~~Exhibits~~ report

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November 15, 1999

Hon. Deborah Renner
Acting Secretary
New York State Public Service Commission
Three Empire State Plaza
Albany, New York 12223

Re: Case 99-T-1423 – Application of the Long Island Power Authority for a Certificate of Environmental Compatibility and Public Need for the Construction of an approximately 22.5 mile long underground electric transmission line in the Town of Southampton, Suffolk County

Dear Acting Secretary Renner:

On behalf of the Long Island Power Authority ("LIPA"), enclosed for filing please find ten (10) copies of the remaining detailed design drawings for the Project. See Exhibit 5 of LIPA's Application, dated October 15, 1999.

Also enclosed for filing are ten (10) copies of certain revised pages of LIPA's Application (i.e., the initial application section, Exhibits 2-5, 9-12 and 14-15, and the prefiled testimony). The revisions reflect corrections and updates and are minor in nature. Revised language is denoted by a line on the right side margin of the pages. Please substitute the enclosed pages for the original pages in LIPA's Application.

Also enclosed are ten (10) copies of a revised public notice associated with LIPA's Motion for an Expedited Proceeding, dated October 15, 1999. The public notice will be published in Newsday on or about November 15, 1999. The revision pertains to a minor change in the Proposed Route in the Shinnecock Canal area.

For the Commission's information, please be advised that LIPA is holding two public information sessions on the Project on November 17, 1999 at the Southampton High School.

Finally, also enclosed are ten (10) copies of an Affidavit of Service pursuant to 16 NYCRR 85-2.10.

Thank you.

Very truly yours,

ADAMS, DAYTER & SHEEHAN, LLP

By: Timothy P. Sheehan (SW)
Timothy P. Sheehan

Attorneys for Long Island Power Authority

Enclosures

cc: Service List

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STATE OF NEW YORK)
: ss
COUNTY OF NASSAU)

AFFIDAVIT OF SERVICE

I, STEVEN V. DALTON, being duly sworn, depose and say that I have this day served copies of all of the within documents upon each person designated on the attached service list by Federal Express overnight service in accordance with the requirements of 16 NYCRR § 85-2.10.

Dated: November 15, 1999

Steven V. Dalton
STEVEN V. DALTON

Sworn to before me
this 15th Day of November, 1999.

Marie Vanacore
Notary Public

MARIE VANACORE
NOTARY PUBLIC, State of New York
No. 30-4769813
Qualified in Nassau County
Commission Expires Sept 30, 2000

Public Notice

General Information

The Long Island Power Authority (LIPA) has filed an application with the Public Service Commission (PSC) for approval to construct a new underground electric transmission line in the Town of Southampton from LIPA's Riverhead Substation to its Southampton Substation. The proposed new line is approximately 22.5 miles in length and is proposed to be constructed entirely underground on existing LIPA, Long Island Rail Road (LIRR), and public rights of way. Detailed descriptions of the proposed route as well as possible alternative routes are set forth below.

Notice of LIPA's Motion

LIPA has made a motion to the PSC requesting that the public hearing required by Section 123 of the Public Service Law to be held on LIPA's application be held before the PSC based on the application, exhibits, prepared testimony, and any other information filed by LIPA and any prepared testimony, information, or papers filed by PSC staff counsel or any other party, without oral testimony being taken.

Any person opposed to the PSC's approval of LIPA's application to construct the proposed new transmission line should, within 10 days from this notice, notify in writing the Acting Secretary, New York State Public Service Commission, Three Empire State Plaza, Albany, New York 12223, of the reasons for his or her opposition.

Proposed Route

The proposed route of the underground transmission line, which recently has been revised slightly in the Shinnecock Canal area, is as follows: Starting from its western terminus at the LIPA Riverhead Substation which is north of Nugent Drive, the route follows LIPA's right of way south from the Riverhead Substation to County Route 51 (Riverhead Moriches Rd.); southwest along the public right of way of County Route 51 to County Route 88 (Speonk-Riverhead Rd.); south along the public right of way of Route 88 to New York State Route 27 (Sunrise Highway); east along the public right of way of Route 27 to Newtown Road; south along the public right of way of Newtown Road to Gate Street; east along the public right of way of Gate Street to the Shinnecock Canal Bridge on Route 27; across the Bridge to Canal Road East; east along the public right of way of Canal Road East to Route 27; east along the right of way of Route 27 to Peconic Road, across the public right of way of Peconic Road to Long View Road; east along the public right of way of Long View Road to Hill Station Road; south on the public right of way of Hill Station Road to the Long Island Railroad; east on the LIRR right of way to the electric line's eastern terminus, LIPA's Southampton Substation, which

is on North Sea Road and West Prospect Street in Southampton.

Alternate Routes

Two possible alternative route segments, one of which includes a combination of overhead and underground facilities, have been given consideration and are described in LIPA's application to the PSC. One alternative is an entirely underground line that would follow the proposed route until it is east of the Shinnecock Canal. It would then stay on Sunrise Highway until it merges with County Road 39; where it would turn south to Tuckahoe Road until it meets the LIRR right of way where the alternate route would again merge with the proposed route. The second alternate route includes a combination of underground and overhead facilities as follows: an underground line would follow the proposed route until it leaves the LIPA right of way at County Road 51; it would turn southeast and traverse private properties and Sears Bellow Park until Route 27; the line would continue east along the north side of Route 27 until it reached Exit 65 where it would convert to an overhead line and cross Route 27; it would continue south to LIPA's Tiana Substation and then follow the LIRR right of way to LIPA's Southampton Substation.

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Application

A. Description of the Proposed Facility

The Long Island Power Authority ("LIPA") proposes to construct a new underground electric transmission line entirely within the Town of Southampton, from LIPA's Riverhead Substation to its Southampton Substation (the "Project"). The Project is essential to maintaining reliable electrical supply to the South Fork of Long Island by providing an adequate margin for operation of the electric system at peak loads under normal conditions and in the event of transmission outages. Stated simply, the Project is necessary to enable LIPA to meet its customers' current and future electrical requirements and is vital to maintaining the integrity of the electric system on Long Island. The electric transmission line is subject to the licensing requirements of Article VII of the Public Service Law and must receive a certificate of environmental compatibility and public need from the Public Service Commission ("PSC").

The electric transmission line will initially operate at 69 kilovolts ("kV") and will be capable of operating at 138kV in the future upon upgrades at the Riverhead and Southampton Substations. The transmission line will consist of three single solid dielectric cables, each consisting of a 2500 kcmil copper conductor (each approximately 1.7 inches in diameter), cross-linked polyethylene insulation surrounded by a metal sheath and a polyethylene outer jacket having an overall diameter of approximately five inches. Each cable will be installed in an 8-inch high-density polyethylene ("HDPE") conduit. An additional set of three 8-inch HDPE conduits, without electrical cables, will be installed for future use. The conduits will be installed in a 42-inch wide trench and buried a nominal 42 inches. In areas where less than a 42-inch cover is identified, a means of mechanical protection shall be placed over the conduits to withstand anticipated external loads. No dielectric fluids will be utilized in this transmission line. One twin telecommunication conduit will also be installed in the same trench providing a fiber optic link between substations for system protection purposes.

B. Proposed Route

As shown in Exhibit 2 Attachment A, the proposed transmission line will be constructed entirely underground on existing LIPA, Long Island Rail Road ("LIRR"), and public rights-of-way ("ROW"). The Proposed Route for the line is approximately 22.5 miles in length. Starting from its western terminus at the LIPA Riverhead Substation, north of Nugent Drive, the proposed route travels along LIPA's ROW south from the Riverhead Substation to County Road 51 (Riverhead-Moriches Road); southwest along the public ROW of County Road

51 to Speonk-Riverhead Road; south along the public ROW of Speonk-Riverhead Road to New York State Route 27 (Sunrise Highway); east along the public ROW of Route 27 to Newtown Road; south along the public right-of-way of Newtown Road to Gate Street; east along the public right-of-way of Gate Street to the Shinnecock Canal Bridge on Route 27; across the Bridge to Canal Road East; east along the public right-of-way of Canal Road East to Route 27; east along the right-of-way of Route 27 to Peconic Road and Long View Road; east along the public ROW of Long View Road to Hill Station Road; south on the public ROW of Hill Station Road to the Long Island Railroad; east on the LIRR ROW to the electric line's eastern terminus, LIPA's Southampton Substation, which is on North Sea Road and West Prospect Street in Southampton (the "Proposed Route").

C. Summary of Environmental Studies and Environmental Impact

Archaeological, land use, ecological and historical studies have been conducted for the Proposed Route, as well as the two alternate routes, and are described in Exhibit 4.

Using the Proposed Route of the Project or the alternate routes, the Project will not impact any areas of sensitive land use or areas of archeological or historical significance based on information reviewed to date. Based on information received from the New York State Office of Parks, Recreation and Historic Preservation ("NYSOPRHP") and other relevant agencies and organizations, no known areas of historical or cultural interests will be impacted by the Project. As discussed in more detail in Exhibit 4, historical and archeological resources will be further evaluated prior to construction by an archeologist from SUNY at Stony Brook.

With respect to environmental issues, the ecological studies have identified native flora and fauna that could be impacted. These impacts will be minimal. In addition, there are several freshwater wetlands that are on or near the Proposed Route. However, as described below, the wetlands will not be adversely impacted by this Project. A small wetland exists about 100 feet west of LIPA's cleared ROW north of Nugent Drive and will not be impacted by construction activities. A second wetland exists on LIPA's ROW south of Nugent Drive north of Route 51. A third freshwater wetland exists on the LIRR ROW west of Southampton College. There will be no impacts to the second and third wetlands since the line will be directionally drilled under them.

The Project area, including the alternative routes, will traverse the Central Pine Barrens area. The Project area is dominated by pitch pine and scrub oak forest with some transitioned pitch pine-oak heath woodlands. The dwarf pine

plains area, which is along the southern side of Sunrise Highway and adjacent to the route, is outside of the construction zone. As described below and more completely in Exhibit 4, the Proposed Route will not have an adverse impact on the Pine Barrens since it will be restricted to the shoulder areas of State, County and Town roads and will not impact any undisturbed areas of the Pine Barrens. Compared to the alternative routes, it will have the least ecological impact on the Pine Barrens. The Proposed Route will follow previously disturbed existing public rights-of-way that are non-ecologically sensitive. They are transitional zones (ecotones) and are not integral to the flora and fauna communities within the Central Pine Barrens area proper. Every effort has been made, through discussion with the Suffolk County Department of Public Works ("SCDPW"), the NYSDOT and the Town of Southampton to select areas within the rights-of-way that will cause the least possible impacts consistent with public safety and need. Areas within the Town, SCDPW and NYSDOT ROWs, such as the median of Route 51 and the shoulder areas of Route 27 and Town roads that are less vegetated, have been selected to minimize impacts to flora and fauna species.

D. Statement of Need for the Proposed Facility

The Project area is known as the South Fork of Long Island, which includes the Towns of Southampton and East Hampton, and is identified from the perspective of the LIPA electric system as the South Fork Load Pocket. A load pocket is a specific area of the electric system served by distribution substations that are supplied by the electric transmission system into the area or a combination of transmission into the area and electric generation within the area. In some cases, generation located within the load pocket is necessary for electric supply during at least a portion of the time. The South Fork Load Pocket includes the 51 MW of generation installed east of Riverhead. The need for the proposed transmission facility is demonstrated primarily through analysis of conditions experienced during the summer of 1999 in the South Fork Load Pocket. The existing transmission system and the need for the Project are also described in the context of the larger area known as the East End of Long Island. This portion of the LIPA electric system is shown in Figure D-1, which depicts the substations and electric transmission system east of Riverhead on both the North and South Forks of Long Island. Riverhead is the eastern extent of the LIPA 138kV bulk transmission system. The North Fork is supplied by a 69kV overhead transmission line, and an older 23kV overhead line, which extend from Riverhead to Southold. The South Fork is supplied by a double-circuit 69kV overhead line which extends from Riverhead to the Buell Substation in East Hampton. The smaller substations east of Buell are supplied by a 23kV system. The North and South Forks are linked by a 69kV transmission cable, which extends from the Southold

Substation on the North Fork, across Shelter Island, to the Buell Substation in East Hampton.

During the summer of 1999, the LIPA electric system experienced unprecedented electric loads, particularly on the South Fork of Long Island, east of the Tiana Substation. On July 5, 1999, the load served by the substations in Southampton, Bridgehampton, and East Hampton, and the smaller substations east to Montauk, reached a level that was 25% higher than the 1998 peak for this area, and 18 % above the forecast of 141 megavolt-amperes ("MVA").

Data from the LIPA system indicated that the South Fork load level reached on July 5, 1999 (which was actually reduced by some distribution system outages) was essentially at the maximum level sustainable by the 69kV transmission system that serves the area. Had the load been higher, the voltages on the transmission system would have dropped below the level necessary to sustain flow of power into this area, as well as the remaining portions of the system east of the Riverhead Substation. To prevent this phenomenon, known as voltage collapse, automatic load shed systems at the Southampton and East Hampton (Buell) Substations would have been activated, interrupting service to approximately 32% of the over 41,000 customers on the South Fork. The automatic load shedding system, originally envisioned to deal with the contingency of loss of the existing double-circuit transmission line from Riverhead to Southampton, would have been activated. It would also have operated for loss of generation or loss of single-circuit line events.

Load and voltage data for the area east of the Tiana Substation clearly show this situation. Figure D-2 shows the hourly load level in MVA for a number of the peak days in July 1999, and Figure D-3 shows the transmission voltage at the Buell Substation. Based on previous computer simulations of transmission load flows and on the voltage data acquired during the 1999 summer, the maximum capability of the existing transmission system to the South Fork, with all lines in service, is 170 MVA. The South Fork's load level of 167 MVA experienced on July 5, 1999 is essentially at that maximum limit. Based on load flow simulations, the current limit for loss of the double-circuit transmission line is 120 MVA.

Given the higher occurrence of load levels above this limit, there is a clear need to also improve the first contingency supply limit to reduce exposure to outages. Aside from the July 5 peak, weekend peak loads on the South Fork have regularly exceeded the summer 1999 forecast of 142 MVA, leading LIPA to the conclusion that previous plans for this area need to be advanced by up to four years. The revised plan accelerates the addition of new capacitor banks at

the Southampton and Bridgehampton Substations from 2001 and 2002, respectively, to 2000 and accelerates the 69kV terminal modifications at Southampton from 2003 to 2000. It also accelerates this Project from 2004 to 2000. In addition, approximately 30 additional distribution capacitor banks will be installed in the Riverhead area by the summer of 2000 as a further measure to ensure adequate system voltage in the Project area.

The South Fork Projects, including the transmission line, will improve the normal supply capability to the area east of the Tiana Substation to approximately 230 MVA. The load limit under the first transmission contingency will improve to approximately 180 MVA. These improvements will provide the capability to serve the growing load east of Riverhead, particularly on the South Fork, where the load is forecast to reach in excess of 160 MVA by the summer of 2000 under normal weather conditions, or up to 180 MVA under the abnormally severe weather conditions experienced in the summer of 1999.

E. Alternatives

1. Alternative Routes and Construction

Various alternative routes, as well as consideration of overhead and underground construction, were initially considered together in the evaluation of alternatives. First, LIPA evaluated the sufficiency of reconstructing the existing double-circuit 69kV line along its easement from Riverhead to Tiana to 138kV which would include larger steel poles, conductors and insulators. While feasible from a construction standpoint (if easements could be renegotiated), this option did not satisfy LIPA's planning requirements, which clearly involve the need for a second, independent electric supply source to the South Fork due to reliability issues.

Second, LIPA's existing transmission ROW and easements were evaluated to determine their suitability for construction of an additional overhead circuit at either 138kV or 69kV. The ROW was inadequate for this usage except in a limited area, near the Riverhead Substation. This is owned by LIPA, and is wider than the remainder of the ROW between the Riverhead and Tiana Substations. Further, underground construction would be limited at various locations because of changing terrain. Finally, LIPA does not own the ROW corridor. In certain easement portions of the ROW, limitations on the current easements would require re-negotiation for underground facilities. Renegotiating over 150 easements would jeopardize a 2000 in-service date.

Usage of the LIRR ROW was also evaluated. Parts of LIPA's existing

easement between the Tiana and Southampton Substations are adjacent to the LIRR ROW on the south side of the track. This alternative was found to be limited for both overhead and underground construction for much of the route because of changes in natural terrain elevation and the difference between the track elevation and LIPA easement. Despite deficiencies, this option is more fully considered in this Application as part of Alternative 2.

Finally, the Proposed Route was developed by evaluating routes which utilize the edge of County and State road ROWs which generally pose minimum construction difficulty and minimized environmental impacts as well. Indeed, the Proposed Route was selected to avoid disturbing the Pine Barrens' undisturbed areas. As a result, the choice of underground or overhead construction is largely dictated by these considerations, the timing of approval and the construction schedule, given the need to have the line in service as soon as practicable.

The above considerations led to the three alternatives identified in this application.

Proposed: Underground Route

LIPA ROW south from Riverhead Substation to County Road 51;
Southwest along County Road 51 to Speonk-Riverhead Road;
South along Speonk-Riverhead Road to New York State Route 27;
East along Route 27 to Newtown Road, south to Gate Street, east across the Shinnecock Canal Bridge to Canal Road East;
East along Route 27 to Peconic Road;
East along Long View Road to Station Hill Road;
South along Hill Station Road to the LIRR;
East along the LIRR ROW to the Southampton Substation

Alternative 1: Underground Route

Same as Proposed Route for the portion west of Shinnecock Canal;
East of Shinnecock Canal: Route 27 to County Road 39 to Tuckahoe Road;
Along LIRR ROW to Southampton Substation

Alternative 2: Underground/Overhead Hybrid Route

Underground along the right of way of the existing overhead transmission line, which traverses private properties and Sears Bellow Park until Route 27, and continues east along the north side of Route 27 to Exit 65;

Overhead across Route 27 and south to the Tiana Substation;
Overhead along the LIRR ROW to the Southampton Substation

2. Generation

The South Fork currently relies on 51 MW of combustion turbine and diesel generating units installed at Southampton, East Hampton, Southold, and Montauk. Transmission load flow simulations have shown that the addition of 72 MW of generation at Southampton provides a comparable improvement in normal and contingency power supply capability to a 69kV transmission line. Construction of two simple-cycle aeroderivative combustion turbine units with a combined summer peak rating of 72 MW was considered the most likely generation alternative for expedited installation. This plant would not be subject to Public Service Law Article X review, but would be subject to environmental review under the State Environmental Quality Review Act (SEQRA) regulations and other permitting requirements.

The following considerations led to the decision by LIPA to defer the generation option at this time:

a. Additional generation would defer, but not eliminate, the need for the new transmission line.

b. The time required for the SEQRA environmental review and permit approval process would likely be 18 months or longer even under an expedited schedule.

c. Significant accelerated expansion of the gas transmission system would also be required to support the generation option.

d. The total cost of the generation option was estimated to be greater than the cost of the Project.

e. LIPA has undertaken a competitive procurement process for additional generating capacity on Long Island; bids were returned to LIPA on September 8, 1999. The timing of this competitive procurement process, together with requirements for SEQRA environmental review and permitting and the need for expansion of the gas transmission system, could not support summer 2000 operation.

3. Demand Side Management

An evaluation of the expected impact of LIPA's extensive Clean Energy Program has demonstrated that Demand Side Management ("DSM") efforts would not be able to produce peak load reductions that would make a substantial contribution to the anticipated electric supply deficiency in this region of Long Island. Despite LIPA's existing DSM Program, additional strategies were examined to expand the reach of the Clean Energy Program.

An evaluation of the census data indicates that the South Fork has approximately 41,000 customers and 10,400 commercial/industrial accounts. LIPA will direct a targeted marketing campaign at this region to promote participation in the Clean Energy Program. Offerings selected are those most likely to succeed with the current demographics of the region. This campaign will be supplemented with a newly developed targeted Peak Load Reduction Program. LIPA has determined that the residential Clean Energy Programs likely to be effective in the South Fork are the Residential Lighting and Appliance Program, HVAC Efficiency Program, Residential Energy Affordability Program ("REAP") and the Rooftop Photovoltaic Program. The commercial programs likely to be successful are the Commercial New Construction and Renovation Program and the Regional High Efficiency HVAC Program. In addition, a new Direct Load Control ("DLC") Program will be developed for residential and commercial customers as described in Exhibit 3. These existing and expanded programs are expected to yield peak load reductions of approximately 3 MW-- 1 MW from conservation and 2 MW from DLC.

While these reductions will assist in mitigating load growth, they clearly do not meet the load requirements of the South Fork nor eliminate the need for this Project.

EXHIBIT 2

LOCATION OF FACILITIES

General

Attachment A of Exhibit 2 contains the following drawings:

NYSDOT Quadrangle Map (1:24,000) depicting the Proposed and Alternate Routes (labeled Part 86.3-1(i)

NYSDOT Quadrangle Map (1:250,000) (revised from October 15, 1999 Application) regionally depicting the Proposed and Alternate Routes (labeled Part 86.3-2)

Attachment B of Exhibit 2 contains a set of Land Use drawings which depict the archeological, historical, zoning and other Land Use features. Attachment C of Exhibit 2 contains a set of Ecological drawings (revised from October 15, 1999 Application) which depict the general ecological communities along the Proposed and Alternate Routes. Refer to Exhibit 4 for a discussion of the archaeological, historical, scenic and land use features identified on Attachments B and C as well as the environmental impacts of the proposed Project and alternatives. Because these drawings are oversized, they are separately packaged.

Attachment D of Exhibit 2 contains a set of aerial photographs, which depict the Proposed Route's general corridor. These aerial photographs do not depict the exact placement of the cable relative to the shoulder of the roads. Refer to the detailed design drawings in Exhibit 5, which depict the placement of the cable's path within the proposed route (responsive to Part 86.3(b). Because these drawings are oversized, they are separately packaged. These aerials were taken in February, 1999 during winter conditions when physical objections can be clearly defined without foliage cover.

Description of Project and Location of Facilities

The following describes the proposed electric line and route:

The new underground transmission facility will consist of approximately 22.5 miles of solid dielectric cable constructed of 2,500,000 circular mil (2500 kcmil) copper conductor approximately 1.7 inches in diameter, having cross linked polyethylene insulation rated at 138kV. A corrugated metallic sheath will surround the

insulation to provide protection and prevent water migration into the cable. An outer polyethylene jacket will encase the metallic sheath. In all, the cable will measure approximately five inches in diameter. The transmission line will use three cables. Each cable shall be installed within an 8-inch high-density polyethylene ("HDPE") conduit. The conduits will be installed in a set of three having a trefoil (triangular) configuration. In addition to the new circuit, another set of three 8-inch HDPE conduits in trefoil configuration will be installed approximately 8 inches from the cable run to support the future energy needs of the region. The construction methods will be by conventional trenching, jacking or directional drilling techniques where required to minimize any impact on the associated communities and roadways. The project ROW construction width is expected to be 20-25 feet to accommodate trenching equipment, material and personnel work area. The construction will require the excavation of one trench approximately 42 inches in width where the nominal depth of conduit shall be 42 inches below grade, unless conditions require otherwise. See Attachment F of this Exhibit for a cross-sectional view of the cables and trench. In cases where conditions dictate less than 42 inches of cover, the affected section of conduit will be designed and installed with less cover having appropriate protection to withstand anticipated external loads. Underground facility markers and tracers shall be utilized to provide warning and ease of locating the second conduit run when required in the future.

In addition to the transmission circuit, one twin telecommunication conduit will be installed. One conduit will be filled with fiber optic cable providing a state-of-the-art link between the Riverhead and Southampton Substations for system protection purposes. The other conduit will be available for future telecommunication use.

Known underground utilities and facilities that will be encountered along the route will be identified on the design drawings in addition to the new transmission line.

During the final design and construction phases, test openings will be excavated along the route to accurately locate subsurface facilities. The test opening information will be utilized to design a safe and accurate conduit installation. Further, all construction related requirements of New York State and local agencies will be followed before construction starts.

At certain locations, vegetation removal may be necessary to clear approved rights of way to facilitate underground transmission line installation. This will require clearing selected areas along the LIRR ROW east of Hill Station Road, New York State ("NYS") Route 27 and Speonk-Riverhead Road. Further discussion of the ROW clearing can be found in Exhibit 4 – Environmental Impact, and on the detail drawings of Exhibit 5.

The proposed underground transmission route is planned as follows:

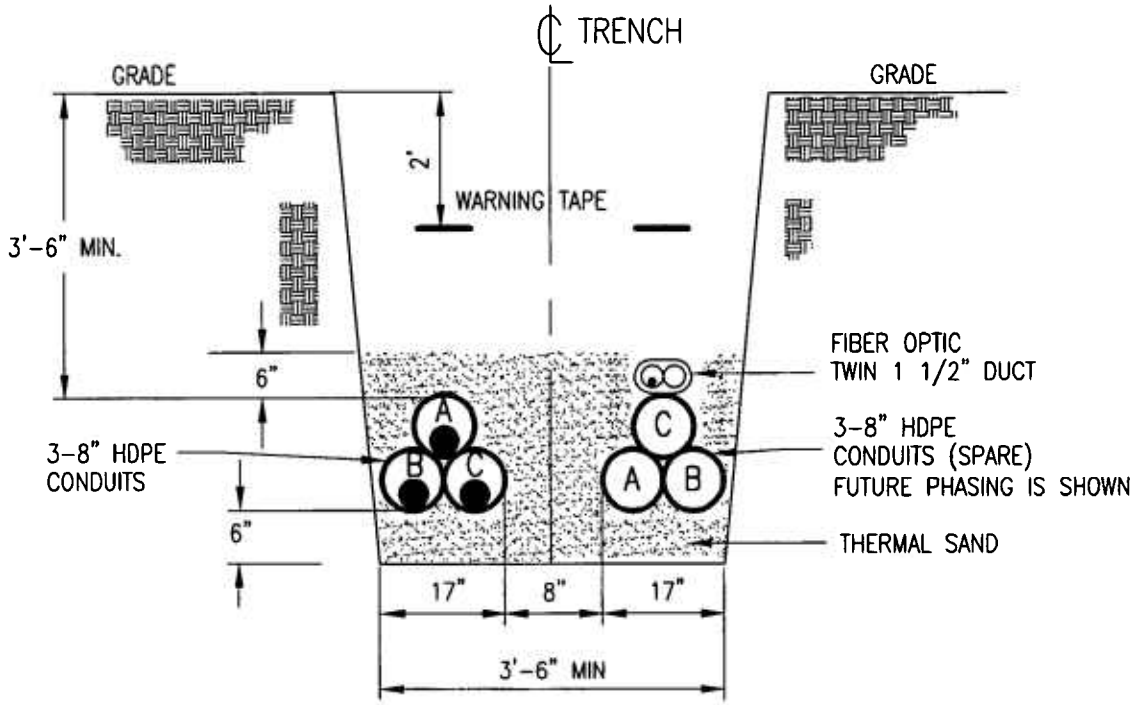
Starting at LIPA's Riverhead Substation located south of the Peconic River, southeast of the intersection of NYS Route 25 and Mill Road in the Town of Southampton, an overhead to underground transition terminal will be built for the new transmission line. The 22.5 mile underground circuit will migrate east and south along LIPA's ROW for approximately 1.6 miles between LIPA's existing 69kV tower and wood pole lines to County Road 51 (Riverhead–Moriches Road), crossing NYS Route 24, Nugent Drive. The route crosses under County Road 51 and heads southwest along the northern segment of the median for approximately 0.8 miles to Speonk-Riverhead Road. The transmission line then turns south along the western shoulder of Speonk-Riverhead Road to NYS Route 27 for 2.4 miles. At the intersection of Speonk-Riverhead Road and NYS Route 27, the facilities will be jacked or directionally drilled under Route 27 to its south side where it will travel east along the southern side of the roadway. The route along Route 27 will predominantly be in the grass area located approximately 30 feet from the edge of the concrete roadway. This portion of the overall route to the Shinnecock Canal is approximately 11.2 miles. As it approaches the Shinnecock Canal, the transmission line will go south on Newtown Road, east on Gate Street, to the Bridge. Two 16-inch HDEP conduits will be attached to the Shinnecock Canal NYS Route 27 bridge for the cable crossing. One conduit will house the three cables for the new circuit and the other is designated for future use. The route will continue approximately 0.4 miles along Canal Road East and onto the shoulder of the NYS Route 27 entrance ramp and migrate onto the south side of NYS Route 27 to Peconic Road, a distance of 1.0 miles. The route crosses Peconic Road and travels 0.1 miles to Longview Road where it heads east along the northern shoulder of Longview Road for approximately 1.2 miles. At the intersection of Longview Road and Hill Station Road, the route will head south 0.3 miles on Hill Station Road to the LIRR ROW where the transmission line will enter the LIRR ROW at the southeast corner of Hill Station Road. It will then travel along the LIRR ROW 3.5 miles until it reaches the Southampton Substation at the intersection of North Sea Road and West Prospect Street. The transmission line will be terminated at Southampton with an underground to overhead transition terminal and connect to a newly installed circuit breaker and series reactor that is tied to LIPA's 69kV system. LIPA has received conceptual approval of the Proposed Route from the NYSDOT, SCDPW and LIRR. Copies of letters from these agencies describing their conceptual approval are found in Attachments E of this Exhibit.

The maps of this Exhibit assist in defining that:

- The route will be from LIPA's Riverhead Substation to LIPA's Southampton Substation, a distance of approximately 22.5 miles. The proposed transmission line is located solely within LIPA's service territory and will not connect to electric systems of other utilities. The proposed transmission line will have a normal rated capacity of 120 MVA at 69kV operation.

- The location of attachment of two 16-inch conduits to the NYS Route 27 bridge that cross the Shinnecock Canal for the installation of the transmission cables and for a future circuit are shown in the detailed drawings of Exhibit 5.

- The transmission circuit exits at an underground-to-overhead transition terminal series reactor and substation circuit breaker connected to LIPA's 69kV system at LIPA's Riverhead (9A) and Southampton (9B) Substations.



TYPICAL X-SECTION

2500 KCMIL XLPE CABLE IN 8" HDPE CONDUIT

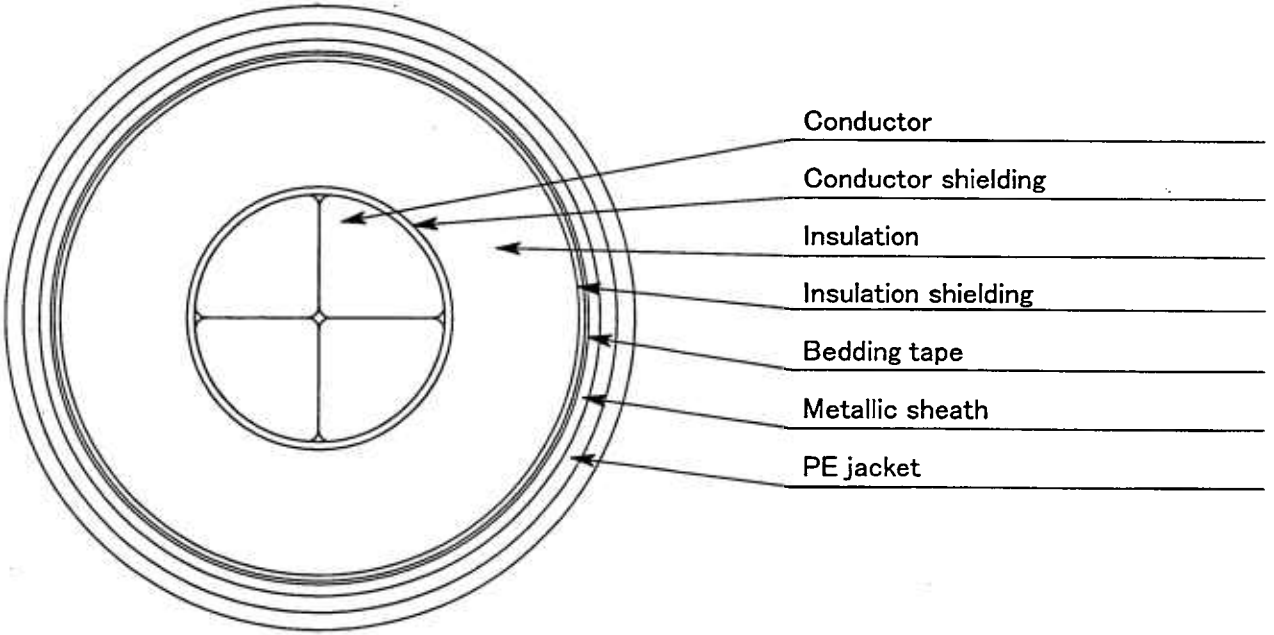
LOOKING FROM RIVERHEAD TO SOUTHAMPTON ALONG CABLE ROUTE

LIPA
Long Island Power Authority

KEYSPAN ENERGY

FILE: SoFork-1.dwg

138kV XLPE INSULATED POWER CABLE



CONSTRUCTION DATA

Nominal voltage (kV)				138
Number of core				1
Conductor	Nominal sectional area			1200mm^2
	Material			Uncoated copper
	Shape			Four segmental
	Diameter (Approx. inches)			1.67
Conductor shielding	Tape layer	Material		Semi-conducting tape
		Thickness (Approx. mils)		22
	Extruded layer	Material		Semi-conducting compound
		Min. Ave. thickness (mils)		30
Insulation	Material			XLPE
	Minimum average thickness (mils)			850
Insulation shielding	Extruded layer	Material		Semi-conducting compound
		Minimum thickness (mils)		40
Bedding tape	Material			Semi-conducting swelling tape
	Thickness (Approx. mils)			24
Metallic sheath	Material			Aluminium
	Minimum thickness (mils)			80
Jacket	Material			Polyethylene
	Minimum average thickness (mils)			110
Outside diameter of cable (Approx. inches)				4.9
Weight of cable (Approx. lb/1000ft)				13,900
Maximum DC conductor resistance at 25℃ (Ω/1000ft)				0.0046
Minimum insulation resistance (Mohm-1000ft)				9,800
Maximum electrostatic capacity (μF/1000ft)				0.063

and the construction schedule, given the need to have the line in service as soon as practicable.

The above considerations led to the three alternatives identified in this application.

Proposed: Underground Route

LIPA ROW south from Riverhead Substation to County Road 51;
Southwest along County Road 51 to Speonk-Riverhead Road;
South along Speonk-Riverhead Road to New York State Route 27;
East along Route 27 to Newtown Road, to Gate Street, across the Shinnecock Canal Bridge to Canal Road East
East along Route 27 to Peconic Road;
East along Long View Road to Station Hill Road;
South along Hill Station Road to the LIRR;
East along the LIRR ROW to the Southampton Substation

Alternative 1: Underground Route

Same as Proposed Route for portion west of Shinnecock Canal;
East of Shinnecock Canal: Route 27 to County Road 39 to Tuckahoe Road;
Along LIRR ROW to Southampton Substation

Alternative 2: Underground/Overhead Hybrid Route

Underground along the right of way of the existing overhead transmission line, which traverses private properties and Sears Bellow Park until Route 27, and continues east along the north side of Route 27 to Exit 65;
Overhead across Route 27 and south to the Tiana Substation;
Overhead along the LIRR ROW to the Southampton Substation

Another alternative is construction of a line with capability for initial 138kV operation, rather than provision for future operation at this higher voltage. Construction for future operation at 138kV provides the option of increasing the future capability of the line with no additional cost, since the cable design is the same for both 69kV and 138kV operation. The difference between the two modes of operation is in the terminals. Operation at 138kV would require a 138kV terminal at Southampton, including a 138/69kV step-down transformer, and shunt reactors to reduce the reactive contribution from the cable charging current. The impact of these requirements on the construction schedule, as well as the adequacy of 69kV operation for forecast loads in the near term, led to the decision to construct the Project for initial 69kV operation.

TABLE OF CONTENTS

EXHIBIT 4

ENVIRONMENTAL IMPACT

This exhibit has been prepared to be responsive to both the information required in Section 86.3(a)(1) and (2) (which is graphically shown in Attachments A-D of Exhibit 2 and the information required by Section 86.5.

I. Existing Conditions

A. Introduction

Sections B-D below provide the baseline information for the land use, historic resources, vegetation and wildlife for the Proposed Route, Alternate Route 1 and Alternate Route 2, respectively. Each of the major subject areas are divided into methodology and results. Section I of this Exhibit describes existing conditions along the Proposed and Alternate Routes. The impacts of the proposed Project are set forth in Section II of this Exhibit.

PSC Article VII regulations generally provide for a corridor study width of three miles from either side of a proposed transmission line. However, the line under consideration is inherently designed to be low impact both in construction and operation. For example, as an underground line, the facility will be invisible once installed. Because of this, and since a three-mile corridor would extend in certain areas into the Atlantic Ocean and Peconic Bay, the study corridor was narrowed where appropriate to conform with the physical placement realities of the Project. In general, cultural and historic resources were examined within three miles of either side of the Proposed Route. Land use characteristics were evaluated on a variable corridor width, but certainly sufficient to encompass any possible impacts of the Project. Vegetation and wildlife zones of study extended approximately one mile on either side of the corridor, but more in some areas where the vegetative communities were homogeneous for greater distances. In all cases, the study area widths were more than sufficient to be inclusive of all expected or potential impacts.

Baseline data and impact assessments that are common to all routes are provided in the Proposed Route discussions and only differences are set forth in the Alternate Route discussions.

B. Proposed Route

1. Land Use

a. Methodologies

The land use survey was conducted by first examining 1 inch = 200 feet February 1999 aerial photographs of the entire Proposed Route. The land use information obtained from the aerials was recorded on tax maps of the entire route. These data were verified during two field surveys, September 21, 1999 and September 27, 1999. The field surveys provided clarification and specific details not shown on the aerial photography. Figures 4.1-6 depict the results of the land use survey.

In addition to the aerial and field programs, planning departments in the Village and Town of Southampton were contacted for concerns about land use along the Proposed Route and Alternate Routes, and any current land use issues in their respective municipalities. The Town of Southampton Comprehensive Plan Update (1997) was also reviewed.

b. Summary of Findings

This section focuses on the identification of land use resources adjacent to the proposed electric transmission line construction Project. The land use resources include agricultural, residential, commercial, institutional, industrial, conservation, and recreational. Noise-sensitive receptors, such as hospitals or schools, were identified, as well as water recharge zones and special groundwater districts were also listed. Please refer to Exhibit 2 of Attachment C for a graphic representation of the finding.

1) Agricultural

Adjacent to the Proposed Route on Speonk-Riverhead Road on the west-side of Suffolk County Community College is approximately 217 acres of agricultural land. Approximately 82.6 acres of agricultural land are located on the south side of the LIRR ROW, approximately one mile west of the Southampton Substation. Approximately 45.5 acres of agricultural land are located 0.5 miles west of the Southampton Substation, adjacent on the north side to the LIRR ROW.

2) Residential

Approximately 70% of the Proposed Route is not adjacent to any residential areas. Residential parcels become a common land use adjacent to the route in the vicinity of Exit 65 on Route 27.

The Proposed Route is adjacent to ten different Town of Southampton residential zoning districts (see Zoning map and Table 4.1). It is also adjacent to three different Village of Southampton residential zoning districts (see Zoning map and Table 4.2).

3) Commercial

The Proposed Route is adjacent to four Town of Southampton and two Village of Southampton commercial/business districts (see Zoning map). These commercial districts are primarily south of the route beginning in and east of Hampton Bays, and are not directly on the Proposed Route.

4) Noise-Sensitive Receptors - Institutional

United Methodist Church and Saint Rosalie Roman Catholic Church, both in Hampton Bays, are located approximately 600 feet south of Route 27.

Long Island University - Southampton College is adjacent on the south side of the LIRR ROW, between Black Watch Court and Tuckahoe Road.

Suffolk County Community College is on Speonk-Riverhead Road.

Southampton Montessori School is located on St. Andrews Road in Southampton, approximately 75 feet north of the LIRR ROW. A Greek Orthodox Church is southerly adjacent to the LIRR ROW, south of County Road 39 in Southampton.

Southampton Full Gospel Church is located on County Road 39, approximately 0.35 miles north of the LIRR ROW.

5) Industrial

The Proposed Route is adjacent to two Town of Southampton light industrial zoning districts (see Zoning and Land Use maps). These include primarily sand mines and junk yards.

6) Conservation

The Proposed Route is adjacent to property designated Open Space Conservation in the Town of Southampton Zoning Code (see Land Use map). The land adjacent to the LIPA ROW that is southeast of the Riverhead Substation consists of Cranberry Bog County Park.

The south side of County Road 51, along the Proposed Route, contains a fenced in Water Recharge Protection Area, designed to recharge collected water into the aquifer. This area is also part of the Suffolk County Parks Nature Preserve.

Maple Swamp County Park is approximately 0.5 miles north of the Proposed Route, on the north side of Route 27. Birch Creek Owl Pond County Park is within 1.25 miles of the Project route, also on the north side of Route 27.

The Nature Conservancy-Shinnecock Hills Preserve encompasses approximately 61 acres of land adjacent on the north side to the LIRR tracks between Arbutus Road on the west side and Tuckahoe Road on the east side.

7) Shinnecock Indian Reservation

The primary Shinnecock Indian Reservation is located approximately 0.6 miles south of the LIRR ROW and approximately four miles east of Shinnecock Canal. The Shinnecock Indians also own approximately 161 acres of land west of the Canal and north of Route 27.

8) The Pine Barrens

Dwarf Pine Plains County Nature Preserve is located on the southern side of Route 27 west of Exit 63, immediately south of where the transmission line will be buried. The David A. Sarnoff State Pine Barrens Preserve is approximately 400 feet north of the Proposed Route, on the north side of Route 27, roughly between Quogue Riverhead Road and Speonk Riverhead Road.

The Proposed Route is within the grassy shoulder alongside the roads within the Central Pine Barrens. The Central Pine Barrens encompass nearly 100,112 acres of land on Long Island. The lands within the Central Pine Barrens encompass five land-use categories including:

- Core Preservation Area (CPA), which promotes compatible agricultural, horticultural and open space recreational uses, but prohibits or redirects new construction or development.

- Compatible Growth Areas, which discourage piecemeal and scattered development but allow appropriate patterns of compatible residential, commercial, agricultural and industrial development.

- Critical Resource Areas.

- Planned Development Districts, which can function as receiving sites for development rights or Pine Barrens credits. These areas are also known as Transfer Development Rights ("TDR") areas.

- As-of-Right Residential Receiving Areas, which identify receiving sites for development rights or Pine Barrens credits.

The Proposed Route is within the Pine Barrens CPA from the Riverhead substation to the vicinity of Exit 65 on Route 27 in Hampton Bays. The route exits the CPA and runs through several hundred yards of CGA and TDR Areas to points where it exits the Central Pine Barrens Area.

9) Hydrologic Zones

In the Pine Barrens, precipitation percolates into the ground to recharge aquifers at a rate of 350 billion gallons of water annually. To ensure the protection of this resource, the Long Island Comprehensive Waste Treatment Management Plan introduced the concept of hydrologic zones based upon different flow patterns. The two basic zone types are those areas that contribute to deep-water recharges and those that contribute to shallow water recharges or transmit water to recharge surface waters. Eight specific hydrologic zones (Hydrologic Zones I through VIII) have been identified on Long Island.

The Proposed Route is within Hydrologic Zone III from the Riverhead Substation to just past Exit 65 on the Sunrise Highway (Route 27) in Hampton Bays. Zone III is an area that has good groundwater quality in both the Upper Glacial and Magothy aquifers and has been designated as a major deep recharge zone. The remainder of the route lies within Zone IV which is characterized by shallow flow systems that discharge directly into streams and marine waters.

10) Special Groundwater Protection Area

According to the 1992 Long Island Regional Planning Board - The Long Island Comprehensive Special Groundwater Protection Area Plan, nine Special Groundwater Protection Areas (SGPAs) were created on Long Island to "present a unique, final opportunity for comprehensive, preventive management to preclude or minimize land use activities that can have a deleterious impact on groundwater". Goals of the SGPA legislation include maintaining the volume of water recharge into the aquifer system, insure the chemical quality of the water recharge, and to maintain existing wetlands.

The route is within the Central Suffolk SGPA from the Riverhead substation to the vicinity of Exit 65 on Route 27 in Hampton Bays. The remainder of the route, to its terminus in Southampton, is not within a designated SGPA.

11) Critical Environmental Areas

Pursuant to the New York State Environmental Quality Review Act (SEQRA), 6 NYCRR 617.14(g), both County and local governmental agencies can designate lands with exceptional or unique characteristics as Critical Environmental Areas (CEAs). According to the New York State Department of Environmental Conservation (NYSDEC), there are ten CEAs either designated as CEAs or designated for acquisition in the Town of Southampton. The Dwarf Pine Plains area in Westhampton, Central Pine Barrens, Sears Bellows addition, and Central Suffolk SGPA are the only CEAs through which the Proposed Route passes.

12) Recreational

A review of the Proposed Route and appropriate area maps indicate that there are recreational land uses along the route. Specifically, approximately 750 feet east of the route on County Road 51 is the entrance to Hampton Hills Golf and Country Club. Sears Bellows County Park is approximately 1,000 feet north of the route. Shinnecock Canal is also along this route. National Golf Links of America and Shinnecock Hills Golf Courses are both approximately one mile north of the LIRR ROW in Southampton, east of the Canal. Southampton Golf Club is located on County Road 39 approximately 330 feet north of the LIRR ROW along the route. Southampton Golf Range on County Road 39 is adjacent on the north side to the LIRR ROW.

2. Cultural Resources

a. Methodologies

An inquiry was made to New York State Office of Parks, Recreation, and Historic Preservation ("NYSOPRHP") for a State listing of any historic and cultural resources along the Proposed Route. The Suffolk County Historical Society was also contacted to address any local concerns and obtain a similar listing of historic and cultural resources along the Proposed Route. The Southampton Colonial Society was also contacted.

b. Summary of Findings

1) Historical Resources

No National Historic Landmarks were located within three miles of the Proposed Route.

The NYSOPRHP stated in its letter dated October 13, 1999 (Attachment 1), that with regard to potential impacts to historic structures, no such impact is anticipated for the proposed underground route. The October 12, 1999 (Attachment 2) response from the Suffolk County Historical Society states that there would not be impacts to historic resources as a result of this project, since the trench will follow along established roadways and rail road tracks. The Southampton Colonial Society stated there are visually no historic structures that would be impacted as a result of this project. According to the Southampton Comprehensive Plan (1997),

the National Register of Historic Places indicates the nearest listing to the Proposed Route is the William Merritt Chase Homestead, on the north side of Montauk Highway, west of Sugar Loaf Road, Shinnecock Hills, which is approximately 0.6 miles south of Long View Road, east of Shinnecock Canal.

2) Archaeological Resources

The NYSOPRHP was contacted regarding archaeological resources along the Proposed Route and stated in an attachment to its letter dated October 13, 1999, that the OPRHP recommends a Phase 1 archaeological survey is warranted unless previous substantial ground disturbance can be documented. The October 12, 1999 response from the Suffolk County Historical Society states that there would not be impacts to archaeological resources as a result of this project, since the trench will follow along established roadways and rail road tracks. The Southampton Colonial Society was contacted regarding the project and stated there may be archaeological resources along the route. According to the Town of Southampton Comprehensive Plan, the eastern half of the Proposed Route lies within a significant archaeological concentration area, which begins approximately one mile west of Shinnecock Canal and continues approximately four miles east of the Canal.

Dr. David Bernstein of SUNY Stony Brook will be retained to provide archeological assessment services to ensure that the Project does not disturb areas of archeological significance.

3. Vegetation

a) Methodologies

The vegetation survey was conducted by first examining large scale 1999 aerial photographs of the entire planned Proposed Route. Each major vegetation type was labeled and transferred to the GIS base map utilized for the Project. The major vegetative classifications referenced were based upon the New York Natural Heritage Program, "Ecological Communities of New York State", (Reschke, 1990). After the aerial interpretation was completed, a series of ground truthing field trips were conducted to verify the results obtained. The ground truthing also provided some additional details not included in the photo interpretation.

Aerial photographs (1996 and 1999) were reviewed for aerial photo-

interpretation of vegetative cover types existing on the Proposed Route and the areas surrounding them. The Suffolk County Soil Survey was reviewed and correlated to aerial photographs for site interpretation. Reschke's (1990) *Ecological Communities of New York State* was used to characterize the vegetative cover types on the Proposed Route.

In addition to the aerial and field programs, an inquiry was sent to the NYSDEC, Natural Heritage Program (NHP), for a listing of rare and endangered species that may occur in the Proposed Route. The U.S. Fish and Wildlife Service (F&WS) was also contacted for similar information that may reside in federal files.

Figures 4.7-12 depict the results of the Vegetation Survey.

b. Summary of Findings

The Proposed Route is dominated by a Pitch Pine-Oak Forest that can be found from the Riverhead Substation to Route 27 (along both the Proposed and the Alternate Routes). In addition, there are patches of transitional Pitch Pine-Oak-Heath Woodland, Pitch Pine-Heath Barrens, and Pitch Pine-Scrub Oak Barrens along the Proposed Route. There are also large areas of Dwarf Pine Plains on the eastern portion of the Project area along Route 27, adjacent to the route, outside the construction zone.

Along the Proposed Route, a community described as mowed roadside/pathway exists. The Proposed Route is adjacent to residential and commercial properties in some areas, and many of these properties are described as mowed lawn with trees (or residential/landscaped). There are areas along the Proposed Route where groundwater recharge basins have been excavated (particularly along Sunrise Highway, Route 27). These areas are classified as water recharge basins. Finally, the Proposed Route joins the LIRR tracks and leads to the Southampton Substation. This community has been defined as herbicide-sprayed roadside/pathway. These vegetative communities are discussed in further detail below.

There are three areas along the Proposed Route as well as the Alternate Routes where the cables would be installed within the proximity of freshwater wetlands, as defined by the NYSDEC. These wetlands also fall under the Town of Southampton's wetland regulations. The two communities, which describe the vegetation on these wetlands, are Pine Barrens Vernal Pond (along the Proposed

Route south of the Riverhead Substation) and Pine Barrens shrub swamp (along the LIRR tracks).

1) Pitch Pine-Oak Forest - The Pitch Pine-Oak Forest is represented on site by dominant indicator species including pitch pine (*Pinus rigida*), scarlet oak (*Quercus coccinea*), and to a lesser extent, white oak (*Quercus alba*). This mixed forest community typically occurs on well-drained sandy soils of glacial outwash plains or moraines (Reschke, 1990). The density of pitch pines in this community varies widely across the subject site. The pitch pine is the dominant species along the Proposed Route, and is also dominant along much of the roads and highways along the Proposed Route. Fire typically maintains a variety of successional stages within pitch pine-oak woodlands and allows the pines to perpetuate in the stand (Kricher & Morrison, 1988 and Reschke, 1990). The site reconnaissance revealed evidence of recent fires within the pine stands along both Route 27 (between exits 62 and 64) and the southern portion of Speonk-Riverhead Road. Throughout the length of the Proposed Route, oaks dominate the canopy layer, with pitch pines being more thinly distributed. Here, scarlet oak forms the primary canopy, with white oak representing a secondary canopy.

   The understory vegetation shifts slightly across the site as well. Throughout the pine-dominated stands, various oaks and heath grow as dense scrub. Throughout the site, there are large pine-dominated stands where the understory is almost completely dominated by scrub oak. This occurs throughout the areas that have been burned by fires or disturbed by other means. Black huckleberry (*Gaylussacia baccata*) and low-bush blueberry *(Vaccinium angustifolium)* can be found in the understory of the pitch pine and oak forest in some percentage throughout almost the entire Proposed Route. Another less dominant understory species that was identified often in the Pitch Pine-Oak Forest community was sweet fern *(Comptonia peregrina).*

2) Dwarf Pine Plains - The Dwarf Pine Plains community is represented on site by the dominant indicator species of dwarf pitch pine and scrub oak (*Quercus ilicifolia*). This community occurs on soils that are infertile, coarse textured sands that are excessively well-drained. The canopy of dwarf pitch pines and scrub oaks was observed to be from 6 to 10 feet tall in the area along Route 27 where this community can be found. This community was observed to include a dense understory of black huckleberry, blueberry,

hudsonia (*hudsonia ericoides*), and bearberry. The Dwarf Pine Plains community can be found in large areas between Exit 63 and Exit 65 on Route 27. The Proposed Route does not impinge upon the Dwarf Pine Plains community.

3) Mixture of Pitch pine-scrub oak barrens, Pitch pine-oak-heath-woodland, and Pitch pine-heath barrens - Along almost the entire stretch of the Proposed Route (and the two Alternate Routes), the communities can be described as a mixture of these three communities, all varying slightly in successional structure and, therefore, different dominant vegetation (namely, different percent cover of pitch pine versus various oak varieties in the canopy). The Pitch pine-scrub oak barrens is a shrub-savanna community that occurs on well-drained, sandy soils that have developed on sand dunes, glacial till, and outwash plains. The Pitch pine-oak-heath woodland is described as a Pine Barrens community that occurs on well-drained, infertile, sandy soils. The structure of this community is intermediate between a shrub-savanna and a woodland. Finally, the Pitch pine-heath barrens is described as a shrub-savanna community that occurs on well-drained, sandy or rocky soils. This is a broadly defined community with several regional variants. All of these communities indicate the dominant tree species as being pitch pine, and then each community has varying percent covers of different oak (white, scarlet, black, red, and scrub) species for the canopy. The most dominant oak species observed along both Proposed Route is the scarlet oak, which accounts for approximately 80% of the oaks along the Proposed Route.

The understory of these three communities all include heath species, such as blueberry, huckleberry, and bearberry. Scrub oak, sweet fern, wintergreen, and bearberry are also included in most of these communities. Adjacent to the Proposed Route, the percent cover of the groundcover varied depending on factors including how recently the area was last disturbed (by fire, mowing, or other means), how often the area is disturbed, and the different soil types that are evident.

These three communities (and also Pitch pine-oak forest community) were all evident and mix frequently adjacent to the Proposed Route. This mixing is dependent upon varying factors including how recently the area was last disturbed (by fire, mowing, or other means), how often the area is disturbed, and the different soil types that are evident.

4) Mowed lawn with trees - The Proposed Route contain adjacent residential or commercial areas which have an ecological community described as "mowed lawn with trees". This community is described as residential, recreational, or commercial land in which the groundcover is dominated by clipped grasses and forbs, and is shaded by at least 30% with trees. The eastern part of the Proposed Route (east of Route 24, Exit 65 on Route 27) contains the largest percent of this community.

5) Unpaved Road/Path - An unpaved path exists along sections of the Proposed Route on the south edge of Route 27, but within the NYSDOT ROW. This is an ecological community described by Reschke (1990) as a sparsely vegetated road or pathway of bare soil that are maintained by regular trampling or scraping of the land surface. Path rush (*Juncus tenuis*), various grasses, mugwort (*Artemisia vul*garis), and *ragweed (Ambrosia artemisiifolia)* are the common vegetation that were observed in these areas. Common saplings included winged sumac (*Rhus copallina*), black cherry (*Prunus serotina*), and black locust (*Robinia pseudoacacia*).

   The Proposed Route has vegetative communities that reflect disturbed and periodically maintained areas. The ROW that stretches from the Riverhead Substation to County Road 51 is dominated by a mix of bearberry, scrub oak, Hudsonia, sweet fern, and greenbrier.

   The area adjacent to the Proposed Route along Route 27 consists of vegetation such as scrub oak, pitch pine saplings, mugwort, ragweed, low bush blueberry and black huckleberry.

6) Water recharge basin – Several basins are located along the Proposed Route. This community is described as the aquatic community of a constructed depression near a road or development that receives runoff from paved surfaces and allows the water to percolate through to the groundwater, thereby recharging the groundwater. These basins are intermittently flooded during periods of heavy precipitation. Vegetation that can be expected in these areas is common reed (*Phragmites australis*) and red maple.

7) Successional old field - This community is described as a meadow dominated by forbs and grasses that occurs on sites that have been cleared and plowed (for farming and development), and then abandoned. Characteristic herbs which were identified in the areas

of the Proposed Route include goldenrods (*Solidago sp.*), hawkweeds (Hieracium sp.), ragweed (*Ambrosia artemisiifolia*), Queen Anne's lace (*Daucus corota*), and dandelion (*Taraxacum officinale*). Characteristic shrubs that were identified in the areas of the proposed and alternate routes include arrowwood (*Viburnum recognitum*) and eastern red cedar. This community occurs in small areas throughout the Proposed Route, usually a few hundred feet from the existing roadways.

8) Herbicide-sprayed roadside/pathway - The vegetation along the LIRR tracks is indicative of a Herbicide-sprayed roadside/pathway as described by Reschke (1990). This community is described as a narrow strip of low-growing vegetation along LIRR ROW such as railroad tracks that is maintained by spraying herbicides. The vegetation along the slopes adjacent to the LIRR tracks consists of invasive, pioneer trees and shrubs that are found in disturbed areas. Vegetation included winged sumacs, black cherry, asiatic bittersweet (*Celastrus orbiculatus*), poison ivy (*Rhus radicans*), fox grape (*Vitis labrusca*), mugwort and ragweed. There were also areas where pitch pine and eastern red cedar saplings were growing, along with areas dominated by bayberry.

   The vegetation past the steep slopes of the LIRR tracks included bayberry (*Myrica pensylvanica*), asiatic bittersweet, red cedar (*Juniperus virginiana*), and beach plum in the shrub and small tree layer. Goldenrod (*Solidago spp.*) and mixed grasses are dominant in the herbaceous community.

   The vegetation is thick in some areas with vines (asiatic bittersweet, fox grape, greenbrier, and poison ivy), and dense shrubbery. However, much of the area north and south of the LIRR tracks has been developed and the vegetation is very sparse in these areas.

9) Mowed roadside/pathway - The vegetation along Route 27 and Speonk-Riverhead Road and County Road 51 is typical for highway areas on Long Island and has been defined as mowed roadside/pathway. This community is described as a narrow strip of mowed vegetation along the side of a road. The vegetation in these mowed strips is described as being dominated by grasses, sedges, and rushes; or it may be dominated by forbs, vines, and low shrubs that can tolerate infrequent mowing. Highway turfgrass establishment typically utilizes seed mixtures which incorporate various cool season grasses (i.e., bluegrass, perennial ryegrass)

along with a nitrogen-fixing legume (i.e., clover, birdsfoot trefoil). The NYSDOT Current Standard Specifications (January 1990) call for the following seed mixtures for areas proposed for turf establishment:

a) Red fescue, perennial ryegrass, and white clover;

b) Tall fescue, fine-leaved fescue, and perrenial ryegrass;

c) Kentucky bluegrass, fine-leaved fescues, and perennial ryegrass

In addition, NYSDOT also permits a mixture of warm season grasses and legumes as follows:

a) Sand lovegrass, switchgrass, indian grass, little bluestem, sand bluestem, big bluestem and a nurse crop (i.e., winter rye or spring oats).

b) Flatpea, birdsfoot trefoil, and switchgrass.

Past highway corridor turfgrass seed mixtures may also have included other species, such as weeping lovegrass, as evident along south-facing highway embankments along highways such as Route 27.

Tree, shrub and groundcover plantings which occur along highway corridors generally incorporate a wide variety of ornamental species which are tolerant of urban conditions (e.g., poor air quality, soil compaction, drought conditions). Within the past decade or so, NYSDOT has shifted emphasis from ornamental plants to more native species, wherever practical and available. Thus, highway plantings may include a wide array of species, incorporating ornamentals such as Norway maples, honey locust, ginkgo, littleleaf linden, hawthornes, flowering crab apples, forsythia, and several species of spruces and pines; to utilizing the more native species shadbush, flowering dogwood, eastern red cedar, white pine, beach plum, bayberry, and mountain laurel. Over time, highway plantings have also shifted species of emphasis due to pests or diseases that have created significant damages to standing stock. Some of the species that may have been prevalent in historical plantings and may still be evident on highway corridors, are no longer being planted or established except in isolated numbers and locations, including Japanese black pines, Austrian pine, autumn olive, and various hawthornes.

10) Pine barrens shrub swamp - This community is described as a shrub-dominated wetland that occurs in shallow depressions in the coastal plain. Characteristic shrub species include leatherleaf (*Chamaedaphne calyculata*) and highbush blueberry (*Vaccinum corymbosum*). *Sphagnum* dominates the groundlayer with small patches of sundews. A freshwater wetland is located along both sides of LIRR tracks, west of Southampton College. This wetland is dominated by tree species such as red maple, sour gum, and sassafras. The shrubs, which were identified in this wetland, include leatherleaf, buttonbush, and Northern arrowwood.

11) Pine Barrens vernal pond - This community is described as a seasonally fluctuating, groundwater-fed pond that occurs in pine barrens, either in low areas of the coastal plain, or between dunes. Characteristic species include leatherleaf, black huckleberry, and peat moss. Stunted trees may be present on hummocks within the wetland; characteristic trees include red maple and pitch pine. Two of these wetland areas can be found along the existing LIPA ROW immediately south of Route 24. Wetland trees such as red maple and oak dominate this wetland. Another wetland is located along the existing LIPA ROW between Route 24 and County Road 51. This wetland is dominated by vegetative species such as leatherleaf, high-bush blueberry, sphagnum moss, and sundews.

4. Wildlife

a. Methodologies

The wildlife survey was conducted by literature research and on-site field investigations.

A field survey of the route was conducted in order to identify the bird population along the Proposed Route. Binoculars were used to aid identification of species. Birds were also identified by sound. Herpetiles (amphibians and reptiles) on the Project site were recorded during the site surveys. Debris, rocks, plastic or metal objects were turned over in search of herpetile habitats. Herpetiles seek such habitats for many reasons including protection, food and, in the case of metal and plastics, for warmth.

A survey of both small and large mammals was also conducted on the ROW. Direct sightings, spores and tracks identified the resident

wildlife. The presence of burrows or ground nests was also a fingerprint to classify species.

b. Summary of Findings

1) Wildlife - General

The Proposed Route between the Riverhead and Southampton Substations traversed numerous different habitat types including red maple - hardwood, pine barrens - shrub, successional old field, pitch pine - scrub oak barrens, pitch pine - oak-heath woodlands, pitch pine - oak forest, and mowed roadside/pathways. These habitat classifications are consistent with *Ecological Communities of New York State* (Reschke) 1990.

These habitats have the potential to support numerous wildlife species. Lavine, 1998, reports 451 avian species from New York State; Conant and Collins, 1991, identifies 33 herpetile (reptile and amphibian) occurring on Long Island; and Connor, 1971, identifies 35 mammalian species from Long Island. A discussion regarding each wildlife group and the individuals anticipated to occur within the power line corridor is as follows.

2) Avifauna

Of the 451 avian species reported to occur in New York State, half are migratory (approximately 230 species) which pass through Long Island while en route during the spring and fall migrations. Approximately 125 species breed in the vicinity of the corridors, and the remaining 96 species either breed elsewhere on Long Island or utilize habitats (e.g., oceans, beaches, etc.). Most are not present in the study area.

The species most likely to be encountered will be those that utilize the forest edge and are considered to be habitat generalist. The term habitat generalist applies to species that are not restricted to a particular habitat type and are capable of utilizing the habitat that is available. Some of the more common species anticipated to be encountered include: the red-tailed hawk (*Buteo jamaicensis*), gray catbird (*Dumetella carolinensis*), American robin (*Turdus migratorius*), common yellowthroat (*Geothlypis trichas*), yellow warbler (*Dendroica petechia*), mourning dove (*Zenaida macroura*), bluejay (*Cyanocitta cristata*), black-capped chickadee (*Parus atricapillus*), tufted titmouse (*Parus bicolor*), northern mockingbird

(*Mimus polyglottos*), rufous-sided towhee (*Pipilo erythrophthalmus*), and northern cardinal (*Cardinalis cardinalis*), along with the typical alien species, such as the house sparrow (*Passer domesticus*), European starling (*Sturnus vulgaris*), and the rock dove (*Columba livia*).

It should be noted that the habitats transversed also support several avian species considered to be of special concern by the NYSDEC. In particular, areas of successional old field have been documented to support species such as the eastern bluebird (*Sialia sialis*), grasshopper sparrow (*Ammodramus savannarum*), and vesper sparrow (*Pooecetes gramineus*). These species have been observed in the vicinity of County Road 51 (Andrele and Carroll, 1988). The various pine barren habitats also support a species of special concern: the common nighthawk (*Chordeiles minor*), as well as forest interior species such as the red-breasted nuthatch (*Sitta canadensis*), pine warbler (*Dendroica pinus*), ovenbird (*Seiurus aurocapillus*), and the black and white warbler (*Mniotilta varia*). All of these species are common in Long Island's pine oak forest, but declining throughout the United States (Planning Department, Town of East Hampton, 1999). Conservation groups are concerned with the protection of the habitats that support these species.

3) Herpetiles

In general, the presence of reptiles and amphibians is not detected as they are typically very secretive, small, well camouflaged, slow moving, and solitary. The only time some species become more conspicuous is during breeding season when certain species (e.g., frogs) congregate and begin calling.

Of the 33 species of herpetiles identified, approximately three-quarters (23 species) are found either in or in close association with wetland habitat. A list of these species is presented as Table 4.3. Of these species, several are listed by NYSDEC as either endangered, threatened, or as a species of special concern.

The tiger salamander is listed as endangered; the cricket frog and mud turtle are considered to be threatened, and the southern leopard frog, blue-spotted salamander and spotted salamander are species of special concern.

The remaining species are all upland forms and are likely to be present in a variety of habitats. A list of these species is presented on Table 4.4.

Of the upland species, only the eastern hognose snake is listed as a species of special concern.

4) Mammalian Species

A total of approximately 30 mammalian species have the potential to utilize the habitats found along the corridor pathway. Table 4.5 presents those species.

While the most commonly observed species would include the opossum, eastern cottontail, woodchuck, red fox, raccoon, and white-tailed deer (which have been observed at dusk along the roadside in eastern Long Island), they are not the most abundant. The most abundant species are the small secretive insectivores and rodents, such as the short-tailed shrew, eastern chipmunk, white-footed mouse, meadow vole, pine vole, house mouse, and Norway rat. These species are ubiquitous and abundant throughout Long Island.

The most common bat species are the little brown bat and red bat. These species are also common throughout the area

In general, the majority of the mammalian species identified are not restricted by habitat type. Although certain species may have a habitat preference, they are capable of utilizing several different habitat types. The most restricted species are those that are aquatic in nature and are only found in the wetland habitat. The only two species identified on the list considered to be aquatic in nature are the muskrat and the mink.

5) Insects

In addition to the previously discussed wildlife species, the corridor supports a great number of insect species, which in turn provide a food source for the higher trophic levels.

Some of these insects, in particular butterflies and moths, are considered to be rare in New York State. The buckmoth (*Hemileuca maia*) is listed as a species of special concern by the NYSDEC. Buckmoths are typically found in association with recent burns or

other cleared areas in the Pine Barrens where scrub oak is present. The buckmoth has been reported to be common in the dwarf pine forest found in Westhampton. Additional rare species found in the pine barren habitat, but are not listed by the NYSDEC, include butterfly species, such as the Edward's hairstreak (*Satyrium edwardsii*) and the frosted elfin (*Incisalia irus*) and a moth species, the *aureolaria* seed borer (*Rhodoecia aurantigo*). The Edward's hairstreak is typically found in close association with scrub oak, while the other species are more generalistic and found throughout the Pine Barrens.

5. Endangered and Threatened Species

a. Methodologies

The NYSDEC Natural Heritage Program was contacted to perform a computerized search of the Project area for the presence of threatened, endangered, protected, rare, and species of special concern. The NYSDEC Breeding Bird Atlas was also consulted for rare species known to breed within the Project vicinity. The U.S. Fish and Wildlife Service was contacted for any information concerning endangered and/or threatened species on or in the vicinity of the Project area.

b. Summary of Findings

The New York State Department of Environmental Conservation Natural Heritage Program (NYSDECNHP) stated in its letters dated September 28, 1999 and October 5, 1999 (Attachments 3 and 4) that their databases had been reviewed with respect to the location of the line (both the Proposed and alternative routes). Below is a list of rare or state-listed wildlife and vegetation species, significant natural communities, and other significant habitats which the NYSDECNHP databases indicate occur, or may occur, on the corridors or in the immediate vicinity of the corridors.

Rare or State-listed Wildlife Species

Species Common Name	Species Latin Name	NY Legal Status & Heritage Ranks	Year Last Seen
Yellow-Spotted Graylet	Hyperstrotia flaviguttata	Unprotected	1996
Dusted Skipper	Atrytonopsis hianna	Unprotected	1996
Packkard's Lichen Moth	Cisthene packardii	Unprotected	1996
Coastal Barrens Buckmoth	Hemileuca maia maia	Unprotected-Special Concern	1984
A Noctuid Moth	Euxoa pleuritica	Unprotected	1993
Violet Dart	Euxoa violaris	Unprotected	1987
Herodias Underwing	Catocala herodias gerhardi	Unprotected	1996
Jair Underwing	Catocala jair ssp 2	Unprotected	1996
Pink Sallow	Psectraglaea carnosa	Unprotected	1996

Species Common Name	Species Latin Name	NY Legal Status & Heritage Ranks	Year Last Seen
Barrens Itame	Itame sp. 1	Unprotected	1996
Pine Barrens Zale	Zale sp. 1	Unprotected	1995
A Slug Moth	Chaetaglaea cerata	Unprotected	1986
Spiny Oakworm	Anisota stigma	Unprotected	1996
Tiger Salamander	Ambystoma tigrinum	Unprotected	1991
A Tiger Beetle	Cicindela abdominalis	Unprotected	1913
Doll's Merolonche	Merolonche dolli	Unprotected	1931
Source: NYSDEC Division of Fish, Wildlife & Marine Resources - New York Natural Heritage Program, Sept. 1999			

Rare or State-listed Vegetative Species

Species Common Name	Species Latin Name	NY Legal Status & Heritage Ranks	Year Last Seen
Hop Sedge	Cyperus lupulinus ssp	Unprotected	1950
New England Blazing-Star	Liatris scariosa var novae-angliae	Rare	1919
Short-fruit Rush	Juncus brachycarpus	Unprotected	1943
Ipeca Spurge	Euphorbia ipecacuanhae	Unprotected	1918
Swamp Pink	Arethusa bulbosa	Rare	1925
Stargrass	Aletris farinosa	Unprotected	1949
Fibrous Bladderwort	Utricularia striata	Rare	1972
Spotted Pondweed	Potamogeton pulcher	Unprotected	1952
Virginia False Gromwell	Onosmodium virginianum	Rare	1927
Fewflower Nutrush	Cscleria pauciflora var caroliniana	Threatened	1950
Flax-leaf Whitetop	Aster solidagineus	Unprotected	1996
Sandplain Wild Flax	Linum intercursum	Threatened	1992
Showy aster	Aster spectabilis	Unprotected	1996
Small White Snakeroot	Eupatorium aromaticum	Unprotected	1992
Evening Primrose	Oenothera oakesiana	Unprotected	1952
Atlantic White Cedar	Chamaecyparis thyoides	Rare	1997
Nantucket Juneberry	Amelanchier nantucketensis	Endangered	1997
Bushy Rokrose	Helianthemum dumosum	Threatened	1998
Possum-haw	Viburnum nudum	Threatened	1926
Slender Beadgrass	Paspalum setaceum var psammaphilum	Unprotected	1923
Source: NYSDEC Division of Fish, Wildlife & Marine Resources - New York Natural Heritage Program, Sept. 1999			

The United States Fish and Wildlife Service (USF&WS) stated in their letter dated October 7,1999 (Attachment 5) that except for occasional transient individuals, no Federally listed or proposed endangered or threatened species under the USF&WS jurisdiction are known to exist in the respective project impact areas.

No rare and endangered species or State listed species were located during the field vegetation and wildlife surveys on the Proposed Route or Alternate Routes.

6. Soils

a. Methodologies

The soil survey was conducted by literature search and on-site field investigations.

The Soil Survey of Suffolk County, New York, published by the United States Department of Agriculture Soil Conservation Service, was consulted to determine the various soil associations and specific soil names encountered along the Proposed Route.

A field survey of the route was conducted to verify general soil conditions and slopes encountered.

b. Summary of Findings

In general, the soils encountered along the Proposed Route fall within one of four soil associations, according to the Soil Survey of Suffolk County. These association are as follows:

Plymouth Carver association, rolling and hilly. These soils are deep, excessively drained, coarse-textured soils on moraines. They are present primarily on the western portion of the Proposed Route, in the areas of Flanders, Hampton Bays, and Shinnecock Hills.

Plymouth Carver association, nearly level and undulating. These soils are deep, excessively drained, coarse-textured soils on outwash plains. They are present primarily on the western portion of the Proposed Route, in the area of Westhampton, west of Exit 64 on Route 27.

Montauk, sandy variant-Plymouth association. These soils are deep, rolling and hilly, excessively drained, coarse-textured soils on moraines. They are present on the eastern portion of the Proposed Route, from Shinnecock Hills to east of Southampton College.

Bridgehampton-Haven association. These soils are deep, nearly level to gently sloping, well drained to moderately well drained, medium-textured soils on outwash plains. They are present on the eastern portion of the Proposed Route, in the vicinity of Southampton Village.

The complete list of soils encountered along the Proposed Route is as follows:

CpC	- Carver and Plymouth Sands -	3 - 15% slopes
CpA	- Carver and Plymouth Sands -	0 - 3% slopes
CpE	- Carver and Plymouth Sands -	15 - 35% slopes
At	- Atsion Sand - Only one spot on LIPA ROW n/o Route 51	
MnC	- Montauk Loamy Sand, sandy variant -	8 - 15% slopes
PlB	- Plymouth Loamy Sand -	3 - 8% slopes
PlC	- Plymouth Loamy Sand -	8 - 15% slopes
RdB	- Riverhead Sandy Loam -	3 - 8% slopes
HaB	- Haven Loam -	2 - 6% slopes
HaA	- Haven Loam -	0 - 2% slopes
RdA	- Riverhead Sandy Loam -	0 - 3% slopes
PlA	- Plymouth Loamy Sand -	0 - 3% slopes
CuB	- Cut and Fill Sand -	Gently sloping
Su	- Sudbury Sandy Loam - only one spot at Route 113	
RdC	- Riverhead Sandy Loam -	8 - 15% slopes
CuE	- Cut and Fill Sand -	Steep
Mu	- Muck - Only one spot located south of Bellows Pond	
MnB	- Montauk Loamy Sand, sandy variant -	3 - 8% slopes
MfC	- Montauk Fine Sandy Loam -	8 - 15% slopes
Gp	- Gravel pits - located east of Southampton College	
BgA	- Bridgehampton Silt Loam - immediately west of Southampton Substation	0 - 2% slopes
Bm	- Bridgehampton Silt Loam - west of Southampton Substation -	Graded

NOTE: The soils encountered along Alternate Route 1 are the same as those for the Proposed Route.

C. Alternate Route 1

The only difference between Alternate Route 1 and the Proposed Route is the section from the NYSDOT maintenance facility on Route 27 to County Road 39 to Tuckahoe Road to the LIRR ROW. From an environmental perspective, only the land use distinctions need separate discussion, since the other environmental sections are applicable to Alternate Route 1.

Alternate Route 1 follows a commercial corridor along Route 27 and County Road 39, passing store fronts and other commercial establishments instead of the more residential Long View Road and subsequent LIRR ROW. The alternate route begins where Route 27 and County Road 39 meet, and two eastbound lanes merge into one, creating a significant amount of traffic during peak hours year-round. There is no shoulder and sidewalks are immediately adjacent to the road. County Road 39 has already been widened; however, traffic congestion is steadily increasing. This route runs through a commercial strip, which includes two motels, two gas stations, boat and mechanic shops, a few retail stores, and a few restaurants. The significant differences in environmental impacts between Alternate Route 1 and the Proposed Route are discussed in Section II of this Exhibit.

D. Alternate Route 2

1. Introduction

Alternate Route 2 has been discussed in Exhibit 3. Briefly, it follows LIPA's existing 69kV double-circuit transmission line across private properties (via easements) to Exit 65 on Sunrise Highway (Route 27). It then transitions to an overhead line to LIPA's Tiana Substation where it joins the LIRR ROW. The following environmental characteristics of the route are presented insofar as they differ from those of the Proposed Route.

2. Land Use

a. Agricultural

Approximately 82.6 acres of agricultural land is located on the south side of the LIRR ROW, approximately one mile west of the Southampton Substation. Approximately 45.5 acres of agricultural land is 0.5 miles west of the Southampton Substation, adjacent on the north side to the LIRR ROW.

b. Residential

Alternate Route 2 is adjacent to ten different Town of Southampton residential zoning districts (see Zoning map and Table 3). It is also adjacent to three different Village of Southampton residential zoning districts (see Zoning map and Table 4).

c. Commercial

Alternate Route 2 is adjacent to five Town of Southampton and two Village of Southampton commercial/business districts (see Zoning map). These commercial districts are primarily along the route in and east of Hampton Bays.

d. Noise Sensitive Receptors - Institutional

Long Island University - Southampton College is adjacent on the south side to the LIRR tracks, between Black Watch Court and Tuckahoe Road.

Southampton Montessori School is located on St. Andrews Road, approximately 200 feet north of the LIRR ROW. Southampton Full

Gospel Church is located on County Road 39, approximately 0.38 miles north of the LIRR ROW. A Greek Orthodox Church is southerly adjacent to the LIRR ROW, south of County Road 39 in Southampton.

e. Industrial

Alternate Route 2 is adjacent to one Town of Southampton light industrial zoning district (see Zoning and Land Use maps). These include primarily sand mines and junk yards.

f. Conservation

The Project route is adjacent to land designated Open Space Conservation in the Town of Southampton Zoning Code. The land adjacent to the LIPA ROW that is southeast of the Riverhead Substation consists of Cranberry Bog County Park.

Maple Swamp County Park is approximately 0.5 miles north of the Project route, on the north side of Route 27. Birch Creek Owl Pond County Park is within 1.25 miles of the Project route, also on the north side of Route 27.

The Nature Conservancy-The Shinnecock Hills Preserve encompasses approximately 61 acres of land on the north side of the LIRR tracks roughly between Arbutus Road on the west side and Tuckahoe Road on the east side.

Alternate Route 2, from the Riverhead Substation to where it exits the CEAs in the vicinity of Exit 65 on the Sunrise Highway (Route 27) in Hampton Bays, follows the previously cleared LIPA-owned transmission line ROW.

The David A. Sarnoff State Pine Barrens Preserve is approximately 400 feet north of Alternate Route 2, in the land on the north side of Route 27, roughly between Quogue Riverhead Road and Speonk Riverhead Road.

g. Shinnecock Indian Reservation

A Shinnecock Indian Reservation Parcel is approximately 0.5 miles north of the route, west of the Shinnecock Canal. The main Shinnecock Indian Reservation is 0.5 miles south of the route, east of the Canal.

h. Recreational

A review of Alternate Route 2 and the appropriate area maps indicates that there are recreational land uses along the route. Specifically, approximately 750 feet east of the route on County Route 51 is the entrance to Hampton Hills Golf and Country Club. This route crosses through the southern portion of Sears Bellows County Park. Shinnecock Canal is also along this route. Traveling east from the Canal, National Golf Links of America, Shinnecock Hills, and Southampton Golf Club Golf Course are all within approximately 0.25 miles of the route, north of the LIRR ROW. Southampton Golf Range is adjacent on the north side of the LIRR ROW.

3. Vegetation

Alternate Route 2 bisects, in part, central core areas of the Pine Barrens as it traverses within the existing LIPA easement. Because of this, the adjacent vegetation is more typical of the mature pine-oak communities than the ecotones and transitional vegetative communities found along the Proposed Route areas, such as Route 27.

There is a large stretch of this pine oak community along the existing LIPA ROW from the Hampton Hills Golf and Country Club to Route 24 (Exit 65 on Route 27). This community would be indicative of an area where a fire has not occurred in several years, which has led to the oaks out-competing the pitch pines for sunlight.

The overstory vegetation along Alternate Route 2 is a combination of pitch pine and various oak (red, black, scarlet and white) species. The dominance of these trees changes throughout the corridor, and depends on the frequency of disturbance (e.g., fire or clearing) in the area. Approximately 75% of the various oak species in this corridor consists of scarlet oak. The understory along this corridor is mostly low-bush blueberry and huckleberry. Along the edge between the pitch pine-oak habitat and Alternate Route 2 there are scattered areas of sweet fern, pitch pine saplings and bayberry. The vegetation along the Alternate Route 2 consists of a combination of scrub oak, low-bush blueberry, huckleberry and bearberry. The vegetation along Alternate Route 2 that intersects the Hampton Hills Golf and Country Club appears to have been allowed to grow more dense than the rest of the routes studied for this project. This corridor consists of pitch pine saplings (between two and six feet tall) and various species of oak saplings (mostly scarlet oak). Also, the topography through this corridor is more dynamic and appears to have

allowed the growth of species such as eastern red cedar, sweet fern, bearberry and golden heather along Alternate Route 2.

The vegetation along the LIRR tracks in Southampton consists of plants, shrubs and trees, which are typical for areas that are sprayed and maintained with herbicide on Long Island. In the sandy soils adjacent to the ballast area, scattered eastern red cedar, pitch pine, sarsaparilla, winged sumacs, black cherry, tree of heaven and various species of oak (red, black, white, scarlet and scrub) saplings can be found. These saplings are clearly not thriving in this area, as it is an area of high and frequent disturbance. Shrubs such as bayberry, mugwort, ragweed, beach plum, low-bush blueberry and huckleberry can be found in this area. The ground cover in this habitat consists mostly of vines (asiatic bittersweet, wild grape, greenbrier, poison ivy and Virginia creeper), various grasses (switchgrass, bluegrass, crabgrass, etc.) and sedges. Larger eastern red cedar, tree of heaven, pitch pin and oak trees can be found amongst smaller shrubs, vines and grasses further away from the tracks (greater than 20 feet from the centerline of the tracks). These trees are generally spare in this area. Beyond this community, much of the corridor along the LIRR tracks is developed by either paved roads, buildings, or other maintained areas.

4. Soils

In addition to the general soil associations described above, the complete list of soils encountered along Alternate Route 2 is as follows:

CpC	- Carver and Plymouth Sands -	3 - 15% slopes
CpA	- Carver and Plymouth Sands -	0 - 3% slopes
CpE	- Carver and Plymouth Sands -	15 - 35% slopes
At	- Atsion Sand - only one spot on LIPA ROW n/o Route 51	
MnC	- Montauk Loamy Sand, sandy variant -	8 - 15% slopes
PlA	- Plymouth Loamy Sand -	0 - 3% slopes
PlB	- Plymouth Loamy Sand -	3 - 8% slopes
CuB	- Cut and Fill Sand -	Gently sloping
RdA	- Riverhead Sandy Loam -	0 - 3% slopes
PlC	- Plymouth Loamy Sand -	8 - 15% slopes
MnB	- Montauk Loamy Sand, sandy variant -	3 - 8% slopes
MfC	- Montauk Fine Sandy Loam - west of Southampton College	8 - 15% slopes
HaA	- Haven Loam -	0 - 2% slopes
Gp	- Gravel pits - located east of Southampton College	
RdB	- Riverhead Sandy Loam -	3 - 8% slopes

BgA	- Bridgehampton Silt Loam - immediately west of Southampton Substation	0 - 2% slopes
Bm	- Bridgehampton Silt Loam - Immediately west of Southampton Substation	Graded
RdC	- Riverhead Sandy Loam -	8 - 15% slopes

It should be noted that, after reviewing the soil survey maps and surveying the Proposed and Alternate Routes, it is apparent that the slopes encountered along Alternate 2, specifically along the LIPA easement west of Sears Bellows Park, are significantly greater than those encountered along the Proposed Route.

II. Environmental Impacts

The Proposed Route and construction methods for this Project have been chosen so as to have as little impact as possible on the physical environment. The Proposed Route and the Alternate Routes have been reviewed with respect to potential impacts to existing and future land uses, critical environmental areas, vegetation, wildlife, water resources, transportation, and cultural, historical and archaeological resources. Impacts will be temporary and transient in nature as they essentially will be restricted to construction activities. The size of the trenches and the amount of vegetation cleared or trimmed will be kept to the absolute minimum size required to safely install the cables. Trenches will be backfilled immediately after installation of the conduit and soil stabilization steps will be taken immediately. Where feasible, trenchless technologies will be utilized to traverse road crossings and environmentally sensitive areas such as freshwater wetlands. There will be no significant permanent impact since no herbicides will be used and only manhole areas will require minimal maintenance.

The following sections discuss possible impacts of the proposed Project and alternates.

A. Proposed Route

1. Land Use

a. Agricultural

Since the Project will occur in grassy shoulders, agricultural properties will not be impacted by the Proposed Route.

b. Residential

Construction activities will occur during daylight hours through residential sections. Since cable laying is essentially a moving process, disturbances are expected to be transient, i.e., a matter of hours to a few days, to any one receptor. Public notice will be given as to the scheduling of construction activities, and every effort will be made to accommodate special needs of residents along the route.

c. Commercial

Since there are no commercial properties, e.g., retail stores and restaurants on the Proposed Route, there will be no impacts to commercial properties during construction phases.

d. Institutional - Noise Sensitive Receptors

Learning institutions and places of worship along the Project route, primarily east of Hampton Bays, will be temporarily impacted by noise during construction. However, since the activities are continually moving, impacts will be transient, typical of road construction projects. Every effort will be made to avoid or minimize construction activities at these locations.

e. Industrial

Industrial properties, e.g., salvage yards and sand mines, will not be impacted by the Project.

2. Conservation

a. Critical Environmental Areas Mitigation Measures

As previously discussed in Section I, the CEAs along the Proposed Route includes the Central Pine Barrens, Hydrologic Zones III and IV, and SGPA. The primary concern with respect to the Central Pine Barrens is to protect the unusual flora and fauna as well as to protect the underlying aquifer system. Protection of groundwater quality is also the primary concern of the Hydrologic Zones and SGPA. This route transverses the CEAs from its beginning point at the Riverhead substation to the vicinity of Exit 65 on Route 27 in Hampton Bays. None of the CEAs extend an appreciable distance south or east of this intersection.

The primary environmental concerns for the CEAs transversed by the proposed Project will be: 1) protect the flora of the Pine Barrens and 2) protect the underlying aquifer system. The only period of time that the proposed Project could potentially impact these two areas of concern are during the construction phase of the Project. There will be no operational environmental impacts from the Project since the construction materials are inert (no leachable components).

b. Protection of the Pine Barrens

The Proposed Route avoids impact to undisturbed areas of the Pine Barrens. The work will be conducted along previously cleared rights-of-way either along LIPA-owned transmission lines or the shoulders of roadways. The most significant potential impact to the Pine Barrens from the Project will be from potential erosion and sedimentation during rainfall events during the construction of the transmission line trench. The construction will be accomplished by stand-alone work crews who, in a continuous process at each site, will:

- Excavate the transmission line trench.
- Place sections of the HDPE conduit.
- Immediately backfill the trench, regrade the soil and stabilize the soil via hydroseeding or mulch.
- Install electrical cables from manhole locations placed approximately 2,500 feet apart.

By necessity, there will be a temporary open excavation, associated soil pile, and unvegetated strip of disturbed soil in the vicinity of each working crew. Generally, the trench will be backfilled immediately upon the installation of the HDPE conduit. Excess soils will be removed periodically to eliminate erosion concerns and no extensive or long-term stockpiles of soils will occur. Although disturbed, the sandy nature and high porosity of the extant soils, as well as the level topography, will not be conducive to sheet run-off or erosion except in an extremely severe storm. Nevertheless, temporary Best Management Practices ("BMPs") such as filter-cloth fences and hay bales will be utilized in all areas stripped of vegetation to protect the nearby Pine Barrens environment. These BMPs will remain in place until the disturbed soils are successfully re-vegetated with appropriate flora.

Vegetation impact assessments were made by a combination of aerial photography, field verification and estimation techniques. Aerials and field techniques were used to determine the length of several sections

within the Proposed route. The sections were separated by several factors, including vegetative community differences, tree spacing, and varying differences in the required width of the ROW.

Along most of the length of the proposed route, the line will be placed along the grassy shoulder of Route 27. The line will also be placed in the shoulder, and, if necessary, in the traffic lane, of Speonk-Riverhead Road. Though some tree trimming will be necessary along Speonk-Riverhead Road, no tree loss is expected for the entire length of the proposed route until some areas east of Exit 65 (Route 24). Along County Road 51, the line will be in the median (as discussed previously) and will not affect any trees. Where necessary, the line will be placed closer (less than 30 feet) to the paved road (and steel plated for safety) in order to avoid the clearing of trees.

In sections east of Exit 65 on Route 27, there will be some tree clearing necessary (particularly along the LIRR). However, as discussed previously, these trees are species which typically grow along herbicide-maintained railways and alongside roadways and it is expected there would be no clearing of Pitch pine-oak species. A minimum additional clearing of approximately 5 feet would be necessary along the LIRR and along roadsides from Route 27 to the LIRR. The maximum additional clearing would be approximately 15 feet. Areas that are impacted by clearing will be restored by selective re-vegetation based on consultation with environmental agencies, advisory groups and neighboring property owners.

c. Freshwater Wetlands

As described earlier, the Project passes within the regulated area of three freshwater wetlands, as defined by the NYSDEC and Town of Southampton. These wetlands will not be adversely impacted by this Project. A small wetland exists about 100 feet west of LIPA's cleared ROW north of Nugent Drive and will not be impacted by construction activities. A second wetland exists on LIPA's ROW south of Nugent Drive north of Route 51. A third freshwater wetland exists on the LIRR ROW west of Southamton College. There will be no impact to the second and third wetlands since the line will be directionally drilled under them. Entry and exit pits for the drilling operation will be located upland of the wetland. For all three wetland areas, the Applicant will ensure compliance with applicable requirements of the NYSDEC and the Town of Southampton. KeySpan Energy's Wetland Construction Guideline, which will be part of the Environmental Management & Construction Plan (to be submitted on or about

November 30, 1999), will be utilized on the Project and Project monitors will ensure that construction activities will not encroach upon the wetlands.

d. Protection of the Underlying Aquifer System

Review of the available data indicates that groundwater occurs at depths 20 feet below ground surface (bgs) or greater for the majority of both the Proposed Route (and Alternate Routes); therefore, groundwater will not be encountered during excavation activities. The data becomes somewhat equivocal in the vicinity of the Shinnecock Canal; however, if the bottom elevation of the trenches is at 15 feet or more above mean sea level, groundwater should not be encountered. Groundwater is expected to be encountered at between five and six feet bgs in the immediate vicinity of the Riverhead substation. However, installation of the transmission line is not expected to require dewatering activities.

As the Project involves a buried electric transmission line that is constructed with inert non-leachable materials, there will be no potential impacts to the underlying aquifer system and groundwater quality once the construction phase of the Project is completed. During the construction phase of the Project, the primary concern for environmental impacts will be the potential release of liquid fuels (gasoline and diesel) from trucks and equipment, hydraulic fluid and oil from equipment, and existing subsurface oil lines.

To mitigate the potential for fuel and oil releases from the construction crews vehicle and equipment, there will be no temporary fuel storage tanks stored along the Proposed Route. All refueling will be conducted on protective barriers. In addition, each apparatus will be inspected prior to the beginning of each workday to ensure that it is free from leaks. Any piece of apparatus observed to be leaking will be immediately taken out of service and repaired. The construction crews will also be fully briefed on the potential environmental impacts of their actions and will receive specific training on fuel handling procedures to minimize the potential for the release of fuel, hydraulic fluid, or oil. Should a spill or release occur, any impacted soils will immediately be placed on impermeable plastic, the NYSDEC Spills Unit notified, and appropriate remedial action taken to mitigate the release.

3. Highway Land Use (Transportation Corridor)

Since the transmission line will be installed within the shoulders of highways, there will be minimal temporary impact and no permanent impact to adjacent properties. Temporary interference with access to these properties may be necessary during construction activities. Impacts will be minimized by strictly adhering to all NYSDOT, SCDPW, Town and Village of Southampton requirements, and close communication with adjacent property owners.

There will be no impact to utilization of land suitable for future use, primarily due to the Project's construction in the shoulders of highways. Some clearing will take place where there is invasive vegetation closer to the roadway, predominantly east of Exit 65 on Route 27.

Possible impacts to the shoulders of highways are restricted to construction related impacts, temporary disruption to manmade features (i.e., sidewalks, guide rails, curbs, utilities, etc.), and temporary noise interference to adjacent properties. Construction-related impacts, such as noise, dust, dirt, and disturbance of traffic flow, will be minimized by following the applicable procedures in the Environmental Management and Construction Plan (EM&CP) to be filed on or about November 30, 1999. No blasting operations are anticipated. Additionally, impacts will be mitigated by adherence to Keyspan Energy's Standard Specification and adherence to applicable State and local requirements for construction along the shoulders of the highways.

Temporary disturbances to existing sidewalks, pavements, guide rails, and other utilities will be mitigated by complying with conditions of the relevant permits. Traffic flow will be disturbed as little as possible by adhering to the traffic control measures specified by the NYSDOT and local agencies. In addition, construction activities will be sequenced to avoid impacts on key road corridors during the tourist season.

4. Cultural & Historical Resources

The electric transmission line route's selection and construction methods have been developed and designed to minimize impacts to cultural and historical resources. For example, since the entire route will be installed within County road, State highway, LIPA or LIRR ROWs, which are previously disturbed corridors, and based on literature investigations, there will be no anticipated impact to cultural resources during construction.

5. Archaeological Resources

The response from NYSOPRHP dated October 13, 1999 states that there are a number of archaeological sites in or adjacent to the project corridor. Therefore, the NYSOPRHP recommends that a Phase 1 archaeological survey is warranted unless substantial ground disturbance can be documented. The Phase 1 Survey is divided into two progressive units of study including a Phase 1A sensitivity assessment and initial project area field inspection, and a Phase 1B subsurface testing program for the project area. A professional archaeologist will be retained, as appropriate, in the event that these resources are encountered in the Project Route. The archaeologist will conduct a site survey and test digs will be performed in the upper soil strata to ensure that no disturbances are made to Native American or other artifacts.

6. Vegetation

a. Methodologies

Impacts to vegetation were derived by computing the total area to be cleared during construction and then parceling the total among the various vegetative groupings as provided by the overall vegetative map. For the analysis, a temporary construction disturbance of 25 feet was assumed.

b. Vegetation Impacts

The Proposed Route avoids impacts to undisturbed areas of the Pine Barrens. The Applicant is working closely with NYSDOT and SCDPW on the exact location of the line along the Proposed Route in order to mitigate impacts to vegetation. Indeed, the potential for the Proposed Route to cause any significant impacts to vegetation has been greatly minimized as a result of these discussions. As discussed in Exhibit 2, the route will largely avoid densely treed areas along roadways.

The side of Speonk-Riverhead Road is not sufficiently wide to accommodate the construction activities and some vegetation will need to be trimmed. Based upon field observations made along the Proposed Route on the east side of Speonk-Riverhead Road, the flora within the targeted 15-foot wide strip is already impacted and stressed due to previous road construction activities, debris ejected from passing motorists, and normal road runoff (e.g., salt, oil, and sand). Therefore, there will be no additional significant impact to "pristine"

Pine Barrens flora along Speonk-Riverhead Road by Project-related activities.

Along NYS Route 27, the Proposed Route will be placed in the disturbed, grassy area for its entire length. As a result, there will be no, or minimal, disturbances to trees west of Exit 65. Thus, the trees that border the southern portion of NYS Route 27 (e.g., the Dwarf Pine Barrens) will not be impacted by the Proposed Route. As the NYS Route 27 grassy shoulder narrows east of Exit 65, until the Shinnecock Canal, tree growth becomes closer to the roadway and the available disturbed grassy area becomes less and some tree disturbance (e.g., trimming or removal) will be necessary. This portion of the Project is outside the Coastal Pine Barrens. Nevertheless, the Applicant will take all practical and reasonable steps to minimize impact to the trees.

Post construction, the area will be seeded with a suitable ground cover (e.g., eastern red cedars, grasses) east of Exit 65. It is anticipated that a limited access area around the newly installed manholes will be maintained on a periodic basis, approximately every five years through minor vegetation cutting. No herbicides will be utilized.

As discussed, the Proposed Route is close to three wetland areas. The plan is to route around the wetlands at a sufficient distance to avoid any possible impacts or to directionally drill under the wetlands, again avoiding possible impacts.

Other segments of the route will not cause any measurable vegetation impacts since they cover grass areas or scrub vegetation not conducive to valuable habitat functions.

7. Wildlife

a. Methodologies

The wildlife impact was assumed to be concomitant with the vegetative analysis conducted as above. The conservative assumption was made that wildlife would be eliminated in the same proportion as the vegetation; that is, the adjacent habitats were at carrying capacity and wildlife would not be relocated.

b. Wildlife Impacts

1) Avifauna

As previously stated, it is anticipated that the corridor will be established adjacent to or within designated rights-of-way associated with the roadways and the railroad line. These areas are already disturbed and impacted. Species associated with such habitats are considered to be habitat generalist, ubiquitous throughout the area and tolerant of human disturbances. Therefore, little or no impact is anticipated to occur to the species that are considered to be interior species or utilize the adjacent habitat. Any disturbances will be extremely localized and limited to the duration of the construction. Species composition will return to current as the area begins to re-vegetate after the completion of the Project.

2) Herpetiles

Of the species identified, the greatest potential for impact will be those associated with the wetlands, in particular, the endangered tiger salamander and the threatened cricket frog and mud turtle, but only if filling of the wetlands occurs. However, the plan is to avoid the wetlands or cross beneath them by means of directional drilling.

No impact is anticipated to occur to the remaining upland species, as they are not expected to be encountered in any significant numbers along the edge of the habitat.

3) Mammalian Species

No long-term impacts are anticipated to occur to the mammalian species identified occurring along the Project corridor. Any potential impacts are likely to be very localized and last only for the duration of the Project. Areas currently maintained as rights-of-way will over time return to the vegetative state they are maintained in providing similar habitat to what is currently available. Since most of the species identified do utilize the edges of habitat, any additional clearing will merely offset the edge and will be quickly utilized. Finally, most of the identified species are tolerant of human disturbances and will not be severely impacted by the construction.

4) Insects

As with the other species, all impacts are anticipated to be short-term and localized. Species such as the buckmoth and Edward's hairstreak are likely to benefit from the construction, as the scrub oak will most likely colonize the cleared areas first, providing good habitat for these species.

8. Soils

In general, the potential for erosion along the Proposed Route is relatively low, as most of the soils are well drained and slopes are minimal. The predominant soil types along this route are Carver and Plymouth Sands with slopes of 0-15 %. They are coarse textured soils and have a very low available moisture capacity and high permeability, thereby minimizing the potential for sheet runoff. A very thin organic layer is present. Potential for erosion is moderate to severe only in those areas where slopes are in the 15-35% range (CpE), which are minimal along the route.

The potential for erosion is minimized also by the proposed construction practice of backfilling the cable trenches immediately after installation of the conduits. It is not anticipated at this time that there will be a need to stockpile soil along the route. Work locations will be regraded promptly to return disturbed soils back to original contours. Prompt soil stabilization by means of hydro-seeding and/or the application of mulch will also aid in minimizing soil erosion.

B. Alternate Route 1

The only significant difference in impacts between this route and the Proposed Route would be potential interference with traffic on Route 27 and County Road 39 east of the Shinnecock Canal Bridge. While construction activities could be scheduled to lessen this impact to the extent possible, note should be made that this route is in a densely trafficked corridor, particularly during rush hours and seasonal weekend and holiday periods. Lane closures would be necessary during construction operations and access to business disrupted. Any exacerbation of these existing traffic conditions would lead to a decrease in a level of service, and likely a strong negative response from the affected communities and commercial interests.

C. Alternate Route 2

Alternate Route 2 has greater impacts compared to the Proposed Route along the segment adjacent to the LIRR ROW. The LIRR segment is four miles longer and 25 feet wider. Alternate Route 2 has no Route 27 component, except for a single crossing. Unlike the Proposed Route, Alternate 2 cuts through the central core of the Pine Barrens along an existing overhead LIPA transmission line ROW/easement.

1. Visual Aesthetics

Alternate Route 2 differs from the Proposed Route and Alternate Route 1 in having a segment of the line running from the Tiana Substation to the Southampton Substation. This alternate would have an overhead line from Exit 65 on Route 27 to the Southampton Substation. An environmental impact of this line would be visual intrusion resulting from the overhead lines and towers, which would be considerably higher than the surrounding vegetation and noticeable to the communities at large. The overhead segment of Alternate Route 2 also would be visible from LIRR trains, sections of Route 27 and other adjacent roadways.

2. Cultural Resources

Since a portion of this route would consist of above ground structures, NYSOPRHP stated in their letter dated October 13, 1999 that a survey and evaluation of structures over 50 years of age in the areas of above ground utility lines will be warranted. In many locations, existing utilities will make the addition of new lines of negligible impact. Areas where utilities of similar scale now exist may be excluded from the survey, with prior agreement by NYSOPRHP. The Suffolk County Historical Society stated that no historic structures would be impacted by this route.

3. Vegetation

This route does not run along Sunrise Highway but rather along an existing transmission line ROW/easement. The transmission line corridor would need widening because over time vegetation has grown into the existing LIPA ROW and tree losses could approach the number in the Proposed Route or even be higher. Widening of the existing corridor would also increase the separation of the parcels in the interior sections of the Pine Barrens.

Vegetation impact assessments were made by a combination of aerial photography, field verification and estimation techniques. Aerials and

field techniques were used to determine the length of several sections within the Alternate Route 2. The sections were separated by several factors, including vegetative community differences, tree spacing, and varying differences in the required width of the ROW.

As the existing LIPA ROW from County Road 51 to Exit 65 on Route 27 is on average 58 feet in width, an additional clearing of between 2 feet and 8 feet would be necessary. This would be necessary due to electrical clearance requirements that require construction to be no closer that 20-22 feet from the centerline of the existing conductors. This requirement places the cable trench about 24 to 26 feet from the centerline of the existing ROW. Beyond this, an additional cleared access of 12 feet for construction equipment and materials is necessary. There are also areas along this Route which contain scenic vegetative buffers at roadway intersections which would need to be cleared. Finally, the access to the existing ROW is limited, so Alternate Route 2 would probably require one or two more lateral access roads for equipment and materials.

From an ecological perspective, widening corridors through mature forested areas such as the Pine Barrens is not particularly desirable. In the Proposed Route, some clearing will be necessary, but this is nominally in the disturbed areas alongside Route 27 (east of Exit 65, which is out of the Core Pine Barrens Region). Alternate Route 2 would require clearing of areas in the central Pine Barrens, a much greater impact than the transitional areas along Route 27. In addition, this now wider corridor would contribute to fragmentation of the Pine Barrens ecosystems and, possibly, facilitate human and vehicular intrusion and corresponding wildlife disturbance.

Substantial evidence exists supporting the argument that large tracts of forests support greater habitat for wildlife and vegetation than fragmented forests. Alternate Route 2 would require further fragmentation of an ecosystem which is already fragile. One of the great attributes of the central Pine Barrens is its continuous forest habitat, which is rare on Long Island. Though there are benefits to edge habitats for an increase in the number and diversity of wildlife and vegetation, an edge habitat already exists on both sides of Alternate Route 2, and extending the width between these two edge habitats would not serve an equal ecological benefit as would leaving the existing interior forest undisturbed.

For the segment along the LIRR ROW, Alternate Route 2 will require a new corridor to the north of the tracks and considerable clearing of existing vegetation for construction. Unlike the underground cable in the

Proposed Route, this segment will be overhead and would require periodic clearing and tree trimming for the life of the project.

3. Soils

As indicated on the soil survey maps, Alternate Route 2 has a higher incidence of significant slopes than that of the Proposed Route. Carver and Plymouth Sands – 15-35% slopes (CpE) are encountered quite frequently along the route. Disturbing these soils could create a somewhat greater erosion hazard than the same soil with a gentler slope.

As stated above, this route does not run along Sunrise Highway but rather along an existing transmission right-of-way/easement. Significant widening of the existing corridor may be required in some areas which would mean that in addition to the soils disturbed for cable trenches, additional soil would be disturbed as a result of tree removal.

Although the proposed construction practices described above would help minimize erosion, there is potential for significant long term erosion due to the slopes encountered along much of the LIPA right-of-way/easement. This potential for erosion is exacerbated by unauthorized vehicular traffic along the route. Because of this situation, underground cables could possibly be unearthed sometime in the future.

Exhibit 4
Attachment 1

New York State Office of Parks, Recreation and Historic Preservation
Historic Preservation Field Services Bureau
Peebles Island, PO Box 189, Waterford, New York 12188-0189 518-237-8643

Bernadette Castro
Commissioner

October 13, 1999

Kerry Ehlinger
Historian
Allee, King, Rosen & Fleming, Inc.
117 East 29th Street
New York, New York 10016-8022

Re: PSC/MTA
Keyspan, Riverhead to Southampton Line
T/Riverhead & Southampton, Suffolk Co.
99PR3184

Dear Ms. Ehlinger:

Thank you for requesting the comments of the State Historic Preservation Office (SHPO). We have begun to review the project in accordance with Section 106 of the National Historic Preservation Act of 1966 and the relevant implementing regulations.

With regard to potential impacts to historic structures, no such impact is anticipated for the initially proposed underground route. Alternatives I and II, which are to be above ground in whole or part, have the potential to impact above-ground cultural resources. Our effort to survey and identify National Register of Historic Places eligible properties is not complete in the Towns of Riverhead and Southampton in the proposed corridors. A survey and evaluation of structures over 50 years of age in the areas of above ground utility lines will be warranted. In many locations, existing utilities will make the addition of new lines of negligible impact. Areas where utilities of similar scale now exist may be excluded from survey, with prior agreement by our office.

Attached please find additional comments by SHPO staff archeologist Douglas Mackey. Please address any questions regarding the need for archeological survey to Mr. Mackey at extension 3291. If you have any other questions, please call me at (518) 237-8643, extension 3283.

Sincerely,

James Warren

James Warren
Historic Preservation
Program Analyst

Encl: "Archeology Comment"

ARCHEOLOGY COMMENTS

99PR3184

Based on reported resources, there are a number of archeological sites in or adjacent to your each of the proposed project corridors. Therefore, the Office of Parks, Recreation and Historic Preservation (OPRHP) recommends that a Phase 1 archeological survey is warranted unless substantial ground disturbance can be documented. OPRHP understands that each of these corridors runs primarily within existing Right of Ways (ROW), however, the presence of a ROW does not necessarily mean that the area has been previously disturbed. OPRHP will review the recommendation for survey if you can provide evidence of prior disturbance for part or all of the corridors.

A Phase 1 survey is designed to determine the presence or absence of archeological sites or other cultural resources in the project's area of potential effect. The Phase 1 survey is divided into two progressive units of study including a Phase 1A sensitivity assessment and initial project area field inspection, and a Phase 1B subsurface testing program for the project area. The OPRHP can provide standards for conducting cultural resource investigations upon request. Cultural resource surveys and survey reports that meet these standards will be accepted and approved by the OPRHP.

Our office does not conduct cultural resources surveys. A 36 CFR 61 qualified archeologist should be retained to conduct the Phase 1 survey. Many archeological consulting firms advertise their availability in the yellow pages. The services of qualified archeologists can also be obtained by contacting local, regional, or statewide professional archeological organizations. Phase 1 surveys can be expected to vary in cost per mile of right-of-way or by the number of acres impacted. We encourage you to contact a number of consulting firms and compare examples of each firm's work to obtain the best and most cost-effective product.

Documentation of ground disturbance should include a description of the disturbance with confirming evidence. Confirmation can include current photographs and/or older photographs of the project area which illustrate the disturbance (approximately keyed to a project area map), past maps or site plans that accurately record previous disturbances, or current soil borings that verify past disruptions to the land. Agricultural activity is not considered to be substantial ground disturbance and many sites have been identified in previously cultivated land.

If you have any questions concerning archeology, please call Douglas Mackey at (518) 237-8643 ext. 3291.

DMackey

10/12/99

Exhibit 4
Attachment 2

SUFFOLK COUNTY
HISTORICAL SOCIETY
300 West Main Street
Riverhead, New York 11901-2894
Tel:(516) 727-2881 • Fax: (516) 727-3467

Oct. 12

September 22, 1999

Ms. Kerry Ehlinger, Historian
Allee King Rosen & Flemming, Inc.
117 East 29th Street
New York, NY 10016-8022

Dear Ms. Ehlinger:

Thank you for your letters of Sept. 15th and Sept. 22nd, and for including the maps that indicate the path of the proposed underground transmission line. I've looked everything over and I do not know of any historic or archaeological resources that would suffer in any of three proposals. For the most part it appears to me that the trench will follow long established roadways and rail road tracks.

I do wonder about the first stretch of the original proposal, which goes south from the Riverhead Substation. That's an environmentally sensitive area. I believe it is in the Core Preservation Area of the pine barrens. I also note that it is marked as LIPA Right-of-Way, which I guess means exactly what the phrase implies, that LIPA has the right to use it. You might want to check with the pine barrens commission. In case you don't have it, the director's name is Ray Corwin, his telephone number is 516-563-0385.

Will the path of the first proposal take it near the Rogers Homestead, the Thomas Halsey Homestead and the Parish Art Museum? I can't tell from the map. If it will, I imagine you will want to contact those institutions. I will send a Long Island Museum Association brochure under separate cover.

As far as Alternatives I and II are concerned, I don't see particular problems with either of these either, except from an environmental standpoint. It seems a shame to go right through Wildwood Lake, the NYS Conservation Area to the east of Wildwood Lake, Maple Swamp, and Sears-Bellows County Park. Does this fall within the LIPA Right-of-Way too? As far as the differences between I and II, I don't feel qualified to comment on the difference between above ground and buried wires. Buried sounds better to me.

Since I am not an authority on historic and archaeological resources I feel that you should consider contacting some other people for their input:

Justine Wells
Riverhead Town Historian
Riverhead Town Hall

200 Howell Ave.
Riverhead, NY 11901
516.369.9717
Ms. Wells is generally in her office on Wed. mornings

Dr. Henry Moeller
President of the Suffolk County Archaeological Association
P.O. Box 995
516.728.6291
Dr. Moeller will be going out of town for at least a month at the beginning of Nov. 1999

Dr. Gaynel Stone
RR 2 Box 205
Wading River, NY 11792
516.929.8725
Dr. Stone is an officer of the Suffolk County Archaeological Association and is extremely knowledgeable about historical and archaeological resources. Her address may have changed although I know she has not moved, but she may not receive her mail via RR# since Riverhead Town has assigned all residents house numbers.

Emily Oster
Southampton Town Historian
Southampton Town Hall
116 Hampton Road
Southampton, NY 11968
516.283.6000 ext. 231
Ms. Oster is in the office Mon., Tue. And Wed., 8:30 a.m. to 4 p.m.

I am sending you a copy of something called *Landmarks of Long Island*, for your reference. The original is too large to fax. It is a little difficult for me to compare your map with locations in *Landmarks*. This publication has been out of print for years. It is useful because it lists many of the historic sites on Long Island, but it needs to be updated to reflect additional sites. The phone numbers are probably not current either.

Thank you very much for contacting me about this project. If there is anything further I can do to help please let me know.

Sincerely,

Wallace W. Broege

Wallace W. Broege
Director

New York State Department of Environmental Conservation
Division of Fish, Wildlife & Marine Resources
Wildlife Resources Center - New York Natural Heritage Program
700 Troy-Schenectady Road, Latham, New York 12110-2400
Phone: (518) 783-3932 FAX: (518) 783-3916

John P. Cahill
Commissioner

Exhibit 4
Attachment 3

September 28, 1999

Thomas Young
EEA Inc
55 Hilton Avenue
Garden City, NY 11530

Dear Mr. Young:

In response to your recent request , we have reviewed the New York Natural Heritage Program databases with respect to the proposed Keyspan 20 mile underground electric Transmission Line, area as indicated on the maps you provided, located in the County of Suffolk.

Enclosed is a report of rare or state-listed animals and plants, of significant natural communities, and of other significant habitats, which our databases indicate occur, or may occur, on your site or in the immediate vicinity of your site. The information contained in this report is considered sensitive and may not be released to the public without permission from the New York Natural Heritage Program.
The Breeding Bird Atlas data you requested is also enclosed.

For most sites, comprehensive field surveys have not been conducted; the enclosed report only includes records from our databases. We cannot provide a definitive statement on the presence or absence of all rare or state-listed species or significant natural communities. This information should not be substituted for on-site surveys that may be required for environmental impact assessment.

Our databases are continually growing as records are added and updated. If this proposed project is still under development one year from now, we recommend that you contact us again so that we may update this response with the most current information.

This response applies only to known occurrences of rare or state-listed animals and plants, of significant natural communities, and of other significant habitats. For information regarding regulated areas or permits that may be required under state law (e.g., regulated wetlands), please contact the appropriate NYS DEC Regional Office, Division of Environmental Permits, at the enclosed address.

Sincerely,

Teresa Mackey

Teresa Mackey, Information Services
NY Natural Heritage Program

Encs
cc: Reg. 1, Wildlife Mgr.
Reg. 1, Fisheries Mgr.
Reg. 1, Bureau of Habitat
Peter Nye, Endangered Species Unit, Delmar

New York State Department of Environmental Conservation
Division of Fish, Wildlife & Marine Resources
Wildlife Resources Center - New York Natural Heritage Program
700 Troy-Schenectady Road, Latham, New York 12110-2400
Phone: (518) 783-3932 FAX: (518) 783-3916

John P. Cahill
Commissioner

October 5, 1999

Exhibit 4
Attachment 4

OCT - 8 1999

Thomas Young
EEA Inc
55 Hilton Ave
Garden City, NY 11530

Dear Mr. Young:

In response to your recent request , we have reviewed the New York Natural Heritage Program databases with respect to the proposed ALTERNATIVE Keyspan Electric Undergrand Transmission Line, Towns of Riverhead to Southampton, area as indicated on the map you provided, located in Suffolk County.

Enclosed is a report of rare or state-listed animals and plants, of significant natural communities, and of other significant habitats, which our databases indicate occur, or may occur, on your site or in the immediate vicinity of your site. The information contained in this report is considered sensitive and may not be released to the public without permission from the New York Natural Heritage Program.
Also enclosed, is the Breeding Bird Atlas data for the area, you requested.

For most sites, comprehensive field surveys have not been conducted; the enclosed report only includes records from our databases. We cannot provide a definitive statement on the presence or absence of all rare or state-listed species or significant natural communities. This information should not be substituted for on-site surveys that may be required for environmental impact assessment.

Our databases are continually growing as records are added and updated. If this proposed project is still under development one year from now, we recommend that you contact us again so that we may update this response with the most current information.

This response applies only to known occurrences of rare or state-listed animals and plants, of significant natural communities, and of other significant habitats. For information regarding regulated areas or permits that may be required under state law (e.g., regulated wetlands), please contact the appropriate NYS DEC Regional Office, Division of Environmental Permits, at the enclosed address.

Sincerely,

Teresa Mackey

Teresa Mackey, Information Services
NY Natural Heritage Program

Encs
cc: Reg. 1, Wildlife Mgr.
Reg. 1, Fisheries Mgr.
Reg. 1, Bureau of Habitat
Peter Nye, Endangered Species Unit, Delmar

U.S. FISH & WILDLIFE SERVICE

United States Department of the Interior

FISH AND WILDLIFE SERVICE
3817 Luker Road
Cortland, NY 1304

OCT 1 2 1999

Exhibit 4
Attachment 5

October 7, 1999

Mr. Thomas Young
Ecologist
EEA, Inc.
55 Hilton Avenue
Garden City, NY 11530

Attention: Mr. Roy Stoecker

Dear Mr. Young:

This responds to your letters of September 16 and September 22, 1999, requesting information on the presence of Federally listed or proposed endangered or threatened species in the vicinity of the following locations for the Keyspan Energy underground electric transmission line:

1. The primary route for the 20-mile line beginning at the Riverhead Substation on Nugent Drive in the Town of Riverhead and ending at the Southampton Substation on North Sea Road in the Village and Town of Southampton, Suffolk County, New York. The primary route parallels major roads.

2. The alternate route for the 20-mile line begins and ends at the locations indicated above. The alternate route follows existing utility or railroad corridors for the most part.

Except for occasional transient individuals, no Federally listed or proposed endangered or threatened species under our jurisdiction are known to exist in the respective project impact areas. Therefore, no Biological Assessment or further Section 7 consultation under the Endangered Species Act (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.) is required with the U.S. Fish and Wildlife Service (Service). Should project plans change, or if additional information on listed or proposed species becomes available, this determination may be reconsidered.

The above comments pertaining to endangered species under our jurisdiction are provided pursuant to the Endangered Species Act. This response does not preclude additional Service comments under the Fish and Wildlife Coordination Act or other legislation.

Federally listed endangered and threatened marine species may be found near the project area. These species are under the jurisdiction of the National Marine Fisheries Service. You should contact Mr. Stanley Gorski, Habitat and Protected Resources Division, Area Coordinator, National Marine Fisheries Service, James J. Howard Marine Sciences Laboratory, 74 Magruder Road, Highlands, NJ 07732, for additional information (telephone: [908] 872-3037).

The Nantucket juneberry (*Amelanchier nantucketensis*) is reported from the vicinity of the proposed work. The Nantucket juneberry is considered a species of concern (formerly known as a Category 2 Candidate species) by the Service and its status is being monitored throughout much of its range. Species of concern do not receive substantive or procedural protection under the Endangered Species Act; however, the Service does encourage Federal agencies and other appropriate parties to consider these species in the project planning process.

The Nantucket juneberry is also listed as an endangered species by the New York State Department of Environmental Conservation (State). The State contact for this species is Dr. Kathryn J. Schneider, New York State Department of Environmental Conservation, New York Natural Heritage Program, 700 Troy-Schenectady Road, Latham, New York 12110 (telephone: [518] 783-3932).

For additional information on fish and wildlife resources or State-listed species, we suggest you contact:

New York State Department
of Environmental Conservation
Region 1
Building 40, SUNY
Stony Brook, NY 11794
(516) 444-0200

New York State Department
of Environmental Conservation
Wildlife Resources Center - Information Services
New York Natural Heritage Program
700 Troy-Schenectady Road
Latham, NY 12110-2400
(518) 783-3932

National Wetlands Inventory (NWI) maps may or may not be available for the respective project areas. However, while the NWI maps are reasonably accurate, they should not be used in lieu of field surveys for determining the presence of wetlands or delineating wetland boundaries for Federal regulatory purposes. Copies of specific NWI maps can be obtained from:

Cornell Institute for Resource Information Systems
302 Rice Hall
Cornell University
Ithaca, NY 14853
(607) 255-4864

Work in certain waters and wetlands of the United States may require a permit from the U.S. Army Corps of Engineers (Corps). If a permit is required, in reviewing the application pursuant to the Fish and Wildlife Coordination Act, the Service may concur, with or without stipulations, or recommend denial of the permit depending upon the potential adverse impacts on fish and wildlife resources associated with project implementation. The need for a Corps permit may be determined by contacting Mr. Joseph Seebode, Chief, Regulatory Branch, U.S. Army Corps of Engineers, 26 Federal Plaza, New York, NY 10278 (telephone: [212] 264-3996).

If you require, additional information please contact Michael Stoll at (607) 753-9334.

Sincerely,

Mark W. Clough

ACTING FOR

David A. Stilwell
Field Supervisor

cc: NYSDEC, Stony Brook, NY (Environmental Permits)
NYSDEC, Latham, NY (Attn: Dr. K. Schneider)
NMFS, Highlands, NJ (Attn: S. Gorski)
NMFS, Milford, CT (Attn: M. Ludwig)
COE, New York, NY

EXHIBIT 5

DESIGN DRAWINGS

Contained in Exhibit 5 Attachment A are design drawings showing both plan and profile details of the proposed line for the entire length of the Proposed Route.

The drawings should be utilized to identify the placement of the cable within the Proposed Route. (The aerial photographs in Exhibit 2 (Attachment D) depict the Proposed Route's corridor, not the exact placement of the cable within the Route.)

EXHIBIT 9

COST OF PROPOSED FACILITY

(a) The following estimate has been established for the construction of the proposed underground electric transmission line under the Article VII submittal:

Description	($ x 1000)
Right-of-Way Costs (LIRR Agreement to Use ROW)	Negotiations Underway
Surveys	300
Materials (including equipment rental)	30,100
Labor	35,250
Engineering and Inspection	720
Indirect Construction Costs (includes Administrative, Legal and other overhead costs)	Included in Costs Above
TOTAL	**66,370**

The cost estimate above is predicated upon conceptual route approvals from the involved agencies along the route.

(b.1) The data used to develop the cost of the proposed Project is based upon current KeySpan Energy labor rates, current overhead loadings, historical and current material cost values, some provided by vendors for budgetary purposes. Labor times were derived from recent project experience as well as consultation with experienced construction personnel.

(b.2) At this time, material bids are not available. Cable bids are currently under evaluation and conduit bids have been sent to prospective vendors for response.

EXHIBIT 10 (E-1)

DESCRIPTION OF PROPOSED TRANSMISSION LINE

An underground electric three-phase transmission line of approximate distance of 22.5 miles is planned to be installed from LIPA's Riverhead Substation located south of the Peconic River and southeast of the intersection of NYS State Route 25 and Mill Road to LIPA's Southampton Substation located on the north west corner of Prospect Street and North Sea Road. The new three-phase transmission line will utilize underground solid dielectric cable design with cross-linked polyethylene insulation rated at 138,000 volts AC (138kV). However, since the designated connections at both substations operate at 69,000 volts AC (69kV), the cable will be operated at 69kV at this time. The Proposed Route is as defined in Exhibit 2 of this Application.

The underground cable construction will be of solid dielectric type having a copper conductor with a cross-sectional area of 2,500,000 circular mils (2500 kcmil), cross-linked polyethylene insulation approximately 0.85 inches thick rated at 138,000 volts AC (138kV), a corrugated metallic sheath to prevent water and moisture migration and a polyethylene outer jacket. The overall outer diameter of the cable is approximately five inches. The cable design and performance shall meet all aspects of the latest version of Association of Edison Illuminating Companies Standard AEIC CS-7, Insulated Cable Engineers Association ("ICEA") S-66-524, and American Society for Testing & Materials ASTM B-3. System design will comply with applicable sections of the National Electrical Code ("NEC") and the National Electrical Safety Code ("NESC"). The circuit will consist of three cables, each in an 8-inch high-density polyethylene ("HDPE") conduit, in a trefoil configuration, buried nominally at 42 inches below-grade along the designated route defined in this application. The expected width of 20-25 feet for construction purposes will be necessary for construction vehicles, trenching equipment, material and personnel work area. Manholes shall be used along the route to aid in cable pulling and splicing. Surge protection and cable sheaths cross-bonding equipment will also be located in manholes. An additional set of three 8-inch conduits, without cable, dedicated for future use will be installed within 8 inches of the other. A cross-section of a sample cable and trench configuration is shown in Attachment F of Exhibit 2.

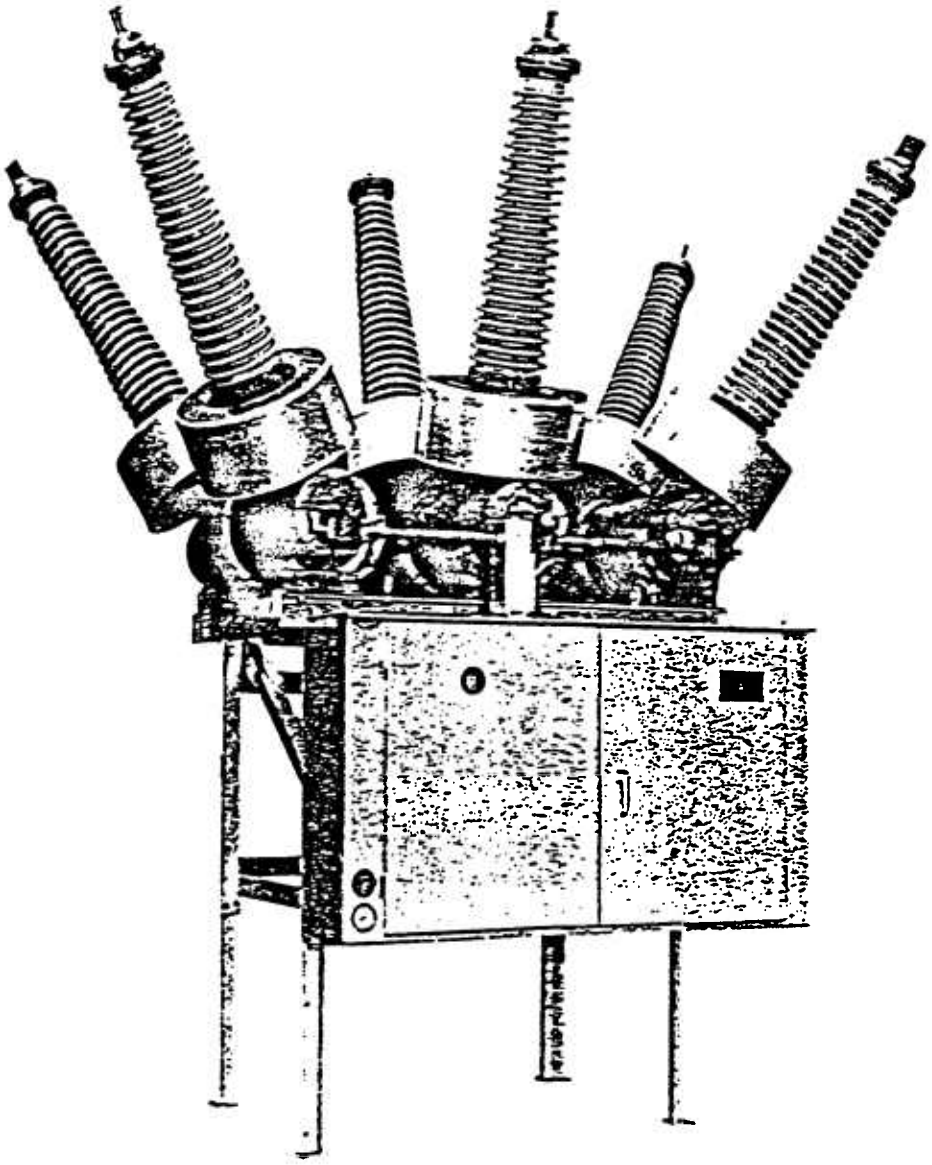
EXHIBIT 11 (E-2)

OTHER FACILITIES

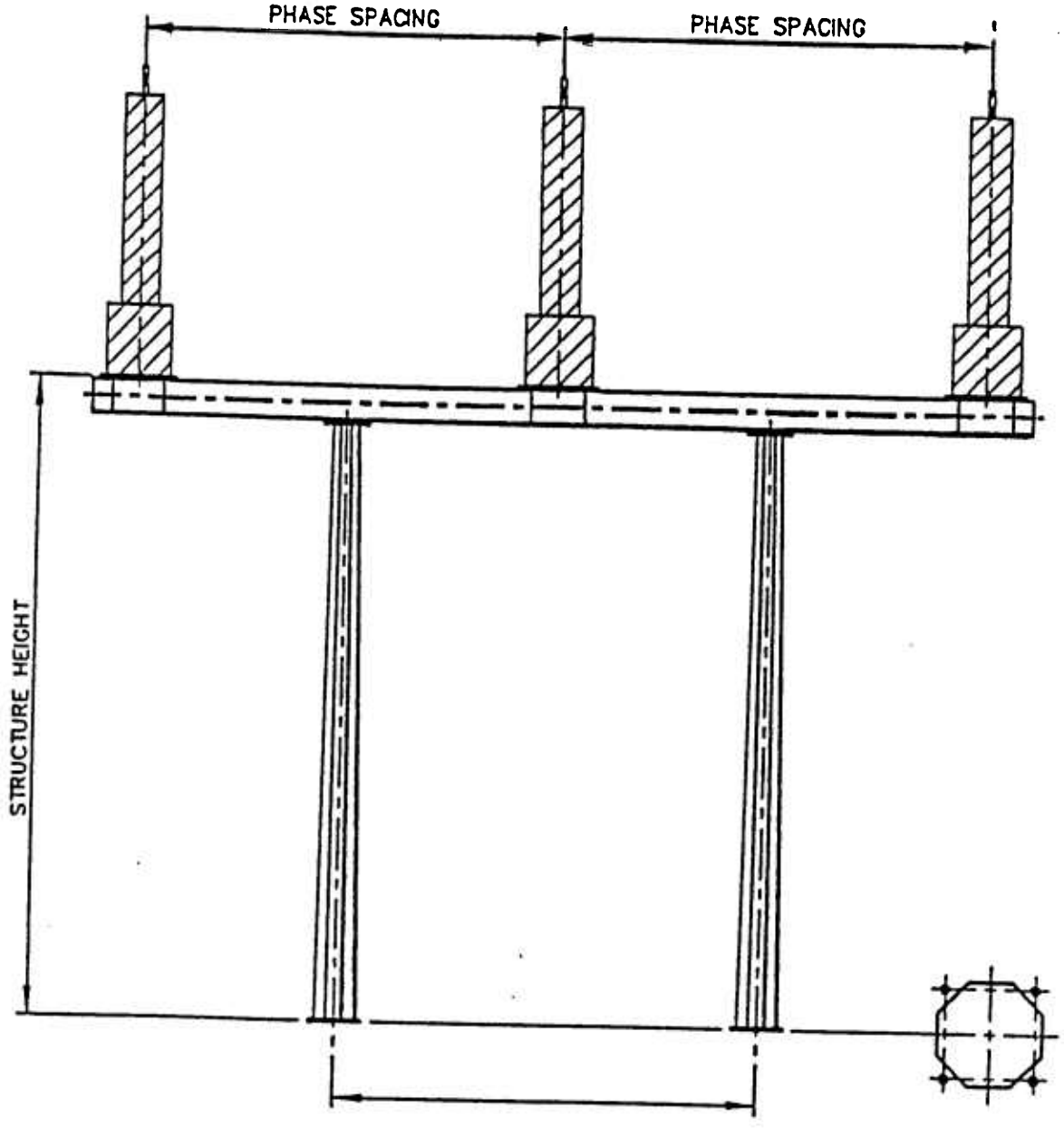
There will be an underground to overhead terminal located at the existing Riverhead and Southampton Substations to transition the underground cable to an overhead connection. The overhead connection will be tied to a newly installed circuit breaker, operating at 69kV, at each substation. The use of two series reactors, one at each substation, will also be employed to optimize cable performance. This specific reactor consists of three units, one for each phase of the circuit. A typical circuit breaker terminal structure and reactor are shown in Attachments 1, 2, and 3 of this exhibit.

One twin fiber optic conduit will be installed in the same trench as the electric transmission circuit. In doing so, a state-of-the-art telecommunication link will be established between the Riverhead and Southampton Substations.

Typical Circuit Breaker

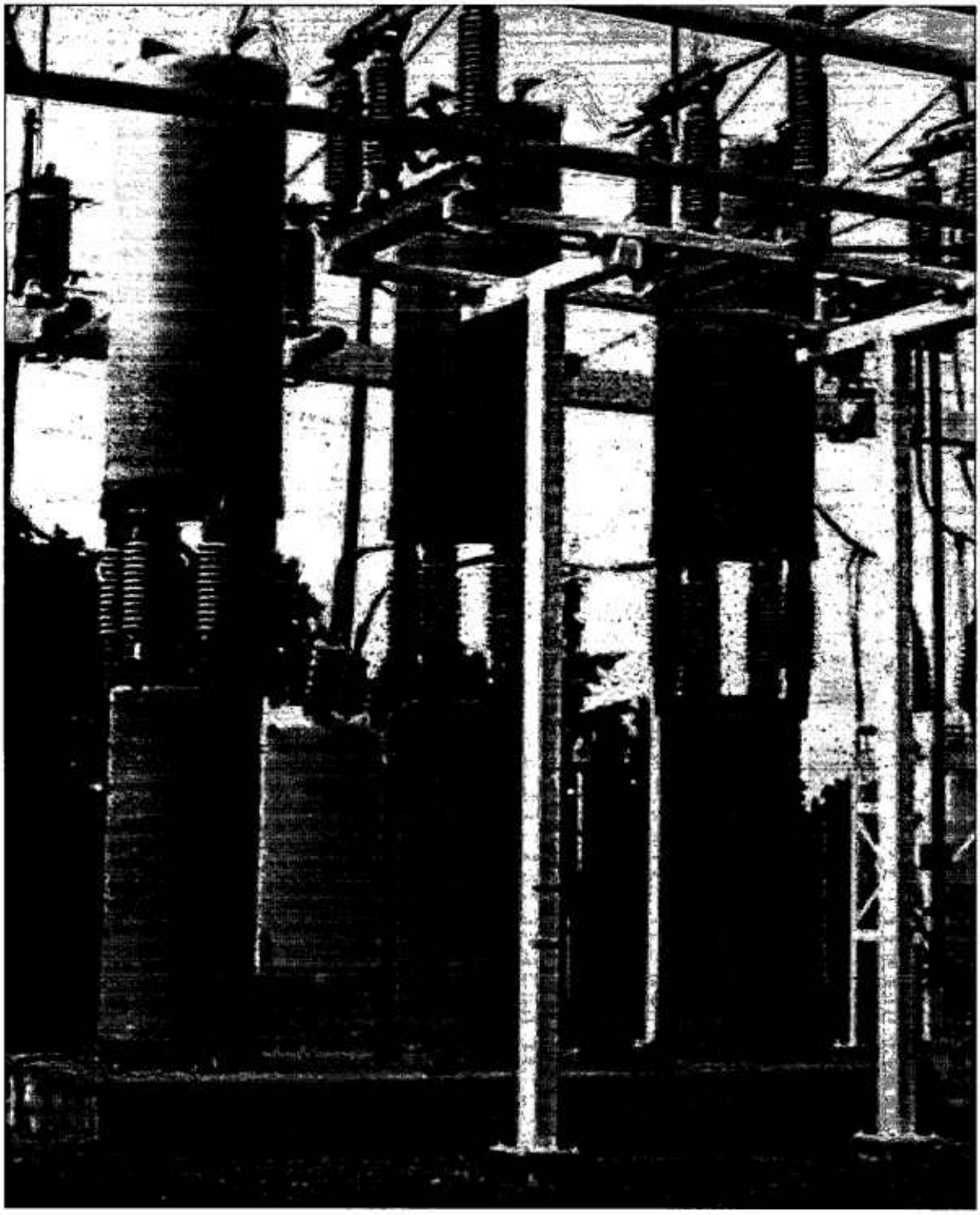


Typical Terminal Structure



Typical Series Reactor

Exhibit 11
Attachment 3



LONG ISLAND POWER AUTHORITY

EXHIBIT 12 (E-3) - UNDERGROUND ELECTRIC TRANSMISSION CONSTRUCTION

PREPARED PURSUANT TO SECTION 88.3

EXHIBIT 12 (E-3)

UNDERGROUND ELECTRIC TRANSMISSION CONSTRUCTION

The underground cable construction will be of solid dielectric type having a copper conductor with a cross-sectional area of 2,500,000 circular mils (2500 kcmil), cross-linked polyethylene insulation approximately 0.85 inches thick rated at 138,000 volts AC (138kV), a corrugated metallic sheath to prevent water and moisture migration into the conductor and a polyethylene outer jacket. The overall outer diameter of the cable is approximately five inches. The cable shall meet all aspects of the latest version of the Association of Electric Illuminating Standard AEIC CS-7, Insulated Cable Engineers Association ("ICEA") S-66-524 and American Society of Testing and Materials ASTM B-3. System design will comply with applicable sections of the latest version of the National Electrical Code ("NEC") and National Electrical Safety Code ("NESC"). The circuit will consist of three cables (one per phase), each in an 8-inch high-density polyethylene ("HDPE") conduit configured in a trefoil (triangular) arrangement to minimize trench width, buried nominally 42 inches below-grade or less with appropriate mechanical protection along the designated route defined in this application. An additional set of three 8-inch conduits dedicated for future use will be installed in the same trench with 8-inch spacing between circuits. The second conduit system will also be configured in a trefoil arrangement to minimize trench width. Cables will not be installed in the second conduit system at this time. A cross-section of a sample cable and trench configuration is shown in Attachment F of Exhibit 2.

Precast concrete manholes will be utilized at specific locations to assist in pulling cables within the conduits and also house cable surge protection equipment, where needed. Cable splices will be made at specific locations based upon cable reel lengths. Sheath cross bonding techniques will also be employed at designated splice locations to minimize circulating currents, sheath voltage levels and maximize cable power capacity.

Since this cable is of solid dielectric design, oil-pumping stations are not required.

LIPA will trench, jack or directionally drill the underground transmission facilities along the designated route defined within this application. The project area ROW width is expected to be 20-25 feet to accommodate construction vehicles, material and personnel work area. Detail drawings of Exhibit 5 identify the planned method of construction along the Proposed Route. It is LIPA's intent to use efficient and economical construction techniques in order to minimize any inconvenience to the communities along the route as well as vegetation. An Environmental Management

and Construction Plan ("EM&CP") will be filed for this Project on or about November 30, 1999.

EXHIBIT 14 (E-5)

EFFECT ON COMMUNICATIONS & ELECTRO MAGNETIC FIELDS

The transmission cable is expected to have no adverse effects on communications (i.e., television, radio, etc.), primarily because all of the electric transmission facilities will be installed underground and will, therefore, have little or no effect on communications signals transmitted through the air. No adverse effect on other underground communication cables, that is, copper conductor communication cables, will be realized from the installation of the electric transmission cable. LIPA will comply with applicable sections of the latest version of the National Electrical Safety Code (NESC) related to appropriate spacing between power and communication cables. Adequate separation between the electric transmission cable and communication facilities will be maintained. As part of the final design of the Project, the electric cable path route and design information will be provided to third parties that may have underground communication cables along or near the same path (e.g., Bell Atlantic, Cablevision, LIRR, etc.) to assure appropriate clearances are achieved.

A study has been performed to determine the present electromagnetic field strength (EMF) along the Proposed Route and, through the use of mathematical formulae, assess the expected electromagnetic field strength during normal circuit operation. The study is attached as Attachment 1 to this exhibit.

The study's modeling results clearly indicate that the calculated magnetic field strength at the edge of the ROWs or roadways along the Proposed route is well below the interim magnetic field standard of 200 mG as established by the New York State Public Service Commission (PSC). In addition, the International Commission on Non-Ionizing Radiation Protection (ICNIRP) and the American Conference of Governmental Industrial Hygienists (ACGIH) specify field levels for worker (1,000 to 10,000 mG) and for general (830 mG) exposure that are much higher than levels that will be generated by the proposed 138kV cable circuits.

The study also concluded that, on the basis of EMF levels generated by the 138kV cable circuits, no interference effects are expected for nearby underground copper communication cables.

This study was reviewed to assure the new magnetic field values considering a single trench design with two circuits spaced approximately 25 inches on center. A letter from the consulting firm (Attachment 2) confirms the two circuits' EMF field is less than the established NYS Public Service Commission standard of 200 mG

based upon LIPA's phase rotated design that is shown in Exhibit 5 of this Application.

Exhibit 14
Attachment 2

ENERTECH Consultants
300 Orchard City Drive
Suite 132
Campbell, CA 95008
408/866-7266
(Fax: 408/866-7279)

17 Main Street
P.O. Box 770
Lee, MA 01238
413/243-2800
(Fax: 413/243-4620)

Web Site: http://www.etc-inc.com

November 9, 1999

Gary Petschauer
Keyspan Energy
445 Broad Hollow Road
Melville, NY 11747

Subject: EMF Levels of 138 kV Cable Circuits

Dear Mr. Petschauer:

The report "Calculated EMF Levels of 139 kV Circuits and Existing Levels along a Proposed Route" that we have issued on October 7, 1999 shows graphs and data on the magnetic field produced by a single circuit and by two circuits separated by 5 feet. Following your recommendation, we have assessed the effect of placing two 138 kV cable circuits in the same trench with a distance of about 25" between the centers of the two circuits.

We have found that the magnetic field of the two cables in the same trench is dependent on the relative phasing of the two circuits. If the two circuits are properly arranged relative to each other, the magnetic field produced by the two circuits carrying the same load can actually be less than the magnetic field produced by a single circuit.

For instance, for a normal peak load the maximum calculated magnetic field at 1 m above ground of a single circuit is 94 mG. Two circuits in the same trench, both at the normal peak loading, produce a maximum field at 1 m above ground equal to 180 mG with the same phasing and 50 mG with reverse phasing. The reverse phasing we are referring to is: A – B – C and C – A – B . The calculations previous performed for a spacing of 5 feet between circuits showed a maximum field of 136 mG with same phasing and 120 mG with reverse phasing.

Best regards,

Luciano E. Zaffanella

Luciano E. Zaffanella
Vice President of Research

EXHIBIT 15 (E-6)

EFFECT ON TRANSPORTATION

The route selected minimizes traffic control needs by minimizing re-routing of traffic, such as that on New York State Route 27, which accounts for 11.2 miles of the 22.5 mile route. Roadways, such as Suffolk County Road 51 and Speonk-Riverhead Road may require off-hours roadwork to minimize traffic impact, and that effort will be coordinated with the respective agencies. Construction along the Long Island Railroad (LIRR) ROW, approximately four miles, is not expected to interfere with rail traffic. That part of the route will place the trench alongside the LIRR tracks situated nominally 20 feet south of the centerline of the tracks within the LIRR ROW. LIRR flagging support may be required during this construction phase to assure compliance with applicable construction safety regulations.

The route selected for the proposed underground electric transmission cable minimizes any effect on existing transportation facilities such as roadways, airports, and railways. During construction, LIPA and its contractors will submit and follow traffic control plans approved by each involved agency along the route, where required, to mitigate any inconvenience to the surrounding communities.

STATE OF NEW YORK
PUBLIC SERVICE COMMISSION

Application of the Long Island Power Authority for a Certificate of Environmental Compatability and Public Need - - Riverhead to Southampton 138kV Underground Transmission Line Project.

DIRECT TESTIMONY OF A PANEL CONSISTING OF

SETH HULKOWER, MADISON MILHOUS,

RICHARD ZAMBRATTO AND ROY STOECKER

ON BEHALF OF

THE LONG ISLAND POWER AUTHORITY

DIRECT TESTIMONY OF A PANEL CONSISTING OF SETH HULKOWER, MADISON MILHOUS, RICHARD ZAMBRATTO AND ROY STOECKER ON BEHALF OF THE LONG ISLAND POWER AUTHORITY

Q. First, the members of the Panel will be introduced. Mr. Hulkower, please state your name, title and business address.

A. Seth Hulkower, Chief Operating Officer of the Long Island Power Authority ("LIPA"), 333 Earle Ovington Boulevard, Uniondale, New York 11553.

Q. Mr. Zambratto, please state your name, title, and business address.

A. Richard Zambratto, General Manager of the Electrical Engineering Department, KeySpan Energy, 445 Broadhollow Road, Melville, New York 11747.

Q. Mr. Milhous, please state your name, title, and business address.

A. Madison Milhous, General Manager of the Electric Planning Department, KeySpan Energy, 175 East Old Country Road, Hicksville, New York 11801.

Q. Mr. Stoecker, please state your name, title, and business address.

A. Roy Stoecker, Vice President of EEA Inc., Environmental Consultants, 55 Hilton Avenue, Garden City, New York 11530.

Q. Were the Exhibits to LIPA's Application to the New York State Public Service Commission for a Certificate of Environmental Compatibility and Public Need ("Application") prepared under the direction and supervision of the members of the Panel?

A. Yes. The following Exhibits accompanying LIPA's Application were prepared under our

direction and supervision:

Exhibit 1	General Information
Exhibit 2	Location of Facilities
Exhibit 3	Alternatives
Exhibit 4	Environmental Impact
Exhibit 5	Design Drawings
Exhibit 6	Economic Effects of the Proposed Facility
Exhibit 7	Local Ordinances
Exhibit 8	Other Pending Filings
Exhibit 9	Cost of Proposed Facility
Exhibit 10(E-1)	Description of the Proposed Transmission Line
Exhibit 11(E-2)	Other Facilities
Exhibit 12(E-3)	Underground Construction
Exhibit 13(E-4)	Engineering Justification
Exhibit 14(E-5)	Effect on Communication & Electromagnetic Fields
Exhibit 15(E-6)	Effect on Transportation

In this testimony, we will discuss, among other things, the principal Exhibits contained in LIPA's Application.

Q. Mr. Hulkower, please describe your educational background and business experience.

A. I received my S.M. in Technology and Policy from the Massachusetts Institute of Technology and my B.S. in Mechanical Engineering and B.A. in Economics from Tufts University. I was appointed Executive Director of LIPA in July 1996 and am now serving as the

Chief Operating Officer. Before joining LIPA, I held positions at Merill International Ltd., JFG Associates, Inc., Putnam Hayes & Bartlett, Inc., New England Power Company and Stone and Webster Engineering Company.

Q. Would you please describe the principal reasons LIPA wishes to proceed with the project?

A. LIPA proposes to construct a new underground electric transmission line about 22.5 miles long, from LIPA's Riverhead Substation to its Southampton Substation (the "Project"). During the summer of 1999, LIPA's electric system experienced unprecedented electric loads, particularly on the South Fork of Long Island. The Project is essential both to maintain reliable electrical supply to the South Fork and to satisfy that region's current and future electrical requirements. The Project will significantly increase system reliability by providing a third transmission supply to the distribution systems in East Hampton and Southampton and will provide a needed margin for operation during peak demands under both normal conditions and in the event of transmission outages. The Project is needed in order for LIPA to meet summer of 2000 demands.

Q. What will be the economic effects of the Project?

A. The Project will have a positive economic benefit on the community since the increased reliability of the electric system will significantly reduce the possibility of interruptions in service. The Project is not expected to promote economic growth, however, since it has been designed to serve present loads and near-term load growth.

Q. Mr. Zambratto, please describe your educational background and business experience.

A. I received a Bachelors of Science in Electrical Engineering from Polytechnic Institute of Brooklyn in 1973 and a Masters of Business Administration from Saint John's University in 1981. I am currently pursuing and expecting to receive a Masters in Electrical Engineering from the State University at Stony Brook in December 1999. Since 1973, I have held various positions in Engineering, Planning and Electric Operations within the Long Island Lighting Company. In March of 1997, I became the Manager of the Electrical Engineering Department of the Long Island Lighting Company, and since the merger in 1998, I have remained the Manager of Electrical Engineering of KeySpan Energy.

Q. Please provide a description of the engineering characteristics of the proposed transmission line.

A. The electric transmission line will initially operate at 69 kilovolts ("kV") but will be capable of operating at 138 kV in the future. The transmission line will be of solid dielectric construction and consist of 2500 kcmil copper electrical cables (each approximately 1.7 inches in diameter) surrounded by a metal sheath and a polyethylene outer jacket, about 5.0 inches in diameter total. Three electrical cables will be installed, each in an 8 inch diameter high density polyethylene ("HDPE") conduit. An additional set of three 8 inch HDPE conduits, without electrical cables, will be installed for future use. Each set of conduits will be installed in a single trench, about 12 inches apart, and buried at a nominal depth of 42 inches. The design and installation of the transmission line are described in detail in Exhibits 10 and 12 of the Application.

Q. What is the Proposed Route of the Project?

A. As shown in Attachment A of Exhibit 2 to the Application, the proposed transmission

line will be constructed entirely underground on existing LIPA, Long Island Rail Road ("LIRR"), and public rights-of-way ("ROW"). The proposed transmission line extends approximately 22.5 miles in length. Starting from its western terminus at the LIPA Riverhead Substation, north of Nugent Drive, the proposed route travels along LIPA's ROW south from the Riverhead Substation to County Road 51 (Riverhead-Moriches Rd.); southwest along the public ROW of County Road 51 to Speonk-Riverhead Road; south along the public right-of-way of Speonk-Riverhead Road to New York State Route 27 (Sunrise Highway); east along the public ROW of Route 27 to Newtown Rd., south along the public ROW of Newtown Rd. to Gate Street, east along the public ROW of Gate Street to the base of the Rte 27 bridge crossing the Shinnecock Canal, east and under the Rte 27 bridge roadway and steel framework to Canal Rd East, east along the public ROW of Canal Road East to Rte 27, east along the public ROW of Rte 27 to Peconic Road; south along the public ROW of Peconic Road a short distance, then across Peconic Road to the northern shoulder of Long View Road; east along the public ROW of Long View Road to Hill Station Road; south on the public ROW of Hill Station Road to the LIRR; east on the LIRR ROW to the electric line's eastern terminus, LIPA's Southampton Substation which is located at the intersection of North Sea Road and West Prospect Street in Southampton (the "Proposed Route"). LIPA has received conceptual approval of the Proposed Route from the NYSDOT, Suffolk County Department of Public Works and LIRR. Copies of letters from these agencies describing their conceptual approval are found in Attachment E of Exhibit 2.

Q. Would you please describe how existing utility or other facilities will be addressed during the construction phase?

A. Known underground utilities and facilities that will be encountered along the route will be

identified on the design drawings (in addition to the new transmission line). During the final design and construction phases, test openings will be excavated along the route to accurately locate subsurface facilities. The test opening information will be utilized to design a safe and accurate conduit installation. Furthermore, all construction-related notification, inspection and verification requirements of New York State and involved local agencies will be followed.

Q. Will the construction entail removal or destruction of much vegetation?

A. No, by design, the Proposed Route minimizes such impacts. However, at certain locations, some vegetation removal will be necessary to clear approved ROWs to facilitate underground transmission line installation. This will involve clearing selected areas along the LIRR ROW east of Hill Station Road, New York State Route 27 and Speonk-Riverhead Road. Further discussion of the ROW clearing is found in Exhibit 4 - Environmental Impacts.

Q. Please describe the construction methods that will be utilized for the Project.

A. Construction methods will be by conventional trenching, jacking or directional drilling techniques. The construction will require the excavation of one 42 inch wide trench where the nominal depth of conduit shall be 42 inches below grade, unless field conditions require otherwise. Attachment F of Exhibit 2 contains a cross-sectional view of the cables and trenches. In cases where conditions dictate less than 42 inches of cover or single trench installation, the affected section of conduit will be designed and installed to withstand anticipated external loads. LIPA intends to use efficient and economical construction techniques in order to minimize any inconvenience to the communities along the route. Open road cutting will be kept to a minimum. Construction activities will be sequenced to avoid impacting heavily trafficked routes during the tourist season. Construction activities will be conducted in accordance with road work permits.

Q. Mr. Milhous, please describe your educational background and business experience.

A. I received a bachelor of engineering from the Georgia Institute of Technology in 1967, a master of science degree in engineering from the same institution in 1968 and a master of science in marine environmental studies in 1975 from SUNY at Stony Brook. I worked at Grumman Aerospace Corporation from September, 1968 until January, 1974. In about January, 1974, I accepted a position at Long Island Lighting Company in the Environmental Engineering Department, where I remained until approximately August, 1994 and held successive positions of Engineer, Sr. Engineer, Division and Department Manager. From 1994 to the present time, I have been Manager of the Electric Planning Department of Long Island Lighting Company until last year's merger, and since then, I have been Manager of the Electric System Planning and Development Department of KeySpan Energy.

Q. Would you please describe the nature of your testimony in this proceeding?

A. My testimony will explain why the proposed transmission facility is necessary to ensure the continued reliable operation of the electric system in the South Fork of Long Island. The Project area includes the Towns of Southampton and East Hampton and is known within the LIPA electric system as the South Fork Load Pocket.

Q. What is a load pocket?

A. A load pocket is a specific area of the electric system served by distribution substations that are supplied by the electric transmission system or a combination of transmission and electric generation. In some cases, generation located within the load pocket is necessary for electric supply during at least a portion of the time. The South Fork Load Pocket is dependent on the 51 MW of generation installed east of Riverhead.

Q. Why is the proposed Project necessary?

A. The need for the proposed transmission facility is established primarily through analysis of conditions experienced during the summer of 1999 in the South Fork Load Pocket. The existing transmission system and the need for the Project are also described in the context of the larger area known as the East End of Long Island. This portion of the LIPA electric system is shown in Figure D-1of the Application, which illustrates the substations and electric transmission system east of Riverhead on both the North and South Forks of Long Island. Riverhead is the eastern extent of the LIPA 138kV bulk transmission system. The North Fork is supplied by a 69kV overhead transmission line, and an older 23kV overhead line, which extend from Riverhead to Southold. The South Fork is supplied by a double-circuit 69kV overhead line which extends from Riverhead to the Buell Substation in East Hampton. The smaller substations east of Buell are supplied by a 23kV system. The North and South Forks are linked by 69kV transmission cable, which extends from the Southold Substation on the North Fork, across Shelter Island, to the Buell Substation in East Hampton.

TRENDS IN ELECTRIC DEMAND

Q. Has the electric load for the Project area remained constant in recent years?

A. No. During the summer of 1999, the LIPA electric system experienced dramatically increased electric loads, particularly on the South Fork of Long Island, east of Tiana Substation. On July 5, 1999, the load served by the substations in Southampton, Bridgehampton, and East Hampton, and the smaller substations east to Montauk, reached a level that was 25% higher than the 1998 peak for this area, and 18% above the forecast of 141 megavolt-amperes ("MVA"). Data from the LIPA system indicated that the South Fork load level reached on July 5 (which

was actually reduced by some distribution system outages) was essentially at the maximum level sustainable by the 69 kV transmission system that serves the area. Had the load been higher, the transmission system would have experienced a phenomenon known as voltage collapse.

Q. What is voltage collapse?

A. Generally, a voltage collapse is a condition that occurs when the voltage on the transmission system drops below the level necessary to sustain the flow of power which produces blackouts in the entire area supplied by that system. To prevent this phenomenon in this context, automatic load shed systems at the Southampton and East Hampton (Buell) Substations would have been activated, affecting approximately 32% of the over 41,000 customers on the South Fork. The automatic load shedding system was designed to deal with the most severe contingency, a loss of the existing double-circuit transmission line from Riverhead to Southampton. Because of the increase in load, this system would, instead, have been also activated under a normal, all lines in service, situation. It would also have operated for loss of generation or loss of single elements of the transmission system. Load and voltage data for the area east of the Tiana Substation clearly show this situation. Figure D-2 of the Application shows the hourly load level in MVA for a number of the peak days in July 1999, and Figure D-3 of the Application shows the transmission voltage at the Buell Substation. Based on previous computer simulations of transmission load flows and on the voltage data acquired during the 1999 summer, the maximum capability of the existing transmission system to the South Fork, with all lines in service, is 170 MVA. The load level of 167 MVA reached on July 5, 1999 is essentially at that maximum limit. Aside from the July 5 peak, weekend peak loads on the South Fork have regularly exceeded the summer 1999 forecast of 142 MVA, leading LIPA to the

conclusion that the proposed Project for this area needs to be advanced by up to four years. Based on load flow simulations, the current limit for loss of the existing overhead 69kV double-circuit transmission line is 120 MVA. Given the higher occurrence of load levels above this limit, there is a clear need to improve the first contingency supply limit to reduce exposure to outages.

BENEFITS OF THE PROPOSED PROJECT

Q. How does the proposed Project resolve these concerns?

A. As described in the Application, the transmission line, together with other electrical projects on the South Fork that are scheduled for completion in 2000, will improve the normal supply capability to the area of the Tiana Substation to approximately 230 MVA. The limit under the first transmission contingency will improve to approximately 180 MVA. These improvements will provide the capability to serve the growing load east of Riverhead, particularly on the South Fork, where the load is forecast to reach in excess of 160 MVA by the summer of 2000 under normal weather conditions, or up to 180 MVA under the extreme weather conditions experienced in the summer of 1999.

EVALUATION OF ALTERNATIVES

Q. Have you considered alternate routes or methods of construction?

A. Yes. Various alternative routes as well as a combination of overhead and underground construction, were initially considered during the evaluation of transmission alternatives. First, LIPA evaluated the sufficiency of upgrading the existing double-circuit 69kV line on its transmission right-of-way. While feasible from a construction standpoint, this option did not satisfy LIPA's planning requirements which clearly involve the need for a second, independent

electric supply source to the South Fork. An expanded discussion of this issue is contained in Exhibit 13(E-4) to the Application. Second, LIPA's existing transmission right-of-way was evaluated to determine its suitability for construction of an additional overhead circuit at either 138kV or 69kV. The right-of-way was inadequate for this purpose because it was too narrow, except in a limited area, near Riverhead Substation. This portion is owned by LIPA and is wider than the remainder of the ROW between Riverhead and Tiana. The right-of-way is also not conducive to underground construction at various locations because of hilly terrain. Finally, LIPA does not own the entire right-of-way corridor. Certain of the easements would have to be renegotiated to allow the construction of underground facilities. Despite these deficiencies, this option is more fully considered in Alternative 2, described in greater detail below. Use of the Long Island Railroad right-of-way was also evaluated. Parts of LIPA's existing ROW, between the Tiana and Southampton substations, are adjacent to the LIRR right-of-way, on the south side of the track. This alternative was found limited for both overhead and underground construction for much of the route because of natural terrain, track elevation and safety considerations. Despite these deficiencies, this option is also more fully considered in this Application as Alternative 2.

Finally, the Proposed Route was developed by evaluating routes which utilize the edge of County and State road ROWs which generally pose minimum construction difficulty and minimized environmental impacts as well. Indeed, the Proposed Route was selected to avoid disturbing the Pine Barrens' undisturbed areas. As a result, the choice of underground or overhead construction is largely dictated by these considerations, the timing of approval and the construction schedule, given the need to have the line in service as soon as possible.

These considerations led to the development of the three alternatives in this Application.

In addition to the Proposed Route, the following two alternative routes have been identified:

A. Alternative 1: Underground Route

Same as Proposed Route for portion west of Shinnecock Canal;

East of Shinnecock Canal: Route 27 to County Road 39 to Tuckahoe Rd;

Along LIRR ROW to Southampton Substation

B. Alternative 2: Underground/Overhead Hybrid Route

Underground along the right of way of the existing overhead transmission line, which traverses private properties and Sears Bellow Park until Route 27, and continues east along the north side of Route 27 Exit 65;

Overhead across Route 27 and South to the Tiana Substation;

Overhead along the LIRR to the Southampton Substation

Q. Have you considered the construction of new generation as an alternative to the Project?

A. Yes. The South Fork currently relies on 51 MW of combustion turbine and diesel generating units installed at Southampton, East Hampton, Southold, and Montauk. Transmission load flow simulations have shown that the addition of 72 MW of generation at Southampton provides a comparable improvement in normal and contingency power supply capability to a new 69 kV transmission line. Construction of two simple-cycle aeroderivative combustion turbine units with a combined summer peak rating of 72 MW was considered the most likely generation alternative for expedited installation. This Project would not be subject to Public Service Law

Article X review, but would be subject to environmental review under the State Environmental Quality Review Act ("SEQR") regulations and other permitting requirements.

The following considerations led to the decision by LIPA to proceed with the proposed Project:

1. Additional generation would defer, but not eliminate, the need for a new transmission line to adequately address system reliability requirements.

2. The time required for the SEQR environmental review and permit approval process would likely be eighteen months or longer even under an expedited schedule.

3. Accelerated expansion of the gas transmission system of Brooklyn Union of Long Island would also be required to support the generation option.

The timing of LIPA's competitive procurement process, together with requirements for SEQR environmental review and other permitting requirements and the need for expansion of the gas transmission system, could not support summer 2000 operation.

Q. Can Demand Side Management strategies be used as an alternative to the Project?

A. No. An evaluation of the expected impact of LIPA's Clean Energy Program has demonstrated that demand side management ("DSM") efforts clearly would not be able to produce peak load reductions that would make a substantial contribution to the anticipated electric supply deficiency in this region of Long Island. Despite LIPA's existing DSM program, additional strategies were examined to expand the reach of the Clean Energy Programs, as part of LIPA's ongoing initiative to maximize conservation opportunities. An evaluation of the census data indicates that the South Fork has approximately 41,000 residential customers and 10,400 commercial/industrial customers. A targeted marketing campaign will be directed at this region, to promote participation in the Clean Energy Program. Offerings selected are those most likely

to succeed given the current demographics of the region. This will be supplemented with a newly developed targeted peak load reduction program. LIPA has determined that the residential Clean Energy Programs that are likely to be effective in the South Fork are the Residential Lighting and Appliance Programs, HVAC Efficiency Program, Residential Energy Affordability Program ("REAP") and the Rooftop Photovoltaic Program. The commercial programs that can be expected to best succeed in the region are the Commercial New Construction and Renovation Program and the Regional High Efficiency HVAC Program. In addition, a Direct Load Control ("DLC") Program will be developed as described in Exhibit 3 to the Application. These existing and expanded programs are expected to yield peak load reductions of approximately 3 MW– 1 MW from conservation and 2 MW from direct load control. While these reductions will assist in mitigating load growth, they clearly do not meet the load requirements of the South Fork nor eliminate the need for this Project.

Q. Mr. Stoecker, please describe your educational background and business experience.

A. I received a Bachelor of Science in biology and chemistry from Manhattan College, a Master of Science in Marine Biology from Long Island University and a Ph.D. in botany from the University of Hawaii. In 1979, I co-founded EEA Inc., an environmental consulting firm for industry and government. I have worked in the fields of environmental and life sciences for approximately 25 years. In this regard, I have managed numerous ecological siting feasibility studies and performed many technical evaluations on issues such as wetlands, marine ecology, water quality and environmental health.

Q. Would you please summarize your testimony in this proceeding?

A. I have been retained as an environmental consultant to LIPA to assist in the review of the environmental issues associated with the proposed Project. My review consisted of performing through archaeological, land use, ecological and historical studies. With respect to environmental issues associated with the Project, there will be only minor short term impacts due to the construction of the electric transmission line and no impacts from its operation. With respect to construction impacts, since the actual construction activities progress at a relatively rapid rate and will not affect a given area for more than one to several days, noise, traffic, and aesthetic impacts will be minimized. Ecological impacts from construction will be minimized by the type of construction techniques employed. For example, a minimal trench width will be used whenever possible and directional drilling will be used under wetlands. In addition, soil erosion prevention and control methods will be used (e.g., the well drained soils inherently minimize erosion, trench backfilling will be contemporaneous with conduit placement, and erosion controls will be utilized as appropriate). Finally, the route selection is designed to avoid sensitive vegetation and disturbed areas will be reseeded and restored.

There will be no impacts as a result of the operation of the electric transmission line. Since the line is constructed of inert nonleachable materials and does not utilize dielectric fluids, groundwater systems will not be impacted. Maintenance of the line will not involve the use of herbicides and will only require minimal vegetative cutting near manhole installations.

The Project area will traverse the Central Pine Barrens area, dominated by pitch pine and scrub oak forest with some transitioned pitch pine-oak heath woodlands. However, as described below and more completely in Exhibit 4 to the Application, the Project will not have a significant impact on the Pine Barrens. The Proposed Route will follow previously disturbed, existing

public rights-of-way that are non-ecologically sensitive. They are transitional zones (ecotones) and are not integral to the neighboring flora and fauna communities. Moreover, every effort will be made to select areas within these rights-of-way that will cause the least possible ecological impacts, consistent with public safety and need. For example, conceptual agreement has been reached between the Applicant and the NYSDOT to place the electric transmission line largely in the grassy, previously disturbed shoulders of NYS Route 27, which will avoid the treed areas that border Route 27.

Q. What methodologies were employed to determine existing land use conditions for the Proposed Route?

A. The existing land use conditions were determined through examination of aerial photographs and field surveys as well as dialogue with municipal planning departments, all as described in Exhibit 4, Section I.B.1.a to the Application.

Q. What type of land use resources that are adjacent to the Proposed Route were identified?

A. The land use resources include agricultural, residential, commercial, institutional, conservation and recreational properties. The agricultural uses are described in Exhibit 4, Section I.B.1.b.1 to the Application. The residential uses are described in Exhibit 4, Section I.B.1.b.2 to the Application. The commercial uses are described in Exhibit 4, Section I.B.1.b.3 to the Application. The institutional uses are described in Exhibit 4, Section I.B.1.b.4 to the Application. The industrial uses are described in Exhibit 4, Section I.B.1.b.5 to the Application. The conservation uses are described in Exhibit 4, Section I.B.1.b.(6), (7), (8), (9), (10) and (11) to the Application. The recreational uses are described in Exhibit 4, Section I.B.1.b.12 to

the Application.

Q. What methodologies were employed to determine cultural resources along the Proposed Route?

A. The cultural resources were determined through inquiry with historical preservation organizations as described in Exhibit 4, Section I.B.2.a to the Application.

Q. Are there any National Historic Landmarks located within three miles of the Proposed Route?

A. No.

Q. What are the historical and archeological resources along the Proposed Route?

A. The historical resources along the proposed route are discussed in Exhibit 4, Section I.B.2.b.1 to the Application. The archeological resources are discussed in Exhibit 4, Section I.B.2.b.2 to the Application.

Q. What methodologies were employed to determine the existing vegetation along the Proposed Route?

A. The existing vegetation was determined through examination of aerial photographs, field examinations and inquiry with NYSDEC, as further described in Exhibit 4, Section I.B.3.a to the Application.

Q. What types of vegetation were identified by the vegetation survey along the Proposed Route?

A. The Proposed Route is dominated by various combinations of pitch pine and oak. This vegetation along with others identified along the Proposed Route are discussed in Exhibit 4, Section I.B.3.6 to the Application.

Q. What methodologies were employed to determine the existing wildlife along the Proposed Route?

A. A wildlife survey was conducted by literature search and on-site field investigations, as further described in Exhibit 4, Section I.B.4.a to the Application.

Q. What type of wildlife were identified by the wildlife survey along the Proposed Route?

A. Various avian, herpetile, mammalian and insect species were identified by the wildlife survey, all as described in Exhibit 4, Section I.B.4.b to the Application.

Q. What methodologies were used to determine if there are any endangered or threatened species along the Proposed Route?

A. The NYSDEC Natural Heritage Program and U.S. Fish and Wildlife Services were contacted for information regarding endangered or threatened species along the Proposed Route. No rare and endangered species were located during the field vegetation and wildlife surveys on the proposed alternate routes. (See Exhibit 4, Section I.B.5. to the Application)

Q. What types of soils are encountered along the Proposed Route and what methodologies were used to make this determination?

A. A soil survey was conducted by literature search and on site field investigations as described in Exhibit 4, Section I.B.6.a to the Application. In general, the soils encountered along the Proposed Route fall within one of four soil associations, according to the Soil Survey of Suffolk County, as follows:

- Plymouth Carver association, rolling of hilly;
- Plymouth Carver association, nearly level and undulating;

- Montauk, sandy variant - Plymouth association; and
- Bridgehampton - Haven association

Profiles for the above soil associations along with a complete list of soils encountered along the Proposed Route is described in Exhibit 4, Section I.B.6.b to the Application.

Q. Please describe Alternate Route 1.

A. Alternate Route 1 is similar to the Proposed Route. The only difference between Alternate Route 1 and the Proposed Route is the section from the NYSDOT maintenance facility on Route 27 to County Road 39 to Tuckahoe Road to the LIRR ROW. From an environmental perspective, only the land use distinctions required separate discussion, since the other environmental sections are applicable to Alternate Route 1. These and use distinctions are more fully described in Exhibit 4, Section I.C.1 to the Application.

Q. Please describe Alternate Route 2.

A. Alternate Route 2 is discussed in Exhibit 3 to the Application. Briefly, it follows LIPA's existing 69kV double-circuit transmission line across private properties (via easements) to Exit 65 on Sunrise Highway (Route 27). It then transitions to an overhead line to LIPA's Tiana Substation where it joins the LIRR ROW.

Q. What impact, if any, will the Project have on agricultural, residential, commercial, institutional and industrial properties along the Proposed Route?

A. Since the Project will occur in previously disturbed ROWs, agricultural properties will not be impacted by the Proposed Route. The impact on residential properties will be minimal as described in Exhibit 4, Section II, A.1.b to the Application. There is no impact on commercial properties since there are no commercial properties on the Proposed Route. The

impact on institutional properties also will be minimal as described in Exhibit 4, Section II. A.1.d. Industrial properties will not be impacted by the Project.

Q. Please discuss Critical Environmental Areas, the environmental concerns related to such areas and the mitigation measures that will be employed to protect same?

A. The Critical Environmental Areas, the environmental concerns related to such areas, and the mitigation measures that will be employed to protect same are described in Exhibit 4, Section II.A.2 to the Application. As discussed therein, imipacts to these areas will be minimal.

Q. What impact, if any, will the Project have on cultural and historical resources?

A. The impact on cultural and historical resources is described in Exhibit 4, Section II.A.4 to the Application and is expected to be minimal.

Q. What impact, if any, will the Project have on archaeological resources?

A. No impacts have been identified. If archaeological resources are identified, a professional archaeologist will be retained, as further discussed in Exhibit 4, Section II.A.5 to the Application.

Q. What methodologies were employed to determine the impact to vegetation along the Proposed Route?

A. The methodologies are described in detail in Exhibit 4, Section II.A.6.a to the Application.

Q. What impact, if any, will the Project have on vegetation along the Proposed Route?

A. The impact to vegetation along the Proposed Route has been minimized and is described in Exhibit 4, Section II.A.6.b to the Application.

Q. What impacts, if any, will the Project have on wildlife along the Project Route and what methodologies were used to make this determination?

A. The methodologies are described in Exhibit 4, Section II.A.7.b to the Application. The

impact to wildlife also will be minimal and is described in Exhibit 4, Section II.A.7.b to the Application.

Q. What impact, if any, will the Project have on soils along the Proposed Route?

A. The impact to soils along the Proposed Route will be minimal and is described in Exhibit 4, Section II.A.8 to the Application.

Q. What are the differences in impacts caused by the Project between the alternate routes and the Proposed Route?

A. The difference in impacts between the Proposed Route and Alternate Route 1 is described in Exhibit 4, Section II.B to the Application. The difference in impacts between the Proposed Route and Alternate Route 2 is described in Exhibit 4, Section II.C to the Application. Specifically, Alternate Route 2 has certain ecological drawbacks and greater impacts as compared to the Proposed Route since it traverses less disturbed and more mature portions of the Pine Barrens.

From an ecological perspective, widening corridors through mature forested areas such as the Pine Barrens is not desirable. In the Proposed Route, some clearing will be necessary, but this is nominally in the disturbed areas alongside Route 27. Alternate Route 2 would require clearing of areas in the central Pine Barrens, a much greater impact than the transitional areas along Route 27. In addition, this now wider corridor would contribute to fragmentation of the Pine Barrens ecosystems and, possibly, facilitate human and vehicular intrusion and corresponding wildlife disturbance.

Substantial evidence exists supporting the argument that large tracts of forests support greater habitat for wildlife and vegetation than fragmented forests. Alternate Route 2 would

require further fragmentation of an ecosystem which is already fragile. One of the great attributes of the central Pine Barrens is its continuous forest habitat, which is rare on Long Island. Though there are benefits to edge habitats for an increase in the number and diversity of wildlife and vegetation, an edge habitat already exists on both sides of Alternate Route 2, and extending the width between these two edge habitats would not serve an equal ecological benefit as would leaving the existing interior forest undisturbed.

For all of the foregoing reasons, the proposed Project provides the minimum adverse environmental impact, consistent with public safety and need.

Q. Does this conclude the Panel's direct testimony in this proceeding?

A. Yes, it does.

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