COMPONENTS OF THE
PUBLIC SERVICE ELECTRIC AND GAS COMPANY

COMPREHENSIVE MITIGATION PLAN

FOR THE SUSQUEHANNA -ROSELAND
TRANSMISSION LINE PROJECT
THROUGH THE NEW JERSEY HIGHLANDS

Prepared by:

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May 18, 2009
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EXECUTIVE SUMMARY OF THE CMP PROPOSAL

New Jersey’s ongoing planning initiatives recognize that the future economic viability of the state is dependent on protecting New Jersey’s drinking water, as well as providing clean, safe and reliable energy. Through the proposed Comprehensive Mitigation Plan ("CMP"), Public Service Electric and Gas Company, ("PSE&G") seeks to balance these two important goals from the proposed 500 kV upgrades to the Susquehanna-Roseland Transmission Line (the “Project”) through the New Jersey Highlands (the “Highlands”) Region.

The Highlands diverse natural communities, including its extensive forests, wetlands, rivers, and streams, are of statewide importance and provide the water supply for over half of New Jersey’s families. The Highlands provides fresh air, open space, and recreation opportunities for millions of residents of the greater New Jersey metropolitan area. Recreation, eco-tourism, agri-tourism and wildlife activities continue to play an important role in the local economy of the area.

The proposed Project is an electrical service reliability project that will involve the major rehabilitation, reconstruction, repair and upgrade of an existing public utility line within its right of way that extends for approximately 26 miles through the Highlands Region. Upgrades will include new tower designs, tower heights, higher capacity wires and new switching stations along the existing transmission route.

The purpose and need for the Project is based on the analysis conducted and a corresponding directive by PJM Interconnection, L.L.C. (“PJM”), an independent FERC-approved Regional Transmission Organization (“RTO”) that operates the electric power grid in 13 states, and the District of Columbia. PJM’s footprint includes New Jersey and Pennsylvania. PSE&G maintains that the proposed transmission upgrade Project is exempt from the Highlands Act, since it constitutes the “routine maintenance and operations, rehabilitation, preservation, reconstruction, repair, or upgrade of public utility lines, rights of way, or systems, by a public utility, provided that the activity is consistent with the goals and purposes of this act.”

The proposed CMP will be prepared for the Project to provide an implementation mechanism for identifying the specific environmental resource issues, the means to avoid and minimize the specific impact and ways that would help to mitigate unavoidable environmental impacts. More recently, positive environmental changes to the Project have come through input received from public meetings and discussions with residents, local officials and regulatory agencies including the New Jersey Department of Environmental Protection (“NJDEP”), the New Jersey Board of Public Utilities (“NJBPU”), and the Highlands Council.

Separate and apart from the CMP components, PSE&G shall comply with any and all conditions and mitigation requirements that are required by NJDEP permits and programs. As detailed within the body of this report, PSE&G believes that the proposed CMP enables the Project to be consistent with the goals and purposes of the Highlands Act. The CMP will contain the following components:

A. TRANSMISSION ROW VEGETATION MANAGEMENT PLAN: This plan focuses on changing some of the overall management practices of the existing right of way to enable them to adapt through directed succession. This will improve their function as
habitat for various species of wildlife including invertebrates and potentially reduce the cost of ROW maintenance.

B. AVIAN MANAGEMENT PROTECTION PLAN: This plan focuses on the specific strategies and elements as recommended within several technical documents for reducing bird mortalities from transmission lines.

C. CRITICAL HABITAT/ENDANGERED SPECIES MITIGATION PLAN: Based upon field surveys and other available information, this plan recognizes the potential impacts to various threatened or endangered species and recommends various construction methods and timing restrictions to preclude or minimize these impacts to the extent practicable.

D. WETLANDS AND TRANSITION AREAS MITIGATION PLAN: This plan provides the mechanism for restoring the functions and values of wetlands impacts associated with the Project, and in response to the regulatory requirements of NJDEP, Division of Land Use Regulation.

E. STREAM AND RIPARIAN ZONE RESTORATION PLAN: This plan provides the mechanism for restoring the functions and values of stream and riparian zone impacts associated with the Project, and in response to the regulatory requirements of NJDEP, Division of Land Use Regulation.

F. STORMWATER, EROSION CONTROL PLAN: This plan provides the mechanism for protecting water quality from runoff associated with the Project during construction and for restoring stable soil profiles and for the protection of steep slopes. This plan is also in response to the regulatory requirements of the county soil conservation district.

G. HISTORIC AND ARCHEOLOGICAL RESOURCES PLAN: This plan provides the analysis and recommendations to reduce and minimize the impacts of the Project on these resources, as required by the State Historic Preservation Office within NJDEP.

H. GREEN ACRES PLAN: Several properties are encumbered by the Green Acres rules administered by NJDEP, Green Acres Program. This plan recommends the compensation strategy to remedy the impacts of these diversions.

I. FOREST MANAGEMENT PLAN: This plan is directed at improving forest habitats on parcels acquired to compensate for Green Acres impacts as well as minimizing the initial impacts and restoring forest resources primarily associated with the construction of access roads, which account for an identifiable impact from the Project.

J. CONTRIBUTION TO THE HIGHLANDS COUNCIL: As part of the CMP for the Project, PSE&G would make a contribution to the Highlands Council to be used to protect the existing character of the Highlands Region to ensure the continued economic activity in the form of agri-tourism, eco-tourism and heritage tourism in support of the Highlands Act with the Project. Based upon current land values, it is estimated that the proposed contribution would support the acquisition and stewardship of over 2,500 acres of lands within the Highlands Region in the vicinity of the Project.
INTRODUCTION

This report has been prepared in order to detail the components that are proposed to be included within a CMP for the Project. These components will provide an implementation mechanism for identifying the specific environmental resource issues, the means to avoid, reduce and minimize the specific impact and to define ways that would help to mitigate unavoidable environmental impacts. PSE&G believes that the combined effect of these components represents a comprehensive response to demonstrate the consistency of the Project with the goals and purposes of the Highlands Act.

The proposed mitigation approach is contained in a planning approach where individual plans would be interwoven to meet multiple resource objectives. These plans would effectively deal with the proposed Project as a whole unit. The proposed mitigation approach is being incorporated now to be an element of the Project that is the subject of the PSE&G application for a Highlands Applicability Determination (HAD).

It is important to recognize that the scale and complexity of this Project continues to evolve with an ongoing eye to reduce the overall environmental impacts of the Project. However, the scope of the proposed CMP is based upon conservative estimates.

The positive environmental changes to the Project have come through the benefit of input received from open public meetings and discussions with residents, local officials and regulatory agencies including the NJDEP, the NJBPU and the Highlands Council.

The CMP will recognize that some of the environmental impacts associated with the Project are considered to be temporary and some are considered to be permanent. Generally, the temporary impacts are associated with construction related activities such as construction access roads, and the permanent impacts, are associated with permanent structures such as transmission structures and switching stations.

Because the Project continues to be refined with respect to proposed access roads, tower locations and other elements, the various actual mitigation plans specified in this proposal have not yet been prepared. Instead, this document provides a framework and will serve as the guiding principles for these plans as they are prepared. PSE&G proposes that approval of the HAD request reflect that the exempt Project incorporates this framework and that the individual plans will be prepared and implemented.
MINIMIZATION OF IMPACTS

Throughout the past several months, PSE&G has attended and presented at two public meetings before the Highlands Council. This venue has enabled the public to express their concerns in written and verbal testimony. Several common themes prevailed throughout these discussions and we have sought to revise the Project plans in direct response to these concerns. The ability to redesign certain elements of the Project to avoid and minimize specific environmental impacts is a form of mitigation.

**Relocated Jefferson Switching Station:** Within the Highlands Preservation Area, PSE&G has identified a new location in the Borough of Hopatcong for the proposed switching station that would have been located in Jefferson Township. This change substantially reduces the amount of forest clearing in the Preservation Area that would have been needed for the Project as shown in Table 1 below. A secondary benefit would be the reduced need for specific transmission structures including approximately thirteen (13) structures, many of which would have been required around Lake Wenonah. Finally, advanced switching station design techniques allow PSE&G to reduce the footprint of the switching station from that which was originally proposed.

<table>
<thead>
<tr>
<th>Resource</th>
<th>Jefferson</th>
<th>Hopatcong</th>
<th>% Reduction</th>
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<tbody>
<tr>
<td>Upland Forest</td>
<td>20.4 acres</td>
<td>6.62 acres</td>
<td>68%</td>
</tr>
<tr>
<td>Wetland Forest</td>
<td>0.5 acres</td>
<td>0.5 acres</td>
<td>0%</td>
</tr>
<tr>
<td>ROW Extension</td>
<td>4,650 feet</td>
<td>1,150 feet</td>
<td>75%</td>
</tr>
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*Anticipated impacts are approximate, PSE&G continues to revised the Project to reduce the environmental impacts

**Potential Relocation of Hanover Switching Station:** Within the Planning Area, PSE&G is also evaluating the logistics for relocating the proposed Hanover Switching Station to an existing landfill in Parsippany-Troy Hills. This would remove the proposed switching station from behind an existing residential neighborhood. Although some new transmission structures may still be required within the existing right-of-way, moving the switching location would enable the relocation of several existing structures and transmission lines through Troy Meadows. This would have lasting environmental benefits on existing wetlands and wildlife resources within the Highlands Region. This would also substantially reduce the total wetlands impacts from the Project and would enable this wetlands complex to be ecologically restored. However, at this time, this action is tentative and PSE&G requests that the current proposal to follow the existing right-of-way through Troy Meadows remain as an option should the details of the alternative prove to not be practical.

**Construction Access Roads:** The submitted site plans show the number of linear access roads that are necessary for the purpose of reaching a tower location for either the removal of an existing tower and installation of a new tower or both. Once the tower work is completed, there will be no further need for construction access and so therefore any newly constructed access roads would be able to be restored upon completion of the work.

However, in many locations, these construction access roads are proposed to be within existing cleared dirt paths, existing logging roads, existing gravel roads, extended residential driveways or...
through existing cleared fields. Many of these existing access points now wind through the forest, and transcend up slopes and down gradients, across boulder fields and over fallen tree trunks. Many are very rough to travel and are rutted by tire tracks, erosion wash-outs and maneuver between trees, yet are used by hunting clubs, forest fire fighters, loggers and other outdoorsman in four-wheeled drive vehicles. The levels of improvements to each of these access points will vary based on the existing conditions in the field, but it is rare that an entirely new construction access point would be required that would involve clearing a new road through an existing forest.

The proposed access roads will generally be required to be sixteen (16) feet wide and will be constructed so as to avoid mature trees to the maximum extent. Many existing trails and paths now measure at least twelve (12) feet wide and may only require the select removal of specific trees, the movement of obstructions like significant boulders, fallen trees and/or the cutting back of existing limbs. Gravel or wooden mats may be required to be placed within the access roads depending upon site conditions. To the maximum extent practical, these access roads would be designed and sited along forest edges or within disturbed portions of forest land. In many areas, the forest canopy of adjacent trees extends across these existing access roads. As such, it is not anticipated that the proposed access roads would result in significant, if any, new fragmentation of Highlands forest resources. Appendix C shows the photographs of several typical forest roads that will be used to provide construction access to the Project site.

In an effort to reduce and minimize the impacts to forest resources, PSE&G has been able to demonstrate that the actual impacts to these areas are substantially less than earlier reported estimates. As PSE&G continues to refine the final site plan details to be submitted with the required permit applications, PSE&G has estimated that less than twenty (20) acres of forest habitat within the Highlands Region will be impacted by the access roads.

Use of a Helicopter: PSE&G is continuing with a feasibility analysis to evaluate potentially eliminating several long access roads that would have involved significant steep slope and wetlands impacts through the use of a helicopter for such work.

Ongoing Public Agency Review: Continued public review and agency input may reveal further reductions in impacts, such as for construction-related access roads. And to the extent that an alternative access road could be identified, by PSE&G or others, that would reduce overall environmental impacts, for example, within the 1000’ buffer surrounding a vernal pool, then this alternative will be explored for feasibility. However, the complexity of the issues involved make the Project very challenging to construct to the satisfaction of every known variable. The CMP will be designed to identify and prescribe reasonable parity to these variables, which should be the outcome of any planning process.

The identification of opportunities to reduce, minimize and mitigate the overall environmental impacts from the Project does not fundamentally change the purpose and need of the Project.
documents currently under the review by the NJBPU. It is understood that the NJBPU will decide on the issue of Project need and will defer to the NJDEP and the Highlands Council regarding the environmental resource review and how the environmental impacts are appropriately addressed through the CMP.

**Highlands Council Staff Review:** In preparing the CMP proposal, PSE&G has reviewed the comments set forth in the December 22, 2008 Highlands RMP Consistency Determination. As noted in prior submissions, the goals and purposes of the Act are separate and distinct from the RMP. Therefore, the PSE&G maintains that the Project is not required to be found consistent with the RMP goals, policies and objectives in order to qualify as an exempt project.

However, PSE&G has used the staff analysis in developing the CMP in order to outline the specific mitigation plan components. In this way, PSE&G provides an implementation mechanism for identifying the specific resource issues, the means to avoid, reduce and minimize a specific impact and to define ways that would mitigate the unavoidable impacts from the Project. At the request of the Highlands Council, we have also calculated the level of impact to Highlands’s resources within the Highlands Planning Area so that there is a collective understanding of the Project impacts within the Highlands Region. In total, the CMP represents an overall response to the issue of consistency with the goals and purposes Highlands Act.

**Cost to Redesign Project:** As PSE&G continues to refine the Project elements and the mitigation components, it is clear that those changes that would have an added economic cost must be weighed in view of the environmental benefits to be achieved. For example, it now appears that the construction and operation of the Hopatcong Switching station may result in some net cost-savings over the Jefferson site based on preliminary estimates. However, the relocation of the Jefferson Switch required the proposed purchase of other lands in Hopatcong, which then had to be reengineered in order to facilitate its proper operation. In order to reduce the footprint of disturbance of this switching station, PSE&G redesigned it to go from an open air facility to a Gas Insulated Switchgear station, which has a higher capital cost. Moving forward, PSE&G will continue to be responsive to the environmental concerns and will continue to refine the design components as well as the components within the proposed CMP. However the economic implications of these actions also need to be considered, in context, as part of the overall planning and design process.

**Timeframe for Completion:** PSE&G has provided a timeframe within Appendix B for the completion of the CMP components generally within a year of the date of the issuance of the requested HAD. This timeframe assumes a final approval of the HAD by the NJDEP on or about August 1, 2009; this timeframe could shift if a final HAD is delayed or other necessary Project approvals have not been obtained. Most of the components will be completed prior to the start of the transmission structure construction or will correspond to the timeframes specified within authorized permits for the regulated activities. Delays in part, or all, of the Project may also impact the schedule to commence and complete the components of the CMP. As the components of the CMP are prepared, PSE&G will make them available on the company’s website and provide an opportunity for review and public input.
IMPLEMENTATION OF THE COMPREHENSIVE MITIGATION PLAN

The components of the CMP will serve as the backbone of the means to reduce, minimize or mitigate the environmental impacts associated with the Project. The applicant, PSE&G, is responsible for the completion and implementation of these plans.

The following agencies share an interest in the Project and ultimately this CMP through a variety of existing regulations:

1. New Jersey Highlands Council
2. New Jersey Board of Public Utilities
3. New Jersey Department of Environmental Protection
   a. Division of Land Use Regulation
   b. Division of Watershed Management
   c. State Historic Preservation Office
   d. Green Acres Program
   e. Division of Fish and Game
   f. Division of Parks and Forestry
   g. NJ Natural Lands Trust
4. Warren, Sussex, Morris, Hudson-Essex-Passaic Soil Conservation Districts
5. US Fish and Wildlife Service

It is anticipated that the Highlands Council will take the lead in the review of the draft and ultimately the final CMP and will continue to provide oversight and monitoring of the same. To the extent required by law, the CMP will also be submitted to the above agencies in order to comply with their specific regulatory requirements.

To ensure completion of these plans, PSE&G is willing to post a performance bond, with the dollar amount to be determined.

The NJBPU is currently reviewing the Project under their applicable laws and regulations. It is understood that the Project relies on, and implementation of this CMP is contingent upon, the NJBPU’s determination to proceed on the Project in a written, non-appealable, order. Effectuation of the CMP would not occur without NJBPU written, non-appealable, approval to commence the Project.
BASIS AND BACKGROUND

The purpose and need for the Project is based on the analysis conducted by PJM Interconnection, L.L.C. (“PJM”), an independent FERC-approved Regional Transmission Organization (“RTO”) that operates the electric power grid in 13 states, and the District of Columbia. PJM’s footprint includes New Jersey and Pennsylvania.

In 2007, PJM conducted 5-year and 15-year planning studies to forecast future transmission expansions required to maintain reliability of the power grid. Data collected during the study indicated 23 existing transmission line circuits in Northern New Jersey and eastern Pennsylvania are expected to (or will) become overloaded within the 15-year study period, with some potentially exceeding capacity as early as 2012. Overloaded transmission lines can cause cascading transmission line outages, potentially resulting in major regional brownouts and blackouts.

PJM has determined that upgrades to the existing electric system are necessary to maintain safe and reliable electric service for customers in the region, including those located in eastern Pennsylvania and Northern New Jersey, which includes customers of Public Service Electric and Gas Company (“PSE&G”), Jersey Central Power & Light Company, Sussex Rural Electric Company and PPL Electric Utilities Corporation (“PPL”).

PSE&G and PPL are working in cooperation with each other in response to a directive by PJM to construct a new 500 kilovolt (kV) transmission line between the Susquehanna switching station near Berwick, Pennsylvania and PSE&G’s existing Roseland Switching Station in Roseland Borough, Essex County, New Jersey, and place it in service by the summer of 2012.

In order to effectively service the grid, this line must also tie into the existing Branchburg to Ramapo 500-kV transmission line. This solution will resolve the projected overloading conditions in Northern New Jersey and Pennsylvania. PJM has determined that there are no suitable alternatives for providing the required relief from the significant transmission system reliability challenges identified for the northeast portion of the PJM region.

This Project will be constructed within the alignment of the existing 150’ wide 230 kV line for a distance through New Jersey of approximately 44 miles that includes approximately 26 miles that are located within the Highlands Region. When completed, this service upgrade will include both a 230 kV and a 500 kV line.

Upgrades to the existing transmission line will require the construction of new, higher tower structures that may be lattice structures or monopoles depending on site conditions. Some of this Region consists of remote rocky, mountain ranges and low-land valleys. Multiple streams, some designated as C1 streams, wetlands and other sensitive habitats, including suitable habitat for threatened or endangered species will also need to be crossed.

Upland forests and wetlands will also need to be impacted, primarily from temporary construction access roads to reach the tower locations with construction equipment to remove the existing structures and to install new structures. The history of this line dates back to the mid-1920s, when during this time, it is highly likely that much of this region was not forested, but in active agriculture
or dairy pasture, except for the most remote areas. Construction access was not likely as difficult as it is today due to the absence of forest cover and the now existing land use regulatory requirements.

Permission for temporary access roads to reach tower locations are being sought from property owners along the existing transmission lines. Where possible, existing driveways, logging roads and other existing cleared linear paths will be used and improved to limit the need for new forest clearing. Several remote access points are also under consideration to be reached by helicopter, depending on the environmental and economic implications when considering the cost of temporary driveway improvements and restoration.

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<th>Environmental Constraint</th>
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<th>Off-ROW</th>
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<tr>
<td>Forest Area</td>
<td>0</td>
<td>20</td>
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<tr>
<td>Temporary Steep Slopes including slopes greater than 10% in the Riparian Corridor</td>
<td>Not-anticipated</td>
<td>1.68</td>
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<tr>
<td>Temporary Wetland Impacts</td>
<td>18</td>
<td>3.09</td>
</tr>
<tr>
<td>Permanent Wetland Impacts</td>
<td>0.1</td>
<td>0</td>
</tr>
<tr>
<td>Vernal Habitat (1,000 ft buffer)</td>
<td>Not-anticipated</td>
<td>4.27</td>
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*Anticipated impacts are approximate, PSE&G continues to revised the project to reduce the environmental impacts.
THE HIGHLANDS WATER PROTECTION AND PLANNING ACT

According to the Highland’s Council, “The Highlands Water Protection and Planning Act will preserve open space and protect the state’s greatest diversity of natural resources including the precious water resources that supply drinking water to more than half of New Jersey’s families. The New Jersey Highlands is a 1,343 square mile area in the northwest part of the state noted for is scenic beauty and environmental significance. The Region stretches from Phillipsburg in the southwest to Ringwood in the northeast, and lies within portions of seven counties (Hunterdon, Somerset, Sussex, Warren, Morris, Passaic, and Bergen) and includes 88 municipalities. The Highlands yields approximately 379 million gallons of water daily and is a vital source of drinking water for over 5 million residents of New Jersey. Protecting New Jersey’s drinking water is critically important to maintaining the future economic viability of the entire state. The Highlands’ diverse natural communities, including its extensive forests, wetlands, rivers, and streams, are of statewide importance. Over 70 percent of its lands are environmentally sensitive. The Highlands provides fresh air, open space, and recreation opportunities for millions of residents of the greater New Jersey metropolitan area. Recreation, eco-tourism, agro-tourism and wildlife activities continue to play an important role in the local economy of the area.”

All "major Highlands development," as defined by the Highlands Act, in the Preservation Area requires NJDEP approval, unless otherwise exempted by the Act. According to the Highlands Act, at C.13:20-28, the following are exempt from the provisions of this act, the Regional master plan, any rules or regulations adopted by the Department of Environmental Protection pursuant to this act, or any amendments to a master plan, development regulations, or other regulations adopted by a local government unit to specifically conform them with the Regional master plan:

(11) The routine maintenance and operations, rehabilitation, preservation, reconstruction, repair, or upgrade of public utility lines, rights of way, or systems, by a public utility, provided that the activity is consistent with the goals and purposes of this act;

The existing transmission line is a public utility line that was constructed in the 1920’s and has been routinely maintained and operated since that time. The proposed Project is a major rehabilitation, reconstruction, repair and upgrade of this existing public utility line within its existing right of way. Upgrades will include new tower designs, tower heights, higher capacity wires and new switching stations along the existing transmission route. PSE&G maintains that based on the plain reading of the statute, the proposed transmission upgrade Project is exempt from the Highlands Act.

The proposed CMP ensures that the Project is consistent with the goals and purposes of the Highlands Act. The CMP recommends responsible construction practices and appropriate planning initiatives that recognize the sensitive resources within the Highlands Region that will be traversed by the upgraded utility line. In addition, the CMP recommends a monetary contribution to the Highlands Council related to the Project, which will advance the purposes and goals of the Act. This contribution would also benefit existing state and Federal acquisition programs, which would extend the ability to leverage and make best use of limited financial resources.
COMPONENTS OF THE
PUBLIC SERVICE ELECTRIC AND GAS COMPANY

COMPREHENSIVE MITIGATION PLAN

FOR THE SUSQUEHANNA - ROSELAND
TRANSMISSION LINE PROJECT

THROUGH THE NEW JERSEY HIGHLANDS
A. TRANSMISSION ROW VEGETATION MANAGEMENT PLAN

The Electric-Transmission Right-of-Way Vegetation Management Plan would be developed for the Project that would exceed the basic requirements of the NJBPU Vegetative Standards for right-of-way maintenance. The purpose of this plan would be to support multiple environmental and economic objectives for the existing PSE&G transmission right-of-way through the Highlands Region. This would result in a reduction in the need to rotationally control the vegetative growth within the ROW to meet public safety requirements of the NJBPU, see N.J.A.C. 14:5-9.1 (2008). These regulations do not preclude the ability to create specific habitats for the multiple species of wildlife including threatened or endangered species that would find these areas suitable with proper directed succession. These regulations also support specific management techniques for maintaining high water quality standards, such as maintaining appropriate riparian zone vegetation and wetland communities along streams that cross through the right-of-way.

This plan would include the following components:

- Identification of unique habitats within the ROW on a span-by-span basis which would form the foundation for the site specific management plan. This would be accomplished using existing GIS data coverage, aerial photo-interpretation, database searches, discussions with agency biologists, field reconnaissance and other appropriate means.

- Incorporate recommendations based on site specific knowledge of site conditions in the field, as appropriate. For example:
  - Timing restrictions for critical habitats
  - Using mats in wetland areas
  - Hand removal of vegetation, where appropriate
  - Rotational cutting and maintenance treatment of spans of similar habitat
  - Selecting vegetation with limited terminal height
  - Using low-pressure ground equipment
  - Planting where appropriate

- The plan would clearly establish that transmission line safety is a primary consideration; while at the same time providing quality wildlife habitats and water quality protection.

- Plan objectives would distinguish between upland habitats compared to riparian habitats recognizing that riparian communities are more sensitive to physical disruption.

- A key component would involve planting sections of the ROW with warm season grass species and wildflowers that can be sustained through a regular mowing maintenance program over a five-year cycle.
To a lesser degree, the plan may also recommend to plant specific span sections of the ROW in low growing native shrub species to encourage diversity and to reduce colonization by exotic invasive plants.

Those sections of the ROW with an existing access road would be graded to support access and planted with an interspersion of warm grass species that can be used to delineate the roadway from the maturing shrub species and cultivars of low and slow growing tree species which will not need to be trimmed.

The management plan would ensure that all areas are monitored to ensure that pioneer tree species do not become established and would remove any species which have the potential to grow tall enough to cause arcing (above 15 feet). These trees would be removed from the management area by machine or by hand and root zones treated by the hand held application of an herbicide, if appropriate and based on field conditions.

In addition, invasive species such as multi-flora rose and Autumn Olive will be removed through mechanical or other means, such as spot treatment of backpacked herbicide, if appropriate and based on field conditions.

The plan would also consider creating habitat for T&E species through modifications of existing habitat conditions for species such as the bog turtle and the golden-winged warbler.

Ultimately, the plan would set up mowing schedule which avoids disturbance of critical species habitat during breeding season or other critical life requisite periods.

It would set up rotational mowing schedule on a 5-year cycle to maintain grassland habitat and protect grassland birds.

The plan would also incorporate other elements not specified above that would be based on the planning process.

To the extent practicable, the Plan would minimize the width of riparian crossings for the Project and reduce or minimize the frequency of machine movement across riparian zones and stream ecosystems.

Over the long-term management of the transmission ROW, the plan would aim to reduce abrupt changes from the center to the edge to the forest habitat. Seeding must utilize native species and must target habitat type and function.
B. AVIAN MANAGEMENT PROTECTION PLAN

In coordination with the Transmission Right-of-Way Vegetation Management Plan that would be developed for the Project, PSEG would also create an Avian Management Protection Plan. The two plans would work together. The Transmission ROW Management Plan would deal with the specific habitat components that would be suitable to enhance bird and other species populations within the right-of-way. The Avian Management Plan would evaluate the bird species composition in the Project area and ways to reduce and minimize the direct impacts from the design of the Project.

The Avian Power Line Interaction Committee’s most recent electrocution prevention guidelines, *Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 1996* (1996) would be used. These guidelines review literature and propose spacing and construction guidelines to reduce avian-caused electrical outages and avian fatalities through cooperative measures among electric utilities, industry, and federal and state agencies. The Avian Power Line Interaction Committee and U.S. Fish and Wildlife Service also recently (April 2005) released guidelines on developing an Avian Protection Plan. This document was cooperatively prepared and is intended to help utilities develop Avian Protection Plans to fit their needs while furthering the conservation of avian species and improving reliability and customer service. The goal of the plan is to greatly reduce avian mortality as well as the risk of enforcement by the U.S. Fish and Wildlife Service under the Migratory Bird Treaty Act (APLIC 2005).

The Principles of an Avian Protection Plan (APP) as taken from the April 2005 Report would consider the following elements for inclusion:

1. **Corporate Policy** An APP typically includes a statement of company policy confirming the company’s commitment to work cooperatively towards the protection of migratory birds. This may include a commitment by the company to balance its goal of providing reliable electrical service in a cost-effective manner with the regulatory requirements protecting avian species, as well as the need to obtain and comply with all necessary permits, monitor incidents of avian mortality, and make reasonable efforts to construct and alter infrastructure to reduce the incidence of avian mortality.

2. **Training** Training is an important element of an APP. All appropriate utility personnel, including managers, supervisors, line crews, engineering, dispatch, and design personnel, should be properly trained in avian issues. This training should encompass the reasons, need, and method by which employees should report an avian mortality, follow nest management protocols, dispose of carcasses, and comply with applicable regulations, including the consequences of non-compliance. Supplemental training also may be appropriate where there are material changes in regulations, permit conditions, or internal policies. APLIC-sponsored “short courses” on avian electrocution, collision, and nest issues...
are conducted annually throughout the U.S. In addition, a two-hour overview presentation of avian issues that can be used for internal company training is available from APLIC (see http://aplic.org).

3. **Permit Compliance** An APP can identify the process under which a company obtains and complies with all necessary permits related to avian issues. Particular attention should be given to specific activities that can require take permits including, but not limited APP Guidelines to, nest relocation, temporary possession, depredation, salvage/disposal, and scientific collection.

4. **Construction Design Standards** Avian interactions with facilities can cause outages or system reliability issues. To improve system reliability, avian interactions should be considered in the design and installation of new facilities, as well as the operation and maintenance of existing facilities. For those reasons, inclusion of accepted construction standards for both new and retrofit techniques also should be included in an APP. Companies can either rely upon existing construction configurations recommended by APLIC (see *Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 1996* and *Mitigating Bird Collisions with Power Lines: The State of the Art in 1994*, or the most current editions of these documents) or may choose to instead develop their own internal construction standards that meet or exceed these guidelines. These standards should be used in areas where new construction should be avian-safe, as well as where existing infrastructure should be retrofitted to provide avian safety.

5. **Nest Management** An APP may include procedures for nest management on utility structures. These procedures should be explained to company employees during training to ensure uniform treatment of avian nest issues among personnel.

6. **Avian Reporting System** Although reporting of avian mortalities may be required as a condition of Federal or State permits, a utility may also choose to voluntarily monitor relevant avian interactions, including mortalities, through the development of an internal reporting system. An APP should consider providing for the development of such a reporting system, which can help a company pinpoint areas of concern by tracking both the specific locations where mortalities may be occurring, as well as the extent of such mortalities. Data collected by company personnel can be limited to avian mortalities or injuries, or could be expanded to include historical tracking of avian nest problems, particularly problematic poles or line configurations, as well as remedial actions taken. All data should be regularly entered into a searchable database compatible for use in additional analysis (see Risk Assessment Methodology below). Bird Mortality Tracking System software developed by APLIC is available for free upon request at http://aplic.org.

7. **Risk Assessment Methodology** A utility can have the greatest impact on reducing avian mortality by focusing its efforts in a cost-effective manner on the areas that pose the greatest risk to migratory birds. Therefore, as a general matter, an APP should include a method for evaluating the risks posed to migratory birds in a manner that identifies areas and issues of particular concern. A risk assessment study will often begin with an assessment of available data addressing areas of high avian use, avian mortality, nesting problems, established flyways, adjacent wetlands, prey populations, perch availability, effectiveness of existing...
procedures, remedial actions and other factors that can increase avian interactions with utility facilities. The avian reporting system discussed in the previous section is an integral component of this risk assessment, as well as the use of avian experts, birders, and biologists who can provide additional information on avian distribution. An APP also may provide for the development of models that will enable a company to utilize biological and electrical design information to prioritize poles most in need of modifications, as well as research on the varied causes of avian mortality and the benefits of utility structures to avian species.

8. Mortality Reduction Measures After completing a risk assessment; a company can focus its efforts on areas of concern, ensure that the activities taken by the utility are not out of proportion to the risks encountered by migratory birds, and then determine whether an avian mortality reduction plan needs to be implemented in certain areas. An APP could implement this approach by developing such a risk reduction plan, utilizing risk assessment results to direct where system monitoring should occur, where retrofit efforts should be focused, and where new construction warrants special attention to raptor and other bird issues. If a utility finds that implementation of such avian protection measures is appropriate, it also may choose to develop a schedule for implementation.

9. Avian Enhancement Options In addition to taking steps to reduce mortality risk to avian species, an APP also may include opportunities for a utility to enhance avian populations or habitat, including developing nest platforms, managing habitats to benefit migratory birds, or working cooperatively with agencies or organizations in such efforts. Where feasible, such proactive development of new ideas and methods to protect migratory birds should be encouraged and explored.

10. Quality Control An APP also may include a mechanism to review existing practices, ensuring quality control. For instance, a utility may conduct an independent assessment of its avian reporting system to ensure its effectiveness, or invest in research on the effectiveness of different techniques and technologies used to prevent collisions, electrocutions and problem nests.

11. Public Awareness An APP generally should include a method to educate the public about the avian electrocution issue, the company’s avian protection program, as well as its successes in avian protection.

12. Key Resources An APP should identify key resources to address avian protection issues including, for example, a list of experts who may be called upon to aid in resolving avian issues. These could include consultants, State and Federal resource agencies, universities, or conservation groups. Engineers may find that internal personnel such as environmental specialists can aid in developing creative solutions to resolve avian interaction problems, and external organizations like APLIC can also serve as helpful resources by providing guidance, workshops, materials, and contacts. An understanding of raptor and other bird behavior can influence how and when avian protection should be utilized, and an APP that connects avian experts with utility decision-makers may reduce the risk of avian incidents and improve system reliability.
**Avian Groups to be Evaluated:**

**Waterfowl, Wading Birds, and Shorebirds**

Waterfowl (ducks, geese, and swans), wading birds (herons and cranes), and shorebirds (plovers, sandpipers, and similar birds) are among the more abundant groups of birds that traverse or are residents of the Highlands Region.

**Neo-tropical Migrants**

Songbirds of the order Passeriformes represent the most diverse category of birds, with the warblers and sparrows representing the two most diverse groups of passerines. The passerines exhibit a wide range of seasonal movements, with some species remaining as year-round residents in some areas and migratory in others, and still other species undergoing migrations of hundreds of miles or more (Lincoln et al. 1998). Nesting occurs in vegetation from near ground level to the upper canopy of trees. Some species, such as the thrushes and chickadees, are relatively solitary throughout the year, while others, such as swallows and blackbirds, may occur in small to large flocks at various times of year. Foraging may occur in flight (i.e., swallows and swifts) or on vegetation or the ground (i.e., warblers, finches, and thrushes). Various conservation and management plans exist for Neotropical migrants, including the Partners in Flight North American Landbird Conservation Plan (Rich et al. 2004).

**Birds of Prey**

The birds of prey include the raptors (hawks, falcons, eagles, kites, and osprey), owls, and vultures, and many of these species represent the top avian predators in many ecosystems. Common raptor and owl species include the red-tailed hawk (*Buteo jamaicensis*), sharp-shinned hawk (*Accipiter striatus*), northern harrier (*Circus cyaneus*), Swainson’s hawk (*B. swainsoni*), American kestrel (*Falco sparverius*), golden eagle (*Aquila chrysaetos*), great horned owl (*Bubo virginianus*), short-eared owl (*Asio flammeus*) and burrowing owl (*Athene cunicularia*). The raptors and owls vary considerably among species with regard to their seasonal migrations, with some species being nonmigratory (year-round residents), others being migratory in the northern portions of their ranges and nonmigratory in the southern portions of their ranges, and still other species being migratory throughout their ranges.
C. CRITICAL HABITAT/ENDANGERED SPECIES MITIGATION PLAN

The focus of the plan to be prepared would be to achieve no net loss of habitat value and to maximize habitat value through improvement of habitat on existing preserved lands. Critical Habitat includes Significant Natural Areas (and all rare, threatened, and endangered plants). Mitigation for disturbance to Critical Habitat must include such for disturbance to plants. Aspects of the Project will be conducted within areas identified as critical habitat for threatened and endangered species. Within the Highlands Region, species of special concern and vernal habitat (plus a 1,000 foot buffer) are also protected. Extensive research by field wildlife biologists regarding the presence or absence of these species is underway. Ongoing coordination the Natural Heritage Program, and the Endangered and non-game program biologists within NJDEP, and the US Fish and Wildlife Service is essential throughout planning, design and construction of the Project in order to reduce impacts upon sensitive species including rare, threatened or endangered species. Implementation of this plan shall include provisions that qualified experts in both wildlife and plant biologists will be at each construction site.

Properties containing known populations of threatened, endangered or rare species should be considered candidate parcels for purchase so that the same mitigation can be incorporated in a Critical Habitat/Endangered Species Mitigation Plan.

General Requirements of the Critical Habitat Plan that would be implemented to the extent practicable and in consultation with the Highlands Council, NJDEP ENSP and the USF&WS:

- The applicant should provide mitigation for each species’ habitat that is disturbed through construction activities. Mitigation should be four-part and account for no net loss of habitat value in terms of quality, quantity, type and function, and is not injurious to occurrences of rare plant species or rare ecological communities;
- Mitigation for any species listed on the Federal Register should occur in compliance with the USFWS and should abide by mitigation for no net loss of habitat value.
- A field survey and description of the local ecological community type(s) on the site and a description of the surrounding, macro-scale ecological community type(s) of which the property is part;
- A field survey of the Project area, including all proposed temporary and permanent access roads, staging areas, etc, and an inventory of rare plant species (in cooperation with NJDEP-ONLM). Rare plants species for the county of the proposed Project based on documented occurrences in the NHP database are found at http://www.nj.gov/dep/parksandforests/natural/heritage/countylist.html. The inventory shall include a description of the survey method, all vegetation communities, and occurrences of rare, threatened and endangered species both on the site and within 500 feet thereof to the extent physically or visually accessible. The inventory shall include a map depicting surveyed species and associated habitat;
- Cooperative planning and implementation of mitigation for disturbance to rare, threatened and endangered plant species and/or sensitive ecological communities with the Highlands Council and NJDEP-ONLM, by utilizing results of the
inventories, combined with existing data, to develop a protection, stewardship, and mitigation plan for rare plant species and ecological communities;

- A survey for timber rattlesnake denning habitat should occur in all mapped areas for the species. Any denning sites found should be avoided during construction and site disturbance;
- Late-season construction activities should be performed to avoid disturbance to all state-listed butterfly species mapped habitat (not limited to Silver-bordered fritillary)
- Avoidance of barred owl, red-shouldered hawk, and goshawk habitat requires that old growth and contiguous wetland forests stands should not be fragmented by access roads or paths. Siting of such should occur in existing edge or disturbed portions of forests. Avoidance of red-shouldered hawk nesting sites, including a ¼ mile buffer, should be required during the breeding season (late March through May).
- Avoidance of Cooper’s hawk habitat requires construction and site disturbance activities to occur outside a ¼ mile buffer, or after the breeding season (early April through late July), in mixed riparian or wetland forests. Access roads or paths should avoid these mapped habitats to the extent practicable.
- Avoidance of wood turtle habitat requires site disturbance activities to occur outside streams and surrounding riparian corridors. Siting of such should occur in existing edge or disturbed portions of riparian areas, so as not to fragment these corridors;
- A survey for northern harrier nest sites should occur along the ROW edges and within emergent wetlands located within 1,000 feet of the ROW. 1000-foot protection buffers should be maintained around all documented nests during the breeding season (late February through late June) to the extent practicable.
- Snags should be maintained in wetland forested areas as nesting sites in mapped red-headed woodpecker habitat;
- Where feasible, hedgerows (shrub or sapling) should be planted across the ROW in non-wetland areas, to facilitate connectivity between fragmented forests for species such as the Allegheny woodrat and wood turtle;
- Seeding of warm season grasses within upland portions of the ROW is encouraged for enhancement of Bobolink and Savannah sparrow habitat;
- Avoid high foliage density stands of evergreens, to protect long-eared owl nesting and roosting sites;

The above information would be incorporated into a Mitigation Plan that considers the requirements necessary, for animals and plants, to maintain the viability of these species populations and would likely recommend practices such as the following if species are present:

- **Bald eagle** - These raptors are documented to have used sections of the Project line. Several pairs are known to nest in the region and these nests are protected by an expansive limit of disturbance buffer. Efforts to reduce and minimize the impact to this species will need to be coordinated in the plan with the US Fish and Wildlife Service.

- **Indiana bat** - Mitigation for this species is predominantly limiting tree removal of specific tree species and establishing timing restrictions to preclude construction activities when
the bats are roosting in maternity colonies. The plan also recommends limited girdling of trees to create dead snags that can be used by the bats as suitable roosting den trees within their habitat range. The location of these roosting colonies would be coordinated with the US Fish and Wildlife Service so that construction activities would be limited within 300’ from any wetlands within 5 miles from the maturity roosting colony, to the extent practicable.

- **Bog turtle** Conservation efforts to minimize the Bog turtle impacts will follow the guidance provided by the US Fish and Wildlife Service within ID 2008-1-0319

- Construction-related mitigation shall incorporate a timing restriction during critical breeding, nesting and hatching periods will be established for specific areas of the Project in the vicinity of these species. When working in the vicinity of bog turtle habitat, a certified bog turtle specialist must be on site to prevent intrusion into the habitat and to relocate turtles that may wander into harms way. The habitat must be silt fenced to prevent sediment migration from the work area.

- Access roads will be designed to avoid suitable bog turtle habitat, except where no feasible or practicable alternative exists to avoid this impact, such as excessive steep slopes. If, on a rare occasion, an access road is required to cross this habitat, culverts and directional funnels should be built into the access road to facilitate movement of turtles between wetland areas. This design will be incorporated under the direction of the NJDEP and or US F&WS to avoid altering critical Bog turtle habitat.

- Where access roads cannot avoid crossing Bog turtle habitat, PSEG’s consultants will conduct Phase 2 Bog turtles surveys where needed and coordinate the review with the above mentioned agencies.
  
  - Post construction mitigation - Other mitigation can include enhancement of existing or potential bog turtle habitat within or outside of the ROW. This typically includes the removal (by hand) of common reed or shrubby vegetation and trees such as red maple that are encroaching into the habitat.
  
  - For large areas, it is possible to remove unwanted vegetation allowing goats to graze in the fenced-in habitat.

- **Timber rattlesnake** – Construction related mitigation - When working in the vicinity of rattlesnake habitat, a qualified herpetologist would be on site to prevent negative interactions and to relocate snakes that may wander into harms way. Access roads through rattlesnake areas would be silt fenced and access roads would be retrofitted with culverts and directional funnels to facilitate snake movement.
  
  - Timber rattlesnake den site - When working within 1 mile of the rattlesnake den site, a qualified herpetologist would be on site to prevent negative interactions and to relocate snakes that may wander into harms way. Access roads through rattlesnake areas would be silt fenced and access roads would be retrofitted with culverts and directional funnels to facilitate snake movement.
• **Longtail salamander** – Construction related mitigation - This species can be found near streams or around caves, where they seek shelter under rocks, rotting logs, or in shale banks. Maintaining riparian zones and limiting driving through streams serve to reduce impacts to this species.

• **Wood turtles** – Construction-related mitigation - This species utilizes different habitat during different times of the year. They are found in streams from mid-November through mid-March for breeding and hibernation and from mid-May through mid-September they are terrestrial traveling hundreds of yards from the streams through adjacent wetlands and uplands. While in the vicinity of documented habitat between March and November a biologist should be on site with work crews to relocate any turtles found in the work area. Additional potential mitigation efforts include silt fences to prevent sediment from reaching streams and seeding disturbed areas immediately upon completion of construction activities adjacent to streams. In order to ensure that water quality is being maintained monitoring for turbidity would be conducted during and after construction adjacent to streams. In addition, no pesticides should be used in wood turtle habitat.

• **Allegheny woodrat** – Post-construction mitigation - This species prefers rock outcrops, caves and talus slopes with a southerly exposure. Surrounding forest vegetation is usually deciduous. Fragmentation is the primary cause of decline in this species. Mitigation for this species could include the planting of shrub greenways across the ROW in areas where this species is known to occur. The shrub greenway will provide a corridor across the open ROW which could be acting as a barrier.

• **Silver-bordered fritillary** – Post-construction mitigation - This species is found in wet meadows and marshes. The larval host plant is violets including *Viola glabella* and *V. nephrophylla*. This species is univoltine with one flight from June-July. Habitat for this species includes emergent wetlands for male patrol areas and larval host plants and adjacent uplands for adult nectar sources. Mitigation for this species includes avoidance of habitat during flight season and avoidance of wetlands.

• **T&E Plants** – Construction-related mitigation - A number of State listed plant species have been identified along the ROW. Mitigation would include avoidance and fencing of known populations of these species.

• **Vernal Habitat** – Construction-related mitigation – It is proposed that all vernal ponds be silt fenced with built in herptile passage ways to prevent sedimentation of the ponds while allowing access for breeding and dispersal. Time limitations would be proposed to limit activities should be conducted along the ROW in the vicinity of vernal ponds between sunset and sunrise as migratory activities typically occur after dark. Vehicles would stay on established roads in the vicinity of vernal ponds to prevent animals which wander away from the pond and hide under rocks, logs, brush and debris during the day from being accidentally crushed. New access roads in the vicinity of vernal ponds would be constructed with culverts and directional funnels to prevent the roads from becoming barriers limiting access to and from the ponds.
D. WETLANDS AND WETLANDS TRANSITION AREAS MITIGATION PLAN

As part of the NJDEP Freshwater wetland permit application, PSE&G is required to demonstrate that wetlands have been avoided to the maximum extent possible and that the applicable sections of the regulations at N.J.A.C. 7:7A have been met. For the most part, the wetlands impacts from the Project are the result of the need for access roads to install the transmission structures. To the extent practicable, PSE&G is using existing access roads along the ROW and this has limited the total amount of wetland impacts from the Project.

Impacts would be further minimized by utilizing protective measures such as wooden matting or the use of low profile vehicles designed for distributing weight so as not to cause unnecessary soil compaction in wetland areas. Because of the scale of the Project, (over 46 miles through New Jersey, of which 26 miles will occur within the Highlands Region) and the likelihood that temporary impacts will exceed six months, PSE&G will be required to apply for an individual permit, which would include a Wetlands Mitigation Plan. A plan may contain the following elements as required by NJAC 7:7A-15 et seq.

Construction-related mitigation
- Use of low profile vehicles designed for distributing weight so as not to cause unnecessary soil compaction;
- Marsh mats to span wetland areas and limit wetland soil compaction;
- Silt fencing of wetland areas to prevent accidental disturbances and siltation;
- Sequencing of construction activity to enable the construction work that requires site access through the wetlands to be completed within six months, as practicable.
- Restoration plan for temporary disturbances which includes a long term monitoring plan;

Post-construction related mitigation may include the following:
- Creation of new wetlands along the ROW and at off site locations.
- Along the ROW combine wetlands restoration with the restoration riparian habitat crossing the ROW. This would involve the creation of scrub/shrub wetlands parallel to streams.
- Creation of wetlands at 2:1 for permanent impacts;
- Purchase of wetland credits from a wetlands mitigation bank at similar ratios
- Purchase and donation of wetland habitat containing T&E species habitat.
- Other required elements to be discussed with the NJDEP at the time of permit submission
E. STREAM AND RIPARIAN HABITAT RESTORATION PLAN

Multiple streams will be required to be crossed to facilitate the construction of the Project. This will require a Flood Hazard Area Permit from the NJDEP. This regulatory authority will control the actual impacts to vegetation within the riparian zone, which could extend up to 300' from the top of the bank of a subject stream. Mitigation of riparian zone impacts can be incorporated with several other CMP components including wetlands, soil erosion and the Forest Management Plan. Mitigation shall incorporate restoration and improvement of existing stream corridors along or near the right-of-way. Mitigation of damaged riparian areas and stream channels off-site, especially along the same streams that traverse the ROW, should achieve greater increase in environmental value than land preservation.

A plan would include the following elements:

Pre-construction mitigation includes:

- Silt fencing the riparian zone along stream that cross the ROW or access roads placed in a manner that reduces concentrated stream flows.
- Limiting access to riparian areas;
- Stream monitoring before, during and after construction activities;
- Seed and/or mulch disturbed areas up gradient of streams within 24 hours of disturbance to prevent soil erosion;
- Minimize disturbance for changes in stream morphology through focused efforts to plants shrubs along stream banks that can establish a stable root mass along the stream bank.

Post-Construction

- Subsequent to restoration – Installing deer fencing to prevent deer from feeding in the restoration areas;
- Planting stream corridors on the ROW with deer resistant shrubs and wetland herbaceous seed mixture;
- Armor permanent road crossings with native river jacks, if needed, to prevent washout during storm events;
- Identifying and fencing any permanent road crossings within the ROW of a stream to prevent maintenance activities from accidentally encroaching into the riparian zone;
- The plan would consider restoring off ROW stream corridors that are not vegetated or dominated by herbaceous vegetation that could be planted with native trees and shrubs to restore woody riparian zone;
- Considering the purchase stream-side land outside of the ROW and place land in conservation easement;
- Monitoring streams subsequent to construction activities to determine success of protection and restoration activities; other required elements to be discussed with the NJDEP at the time of permit submission.
F. STORMWATER, SOIL EROSION AND SEDIMENT CONTROL PLAN

A soil erosion and sediment control plan would be developed for the Project to include the ROW and Hopatcong Switching Station Site and access roads. This will include locations for the placement of silt fence, construction staging, gravel tracking pads and other requirements of the applicable county soil conservation district. The plan would also include Low Impact Design Best Management Practices.

A plan would be developed to avoid areas with steep slopes to the maximum extent possible. For new access roads in steep slope areas, use erosion control matting would be proposed to prevent soil loss. Fencing would be placed along the access roads to limit unnecessary access during construction activities. At the completion of the Project, the disturbed slope areas would have slope profile reestablished and replanted with grass and shrubs to stabilize the soils.

- Erosion control in any riparian area or steep slope should go well beyond standard silt fencing, such as multi-barrier approaches. Silt fencing itself should use advanced techniques and strong materials to avoid undercutting, toppling or splitting of the fence. This is especially true where down gradient T&E habitat may be affected.

- When impacts to steep slopes are unavoidable, emphasize disruption of the least sloped areas over the more steeply sloped areas.

- Minimize length of traverse across steep slopes while controlling erosion/disruption potential (i.e., having a short traverse down a severe steep slope may be more disruptive than a longer traverse that avoids the steep slope).

- Strictly limit vegetation removal on either side of access roads in steep slope areas.

- Diffusion of stormwater flow in sloped areas should be emphasized using measures appropriate to rural areas, such as slope intercepts and off-flow points, swales, etc.

Post-construction mitigation would include gully restoration using live gully breaks and live wattle fences. In addition, bioswales could be constructed at angles along the slope to slow down the flow of water and increase stormwater infiltration. The swales would be lined with grass and shrubs so as to trap sediment as it comes down the slope.

Soil Erosion and Sediment Control Plans – Special elements of this plan would also include:

- **Lake Management Areas**
  - Preparation of Soil Erosion and Sediment Control Plans to protect water resources around existing lakes.

- **Protection of Water Resources Quantity**
  - Design Hopatcong Substation Site to achieve 125% of the preconstruction groundwater recharge; and
  - Construction of bioswales on the ROW to slow down the flow of water and increase stormwater infiltration.
- **Water Quality Protection (Wellhead Protection)**
  - **Stormwater Pollution Prevention Plan** - Hopatcong Switching Station Site; and
  - **Construction Pollution Prevention Plan** - Hopatcong Switching Station Site and ROW

- **Carbonate Rock**
  - Geotechnical boring program to determine the suitability of the area to support structures and determine which methodologies will be used to prevent foundation failure; and
  - Drainage Control around structures within karst formations.

- **Steep slopes**
  - Avoid areas with steep slopes to the maximum extent possible;
  - New access roads in steep slope areas will use erosion control matting to prevent soil loss;
  - Silt fencing and hay combinations will be placed along the access roads to prevent soil erosion and limit unnecessary off road access during construction activities;
  - At the completion of the Project, the slope profile will be reestablished and replanted with grass and shrubs to stabilize the soils;
G. HISTORIC AND ARCHEOLOGICAL RESOURCES PLAN

The Highlands Council has identified 28 historic sites and 10 archeological grids that could potentially be impacted by the Project. As a result, a plan will be required that addresses the specific issues of historic and archeological resources. This Plan is also required by the State Historic Preservation Office (SHPO) and will be reviewed within the context of the Freshwater Wetlands Permits that are submitted to the NJDEP, Division of Land Use Regulation.

Details of the preliminary findings have already been submitted to the SHPO and are being evaluated to identify where more detailed sampling and analysis of the impacts from the Project are required.

Final recommendations to reduce, minimize and mitigate the impact of this Project on these resources are being incorporated by Berger Engineering in coordination with the SHPO.

H. GREEN ACRES PLAN

Through communication with the NJDEP Green Acres Program, portions of the proposed Project will require a Green Acres Diversion in accordance with the Green Acres Regulations at NJAC 7:36-1.1 et. seq. The extent of these diversions will depend on the specific easements for the existing right-of-ways that were granted.

The diversions will occur on lands now owned by NJDEP and two parcels owned by Morris County Park Commission. No diversions will occur on municipal open space lands.

Areas under the jurisdiction of the Green Acres Program for new temporary access roads will also require an approval from Green Acres. However since the access roads will be in place for less than two years, the Green Acres Program indicated that they will treat these areas differently from a permanent diversion.

A mitigation plan for the Green Acres diversions will be prepared during the application review process, which will be submitted this year. It is anticipated that the Green Acres Program and the Highlands Council will coordinate the level of mitigation required to meet the existing Green Acres regulations.
I. FOREST MANAGEMENT PLAN

All Highlands forests will be identified in accordance with the Highlands Council’s Method for Identifying Upland Forests in the Highlands Region. A Forest Management Plan would be developed by a state licensed forester with Highlands Council staff input for those forested lands that are acquired as part of the overall Green Acres compensation ratios.

The Forest Management Plan would also provide for compensation for those forest resources that are temporarily and permanently impacted by access roads and other construction related activities outside of the transmission right-of-way. No forest mitigation would be required for vegetative impacts within the existing ROW primarily because the ROW is maintained in a non-forested condition as per the NJBPU rules governing transmission line maintenance.

This Forest Management Plan would be designed to enhance the functional values of the forest habitat under the control of PSE&G outside of the transmission ROW. The plan would identify the specific forest habitat to be impacted and would be designed to demonstrate that there is no net loss of forest habitat and function.

The Plan will address construction-related mitigation for the construction access roads to include:

- Identification of the route that results in the least disturbance to existing forest resources
- Identification and avoidance (as practical) of large specimen trees or den trees;
- Silt fence along roads to prevent migration of soils from work area;
- The use of a geo-textile fabric under the gravel roads to reduce soil compaction;
- Reverse compaction of those portions of the access roads where the weight of the road and vehicular traffic has compacted the soils potentially limiting infiltration.
- Where appropriate, the replanting the restored temporary access areas using native deer resistant species of shrubs, sub-canopy trees and canopy trees.
- Locations where the planting of shrubs and sub-canopy trees and canopy trees will help restore vertical structure to the forested areas impacted by deer browsing. Plant species will be selected from the native species on either side of the access road to be restored, and all planted species will be protected with deer fencing.
- New access roads that extend into interior forest lands will be limited to the extent practicable to avoid impacts to such species as the black-throated green warbler or wood rush.
- An appropriate nutrient rich soil profile for planting tree and shrub species will be established prior to tree and shrub planting if required.
- The access roadway restoration must be designed to discourage use by ATV’s through some creative means such as boulder fields and staggered tree and shrub plantings.
Post-construction mitigation for the temporary roads includes:

- Monitoring plantings to document success of the reestablishment of a vegetated community where trees and shrubs are planted as a form of mitigation.
- To help reduce the visual effect of the Project, the plan would incorporate a Community Grants for tree planting that will enable residents along the transmission line to plant trees on their property through a PSEG tree grant, if desired by local affected municipalities.
- Seeding must utilize native species and must target habitat type and function.

**Hopatcong Switching Station**

- Preservation and forest restoration of the remainder of property, or other Right-of-way property, as a Highlands Forest restoration/education pilot site, which is approximately 100-200 acres depending upon the final negotiations with existing landowners.

- Forest improvement activities would include:
  - Installation of deer fences;
  - Opening the canopy (canopy cover to remain at least 80% to protect vernal habitat breeding species) to allow for greater sunlight penetration to encourage growth of the native understory layers (may include planting of native understory trees and shrubs);
  - Invasive plant species control;
  - Girdling of trees to create snags; and creating brush piles which serve as habitat for small mammals, birds and herptiles.
J. CONTRIBUTION TO THE HIGHLANDS COUNCIL

The Highlands Act established that the “the maintenance of agricultural production and a positive agricultural business climate should be encouraged to the maximum extent possible wherever appropriate in the New Jersey Highlands; and that all such aforementioned measures should be guided, in heart, mind, and spirit, by an abiding and generously given commitment to protecting the incomparable water resources and natural beauty of the New Jersey Highlands so as to preserve them intact, in trust, forever for the pleasure, enjoyment, and use of future generations while also providing every conceivable opportunity for appropriate economic growth and development to advance the quality of life of the residents of the region and the entire State.” N.J.S.A. 13:20-2.

The Legislature further empowered the Highlands Council to:

“...identify and designate in the Regional master plan special areas in the preservation area within which development shall not occur in order to protect water resources and environmentally sensitive lands while recognizing the need to provide just compensation to the owners of those lands when appropriate, whether through acquisition, transfer of development rights programs, or other means or strategies; and

“...identify any lands in which the public acquisition of a fee simple or lesser interest therein is necessary or desirable in order to ensure the preservation thereof, or to provide sites for public recreation, as well as any lands the beneficial use of which are so adversely affected by the restrictions imposed pursuant to this act as to require a guarantee of just compensation therefore...” N.J.S.A 13:20-6 n. o.

In support of these and other goals of the Highlands Act, and in addition to activities proposed in this CMP to avoid and minimize impacts, the CMP includes PSE&G making a monetary contribution to a fund to be established by the Highlands Council. The contribution will be paid according to the terms and conditions of an approved schedule and agreement between the Highlands Council and PSE&G. This will create a new fund established specifically for the purposes of acquiring critical lands, supporting preservation, conservation and stewardship activities and generally enhancing the Highlands Region related to the Project. PSE&G contribution would be provided to the Highlands Council as a component of the overall comprehensive mitigation plan strategy for the Project.

This contribution is consistent with the goals and purposes of the Highlands Act since the Highlands Act supports the acquisition of exceptional natural resources lands, contiguous forest lands, wetlands, pristine watersheds, and critical habitat for fauna and flora, as well as sites of historic significance that provide additional and substantial recreational opportunities, including opportunities to advance eco-tourism, agro-tourism and historic tourism. It is understood that this funding may be used, as determined by the Highlands Council, for the acquisition or stewardship of lands, preservation of farmland, or by the Highlands Development Credit Bank, which is consistent with the Legislative intent of the Highlands Act. This contribution is detailed within Appendix D.
CONCLUSION:

This report has been prepared in order to detail the components that are proposed to be included within the CMP. We believe that the combined effect of these plans ensures that the Project is consistent with the goals and purposes of the Highlands Act.

As PSE&G moves forward to submit the several required permit applications, the details of the construction access roads, tower locations and switching stations will become more final. PSE&G has benefited from the public and agency input received throughout the past several months and has redesigned elements of the Project in direct response to the concerns heard.

The proposed development of the various components of the CMP as detailed in this document will also provide the opportunity for further input into ways that PSE&G can reduce, minimize and mitigate for the environmental impacts of the Project.

PSE&G understands this is a complex Project involving the coordination of many review agencies and the concerns of the public as well. As demonstrated by the proposal for the CMP, the scale of the issues surrounding the Project in the Highlands Region has not been underestimated and it is believed that through the implementation of the CMP that the Project meets the goals and purposes of the Highlands Act.
APPENDIX A – COMPLIANCE CHART WITH THE
DECEMBER 22, 2008 DRAFT HIGHLANDS STAFF REPORT

Page 33
APPENDIX B

CMP COMPLETION TIME LINE
APPENDIX C – PHOTOS OF TYPICAL EXISTING ACCESS DRIVES
APPENDIX D HIGHLANDS COUNCIL CONTRIBUTION METHODOLOGY

Estimating the Area of Potential Impacts on Existing and Potential Public Resources within the Highlands Region from the proposed Susquehanna-Roseland 500 kV Transmission Line

The purpose of this analysis is to provide the basis of support for a contribution to the Highlands Council to mitigate for potential unavoidable impacts to existing and future public attributes and natural resources of the Highlands Region from the proposed Project. The potential impacts to these areas could have a detrimental influence on eco-tourism and agri-tourism within the Highlands Region, which is a significant economic value to the State of New Jersey.

The Highlands Act Section 2 specifies that “the New Jersey Highlands contains other exceptional natural resources such as clean air, contiguous forest lands, wetlands, pristine watersheds, and habitat for fauna and flora, includes many sites of historic significance, and provides abundant recreational opportunities for the citizens of the State.” N.J.S.A. 13:20-2. The Legislature found that the Highlands “provides a desirable quality of life and place where people live and work; that it is important to ensure the economic viability of communities throughout the New Jersey Highlands.” Id.

The CMP prepared by PSE&G is designed to avoid, minimize, and mitigate for all impacts of the proposed Project in order to ensure that the proposed activities are consistent with the goals and purposes of the Highlands Act. There are, however, aspects of the proposed Project which are unavoidable and may not be directly mitigated.

PSE&G has analyzed these issues and is proposing an alternative form of mitigation in the form of a monetary contribution to the Highlands Council to ensure that the goals and purposes of the Highlands Act are met. Specifically, PSE&G has formulated a methodology that determines the impacts to certain resources that are important to achieve the “goals and purposes of the Act.” In reviewing the Act, one clear goal is that any development “would result in minimal practicable degradation of existing public attributes at the site and within the surrounding area.” See N.J.S.A. 13:20-34.

Within this analysis, GIS was used as an evaluation tool for the purposes of establishing a methodology for quantifying a very conservative estimate of the area of the overall potential impact to existing and potential public attributes and natural resources from the Project throughout the Highlands Region. GIS is a very sophisticated analytical tool, but it also has certain limitations, which requires practical land use knowledge. The results reflect the micro-processing of a significant amount of existing Highlands data to establish the area of existing and potential public attributes and natural resources using the following Highlands data layers:

1. Highlands Preserved Lands
2. Special Environmental Zones
3. Conservation Priority Areas (high and moderate)
4. Agriculture Priority Areas (high and moderate)

The above data layers reflect the legislative mandates of the Highlands Act to identify lands “in which the public acquisition of a fee simple or lesser interest therein is necessary or desirable in order to ensure the preservation thereof…”

GIS was also used to establish “buffers” to delineate ranges of potential impacts based upon the distance from the transmission line. These distances ranged from 0-0.5 miles, 0.5-1 miles, 1-2 miles, 2-3.5 miles and 3.5-7 miles. These layers were clipped to eliminate overlapping data layers in the above ranked order and then assembled to constitute the total “existing and potential public attributes and natural resources” for this analysis. This area was then calibrated based on the distances from the tower locations to produce an estimate of the existing or potential public land features that support eco-tourism and agro-tourism within the Highlands Region in the area of the transmission line as shown in Chart 1 below:

<table>
<thead>
<tr>
<th></th>
<th>0-0.5 miles</th>
<th>0.5-1 miles</th>
<th>1-2 miles</th>
<th>2-3.5 miles</th>
<th>3.5-7 miles</th>
<th>Subtotal</th>
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<td>Priority Areas</td>
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<tr>
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<td>Priority Areas</td>
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Table 1

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<thead>
<tr>
<th></th>
<th>0-0.5 miles</th>
<th>0.5-1 miles</th>
<th>1-2 miles</th>
<th>2-3.5 miles</th>
<th>3.5-7 miles</th>
<th>Subtotal</th>
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<td>Agricultural Priority Areas</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2,947</td>
</tr>
</tbody>
</table>

Total Area 131,556
INTERPRETATION OF THE ESTIMATE D LAND AREA
Chart 1 details the synthesis of a significant amount of GIS data that was assembled to produce an estimate of the existing or potential public land features that support eco-tourism and agro-tourism within the Highlands Region in relation to the transmission line. This estimate indicates that approximately 132,000 acres of land that is either within public ownership or identified as containing a preponderance of environmental features to warrant public acquisition is located within proximity to the transmission line. It is very important not to misinterpret this data. This data is not an estimate of the actual properties that will be directly or physically impacted by the proposed Project, for example through construction activities. Instead, this area reflects that these existing or potential public properties are within the Region that could potentially experience an impact on a very broad scale. Under the Highlands Act, this impact is measured against an array of activities that help to support eco-tourism and agri-tourism, which are often less-tangible and non-consumptive uses of the Highlands Region, but still cumulatively add-up to make the Highlands a very special Region in the State of New Jersey. It was important to attempt to quantify this area, so that an appropriate contribution value, as part of the overall CMP, could be calculated.

PER ACRE CONTRIBUTION ESTIMATES
In order to establish a per acre estimate in order to assess the mitigation contribution, PSE&G utilized the analysis prepared by the Highlands Council in the Land Acquisitions Costs section of the Council’s Financial Analysis Technical Report. The Technical Report provides an analysis of the anticipated acquisition costs of the areas of significant natural and agricultural resources that should be preserved, whether through outright acquisition or through some other measure such as the Transfer of Development Rights. The areas identified are the Conservation Priority Area, the Agricultural Priority Area and the Special Environmental Zone.

As described in the Technical Report, the costs per acre were calculated based upon data from the State Green Acres Program confidential list of total costs per acre for all preserved open space in the Highlands Region by County from August 1, 2002 through January 31, 2008. The average per acre costs for fee simple acquisitions for priority lands in the entire Highlands Region from August 1, 2002 through January 31, 2008, was approximately $7,500 for the area of the Highlands Region in which the Project will be constructed. PSE&G utilized this average cost per acre in the examination of the potential impacts to the Highlands Council’s Conservation Priority Area, Agricultural Priority Area, the Special Environmental Zone and the existing Highlands Preserved Lands.

IMPACT ASSESSMENT MULTIPLIERS
The majority of actual physical construction related impacts from the proposed Project on existing Highlands resources are proposed to be directly addressed by PSE&G. In order to quantify those impacts that are unavoidable, PSE&G examined the numerous goals and policies of the Highlands Act. PSE&G utilized an initial impact factor of 0.07 to estimate the types of impacts anticipated to occur across roughly 28 resource issues in the Highlands Region. PSE&G used 0.07 as the initial impact factor and adjusted this factor using the following variables to adjust the impact based upon the distance from the transmission line:
CONTRIBUTION FORMULA
As a result of this analysis, a simple formula was created that was used to calculate the estimate of the contribution that would be provided to the Highlands Council as a result of the potential impacts of the Project upon existing preserved lands, eco-tourism and agritourism within the Highlands Region. This formula calculated the base area values for each category in Chart 1 above, which was multiplied by $7,500 and then further multiplied by the Impact Assessment multiplier or (IMA) to produce the following formula:  \[(\text{AREA}) \times (\$7,500) \times (\text{IMA}) = \text{Subtotal Contribution}\]

PERMANENT IMPACTS
The proposed Hopatcong switching station is very important to the overall Project since it will facilitate the interconnection of the Susquehanna-Roseland 500 kV line with the Branchburg to Ramapo transmission line. The construction of this switching facility will require the permanent impacts of approximately 5 acres of land that is located within the Highlands Preservation Area. In order to compensate for this impact through a contribution to the Highlands Council, the 2008 Transfer of Development Rights – Technical Report prepared by the Highlands Council was used. The methodology described in this technical report estimated that 145 Highlands Development Credits (HDCs) would be required. However, the cost per acre of $7,500 was used as the estimated value of a HDC credit since there is no comparable value for the cost of an HDC to support utility infrastructure, such as a switching station.

145 HDCs \times \$7,500 \text{ per HDC} = \text{Subtotal contribution}

TEMPORARY IMPACTS
Construction access roads will be required through portions of existing forest land as detailed within the CMP. This impact totals approximately 20 acres. In addition to the other requirements detailed within the CMP, a contribution to the Highlands Council for this impact is also proposed. The formula for this contribution is based on the area of impact (20-acres) times a 5:1 mitigation ratio for temporary impacts times the standard value of $7,500 used in the above estimates.

20-acres \times 5 \ (5:1) \times \$7,500 = \text{Subtotal contribution}
CONCLUSION:

The results of this analysis are summarized within Table 1 that is attached. This table provides a reasonable estimate to compensate for the area of potential impacts of the Project upon existing and potential public attributes and natural resources within the Highlands Regions. Based on the analysis detailed above, the proposed mitigation payment to the Highlands Council is $18,610,524.
TABLE 1: CONTRIBUTION TO THE HIGHLANDS COUNCIL

<table>
<thead>
<tr>
<th>Permanent Impacts</th>
<th>Acres</th>
<th>HDCs</th>
<th>Cost</th>
<th>Subtotals</th>
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<tbody>
<tr>
<td>Hopatcong Switch</td>
<td>5</td>
<td>145</td>
<td>$7,500</td>
<td>$1,087,500</td>
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<table>
<thead>
<tr>
<th>Temporary Impacts</th>
<th>Acres</th>
<th>HDCs</th>
<th>Cost</th>
<th>Subtotals</th>
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<tr>
<td>Access Roads</td>
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<td>5</td>
<td>$7,500</td>
<td>$750,000</td>
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Impacts to Open Space, Eco-tourism and Agri-tourism

<table>
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<tr>
<th>Multiplier</th>
<th>Contribution</th>
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<tr>
<td>0-0.5 miles</td>
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<tr>
<td>0.5-1 miles</td>
<td>$2,424,875</td>
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<td>1-2 miles</td>
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<tr>
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<tr>
<td>3.5-7 miles</td>
<td>$541,380</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>$18,610,524</strong></td>
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TOTAL CONTRIBUTION $18,610,524