological resources.
- Areas of high archaeological potential initially will be systematically surveyed using subsurface tests (shovel tests) at 15-meter intervals (18 tests/acre). Areas of high archaeological potential in the APE will include:
 - Areas within 300 feet of surface water (streams, springs, and wetlands);
 - Areas within 300 feet of previously recorded archaeological sites;
 - Areas within 300 feet of historic resources;
 - Floodplains;
 - Kames and other elevated glacial features providing view sheds over valleys; and
 - Saddles (low passes between drainages).

- Areas of low archaeological potential in the APE will be surveyed using subsurface tests (shovel tests) at 25-meter intervals (6 tests/acre). Areas of low archaeological potential will include:
 - All areas not assessed as having a high potential to contain archaeological resources; and
 - Areas with slopes greater than 15%. Slopes will be examined for the presence of archaeological deposits in caves and rock overhangs.

- Deep testing in conjunction with pedological/geomorphological study will be conducted on floodplains and other high probability areas containing colluvial and alluvial sediments.

- Unavoidable adverse effects to eligible sites will be mitigated according to plans developed in consultation with the PHMC/BHP.

Any identified archaeological sites that may be adversely affected will be evaluated for eligibility for inclusion in the NRHP. Such evaluations are termed “Phase II” evaluations and require sufficient field work and laboratory analysis to determine whether the archaeological resources are eligible for the NRHP. “Phase III” mitigation studies would be required for any archaeological resources eligible for the NRHP that will be adversely affected by the proposed project. Preservation of such sites will be coordinated with the PHMC.

The existing Manor – Graceton 230 kV transmission corridor is already cleared and will require no additional widening to accommodate the rebuilt line. The site-yield of an archaeological survey is directly related to the area of the survey; the bigger the area, the more sites are likely to be discovered. Therefore, the number of archaeological resources likely to be affected by construction of a replacement line within an existing right-of-way is substantially less than on a new transmission line.

All reasonable efforts will be made to avoid affecting archaeological resources. Where practical, archaeological resources in the transmission line corridor, in the direct path of any needed access

roads, or at the locations of proposed work areas will be avoided by relocation of tower positions and rerouting of roads and reconfiguring or relocating work areas.

PPL Electric will continue to consult with the PHMC throughout the planning, design, and construction process and conduct field work and surveys as necessary as part of the project permitting process to minimize potential impacts to archaeological resources in accordance with the requirements of Section 106 of the National Historic Preservation Act.

E. NATURAL FEATURES

The proposed project will not affect any unique geological, scenic, or natural areas. No National Natural Landmarks, parks, or recreational facilities, with the exception of the Susquehanna River and associated riparian areas, are located near the project area. Only minimal tree clearing will be required because the line is being reconstructed in existing right-of-way that is maintained free of tree growth. Additional detail regarding natural features, including geology and soils, surface water resources and aquatic species/habitat, wetlands, vegetation, and wildlife, is presented in the following sections. Geologic features and topography in the Study Area are shown in Figure 2. Soil types are shown in Figure 6. Natural Features, including streams, wetlands, floodplains, special natural areas, and other resources, are shown in Figure 7.

I. Geology and Soils

Geology

The Manor – Graceton Transmission Line is located in the southeastern portion of the Commonwealth in the Piedmont Province¹. Within the Province, the route crosses the Piedmont Upland Section. A Section (i.e., a succession of rock units) is then composed of individual geologic units or formations. The entire Manor – Graceton Transmission Line is located within the Piedmont Upland Section of the Piedmont Province. The Piedmont Upland Section is characterized by broad, gently rolling hills and valleys with low to moderate topographic relief.

¹ A Province is a region having a pattern of relief features or landforms that differs significantly from that of adjacent regions.

The underlying rock types of this section are schists. Elevations range from approximately 100 to 1,200 feet above mean sea level (amsl) in this Section, but are generally between 400 and 600 feet (PADCNr, 2010).

The Otter Creek Gorge is an outstanding geologic feature located in the vicinity of the Manor – Graceton Transmission Line. Otter Creek Gorge is located adjacent to Otter Creek Woods, just over 1 mile south of Shenks Ferry on the Susquehanna River along State Route 425. Otter Creek Woods is considered a special natural area (see Section E.IV). Neither Otter Creek Gorge nor Otter Creek Woods will be affected by the Manor – Graceton Transmission Line rebuild. These areas are not located within or directly adjacent to the right-of-way and they are located far enough away to avoid any visual impact.

Soils

Soils traversed by the existing route are dominated by Chester-Glenelg and Mt. Airy-Manor soil units². Chester-Glenelg is a well drained and somewhat excessively drained soil that is dominantly undulating and rolling. This soil unit consists of land that is gently sloping to moderately steep with deep to very deep well drained soils formed from schist, phyllite, and saprolite which are found on ridge tops and hills. Areas with these soils are mostly used for agriculture with some urban and woodland areas intermingled. This soil unit is found in about 29 percent of York County (York County Environmental Resources Inventory, 2004).

Mt. Airy-Manor is a well drained soil that is dominantly hilly and steep. This soil unit consists of land that is gently sloping to very steep with moderately deep to very deep soils which are somewhat excessively drained and formed from schist and phyllite on dissected ridges and hills. Uses of land with this soil consist mostly of woodland, with some ridgetops being used for row crops and orchards. Areas with this soil unit make up approximately 10 percent of York County (York County Environmental Resources Inventory, 2004). These soil units are further classified into soil series, which are more descriptive. The soil series present along the existing Manor – Graceton route are identified in Table 5.

² Soil units are grouped based on soil patterns, relief and drainage. Soil units consist of major and minor soils and are named for the major soils.

**Table 5. Soil Series Crossed by the Existing Route
Manor – Graceton Transmission Line**

Soil Unit	Description	Miles of Soil Type Crossed and Percentage of Total Length ¹
York County		
Baile silt loam (Ba)	Very deep, poorly drained, moderately low to moderately high saturated hydraulic conductivity, soils. Slope ranges from 0 to 8 percent.	0.13 (.9%)
Chagrin silt loam (Cd)	Deep, well drained moderately permeable soils. Slopes range from 0 to 3 percent.	0.04 (.3%)
Chester silt loam, 3 to 8 percent slopes (CcB)	Very deep, well drained soils, moderately high to high saturated hydraulic conductivity.	2.12 (14.7%)
Chester silt loam, 8 to 15 percent slopes (CcC)	Very deep, well drained soils, moderately high to high saturated hydraulic conductivity.	0.32 (2.2%)
Codorus silt loam (Cm)	Very deep, moderately well drained and somewhat poorly drained soils, moderately high to high saturated hydraulic conductivity. Slopes of 0 to 3 percent.	0.38 (2.6%)
Glennelg channery silt loam, 3 to 8 percent slopes (Gbb)	Very deep, well drained soils, moderately high to high saturated conductivity.	1.13 (7.8%)
Glennelg channery silt loam, 8 to 15 percent slopes (Gbc)	Very deep, well drained soils, moderately high to high saturated conductivity.	2.72 (18.8%)
Glennelg channery silt loam, 15 to 25 percent slopes (Gbd)	Very deep, well drained soils, moderately high to high saturated conductivity.	0.66 (4.6%)
Glennville silt loam, 0 to 3 percent slopes (GdA)	Very deep, moderately well drained or somewhat poorly drained soils, moderately low to moderately high saturated hydraulic conductivity.	0.14 (1%)
Glennville silt loam, 3 to 8 percent slopes (GdB)	Very deep, moderately well drained or somewhat poorly drained soils, moderately low to moderately high saturated hydraulic conductivity.	0.14 (1%)
Mt. Airy and Manor soils, 3 to 8 percent slopes (MOB)	Moderately to very deep, well drained to somewhat excessively drained soils.	0.43 (3%)

**Table 5. Soil Types Crossed by the Existing Route
Manor – Graceton Transmission Line**

Soil Unit	Description	Miles of Soil Type Crossed and Percentage of Total Length¹
Mt. Airy and Manor soils, 8 to 15 percent slopes (MOC)	Moderately to very deep, well drained to somewhat excessively drained soils.	1.52 (10.5%)
Mt. Airy and Manor soils, 15 to 25 percent slopes (MOD)	Moderately to very deep, well drained to somewhat excessively drained soils.	1.24 (8.6%)
Mt. Airy and Manor soils, 25 to 35 percent slopes (MOE)	Moderately to very deep, well drained to somewhat excessively drained soils.	0.07 (0.5%)
Mt. Airy and Manor soils, 8 to 25 percent slopes, very stony (MPD)	Moderately to very deep, well drained to somewhat excessively drained soils.	0.05 (0.3%)
Mt. Airy and Manor soils, 25 to 60 percent slopes, extremely stony (MRF)	Moderately to very deep, well drained to somewhat excessively drained soils.	2.29 (15.8%)
Lancaster County		
Manor very stony silt loam, 25 to 60 percent slopes (MbF)	Very deep, well drained, moderate to high hydraulic conductivity soils.	0.05 (0.3%)
Udorthents, loamy (Ud)	Gently sloping to moderately sloping areas where the original soil has been cut away or covered with a loamy fill material.	0.14 (1%)

¹Remaining percentage is water

Only minor tree clearing will be required as part of the rebuild and PPL Electric will attempt to utilize existing access roads during construction, thereby minimizing the potential for soil erosion. In order to reduce or mitigate potential impacts from construction activities, PPL Electric will employ a range of soil erosion and sediment control measures. These control measures include the following:

- Environmentally sensitive areas such as wetlands, floodplains, streams, and watersheds are identified within the Study Area. This information is utilized to minimize the environmental impact to soils and other natural resources by avoiding such areas to the extent practical.
- Where practical, road grades and alignments would follow the contour of the land with smooth, gradual curves.
- Where streams are not crossed by access roads, vehicular traffic would be restricted to at least 50 feet from the stream bank to avoid disturbance.
- Access through a wetland would be avoided by routing access roads to higher ground around the wetland or by terminating the access road on either side of the wetland.
- Access through floodplains would be avoided by routing access roads to higher elevations around the floodplain or by terminating the access road on either side of the floodplain.
- Access through watershed areas would be avoided by routing access roads around or by terminating the access road on either side of the watershed area.

In addition, soil and erosion control plans, incorporating applicable elements discussed above, will be required as conditions of federal and state permits that will be required to construct the line. The York County Conservation District (CCD) will also review and approve any such soil

and erosion control plans prior to permit issuance. This review will be coordinated through the DEP.

II. Surface Water Resources and Aquatic Species/Habitats

The existing route is located within the Susquehanna River and Muddy Creek watersheds (York County Environmental Resources Inventory, 2004). The surface water crossings for the existing route were identified initially by utilizing the National Hydrography Dataset (HND) (USGS and EPA, 2005). These data were verified by reviewing aerial photography of the project area, and subsequently, by field inspections.

Pennsylvania Water Quality Standards (Title 25 Pa. Code § 93.3) identify protected water uses which provide the basis for the development of water quality criteria. Special quality water uses consist of exceptional value and high quality waters. Biological uses include the maintenance and propagation of aquatic life, including coldwater and warmwater fisheries, and anadromous fish (i.e., those that live their lives in the sea and migrate to freshwater to spawn) and catadromous fish (i.e., those that live their lives in freshwater and travel to the sea to spawn). The Pennsylvania DEP routinely re-evaluates its water quality designations of water body uses. The majority of designated drainages crossed in the project area are listed as trout stocking fisheries.

The Pennsylvania DEP protects four stream water uses: aquatic life, fish consumption, potable water supply, and recreation. If a stream segment is not attaining any of these four uses, it is considered impaired (Pennsylvania Office of Water Management, 2006).

Based on the NHD (USGS and EPA, 2005), aerial photography (dated 2008), and field delineation conducted in October 2010, the existing route crosses 30 drainages (i.e., water courses). One of these drainages, the Susquehanna River, is considered a major stream (i.e., those with drainage areas of approximately 200 square miles or greater), as derived from the Pennsylvania Department of Transportation streams database. Table 6 lists the drainages crossed by the existing route and identifies the applicable designated use.

**Table 6. Number of Drainage Crossings and Designated Uses
Manor – Graceton Transmission Line**

Name of Surface Water Body	No. of Crossings	Major Stream	PADEP Designated Water Use
Boyds Run	1		WWF
Fishing Creek	1		TSF
Furnace Run	1		CWF
Muddy Creek	1		TSF
Neill Run	2		TSF
Oakland Run	1		CWF
Otter Creek	2		HQ-CWF
Sawmill Run	1		WWF
Susquehanna River	1	Yes	WWF
Wallace Run	1		CWF
Unnamed Tributary of Oakland Run (Reach Code No. 02050306005579)	1		CWF
Unnamed Tributary of Fishing Creek (Reach Code No. 02050306000985)	1		TSF
Unnamed Tributary of Orson Run (Reach Code No. 02050306005706)	1		TSF
Unnamed Tributary of Orson Run (Reach Code No. 02050306000913)	1		TSF
Unnamed Tributary of Neill Run (Reach Code No. 02050306000983)	1		TSF
Unnamed Tributary of Fishing Creek (Reach Code No. 02050306000986)	1		TSF
Unnamed Tributary of Otter Creek (No Reach Code)	1		CWF
Unnamed Tributary of Otter Creek (No Reach Code)	1		CWF

**Table 6. Number of Drainage Crossings and Designated Uses
Manor – Graceton Transmission Line**

Name of Surface Water Body	No. of Crossings	Major Stream	PADEP Designated Water Use
Unnamed Tributary of Oakland Run <i>(No Reach Code)</i>	1		CWF
Unnamed Tributary of Oakland Run <i>(No Reach Code)</i>	1		CWF
Unnamed Tributary of Orson Run <i>(No Reach Code)</i>	1		TSF
Unnamed Tributary of Fishing Creek <i>(No Reach Code)</i>	1		TSF
Unnamed Tributary of Otter Creek <i>(No Reach Code)</i>	1		CWF
Unnamed Tributary of Boyds Run <i>(No Reach Code)</i>	1		WWF
Unnamed Tributary of Muddy Creek <i>(No Reach Code)</i>	1		TSF
Unnamed Tributary of Muddy Creek <i>(No Reach Code)</i>	1		TSF
Unnamed Tributary of Neil Run <i>(No Reach Code)</i>	1		TSF
Unnamed Tributary of Fishing Creek <i>(No Reach Code)</i>	1		TSF
Total	30	1	

CWF = Cold Water Fishery; HQ = High Quality; TSF = Trout Stocking Fishery; WWF – Warm Water Fishery

The 14 drainages identified in Table 6 without a reach code³ number are unnamed intermittent or ephemeral streams. These waterbodies could be considered waters of the Commonwealth that can sustain aquatic life and thus have the same water quality designation as the associated basin stream unless otherwise specified in PA Code Chapter 93. The existing route aerially crosses each of these drainages. As shown in Table 6, the existing route crosses one major stream, one

³ A stream segment is referred to as a “reach.” Unique reach codes are provided by the NHD for networked water features and isolated water bodies.

high quality-cold water fishery (HQ-CWF), eight cold water fisheries (CWF), four warm water fisheries (WWF), and fourteen trout stocking fisheries (TSF).

Water quality will be protected by compliance with the terms and conditions of federal and state permits that will be required prior to the start of construction of the proposed transmission facilities. Compliance with Sections 401 and 404 of the Clean Water Act and Title 25, Chapters 102, 105, and 106 of the Pennsylvania Code will be required. Permit conditions will identify steps that must be taken to meet these legal requirements. If any needed access roads must cross streams using temporary or permanent culverts, the U.S. Army Corps of Engineers would likely require a Section 404 permit and the Pennsylvania DEP would likely require Chapter 105 permits. PPL Electric would adhere to any crossing methods identified in such permits. County Conservation Districts (CCDs) will also review and approve soil and erosion control plans prior to permit issuance. It is likely that this review will be coordinated through the Pennsylvania Department of Environmental Protection (DEP). Best management practices specified in these permits will be implemented during construction activities to minimize potential impacts to the water bodies. No additional impacts are expected following construction.

III. Wetlands

Initially, the routing team used U.S. Fish & Wildlife Service (USFWS) National Wetland Inventory (NWI) maps to identify potentially affected wetlands. Wetland types are grouped based on the classification system developed by Cowardin et al., 1979. The NWI produces information on the characteristics, extent, and status of the country's wetlands and deepwater habitats. Federal, state, and local agencies, academic institutions, and the private sector use the NWI information for reviewing general wetlands for planning purposes. The accuracy of NWI maps varies based upon age, wetland type and size, source photography, and survey methods. Therefore, wetland delineations are necessary to determine the actual wetland totals. PPL Electric subsequently conducted wetland delineations of the Manor – Graceton route between October 25 and October 28, 2010 using the U.S. Army Corps of Engineers 1987 Methodology.

NWI wetlands are mapped using the Cowardin (1979) wetland classification system. Two classifications of wetlands are potentially affected by the project: palustrine and riverine. The palustrine system includes all nontidal freshwater wetlands dominated by trees, shrubs, persistent emergents, emergent mosses or lichens, as well as unvegetated shallow water wetlands such as ponds. Wetland types within the palustrine classification are defined based upon the dominant vegetation type and include forested (PFO), scrub shrub (PSS), emergent marsh (PEM), and open water (ponds) (POW). The riverine classification include all wetlands and deepwater habitats contained in natural or artificial channels periodically or continuously containing flowing water or which forms a connecting link between the two bodies of standing water. A number of subsystems exist within the riverine system, including lower perennial (R2), which is characterized by a low gradient and slow water velocity; upper perennial (R3), which is characterized by high gradient and fast water velocity; and unknown perennial; intermittent (R4), which is characterized by flowing water for only a portion of the year; and ephemeral (R6), which is characterized by a wetland, spring, stream, river, pond, or lake that exists for a short period.

Based on the field wetland delineation activities, and as presented in Table 7, the existing line crosses approximately 20.45 acres (11,535 linear feet) of wetlands and waters of the United States, of which 2.41 acres are PEM wetlands and 18.04 acres are riverine wetlands.

**Table 7. Summary of Wetlands Crossed
Manor – Graceton Transmission Line**

Land Use Type	Acres Crossed	Percentage of Route
Freshwater Emergent Wetland (PEM)	2.41	11.8
Upper Perennial Stream (R3)	17.52	85.7
Intermittent Stream (R4)	0.24	1.2
Ephemeral Stream (R6)	0.27	1.3
Total	20.45	100

The existing transmission line crosses the Susquehanna River. However, the two transmission towers directly above the river and the existing transmission tower located partially on an island within the Susquehanna River will not be replaced as part of this project and no construction will occur within the river. PPL Electric will replace the section of the line above the river and the associated tower within the river when operational or structural requirements dictate its replacement. PPL Electric will use timber mats or other acceptable methods for any needed access road crossings of wetlands and it is not anticipated that any structures would need to be placed in wetlands. If any access roads must cross through wetlands, the U.S. Army Corps of Engineers would likely require a Section 404 permit and Pennsylvania DEP could require Chapter 105 permits. PPL Electric would adhere to any crossing methods identified in those permits.

IV. Vegetation

The National Land Cover Dataset (NLCD, 2001) indicates that the existing route is predominantly forest (44 percent), with lesser amounts of grassland/pasture and cultivated cropland (see Table 2). The existing route is located entirely within the Northern Piedmont level III ecoregion and the Piedmont Uplands level IV ecoregion. Level III ecoregions are ecological areas or divisions small enough to enhance regional environmental monitoring, assessment and reporting, as well as decision-making. Level IV ecological regions are further subdivisions of level III units. Because level III and IV 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 (Woods, 1999). The natural vegetation of the Northern Piedmont ecoregion was originally primarily Appalachian Oak Forest (dominated by white and red oaks). Some Oak-Hickory-Pine Forest occurred along the Susquehanna River and was dominated by hickory (*Carya* spp.), Virginia pine (*Pinus virginiana*), pitch pine (*Pinus rigida*), chestnut oak (*Quercus prinus*), white oak (*Quercus alba*), and black oak (*Quercus velutina*) (Woods, 1999). Remnants of the original vegetation can be found in the cool, very rugged Otter Creek gorge, where chestnut oak, hemlock (*Tsuga canadensis*), beech (*Fagus grandifolia*), sugar maple (*Acer saccharum*), and basswood (*Tilia americana*) still grow (EPA, 1999).

York County

York County is located in the area originally described as the Oak-Chestnut Forest Region. In 1904, the American chestnut was virtually eliminated by the chestnut blight fungus. Today, the forest of this region is more aptly classified as Mixed Oak Forest dominated by white, red (*Quercus. rubra*), and black oaks often mixed with tulip poplar, red maple (*Acer rubrum*), and/or beech. Very little of the original forest cover of the Piedmont Section remains, having been cleared for agriculture and development, or repeatedly logged for lumber and fuel. Tulip poplar (*Liriodendron tulipifera*) is currently a dominant species of many woodlands. In older forests, oaks, hickories, maples, beech, and eastern hemlock are commonly associated with tulip poplar.

One variant of the Mixed Oak Forest is the Hemlock-rhododendron association that occurs on north facing slopes along streams. Black birch (*Betula populifolia* and *B. lenta*) is a common associate in these forests. This community type is common in ravines descending to the Susquehanna River as well as on steep north facing slopes along major creeks including Muddy Creek. Another distinct variant is the Mesic Central Forest community type which occurs on slopes and in ravines adjacent to the Susquehanna River. An example of this community type near the existing route is at the Otter Creek Woods, discussed in more detail under the Special Natural Areas subsection. Forests along the lower Susquehanna, especially those with the least disturbance, may be acting as refugia (i.e., isolated habitat generally unaltered by climate) for plant species such as nodding trillium (*Trillium cernuum*), squirrel corn (*Dicentra canadensis*), and blue cohosh (*Caulophyllum thalictroides*) (PHNP, 2004).

Lancaster County

Lancaster County is also located in what was formerly known as the Oak-Chestnut Region. The region is now considered to be predominantly Appalachian Oak Forest, which is the dominant vegetation type in the drier uplands of Lancaster County. Forests on the lower sections of the slopes and within narrow, shaded valleys along the lower Susquehanna River, where the existing route crosses, tend to be dominated by tulip poplar, red and sugar maple, American beech,

basswood, eastern hemlock, and ash (*Fraxinus americana*). These forests typically support rich shrub and herbaceous layers (PHNP, 2008).

Special Natural Areas

York and Lancaster Counties have Natural Areas Inventories (NAI) prepared by the Nature Conservancy along with the Pennsylvania Natural Heritage Program (PNHP) that include information on the locations of rare, threatened, and endangered species and the highest quality natural areas in the various counties. As described below, the existing route crosses, or is very close to crossing, portions of several natural areas. PPL Electric received GIS data from each county, which included the NAI information. This discussion includes special natural areas that are crossed or located within approximately 500 feet of the existing route. Unless otherwise noted, all information comes from that county's NAI and GIS information. Depending on the county and when the NAI was prepared, the identity of some of the rare species may not be revealed. Special natural areas in the Study Area are shown in Figure 7.

York County (Nature Conservancy, 2004)

Otter Creek Woods (Chanceford and Lower Chanceford Townships) – The route traverses 0.7 mile of Otter Creek Woods. This site is a steep sloped, winding ravine with prominent rock outcrops. Otter Creek flows through the ravine creating scenic pools and small waterfalls. The woodland represents a fair example of a Mesic Central Forest Natural Community and is dominated by eastern hemlock and tulip poplar, with lesser amounts of sweet birch, white ash, and hickory. Some of the largest specimens of eastern hemlock known from the County are found in this forest. The herb layer varies depending on slope position and the amount of light reaching the forest floor. Common herbs include Christmas fern (*Polystichum acrostichoides*), wood fern (*Dryopteris*), Indian cucumber (*Medeola virginiana*), jack-in-the-pulpit (*Arisaema triphyllum*), and mountain laurel (*Kalmia latifolia*). Populations of two species of special concern occur here, umbrella magnolia (*Magnolia tripetala*), Pennsylvania Threatened (PT) and crane fly orchid (*Tipularia discolor*), Pennsylvania Rare (PR). A good population of umbrella magnolia grows on the lower slopes of the ravine. A fair to poor quality population of crane fly

orchid is found on an east facing, mesic wooded slope adjacent to the creek. This site receives a considerable amount of disturbance from recreational hiking.

Boyd's Run Ravine (Chanceford Township) – Boyd's Run is located within 30 feet of the transmission centerline. This site is a steep sloped stream ravine dominated by hemlock and mixed hardwoods. A good to fair population of umbrella magnolia grows in the understory of this forest. There are no threats to this population at this time.

Fishing Creek (Chanceford and Lower Windsor Townships) – The route traverses 2.3 miles of the Fishing Creek ravine. This is a locally significant site where a moderate gradient stream flows through a steep sided forested ravine. The largely undisturbed forest is dominated by eastern hemlock, tulip poplar, and sweet birch (*Betula lenta*), with lesser amounts of sugar maple, red maple, and red oak. The diversity of herbs and shrubs varies depending on topography and slope aspect. Riverweed occurs in the creek at this site, but has been delisted since the original NAI report. This plant species is no longer tracked as a species of special concern. This steep sided, forested ravine supports good plant diversity on its south facing slopes.

Sawmill Run Woods (Lower Chanceford Township) – The route traverses 0.3 mile of Sawmill Run Woods. This site is a scenic steep-sided forested ravine that represents a fair to good example of a Mesic Central Forest Natural Community. The community is characterized by tulip poplar, sugar maple, hemlock, pawpaw (*Asimina sp.*) and a lush understory of ferns and other herbs. The upper slopes support a more xeric forest with chestnut oak, white pine (*Pinus strobus*), sweet birch, and hemlock in the canopy and mountain laurel in the shrub layer. Prominent outcrops line the slopes and Sawmill Run flows through the center of the site over several small waterfalls. A large reproducing population of umbrella magnolia is found growing on the lower slopes. The upper slopes support a small population of lobed spleenwort (*Asplenium pinatifidum*) whose State status is currently recommended for listing as PA-Rare. Erosion and off-trail use are potential threats to this plant. The site receives some disturbance from hiking and from visitors from the adjacent campground. A small section of the Mason-Dixon Trail passes through the ravine.

North Branch Muddy Creek – The route traverses 1.3 miles of North Branch Muddy Creek. This creek forms the border between Lower Chanceford and Peach Bottom Townships. The NAI for York County identifies a few small unique natural areas along the North Branch of Muddy Creek in the vicinity of the Manor – Graceton transmission line. Since the publication of this inventory, the PNHP has grouped some of these areas into a larger area referred to as the North Branch Muddy Creek. Based on a review of the new GIS layer versus the NAI publication, it appears that the Manor – Graceton transmission line traverses through or near Muddy Creek and Woodbine and Southside Woods, which are both described in this section.

Muddy Creek at Woodbine (Lower Chanceford and Peach Bottom Townships) – The route traverses 0.3 mile of Muddy Creek at Woodbine. This site supports a small population of downy lobelia (*Lobelia puberula*), a Pennsylvania threatened species, under a young stand of black cherry (*Prunus serotina*), shagbark hickory (*Carya ovata*), and eastern hemlock. This species is known to occur within the transmission right-of-way on a steep southwest slope above Muddy Creek. A current disturbance at this site is vegetation management to keep the right-of-way free of tall trees. Downy lobelia is vulnerable to the herbicide applications and/or machinery. This population may also be vulnerable to increasing coverage of exotic species such as Japanese honeysuckle (*Lonicera japonica*) and stilt grass (*Microstegium vimineum*). If deemed necessary in consultation with the PA Department of Conservation and Natural Resources (DCNR), PPL Electric will develop a specific vegetation management plan for this area in order to protect the downy lobelia.

Southside Woods (Lower Chanceford and Peach Bottom Townships) – This is a locally significant site which encompasses an area on both sides of Muddy Creek including a ravine along a tributary of the creek. The ravine is dominated by hemlock, tulip poplar, and yellow birch (*Betula alleghaniensis*). Mixed ages of the trees and good regeneration provide good structure for this locally significant community. Although portions of the site were logged in the past 60 years or so, it contains some outstanding hemlocks and tulip poplars.

Apollo Park (Chanceford and Manor Townships) – Apollo Park is located approximately 200 feet from the transmission centerline. This site is a Natural Heritage Area (NHA) managed

area that supports one Pennsylvania rare (PR) species. The western shore of this section of the Susquehanna River has excellent forest cover. This section of the river has been dammed by the Safe Harbor Dam, and the resulting slow body of water is referred to as Lake Clark. River bulrush (*Schoenoplectus fluviatilis*) is a PR species that is adapted to the natural disturbance of seasonal flooding along the river. It is an emergent aquatic plant that can form dense stands from spreading roots.

Lancaster County (Nature Conservancy, 2008)

Safe Harbor Woods (Conoy, East Donegal, Manor, and West Hempfield Townships and Marietta Borough) – The route traverses 0.1 miles of Safe Harbor Woods. This site supports three Pennsylvania species of concern, puttyroot (*Aplectrum hyemale*; Pennsylvania rare), Harbinger-of-Spring (*Erigenea bulbosa*, Pennsylvania threatened), and Clinton’s wood fern (*Dryopteris clintoniana*, Pennsylvania threatened). This wooded habitat on the west side of the mouth of the Conestoga River contains steep-sided, narrow ravines that feed into the Conestoga River in a topographically convoluted landscape. The habitat is moist and rich and supports a diverse spring wildflower community. A small patch of puttyroot occurs mid-slope in a moist, richly forested ravine. Harbinger-of-spring occurs in seepy areas and along the banks of a small creek running through the area. The immediate habitat for this species is spongy, and can be easily disturbed by excessive foot traffic. Clinton’s wood fern was documented on a slope facing Witmer Run, which feeds into the Conestoga River. The population is close to a road and could be vulnerable to roadside maintenance activities. PPL Electric or Corporation owns nearly 90 percent of the rare species core habitat and over 50 percent of the Natural Heritage Area.

Blair, Duncan, Urey, and Weise Islands (Conestoga, Manor, Martic, Chanceford, and Lower Chanceford Townships) – The route traverses 1 mile of this natural area. This site includes a portion of the Susquehanna River between Safe Harbor Dam to the north and Holtwood Dam to the south, which includes a large impounded area of the river referred to as Lake Aldred. There are several large and small islands and bedrock outcrops within the river that provide the required habitat for several species of concern. A broad area of bedrock outcrop is exposed during seasonal low water conditions just below the Safe Harbor Dam. The surrounding uplands

on both sides of the river are primarily forested, through roads, railroads, utility rights-of-way and small villages occur scattered along the banks of the river and adjacent uplands. The site supports populations of four state species of concern, Scarlet ammannia (*Ammannia coccinea*, Pennsylvania endangered), Upright primrose-willow (*Ludwigia decurrens*, Pennsylvania endangered), Tooth-cup (*Rotala ramosior*, Pennsylvania rare), and Sida (*Sida hermaphrodita*, Pennsylvania endangered). Scarlet ammannia inhabits various damp to wet habitats, especially on the shorelines of rivers, streams, and ponds, and may also be found in human-created disturbances that simulate natural habitats. Upright-primrose-willow has only been documented at this site on one occasion. Tooth cup is an annual plant that occupies exposed shorelines, stream margins, streambed outcrops, and other damp, open places. Sida is a tall, robust, perennial plant that is also adapted to the natural disturbance of seasonal flooding along the river. Sida was last observed in 1987.

Additional significant tree clearing will not be required because the line is being reconstructed in existing right-of-way that is maintained generally free of tree growth. The right-of-way will be maintained in accordance with PPL Electric's vegetation management plan. Although it is likely that existing access roads can be used in many cases, it is possible that some vegetation clearing would be required to build new access roads in some locations. PPL Electric will minimize this practice wherever feasible and when species are compatible with existing vegetation clearing and management requirements.

Threatened and Endangered Species

On September 16, 2010, PPL Electric submitted a PNHP Pennsylvania Natural Diversity Inventory (PNDI) Project Planning and Environmental Review Form to USFWS, PA DCNR, PA Game Commission (PGC), and PA Fish and Boat Commission (FBC). On October 25, 2010, PPL Electric received a response letter from PA DCNR indicating that plant surveys should be conducted for the species shown in Table 8:

**Table 8. Requested Threatened, Endangered, and Rare Plant Species Surveys
Manor – Graceton Transmission Line**

Species	Status	Habitat/Survey Request
<i>Ammannia coccinea</i> (Scarlet Ammannia)	PE, Proposed PT	Found in wet, sandy or silty shores; flowers July – August. <i>If disturbance to river shores is anticipated, then this species should be searched for.</i>
<i>Equisetum x ferrissii</i> (Scouring-rush)	N, Proposed PE	Habitat is moist gravelly or sandy circumneutral soils of shores and fields.
<i>Hypericum stragulum</i> (St. Andrew’s-cross)	N, Proposed PT	Found in open woods, thickets, dry sandy soil and serpentine barrens; flowers July – August.
* <i>Lobelia puberula</i> (Downy Lobelia)	PE	Habitat is moist, sandy soil of old fields, gravel pits, and serpentine barrens; flowers late August – September. Downy lobelia was previously found onsite of the existing powerline right-of-way clearing on a steep (45 degree) south-facing slope with a flowing seep.
<i>Rotala ramosior</i> (Tooth-cup)	PR	Habitat is wet sandy shores and other swampy open grounds; flowers July – September. <i>If disturbance to river shores is anticipated, then this species should be searched for.</i>
<i>Schoenoplectus fluviatilis</i> (River Bulrush)	PR	Habitat is moist sandy tidal and non-tidal shores and marshes; fruiting time is June – August. <i>If disturbance to river shores is anticipated, then this species should be searched for.</i>
<i>Sida hermaphrodita</i> (Sida)	PE	Habitat includes stream banks; flowering time is July – October.
<i>Spiranthes lucida</i> (Shining Ladies’-tresses)	N, Proposed PT	Habitat is moist banks, lake shores and wet meadows; flowering time is May – July.

FE=Federally Endangered; PE=Pennsylvania Endangered; PT=Pennsylvania Threatened; PR=Pennsylvania Rare;

TU=Tentatively Undetermined; N=No Legal Status; PX=Pennsylvania Extirpated (i.e., no longer found in PA)

* denotes species known onsite

Unless otherwise specified, a survey will be conducted along the entire route for the identified species

Three of the plant species identified (scarlet ammannia, tooth-cup, and river bulrush) need only be surveyed if there is an anticipated disturbance to shores of the Susquehanna River. As previously mentioned, the existing transmission line crosses the Susquehanna River. However, the portion above the river will not be reconstructed as part of this project. Therefore, surveys for the species associated with the shores of the Susquehanna River will not be necessary at this time. PPL Electric will resolve all PNDI conflicts prior to construction.

Vegetation Management

Starting in 2010, PPL Electric began implementing the wire zone/border zone (WZ/BZ) method for managing transmission rights-of-way in order to reduce the potential for disruptions in service associated with vegetation. The wire zone is defined as that area of the right-of-way corridor that extends from the centerline to a distance of ten feet beyond the conductors on each side. The border zone is 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 will be preserved to the greatest extent possible. Those which would violate the wire security zone before the next scheduled treatment will be removed. All non-compatible species will be removed. In addition, all trees and brush – both compatible and non-compatible species – shall be removed from access roads (15-foot width); in work areas; and within a 15-foot perimeter of a tower or immediately adjacent to any structure location.

While stream crossings and wetland areas are subject to WZ/BZ maintenance, Selective or Restrictive clearing procedures will be followed in areas where topography provides sufficient clearances or specific permits or easement restrictions prevent such management. In selective clearing, low-growing trees and shrubs that are compatible with the operation of the line are preserved wherever possible. In restrictive clearing, an attempt is made to preserve even non-compatible species. The preserved vegetation helps to minimize habitat disruption and short-term environmental impacts of line construction, such as erosion, siltation, and loss of shading, which might result from selective clearing. Vegetation will be conducted in accordance with PPL Electric's current Vegetation Management Specifications which are subject to change from time to time. Additional information from PPL Electric's website for 230/500 kV vegetation

management (URL: <http://www.pplweb.com/community+partners/our+environment/230kV-500kV+transmission+line.htm>).

V. Wildlife

Pennsylvania fauna includes at least 71 species and subspecies of mammals (PA Biological Survey, 2003). The least shrew (*Cryptotis parva*) is a state endangered species that may be found within the fields and meadows of Lancaster and York Counties. Only a handful of sites within York and Adams Counties are known to harbor this species. The Allegheny woodrat (*Neotoma magister*) is a state threatened species whose existence in Lancaster County is now questionable. The state threatened eastern small-footed bat (*Myotis leibii*) likely occurs in both counties. Pennsylvania has over 186 nesting bird species (PA Biological Survey, 2003). Due to heavy agricultural development in the region, grassland birds are common in both counties. Several areas in Lancaster County provide stopover locations for birds during the spring and fall migration. These areas have been identified as Important Bird Areas (IBAs) by Audubon Pennsylvania. The Lower Susquehanna River has been identified as one of these IBAs (Nature Conservancy, 2008).

Pennsylvania's mixed landscapes create a great diversity of habitats for a wide range of reptile and amphibian species (collectively known as herpetofauna). Pennsylvania has 73 species of native amphibians and reptiles, including 36 species of amphibians and 21 species of snakes (PA Biological Survey, 2003). Rebuilding within the existing right-of-way significantly reduces and potentially eliminates habitat destruction and new negative impacts to wildlife.

Natural Areas

York and Lancaster Counties each have a NAI prepared by the Nature Conservancy along with the PNHP that include information on the locations of rare, threatened, and endangered species and the highest quality natural areas in the various counties. As discussed above, the existing route crosses, or is very close to crossing, portions of several natural areas. Rare species found in these natural areas are discussed below. This discussion includes special natural areas that are

crossed or located within approximately 500 feet of the existing route. Unless otherwise noted, all information comes from that county's NAI and GIS information. Depending on the county and when the NAI was prepared, the identity of some of the rare species may not be revealed.

York County (Nature Conservancy, 2004)

The Susquehanna River is an excellent recreational and scenic resource, and is a locally significant site. The river and adjacent forested watersheds comprise one of the major corridors for the movement of biota in central Pennsylvania.

Apollo Park (Chanceford Township and Manor Township) – At its closest point, Apollo Park is located approximately 200 feet from the transmission centerline. The site is a NHA-managed area that supports one Pennsylvania species of special concern. The species of special concern was not identified by name in the NAI.

Lancaster County (Nature Conservancy, 2008)

Safe Harbor Woods (Conoy, East Donegal, Manor, and West Hempfield Townships and Marietta Borough) – The route traverses 0.1 miles of Safe Harbor Woods. This site supports a sensitive animal species of concern, which utilizes the steep, dry, southwest-facing slopes along the Susquehanna River.

Blair, Duncan, Urey, and Weise Islands (Conestoga, Manor, Martic, Chanceford, and Lower Chanceford Townships) – The route traverses 1 mile of this natural area. This site includes a portion of the Susquehanna River between Safe Harbor Dam to the north and Holtwood Dam to the south, which includes a large impounded area of the river referred to as Lake Aldred. This site supports three state species of concern, ospreys (*Pandion haliaetus*), prothonotary warblers (*Protonotaria citrea*), and another sensitive species of concern. The species of special concern was not identified by name in the NAI.

Threatened and Endangered Species

According to the USFWS online database and as shown in Table 9, the following federally listed threatened and endangered species are known to exist in York and Lancaster Counties:

**Table 9. Federal and State Threatened and Endangered Wildlife Species
Manor – Graceton Transmission Line**

Group	Species	Current Status	Proposed Status
Bird	Bald eagle (<i>Haliaeetus leucocephalus</i>)	R/PT	PT
Mammal	Indiana bat (<i>Myotis sodalis</i>)	FE/PE	PE
Reptile	Bog turtle (<i>Clemmys muhlenbergii</i>)	FT/PE	PE

FE=Federally Endangered; PE=Pennsylvania Endangered; PT=Pennsylvania Threatened; R=Federal Recovery

As mentioned previously, On September 16, 2010, PPL Electric submitted a PNDI Project Planning and Environmental Review Form on September 16, 2010. Responses were received from the USFWS on October 12, 2010, from the PFBC on October 13, 2010, and from the PGC on November 16, 2010. Response letters are included in Attachment 6 and summarized below.

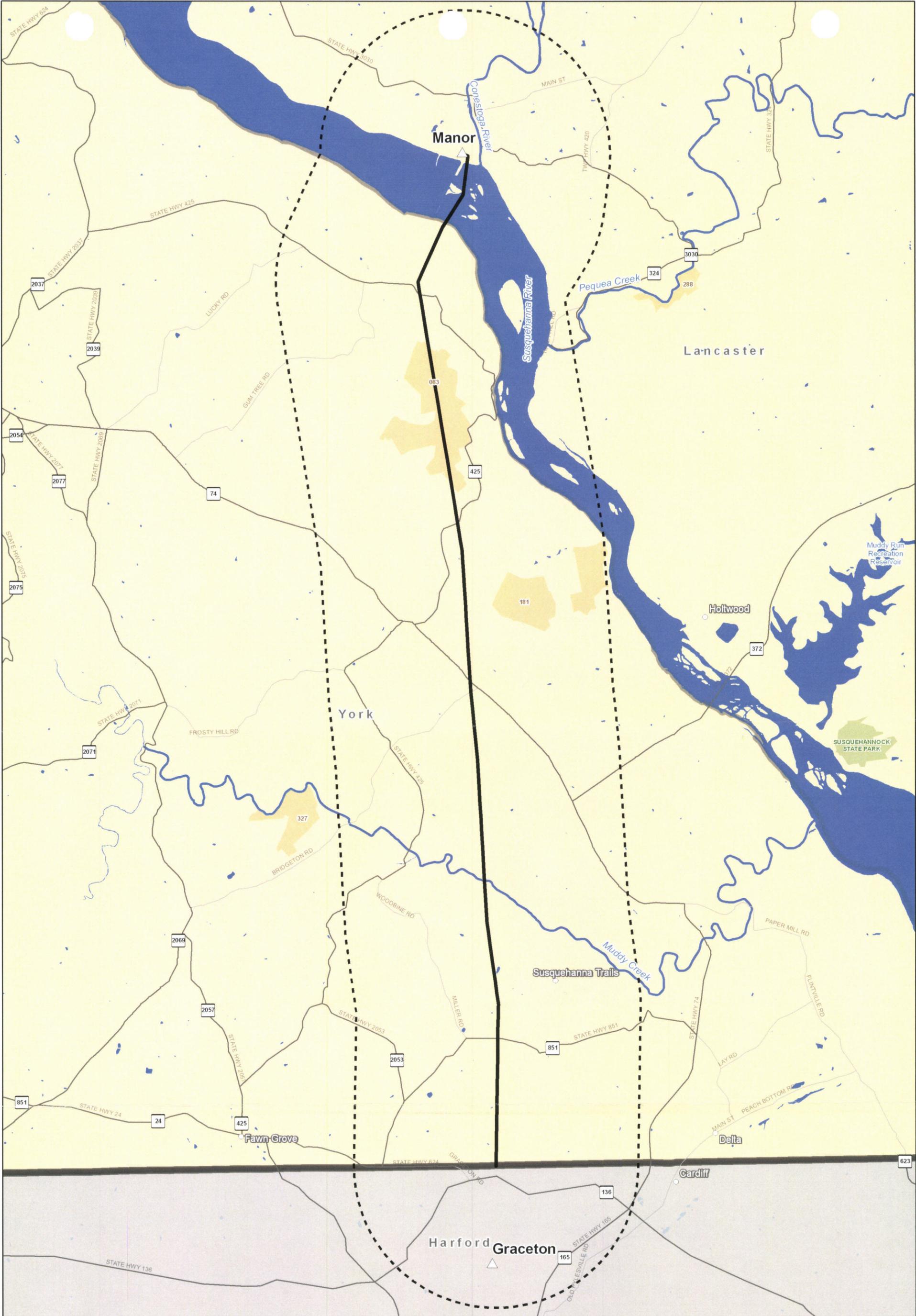
The bog turtle is the only federally listed species that was determined by federal and state agencies (i.e., USFWS and PFBC) to potentially be located within the project area. The USFWS has requested wetland delineations within 300 feet of the proposed project right-of-way and that all wetlands identified within this area should be evaluated for potential suitability as bog turtle habitat. PPL Electric conducted Phase 1 bog turtle surveys during the wetland delineations in October 2010. Initial results from those surveys identified two areas as potential bog turtle habitat. In accordance with USFWS requirements, PPL Electric will complete a formal Phase 1 bog turtle survey report to be submitted to USFWS for concurrence with these findings. PPL Electric will adhere to any resulting USFWS Phase 2 or 3 surveying or permitting requirements.

The PFBC also indicated that the state threatened red-bellied turtle (*Pseudemys rubriventris*) is known to exist in the vicinity of the project. Per the PFBC letter, if wetlands with open water

areas, the Susquehanna River, or the area within 300 feet of these water features are to be disturbed by the proposed project, the PFBC will need to conduct a more thorough evaluation of the potential adverse impacts to the red-bellied turtle. However, if these areas are not disturbed in any way by the proposed activity, and provided best management practices are employed and strict erosion and sedimentation measures are maintained, no adverse impacts to the red-bellied turtle are anticipated. Because no work is planned within the Susquehanna River, and because PPL Electric anticipates being able to span any potential red-bellied turtle habitat, the project is unlikely to adversely impact the red-bellied turtle.

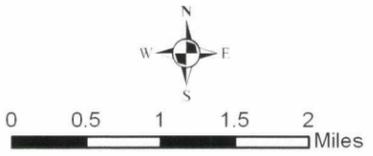
The PGC indicated that no state listed threatened or endangered bird or mammal species are known to existing within the project area. However, the great blue heron (*Ardea herodias*), a state species of special concern, may be located within the project area. Surveys are not required, but the PGC has suggested the following seasonal restriction to avoid potential impacts to nesting great blue heron: all construction activities related to the project that are to occur on the Susquehanna River and/or within Lancaster County should be conducted outside the nesting season to avoid potential impacts to the great blue heron. All construction activities within these areas should occur between August 16 and February 14. PPL Electric will continue to consult with the PGC throughout project planning, design, and construction to minimize any potential impacts to the great blue heron.

PPL Electric will resolve all PNDI conflicts prior to initiation of construction. Rebuilding within the existing right-of-way will not result in additional habitat fragmentation as the right-of-way is currently maintained free of tree growth. Furthermore, the proposed line may actually improve habitat conditions due to the smaller footprint of the monopole structures. Although it is likely that existing access roads can be used in many cases, it is possible that some vegetation clearing would be required to build new access roads in some locations. PPL Electric will minimize this wherever possible.



- Legend**
- City
 - Substations
 - Route
 - Study Area
 - Pennsylvania Gameland
 - State Park
 - Waterbody
 - River
 - Interstate Highway
 - US Highway
 - State Highway
 - Major Road

Figure 1
Project Study Area

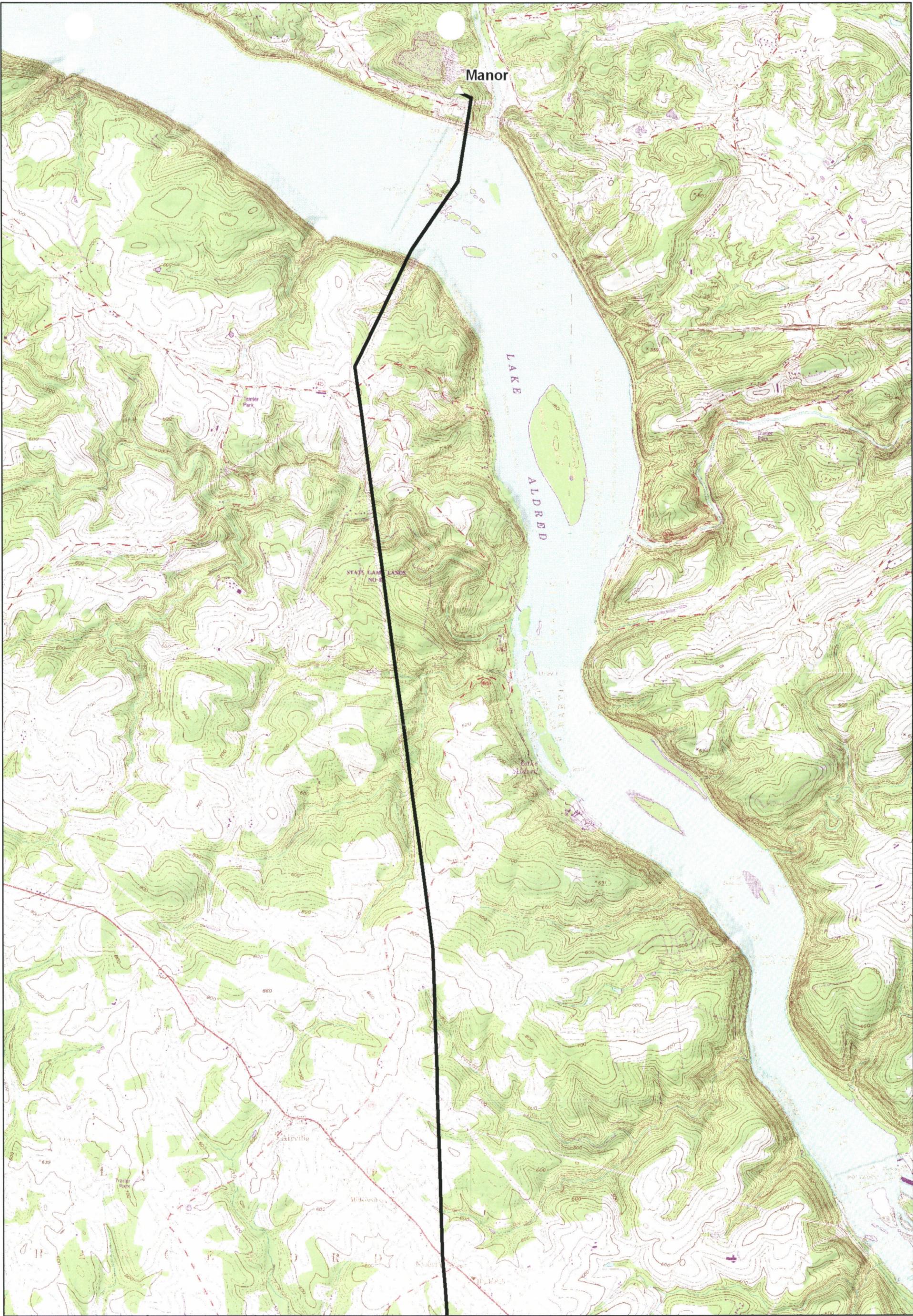


Sources: Pennsylvania Spatial Data Access (PASDA), Environmental Systems Research Institute (ESRI), United States Geological Survey (USGS), United States Fish and Wildlife Service (USFWS), York County.

THE Louis Berger Group, INC.

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





Legend

-  Substations
-  Route

Figure 2A
Topography



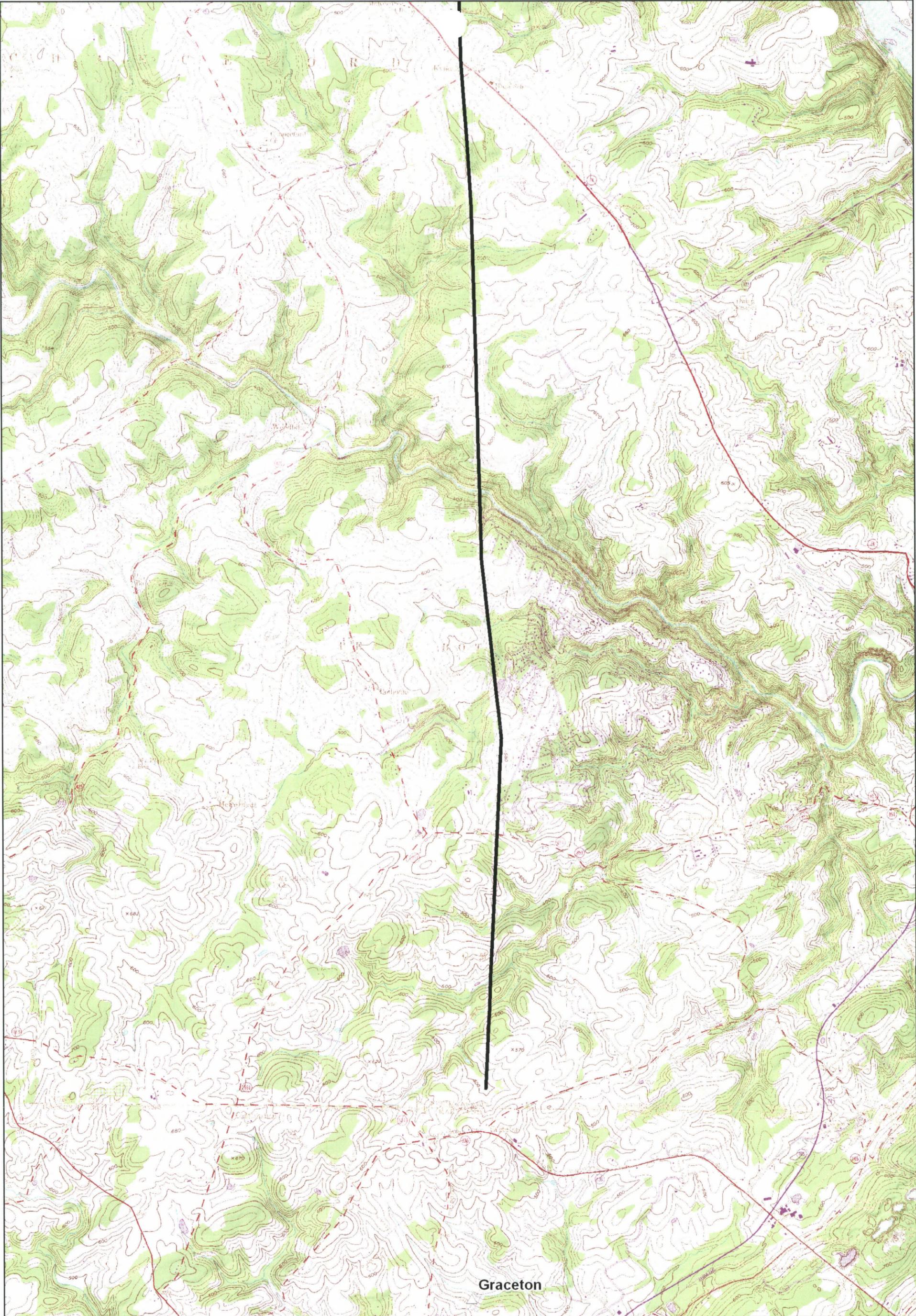
0 0.25 0.5 0.75 1 Miles

Sources: Pennsylvania Spatial Data Access (PASDA),
Environmental Systems Research Institute (ESRI),
United States Geological Survey (USGS),
United States Fish and Wildlife Service (USFWS),
York County.



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





Legend

-  Substations
-  Route

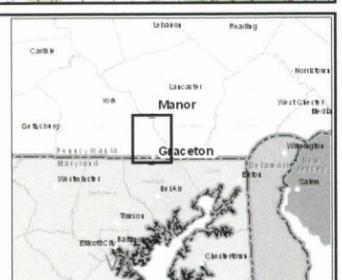
Figure 2B
Topography

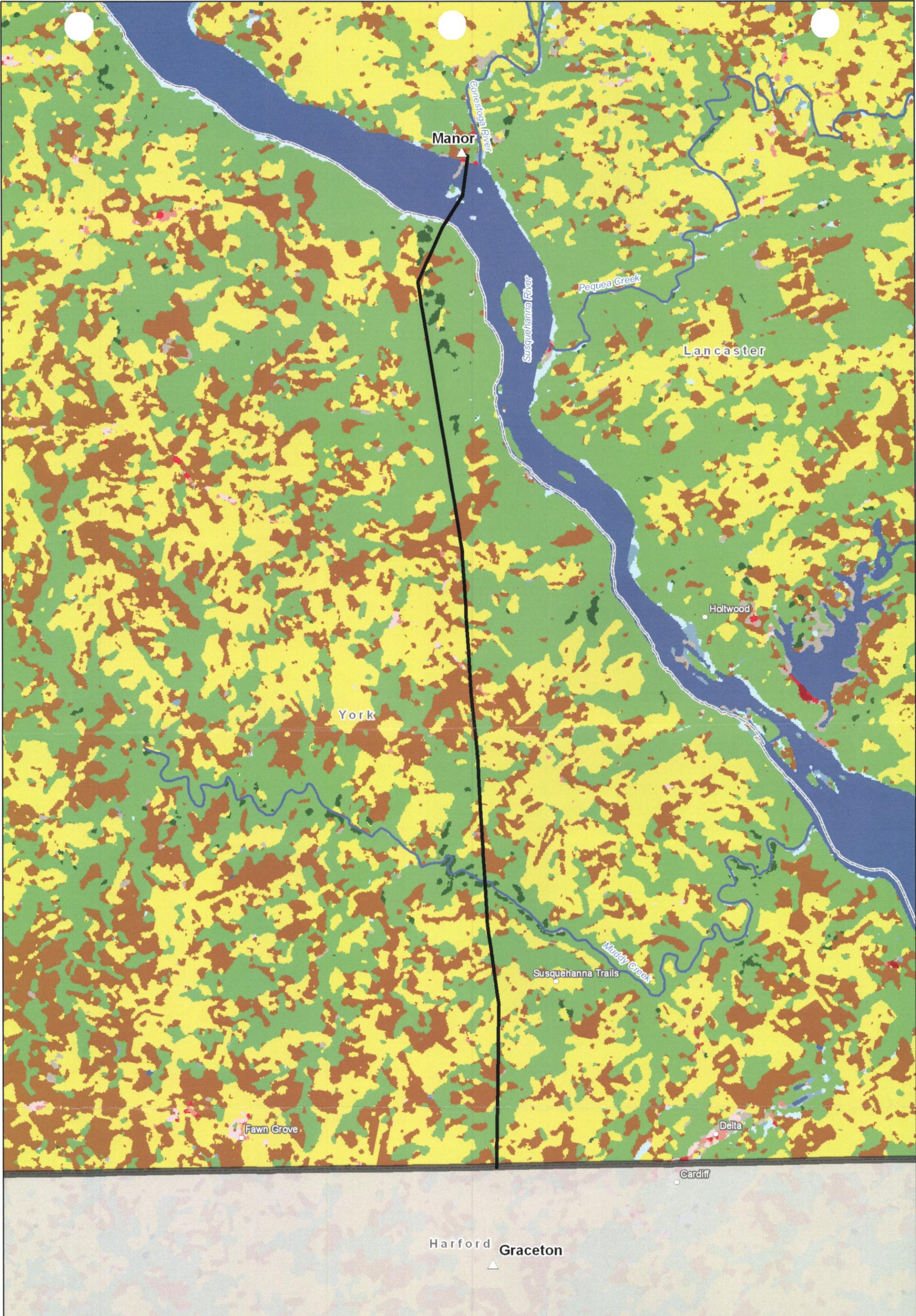


Sources: Pennsylvania Spatial Data Access (PASDA),
Environmental Systems Research Institute (ESRI),
United States Geological Survey (USGS),
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York County.



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

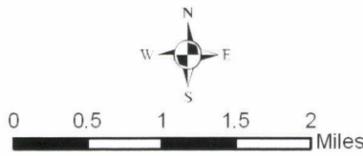




Legend

City	Developed, Medium Intensity	Shrub/Scrub
Substations	Developed, High Intensity	Grassland/Herbaceous
Route	Barren Land	Pasture/Hay
Open Water	Deciduous Forest	Cultivated Crops
Developed Open Space	Evergreen Forest	Woody Wetlands
Developed, Low Intensity	Mixed Forest	Emergent Herbaceous Wetlands

**Figure 3
Land Use**

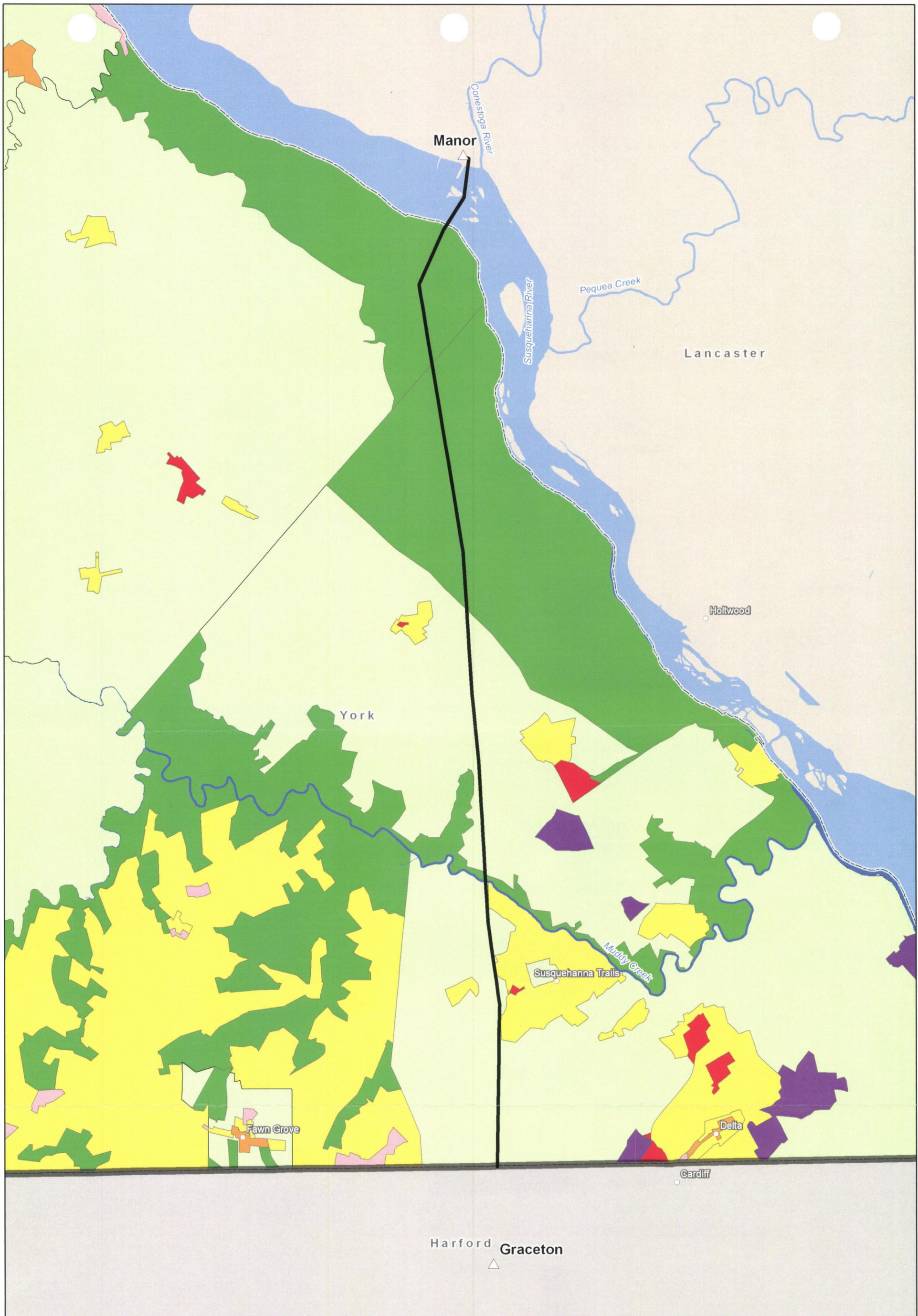


Sources: Pennsylvania Spatial Data Access (PASDA), Environmental Systems Research Institute (ESRI), United States Geological Survey (USGS), United States Fish and Wildlife Service (USFWS), York County.

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

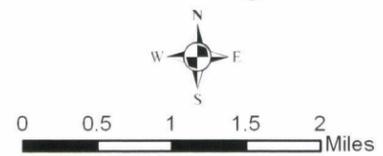




Legend

- City
- △ Substations
- Route
- River
- Agriculture
- Central Business District
- Commercial
- Conservation
- Industrial
- Mixed Use
- Office
- Other
- Residential
- Village

**Figure 4
Zoning**



Sources: Pennsylvania Spatial Data Access (PASDA), Environmental Systems Research Institute (ESRI), United States Geological Survey (USGS), United States Fish and Wildlife Service (USFWS), York County.

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

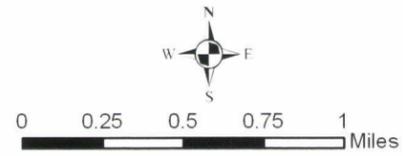




Legend

- City
- Substations
- Route
- River
- Architectural Site
- Interstate Highway
- US Highway
- State Highway
- Major Road

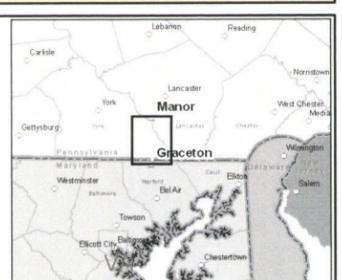
Figure 5A
Cultural Resources

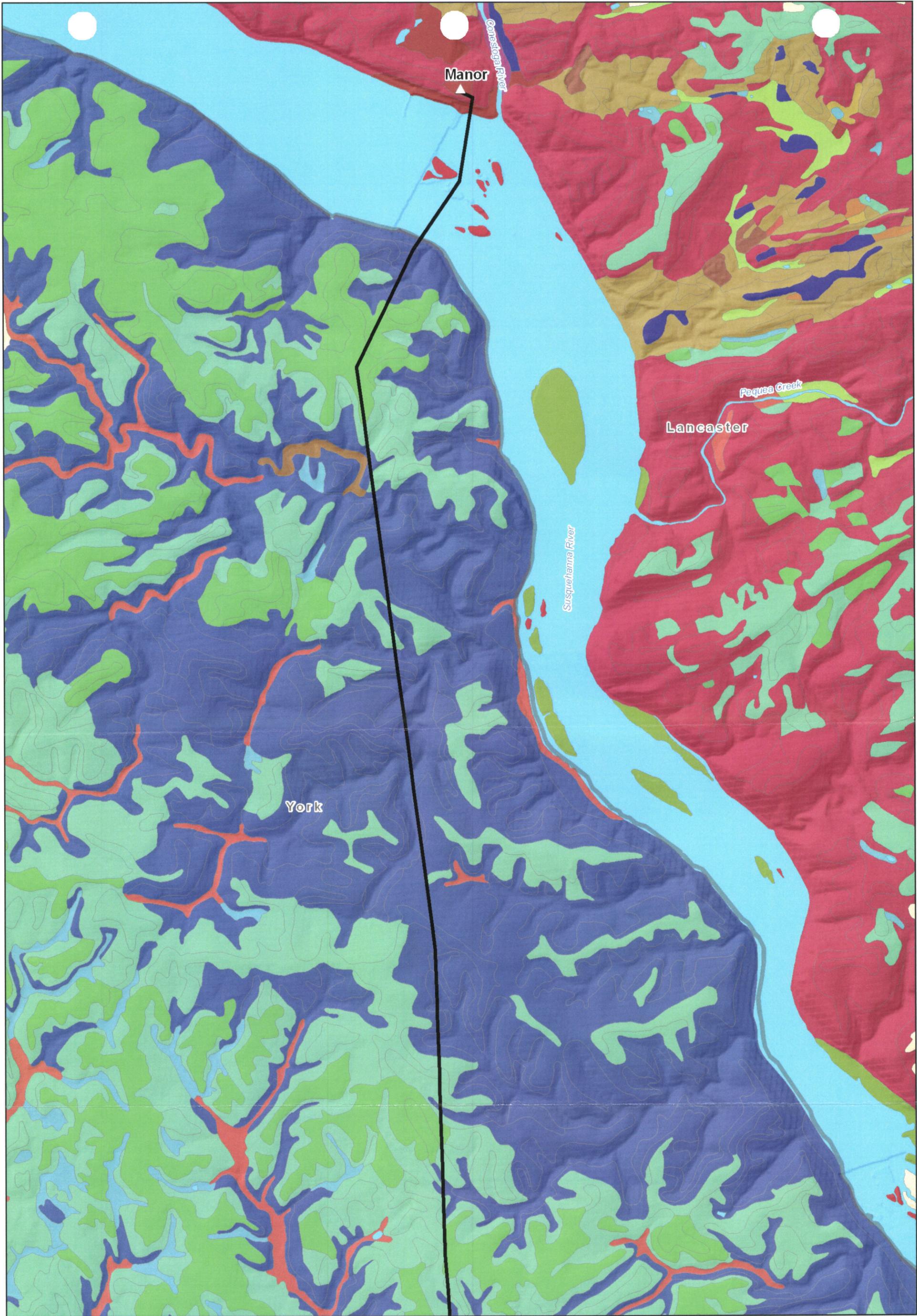


Sources: Pennsylvania Spatial Data Access (PASDA),
Environmental Systems Research Institute (ESRI),
United States Geological Survey (USGS),
United States Fish and Wildlife Service (USFWS),
York County.

THE Louis Berger Group, INC.

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





Legend

Substations	Glenglg	Nolin
Route	Glenville	Pequea
Soils	Hatboro	Pits
Baile	Hollinger	Rock outcrop
Chester	Letort	Udorthents
Chagrin	Mt Airy and Manor	Water
Comus	Manor	
Conestoga	Mount Lucas	
Fluvaquents and Udifluvents	Newark	

Figure 6A
Soils

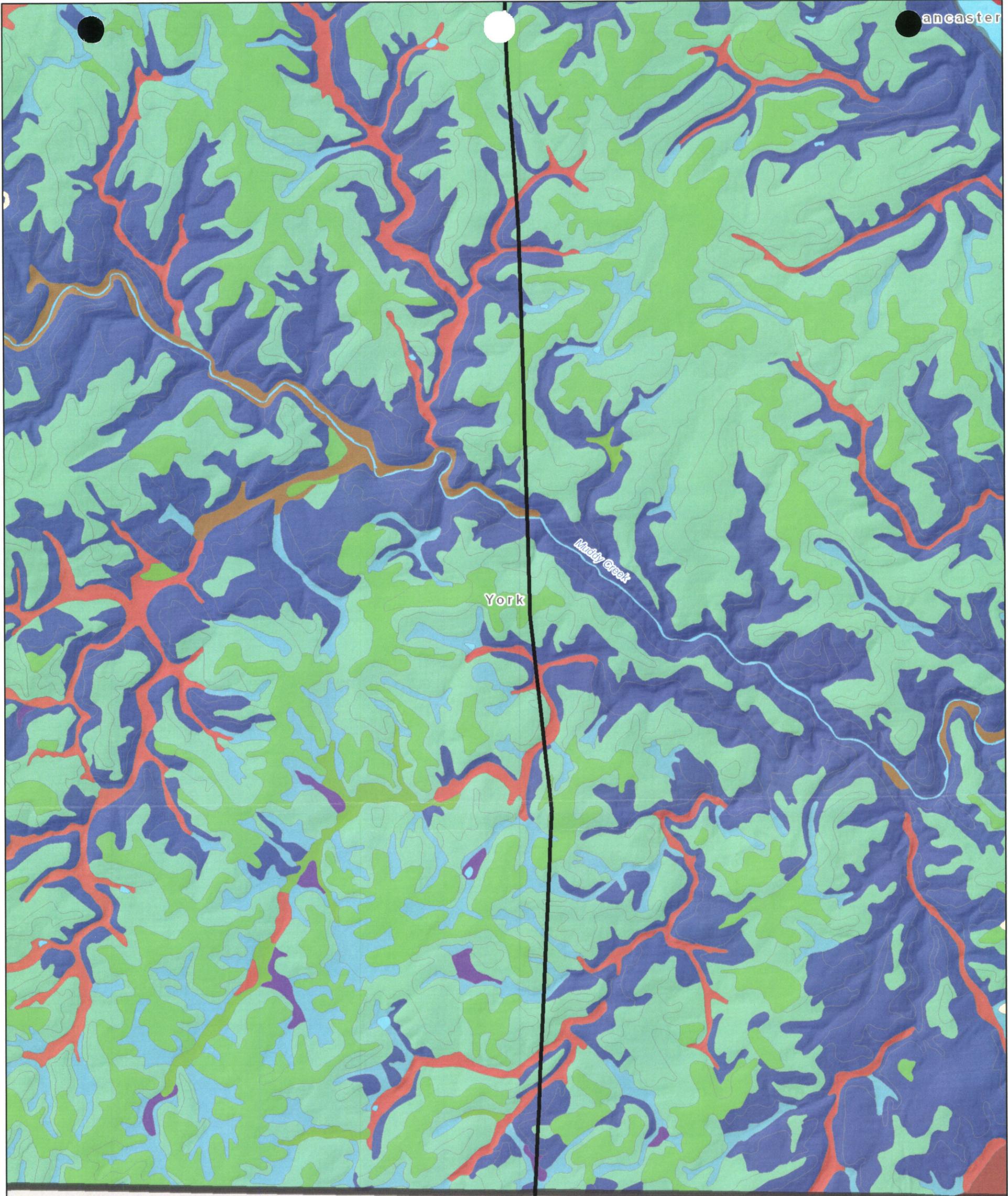


Sources: Pennsylvania Spatial Data Access (PASDA), Environmental Systems Research Institute (ESRI), United States Geological Survey (USGS), United States Fish and Wildlife Service (USFWS), York County.



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





Harford

Graceton

- Legend**
- Substations
 - Route
 - Soils**
 - Baile
 - Chester
 - Chagnin
 - Cornus
 - Conestoga
 - Fluvaquents and Udifluvents
 - Gleneig
 - Glenville
 - Haboro
 - Hollinger
 - Letort
 - Mt Airy and Manor
 - Manor
 - Mount Lucas
 - Newark
 - Nolin
 - Pequea
 - Pits
 - Rock outcrop
 - Udorthents
 - Urban land-Mt Airy complex
 - Water

Figure 6B
Soils



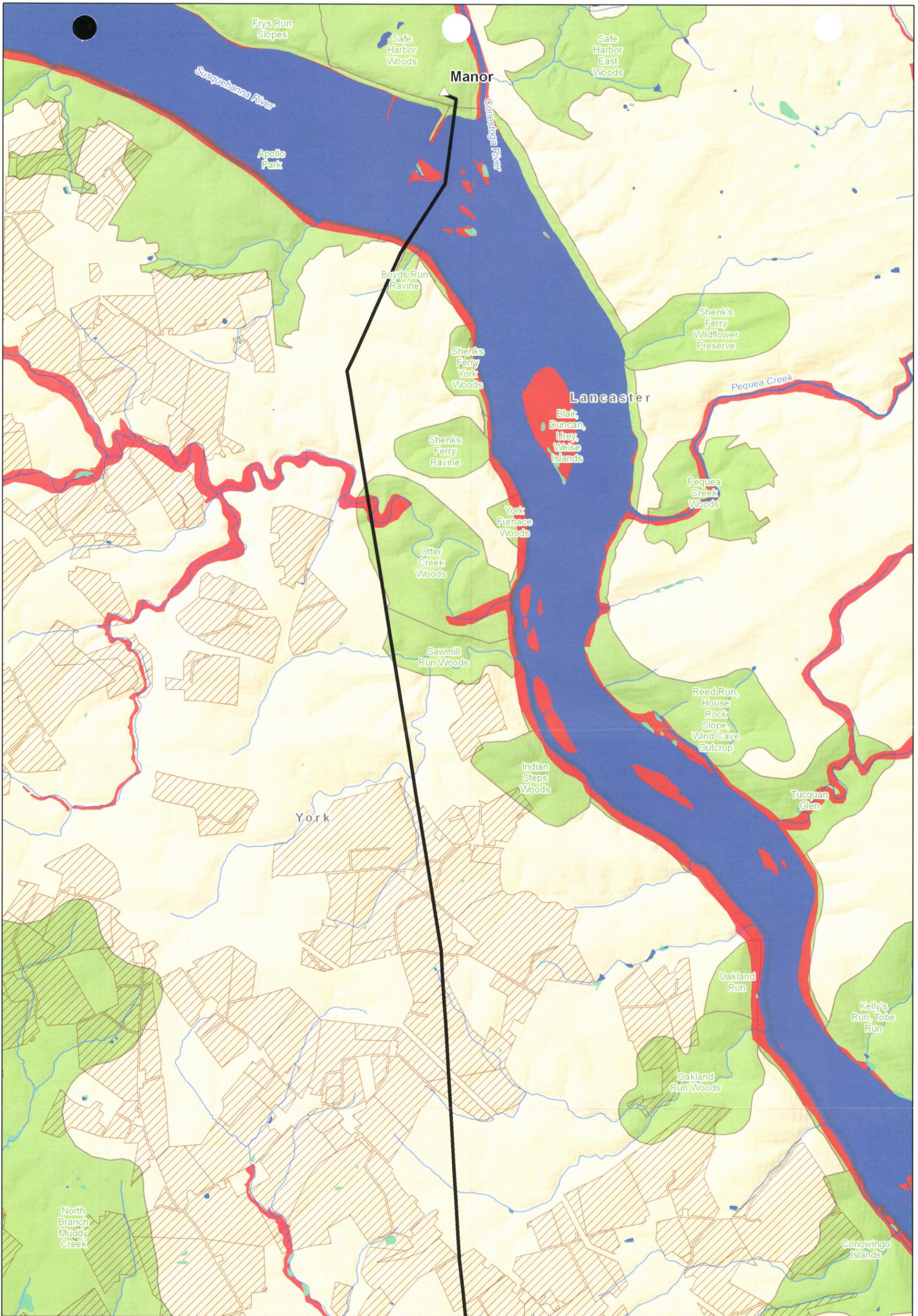
0 0.25 0.5 0.75 1 Miles

Sources: Pennsylvania Spatial Data Access (PASDA), Environmental Systems Research Institute (ESRI), United States Geological Survey (USGS), United States Fish and Wildlife Service (USFWS), York County



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

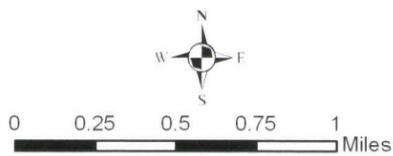




Legend

- △ Substations
- Route
- Stream
- Waterbody
- Wetland (NWI)
- Floodplain
- ▨ Agriculture Preservation
- BDA-Core Area

Figure 7A
Natural Features

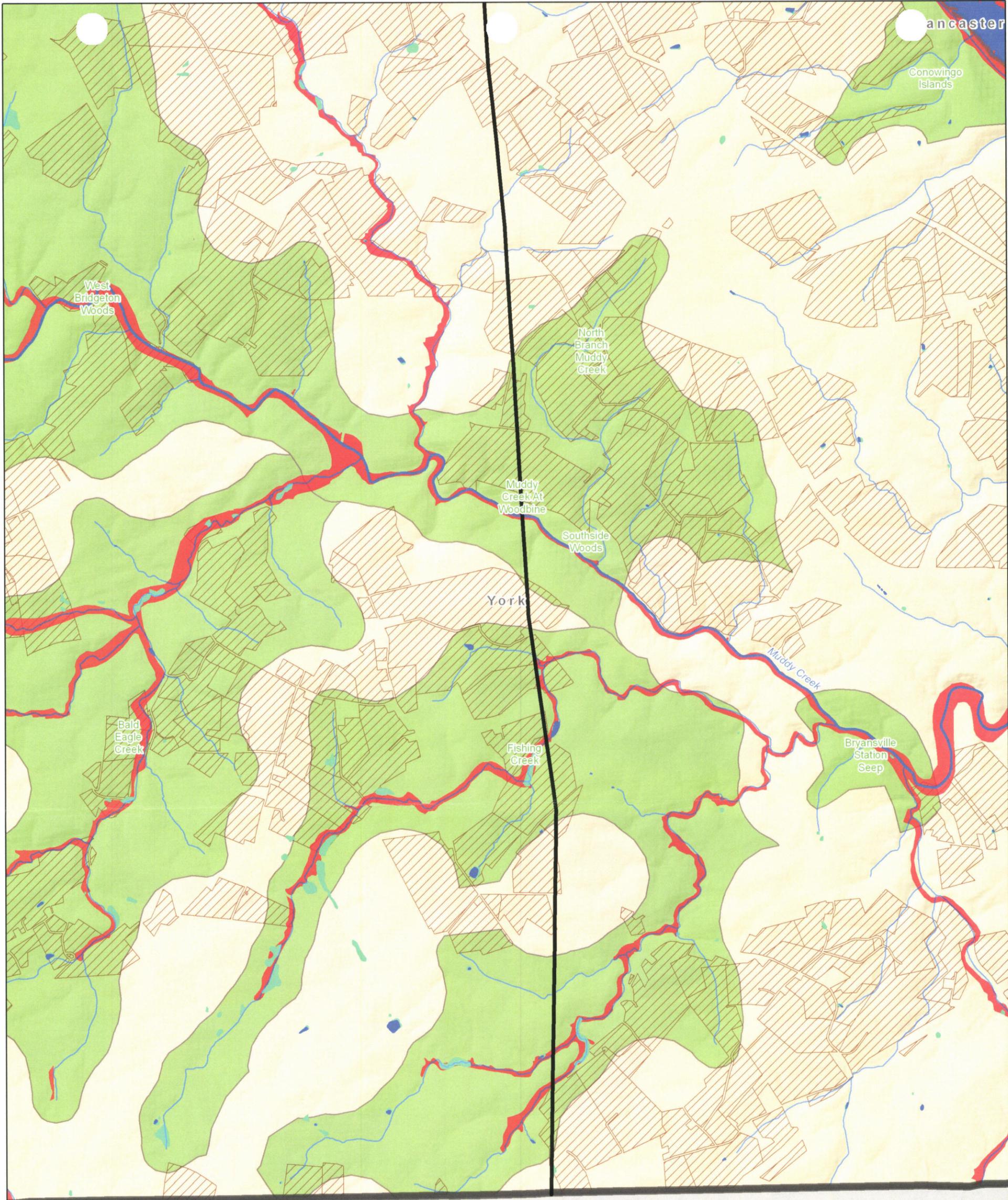


Sources: Pennsylvania Spatial Data Access (PASDA), Environmental Systems Research Institute (ESRI), United States Geological Survey (USGS), United States Fish and Wildlife Service (USFWS), York County.



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



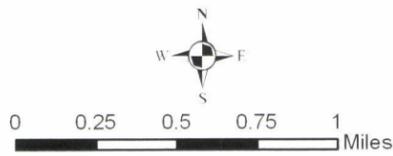


Harford

Graceton

Figure 7B
Natural Features

- Legend**
- △ Substations
 - Route
 - Stream
 - Waterbody
 - Wetland (NWI)
 - Floodplain
 - Agriculture Preservation
 - BDA-Core Area



Sources: Pennsylvania Spatial Data Access (PASDA), Environmental Systems Research Institute (ESRI), United States Geological Survey (USGS), United States Fish and Wildlife Service (USFWS), York County.

THE Louis Berger Group, INC.

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



Attachment

4

ATTACHMENT “4”
MANOR – GRACETON 230 kV TRANSMISSION 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 provisions 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 such things 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

<u>Surface Underneath Conductors</u>	<u>Vertical Clearance to Ground</u>	
	<u>NESC Standard</u>	<u>PPL Electric Design</u>
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

<u>Surface Underneath Conductors</u>	<u>Vertical Clearance to Ground</u>	
	<u>NESC Standard</u>	<u>PPL Electric Design</u>
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

<u>Surface Underneath Conductors</u>	<u>Vertical Clearance to Ground</u>	
	<u>NESC Standard</u>	<u>PPL Electric Design</u>
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:

<u>Voltage-kV</u>	<u>Minimum Clearance</u>
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.

Attachment 5

ATTACHMENT "5"
MANOR – GRACETON 230 kV TRANSMISSION LINE
PPL ELECTRIC MAGNETIC FIELD MANAGEMENT PROGRAM



**MAGNETIC
FIELD
MANAGEMENT
PPL Electric Utilities
Corporation**

DECEMBER 2004

TABLE OF CONTENTS

INTRODUCTION	1
DEVELOPMENT OF PPL EU's MAGNETIC FIELD MANAGEMENT PROGRAM.....	6
VARIABLES THAT AFFECT MAGNETIC FIELDS	6
Effect of Phase Current on Magnetic Fields	6
Effect of Conductor Configuration on Magnetic Fields	7
Effect of Distance from the Magnetic Field Source	7
SUMMARY OF PPL EU's MAGNETIC FIELD MANAGEMENT PROGRAM.....	8
MAGNETIC FIELD MANAGEMENT PROGRAM GUIDELINES	9
Overhead Lines	9
New or Rebuilt Transmission Lines	9
Reconductoring or Adding Additional Circuits to Existing Transmission Lines	14
Distribution Lines	14
Underground Transmission Lines	15
CHARTS.....	16

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

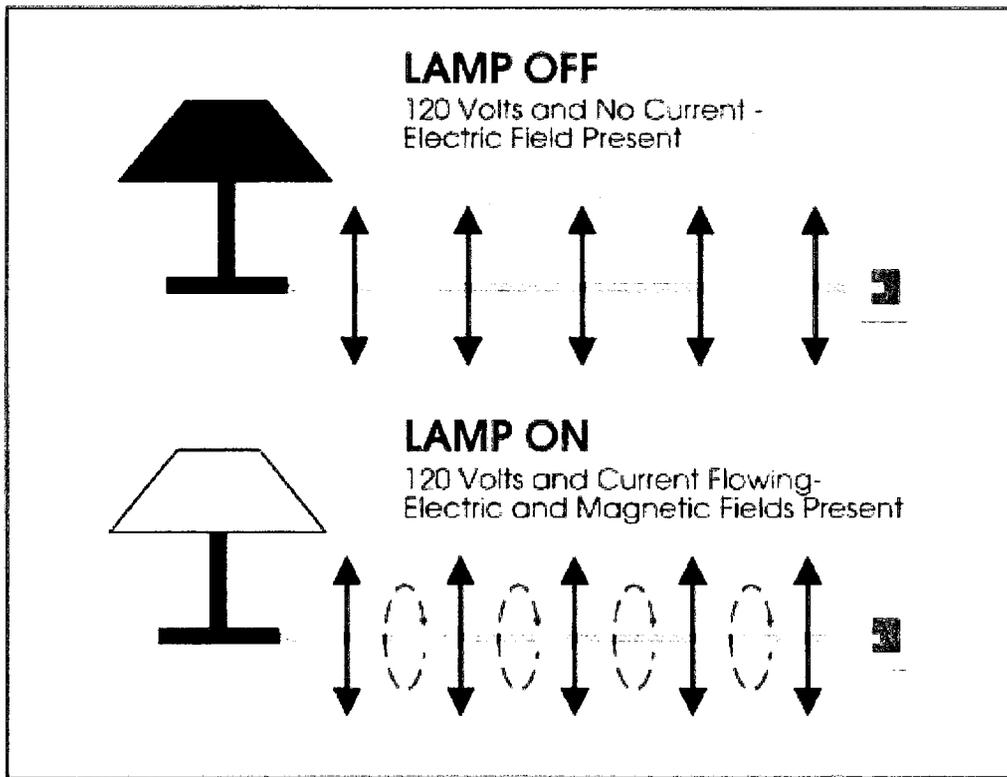


Figure 2

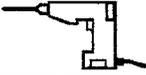
Magnetic field strengths decrease with distance Magnetic fields are measured in milligauss		Source: "EMF In Your Environment", U.S. Environmental Protection Agency 1992		
		At 6 inches	At 1 foot	At 2 feet
Clothes dryer		2 to 10	* to 3	*
Microwave oven		100 to 300	1 to 200	1 to 30
Toaster		5 to 20	* to 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

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.

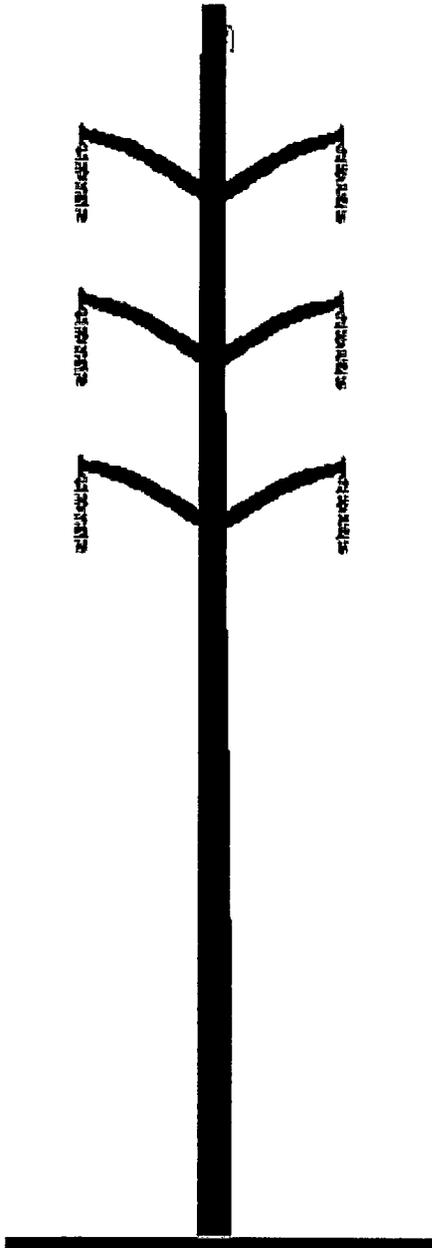
- Main lines are the most heavily loaded sections of a distribution line and therefore have the highest magnetic fields associated with them.
- Increasing the ground clearance by five feet reduces the magnetic field under the line from 14 mG to 11 mG using the standard eight-foot crossarm design. These 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.

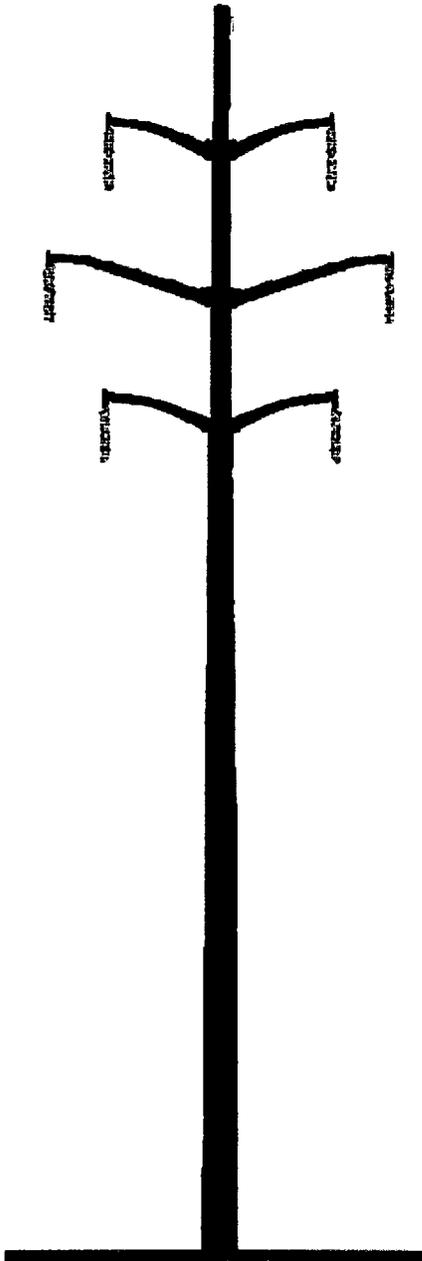
- The phase arrangement that produces the lowest field will be determined.
- The depth of burial of the line will be determined considering the cost of excavation and the location of other buried utilities in the area.
- The use of steel pipe ferromagnetic shielding that reduces magnetic fields will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



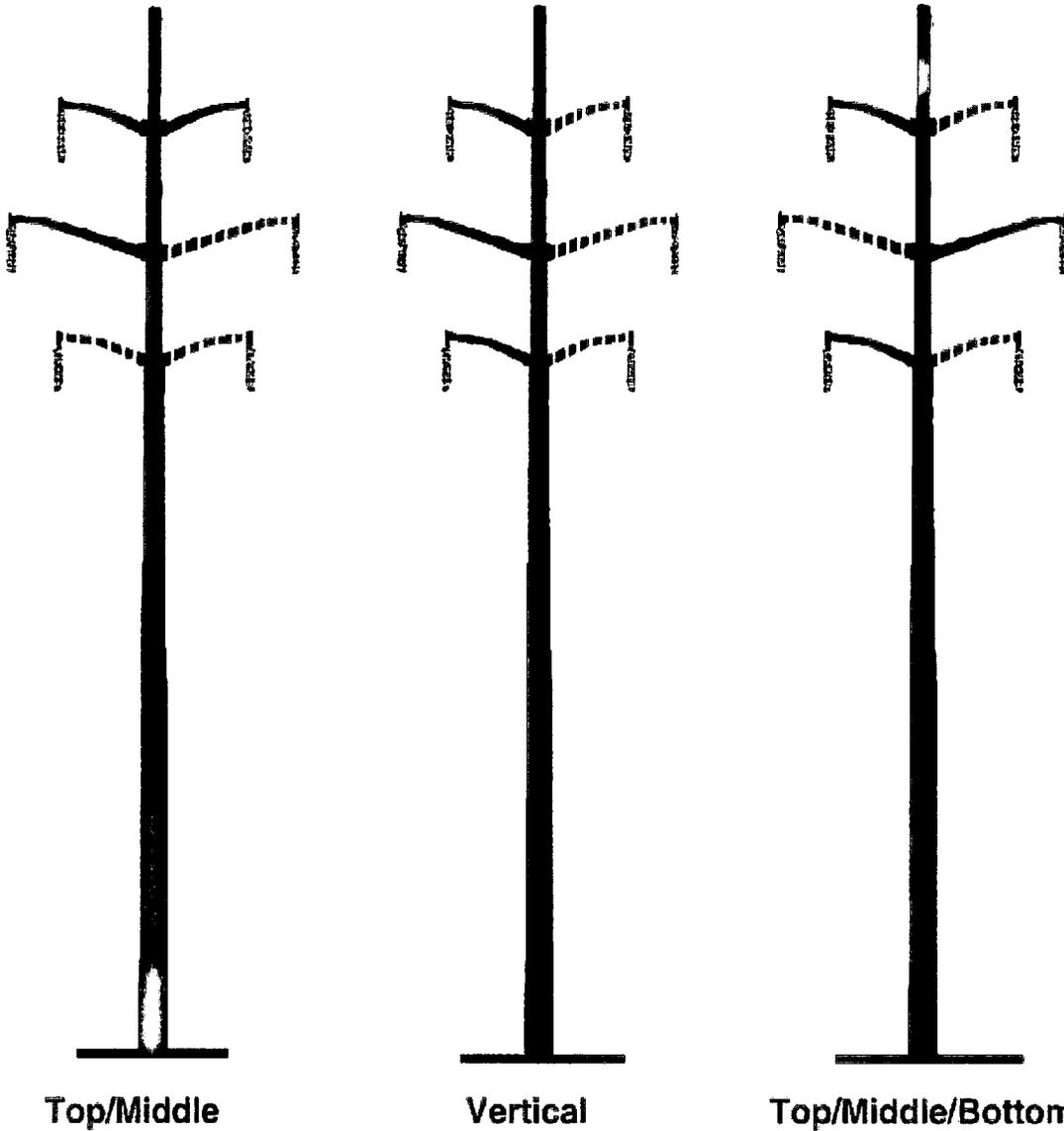
- Lower cost alternative
- Reduces magnetic fields due to higher structures
- Typical conductor data:
 - 1 3/8" HS steel overhead ground wire - 17.3 feet sag
 - 6-556.5 KCMIL 24/7 ACSR power conductors - (PARAKEET) 23.0 feet sag
 - Average span - 600 feet

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

TYPE CONSTRUCTION	MAGNETIC FIELD IN MILLIGAUSS 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



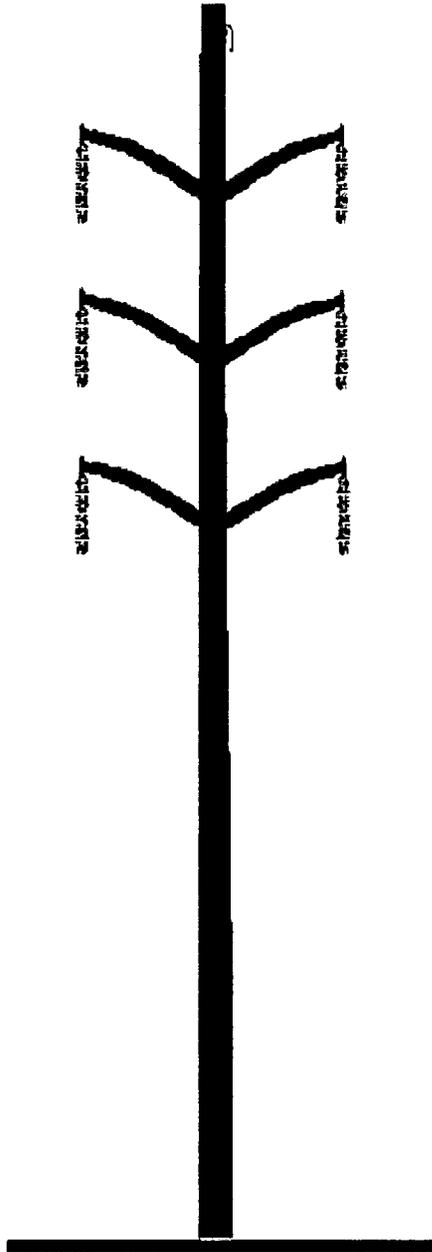
————— initial single circuit
- - - - - future second circuit

**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

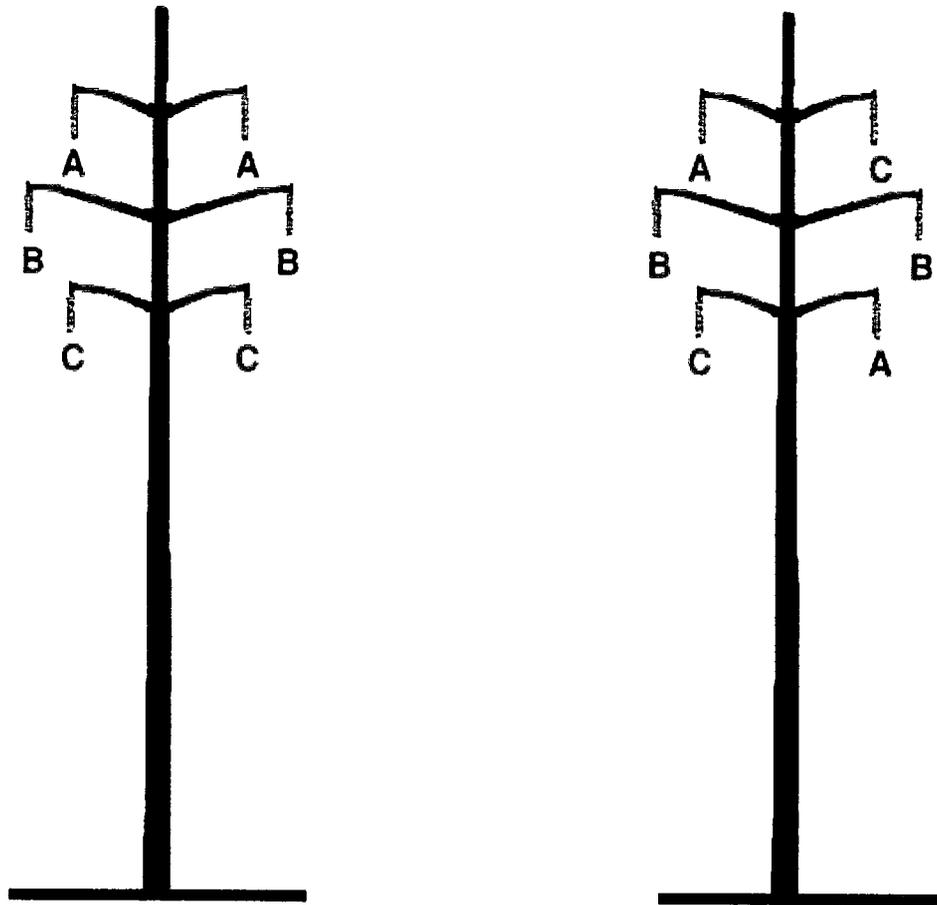
The edge of right of way is 50 feet from the line centerline.
The 400 ampere phase current is balanced between phases.
Calculations are based on a minimum ground clearance of 25 feet.

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: $\longrightarrow \longrightarrow \longrightarrow \longrightarrow$ 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

**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.

**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.

**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.

**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.

**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.

Attachment 6

ATTACHMENT “6”
MANOR – GRACETON 230 kV TRANSMISSION LINE
LIST OF GOVERNMENTAL AGENCIES, MUNICIPALITIES AND
OTHER PUBLIC ENTITIES

PPL Electric consulted with various agencies, municipalities, elected officials and their staff, and other public entities to gather information for the route planning process or otherwise notify of the proposed project. PPL Electric and its representatives sent notification letters to Lancaster and York Counties and the municipalities traversed by the existing route to notify them of the planned project, obtain input and data regarding the project and resources in the project study area, address concerns, and gain valuable input toward understanding potential impacts of the project. Additional information was also requested from and consultation was held with federal, state, and local agencies regarding threatened and endangered species, cultural resources, and other environmental, land use, and permitting requirements and considerations. Copies of consultation and notification letters are appended to this attachment.

The agencies and groups consulted or notified include the following:

Federal Agencies

U.S. Army Corps of Engineers
Baltimore District– CENAB-OP-R
Regulatory Branch
P.O. Box 1715
Baltimore, Maryland 21203–1715

U.S. Fish and Wildlife Service
Pennsylvania Field Office
315 South Allen Street, Suite 322
State College, PA 16801-4850

State Agencies

Pennsylvania Department of Environmental
Protection
Rachel Carson State Office Building
PO Box 2063
400 Market Street
Harrisburg, PA 17105-8767

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

Pennsylvania Game Commission
2001 Elmerton Avenue
Harrisburg, PA 17110-9797

Pennsylvania Fish and Boat Commission
1601 Elmerton Avenue
PO Box 67000
Harrisburg, PA 17106-7000

Pennsylvania Historical and Museum
Commission
State Historic Preservation Office
300 North Street
Harrisburg, PA 17120

Pennsylvania Department of Transportation
Commonwealth Keystone Building
400 North Street, 8th Floor
Harrisburg, PA 17120

Peach Bottom Township Board of
Supervisors
545 Broad Street
Delta, PA 17314

Regional/Local Agencies

Chanceford Township Board of Supervisors
P.O. Box 115
Muddy Creek Road
Brogue, PA 17309

Peach Bottom Township Planning
Commission
545 Broad Street
Delta, PA 17314

Chanceford Township Planning Commission
P.O. Box 115
Muddy Creek Road
Brogue, PA 17309

York County Board of Commissioners
28 East Market Street
Room 216
York, PA 17401

Lancaster County Board of Commissioners
Office of the County Commissioners
150 North Queen Street
Suite 715
Lancaster, PA 17603

York County Planning Commission
28 East Market Street
Room 301
York, PA 17401

Lancaster County Planning Commission
150 North Queen Street
Suite #320
Lancaster, PA 17603

York County Agricultural Land
Preservation Board
118 Pleasant Acres Road Suite F
York, PA 17402

Other Groups

Lower Chanceford Township Board of
Supervisors
4120 Delta Road
Airville, PA 17302

PECO
Attn: Mr. Denis O'Brien, President
2301 Market Street
P.O. Box 8699
Philadelphia, PA 19101

Lower Chanceford Township Planning
Commission
4120 Delta Road
Airville, PA 17302

Metropolitan Edison Company
Attn. Mr. Donald Brennan, President
2800 Pottsville Pike
P.O. Box 16001
Reading, PA 19612-6001

Manor Township Board of Supervisors
950 West Fairway Drive
Lancaster, PA 17603

Manor Township Planning Commission
950 West Fairway Drive
Lancaster, PA 17603

CONSULTATION AND NOTIFICATION LETTERS



United States Department of the Interior



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

October 12, 2010

Sue Sutter
The Louis Berger Group, Inc.
1001 Elm Street
Suite 203
Manchester, NH 03101

RE: USFWS Project #2010-1436

Dear Ms. Sutter:

This responds to your letter of September 16, 2010, requesting information about federally listed and proposed endangered and threatened species within the area affected by PPL Electric Utilities, Manor-Graceton 230 kV transmission line replacement project located throughout multiple townships, York and Lancaster 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 project is within the known range of the bog turtle, 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.

To determine the potential effects of the proposed project on bog turtles and their habitat, begin by identifying all wetlands in, and within 300 feet of, the project area. The project area includes all areas that will be permanently or temporarily affected by any and all project features, including building, roads, staging areas, utility lines, outfall and intake structures, wells, stormwater retention or detention basins, parking lots, driveways, lawns, etc. The area of investigation should be expanded when project effects might extend more than 300 feet from the project footprint. For example, the hydrological effects of some projects (*e.g.*, large residential or commercial developments; golf courses; community water supply wells) might extend well beyond the project footprint due to the effects that impervious surfaces or groundwater pumping may have on the hydrology of nearby groundwater-dependent wetlands. Wetlands should be included on a map showing existing as well as proposed project features.

If someone qualified to identify and delineate wetlands has, through a field investigation, determined that no wetlands are located in or within 300 feet of the project area (or within the expanded investigation area, as described above), it is not likely that your project will adversely affect the bog turtle. If this is the case, no further consultation with the Fish and Wildlife Service is necessary, although we would appreciate receiving a courtesy copy of the wetland investigator's findings for our files.

If wetlands have been identified in or within 300 feet of the project area (or in an expanded investigation area, as described above), assess their potential suitability as bog turtle habitat, as described under "Bog Turtle Habitat Survey" (Phase 1 survey) of the *Guidelines for Bog Turtle Surveys* (revised April 2006). Survey results should be submitted to the Service for review and concurrence. The survey guidelines, as well as a Phase 1 field form and report template, are available from the Service upon request.

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). 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 or near the project 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 retained 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 should be done, 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 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. 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 or require further assistance regarding this matter.

Sincerely,

A handwritten signature in black ink, appearing to read "Clinton Riley", written in a cursive style.

Clinton Riley
Field Office Supervisor

Enclosures



Pennsylvania Fish & Boat Commission

Division of Environmental Services
Natural Diversity Section
450 Robinson Lane
Bellefonte, PA 16823-9620
(814) 359-5147 Fax (814) 359-5175

October 13, 2010

IN REPLY REFER TO:
SIR# 35068

THE LOUIS BERGER GROUP
SUE SUTTER
100 ELM STREET
SUITE 203
MANCHESTER, NH 03101

**RE: Species Impact Review (SIR) – Rare, Candidate, Threatened and Endangered Species
MANOR-GRACETON TRANSMISSION LINE
MULTIPLE MUNICIPALITIES, YORK, LANCASTER Counties, Pennsylvania**

Dear Ms. SUTTER:

I have examined the project narrative and map accompanying your recent correspondence, which shows the location for the above-referenced project. Based on records maintained in the Pennsylvania Natural Diversity Inventory (PNDI) database and our own files, the state endangered and federally listed threatened bog turtle (*Glyptemys mihlenbergii*) and the state threatened red-bellied turtle (*Pseudemys rubriventris*) are known from the vicinity of the project site.

The bog turtle is a small (up to a 4 inch carapace) semi-aquatic, omnivorous turtle that prefers open marshy wetlands associated with springs and groundwater, specific vegetative communities and mucky soils for burrowing. This species is restricted to the southcentral and southeast portions of Pennsylvania. However, due to the lack of pristine habitat found in its range from disturbance and plant successional processes, the bog turtle has, in some cases, become accustomed to disturbed, low quality wetland complexes often with semi-closed canopies. Bog turtles are also known to be transients in forested habitat that are associated with springs and small streams leading to more open marshes. They use these habitats as dispersal corridors to other wetlands. The bog turtle is threatened by habitat destruction, poor water quality and poaching.

In an effort to streamline our threatened and endangered species environmental review process, reduce the redundancy in project reviews and ease our staff workload, the Pennsylvania Fish and Boat Commission has delegated coordination/consultation of joint state/federally listed species impact reviews to the PA Field Office of the U.S. Fish and Wildlife Service (USFWS). Please send your project materials *if you have not already done so* to them at: **U.S. Fish and Wildlife Service, Endangered Species Section, 315 South Allen St. Suite 322, State College, PA 16801-4851**. The proposed route of this transmission line will have to be evaluated for potential wetland impacts and will require consultation with the USFWS if wetlands are within the area of disturbance.

The red-bellied turtle is one of Pennsylvania's largest native aquatic turtles. This turtle species is known to inhabit relatively large, deep streams, rivers, ponds, lakes and marshes with permanent water and ample basking sites. Red-bellied turtles are restricted to the southcentral and southeastern regions of the

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Commonwealth. The existence of this turtle species is threatened by habitat destruction, poor water quality, and competition with aggressive non-native turtle species that share its range and habitat (e.g., red-eared slider, *Trachemys scripta elegans*).

Based on the review of the submitted information and the project's proximity to nearby red-bellied turtle occurrences, there is potential for there to be suitable habitat on-site for these turtles that will require further investigation. **Therefore, if wetlands with open water areas, the Susquehanna River or the area within 300 ft of these water features are to be disturbed from the project activity, we will need to conduct a more thorough evaluation of the potential adverse impacts to the red-bellied turtle.** Items including detailed project plans for these areas, project narrative, general habitat descriptions, and color photographs of the project area, wetlands identification and delineation, stream characterization (flow velocity, width, depth, substrate type, pools and riffles, identification of basking areas, logs, woody debris, presence of aquatic vegetation) would expedite our review process. Pending the review of this information, a habitat assessment or survey targeting the presence of the species of concern may be warranted.

However, if wetlands or water bodies or the area within 300 ft of these water features are not to be disturbed in any way by the proposed activity, and provided that best management practices are employed and strict erosion and sedimentation measures are maintained, I do not foresee any adverse impacts to red-bellied turtle or any other rare or protected species under Pennsylvania Fish & Boat Commission jurisdiction.

Note that this office performed no field inspection of the project area. Consequently, comments in this letter are not meant to address other issues or concerns that might arise concerning matters under Pennsylvania Fish and Boat Commission jurisdiction or that of other authorities. If you have any questions regarding this response, please contact Kathy Gipe (814-359-5186) and **refer to the SIR number at the top of this letter**. Thank you for your cooperation and attention to this matter of threatened and endangered species conservation and habitat protection.

Sincerely,

Christopher A. Urban, Chief
Natural Diversity Section

CAU:KDC:gm



**COMMONWEALTH OF PENNSYLVANIA
Pennsylvania Game Commission**

**2001 ELMERTON AVENUE
HARRISBURG, PA 17110-9797**

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WILDLIFE PROTECTION	717-783-6526
WILDLIFE HABITAT MANAGEMENT	717-787-6818
REAL ESTATE DIVISION	717-787-6568
AUTOMATED TECHNOLOGY SERVICES	717-787-4076

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**BUREAU OF WILDLIFE
HABITAT MANAGEMENT**

717-787-6818

November 16, 2010

Large Project Review

Ms. Sue Sutter
The Louis Berger Group, Inc.
75 2nd Avenue, Suite 700
Needham, Massachusetts 02494

Re: Manor-Graceton 230 Kv Transmission Line
York and Lancaster Counties, Pennsylvania

Dear Ms. Sutter,

Thank you for submitting the Manor-Graceton 230 Kv Transmission Line to the Pennsylvania Natural Diversity Inventory (PNDI) for review. 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 bird species of special concern, and therefore, are not a target species for a survey:

Scientific Name	Common Name
<i>Ardea herodias</i>	<i>Great Blue Heron</i>

However, because of their ecological significance, the following seasonal restriction and conservation measure is suggested to avoid potential impacts to nesting great blue heron:

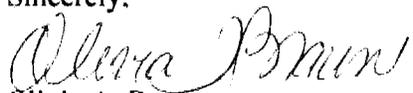
- *All construction activities related to this project located that are to occur on the Susquehanna River and/or within Lancaster County shall be conducted outside the nesting season to avoid potential impacts to great blue heron. All construction activities within these areas shall occur between August 16 and February 14. This seasonal restriction does not apply to activities associated with this project within York County.*
- *Potential impacts to **State Game Lands #083** may be associated with your project. Please contact Mr. Robert A. Einodshofer, Land Management Supervisor, at (814) 643-1831 to discuss the project activities and coordinate obtaining the necessary approvals if your project will impact State Game Lands. It is recommended that you coordinate with Game Commission Staff early in your project planning process.*

This response represents the most up-to-date summary of the PNDI data files and is valid for one (1) year 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 an additional year.

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. Braun

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: OBraun@state.pa.us

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BUREAU OF FORESTRY

October 25, 2010

PNDI Number: 20992

Sue Sutter**Louis Berger Group, Inc.**

1001 Elm Street, Suite 203

Manchester, NH 03101

FAX: 603+-644-5220 (hard copy will not follow)

Re: Manor-Graceton 230 kV Transmission Line
Lancaster and York Counties

Dear Ms. Sutter,

Thank you for your submission of the Pennsylvania Natural Diversity Inventory (PNDI) Environmental Review Large Project Number 20992 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

PNDI records indicate species or resources of concern are located within the vicinity of the project area. Based on a detailed PNDI review, DCNR determined potential impacts to the following threatened or endangered species or species of special concern.

Scientific name	Common Name	PA Current Status	PA Proposed Status
<i>Ammannia coccinea</i>	Scarlet Ammannia	PE	PT
<i>Equisetum x ferrissii</i>	Scouring-rush	N	PE
<i>Hypericum stragulum</i>	St Andrew's-cross	N	PT
* <i>Lobelia puberula</i>	Downy Lobelia	PE	PE
<i>Rotala ramosior</i>	Tooth-cup	PR	PR
<i>Schoenoplectus fluviatilis</i>	River Bulrush	PR	PR
<i>Sida hermaphrodita</i>	Sida	PE	PE
<i>Spiranthes lucida</i>	Shining Ladies'-tresses	N	PT

* denotes species known onsite

Next Steps**Survey Request**

PNDI records indicate species or resources of concern are located within the vicinity of the project area. Based on a detailed PNDI review, DCNR determined potential impacts to the following threatened or endangered species or species of special concern.

***Ammannia coccinea* (Scarlet Ammannia):** habitat is described in Plants of PA, by Rhoads and Block as wet, sandy or silty shores; flowers July-August. Scarlet ammannia was found nearby on a flood-scoured sand and gravel alluvial floodplain. If disturbance to river shores is anticipated, then this species should be searched for.

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PNDI Number: 20992

- Equisetum x ferrissii* (Scouring-rush):** habitat is described as moist gravelly or sandy circumneutral soils of shores and fields. Scouring-rush was found nearby in habitat described as an old quarry.
- Hypericum stragulum* (St Andrew's-cross):** habitat is open woods, thickets, dry sandy soil, and serpentine barrens; flowers in July-August. St. Andrew's-cross was found nearby on a dry gravelly slope.
- **Lobelia puberula* (Downy Lobelia):** habitat is moist, sandy soil of old fields, gravel pits and serpentine barrens; flowering time is late August-September. Downy lobelia was previously found onsite of the existing powerline right-of-way clearing on a steep (45degree) SS-facing slope with a flowing seep. Management comments include keeping succession down and maintaining an open right-of-way.
- Rotala ramosior* (Tooth-cup):** habitat is wet sandy shores and other swampy open grounds; flowers July-September. Tooth-cup was found nearby on an alluvial island. If disturbance to river shores or alluvial banks are anticipated, then tooth-cup should be searched for.
- Schoenoplectus fluviatilis* (River Bulrush):** habitat includes moist sandy tidal and non-tidal shores and marshes; fruiting time is June-August. River bulrush was found nearby in a silt/sand bar at the mouth of a tributary of the Susquehanna River. If disturbance to river shores or alluvial banks are anticipated, then river bulrush should be included in the survey.
- Sida hermaphrodita* (Sida):** habitat is simply described as stream banks in Rhoads and Block; flowering time is July-October. Sida was found nearby in a deep, rich loose soil in a rich mesic ravine along the Susquehanna River.
- Spiranthes lucida* (Shining Ladies'-tresses):** habitat is moist banks, lake shores and wet meadows, usually on calcareous soils; flowering time is May-July. Shining ladies'-tresses was found nearby in wet gravel in an old quarry.

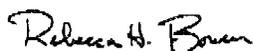
A survey for the above species should be conducted by a qualified botanist *at the appropriate time of year and then submitted to our office for review*. Your botanist should *fill out the field survey form while performing their survey*: <http://www.naturalheritage.state.pa.us/InternetFieldSurveyForm.pdf>. 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 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 summary of the PNDI data files and is valid for one (1) year 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).

This finding applies to impacts to DCNR only. To complete your review of state and federally-listed threatened and endangered species and species of special concern, please be sure the U.S. Fish and Wildlife Service, PA Game Commission, and the Pennsylvania 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,



Rebecca H. Bowen, Environmental Review Manager FOR Chris Firestone, Wild Plant Program Mgr.
Ph: 717-772-0258 ~ c-rbowen@state.pa.us

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THE Louis Berger Group, INC.

1001 Elm Street, Suite 203, Manchester, NH 03101
Telephone: 603-644-5200 Fax: 603-644-5220

September 16, 2010

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

Re: Manor-Graceton 230 kV Transmission Line Project
Request for Project Review for Pennsylvania Natural Diversity Inventory
Large Project

We request, on behalf of PPL Electric Utilities, that your agency provide a Pennsylvania Natural Diversity Inventory (PNDI) review for current state and federal listed rare, threatened, and endangered species and habitats that are known to occur, or that could potentially occur, in the vicinity of the Study Area for the proposed Manor-Graceton 230 kV Transmission Line (Project).

PPL Electric Utilities has determined that the existing, single-circuit Manor-Graceton 230 kV transmission line between PPL EU's Manor Substation, located near the Safe Harbor Hydroelectric Project and dam on the north/east side of the Susquehanna River in Conestoga Township, Lancaster County, and the Pennsylvania-Maryland border in Peach Bottom Township, York County, must be replaced with a new double-circuit 230 kV line and structures. This segment of line is approximately 14.5 miles long and is being replaced/supplemented as part of the PPL EU Asset Optimization Strategy (AOS) program.

PPL EU intends to submit a Letter of Notification (LON) to the Pennsylvania Utility Commission (PUC) in order to rebuild this transmission line in its current location. This rebuild will entail new transmission structures and conduit on existing right-of-way. PPL EU does not anticipate the need for additional right-of-way for this rebuild. The line will cross the Susquehanna River in the vicinity of the Safe Harbor plant at the same location as the existing transmission line. In Pennsylvania, the proposed transmission line traverses portions of York and Lancaster counties, and is shown on the attached map which depicts the USGS topographic quad names crossed. The existing transmission line crosses the following USGS quad maps: Safe Harbor, Airville, and Fawn Grove.

We have attached the completed PNDI Form. If you would like a GIS shapefile of the Project on individual USGS quad maps, please let me know and we'll be happy to provide it. Similarly, if you are able to provide the locations of any records you find during your PNDI search on a shapefile for us, we would appreciate it.



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, Siting Supervisor
 Address: Two North Ninth St (Genn4) Allentown, Pa 18101
 Phone Number: 610.774.5956 Fax Number: 610.774.6239

Contact Person Information - if different from applicant

Name: Sue Sutter The Louis Berger Group, Inc.
 Address: 75 2nd Ave. Suite 700 Needham, MA 02494
 Phone Number: 781-707-7445 Fax Number: 781-444-0099

Project Information

Project Name: Manor-Graceton 230 Kv Transmission Line
 Project Location: York And Lancaster Counties
 Municipality: Too Many To Show County: York And Lancaster
 Attach a copy of a U.S.G.S. 7 1/2 Minute Quadrangle Map with Project Boundaries clearly marked.
 U.S.G.S. Quad Name: Safe Harbor, Airville, Fawn Grove,

Project Description

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

PPL Electric Utilities (EU) proposed to replace the existing, single-circuit Manor-Graceton 230 kV transmission line segment between PPL EU's Manor Substation, located near the Safe Harbor Hydroelectric Project and dam on the north/east side of the Susquehanna River in Conestoga Township, Lancaster County, and the Pennsylvania-Maryland border in Peach Bottom Township, York County, with a new double-circuit 230 kV line and structures. This segment of line is approximately 14.5 miles long and is being replaced as part of PPL EU's Asset Optimization Strategy (AOS) program. This replacement will entail new transmission structures and conduit on existing right-of-way. The line will cross the Susquehanna River in the vicinity of the Safe Harbor plant at the same location as the existing transmission line.

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 Xng 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

US Fish and Wildlife Service

How to Use the PNDI Project Planning & Environmental Review Form

How do I access the PNDI Environmental Review Tool?

Visit www.naturalheritage.state.pa.us. Click on "PNDI Project Planning and Environmental Review" on the bottom left corner of the homepage to access the tool. Follow this link to access the ER Tool and for step-by-step instructions on using the ER Tool, FAQ's and access to an electronic version of the PNDI Form.

When do I use this form?

1. Before conducting the PNDI online search

The Applicant can complete the PNDI Form and submit it to the person conducting the online PNDI Project Planning and Environmental Review Tool search. This person performing the search could be someone from DEP, the County Conservation Districts, or a consultant. Alternatively, if the Applicant plans to conduct the PNDI online search his or herself—a search form is not needed prior to the PNDI online search.

2. After conducting the PNDI online search

If your PNDI Project Environmental Review Receipt has "Potential Impacts," DEP and the jurisdictional agencies require that you submit additional information to the agencies noted on the Receipt for further review. Please send a copy of the PNDI Receipt, a completed PNDI Form, and a USGS 7.5 minute quadrangle map with project boundaries delineated on the map to the agencies referenced on your PNDI Receipt.

3. If your Project is a "Large Project"— too large/long to search on the online system

Projects are considered "Large Projects" when the ENTIRE project is:

- Linear/Large Projects that exceed map limits: approximately 2-2.84 miles depending on browser size
- Projects that will not fit on 1:24,000 scale map. Project Maximums: 1024 x 768 browsers: 2625 acres; 15,000 feet long x 7600 feet wide; approximately 2.84 miles 800 x 600 browsers: 1050 acres; 11,000 feet long x 4000 feet wide; approximately 2 miles
- Township-wide, Countywide or Statewide Projects. Examples: Act 537 Sewage Plans, Wind Farms, Roadway Improvements exceeding map limits above.

For "Large Project" review, please forward a completed PNDI Form and a USGS 7.5 minute quadrangle with project boundaries and quad name marked on the map to DCNR, PFBC, PGC, and USFWS (contact information on page 1 of form). Due to system limitations and agency requirements, projects should not be submitted piecemeal. The entire project area including roads and infrastructure should be submitted as a single unit.

PNDI Form Definitions

Applicant: Person that owns the property or is proposing the project or activity

Contact Person: Person to receive response if different than applicant (e.g. Consultant)

Project Name: Descriptive title of project (e.g. Twin Pines Subdivision, Miller Bridge Replacement)

Project Location: Description of actual location (e.g. Intersection of Smith and Clay Rd., Latitude & Longitude)

Proposed Activity: Include ALL earth disturbance activities for project (e.g. for a timber sale—include stream crossings, cutting areas and new roadway accesses). Also include Current Conditions (e.g. housing, farmland, current land cover), and how Construction/Maintenance Activity is to be accomplished

Total Acres of Property: Entire site acreage (e.g. timber sale property—including road access (200 acres)

Acreage to be Impacted: Disturbance acreage (e.g. timber sale—if the property is 200 acres, but only 100 acres will be disturbed, for example: cutting on 90 acres, a road impacting 10 acres); include all temporary and permanent activities



Legend

-  Substations
-  Study Area

Manor-Graceton 230 kV Line

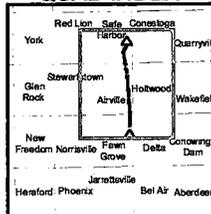


0 0.5 1 1.5 2 2.5
Miles

MAP INDEX



QUAD INDEX





THE Louis Berger Group, INC.

1001 Elm Street, Suite 203, Manchester, NH 03101
Telephone: 603-644-5200 Fax: 603-644-5220

September 16, 2010

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

Re: Manor-Graceton 230 kV Transmission Line
Request for Project Review for Pennsylvania Natural Diversity Inventory
Large Project

We request, on behalf of PPL Electric Utilities, that your agency provide a Pennsylvania Natural Diversity Inventory (PNDI) review and Species Impact Review (SIR) for current state and federal listed rare, threatened, and endangered species and habitats that are known to occur, or that could potentially occur, in the vicinity of the Study Area for the proposed Manor-Graceton 230 kV Transmission Line (Project).

PPL Electric Utilities has determined that the existing, single-circuit Manor-Graceton 230 kV transmission line between PPL EU's Manor Substation, located near the Safe Harbor Hydroelectric Project and dam on the north/east side of the Susquehanna River in Conestoga Township, Lancaster County, and the Pennsylvania-Maryland border in Peach Bottom Township, York County, must be replaced with a new double-circuit 230 kV line and structures. This segment of line is approximately 14.5 miles long and is being replaced/supplemented as part of the PPL EU Asset Optimization Strategy (AOS) program.

PPL EU intends to submit a Letter of Notification (LON) to the Pennsylvania Utility Commission (PUC) in order to rebuild this transmission line in its current location. This rebuild will entail new transmission structures and conduit on existing right-of-way. PPL EU does not anticipate the need for additional right-of-way for this rebuild. The line will cross the Susquehanna River in the vicinity of the Safe Harbor plant at the same location as the existing transmission line. In Pennsylvania, the proposed transmission line traverses portions of York and Lancaster counties, and is shown on the attached map which depicts the USGS topographic quad names crossed. The existing transmission line crosses the following USGS quad maps: Safe Harbor, Airville, and Fawn Grove.

We have attached the completed PNDI and SIR Forms. If you would like a GIS shapefile of the Project on individual USGS quad maps, please let me know and we'll be happy to provide it. Similarly, if you are able to provide the locations of any records you find during your PNDI search on a shapefile for us, we would appreciate it.



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,

A handwritten signature in black ink that reads 'Sue Sutter' in a cursive, slightly stylized script.

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

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: 1001 Elm Street, Suite 203, Manchester, NH 03101

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

Project Description: Replacement of the PPL Electric Utilities owned existing single-circuit 230 kV Manor-Graceton transmission line located in York and Lancaster Counties.

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: York, Lancaster Township/Municipality: Multiple

Name of the United States Geological Survey (U.S.G.S.) 7.5 Minute Quadrangle Map where project is located: Multiple, see attached letter 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:** _____ ° / _____ ' / _____ " N

Indicate latitude/longitude in degrees-minutes-seconds format only. **Longitude:** _____ ° / _____ ' / _____ " 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.

1001 Elm Street, Suite 203, Manchester, NH 03101
Telephone: 603-644-5200 Fax: 603-644-5220

September 16, 2010

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

Re: Manor-Graceton 230 kV Transmission Line
Request for Project Review for Pennsylvania Natural Diversity Inventory
Large Project

We request, on behalf of PPL Electric Utilities, that your agency provide a Pennsylvania Natural Diversity Inventory (PNDI) review for current state and federal listed rare, threatened, and endangered species and habitats that are known to occur, or that could potentially occur, in the vicinity of the Study Area for the proposed Manor-Graceton 230 kV Transmission Line (Project).

PPL Electric Utilities has determined that the existing, single-circuit Manor-Graceton 230 kV transmission line between PPL EU's Manor Substation, located near the Safe Harbor Hydroelectric Project and dam on the north/east side of the Susquehanna River in Conestoga Township, Lancaster County, and the Pennsylvania-Maryland border in Peach Bottom Township, York County, must be replaced with a new double-circuit 230 kV line and structures. This segment of line is approximately 14.5 miles long and is being replaced/supplemented as part of the PPL EU Asset Optimization Strategy (AOS) program.

PPL EU intends to submit a Letter of Notification (LON) to the Pennsylvania Utility Commission (PUC) in order to rebuild this transmission line in its current location. This rebuild will entail new transmission structures and conduit on existing right-of-way. PPL EU does not anticipate the need for additional right-of-way for this rebuild. The line will cross the Susquehanna River in the vicinity of the Safe Harbor plant at the same location as the existing transmission line. In Pennsylvania, the proposed transmission line traverses portions of York and Lancaster counties, and is shown on the attached map which depicts the USGS topographic quad names crossed. The existing transmission line crosses the following USGS quad maps: Safe Harbor, Airville, and Fawn Grove.

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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.

1001 Elm Street, Suite 203, Manchester, NH 03101
Telephone: 603-644-5200 Fax: 603-644-5220

September 16, 2010

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

Re: Manor-Graceton 230 kV Transmission Line
Request for Project Review for Pennsylvania Natural Diversity Inventory
Large Project

We request, on behalf of PPL Electric Utilities, that your agency provide a Pennsylvania Natural Diversity Inventory (PNDI) review for current state and federal listed rare, threatened, and endangered species and habitats that are known to occur, or that could potentially occur, in the vicinity of the Study Area for the proposed Manor-Graceton 230 kV Transmission Line (Project).

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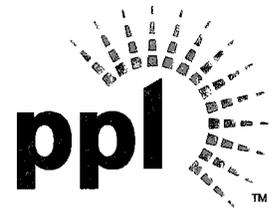
Please provide the requested information in writing and by email or fax at your earliest convenience to me at ssutter@louisberger.com or 1001 Elm Street, Suite 203, Manchester, NH 03101. If you have any questions please do not hesitate to contact me at this email address, by phone at 781-707-7445, or by fax at 603-644-5220.

Sincerely,

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

John M. Levitski
Regional Director
Tel.: 717-560-2533
Fax: 717-560-2620
E-mail: jmlevitski@pplweb.com

PPL Corporation
651 Delp Road
Lancaster, PA 17601-3034
<http://www.pplweb.com>



September 27, 2010

Mr. Eric T. Bacon, Chairman
Board of Supervisors
Chanceford Township
51 Muddy Creek Forks Road
P.O. Box 115
Brogue, PA 17309

Dear Mr. Bacon:

PPL Electric Utilities is planning to replace the Manor-Graceton 230 kV transmission line from Brogue, PA to Delta, PA in Chanceford, Lower Chanceford and Peach Bottom Townships. The existing transmission line was constructed in the 1930's and our studies have found deterioration of the conductors. Replacement of the line is necessary to improve reliability and reduce maintenance.

The structures and conductors will be replaced from the Susquehanna River near the Safe Harbor Dam to the Pennsylvania-Maryland state line at Delta, PA. The existing steel lattice towers will be replaced with single-shaft steel poles. The current plan does not include the replacement of the tower in the Susquehanna River. However, this tower will be included within the PUC filing and may be replaced in the future.

The existing lattice towers have an average height of approximately 85 feet and the new single-shaft steel poles will have an average height of around 145 feet. The existing towers occupy approximately 900 square feet while the new towers will occupy approximately 64 square feet each. It is anticipated that all work will be conducted within existing right-of-way and the acquisition of new right-of-way will not be required. The construction will begin in October, 2011 and conclude by July, 2012.

If you have any questions, or would like to discuss this work in greater detail, please contact Doug Grossman at 610-774-2540.

Sincerely,

John M. Levitski
Regional Director

Cc: Steven Chronister, York County Commissioner
S. David Stewart, Peach Bottom Township Supervisor
David Glenn, Lower Chanceford Township Supervisor
Scott F. Martin, Lancaster County Commissioner
Doug Grossman

Enclosures

John M. Levitski
Regional Director
Tel.: 717-560-2533
Fax: 717-560-2620
E-mail: jmlevitski@pplweb.com

PPL Corporation
651 Delp Road
Lancaster, PA 17601-3034
<http://www.pplweb.com>



September 27, 2010

Mr. David Glenn, Chairman
Board of Supervisors
Lower Chanceford Township
4120 Delta Road
Airville, PA 17302

Dear Mr. Glenn:

PPL Electric Utilities is planning to replace the Manor-Graceton 230 kV transmission line from Brogue, PA to Delta, PA in Chanceford, Lower Chanceford and Peach Bottom Townships. The existing transmission line was constructed in the 1930's and our studies have found deterioration of the conductors. Replacement of the line is necessary to improve reliability and reduce maintenance.

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The existing lattice towers have an average height of approximately 85 feet and the new single-shaft steel poles will have an average height of around 145 feet. The existing towers occupy approximately 900 square feet while the new towers will occupy approximately 64 square feet each. It is anticipated that all work will be conducted within existing right-of-way and the acquisition of new right-of-way will not be required. The construction will begin in October, 2011 and conclude by July, 2012.

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Sincerely,

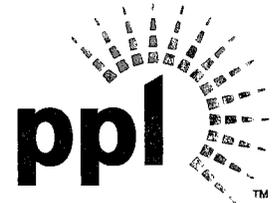
John M. Levitski
Regional Director

Cc: Steven Chronister, York County Commissioner
S. David Stewart, Peach Bottom Township Supervisor
Eric T. Bacon, Chanceford Township Supervisor
Scott F. Martin, Lancaster County Commissioner
Doug Grossman

Enclosures

John M. Levitski
Regional Director
Tel.: 717-560-2533
Fax: 717-560-2620
E-mail: jmlevitski@pplweb.com

PPL Corporation
651 Delp Road
Lancaster, PA 17601-3034
<http://www.pplweb.com>



September 27, 2010

Mr. S. David Stewart, Chairman
Board of Supervisors
Peach Bottom Township
545 Broad Street Extension
Delta, PA 17314-9203

Dear Mr. Stewart:

PPL Electric Utilities is planning to replace the Manor-Graceton 230 kV transmission line from Brogue, PA to Delta, PA in Chanceford, Lower Chanceford and Peach Bottom Townships. The existing transmission line was constructed in the 1930's and our studies have found deterioration of the conductors. Replacement of the line is necessary to improve reliability and reduce maintenance.

The structures and conductors will be replaced from the Susquehanna River near the Safe Harbor Dam to the Pennsylvania-Maryland state line at Delta, PA. The existing steel lattice towers will be replaced with single-shaft steel poles. The current plan does not include the replacement of the tower in the Susquehanna River. However, this tower will be included within the PUC filing and may be replaced in the future.

The existing lattice towers have an average height of approximately 85 feet and the new single-shaft steel poles will have an average height of around 145 feet. The existing towers occupy approximately 900 square feet while the new towers will occupy approximately 64 square feet each. It is anticipated that all work will be conducted within existing right-of-way and the acquisition of new right-of-way will not be required. The construction will begin in October, 2011 and conclude by July, 2012.

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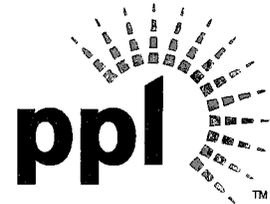
John M. Levitski
Regional Director

Cc: Steven Chronister, York County Commissioner
David Glenn, Lower Chanceford Township Supervisor
Eric T. Bacon, Chanceford Township Supervisor
Scott F. Martin, Lancaster County Commissioner
Doug Grossman

Enclosures

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PPL Corporation
651 Delp Road
Lancaster, PA 17601-3034
<http://www.pplweb.com>



September 27, 2010

Mr. Steven Chronister, President
York County Commissioners
28 E. Market St., Room 216
York, PA 17401

Dear Mr. Chronister:

PPL Electric Utilities is planning to replace the Manor-Graceton 230 kV transmission line from Brogue, PA to Delta, PA in Chanceford, Lower Chanceford and Peach Bottom Townships. The existing transmission line was constructed in the 1930's and our studies have found deterioration of the conductors. Replacement of the line is necessary to improve reliability and reduce maintenance.

The structures and conductors will be replaced from the Susquehanna River near the Safe Harbor Dam to the Pennsylvania-Maryland state line at Delta, PA. The existing steel lattice towers will be replaced with single-shaft steel poles. The current plan does not include the replacement of the tower in the Susquehanna River. However, this tower will be included within the PUC filing and may be replaced in the future.

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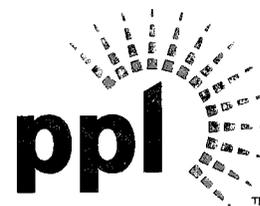
John M. Levitski
Regional Director

Cc: Scott F. Martin, Lancaster County Commissioner
David Glenn, Lower Chanceford Township Supervisor
Eric T. Bacon, Chanceford Township Supervisor
S. David Stewart, Peach Bottom Township Supervisor
Doug Grossman

Enclosures

John M. Levitski
Regional Director
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E-mail: jmlevitski@pplweb.com

PPL Corporation
651 Delp Road
Lancaster, PA 17601-3034
<http://www.pplweb.com>



September 27, 2010

Mr. Scott F. Martin, Chairman
Office of County Commissioners
150 N. Queen St., Suite 715
Lancaster, PA 17603

Dear Mr. Martin:

PPL Electric Utilities is planning to replace the Manor-Graceton 230 kV transmission line from Brogue, PA to Delta, PA in Chanceford, Lower Chanceford and Peach Bottom Townships. The existing transmission line was constructed in the 1930's and our studies have found deterioration of the conductors. Replacement of the line is necessary to improve reliability and reduce maintenance.

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If you have any questions, or would like to discuss this work in greater detail, please contact Doug Grossman at 610-774-2540.

Sincerely,

John M. Levitski
Regional Director

Cc: Steven Chronister, York County Commissioner
David Glenn, Lower Chanceford Township Supervisor
Eric T. Bacon, Chanceford Township Supervisor
S. David Stewart, Peach Bottom Township Supervisor
Doug Grossman

Enclosures

Attachment

7

ATTACHMENT "7"

MANOR – GRACETON 230 kV TRANSMISSION LINE

LIST OF PROPERTY OWNERS WITHIN THE RIGHT-OF-WAY

<u>Property Owner</u>	<u>Parcel Number</u>
PPL Holtwood LLC 2 N Ninth St Allentown, PA 18101	1
Pennsylvania Lines LLC c/o Norfolk Southern Railway Co 110 Franklin Rd SE Roanoke, VA 24042	2
Safe Harbor Water Power Co 1 Powerhouse Rd Conestoga, PA 17516	3
Safe Harbor Water Power Co 1 Powerhouse Rd Conestoga, PA 17516	4
Safe Harbor Water Power Co 1 Powerhouse Rd Conestoga, PA 17516	5
Safe Harbor Water Power Co 1 Powerhouse Rd Conestoga, PA 17516	6
Safe Harbor & Power Corp 1 Powerhouse Rd Conestoga, PA 17516	7
Penna Power & Light Co Two North Ninth St Allentown, PA 18101	8
Penna Power & Light Co Two North Ninth St Allentown, PA 18101	9

Penna Power & Light Co Two North Ninth St Allentown, PA 18101	10
Penna Power & Light Co Two North Ninth St Allentown, PA 18101	11
Joyce A Heffner 1560 Furnace Rd Brogue, PA 17309	12
Brook Run Farms 509 Letort Road Washington Boro, PA 17582	13
Commonwealth of Pennsylvania 400 Market St 7Th Flr Harrisburg, PA 17105 8767	14
PPL Holtwood LLC 2 N Ninth St Allentown, PA 18101	15
Leroy D & Jewel O Good 10852 Kline Rd Brogue, PA 17309	16
Game Commission Commonwealth of Pennsylvania State Capitol Harrisburg, PA 17120	17
Emanuel S & Annie S Esh 508 Furnace Rd Airville, PA 17302	18
Kevin M & Cindy Jo Riedel 565 Furnace Rd Airville, PA 17302	19
David L & Christine Y Druck 2243 Woodbine Rd Airville, PA 17302	20

David L & Christine Y Druck 2243 Woodbine Rd Airville, PA 17302	21
PECO Energy Company Attn Real Estate Dept N3 3 2301 Market St 16Th Flr Philadelphia, PA 19103	22
R Leon Jr & Marlene J Kilgore 79 Kilgore Rd Airville, PA 17302	23
Peco Energy Company Attn Real Estate Dept N3 3 2301 Market St 16Th Flr Philadelphia, PA 19103	24
Marvin H & Shirley M Burton 3737 Delta Rd Airville, PA 17302	25
Robert M & Lois M Jordan 3932 Delta Rd Airville, PA 17302	26
Lois A Manifold 3801 Delta Rd Airville, PA 17302	27
William F & Rita R Dalton 3890 Delta Rd Airville, PA 17302	28
Gregory A & Donna S Kennard 1277 Bridgeton Rd Airville, PA 17302	29
Robert M & Lois M Jordan 12640 Collinsville Rd Brogue, PA 17309 9089	30
Robert M & Lois M Jordan 12640 Collinsville Rd Brogue, PA 17309 9089	31

Jay D Sr & Sharon Sue Caudill 48 Salisbury Rd Airville, PA 17302	32
James D & Lena M Caudill 118 Walnut St Columbia, PA 17512	33
Dallas F & Mabel J Caudill Revocable Living Trust 162 Reinecke Rd Airville, PA 17302	34
Allison D Wolfe 119 Reinecke Rd Airville, PA 17302	35
David D & Rachel B Esh 40 Frogtown Rd Paradise, PA 17562	36
George N & Joan L Bair 216 Atkins Rd Airville, PA 17302	37
Elam H & Annie B Esh 209 Telegraph Rd West Airville, PA 17302	38
Henry K & Elizabeth H Esh 334 W Telegraph Rd Airville, PA 17302	39
Dana E & Verna E Holmes 325 W Telegraph Rd Airville, PA 17302	40
James & Chong S Reheard 333 W Telegraph Rd Airville, PA 17302	41
Gene A & Linda L Woods 346 W Telegraph Rd Airville, PA 17302	42

Clyde M & Pearl L Holloway 349 W Telegraph Rd Airville, PA 17302	43
Tayacres Farm 183 Buecker Rd Delta, PA 17314	44
Joseph H Sr & Ada May Koepper, Trustees Joseph H Sr & Ada May Koepper Revocable Trust 3139 White Hall Rd White Hall, MD 21161	45
Roger Cooper 1154 Flintville Rd Delta, PA 17314	46
Tayacres Fa 183 Buecker Rd Delta, PA 17314	47
Paul W & Laura A Chambers Herzog 7 Pancoast Rd Waretown, NJ 08758	48
Paul W & Chambers Laura A Herzog 7 Pancoast Rd Waretown, NJ 08758	49
Glenn J Bradley 8178 Woodbine Rd Airville, PA 17302	50
Chris A Jr & Joan L Parrow 8133 Woodbine Rd Airville, PA 17302	51
Priscilla D Knight 322 Murphy Rd Airville, PA 17302	52
Douglas F & Nancy H Hankey 530 Murphy Rd Airville, PA 17302	53

Priscilla D Knight 322 Murphy Rd Airville, PA 17302	54
David E & Martha H Gemmill 458 Gemmill Rd Delta, PA 17314	55
Dana M & Kenneth W Jr Smith 37 Windy Farm Ln Delta, PA 17314 8004	56
Victor J Jr & Janet L Renzi 63 Windy Farm Ln Delta, PA 17314	57
David S Sr & Catherine M Bilger 183 Gemmill Rd Delta, PA 17314	58
Amos H & Mary Ann Miller 299 Aubel Rd Delta, PA 17314	59
Penna Power & Light Co Two N Ninth St Allentown, PA 18101	60
Craig A & Jennifer K Metzler 1348 Bryansville Rd Delta, PA 17314 9243	61
Donald E Jr Davis 123 Clubhouse Rd Delta, PA 17314	62
Winfred E & Virginia W Fennell 828 Northpoint Rd Baltimore, MD 21224	63
James M & Rebecca H Gjerdahl 103 Clubhouse Rd Delta, PA 17314	64

S Smith Fulton 1842 Bryansville Rd Delta, PA 17314	65
Brothers Gross 749 Graceton Rd Fawn Grove, PA 17321	66
Michael L & Geraldine M Sacilotto 1274 Line Rd Delta, PA 17314	67
Robert A & Carolyn J Lemen 578 Cook Rd Delta, PA 17314	68
Joe & Krista McCollum 594 Cook Road Delta, PA 17314	69
Hendrzak 533 Hollow Rd Delta, PA 17314	70
William M Jr & Donna O Hanna 2614 Whiteford Rd Whiteford, MD 21160	71
Mark E & Melanie Hawkins 384 Hollow Rd Delta, PA 17314	72
George R & Jocelyn J Butler 2805 Whiteford Rd Whiteford, MD 21160	73

Attachment 8

ATTACHMENT "8"
MANOR – GRACETON 230 kV TRANSMISSION LINE
ENVIRONMENTAL INVENTORY GUIDELINES

ENVIRONMENTAL INVENTORY GUIDELINES

An environmental inventory lists environmental factors considered when evaluating and selecting transmission line routes. These factors can be adversely affected by, or be compatible with, transmission facilities.

Major factors and the reasons why they are inventoried are listed in the following table:

CATEGORY

WHY INVENTORIED

A. Linear Features

- | | |
|---|---|
| <ol style="list-style-type: none">1. Turnpikes, Interstate Highways, Major U.S., Pennsylvania, and Legislative Routes (LR)2. Pipelines3. Railroads4. Floodwalls, Levees5. Communication Facilities6. Property Lines7. Vacant Right-of-Way8. Power Lines9. Tree Rows | <p>Paralleling existing linear features, particularly transmission lines, is often desirable for several reasons. Paralleling usually adds only incrementally to existing impacts, rather than creating new impacts. Narrower rights-of-way are needed because maximum utilization is made of land already encumbered. Existing access roads can be used, less tree clearing is needed, and, from a community planning perspective, the combination of linear features into a common corridor is desirable.</p> |
|---|---|

B. Land Use

- | | |
|--|--|
| <ol style="list-style-type: none">1. Residential<ol style="list-style-type: none">a. Dwellingsb. Subdivisionsc. Developmentsd. Future Developmentse. Urbanized Areas2. Commercial and Industrial3. Interference Zones<ol style="list-style-type: none">a. Radio Stationsb. Microwave Towersc. Airports | <p>Whenever possible, avoiding present and proposed residential development is desirable because land use impacts, potential visual intrusions and costs are minimized. Compatible joint uses of land are also explored.</p> <p>Because these areas are generally compatible with transmission facilities, the possibility of routing through these areas is explored.</p> <p>These are usually avoided, if feasible. If this is not feasible, undergrounding or mitigating measures are considered.</p> |
|--|--|

CATEGORY

WHY INVENTORIED

5. Public Areas

- a. Cemeteries
- b. Churches
- c. Hospitals
- d. Schools

Visual intrusions into these areas are avoided where possible.

6. Recreational Areas

- a. Parks
- b. Golf Courses
- c. Ski Areas
- d. Preserves and Game Lands
- e. Tourist Recreational Facilities

Visual intrusions into these areas are avoided where possible.

7. Extractive Areas

- a. Coal
- b. Limestone
- c. Peat Bogs

Areas where significant mineral resources can be economically extracted are generally avoided. Where practical, lines span small areas and are routed along boundaries.

8. Orchards and Nurseries

Removal of productive trees and interference with orchard maintenance (spraying, irrigating, etc.) are avoided where possible.

C. Visual and Scenic Features

1. Unique Scenic Areas

It is preferable to avoid these areas.

2. Highpoints

Prominent Slopes
Ridge Lines
Panoramic Views
Scenic Highways
Residential Areas .

These features are avoided where practical to eliminate or minimize visual intrusion in areas of potentially high visual exposure and scenic quality. Views from residential areas are avoided, if possible.

D. Soils and Slopes

1. Soils

- a. Shallow Bedrock
- b. Stony Soils
- c. Wet Soils
- d. Erodible Soils

These soil types are generally avoided due to both construction and environmental constraints. High construction costs and disruption to the area may result from blasting, road construction, structure grading and setting, and material handling and hauling.

CATEGORY

WHY INVENTORIED

2. Slopes

Steep slopes (15 percent to 25 percent or greater) are avoided where possible to minimize the potential for soil erosion and slower revegetation.

Again, increased construction costs and environmental damage may occur when building on slopes due to road construction, vegetation clearing, and the handling, hauling and setting of structures.

3. 100-Year Floodplain

These areas are generally avoided to prevent potential disruption of floodplains and flood control facilities. Construction costs necessary to maintain reliability also are higher.

E. Cultural Features

1. Historic Sites

Visual intrusions on historic sites are avoided where possible.

2. Archaeological Areas

Known sites and areas of high potential are avoided, where possible, to prevent damage to resources.

F. Geology

Bedrock type is determined to predict the potential presence of endangered species and other wildlife, and mineral resources are identified. Special attention is given to certain bedrock types with particular characteristics or problems. Caves, springs, and sinkholes are avoided.

1. Unique Geological Areas

Visual intrusions on unique formations and destruction of collection sites are avoided where practical.

G. Natural Features

1. Aquatic Resources, Water Bodies, Streams, Rivers and Wetlands

CATEGORY

WHY INVENTORIED

a. Water Quality

The potential for siltation or obstruction with silt or mud, and temperature increases due to removal of bank vegetation are avoided to the greatest extent possible. Special caution is exercised near waters recognized for exceptional quality. Measures used to mitigate effects of crossing water bodies may result in reduced reliability or increased maintenance costs.

b. Fish, Aquatic Life

Major aquatic organisms present in potentially affected water bodies are identified to determine potential impacts. Widely used fisheries are avoided. If this is not practical, caution is exercised in crossing to prevent decrease in water quality, especially due to siltation. The presence or likely occurrence of endangered or threatened aquatic species is determined, and known locations of such species are avoided or impacts are mitigated.

2. Terrestrial Resources

a. Vegetation Types

Major types of vegetation are identified to characterize area habitats and predict the occurrence of wildlife species and potential impacts of removing these vegetation types. Important areas are identified, especially vegetation not common in the area, and attempts are made to avoid them where possible (e.g., coniferous growth in a primarily deciduous woodland; trees in an urban area, etc.).

An attempt is made to minimize clearing of wooded areas, which is considered a constraint due to disruption of existing environment, costs of clearing, future maintenance, and reduced liability. However, clearing through areas of heavy woodland can benefit wildlife as open areas resprout and are widely used as browse and cover areas.

Attempts are made to avoid or minimize interference with commercially-used vegetation and tree plantations, lumbering operations, etc.

CATEGORY

WHY INVENTORIED

b. Wildlife

Positive and negative impacts on area species are predicted. The presence or likely occurrence of endangered or threatened animal species or their critical habitat requirements are considered. Known areas of occurrence are avoided or impacts are mitigated.

c. Unique Natural Wilderness Areas

Visual intrusion and disruption of the natural environment should be avoided where possible.

Attachment 9

ATTACHMENT “9”
MANOR – GRACETON 230 kV TRANSMISSION LINE
LAND USE AND COMPREHENSIVE PLAN ASSESSMENT

PPL EU collected and reviewed available county-level comprehensive or land use plans for York and Lancaster Counties. Both counties have adopted comprehensive plans to guide development within the county. In addition, each of the townships crossed by the line has adopted its own comprehensive plan. Manor Township is part of the *Central Lancaster County Growing Together Comprehensive Plan*. Peach Bottom Township has adopted a multi-municipal plan with the Borough of Delta. Chanceford and Lower Chanceford Townships have also adopted a multi-municipal plan for the Muddy Creek region. Each of these plans and their applicability to the proposed Manor-Graceton 230 kV transmission line rebuild is summarized below.

York County Comprehensive Plan

The York County Comprehensive Plan is divided into 12 separate planning documents developed between 1992 and 2009. Select planning documents that may be affected by the proposed project are discussed below. The Lancaster County Comprehensive Plan is divided into four separate planning documents, which are also discussed below. Municipal level comprehensive plans are also discussed in this section.

York County Growth Management Plan, December 2008

The summary report of the Comprehensive Plan is the Growth Management Plan, which presents an overall framework for growth and provides a mechanism for working with municipalities to make decisions on future development through delineation of growth areas and the identification of important agricultural and resource areas. The report identifies County-wide growth management issues and presents a future land use plan for York County. As stated in the report,

the primary goal of the plan is to provide an overall land use framework for development of regional plans.

The York County plan builds upon four principles: (1) use of “natural” land use patterns based on the physical determinants of the County; (2) delineation of primary growth areas; (3) tightening the need for restrictions in open space and agricultural areas; and (4) intermunicipal cooperation. The plan discusses development trends in the County and notes that, while development is occurring throughout York County, the bulk of development is concentrated in several defined growth areas. The project will not traverse any of the growth areas.

The existing route, which PPL Electric proposes to utilize for the rebuilt line, traverses Chanceford, Lower Chanceford and Peach Bottom Townships. Chanceford is identified as an established rural area, Lower Chanceford is identified as an interim rural area, and Peach Bottom is identified as an established rural area with an established secondary growth area in the center of the township. The plan discusses the significant loss of farmland in the County (approximately 6 square miles annually). The two primary growth issues identified in the plan include development versus preservation and conflicts between county and municipal planning.

The project will not further impact these rural areas as the proposed transmission line will use the same right-of-way as the existing line. The proposed line would increase the amount of agriculture space available for farming, as the footprints of the monopole structures are smaller than the footprints of the existing lattice towers.

Protecting York County’s Rural Environment, Current Zoning and Preservation Practices, 2009

York County developed this plan to develop guidelines for the preservation of agricultural land within the County. According to the plan, the County’s best farmland is located along the southern border in the area between the City of York and the Maryland border. This area is also in high demand for residential development due to its convenient access to I-83 and Baltimore

County. Several municipalities, including Chanceford, Lower Chanceford, and Peach Bottom Townships, have adopted ordinances which create agricultural protection zones (APZ) in which owners may transfer development rights. Such ordinances allow the owner of a parcel of land to sell his or her right to develop all or a portion of a parcel of land to the owner of another parcel of land where development is more desirable. The restrictions for APZ land are primarily targeted toward limited residential development and do not apply to the siting of transmission lines.

York County Environmental Resources Inventory, 2004

The report discusses York County physiographic, topography, geology, mining, soils, hydrologic features, land cover, air quality, climate, and unique features and areas. Information relevant to the project is discussed in Attachment 3, Section E, Natural Features.

York County Open Space and Greenways Plan, 2006

The purpose of the plan is to provide an overview of the County, an inventory of open space and greenways, discuss the protection and preservation of open space and natural resources in growth and rural areas, and to serve as a guidance document for planning and preservation. The plan identifies the following challenges to York County: population growth, urban and suburban sprawl, loss of agricultural lands, and environmental degradation. According to the plan, York County has proposed two projects for consideration as Forest Legacy Lands. The Forest Legacy Program (FLP) is a voluntary program of the USDA Forest Service, which provides grants to states for the purchase of conservation easements. Priority is given to forest land that possesses important scenic, cultural, and recreational resources, fish and wildlife habitats, water resources and other valuable ecology. The two proposed projects located within York County include the River Hills Project (540 acres) and the River Hills Annex project (482 acres). These parcels are located in Chanceford and Lower Chanceford Townships adjacent to Apollo County Park. At this time, neither of these projects has been approved as FLPs. It is unknown whether the proposed transmission line would cross either of these proposed FLP areas. The existing line

crosses within 200 feet of Apollo Park, so it is likely that the rebuild will traverse through or near one or both of the proposed FLP areas. However, the proposed project will not significantly impact either proposed FLP site as the rebuild will utilize existing right-of-way, which is already cleared of trees.

The plan identifies various manmade and natural environmental resource areas, including priority open space areas and regional ecological hubs. Ecological hubs are defined as contiguous areas of ecological importance of at least 100 acres. No ecological hubs are located along the existing route. The existing route traverses near or through some medium ranked priority open space areas, primarily located along the Susquehanna River, State Game Lands No. 83, and Muddy Creek. The plan also identifies proposed greenway and open space projects in the County. The existing line traverses one of these proposed greenway areas, which parallels the Susquehanna River. York County assigned point values to each manmade or natural conservation or potential conservation area to develop a comprehensive open space map. Point values range from 1 (lowest importance) to 8 (highest importance). The existing line appears to traverse through or near portions of 3 and 4 point valued areas along the Susquehanna River and scattered portions of 1 and 2 point valued areas throughout the study area. The data is further grouped into a focus area and greenways map. The existing route traverses two designated focus areas and one mega greenway: the Susquehanna Riverside South Focus Area along the Susquehanna River; the Southeastern County/Muddy Creek Focus Area in Lower Chanceford and Peach Bottom Townships; and the Susquehanna Mega Greenway. The proposed project will not significantly impact any of these natural areas, as the project will utilize existing right-of-way.

York County Subdivision and Land Development Ordinance, 2007

York County has adopted a County-wide subdivision and land development ordinance (SALDO). Each municipality crossed by the existing line has also adopted municipal level SALDO. According to Section 518 of the York County SALDO, where any electric transmission line traverses a land development, the developer shall confer with the applicable

transmission or distribution company to determine the maximum distance which shall be required between each structure and the centerline of such transmission line. In addition, the SALDO states that all new or replacement public and private utilities and facilities in flood-prone areas shall be elevated or flood-proofed up to the Regulatory Flood Elevation. PPL Electric will avoid design and construction in flood plains wherever possible. In cases where construction in a flood plain is unavoidable, PPL will work closely with the affected county or municipality, as well as comply with all applicable state and federal permitting requirements, to ensure that no significant impacts occur.

Lancaster County Comprehensive Plan

The Lancaster County Comprehensive Plan is comprised of three elements: the Policy Element, the Growth Management Element, and the Functional Element. Each is discussed below.

Lancaster County Policy Element, 1999

The Policy Element contains the vision and goals of the Lancaster County Comprehensive Plan. It also includes key focus areas and policies and actions that need to be implemented to reach the vision for the future. This structure is designed to show the close relationship and interconnectedness between different planning issues. In addition, the "Key Focus Areas" element of the plan is designed to help the County focus on the issues that the community deems most important. Similar to York County, Lancaster County is concerned about the loss of agricultural land, increased sprawl, and preserving natural areas. Some of the actions identified to preserve agricultural lands and natural resources include the acquisition of conservation easements, adoption of protective zoning districts, and the establishment of riparian buffers.

Lancaster County Growth Management Element, 2006

The Growth Management Element primarily consists of maps which visually represent the land use goals and objectives contained in the Policy Element. The plan identifies an Urban Growth

Area (UGA) Strategy for areas appropriate for urban growth and reinvestment; a Rural Strategy for areas that should be maintained in agriculture, natural resources, and similar uses; and an Implementation Strategy containing tools to shape growth and to achieve desired land use patterns. The Growth Management Element also advocates the use of traditional neighborhood design techniques to accommodate new growth within Urban and Village Growth Areas. The plan establishes a framework for future land use and identifies areas appropriate for urban growth, areas that should be maintained in agriculture, natural resources, and similar uses, and strategies and tools that municipalities and the County can use to shape growth. The existing line traverses a designated natural area in Manor Township.

Lancaster County Functional Element – Green Infrastructure, 2009

Functional Elements are specialized planning documents designed to specifically address issues of concern, such as open space, housing, cultural resources, or transportation. These elements are incorporated into the Lancaster County Comprehensive Plan as official amendments. Functional elements include a Regional Open Space Plan (Green Infrastructure), a Housing Element, a Long-Range Transportation Plan, a Water Supply and Wellhead Protection Plan, a Strategic Tourism Development Element, and a Cultural Heritage Element. The Green Infrastructure Element defines a County-wide vision, goals and objectives, strategies, and tools to preserve, conserve, restore, and enhance natural resources through the establishment of a countywide, integrated green infrastructure system. It highlights the importance of protecting large blocks of contiguous land and improving connectivity by establishing a network of natural areas, conservation lands, and working landscapes. Maps within the plan identify existing natural areas, land use, vegetation cover, steep slopes, among other features. The existing line passes near an outstanding geologic feature referred to as the sculptured rocks, and one important bird and mammal area: the Lower Susquehanna River Corridor.

The Lancaster County Conservancy has identified “Natural Gems” within the County. Natural Gems are priority natural resource areas that are the focus of the Conservancy’s preservation efforts. The Natural Gems were identified using a rating system based on seven important

environmental attributes including water bodies, wetland, forestland, grassland, geologic features, plants, animals, and location relative to other preserved areas. The existing line passes near one Natural Gem area located in Conestoga Township, and crosses land identified as priority restoration habitat areas. The plan identifies a proposed trail along the Susquehanna River. The proposed project must cross the Susquehanna River. Crossing the river at any location other than the existing route would result in more significant impacts to these natural resources.

Delta-Peach Bottom Region Comprehensive Plan, 2004

The Delta-Peach Bottom Region Comprehensive Plan discusses a plan for land use, housing, transportation, community facilities and utilities in the region. The plan discusses various goals, including the following: to manage growth in the region; to create a land use plan that provides a balanced mix of residential and non-residential uses, thus providing the economic means to meet and sustain future public infrastructure and community service needs and demands; to preserve agricultural lands; to manage and protect farmland soils from loss, overuse and degradation; and to retain and sustain the region's natural resource areas and protect environmentally sensitive resources.

Muddy Creek Joint Comprehensive Plan: Chanceford Township, Felton Borough, and Lower Chanceford Township, 2009 (Preliminary Draft)

The Muddy Creek region consists of Chanceford and Lower Chanceford Townships and Felton Borough. A preliminary draft of the Comprehensive Plan was issued in January 2009; however, the plan has not been adopted at this time. The purpose of the plan is to provide direction and guidance for managing and directing future growth, development, and preservation in the region. By implementing the plan, the municipalities will be able to continue to function as a major agricultural production area in York County and will continue to maintain their rural character of rolling farmland and open spaces. The region expects a limited amount of growth in the area over the next several years. The plan identifies areas most suitable for future growth and steers

development away from areas of prime agricultural soils. The most important issues to residents are the desire to maintain and preserve the natural, cultural, and historic resources and heritage of the region, and to protect the rural character of the area. The future land use section identifies utility uses as a public/institutional use. The plan indicates that utility uses should be permitted in all zoning districts by special exemption. Rebuilding the existing Manor-Graceton transmission line would be consistent with the goals of the regional comprehensive plan, as the transmission line would be rebuilt in existing right-of-way, eliminating the need to disturb additional portions of agriculture or rural areas, and by replacing lattice towers with monopoles, thereby resulting in less impact on farming operations.

Growing Together: A Comprehensive Plan for Central Lancaster County, PA, 2006

This document is a multi-municipal comprehensive plan encompassing 11 municipalities in Central Lancaster County, including Manor Township. The purpose of the plan is to serve as a coordinator, facilitator, and resource for the projects that the member municipalities decide to undertake. Natural resource protection is among the goals identified by the plan, including the establishment of riparian buffers along the Susquehanna River.

Attachment 10

ATTACHMENT “10”
MANOR – GRACETON 230 kV TRANSMISSION LINE
HISTORIC ARCHITECTURAL AND ARCHEOLOGICAL SITES

TABLE OF CONTENTS

<u>SECTION</u>	<u>TOPIC</u>	<u>PAGE</u>
A.	INTRODUCTION.....	1
B.	HISTORIC AND ARCHITECTURAL SITES.....	1
C.	ARCHAEOLOGICAL SITES	1

LIST OF TABLES

TABLE 1	HISTORIC ARCHITECTURAL SITES WITHIN A 2-MILE RADIUS OF RIGHT-OF-WAY.....	2
TABLE 2	ARCHAEOLOGICAL SITES WITHIN APPROXIMATELY 1,000 FEET OF RIGHT-OF-WAY.....	6
TABLE 3	ARCHAEOLOGICAL SITES WITHIN A 2-MILE RADIUS OF RIGHT-OF-WAY.....	7

ATTACHMENT “10”
MANOR – GRACETON 230 kV TRANSMISSION LINE
HISTORIC ARCHITECTURAL AND ARCHEOLOGICAL SITES

A. INTRODUCTION

Resources of historic architectural and archaeological significance are located in the vicinity of the Manor - Graceton 230 kV Transmission Line Study Area. Initial analysis of the project’s potential to affect cultural resources involved a review of the Pennsylvania Historical and Museum Commission (PHMC)/Bureau of Historic Preservation (BHP) Cultural Resource Geographic Information System (CRGIS) on-line inventory of cultural resources. The review involved identifying all known prehistoric and historic period archaeological sites and all known historic architectural resources and historic districts within a 4-mile-wide corridor (i.e., 2 miles on either side of the right-of-way) in accordance with PUC regulations (52 Pa. Code § 57.72). A list of architectural and archaeological resources identified in the CRGIS within 2 miles of the right-of-way is shown in the following tables. Potential project impacts on these resources, as well as consultation with the PHMC regarding required studies and protocols, are discussed in Attachment “3”, Section D.

B. HISTORIC ARCHITECTURAL SITES

Ninety-four previously recorded historic architectural sites were identified within a 2-mile radius of the centerline of the transmission line ROW: 16 in Lancaster County, and 76 in York County and two in multiple counties. Each of these sites and its listing status on the National Register of Historic Places is shown in Table 1.

C. ARCHAEOLOGICAL SITES

Eight previously recorded archaeological sites were noted within approximately 1,000 feet of the ROW. None of these sites have been evaluated for eligibility for inclusion in the National Register of Historic Places (NRHP) by the PHMC/BHP. These sites are identified below in Table 2. In addition, a total of 39 previously recorded archaeological sites were identified within a 2-mile radius of the ROW. Each of these sites and its listing status on the National Register of Historic Places are identified in Table 3.

**TABLE 1
HISTORIC ARCHITECTURAL SITES WITHIN A 2-MILE RADIUS OF RIGHT-OF-WAY**

Key #	Name	County	Municipality	Type	NRHP Status	Evaluation or Listing Date	Distance from C/L (miles)
081992	River Road Property	Lancaster	Manor	Building	N.D.	N/A	0.80
081994	Unknown	Lancaster	Manor	Building	N.D.	N/A	0.80
081995	Joseph Frey House	Lancaster	Manor	Building	N.D.	N/A	1.05
081990	Unknown	Lancaster	Manor	Building	N.D.	N/A	1.50
101535	Safe Harbor Iron Works	Lancaster	Conestoga	Site	N.D.	N/A	0.70
101536	Safe Harbor Superintendent's House	Lancaster	Conestoga	Building	N.D.	N/A	0.70
101571	Unknown	Lancaster	Conestoga	Building	N.D.	N/A	0.75
101572	Safe Harbor School	Lancaster	Conestoga	Building	N.D.	N/A	0.75
101537	Unknown	Lancaster	Conestoga	Building	N.D.	N/A	0.75
101539	Conestoga Canal Lock	Lancaster	Conestoga	Site	N.D.	N/A	0.80
101573	Green Hill United Brethren Church	Lancaster	Conestoga	Building	N.D.	N/A	0.90
101542	River Corner Mennonite Church	Lancaster	Conestoga	Building	N.D.	N/A	0.90
101583	Jacob & E Warfel	Lancaster	Conestoga	Building	N.D.	N/A	1.15
101551	Benedick & Anna Eschelman, House 2	Lancaster	Conestoga	Building	N.D.	N/A	1.60
098117	John J. Devitry Property	Lancaster	Conestoga	Building	N.D.	N/A	1.75
101582	Dr. Kendig House	Lancaster	Conestoga	Building	N.D.	N/A	1.80
102143	Pennsylvania Railroad: Enila Branch Low Grade Freight Line	Multiple	Multiple	District	Eligible	N/A	0
156240	Columbia and Port Deposit Railroad	Multiple	Multiple	District	N.D.	N/A	0
156050	Maryland and Pennsylvania Railroad	York	Multiple	District	N.D.	N/A	0
139985	Unknown	York	Chanceford	Structure	Ineligible	N/A	0.05
142956	Roland and Benita Ranck Property	York	Chanceford	Building	Ineligible	N/A	0.10

**TABLE 1
HISTORIC ARCHITECTURAL SITES WITHIN A 2-MILE RADIUS OF RIGHT-OF-WAY**

Key #	Name	County	Municipality	Type	NRHP Status	Evaluation or Listing Date	Distance from C/L (miles)
098905	Unknown	York	Chanceford	Building	Eligible	N/A	0.35
098911	Unknown	York	Chanceford	Building	N.D.	N/A	0.40
098903	Unknown	York	Chanceford	Structure	N.D.	N/A	0.40
098904	Unknown	York	Chanceford	Building	N.D.	N/A	0.40
098895	Shenk's Ferry School	York	Chanceford	Building	N.D.	N/A	0.70
139984	Unknown	York	Chanceford	Structure	Ineligible	N/A	0.85
046013	Unknown	York	Lower Chanceford	Building	N.D.	N/A	0.25
046045	Unknown	York	Lower Chanceford	Building	N.D.	N/A	0.30
099022	Unknown	York	Lower Chanceford	Building	N.D.	N/A	0.55
097471	Country Bridge No. 29	York	Lower Chanceford	Structure	Eligible		0.55
097471	Unknown	York	Lower Chanceford	Building	N.D.	N/A	0.60
046010	Unknown	York	Lower Chanceford	Building	N.D.	N/A	0.65
140092	Unknown	York	Lower Chanceford	Structure	Ineligible	N/A	0.75
099018	Unknown	York	Lower Chanceford	Building	N.D.	N/A	0.80
099019	York Furnace Post Office	York	Lower Chanceford	Building	N.D.	N/A	0.80
046009	Unknown	York	Lower Chanceford	Building	N.D.	N/A	0.85
046008	Unknown	York	Lower Chanceford	Building	N.D.	N/A	0.90
096374	Indian Steps Cabin/Museum	York	Lower Chanceford	Building	Listed	3-9-1990	1.00
046004	Unknown	York	Lower Chanceford	Building	N.D.	N/A	1.10
099020	Unknown	York	Lower Chanceford	Building	N.D.	N/A	1.10
043528	Woodbine Mill	York	Lower Chanceford	Building	N.D.	N/A	1.10
099025	Unknown	York	Lower Chanceford	Building	N.D.	N/A	1.15
046025	Unknown	York	Lower Chanceford	Building	N.D.	N/A	1.25
046024	Unknown	York	Lower Chanceford	Building	N.D.	N/A	1.30
046005	Unknown	York	Lower Chanceford	Building	N.D.	N/A	1.35
046007	Unknown	York	Lower Chanceford	Building	N.D.	N/A	1.35
046006	Unknown	York	Lower	Building	N.D.	N/A	1.45

**TABLE 1
HISTORIC ARCHITECTURAL SITES WITHIN A 2-MILE RADIUS OF RIGHT-OF-WAY**

Key #	Name	County	Municipality	Type	NRHP Status	Evaluation or Listing Date	Distance from C/L (miles)
			Chanceford				
099023	Unknown	York	Lower Chanceford	Building	N.D.	N/A	1.50
045997	Unknown	York	Lower Chanceford	Building	N.D.	N/A	1.50
099024	Unknown	York	Lower Chanceford	Building	N.D.	N/A	1.70
112021	McCalls Ferry Farm	York	Lower Chanceford	Building	Listed	8-2000	1.70
099026	Unknown	York	Lower Chanceford	Building	N.D.	N/A	1.70
046002	Unknown	York	Lower Chanceford	Building	N.D.	N/A	1.75
046003	Unknown	York	Lower Chanceford	Building	N.D.	N/A	1.75
045995	Unknown	York	Lower Chanceford	Building	N.D.	N/A	1.80
045996	Unknown	York	Lower Chanceford	Building	N.D.	N/A	1.80
045998	Unknown	York	Lower Chanceford	Object	N.D.	N/A	1.90
045652	Unknown	York	Fawn	Building	N.D.	N/A	1.05
155706	Blake House	York	Fawn	Building	Ineligible	N/A	1.15
155707	Lasker Farmstead	York	Fawn	Building	Ineligible	N/A	1.20
043534	Unknown	York	Fawn	Building	N.D.	N/A	1.25
043535	Unknown	York	Fawn	Building	N.D.	N/A	1.45
045558	Unknown	York	Fawn	Building	N.D.	N/A	1.50
045552	Unknown	York	Fawn	Building	N.D.	N/A	1.50
045551	Unknown	York	Fawn	Building	N.D.	N/A	1.50
045550	Unknown	York	Fawn	Building	N.D.	N/A	1.55
045651	Unknown	York	Fawn	Building	N.D.	N/A	1.55
045573	Unknown	York	Fawn	Building	N.D.	N/A	1.70
045553	Unknown	York	Fawn	Building	N.D.	N/A	1.70
043527	Unknown	York	Fawn	Building	N.D.	N/A	1.75
045565	Unknown	York	Fawn	Building	N.D.	N/A	1.75
045564	Unknown	York	Fawn	Building	N.D.	N/A	1.75
045557	Unknown	York	Fawn	Building	N.D.	N/A	1.75
098456	Unknown	York	Peach Bottom	Building	N.D.	N/A	0.10
098439	Unknown	York	Peach Bottom	Building	N.D.	N/A	0.15
098440	Unknown	York	Peach Bottom	Building	N.D.	N/A	0.25
098457	Bryansville Grist Mill	York	Peach Bottom	Building	N.D.	N/A	0.40
098442	Unknown	York	Peach Bottom	Building	N.D.	N/A	0.45
098438	Unknown	York	Peach Bottom	Building	N.D.	N/A	0.50
098437	Walt Miller & Sons Farm	York	Peach Bottom	Building	N.D.	N/A	0.50
098478	Unknown	York	Peach Bottom	Structure	N.D.	N/A	0.70
198441	Ransay's	York	Peach Bottom	Building	N.D.	N/A	0.95

**TABLE 1
HISTORIC ARCHITECTURAL SITES WITHIN A 2-MILE RADIUS OF RIGHT-OF-WAY**

Key #	Name	County	Municipality	Type	NRHP Status	Evaluation or Listing Date	Distance from C/L (miles)
	Tavern						
098460	Unknown	York	Peach Bottom	Building	N.D.	N/A	1.30
098459	Methodist Protestant Chapel; Mt. Olivet U.M. Church	York	Peach Bottom	Site	N.D.	N/A	1.50
198443	Unknown	York	Peach Bottom	Building	N.D.	N/A	1.60
098444	Unknown	York	Peach Bottom	Building	N.D.	N/A	1.65
098461	Unknown	York	Peach Bottom	Building	N.D.	N/A	1.65
098462	Unknown	York	Peach Bottom	Building	N.D.	N/A	1.65
098463	Unknown	York	Peach Bottom	Building	N.D.	N/A	1.65
098464	Bryansville Post Office	York	Peach Bottom	Building	N.D.	N/A	1.65
098465	Unknown	York	Peach Bottom	Building	N.D.	N/A	1.65
098466	Unknown	York	Peach Bottom	Building	N.D.	N/A	1.65
098446	Mt. Holley School	York	Peach Bottom	Building	N.D.	N/A	1.90

N.D. – Status Not Determined

Table 2: Archaeological Sites Within Approximately 1,000 Feet of Right-Of-Way						
Site #	County	Municipality	Resource Type	NRHP Status	Evaluation or Listing Date	Distance from C/L (miles)
36LA0064	Lancaster	Manor	Prehistoric Open Habitation	Not Evaluated	N/A	0.10
36LA1255	Lancaster	Conestoga	Petroglyph/ Pictograph	Not Evaluated	N/A	0.25
36YO0231	York	Chanceford	Prehistoric Open Habitation	Not Evaluated	N/A	0.10
36YO0229	York	Chanceford	Prehistoric Open Habitation	Not Evaluated	N/A	0.20
36YO0232	York	Chanceford	Prehistoric Open Habitation	Not Evaluated	N/A	0.20
36YO0084	York	Chanceford	Prehistoric Open Habitation	Not Evaluated	N/A	0.25
36YO0035	York	Chanceford	Prehistoric Open Habitation	Not Evaluated	N/A	0.25
36YO0331	York	Lower Chanceford	No data	Not Evaluated	N/A	0.20

Table 3: Archaeological Sites Within a 2-Mile Radius of Right-Of-Way						
Site #	County	Municipality	Resource Type	NRHP Status	Evaluation or Listing Date	Distance from C/L (miles)
36LA0064	Lancaster	Manor	Prehistoric Open Habitation	Not Evaluated	N/A	0.10
36LA0001	Lancaster	Manor	Prehistoric/Historic Village	Listed or Determined Eligible	4/3/1986	1.20
36LA0055	Lancaster	Manor	Historic and Prehistoric	Not Evaluated	N/A	1.70
36LA1091	Lancaster	Conestoga	Petroglyph/Pictograph	Not Evaluated	N/A	0.30
36LA1092	Lancaster	Conestoga	Petroglyph/Pictograph	Not Evaluated	N/A	0.30
36LA1093	Lancaster	Conestoga	Petroglyph/Pictograph	Not Evaluated	N/A	0.40
36LA1255	Lancaster	Conestoga	Petroglyph/Pictograph	Not Evaluated	N/A	0.50
36LA0185	Lancaster	Conestoga	Petroglyph/Pictograph	Not Evaluated	N/A	0.50
36LA1182	Lancaster	Conestoga	No Information	Not Evaluated	N/A	0.60
36LA0184	Lancaster	Conestoga	Petroglyph/Pictograph	Listed or Determined Eligible	Unknown	0.60
36LA0242	Lancaster	Conestoga	Prehistoric Open Habitation	Not Evaluated	N/A	0.70
36LA0356	Lancaster	Conestoga	Prehistoric Open Habitation	Not Evaluated	N/A	0.80
36LA0006	Lancaster	Conestoga	Prehistoric Open Habitation	Not Evaluated	N/A	1.20
36LA0252	Lancaster	Conestoga	Prehistoric Open Habitation	Not Evaluated	N/A	1.30
36LA1451	Lancaster	Conestoga	Prehistoric Unknown Function	Not Evaluated	N/A	1.40
36LA0117	Lancaster	Conestoga	Prehistoric Open Habitation	Not Evaluated	N/A	1.60
36LA0002	Lancaster	Conestoga	Prehistoric/Historic Village	Listed or Determined Eligible	Unknown	1.75
36LA0115	Lancaster	Conestoga	Prehistoric Open Habitation	Not Evaluated	N/A	1.85
36LA0084	Lancaster	Conestoga	Prehistoric Open Habitation	Not Evaluated	N/A	0.60
36LA0032	Lancaster	Martic	Prehistoric Open Habitation	Not Evaluated	N/A	0.90
36LA0030	Lancaster	Martic	Prehistoric Open Habitation	Not Evaluated	N/A	0.90
36LA0062	Lancaster	Martic	Prehistoric Open Habitation	Not Evaluated	N/A	0.90
36LA0033	Lancaster	Martic	Prehistoric Open Habitation	Not Evaluated	N/A	0.95

Table 3: Archaeological Sites Within a 2-Mile Radius of Right-Of-Way						
Site #	County	Municipality	Resource Type	NRHP Status	Evaluation or Listing Date	Distance from C/L (miles)
36LA0031	Lancaster	Martic	Prehistoric Open Habitation	Not Evaluated	N/A	1.00
36LA0060	Lancaster	Martic	Prehistoric Open Habitation	Listed or Determined Eligible	Unknown	1.40
36LA0061	Lancaster	Martic	Prehistoric Open Habitation	Listed or Determined Eligible	Unknown	1.45
36LA1342	Lancaster	Martic	Prehistoric Open Unknown Function	Not Evaluated	N/A	1.90
36YO0231	York	Chanceford	Prehistoric Open Habitation	Not Evaluated	N/A	0.10
36YO0229	York	Chanceford	Prehistoric Open Habitation	Not Evaluated	N/A	0.20
36YO0232	York	Chanceford	Prehistoric Open Habitation	Not Evaluated	N/A	0.20
36YO0084	York	Chanceford	Prehistoric Open Habitation	Not Evaluated	N/A	0.25
36YO0035	York	Chanceford	Prehistoric Open Habitation	Not Evaluated	N/A	0.25
36YO0330	York	Chanceford	Historic	Determined Not Eligible by SHPO	N/A	0.50
36YO0036	York	Chanceford	Prehistoric Open Habitation	Not Evaluated	N/A	0.85
36YO0331	York	Lower Chanceford	No Data	Not Evaluated	N/A	0.20
36YO0014	York	Lower Chanceford	Prehistoric Open Habitation	Not Evaluated	N/A	1.20
36YO0010	York	Lower Chanceford	Prehistoric Open Habitation	Not Evaluated	N/A	1.65
36YO0001	York	Lower Chanceford	Prehistoric Open Habitation	Not Evaluated	N/A	1.70
36YO0186	York	Lower Chanceford	Prehistoric Open Habitation	Not Evaluated	N/A	1.70
36YO0002	York	Lower Chanceford	Rock Shelter/Cave	Not Evaluated	N/A	1.75
36YO088	York	Fawn	Prehistoric Surface Scatter	Not Evaluated	N/A	1.50

Attachment 11

ATTACHMENT “11”
MANOR – GRACETON 230 kV TRANSMISSION LINE
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