

4.0 ALTERNATIVES

We evaluated alternatives to the Islander East Pipeline Project to determine whether they would be reasonable and environmentally preferable to the proposed action. These alternatives include the no-action or postponed-action alternative, system alternatives, route alternatives, route variations, and aboveground facility alternatives. The full range of alternatives considered is discussed below.

The evaluation criteria for selecting potentially environmentally preferable alternatives are:

- Technical and economic feasibility and practicality;
- Significant environmental advantage over the proposed project ^{1/}; and
- Meeting the project objectives of:
 - Delivering increased volumes of natural gas to meet the load of new, efficient, clean burning, gas-fired electric generating plants as well as older, existing facilities that may convert to natural gas in the future;
 - Supplying enough natural gas to heat 600,000 homes in Long Island, and New York City and meet future local gas distribution company growth in Connecticut;
 - Fully integrating market access between New York and New England; and
 - Enhancing access to virtually every major natural gas supply basin in North America.

4.1 NO ACTION OR POSTPONED ACTION ALTERNATIVE

The FERC has three alternative courses of action in processing an application for a Certificate. It may: (1) grant the Certificate with or without conditions; (2) deny the Certificate; or (3) postpone the action pending further study.

If FERC postpones or denies the application, the short- and long-term environmental impacts identified in this EIS would not occur. If FERC were to select the no-action alternative, however, the objectives of the proposed project would not be met and there would be an insufficient supply of natural gas for the new power plants as well as other existing commercial, industrial, or domestic users. Although it would be purely speculative, and therefore beyond the scope of this EIS, to attempt to predict what actions may be taken by policy makers or end users in response to the no-

^{1/} We defined "significant environmental advantage" based on guidelines provided in CEQ's *Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act* to include both the context and intensity of the environmental impacts being compared (see 40 CFR 1508.27).

4.0 ALTERNATIVES

action or postponed-action alternatives, the unmet demand on Long Island could be partially offset by conservation efforts. Conservation would probably reduce demand incrementally in response to increased prices and public awareness. In most cases, however, customers would either experience energy shortages or would substitute with alternative fuels. Options for alternative energy sources such as oil, wood, coal, solar, or wind are extremely limited on Long Island. Increased use of alternative fuels such as oil, wood or coal would generally result in higher emission rates of NO_x and SO_2 than would have been the case with natural gas. Replacement of the natural gas by other energy sources is also impracticable in the timeframe required by the end users. Solar power, while very clean, is not a reliable energy source in the project area. Likewise, it is unlikely that wind power could be sufficiently developed in the project area to be a viable alternative to the proposed project. We do not consider liquefied or compressed natural gas as viable alternatives to the proposed action because of the significant new infrastructure that would be required; the long lead time that would be needed to design, permit, and construct these facilities; and the fact that there are no such projects currently under consideration.

It is difficult to determine the impact of a pipeline project on greenhouse gas emissions; however, credible estimates of greenhouse gas emissions can be developed based upon reasonable assumptions regarding the use of the natural gas delivered by the pipeline and what energy resources would likely be utilized if the gas from the pipeline was not available. Islander East's proposed project would provide an additional 260,000 Dth/d of natural gas to one local distribution company (KeySpan Energy Delivery Long Island) and two proposed power plants (the 500-MW Brookhaven Energy Power Plant and the 500-MW AES Long Island Power Plant). If the additional 260,000 Dth/d were replaced with other fossil fuels, greenhouse emissions could potentially increase by 2,166,000 metric tons of carbon dioxide per year, depending on the alternate fuel assumption made in the analysis.

This analysis only evaluates the potential change in greenhouse gas emissions for the ultimate end user of the natural gas volumes associated with the project. Greenhouse gas emissions are also related to the production, processing, transmission, and distribution of natural gas as well as the alternative fossil fuels.

4.2 SYSTEM ALTERNATIVES

System alternatives differ from alternative pipeline routes (i.e., route alternatives or route variations) in that they make use of other existing, modified or planned pipeline systems to meet the stated objectives of the proposed project. A system alternative would make it unnecessary to construct all or part of the proposed project, although some modifications to another existing pipeline system may be required to increase its capacity or, conversely, another entirely new system may need to be constructed. Although these modifications or additions could result in environmental impacts, the impacts may be less, similar to, or greater than the impacts that would result from the proposed project. The purpose of evaluating system alternatives is to determine whether potential environmental impacts associated with construction and operation of the proposed facilities could be avoided or reduced, while still allowing the stated objectives of the proposed project to be met.

The only existing interstate pipeline from Connecticut to Long Island is Iroquois. Iroquois' existing system does not have the capacity to make Islander East's deliveries without expansion and is not located near some of Islander East's customers. However, Iroquois has proposed expanding

its system to deliver additional gas to eastern Long Island (ELI Extension Project). We have looked at system alternatives which use the ELI Extension Project. We have also looked at a system alternative using the planned Tennessee Connecticut-Long Island Lateral Project.

In a February 19, 2002 filing, Iroquois stated that it does not believe that current and future market data support building two pipelines to eastern Long Island (specifically Islander East and ELI Extension Projects). Because the Commission has not yet determined if Islander East and ELI Extension Projects are competing projects we have looked at two system alternatives using the ELI Extension Project, one which would transport the total volume of gas from both proposals (435,000 Mcf per day) and one which would only transport Islander East's proposed firm volumes (260,000 Mcf per day which is approximately equivalent to Iroquois proposed deliveries through the ELI Extension Project and Islander East's deliveries to the two power plants).

4.2.1 One-Pipe System Alternative

We have examined the One-Pipe System Alternative as an alternative to building both the ELI Extension Project and the Islander East Project. This alternative would transport the total volume of gas proposed in both projects, about 435,000 Mcf per day. This is a preliminary analysis since the environmental analysis of ELI Extension Project is not complete. Additional information will be included in the final EIS.

The One-Pipe System Alternative would require the construction of:

- 16 miles of 36-inch-diameter pipeline loop between Brookfield and Milford, Connecticut paralleling Iroquois's existing pipeline;
- 29.1 miles of 24-inch-diameter pipeline starting in Long Island Sound near Milford, Connecticut and ending in Brookhaven, New York (the onshore portion of this alternative is nearly identical to Islander East's route);
- 5.6 miles of 24-inch-diameter pipeline lateral in Suffolk County, New York (the Calverton Lateral as proposed by Islander East);
- a new 20,000 horsepower compressor station in Milford, Connecticut; and
- meter stations in Brookhaven and Calverton, New York.

See figure 4.2.1-1 for the location of the Long Island Sound crossing and the Milford Compressor Station. Figure 4.2.1-2 shows the location of the loop. The location of all other facilities is as show in Appendix B.

Table 4.2.1-1 compares the facilities required for the One-Pipe System Alternative with the facilities required for both the ELI Extension and the Islander East Projects. The only facility required for the system alternative which has not been proposed in either the ELI Extension Project or Islander East Project is the 16 miles of 36-inch-diameter pipeline loop in Connecticut.

4.0 ALTERNATIVES

Using the One-Pipe System Alternative would eliminate the construction of dual, parallel pipelines on Long Island. Instead of each company constructing its own pipeline, one would be built. Since the Long Island portion of this system alternative is identical to Islander East's proposal (12 miles of 24-inch-diameter mainline and the Calverton Lateral) the environmental impact would be as described in this DEIS.

Offshore, our preliminary analysis of the One-Pipe System Alternative indicates that one crossing of Long Island Sound would be eliminated (Islander East's crossing). All 435,000 Mcf per day would be transported through one 24-inch-diameter mainline pipeline following the shorter offshore Iroquois route. The 22.6 mile offshore Islander East pipeline would not be required and its associated impacts would not occur. It appears that the One-Pipe System Alternative would avoid shellfish beds along the Connecticut coast, which would be crossed by Islander East.

TABLE 4.2.1-1
Comparison of the Facilities Required for the One-Pipe System Alternative with the Facilities Required for Both the ELI Extension and Islander East Projects

Facility	Location	One-Pipe System Alternative	ELI Extension and Islander East Projects
Mainline Pipeline	Onshore Connecticut	none	10.2 miles
	Onshore New York	12.0 miles	24 miles
Mainline Pipeline	Offshore Connecticut	7.5 miles	18.5 miles
	Offshore New York	9.6 miles	21.2 miles
Lateral	Onshore New York	5.6 miles	5.6 miles
Looping	Onshore Connecticut	16.0 miles	none
Compressor Stations	Connecticut	1-20,000 hp (Milford)	2-totaling 30,310 hp (Milford and Cheshire)
Meter Stations	Connecticut and New York	2	4

Although the One-Pipe System Alternative would not require the construction of Islander East's 10.2-mile mainline in Connecticut, it would require the construction of a 16-mile, 36-inch-diameter loop running from Brookfield to Milford, Connecticut. A preliminary analysis of the loop, based on U.S.G.S. Topographic maps, indicates that it would cross about 13.3 miles of forest and at least 15 streams. The construction for loop would be occur within 50 feet of at least 14 residences. The loop crosses many areas with steep terrain, which would require extra workspace. By comparison the Islander East Connecticut Mainline would cross about 2.9 miles of forest and 12

streams. Construction would occur within 50 feet of 33 residences. The Islander East Connecticut Mainline crosses relatively flat topography. It should be noted that the information on the loop is preliminary and more detailed information will be contained in the final EIS.

The construction of the One-Pipe System Alternative would reduce emissions over building both projects because only one compressor station (Milford) would be required, the Cheshire Compressor Station would not be built.

It appears that since the One-Pipe System Alternative reduces the amount of pipeline constructed it would reduce impact to: Long Island, including the Central Pine Barrens; Long Island Sound, including the Connecticut shellfish beds; and the Branford Land Trust. It would also reduce emissions since only one compressor station would be constructed. However, although it eliminates impacts to one group of landowners in Connecticut along the 10 mile mainline, it creates new impacts to another group of landowners in Connecticut along the 16 mile loop. At this time we do not have sufficient information to recommend the One-Pipe System Alternative. We will continue to collect additional information on this alternative for inclusion in the final EIS. Your comments on this alternative are requested.

4.2.2 ELI System Alternative

In the event that the Commission decides that there is a market for only one pipeline to serve eastern Long Island we have examined using the Iroquois' proposed ELI Extension Project (ELI System Alternative) instead of the Islander East Project to deliver 260,000 Mcf per day. However, since Islander East has one customer (AES Calverton) which could not be served by Iroquois proposed facilities we are including the Calverton Lateral as part of this system alternative. This is a preliminary analysis since the environmental analysis of the ELI Extension Project is not complete. Additional information will be included in the final EIS.

The ELI System Alternative would require the construction of:

- 7.0 miles of 36-inch-diameter pipeline loop between Brookfield and Sandy Hook, Connecticut;
- 29.1 miles of 20-inch-diameter pipeline starting in Long Island Sound near Milford, Connecticut and ending in Brookhaven, New York (the onshore portion of this alternative is nearly identical to Islander East's route);
- 5.6 miles of 24-inch-diameter pipeline lateral in Suffolk County, New York (the Calverton Lateral);
- a new 20,000 horsepower compressor station in Milford, Connecticut; and
- meter stations in Brookhaven and Calverton, New York.

4.0 ALTERNATIVES

See figure 4.2.2-1 for the location of the loop. The location of the Long Island Sound crossing and the Milford Compressor Station is shown on figure 4.2.1-1. The location of all other facilities is as shown in Appendix B.

Table 4.2.2-1 compares the facilities required for the ELI System Alternative with the facilities required for the Islander East Projects.

TABLE 4.2.2-1
Comparison of the Facilities Required for the ELI System Alternative with the Facilities Required for the Islander East Project

Facility	Location	ELI System Alternative	Islander East Project
Mainline Pipeline	Onshore Connecticut	none	10.2 miles
	Onshore New York	12.0 miles	12.0 miles
Mainline Pipeline	Offshore Connecticut	7.5 miles	11.0 miles
	Offshore New York	9.6 miles	11.6 miles
Lateral	Onshore New York	5.6 miles	5.6 miles
Loop	Onshore Connecticut	7 miles	none
Compressor Stations	Connecticut	1-20,000 hp (Milford)	1-10,310 hp (Cheshire)
Meter Stations	Connecticut and New York	2	3

Using the ELI System Alternative would eliminate the construction of 10.2 miles of new onshore mainline in Connecticut. However, it would require a new 7 mile, 36-inch-diameter loop of Iroquois' mainline in Connecticut. Our preliminary analysis indicates that construction of the loop would require expanding the existing right-of-way in a rugged, mainly forested area. The Islander East route would also expand existing rights-of-way, some of which are in forested areas. However, the topography along the Islander East route is relatively flat. It appears that the ELI System Alternative loop would be within 50 feet of about 8 residences and cross about 7 streams. Islander East's Connecticut mainline would be within 50 feet of 33 residences and cross about 12 streams.

4.0 ALTERNATIVES

Since the onshore portion of this proposal in New York is identical to Islander East's proposal the environmental impact of this segment is described in section 3 of this environmental document.

Our preliminary analysis of the system alternative offshore pipeline indicates the crossing of Long Island Sound would be reduced by 5.5 miles. It also appears that the ELI System Alternative would avoid shellfish beds along the Connecticut coast.

As shown on table 4.2.2-2 the emissions from the Milford Compressor Station would be greater than from the Cheshire Compressor Station. However, the noise level would be the same. The Milford Compressor Station would be in an industrial area which includes a railroad, a landfill, and an asphalt plant. The Cheshire Compressor Station is in an agricultural field, bordered by forest and Interstate 91.

**TABLE 4.2.2-2
Comparison of the Construction and Operational Impacts of the Milford and Cheshire Compressor Stations**

Environmental Factor	Milford Compressor Station (ELI System Alternative)	Cheshire Compressor Station (Islander East Project)
Noise		
	Nearest NSA	1,300 feet
	1,200 feet	1,200 feet
	Projected Noise Level at Nearest NSA	52 L _{dn}
	52 L _{dn}	52 L _{dn}
Air Quality		
	SO ₂	5.7 tons per year (tpy)
	1.4 tpy	1.4 tpy
	NO _x	47.7 tpy
	39.1 tpy	39.1 tpy
	CO	77.3 tpy
	47.6 tpy	47.6 tpy
	VOC	1.1 tpy
	2.2 tpy	2.2 tpy
	PM ₁₀	4.7 tpy
	2.8 tpy	2.8 tpy
Existing Land Use	Industrial	Agricultural

Based on our preliminary analysis, if the ELI System Alternative was constructed instead of the Islander East Project there would be no change in impacts on Long Island. Air emissions would increase due to the greater amount of compression at Milford (versus Cheshire). In Connecticut the impacts would be moved from the landowners along the Islander East mainline to those along the loop. Impacts to Long Island Sound should be reduced since the crossing length would be reduced by 5.5 miles. At this time we do not have sufficient information to recommend the ELI System Alternative. We will continue to collect additional information on this alternative for inclusion in the final EIS. Your comments on this alternative are requested.

4.2.3 Long Island System Alternative

Since both the Islander East Pipeline Project and the ELI Extension Project use the same route on Long Island we have examined using a single pipeline on the island to reduce environmental impacts, if the Commission were to approve both projects. In this system alternative each company would construct its own facilities in Connecticut and across Long Island Sound. At Shoreham, New York a new 5,000 hp compressor station would be required. From this point the facilities would be nearly the same as proposed in the Islander East Pipeline Project: the Calverton Lateral, meter stations, and a single 12-mile-long, 30-inch-diameter pipeline. The single pipeline would deliver the volumes proposed in both projects.

Except for the compressor station in Shoreham, the environmental impacts of the Long Island System Alternative would be as previously described in this DEIS. Although the size of the pipeline has increased from 24-inch-diameter to 30-inch-diameter, the width of the construction (75 feet) and the permanent (50 feet) rights-of-way would remain the same. In determining the impacts of constructing both pipelines we assumed a 50 foot overlap of construction rights-of-way with a 25 foot overlap of permanent rights-of-way. The impacts resulting from the construction of the Calverton Lateral and the meter stations would not change.

It should be noted that Islander East has a proposed in-service date of late 2002, while Iroquois has proposed in-service date of late 2003. This means that if both projects were to be approved as stand alone projects, the areas disturbed by Islander East's construction would again be disturbed by Iroquois' construction the following year.

Constructing a single 12-mile-long, 30-inch-diameter pipeline instead of dual pipelines would result in a reduction of environmental impacts as shown on table 4.2.3-1. Since the total width of the construction and permanent rights-of-way would be reduced by 25 feet there would be an overall reduction in ground disturbance. The main environmental benefit of this system alternative is that it limits the number of times streams and wetlands would be crossed. It would also reduce the impact on nearby residences and traffic, particularly on the William Floyd Parkway, since construction would only occur once.

However, the Long Island System Alternative would also require the construction of a 5,000 hp compressor station near landfall in Shoreham, New York. We have identified a potential site for the compressor station on property owned by KeySpan adjacent to the KeySpan Access Road. Construction of the compressor station would disturb about 15 acres, assuming the physical lay-out would be similar to the Cheshire Compressor Station. After construction about 10 acres would be used for the operation of the compressor station. The site we have identified is reasonably level and totally forested upland, leveling and grading would be required. It appears that no streams or wetlands would be affected. The nearest residence to this site appears to be at least 800 feet from the site. Emissions and noise from the compressor station would be similar to the Cheshire Compressor Station.

At this time we do not have sufficient information, particularly on the compressor station, to recommend the Long Island System Alternative. We will continue to collect additional information on this alternative for inclusion in the final EIS. Your comments on this alternative are requested.

4.0 ALTERNATIVES

We also note that the use of this system alternative would require the agreement of both Iroquois and Islander East.

TABLE 4.2.3-1
Comparison of the Long Island System Alternative to Constructing Dual Pipelines on Long Island

Environmental Factor	Unit	Dual Pipelines on Long Island	Single Pipeline on Long Island
Area Disturbed by Construction	(ac)	273.8	237.4
Total Width Construction Right-of-Way	(ft)	100	75
Total Width of Permanent Right-of-way	(ft)	75	50
Waterbody Crossings	(no.)	4	2
NWI-mapped Wetlands Disturbed	(ac)	2.5	1.9
NWI-mapped Forested Wetlands Disturbed	(ac)	2.5	1.9
Existing Residences within 50 feet of Construction Right-of-Way	(no.)	7	6

4.2.4 Tennessee Connecticut-Long Island Lateral Project System Alternative

It has been suggested that we examine Tennessee Gas Pipeline Company's (Tennessee) planned Connecticut-Long Island Lateral Project. At this time, Tennessee has not filed an application for this project and has not indicated that it still plans to pursue this project. A system alternative using Tennessee's route would require the construction of 110 miles of pipeline. We do not believe that the construction of system alternative that is 60 miles longer than the propose project is a reasonable alternative.

4.3 ROUTE ALTERNATIVES

Geographic or major route alternatives are identified to determine if these alternatives could avoid or reduce impacts on environmentally sensitive resources, such as large population centers, scenic areas, conservation areas and larger wetland complexes that would be crossed by the proposed pipeline. The origin and delivery points of a major route alternative are generally the same as for the corresponding segment of a proposed pipeline. However, the alternative could follow routes significantly different from the proposed pipeline. Route alternatives would not modify or make use of an existing or modified pipeline system as would a system alternative.

We analyzed eight route alternatives to the Islander East Pipeline Project. A comparison of environmental factors of each major route alternative with the corresponding segment of proposed

route is included with the discussion of each route alternative. A summary of the route alternatives evaluated for the Islander East Pipeline Project is provided in table 4.3.1-1.

TABLE 4.3.1-1
Summary of Route Alternatives Evaluated

Location	Route Alternative Name	MP ^{a/}	Length (mi)	Purpose for Alternative
Connecticut	Replacement Alternative	0.0-6.1	6.1	Eliminates the need to expand the existing right-of-way.
	Sachem Head Alternative	7.6-17.9	14.6	Avoids shellfish beds crossed by the proposed route.
	Short Beach Alternative	2.9-16.2	14.2	Minimizes shellfish bed lease crossings and wetland and stream crossings.
	Option 2 Alternative	10.9-16.2	5.1	Reduces crossings of shellfish beds on the Connecticut side of Long Island Sound.
	Option 3 Alternative	10.9-16.2	5.2	Minimizes crossings of shellfish beds on the Connecticut side of Long Island Sound.
	New Haven Amtrack Alternative	N/A	N/A	Minimize onshore impacts and reduce shellfish bed crossing.
New York	Calverton Lateral Alternative	CA 0.5-CA 3.3	2.2	Maximizes percentage of route adjacent to existing rights-of-way and avoids crossing of Central Pine Barrens CPA.
	Calverton State Route 25 Alternative	37.8-CA 5.6 ^{b/}	4.9	Reduces length of pipeline.

^{a/} MPs are proposed route MPs and correspond to where the route alternative deviates from and then rejoins the proposed route.

The difference between beginning and ending MPs does not reflect the actual length of the route alternative.

^{b/} The MPs on the Calverton Lateral are preceded by "CA" to distinguish them from the MPs on the Islander East Pipeline.

N/A=Not Applicable

4.3.1 Replacement Route Alternative (MP 0.0 to 6.1)

The Replacement Route Alternative was identified to minimize the need for additional permanent right-of-way. This alternative would remove the existing Algonquin C-5 8-inch-diameter pipeline between the North Haven Meter Station at MP 0.0 and MP 6.1 and replace it with a new 24-inch-diameter pipeline instead of constructing the first 6.1 miles of the Islander East Pipeline. Because the Replacement Route Alternative would require taking the existing Algonquin C-5 pipeline out of service for an extended period of time and would interrupt Algonquin's firm service commitments to Southern Connecticut Gas Company, this alternative was eliminated from further consideration.

4.3.2 Sachem Head Route Alternative (MP 7.6 to 17.9)

The Sachem Head Route Alternative was identified at the request of the Connecticut Department of Agriculture, Division of Aquaculture, to attempt to avoid the shellfish beds crossed by the proposed route (see figure 4.3.2-1). The Sachem Head Route Alternative deviates from the proposed route at MP 7.6 and proceeds generally southeast running adjacent to existing powerline rights-of-way. Just west of West River the alternative leaves the powerline right-of-way and proceeds south, cross-country, for approximately 2.3 miles to the Long Island Sound shoreline. Once

offshore, the Sachem Head Route Alternative proceeds southeast and then southwest for approximately 7.8 miles until it rejoins the proposed route at MP 17.9.

The Sachem Head Route Alternative would be adjacent to existing rights-of-way for 2.4 miles more than the proposed route, would not cross any shellfish bed leases, and would avoid crossing Long Island Sound in the vicinity of the Thimble Islands.

However, the Sachem Head Route Alternative would be longer (4.3 miles), cross two more perennial streams and 1,700 feet more NWI-mapped wetlands, including more forested wetlands than the proposed route (see table 4.3.2-1). This route alternative would also require more forest clearing, and may cross about 850 feet of Cockaponset State Forest land, require relocation of several mobile homes, and pass within 50 feet of more residences than the proposed route.

TABLE 4.3.2-1
Comparison of the Sachem Head Alternative to the
Corresponding Segment of the Proposed Route
MP 7.6 to 17.9

Environmental Factor	Unit	Sachem Head Alternative	Islander East Proposed Route	Source
Length	(mi)	14.6	10.3	USGS Topographic Maps
Length On-shore	(mi)	6.8	2.6	USGS Topographic Maps
Length Adjacent to Existing Right-of-Way	(mi)	4.2	1.8	USGS Topographic Maps
Perennial Freshwater/Saltwater Waterbodies Crossed	(no.)	5	3	USGS Topographic Maps
NWI-mapped Wetlands Crossed	(ft)	4,475	2,775	NWI Maps
NWI-mapped Forested Wetlands	(ft)	2,700	2,307	NWI Maps
Forest Land Crossed	(mi)	5.0	1.4	Aerial Photographs
Agricultural Land Crossed	(mi)	0.0	0.0	Aerial Photographs
Existing Residences within 50 feet of Construction Right-of-Way	(no.)	17	8	Aerial Photographs
State/Town Shellfish Leases Crossed	(ft)	0.0	8,163	Ocean Surveys, Inc. Data

Although the proposed route would cross about 8,163 feet of shellfish bed leases, the directional drill would avoid direct impact to about 3,081 feet (see section 3.4.1.2). As previously mentioned, our review shows that two of the three state shellfish leases crossed by the proposed route are inactive and not commercially leased. The third lease site is used primarily for temporary placement of clams. Islander East's proposed mitigation measures for shellfish bed impacts are described in table 3.8.3-1. Potential impacts to the shellfish beds and our recommendations are described in section 3.4.1.2. Because of the increased terrestrial impacts, we do not recommend the Sachem Head Route Alternative.

4.3.3 Short Beach Route Alternative (MP 2.9 to 16.2)

The Short Beach Route Alternative was identified to maximize collocation of the pipeline route along another right-of-way corridor to Long Island Sound and minimize wetland and stream crossing. In addition, this route alternative was proposed to minimize shellfish bed lease crossings (see figure 4.3.3-1). The Short Beach Route Alternative would begin at MP 2.9 and generally proceed south and southwest from the proposed route for approximately 4.6 miles across forest land to an existing powerline corridor. Near the south end of Lake Saltonstall, the alternative leaves the powerline and continues cross-country south and southeast across Interstate 95, U.S. Route 1, and

a densely populated residential area before entering Long Island Sound near Short Beach. Once offshore, the alternative turns and proceeds southwest until it rejoins the proposed route at MP 16.2.

The Short Beach Route Alternative offshore portion of the project is 1.1 miles longer than the proposed route and would disturb more sea floor. This route alternative crosses about 4,438 less shellfish bed leases (see table 4.3.3-1). However, the HDD for the Short Beach Route Alternative would exit within a town of Branford leased, active shellfish bed while the Proposed Route's HDD would exist within an inactive state shellfish bed.

**TABLE 4.3.3-1
Comparison of the Short Beach Alternative to the Corresponding Segment of the Proposed Route
MP 2.9 to 16.2**

Environmental Factor	Unit	Short Beach Alternative	Islander East Proposed Route	Source
Length	(mi)	14.2	13.3	USGS Topographic Maps
Length On-shore	(mi)	7.1	7.3	USGS Topographic Maps
Length Adjacent to Existing Right-of-Way	(mi)	4.6	6.3	USGS Topographic Maps
Perennial Freshwater Waterbodies Crossed	(no.)	4	7	USGS Topographic Maps
NWI-Mapped Wetlands Crossed	(ft)	1,300	4,999	NWI Maps
NWI-Mapped Forested Wetlands Crossed	(ft)	1,150	3,957	NWI Maps
Forest Land Crossed	(mi)	4.3	2.7	Aerial Photographs
Agricultural Land Crossed	(mi)	0.1	0.3	Aerial Photographs
Existing Residences Within 50 feet of the Construction Right-of-Way	(no.)	50	37	Aerial Photographs
Water Supply Watershed Crossed	(mi)	4.5	2.3	Aquifer Protection Area Data
State/Town Shellfish Leases Crossed	(ft)	3,725	8,163	Ocean Surveys, Inc. Data

The onshore lengths of the Short Beach Route Alternative and the proposed route are similar, but the proposed route follows more existing rights-of-way and would result in less tree clearing than the Short Beach Route Alternative. The Short Beach Route Alternative reduces the number of perennial stream crossings and amount of NWI-mapped wetlands and forested wetlands crossed. However, the route alternative would cross more public water supply watersheds (i.e., Four River Diversion Watershed and Lake Saltonstall Watershed), public interest areas (the Lake Saltonstall Recreation Area and the Connecticut Sports Complex) and would be in close proximity to more residences than the proposed route. The route alternative would cross more areas of steep slope, particularly south of Farm River which would require the clearing of more temporary workspace. In addition, the Short Beach Route Alternative would parallel Lake Saltonstall for about 1.8 miles requiring the clearing of trees up slope of the lake. Based on our review, we do not believe that the environmental advantages of the Short Beach Route Alternative outweighs the disadvantages, and therefore, do not recommend the use of the Short Beach Route Alternative.

4.3.4 Option 2 and Option 3 Offshore Route Alternatives (MP 10.9 to 16.2)

We examined two offshore route alternatives for the Connecticut side of Long Island Sound between MP 10.9 and 16.2 to minimize the crossing of shellfish bed leases. The Option 2 Route Alternative deviates from the proposed route at MP 11.7 and continues south generally between 500 and 2,000 feet east of the proposed route. The Option 3 Route Alternative begins at MP 10.9 and proceeds south, southeast, and then south again generally between 2,000 and 5,800 feet east of the proposed route. Both route alternatives end when they rejoin the proposed route at MP 16.2 (see figure 4.3.4-1).

The Option 2 Route and Option 3 Route Offshore Alternatives would be slightly shorter than the proposed route (0.2 and 0.1 mile, respectively) (see table 4.3.4-1). The Option 3 Route Alternative crosses one shellfish bed lease, Option 2 Route Alternative crosses two shellfish bed leases, and the proposed route crosses three shellfish bed leases. However, two of the three state shellfish bed leases crossed by the proposed route and one of the shellfish bed leases crossed by the Option 2 Route Alternative are inactive and not commercially leased.

TABLE 4.3.4-1
Comparison of the Option 2 and Option 3 Alternatives to the Corresponding Segment of the Proposed Route MP 10.9 to 16.2

Environmental Factor	Unit	Option 2 Alternative	Option 3 Alternative	Islander East Proposed Route	Source
Length	mi	5.1	5.2	5.3	USGS Topographic Maps
State Shellfish Bed Leases Crossed	ft	4,449	1,348	6,141	Ocean Survey Inc. Data

Although the Option 3 Route Alternative has the least shellfish bed lease impacts, the sea floor topography and geologic conditions present engineering concerns with placement of the pipeline

along this route (i.e., bedrock near the surface and/or bedrock outcrop onto the sea floor and steep abrupt drop offs). The Option 2 Route Alternative has terrain that is also steeper than the proposed route.

While the Option 3 Route Alternative and Option 2 Route Alternative would potentially affect less shellfish bed leases, we believe, from an engineering perspective, that these two option route alternatives are more difficult to construct and may require additional blasting. Although it is possible to mitigate for blasting impacts, there would be some permanent changes to the sea floor as the result of blasting. Based on our review, we believe that avoiding blasting is preferable to the Option 2 Route Alternative or the Option 3 Route Alternative crossing inactive shellfish lease beds. Therefore, we do not recommend the use of either the Option 2 Route Alternative or the Option 3 Route Alternative.

4.3.5 Calverton Lateral Route Alternative (MP CA 0.5 to CA 3.3)

The Calverton Lateral Route Alternative was identified to maximize the use of existing rights-of-way and avoid crossing the Central Pine Barrens Core Preservation Area (CPA). The Calverton Lateral Route Alternative would begin at MP CA 0.5 and continue east adjacent to an existing powerline corridor just north of State Route 25A for approximately 1.7 miles until it reaches North Country Road. The route alternative then turns and proceeds southeast along the powerline and road for approximately 0.5 mile before turning south again, crosses State Route 25A, and rejoins the proposed route at MP CA 3.3 (see figure 4.3.5-1).

The Calverton Lateral Route Alternative would be about 0.6 mile shorter than the proposed route and follow adjacent to existing rights-of-way for 1.1 mile further. This route alternative would also cross less forest land (0.2 mile) and agricultural land (0.5 mile) than the proposed route (see table 4.3.5-1). The primary advantage of the Calverton Lateral Route Alternative is that it does not cross Central Pine Barrens CPA, and avoids potential habitat for a state-listed species.

However, the Calverton Lateral Route Alternative follows a powerline right-of-way through a subdivision with residences on either side of the right-of-way. There are 12 residences within 50 feet of the Calverton Lateral Route Alternative construction right-of-way. In comparison, the proposed route has no residences within 50 feet of the construction right-of-way and is relatively undeveloped.

Although no residences would be directly affected by construction, short-term impacts such as noise and fugitive dust could cause annoyance. In addition, in some areas construction of the Calverton Lateral Route Alternative would remove all tree screening between residences and the powerline.

The Calverton Lateral proposed route does not pass within 50 feet of any residences in this area. Although the Calverton Lateral does cross about 0.9 mile of Central Pine Barrens CPA, all but 300 feet of this crossing is adjacent existing cleared right-of-way (road/powerline). Therefore, except for 300 feet, construction would only expand an existing cleared corridor. See section 3.5.2 for a discussion of the proposed mitigation for the Central Pine Barrens. Both the proposed route and the Calverton Lateral Route Alternative have environmental advantages and disadvantages. Since neither

route is environmentally superior, and the proposed route is acceptable, we do not recommend the Calverton Lateral Route Alternative.

TABLE 4.3.5-1
Comparison of the Calverton Lateral Alternative to the Corresponding Segment
of the Proposed Route MP CA 0.5 to CA 3.3 ^{a/}

Environmental Factor	Unit	Calverton Lateral Alternative	Calverton Lateral Proposed Route	Source
Length	(mi)	2.2	2.8	USGS Topographic Maps
Length Adjacent to Existing Right-of-Way	(mi)	2.2	1.1	USGS Topographic Maps
Perennial Waterbodies Crossed	(no.)	0	0	USGS Topographic Maps
NWI-Mapped Wetlands Crossed	(ft)	0.0	0.0	NWI Maps
NWI-Mapped Forested Wetlands Crossed	(ft)	0.0	0.0	NWI Maps
Forest Land Crossed	(mi)	1.1	1.3	
Agricultural Land Crossed	(mi)	0.4	0.9	Aerial Photographs
Tree Nursery Crossed	(ft)	0.0	1,380	Aerial Photographs
Existing Residences Within 50 feet of the Construction Right-of-Way	(no.)	12	0	Aerial Photographs
Central Pine Barrens CPA Crossed	(mi)	0.0	0.9	Data from the Central Pine Barrens Commission

^{a/} The MPs on the Calverton Lateral are preceded by "CA" to distinguish them from the MPs on the Islander East Mainline.

4.3.6 Calverton State Route 25 Route Alternative (MP 37.8 to MP CA 5.6)

The Calverton State Route 25 Route Alternative was identified to minimize the length of the Calverton Lateral and to maximize the use of existing rights-of-way. The Calverton State Route 25 Route Alternative begins at MP 37.8, adjacent to the William Floyd Parkway and State Route 25 (Middle Country Road) interchange. The route alternative proceeds northeast for 1.7 miles on the north side of State Route 25, crosses over to the south side and continues for another 3.3 miles until it rejoins the proposed route at MP CA 5.6 (see figure 4.3.6-1).

The Calverton State Route 25 Route Alternative would be about 0.7 mile shorter and located adjacent to existing rights-of-way for 1.4 mile longer than the proposed route. The Calverton State Route 25 Route Alternative would cross 1.6 mile more forest land and 2.4 miles more Central Pine Barrens CPA than the proposed route (see table 4.3.6-1).

In addition, the route alternative would cross Horn Pond and require a tap valve between the Islander East and Calverton Lateral pipeline. The tap valve would require construction of aboveground facilities and an access road within the Central Pine Barrens CPA.

While the Calverton State Route 25 Route Alternative would be shorter in length and would disturb less land than the proposed route, we believe that its potential impact on the Central Pine Barrens CPA outweighs its advantages, and therefore, do not recommend the use of the Calverton State Route 25 Route Alternative.

We also looked at a variation to the beginning of the Calverton State Route 25 Route Alternative using an existing firebreak across the Brookhaven National Laboratory (BNL) to avoid a planned new residential subdivision on the proposed route. The route variation would begin at MP 38.4, approximately 0.6 mile south of the start of the Calverton State Route 25 Route Alternative. From MP 38.4, it would proceed east for approximately 1.6 miles across primarily open land associated with an existing cleared firebreak on BNL property. It would then turn and proceed north adjacent to the east side of an existing electric transmission line for approximately 1.3 miles across primarily forest land until it reaches State Route 25 and joins the Calverton State Route 25 Route Alternative.

A new residential subdivision (May's Farm) is planned and currently under construction along the proposed route near MP CA 2.0. Currently, only one residence is within 50 feet of the construction right-of-way along the proposed route near MP CA 1.3. The Islander East proposed route through the area would cross 12 home building sites, following property lines, within the development. Depending on construction timing, residents could be impacted by noise, dust, increased traffic levels, and/or traffic delays. The variation to the Calverton State Route 25 Route Alternative would avoid these residential impacts, however, it would also cross an additional 4,000 feet of the Central Pine Barrens CPA. In order to avoid additional impact to the Central Pine Barrens CPA we do not recommend the Calverton State Route 25 Route Alternative with this variation.

TABLE 4.3.6-1
Comparison of the Calverton State Route 25 Alternative to the Corresponding
Segment of the Proposed Route MP 37.8 to CA 5.6 ^{a/}

Environmental Factor	Unit	Calverton State Route 25 Alternative	Calverton Lateral Proposed Route	Source
Length	(mi)	4.9	5.6	USGS Topographic Maps
Length Adjacent to Existing Right-of-Way	(mi)	4.9	3.5	USGS Topographic Maps
Perennial Waterbodies Crossed	(no)	1	0	USGS Topographic Maps
NWI-Mapped Wetlands Crossed	(ft)	0.0	0.0	NWI Maps
NWI-Mapped Forested Wetlands Crossed	(ft)	0.0	0.0	NWI Maps
Forest Land Crossed	(mi)	3.9	2.3	Aerial Photographs
Agricultural Land Crossed	(mi)	0.0	0.9	Aerial Photographs
Tree Nursery Crossed	(ft)	0.0	1,380	Aerial Photographs
Existing Residences Within 50 feet of the Construction Right-of- Way	(no)	2	1	Aerial Photographs
Central Pine Barrens CPA Crossed	(mi)	3.4	1.0	Data from the Central Pine Barrens Commission

^{a/} The MPs on the Calverton Lateral are preceded by "CA" to distinguish them from the MPs on the Islander East Mainline.

4.3.7 New Haven (Amtrak) Route Alternative

At the request of the Branford Land Trust, a route alternative was studied to minimize potential impacts on Branford Land Trust land and residences in Branford. The route alternative would follow the Amtrak and/or Interstate 91 from Algonquin's mainline to New Haven.

We have looked at this route on maps and in the field and we do not believe that the route is feasible or reasonable.

The corridor adjacent to the Amtrak railroad is highly congested with numerous existing commercial/industrial buildings, substantial tidal wetlands, and areas of potentially contaminated soils. In downtown New Haven, there is simply no space for a pipeline either adjacent to Amtrak or Interstate 91 because of buildings, powerlines, and bridges. Outside of New Haven the route would

cross extensive salt marshes and the Quinnipiac River. Offshore the route would cross through New Haven Harbor and would require a longer crossing of Long Island Sound.

4.4 ROUTE VARIATIONS

Route variations differ from system or route alternatives in that they are identified to reduce impacts on specific, localized resource issues (including isolated wetlands and residences), resolve landowner requests, and avoid construction constraints because of terrain condition. Although some variations can be several miles long, most are short and relatively close to the proposed route. We analyzed locations where site-specific issues warranted analysis of route variation. Each of these route variations is analyzed in comparison with the corresponding segment of proposed route. In addition to the route variation identified, it is expected that minor shifts in alignment may continue to be required prior to and during construction to accommodate site-specific routing constraints related to engineering, landowner, and environmental concerns.

4.4.1 Pine Orchard Variation (MP 9.6 to 10.8)

The Pine Orchard Variation was identified during the site visit of the proposed route to minimize impacts on land owned and managed by the Branford Land Trust. The Pine Orchard Variation would deviate from the proposed route at MP 9.6 just south of the Amtrak Railroad. The variation would proceed southwest across 450 feet of forest land, and enter and cross approximately 3,000 feet of the Pine Orchard Yacht and Country Club (see figure 4.4.1-1). An HDD worksite would be set up at the south end of the driving range within a 150-foot by 200-foot extra workspace. The drill would be set up about 650 feet from the shoreline and would extend approximately 3,200 feet out into the Long Island Sound. The Pine Orchard Variation would end at the exit point at MP 10.8 in approximately the same location as the proposed drill exit point.

The Pine Orchard Variation would avoid the Branford Land Trust property and nature trail parallel to and crossed by the proposed pipeline route, and would reduce forest and wetland clearing impacts by approximately 2.8 acres. However, the variation would be 2 miles longer, cross more waterbodies, and require more permanent and construction rights-of-way than the proposed route (see table 4.4.1-1). None of the Pine Orchard Variation would be located adjacent to existing right-of-way, whereas the proposed route would be located adjacent to the Branford Steam Railroad right-of-way. The variation would cross greens, fairways and the driving range resulting in impacts to golf course operation during construction and restoration.

TABLE 4.4.1-1
Comparison of the Pine Orchard Variation to the Corresponding Segment of the Proposed Route
MP 9.6 to 10.8

Environmental Factor	Unit	Pine Orchard Variation	Proposed Route	Source
Length	(mi)	1.4	1.2	Aerial Photographs
Length adjacent to existing right-of-way	(mi)	0	1.0	Aerial Photographs
Permanent right-of-way <u>a/</u>	(acres)	3.7	3.1	Aerial Photographs
Construction right-of-way <u>a/</u>	(acres)	6.5 <u>b/</u>	4.6	Aerial Photographs
Residences within 50 feet of the edge of the construction right-of-way	(no.)	1	0	Aerial Photographs
Waterbodies crossed	(no.)	2	0	USGS Topographic Maps
NWI-mapped wetlands	(feet)	300	528	NWI maps and Aerial Photo Interpretation (for Variation) Field Delineation Data (for Proposed Route)
Agricultural land	(acres)	0	0	Aerial Photographs
Forest land	(acres)	1.3	4.1	Aerial Photographs
Branford Land Trust Crossing	(mi)	0	0.2	Aerial Photographs
Town Shellfish Bed Leases Crossed <u>d/</u>	(feet)	1,300	2,022	Ocean Surveys, Inc., Data

a/ Measurements represent the onshore portion of the route up to the HDD staging area.
b/ Based on a 90-foot-wide construction right-of-way within the limits of the golf course and a 75-foot-wide construction right-of-way elsewhere.
c/ Includes 0.2 acre for rock storage and 0.3 acre for staging road and waterbody crossings within the Pine Orchard Golf Course.
d/ Shellfish beds would be crossed using HDD methods.

Residents near the HDD site for the proposed route have raised concerns about noise from the drilling operation. We believe noise would be a greater concern with the Pine Orchard Variation because there are more residences closer to the HDD with less natural buffering (vegetation and topography). The HDD on the Pine Orchard Variation is also more problematic due to the engineering. Since we believe that the success of the HDD is critical to the protection of the shoreline and the nearshore habitat, we believe that the drill should occur in the location which has the greatest potential for success. Therefore, because of the increased length, engineers' concerns for the drill and increased noise issues, we do not recommend the Pine Orchard Variation. However, in order to address the Branford Land Trust concerns, we have looked at the Pond Variation, discussed below.

4.4.2 Pond Variation

The Pond Variation was identified to reduce impacts on Branford Land Trust property. Based on our review of the alignment photos and site visit, the Pond Variation follows the western edge of the Tilcon tracks between MP 9.7 and MP 9.85. Construction would proceed through the eastern edge portion of the pond just west of the Tilcon track right-of-way. It is shorter than the proposed route and located adjacent to existing rights-of-way for an additional 0.1 mile. The Pond Variation would cross 0.1 mile of the Branford Land Trust property and eliminate the approximately 2.4 acres of tree clearing on Branford Land Trust property necessary under the proposed route alignment (see figure 4.4.2-1). However, the Pond Variation would cross one perennial waterbody (the pond) and the 50 foot-wide emergent wetland that encircles it (see table 4.4.2-1). The corresponding segment of the proposed route crosses no waterbodies or wetlands.

The small shallow pond (approximately 200 feet long by 50 feet wide) sits at the base of a heavily wooded sloped area of the Branford Land Trust Gould Lane property and the western edge of the Tilcon Railroad tracks. The pond and associated wetlands provide storage and purification of storm water runoff and habitat for ducks, birds and wetland edge animals. The pond contains lily pads and common emergent aquatic plants in the shallow areas. No federally or state-listed threatened and endangered species, or species of special concern, have been identified in the pond or associated wetlands. The pond and wetland appear to have been formed by the fill for the railroad which blocked drainage in the area.

TABLE 4.4.2-1
Comparison of the Pond Variation to the Corresponding Segment of the Proposed Route (MP 9.7 - 9.85)

Environmental Factor	Unit	Pond Variation	Proposed Route	Source
Length	(mi)	0.1	0.2	Alignment Sheets
Length Adjacent to Existing Right-of-way	(mi)	0.1	0	Alignment Sheets
Branford Land Trust Crossing Length	(mi)	0.1	0.2	Alignment Sheets
Perennial Waterbodies Crossed	(no.)	1 (pond)	0	USGS Topographic Maps
Wetlands Crossed	(ft)	380	0	Alignment Sheets & CT Wetland Delineation Reports
Forested Wetlands Crossed	(ft)	0	0	Alignment Sheets & CT Wetland Delineation Reports

The construction of the pipeline through the edge of the pond would directly impact aquatic wildlife and vegetation, and disturb pond soils and sediment structure. Islander East proposes to implement the measures outlined in its ESC Plan to minimize adverse effects to wetlands resulting from construction. In addition, Islander East stated that it would monitor wetlands annually for

4.0 ALTERNATIVES

the first 3 to 5 years (or as required by permit) to determine the success of revegetation following construction. Directional drilling under the pond was determined not to be feasible because the length of the wetland and pond was too short for drilling. In addition, the extra workspace needed to conduct the drilling would require the clearing of additional Branford Land Trust property.

Placing the pipeline on the opposite side of the railroad would place it in a salt marsh. We do not believe crossing the salt marsh is an acceptable alternative.

The Pond Variation would more effectively use the existing railroad right-of-way and reduce tree clearing and recreation use impacts to Branford Land Trust property. Although direct impacts on wetlands associated with the pond and pond vegetation are higher, the proposed route around the pond would also indirectly impact the pond by removing the trees directly west of the pond and allowing more sunlight to reach the pond and increase soil erosion impacts. In addition, our review indicates that the removal of trees on the Branford Land Trust property to accommodate the proposed route alignment around the pond would result in forest fragmentation and have long-term impacts on Branford Land Trust forest land whereas the Pond Variation wetland impacts would be short-term. Due to the increase in the collocation with an existing corridor, a decrease in the length of the pipeline, and the less long-term impact on Branford Land Trust property and forest land, we believe this route variation is preferable to the proposed route. Therefore, we recommend that:

- **Islander East incorporate the Pond Variation into the proposed route. Islander East should also file with the Secretary for review and written approval by the Director of OEP, prior to the start of construction, a site-specific plan for the crossing of the pond. This plan should include, at a minimum: construction methods; extra workspace location, size, and purpose; erosion control methods and placement; restoration and revegetation specifics; and a monitoring plan.**

4.4.3 County Park Variation (MP CA 1.1 to CA 1.9)

The County Park Variation was identified to reduce the amount of tree clearing in the CPA of the Central Pine Barrens on Long Island, New York. The County Park Variation deviates from the proposed route at MP CA 1.1 and continues south adjacent to the west side of an electric transmission line right-of-way for a distance of 400 feet. At this point, the variation turns east and proceeds approximately 0.5 mile across forest and open land until it rejoins the proposed route at MP CA 1.7 (see figure 4.4.3-1).

The County Park Variation would increase the length of pipeline adjacent to existing rights-of-way by 0.1 mile but it would also be longer and disturb more land during construction and require more land for operation (0.6 acre and 0.4 acre, respectively) than the corresponding segment of the proposed route (see table 4.4.3-1). Both routes would require clearing approximately 3.3 acres of forest land during construction. However, approximately 0.7 acre of the 3.3 acres along the County Park Variation would occur within the Central Pine Barrens CPA. Because of the increased terrestrial impacts and additional tree clearing within the Central Pine Barrens CPA, we do not recommend the County Park Variation.

TABLE 4.4.3-1
Comparison of the County Park Variation to the Corresponding Segment of the Proposed Route
MP CA 1.1 to CA 1.7

Environmental Factor	Unit	County Park Variation	Proposed Route	Source
Length	(mi)	0.6	0.5	Aerial Photographs
Length adjacent to existing right-of-way	(mi)	0.1	0.0	Aerial Photographs
Permanent right-of-way	(acres)	3.7	3.3	Aerial Photographs
Construction right-of-way	(acres)	5.6	5.0	Aerial Photographs
Residences within 50 feet of Construction Right-of-Way	(no.)	0	0	Aerial Photographs
Waterbodies crossed	(no.)	0	0	USGS Topographic Maps
NWI-mapped wetlands	(feet)	0	0	NWI Maps
Agricultural land	(acres)	0.0	0.0	Aerial Photographs
Forest land	(acres)	3.3	3.3	Aerial Photographs
Central Pine Barrens CPA	(acres)	0.7	0.0	Data from the Central Pine Barrens Commission

4.4.4 William Floyd Parkway Variation (MP 41.4 to 41.8)

Several members of the New York Assembly, the Wading River Civic Association, and the Long Island Pine Barrens Society have requested that we examine alternatives to the proposed route where it parallels the eastside of the William Floyd Parkway (Parkway) in order to avoid the Core Preservation Area (CPA) of the Central Pine Barrens. We have evaluated the proposed route from about MP 34.4 to about MP 41.7. Based on the information available to us, the following are our findings.

We examined placing the pipeline in the median of the Parkway. Based on our field, photo alignment, and topographic map examination of the median we have determined that this is not a feasible alternative. The median fluctuates in width and topography. In most areas it is not physically possible to place the pipeline in the median due to the width of the median, overpasses, and/or the topography (rock outcrops and steep narrow depressions). In all areas our major concern is for the safety of the construction workers and motorists during construction and maintenance activities. Working in the median would disrupt traffic in both directions.

We also examined placing the pipeline on the westside of the Parkway. From about MP 34.4 to about MP 38.2, the westside of the Parkway is not in the CPA, while the eastside is. However, there are about 65 residences that backup against the Parkway on the westside, while the eastside has only about 15 residences. If the pipeline were placed on the westside of the Parkway some of the 65

residences would lose at least part of their tree screen, some could lose all, and some could also lose swimming pools and sheds. Because of the impacts to the residences we do not recommend moving the pipeline to the westside of the Parkway for this segment.

From about MP 38.2 to about MP 39.5, both sides of the Parkway are in the CPA. However, it should be noted that once again there are more residences on the westside of the Parkway. From about MP 39.5 to about MP 41.5, the eastside of the Parkway is not in the CPA while portions of the westside are. In this segment there is only one residence and it is on the eastside. For these two segments we do not recommend moving the pipeline to the westside of the Parkway since it would increase the amount of CPA being crossed.

However, from about MP 41.5 to about MP 41.7 the CPA is only on the eastside of the Parkway. In addition, there are no residences and fewer trees on the westside of the Parkway. In this area we identified the William Floyd Parkway Variation which would cross the Parkway at MP 41.4, continuing west into the open field, then turning south to join with the proposed route near MP 41.8 (see figure 4.4.4-1). This variation would avoid about 0.2 mile of the Central Pine Barrens CPA, avoid clearing about 0.2 mile of trees, and would not impact residences. Therefore, we recommend that:

- **Islander East incorporate the William Floyd Parkway Variation into the proposed route between MPs 41.4 and 41.8.**

4.4.5 Other Site-Specific Variations

During the project site visits conducted on October 16 and 18, 2001 and February 20, 2002, the public identified a number of route variations to the proposed route to minimize environmental impacts and/or residential impacts. The following is a brief description of the variations proposed and the reasons why each variation is not recommended and was eliminated from further consideration.

It has been suggested that moving the route to the opposite side of the railroad track near MP 7.7 (Branford River) and MP 9.6 would avoid or reduce impacts on wetlands and waterbodies. In both cases there are wetlands and waterbodies on both sides of the railroad track. In both cases crossing over the tracks would also place the route closer to residences. Near MP 7.7, utilities along the tracks and the crossing of U.S. Route 1 complicate the construction. It has been suggested that HDD crossing of U.S. Route 1 would solve some of these problems. We believe that this crossing is not a good candidate for an HDD because of its length. Near MP 9.6 the proposed route avoids large rock outcrops. These outcrops could be removed by blasting, but it would open a larger corridor through the forest. Therefore, we do not recommend a route variation for either of these locations.

The Town of Branford suggested that approximately between MP 9.2 and MP 9.4 it appeared that by continuing the pipeline on the west side of the Branford Steam Railroad and making use of the "Marshaling Yard" open area, potential wetland impacts would be reduced. We examined placing the pipeline on the west side of the rail tracks between MP 9.2 and 9.4. We agree with the Town

of Branford that placing the pipeline west of the railroad would reduce impacts to wetlands. However, Tilcon has stated that it plans to expand the Marshaling Yard to the west. These plans include placing additional tracks which would preclude the placement of the pipeline.

Another suggestion was made to consider routing the pipeline at MP 4.5 east along the powerline, turn south along Twin Lake Road, and rejoin the proposed route near MP 5.0. We found that the narrow right-of-way already contains numerous utilities that would make placement of the pipeline within this area very difficult. Underground utilities include a natural gas distribution line, water distribution line, sanitary sewer line and storm sewer piping in addition to aboveground power and telephone lines. There would be insufficient room left to install a new 24-inch natural gas pipeline within the road as well. In addition, this alignment would increase the pipeline by 750 feet, affect five additional residences, and disrupt traffic along the road for the 2 to 3 week estimated construction period for this section of the line. Therefore, we are not recommending this variation.

During the site visits, the public also questioned why the pipeline could not be routed between the two Tilcon tracks on the Connecticut side of the project. We evaluated placing the pipeline in between the Branford Steam Railroad (Tilcon) tracks from MP 6.1 to about MP 10.1. In review of the railroad tracks layout within the right-of-way, we found that construction of the pipeline between the tracks would present an increased safety concern for workers. The area between the tracks is narrow and would require shutting down the rail line to excavate and lay the pipe. This would impact the operation of the Tilcon railroad between the quarry and barge loading site during construction of the pipeline along this segment. In addition, the track roadbed is fill and not a good construction base for installing the pipe. Further, excavating the roadbed could undermine the stability of the track base and increase safety concerns for operations of the active Tilcon railroad. We are not recommending the Tilcon track variation because of the possibility of undermining the stability of the rail roadbed and the close proximity of the two tracks which makes construction safety a major concern.

4.5 ABOVEGROUND FACILITY ALTERNATIVES

Islander East proposes to construct one new compressor station, three meter stations, and five mainline valves. We did not identify any significant issues regarding the proposed locations of these facilities, so no alternative were studied in detail.