

A. INTRODUCTION

This chapter considers the effects of the proposed transmission line on groundwater, geology, and surface waters. This chapter also describes the existing character of the Direct Route Alternative in terms of the subsurface hydrogeology. In addition, groundwater characteristics are described. An assessment of the Direct Route Alternative's impacts on these resources is also provided.

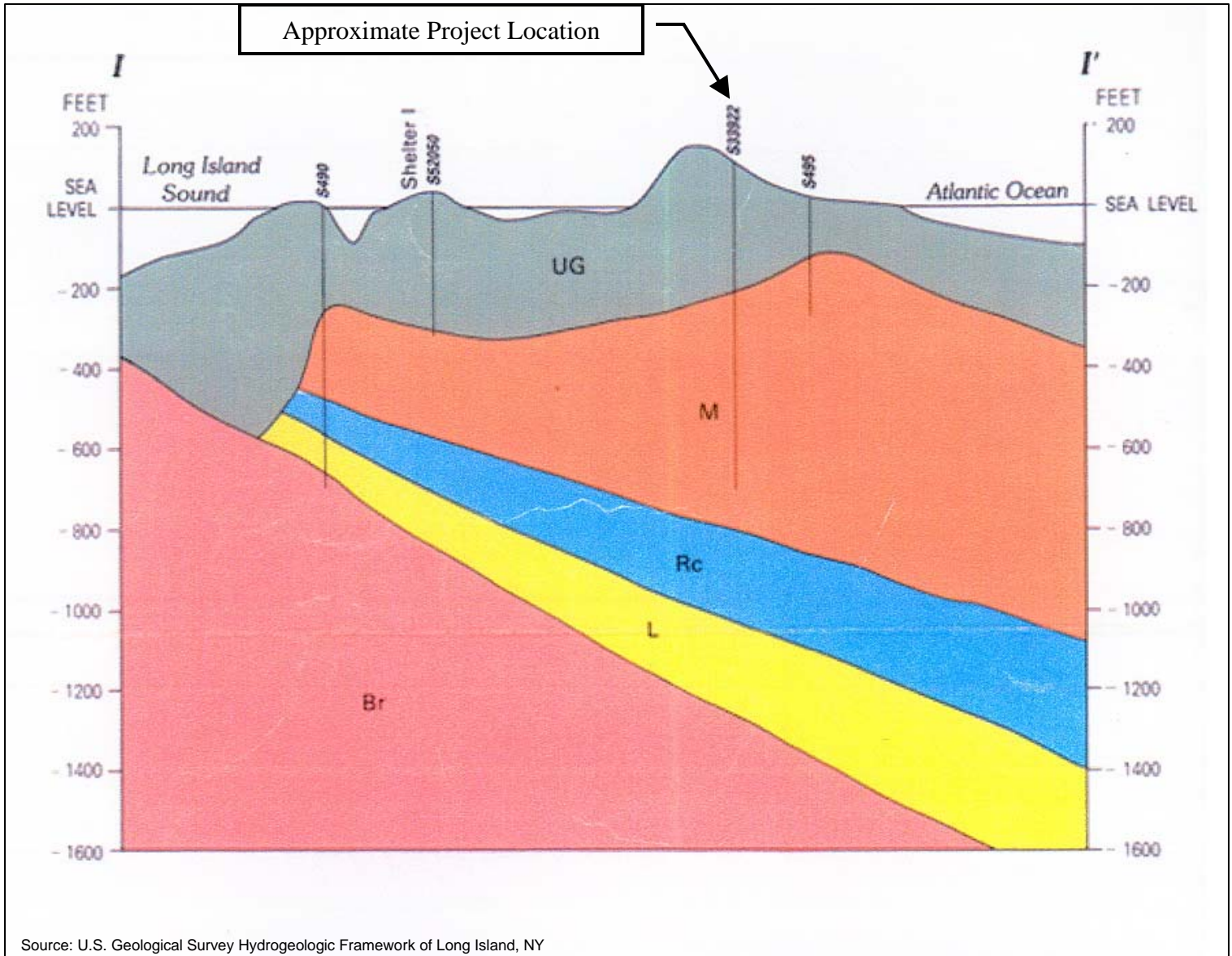
The Direct Route Alternative also examines the Village underground option. This option is not the reasonable worst case when considering potential groundwater and surface water impacts.

B. EXISTING CONDITIONS**REGIONAL GEOLOGIC CONDITIONS**

Most of Long Island's geology is defined by two terminal moraines—low, hill-like formations that are remnants of the advances of the glaciers during the last ice age (the Pleistocene epoch). The two morainal ridges—the Harbor Hill Moraine and Ronkonkoma Moraine—run the length of Long Island and diverge to the east to form the North Fork and South Fork. The moraines are made of poorly sorted glacial till deposited at the glacial terminus. South of the moraines are outwash plain deposits of sands and gravel. The Direct Route Alternative predominately lies on the outwash plains while the north easternmost portion of the route lies on the Ronkonkoma Moraine, which generally runs through the central portion of Suffolk County and the northern portion of the Town of Southampton.

Long Island is composed of many layers of sand, clay, and gravel, with southeasterly sloping bedrock below. These layers of subsurface geologic deposits are important in defining the groundwater aquifers that underlie Long Island. The interrelationships of the various geologic deposits dictate how the aquifer is recharged by rainfall, and also determine how activities on the land surface might affect the quantity and quality of the groundwater. As shown schematically in Figure 12-1, the geologic composition of most of Long Island consists of three distinct formations that lie atop bedrock (Smolensky et al. 1989).¹ The thickness of these unconsolidated glacial and deltaic deposits ranges from a few hundred feet in the northwestern sections of Nassau County to more than 2,000 feet along Suffolk's south shore barrier beaches. Beginning at the surface and extending down to bedrock, these formations include:

¹ D.A. Smolensky, H.T. Buxton, and P.K. Shernoff. 1989. *Hydrogeologic Framework of Long Island, New York*. Maps prepared in cooperation with the New York City Department of Environmental Protection, Nassau County Department of Public Works, and Suffolk County Water Authority and Department of Health.



Long Island Power Authority
 Southampton to Bridgehampton Transmission Line

**Direct Route Alternative
 Geologic Cross-Section
 Figure 12-1**

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- Upper Glacial Aquifer (Upper Pleistocene)—The Glacial Aquifer is the youngest of the formations and the closest to the surface. It was created 15,000 years ago from glacial deposits of sand and gravel from the retreating glaciers. Along the Direct Route, these deposits extend from ground level to about 200 feet down below the surface to the top of the Magothy Formation.
- Magothy Aquifer—Just below the Upper Pleistocene, the Magothy Formation was formed in the Cretaceous Age (70 to 140 million years ago). This formation consists of fluvial and deltaic deposits and is composed mainly of mixed layers of sand, silt, and clay. The Magothy contains some discontinuous clay layers (“lenses”). Gravel is also present, but limited primarily to the lower strata of the formation. Minerals (e.g., muscovite and pyrite) distinguish this formation from the upper glacial deposits, as does lignite, which is a signature feature of the Magothy. This formation is approximately 675 feet thick below the Direct Route. The Magothy Aquifer is the primary drinking water source for most of Long Island.
- Raritan Formation and the Lloyd Aquifer—Beneath the Magothy is a layer of clay, which comprises the upper strata of the Raritan Formation. This formation is about 225 feet thick in the vicinity of the Direct Route. Below this clay layer is the Lloyd Aquifer. The Lloyd is approximately 250 feet thick beneath the area of the Direct Route. It consists primarily of fine- to coarse-grained sand and gravel, intermixed with clay. The Raritan Formation’s confining unit of clay is quite thick and restricts the water flow between the Lloyd Aquifer and the Magothy Aquifer.
- Bedrock—Bedrock dates from the Precambrian and Paleozoic eras (more than 500 million years old). It begins about 1,250 feet below the Direct Route Alternative and is composed of impermeable schist and gneiss.

SOILS

The soil types found along the Direct Route Alternative were mapped based on New York State’s Geographic Information System Clearinghouse database and the Soil Survey of Suffolk County, New York (United States Department of Agriculture [USDA] Soil Conservation Service, April 1975). The soils along the Direct Route Alternative are listed in Table 12-1. Soil types are characterized by their composition (i.e., sands, clays, etc.), slope, erodability, permeability, and typical depth to groundwater. Based on this characterization, the soil survey provides a three-part measure of constraints on development divided into slight, moderate, or severe for different potential site uses (paved surfaces, home construction, septic disposal). Moderate and severe limitations do not in themselves create significant adverse environmental impacts but reflect the likelihood of additional site preparation and site engineering, ongoing maintenance requirements, and costs necessary to utilize the land for an intended purpose.

The most prevalent soil type found along the route is Bridgehampton silt loam (BgA) with slopes ranging from 0 to 2 percent. This soil class comprises almost 50 percent of the route and is generally found in the southern and central portions of the route. Other dominant soil classes include Haven loam (HaA and HaB) with slopes ranging from 0 to 6 percent; Plymouth loamy sand (PIA) with slopes ranging from 0 to 3 percent; and Bridgehampton silt loam (BgB) with slopes ranging from 2 to 6 percent. These soils are generally found throughout the route, with the exception of HaA and HaB soils, which are featured solely west of Mitchells Lane.

Table 12-1
Soils Along the Direct Route Alternative

Soil Class	Soil Description
BgA	Bridgehampton silt loam, 0-2 percent slopes
BgB	Bridgehampton silt loam, 2-6 percent slopes
Bm	Bridgehampton silt loam, graded
CpA	Carver and Plymouth sands, 0-3 percent slopes
CpC	Carver and Plymouth sands, 3-15 percent slopes
CpE	Carver and Plymouth sands, 15-35 percent slopes
CuB	Cut and fill land, gently sloping
HaA	Haven loam, 0-2 percent slopes
HaB	Haven loam, 2-6 percent slopes
He	Haven loam, thick surface layer
PIA	Plymouth loamy sand, 0-3 percent slopes
PIB	Plymouth loamy sand, 3-8 percent slopes
PIC	Plymouth loamy sand, 8-15 percent slopes
RdA	Riverhead sandy loam, 0-3 percent slopes
RdB	Riverhead sandy loam, 3-8 percent slopes
We	Wareham loamy sand
Sources: Soil Survey of Suffolk County, New York, USDA Soil Conservation Service, April 1975	

According to the USDA Natural Resources Conservation Service, the BgA, BgB, HaA, HaB, Haven loam (He), Riverhead sandy loam (RdA and RdB) soils are identified as prime agricultural soils and therefore are largely located in those portions of the route that are farmed. Prime farmland soils are identified by the USDA as “land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and that is available for these uses.”

Since the Bridgehampton Substation parcel is located in the eastern portion of the study area, the dominant soil type at the site is Carver and Plymouth sands (CpC) with slopes ranging from 3 to 15 percent. This soil class comprises about 62 percent of the site. Table 12-2 provides a breakdown of soil types at the Bridgehampton Substation site. Plymouth loamy sand (PIB) with slopes ranging from 3 to 8 percent is the next dominant soil, representing 23 percent of the site.

Table 12-2
Bridgehampton Substation Soils

Soil Class	Soil Description	Acres	Percent of Total
CpC	Carver and Plymouth sands, 3-15 percent slope	4.9	61.7
CuB	Cut and fill land, gently sloping	1.2	14.7
PIA	Plymouth loamy sand, 0-3 percent slope	0.03	0.3
PIB	Plymouth loamy sand, 3-8 percent slope	1.9	23.3
TOTAL		8	100
Sources: Soil Survey of Suffolk County, New York, USDA Soil Conservation Service, April 1975			

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The general soil properties associated with each dominant soil mapping unit described above, as presented in the Soil Survey of Suffolk County, are as follows:

- **Bridehampton Series**—deep, well drained to moderately well drained, medium-textured soils that formed in thick silty deposits over coarse sand and gravel. Slopes range from 0 to 12 percent but are generally level to gently sloping and are mainly on flat outwash plains. Permeability is moderate in the silt loam layers and very rapid in the sandy substratum.
- **Carver Series**—deep excessively drained, coarse textured soils generally present on rolling moraines and broad outwash plains. Slopes range from 0 to 35 percent. Permeability is rapid throughout the zones of this series.
- **Cut and Fill Land**—areas that have been altered in grading operations for housing developments, shopping centers, and similar non-farm uses. During the initial phase of grading which consists of cuts and fills for streets or parking lot, excess soil material is stockpiled for final grading and topdressing around houses or other buildings. Areas of Cut and fill land contain deep cuts in or near the sandy substratum of the soil or sandy fills of 28 inches or more. Generally, cuts are so deep or fills so thick that identification of soils by series is not possible.
- **Haven Series**—deep, well-drained, medium-textured soils that formed in a loamy or silty mantle over stratified coarse sand and gravel. Slopes range from 0 to 12 percent but generally range from 1 to 6 percent. Permeability is moderate in the surface layer and subsoil and rapid or very rapid in the substratum.
- **Plymouth Series**—deep excessively drained, coarse-textured soils that formed in a mantle of loamy sand or sand over thick layers of stratified coarse sand and gravel. Slopes range from 0 to 15 percent. These soils are primarily found on broad, gently sloping to level outwash plains and on undulation to steep moraines. Permeability is rapid in these soils except in those of the silty substratum phase where permeability is moderate.
- **Riverhead Series**—deep, well-drained, moderately coarse textured soils that formed in a mantle of sandy loam or fine sandy loam over thick layers of coarse sand and gravel. Generally nearly level to gently sloping, these soils range from nearly level to steep slopes. Permeability is moderately rapid in the surface layer and in the subsoil and very rapid in the substratum.
- **Wareham Series**—deep, somewhat poorly drained, coarse-textured soils with slopes less than 3 percent that formed in a mantle of loamy sand or sand over sand or sand and gravel. These soils are generally found around tidal marshes and creeks of the south shore or in low lying areas adjacent to ponds, rivers, or marshes. Permeability is rapid.

The Soil Survey of Suffolk County provides generalized soil suitability ratings for potential uses on sites. Provided below is a summary of the general limitations associated with soils found along the route based on soil suitability. The key rating measures applied to the soils analysis are:

- **Slight**—the soil is generally well-suited to the intended use, or the degree of soil limitation is minor and can easily be overcome. Good performance and low maintenance can be expected.
- **Moderate**—the soil is moderately suited for the intended use, or the degree of soil limitation can be overcome/modified by special planning, design, or maintenance. The performance of these soils for the listed use is less desirable than soils ranked as having a “slight” limitation for the same use. The problems associated with use of these soils may be intermittent or

seasonal in nature. Some soils may require additional treatment such as artificial drainage, runoff control to reduce erosion, over-excavation, extended sanitary lines, or special manipulation or modification. Modifications may include soil admixture, special foundations, extra reinforcement for structures, and sump pumps.

- Severe—this rating indicates that the soils have one or more properties which are considered unfavorable for the intended use, such as steep slopes, flooding hazards, a high shrink-swell potential, seasonal high water table, or low bearing strength. This degree of limitation generally requires major soil reclamation, special design, or intensive maintenance. Some of these limitations may be overcome, but the degree of alteration may be cost-prohibitive.

GROUNDWATER CONDITIONS

OVERVIEW

In 1978, the aquifers of Long Island were designated by the U.S. Environmental Protection Agency (EPA) as a sole source aquifer (Federal Register, 43, June 21, 1978), with the finding that the system is the “principal source of drinking water” to the people of Long Island and “if contaminated, would create a significant hazard to public health.” As a result, federally funded projects on Long Island must be reviewed by the EPA to ensure that they do not adversely affect groundwater. This designation is made pursuant to the Safe Drinking Water Act, Section 14-24(e).

The three main aquifers supply both Nassau and Suffolk Counties with potable water. The Upper Glacial Aquifer is used widely for water supply in areas of central and eastern Suffolk County. Because the Upper Glacial Aquifer in Nassau County is generally of degraded quality due to past sanitary and industrial waste disposal practices, the majority of Nassau County obtains its water supply from the deeper Magothy Aquifer. While the Magothy Aquifer also supplies the majority of Suffolk County with potable water, the Lloyd Aquifer supplies water to the south shore barrier beach communities. Most private wells in the County obtain water from the Upper Glacial Aquifer. The Suffolk County Water Authority (SCWA), the primary purveyor of water to the County and the study area presently maintains 227 wells in the Upper Glacial Aquifer, 344 wells in the Magothy Aquifer, and 4 wells in the Lloyd Aquifer.¹ The project area also comprises private wells that are not connected to the public system.

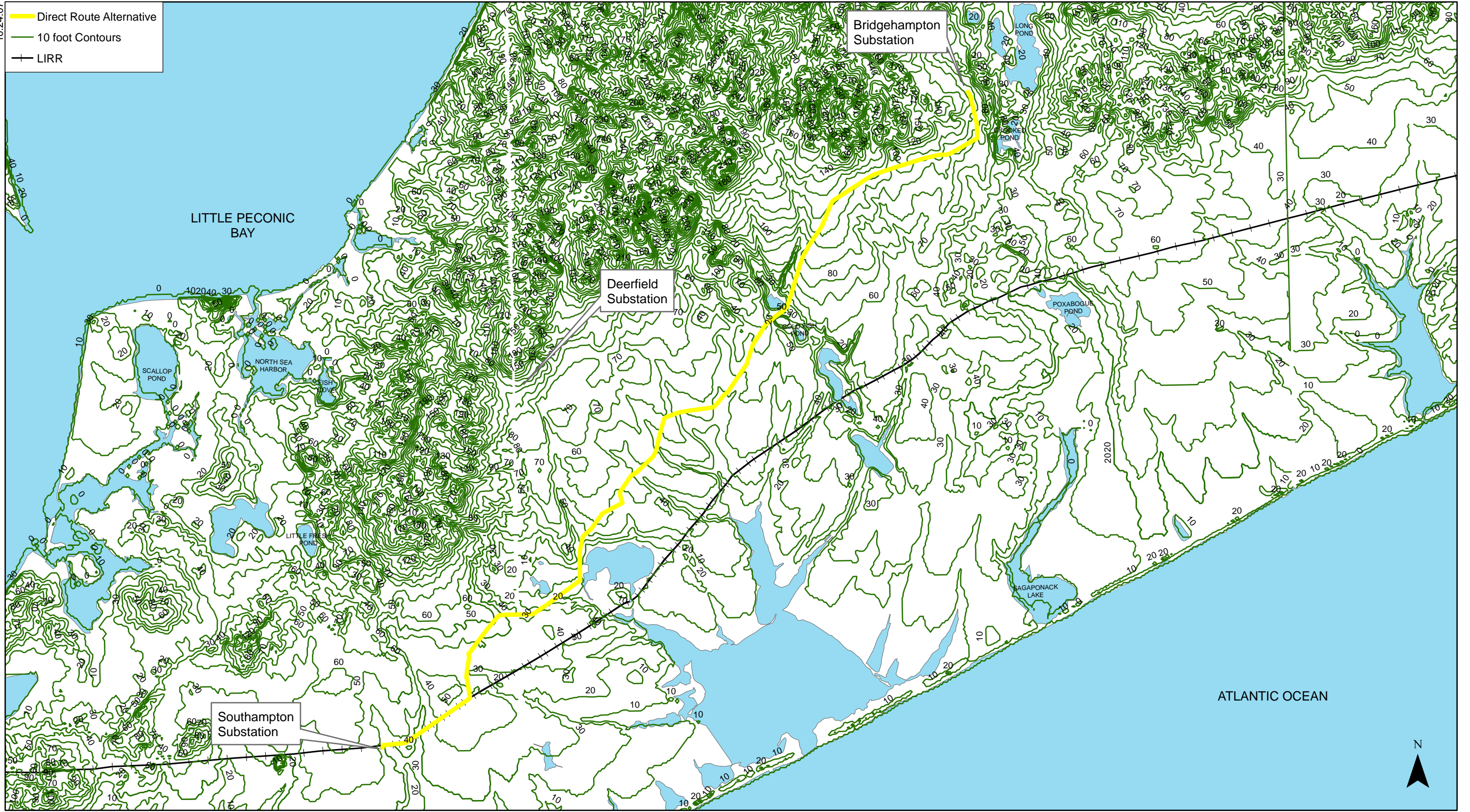
DEPTH TO GROUNDWATER

Depth to groundwater is generally equivalent to sea level at the north and south shorelines of Long Island and, following the topography, rises in elevation towards the center of the island. These ground level elevation changes form a parabola in the groundwater levels. The depth to groundwater on the island ranges from a few feet along the shorelines and stream/lake margins to more than 200 feet in the center of the island, depending on the surface topography. The high point of the parabola is referred to as the groundwater divide that creates a hydraulic gradient causing groundwater to flow to the north (into Long Island Sound), or to the south (into the Atlantic Ocean). The Direct Route Alternative is located south of the divide. Topography along most of the route, west of Mitchell Lane, ranges from 10 feet above mean sea level (MSL) to 50 feet above MSL, see Figure 12-2. The eastern portion of the route, east of Mitchell Lane, ranges from 60 feet above MSL to 120 feet above MSL. Topography within the Bridgehampton

¹ 2007 Annual Drinking Water Quality Report, Suffolk County Water Authority

10.24.07

- Direct Route Alternative
- 10 foot Contours
- LIRR



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Substation lot ranges from 110 feet above MSL at the southern boundary and decreases to 90 feet above MSL towards the northern portion of the site. According to the SCWA, the water table is at an elevation between 8 and 20 feet above MSL along the Direct Route Alternative. The western end of the route has a lower water table (i.e., 8 feet above MSL) while the eastern edge has a slightly higher water table (20 feet above MSL). Therefore, the approximate depth to groundwater ranges from 2 to 100 feet above MSL.

Average rainfall on Long Island is approximately 44 inches per year, roughly half of which goes to evaporation or evapotranspiration. The remaining 22 inches recharge the aquifers, primarily during the months of October through April.

GROUNDWATER QUALITY

According to SCWA's 2007 Annual Drinking Water Quality Report, SCWA tests for 258 chemical constituents in local wells. Testing is performed at the wellhead, at various stages of treatment and within the distribution system for a wide range of parameters, including bacteria, inorganic chemicals such as nitrate, chloride, and lead, volatile organic compounds, pesticides, and herbicides. Approximately 17 percent of SCWA wells receive additional treatment using granular activated carbon filtration. Air strippers, ion exchange, reverse osmosis, iron and manganese removal filters are also used as needed.¹ Local water is naturally well-purified and is of high quality. Local well water is characteristically acidic and requires some chemical "buffering" to prevent damage to piping. Also, certain wells have higher naturally occurring iron levels that require the addition of polyphosphates. Overall, the water is of high quality and is subject to testing to ensure that it satisfies all local, County, State, and federal guidelines and standards for potable water. According to the water quality report, the study area is served by Distribution Areas 23 and 34. However, 48 percent of the total water provided to Distribution Area 34 comes from Distribution Area 23. Based on 2006 testing, the only constituent that exceeded water quality standards in Distribution Area 23 is iron, with a high value of 886 ug/l and an average value of 118 ug/l. The standard is 300 ug/l. Iron does not pose a human health hazard but can cause an aesthetic problem. In areas where high concentrations of iron naturally occur in the groundwater, SCWA adds sequestering agents such as polyphosphates to control the iron and keep it in solution. SCWA also utilizes specialized iron removal filters and implementing strategies such as locating new sources of low iron water, and systematic flushing of water mains. There were no water quality standard exceedances within Distribution Area 34.

GROUNDWATER PROTECTION AND PROGRAMS

Safe Drinking Water Act (SDWA)

The Safe Drinking Water Act of 1974 (SDWA) authorized EPA to regulate public water systems to protect the public's health. The EPA set standards for chemicals that might be found in water that could potentially have adverse effects. EPA has 25 drinking water standards, 10 of which are for synthetic organics. These drinking water protection measures are also written into the state and county regulations (see the discussion below).

¹ 2007 Annual Drinking Water Quality Report, Suffolk County Water Authority

Special Groundwater Protection Areas

Article 55 of the State's Environmental Conservation Law (known as the Sole Source Aquifer Protection Act) established the Special Groundwater Protection Planning Project on Long Island. Prepared under the direction of the Long Island Regional Planning Board and released in 1992, the Long Island Comprehensive Special Groundwater Protection Area Plan identifies nine special groundwater protection areas (SGPA) in the Nassau and Suffolk County regions. The SGPAs are watershed recharge areas important for the maintenance of large volumes of high quality groundwater. SGPAs are usually located in largely undeveloped or sparsely developed areas of Long Island that provide recharge to portions of the deep flow aquifer system. The existing water supply policy is to ensure the future quantity and quality of groundwater recharge by controlling development and pumpage in these SGPAs. All SGPAs are designated Critical Environmental Areas under the State Environmental Quality Review Act, which are areas of exceptional or unique natural settings that have an inherent ecological, geological, or hydrological sensitivity. The South Fork SGPA covers the area where the new transmission line is proposed (see Figure 12-3).

The plan makes the following recommendations relative to the South Fork SGPA:

- Suffolk County, the Towns of Southampton and East Hampton should continue to purchase farmland development rights in order to consolidate and expand the farm preservation area. The towns should also use clustering and transfer of development rights as appropriate to add to the area. To the extent feasible, road frontage should remain in agricultural use.
- Suffolk County should continue to support the Cornell Cooperative Extension Service efforts to introduce and to secure the adoption of best management practices for agriculture.
- The County and the Towns of Southampton and East Hampton should continue to acquire and preserve woodland and other non-farm parcels in accordance with the town greenbelt plans. The towns should also utilize mandatory clustering and, where appropriate, transfer of development rights (TDR) to supplement their purchases.
- The Town of Southampton should acquire and replot all or as much as possible of the old filed map subdivisions to prevent unsewered development at densities that are incompatible with groundwater protection.
- The Towns of Southampton and East Hampton should rezone areas not already zoned for residential use at 5 acres per dwelling unit to require a minimum lot size of five acres. In addition, provision should be made for the transfer of development rights to sites outside the SGPA at the rate of one unit for every 2 acres.
- The two towns should limit commercial and industrial uses to those few areas already committed to them.

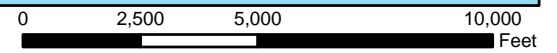
New York State Department of Health Source Water Assessment Program

A mission of the New York State Department of Health (NYSDOH) is to protect and promote the health of the citizens of New York State. Within the NYSDOH, the Bureau of Public Water Supply Protection (BPWSP) has the primary responsibility of administering the Public Water System Supervision program (PWSS) and for assuring that safe, potable water, in adequate quantities, is provided throughout the state. This is accomplished through:

- Oversight of local water supply regulatory programs;
- Training and certification of water supply operators;

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— Direct Route Alternative
 South Fork SGPA
 LIRR



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- Maintenance of a statewide database on individual public water systems;
- Development and initiation of enforcement policies;
- Plan review;
- Maintenance of a water quality surveillance program; and
- Providing technical assistance to both regulatory units and water suppliers.

The regulatory agency that oversees New York's PWSS is the EPA. The primary federal legislation governing public drinking water systems is the SDWA, including 1986 and 1996 amendments.

The 1996 amendment of the SDWA places a strong emphasis on the protection of surface and groundwater sources used for public drinking water. As a result of these amendments, States must develop a Source Water Assessment Program (SWAP) and complete assessments of the sources of drinking water used by public water systems. Each source water assessment must include:

- A delineation of the source water assessment areas;
- An inventory of potential significant contaminant sources within the source water assessment area; and
- An evaluation of the source water's susceptibility to contamination.

The SWAP for Long Island was completed by NYSDOH and the Suffolk County Department of Health Services (SCDHS) in 2003. Results of the 2003 assessment showed that 60 percent of drinking water supply wells in Suffolk County have a low susceptibility to contamination by microbials, including protozoa, enteric bacteria, and enteric viruses while 20 percent of the wells have a medium to high susceptibility. Specifically, shallow wells are more vulnerable to the presence of microbial sources in unsewered areas that have relatively short travel times from the water table to the well, particularly in central and eastern parts of the County. In addition, more than 70 percent of the public wells in Suffolk County rated medium to high for nitrate susceptibility. The high susceptibility rating is likely due to the slow degradation of nitrates in groundwater. About 10 percent of Suffolk County wells were rated as medium to high for susceptibility to pesticides and almost 70 percent of wells in the County were also rated medium to high for volatile organic compounds (VOCs).

Groundwater and Surface Water Discharge Permits

In 1987, the Clean Water Act (CWA) was amended to specifically identify the types of storm water discharges requiring permit authorization and to establish deadlines for their achievement. New York State administers the State Pollutant Discharge Elimination System (SPDES) program which serves as the authorizing mechanism for activities in the State to comply with the National Pollution Discharge Elimination System (NPDES) program enacted pursuant to the CWA.

Whenever there are discharges to State waters, authorization is required through a SPDES permit from the New York State Department of Environmental Conservation (NYSDEC). A SPDES permit also satisfies the federal NPDES process, since NYSDEC has an approved NPDES program which is administered in lieu of the EPA issuing NPDES permits in New York State.

Local Regulations and Programs

As a stated public authority serving an essential governmental function, LIPA is not required to obtain local (including county) approvals. However, LIPA will cooperate with local authorities where practicable and to the extent that electric operations are not inhibited.

Potential applicable local laws pertaining to ground and surface water quality are discussed below.

Long Island Comprehensive Waste Treatment Plan (208 Study). The *Long Island Comprehensive Waste Treatment Management Plan* (208 Study) issued in 1978 by the Long Island Regional Planning Board (LIRPB) identified eight Hydrogeologic Zones in Nassau and Suffolk Counties with the objective of protecting groundwater quality. These eight zones were differentiated based on differences in underlying groundwater flow patterns and groundwater quality. Zones I through III and V occupy geographic areas that are primarily characterized by a deep flow system (or large vertical component of groundwater flow recharging the aquifer). The remaining four zones are characterized by a larger horizontal component of groundwater flow, which contributes to shallow recharge or transmits flows to surface waters.

The Direct Route Alternative is located in Hydrogeologic Zone V, which extends over the central portion of the South Fork.

Suffolk County Water Pollution Control. The purpose of Article 7 of the Suffolk County Sanitary Code is to safeguard all the water resources of Suffolk County, especially in deep recharge areas and water supply sensitive areas, from discharges of sewage, industrial and other wastes, toxic or hazardous materials, and storm water runoff by preventing and controlling such sources in existence when the article was enacted, and also by preventing further pollution from new sources under a program which is consistent with maintaining and protecting water resources. This article regulates the discharge of sewage, industrial wastes, toxic or hazardous materials, or other wastes to surface or groundwater. These discharges are prohibited in deep recharge or water supply sensitive areas. It also regulates the storage of toxic or hazardous materials.

Suffolk County Toxic and Hazardous Materials Handling. Article 12 of the Suffolk County Sanitary Code regulates the storage of hazardous materials/wastes and petroleum products with requirements for spill cleanup. This article provides design details for underground storage tanks and outdoor aboveground storage tanks. The law exempts from regulation underground storage tanks with a capacity of less than 1,100 gallons.

SURFACE WATERS

There are several surface water bodies in the vicinity of the proposed new transmission line and Bridgehampton Substation. These include Mill Pond, Shorts Pond, Gold Fish Pond, and Crooked Pond. As discussed in detail in Chapter 9, "Natural Resources," the soils on the sites are highly permeable and storm water percolates naturally into the ground in areas where there are no impervious surfaces. The developed portion of the existing substation presently utilizes a layer of permeable gravel to control runoff and to allow precipitation to percolate into the ground.

PROTECTION PROGRAMS

Freshwater Wetlands

New York's freshwater wetlands are protected pursuant to Article 24 of the New York State Environmental Conservation Law (the Freshwater Wetlands Act). The Act directs the NYSDEC

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to regulate land use in and around certain freshwater wetlands with a protective buffer area extending 100 feet upland of the wetland boundary. In general, to be protected under the Freshwater Wetlands Act, a wetland must be 12.4 acres or larger. Smaller wetlands may be protected by the Commissioner if they are deemed to have unusual local importance as defined by the NYSDEC. The Act requires NYSDEC to map all protected wetlands so as to identify those wetlands that meet the criteria set for in the law, and to provide a mechanism by which affected property owners can be notified that a particular wetland in their area is protected. Examples of activities within freshwater wetlands or regulated adjacent areas that require a freshwater wetlands permit include: construction of buildings, roadways, septic systems, bulkheads, dikes or dams; placement of fill, excavation, or grading; modification, expansion, or extensive restoration of existing structures; drainage; and application of pesticides. The Town of Southampton also regulates activities in and near freshwater wetlands through Chapter 325 of the Town code. In establishing Chapter 325, the Town Board created a policy to achieve no net loss of existing wetlands and to restore and create wetlands where appropriate. The Town Code lists activities that require a permit in wetland areas or within 200 feet of a wetland boundary. Permits are sought from the Conservation Board or Planning Board (the approving authority depends on type of application). Permits may also be issued by the Town's Chief Environmental Analyst for certain kinds of activities, i.e., administrative wetlands permits.

The Direct Route Alternative would construct new poles within NYSDEC regulated adjacent areas. If the proposed line were constructed underground, construction would also occur within NYSDEC regulated adjacent areas. See Chapter 9, "Natural Resources," for additional information on wetlands within the study area. KeySpan has a General Wetlands Permit that regulates certain utility activities, including the installation of transmission and distribution poles within the adjacent area and within the wetland itself. The purpose of the restrictions in the General Wetlands Permit is to prevent degradation of the wetlands. This General Wetlands Permit would apply to the pole replacement work that would occur within the regulated adjacent. In addition, there are wetland areas located within the Bridgehampton Substation parcel. However, these wetlands would not be affected by the Direct Route Alternative.

The federal government, through the Army Corp of Engineers, regulates activities in freshwater certain regulated wetlands; specifically the dredging, construction, and/or placement of any dredged or fill material in any fresh or marine waters of the United States; or any work affecting the course, location, condition, or capacity of such areas. These wetland activities are regulated in accordance with Title 33 of the Code of Federal Regulations, Parts 320-330, which are implemented pursuant to Section 404 of the 1977 CWA amendments. Under the regulations of the nationwide permitting program, the review of permits for federally regulated wetlands generally addresses projects that impact headwater (freshwater) wetlands of 1 acre or more. U.S. Fish and Wildlife Service, the EPA Marine Wetlands Protection Branch, and the National Oceanic and Atmospheric Administration's National Marine Fisheries Service, by interagency agreement, are each active in the review of applications for federal wetlands permits. There are no regulated setbacks under the federal program. The Direct Route Alternative would not have a significant adverse impact on federally regulated wetlands.

New York State Department of State Coastal Zone Management Program

The State of New York has a Coastal Zone Management Program that is administered through the New York State Department of State. This program provides a state level of review and oversight for projects and actions that are proposed within the States coastal zone, which

includes a portion of the study area. When activities are proposed in the State's coastal zone that require federal or State discretionary permits or approvals, a coastal zone consistency analysis must be performed. There are 44 State policies that are reviewed as part of this process. The Direct Route Alternative is consistent with those policies. See Chapter 5, "Coastal Zone Management," for the coastal zone consistency analysis.

C. POTENTIAL IMPACTS OF THE PROPOSED PROJECT

SOILS AND GEOLOGY

The proposed Direct Route Alternative transmission line would not alter the grade of the affected land surface while the expanded Bridgehampton Substation site would require regrading. On-site soils would be used to regrade the area for the expanded substation. Only topsoil and unsuitable material, which can not be used for site grading, would be removed from the site. It is expected that about 12,000 cubic yards of material would be removed from the site. Typical regrading would occur in the upper 2 feet of soil and thus, would not substantially change the characteristics or functions of the upper Glacial Aquifer, which is the shallowest of Long Island's three geologic formations. The overall topography at the substation would remain similar to existing conditions. Therefore, the Direct Route Alternative would not significantly impact the local geology. During and after construction, erosion and sediment control measures would be implemented to stabilize exposed soil and to provide a final cover of vegetation on post-construction slopes. See Chapter 15, "Construction," for erosion control measures proposed as part of the construction of the new transmission line and substation.

As noted above, the Soil Survey of Suffolk County provides generalized soil suitability ratings for potential uses on sites. It is important to note that within the Direct Route Alternative, much of the upper portions of the natural soil profile and structure have likely been altered through human activities since the soil survey was conducted in 1975 and the suitability ratings, while descriptive, may no longer be fully applicable. It is not expected that soil suitability limitations would impact the siting of the new transmission line and substation expansion because there are already existing distribution lines along this route and an existing substation on the same lot where the substation expansion is proposed. The construction activities necessary to build the transmission line and substation expansion are described in detail in Chapter 15, "Construction", and the following summarizes the general limitations associated with site development based on soil suitability.

Relative to the Direct Route Alternative transmission line, most of the dominant soil classes along the route have slight limitations when considering the construction of pipelines, paths and trails, streets and parking lots and home sites. However, HaA, HaB, and PIA have moderate limitations for the construction of a pipeline due to stability of the soils when trenching down to 6 feet. Limitations are less restrictive for shallower ditches. As detailed in Chapter 15, "Construction," the trench for the underground portion of the project would be between 4 and 5 feet deep. Moderate and severe soil limitations do not in themselves create significant adverse environmental impacts but may require additional site preparation and engineering and cause a need for increased maintenance requirements. It is expected that good engineering practices, Best Management Practices, and erosion control measures instituted as part of the installation of the underground portion of the line would overcome any soil suitability limitation and not pose a significant adverse impact. The soils along the route generally do not have limitations with regard to slope as identified in the soil survey. It is not expected that the proposed line, whether overhead or underground, would have a significant adverse impact on soils since the soils

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present are compatible with the construction of pipelines, paths and trails, streets and parking lots, and home sites and good engineering practices would overcome soil suitability limitations.

Relative to the substation expansion, the dominant soils on the substation property, CpC and PIB, have slight to moderate limitations when constructing homesites and moderate to severe limitations with regard to construction of roads and parking lots. These limitations are associated with slopes. As stated, grading within the top 2 feet of the soil would be required for the construction of the new substation. During grading, erosion control measures and Best Management Practices would be in-place in conformance with local, County, and State regulations to avoid adverse impacts. Although a large portion of the site would be cleared, based on the on-site soils and their suitability for development and site engineering and design, it is anticipated that the new substation would not have any significant adverse impacts on soils.

GROUNDWATER AND SURFACE WATER

As part of the Direct Route Alternative, poles would be drilled about 8 to 10 feet deep. This depth has been found to be stable, even if some of the underground portion of the pole is in the water table. If groundwater is encountered, dewatering would be implemented and testing would be performed in those areas in which contaminated soil and/or groundwater is suspected to ensure compliance with proper regulatory discharge requirements. If necessary, pre-treatment would be conducted prior to the water discharge, as required by regulatory permits and approvals. However, in most instances, the poles would not reach the water table. It is not expected that the installation of the transmission poles would cause the degradation of groundwater because the poles would not contain hazardous materials that would pose a threat to the aquifer.

Land development can affect both the quantity and quality of storm water runoff. There would be no addition to impervious coverage due to the construction of the proposed transmission line. However, the expanded substation would increase the existing impervious coverage (4,100 square feet) by about 23,000 square feet. The quantity of storm water infiltration would be maintained and recharged on-site, consistent with Suffolk County and State regulations. Recharge from the new substation would be provided through a layer of permeable gravel. Runoff and pollutant loading from the expanded substation would be limited and would not be expected to carry any significant or unusual pollutant loads that would pose a threat to surface water or groundwater. As a result, it is concluded that the Direct Route Alternative would not have a significant adverse impact on groundwater or surface waters.

The Direct Route Alternative would increase impervious coverage by about 23,000 square feet, a relatively small area that would not materially change natural recharge of the aquifer. This small change would be consistent with federal, State, County, and local regulations and in accordance with guidelines set forth to protect Critical Environmental Areas. Further, runoff and pollutant loadings would be limited and would not carry significant or unusual pollutant loads and therefore, groundwater quality would be maintained. Thus, the Direct Route Alternative would be designed to limit the degradation of groundwater in the project vicinity and not cause a detriment to local or regional groundwater or surface water conditions. See Chapter 9, "Natural Resources," for additional information regarding the Direct Route Alternative's impacts on surface waters in the study area. As discussed in that chapter, to minimize disturbance to surface waters, directional drilling would be utilized in areas where the Direct Route Alternative would cross a wetland, stream, or culvert.

Further, all erosion and sediment control measures and Best Management Practices (including specifications for temporary and permanent seeding) used during construction of the Direct Route Alternative and substation expansion would comply with the specifications contained in the New York State Stormwater Management Design Manual dated August 2003. In addition, KeySpan's Wetland Construction Guidelines would be used for erosion control and stormwater management. These guidelines meet or exceed the New York State Best Management Practices. The guidelines would be strictly enforced during the construction period to prevent any impacts on nearby wetlands, drainage courses, and properties. Observance of KeySpan's Wetland Construction Guidelines and the restrictions contained in the NYSDEC issued General Wetlands Permit would prevent significant adverse impacts from stormwater. As detailed in Chapter 15, "Construction," erosion and sediment control measures and Best Management Practices would be installed prior to beginning land disturbances and would not be removed until the disturbed land areas are stabilized. Such practices include seeding or mulching for surface stabilization, silt fences, haybale dikes, and water quality swales. Maintenance would be performed as necessary to ensure continued stabilization.

STORMWATER POLLUTION PREVENTION PLAN AT THE SUBSTATION

A Stormwater Pollution Prevention Plan (SWPPP) would be prepared and implemented for the construction of the expanded substation as part of the Direct Route Alternative.

Spill Control Equipment

Emergency spill control equipment would be provided during construction activities when dielectric fluids are handled. The spill kits would include sorbent materials.

Inspections

As part of the substation construction and during maintenance activities, an inspection program would be developed and implemented. The inspections are intended to uncover any conditions that may adversely impact spill potential or the quality of stormwater discharges.

Personnel Training

Effective stormwater pollution prevention includes periodic training of personnel to prevent the discharge of oil or hazardous substances. Training would ensure that personnel involved with the operation and maintenance of the systems know the proper actions to take in the event of a spill or release. The personnel would ensure that, in the event of a spill, they are capable of following the appropriate procedures for spill cleanup and reporting.

Conclusion

Most of the stormwater runoff from the expanded substation would percolate through the gravel layer and into the soil. During very heavy, intense rainfalls, some stormwater may runoff into the surrounding area. The volume of stormwater is not expected to have a significant impact on the surrounding surface water and groundwater. The preparation and implementation of the SWPPP during the construction of the expanded substation would prevent or minimize the potential for discharge of hazardous materials in the surface waters and groundwater.

CHEMICALS USED AT THE SUBSTATION

As part of the Direct Route Alternative, the Bridgehampton Substation would be expanded on a LIPA-owned parcel. The existing Bridgehampton Substation is located on this parcel, and would

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remain in operation with the proposed transmission line. The expansion of the substation is necessary to accommodate the new transmission line. The operation of a substation involves the use of certain products and chemicals, many of which are common household items. LIPA, together with KeySpan, has an extensive program of chemical approval, communication of hazards, and training of employees in the use and hazards of chemicals. All chemicals and products used must go through a variety of reviews, including a health and safety review and an environmental review. The chemical or product can only be used after it is approved for system use. Programs are in place to reduce the use and storage of hazardous chemicals and to deal with spills and other emergencies that may arise. During routine operations, the substation produces no hazardous wastes. During maintenance activities, small quantities of hazardous wastes may be generated and would be properly disposed of.

Polychlorinated Biphenyls

Polychlorinated Biphenyls (PCBs) would not be used at the existing and expanded substation.

Asbestos

Asbestos would not be used at the existing and expanded substation.

Lead

Lead is used in the existing substation and would be used at the expanded substation in sealed batteries for emergency power. These batteries are, and would be, housed in specially designed control rooms that have either concrete floors or a metal floor joined to the sides of the buildings. Batteries are recycled when replacement is required.

Mercury

The only mercury used at the existing substation is low mercury lamps. Low mercury lamps would also be used at the expanded substation. These lamps, when no longer functioning, would be disposed of in accordance with applicable regulations.

Sulfur Hexafluoride

Sulfur hexafluoride (SF₆) gas is used in circuit breakers to suppress electric arcing during the switch operation. SF₆ is a non-toxic gas, which has been identified as a greenhouse gas. The amount of SF₆ currently present is about 25 gallons per circuit breaker, which is below the reporting quantity for inventory purposes. There are currently two 69 kilovolt gas circuit breakers at the existing substation. As part of the expanded substation, 12 new gas circuit breakers would be added and 1 existing circuit breaker removed. SF₆ would be contained in a sealed vessel.

Dielectric fluid

Transformers contain dielectric fluid, which is a refined petroleum distillate that removes heat and acts as an electrical insulator within the transformer. Dielectric fluid is similar in appearance to 3-In-One oil. Each transformer contains approximately 4,745 gallons of insulating dielectric fluid. Currently there are two transformers at the existing substation. No new transformers would be installed at the expanded substation.

Sulfuric acid

Sulfuric acid is present at the existing substation and would be present at the expanded substation in sealed batteries that are used to provide backup emergency power. Up to a total of approximately 60 gallons of sulfuric acid could be used at the substation. The batteries located at the expanded substation would be stored on specially designed racks in the control rooms. The racks would either stand on concrete floors or on a metal floor joined to the sides of the building to prevent leaking acid from being released into the environment.

Other materials

At the existing and expanded substation, other products may be used from time to time for various cleaning, maintenance, and repair functions. Many of the products used are similar to those sold in grocery or hardware stores. These items include cleaners such as San-Aide window cleaner, Simple Green (a general cleaning agent), hand soaps, detergents for washing floors, desk cleaners, and light oils such as Liquid Wrench and WD40. These items, except hand soap, are not currently stored at the substation and would not be stored at the expanded substation.

Conclusion

The quantity of hazardous materials or chemicals that are used or stored at the substation is currently small, and would be expected to remain small as a result of the Direct Route Alternative. The existing substation has not generated any hazardous wastes over the last 5 years and as such, is currently listed as a conditionally exempt small-quantity generator (i.e., generates less than 220 pounds per month of hazardous waste). The expanded substation would also be listed as a conditionally exempt small-quantity generator. It is expected that the amount of hazardous waste generated at the substation would continue to be very small and would be a function of maintenance activities. All materials used at the expanded substation would be disposed of in accordance with all applicable rules and regulations. Therefore, the expansion of the Bridgehampton Substation is not expected to have a significant adverse impact from the use and storage of chemicals. *