

COMMONWEALTH OF MASSACHUSETTS
Energy Facilities Siting Board

In the Matter of the Petition of Colonial)
Gas Company d/b/a KeySpan Energy)
Delivery New England for Approval to)
Construct 13.1 Miles of Natural Gas)
Pipeline in Sandwich, Barnstable,)
Yarmouth, Dennis, and Harwich,)
Massachusetts)

EFSB 05-2

FINAL DECISION

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Presiding Officer
May 17, 2006

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LIST OF ABBREVIATIONS

Algonquin	Algonquin Gas Transmission Company
Company	Colonial Gas Company d/b/a KeySpan Energy Delivery New England
d/b/a	doing business as
dBA	decibels, A-weighted
Department	Massachusetts Department of Telecommunications and Energy
DCR	Massachusetts Department of Conservation and Recreation
DSM	demand side management
D.T.E. Road Restoration Standards	<u>Public Utility Road Restoration Standards</u> , D.T.E. 98-22, att., §§ 1.0-12.0 (August 26, 1999)
G.L.	Massachusetts General Laws
hp	horsepower
KeySpan	Colonial Gas Company d/b/a KeySpan Energy Delivery New England
L ₁₀	sound levels exceeded for 10% of a time period
LNG	liquified natural gas
2002 LRRP	Long-Range Resource and Requirements Plan for the years 2001/2002 to 2005/2006 (2002)
2005 LRRP	Long-Range Resource and Requirements Plan for the years 2005/2006 to 2009/2010 (2005)
MADEP	Massachusetts Department of Environmental Protection
MassGIS	Massachusetts Geographic Information System
MCP	Massachusetts Contingency Plan [310 CMR 40.0000]
MHD	Massachusetts Highway Department
MMBtu	million British thermal units
MMBtu/day	million British thermal units per day
MMBtu/hr	million British thermal units per hour
MMBtu/yr	million British thermal units per year
municipalities	Towns of Sandwich, Barnstable, Yarmouth, Dennis, and Harwich
NHESP	Massachusetts Natural Heritage and Endangered Species Program

PAL	Public Archaeology Lab, Inc.
psig	pounds per square inch, gauge
PV	present value [costs]
Rail Trail	Cape Cod Rail Trail
railroad bridge	no-longer-used railroad bridge crossing the Bass River
Siting Board	Massachusetts Energy Facilities Siting Board
SPCC	Spill Prevention Control and Countermeasures [plan]
SWPPP	Stormwater Pollution Prevention Plan
SynerGEE model	Advantica/SynerGEE gas flow model
Towns	Town of Yarmouth and Town of Dennis, jointly
URAM	Utility-related Abatement Measure [for MCP]
USGS	U.S. Geological Survey
<u>ANP Blackstone Decision</u>	<u>ANP Blackstone Energy Company, 8 DOMSB 1 (1999)</u>
<u>CELCo Decision</u>	<u>Cambridge Electric Light Company, 12 DOMSB 305 (2001)</u>
<u>MECo/NEPCo Decision</u>	<u>Massachusetts Electric Company and New England Power Company, 18 DOMSB 383 (1989)</u>
<u>MMWEC Decision</u>	<u>Massachusetts Municipal Wholesale Electric Company, 12 DOMSB 18 (2001)</u>
<u>NSTAR Gas Decision</u>	<u>NSTAR Gas Company, 13 DOMSB 143 (2001)</u>
<u>1997 BECo Decision</u>	<u>Boston Edison Company- Hopkinton and Milford, 6 DOMSB 208 (1997)</u>
<u>1998 NEPCo Decision</u>	<u>New England Power Company, 7 DOMSB 333 (1998)</u>
<u>2006 Berkshire Gas Decision</u>	<u>The Berkshire Gas Company, EFSB 05-1 (2006)</u>
<u>2005 NSTAR Electric Decision</u>	<u>Boston Edison Company, d/b/a NSTAR Electric, 14 DOMSB 233 (2005)</u>

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FIGURE 1: Western Segment

FIGURE 2: Middle Segment

FIGURE 3: Eastern Segment

Pursuant to G.L. c. 164, § 69J, the Energy Facilities Siting Board hereby APPROVES, subject to the conditions set forth below, the petition of Colonial Gas Company, d/b/a KeySpan Energy Delivery New England, to construct approximately 13.1 miles of underground natural gas pipeline on Cape Cod.

I. INTRODUCTION

A. Summary of the Proposed Project

On June 3, 2005, Colonial Gas Company, d/b/a KeySpan Energy Delivery New England (“KeySpan” or “Company”) filed a petition with the Energy Facilities Siting Board (“Siting Board”) for approval to construct three new non-contiguous segments of natural gas distribution pipeline, approximately 13.1 miles in combined length in the Towns of Sandwich, Barnstable, Yarmouth, Dennis, and Harwich, Massachusetts (“municipalities”). The new pipeline segments would augment the Company’s existing Sagamore Line, a 42-mile distribution line on Cape Cod (“pipeline project” or “proposed project”) (Exhs. KED-1, at 1-1; KED-2).

Algonquin Gas Transmission Company (“Algonquin”) currently supplies natural gas to the Company at two take stations located north and west of the Cape Cod Canal, in Bourne (Exh. KED-1, at 1-1). KeySpan indicated that Algonquin intends to extend its pipeline facilities to a new delivery point on Cape Cod, connecting to KeySpan’s Sagamore Line at the intersection of Route 130 and Service Road in Sandwich. According to KeySpan, the Algonquin G Lateral will provide additional gas supplies at the new delivery point at 270 pounds per square inch, gauge (“psig”). KeySpan stated that the purpose of the pipeline project is to address existing low-pressure issues on the Sagamore Line and to provide deliverability for the additional gas that the Company would receive from Algonquin (id.).

The three segments of the proposed project are identified by KeySpan as the Western Segment, which would be located in the Towns of Sandwich and Barnstable; the Middle Segment, which would be located in the Towns of Yarmouth, Dennis, and Harwich; and the Eastern Segment, which would be located in the Town of Harwich (id.). KeySpan views

construction of the three individual segments as one project, and stated that it intends to construct the project in stages over a time-frame of approximately ten years (id. at 1-3).¹

1. The Western Segment

The Western Segment along the primary route would consist of 6.6 miles of 270-psig, 20-inch diameter pipeline in Sandwich and Barnstable (Exhs. KED-1, at 1-4; EFSB-E-1(1)). The primary route begins at the intersection of Route 130 and Service Road in Sandwich, runs east along Service Road, and ends where an existing NSTAR right-of-way crosses Service Road, just short of Route 149 in Barnstable (Exhs. KED-1, at 1-4; EFSB-E-1(1)). KeySpan indicated that it would build the Western Segment in stages – the first stage installed in time to provide additional capacity for the 2009/2010 heating season and additional stages completed by approximately 2014, depending on the actual rate of growth of customer demand (Exh. KED-1, at 2-25; Tr. 1, at 147-150).

2. The Middle Segment

The Middle Segment along the primary route would consist of approximately 4.9 miles of 200-psig, 12-inch diameter pipeline in Yarmouth, Dennis, and Harwich (Exhs. KED-1, at 1-4; EFSB-E-1(2)). The primary route begins at KeySpan's existing liquefied natural gas ("LNG") facility in South Yarmouth, runs easterly through Yarmouth on White's Path, North Main Street, Great Western Road, and Highbank Road, crossing the Highbank Road bridge over the Bass River into Dennis (Exhs. KED-1, at 1-4; EFSB-E-1(2)). In Dennis, the primary route passes through the South Dennis Historical District on Highbank Road, and continues eastward on Upper County Road, Great Western Way, Great Western Road, and Depot Street; the primary

¹ KeySpan presented information regarding the likely sequence and timing of construction for each of the three segments, based on its current base-case load forecast. However, the Company stated that it will re-evaluate its load forecast on an annual basis (Tr. 1, at 147-150). The Company further stated that the actual sequencing and timing of pipeline construction would be conducted on an as-needed basis, consistent with any future modifications to KeySpan's load forecast and subject to any adjustments the Company might make to coordinate with activities of the municipalities that would be affected by construction (id.).

route extends into Harwich, where it ends at the intersection of Depot Street and Main Street (Exhs. KED-1, at 1-14, fig. 4-6).

KeySpan stated that the first 12,000 feet of the Middle Segment is needed by the start of the 2006/2007 heating season (Exh. KED-1, at 1-5, 2-24). KeySpan indicated that, assuming completion of Algonquin's pipeline extension by the start of the 2007/2008 heating season, the Company would construct the remainder of the Middle Segment (a total of approximately 13,000 feet) in 2008 and 2009, in time to provide additional capacity for the 2009/2010 heating season (*id.* at 2-24 to 2-25; Tr. 1, at 147-150). The Company stated that, without the Algonquin pipeline extension, and subject to the actual rate of growth of demand, it would complete construction of the entire Middle Segment by the start of the 2007/2008 heating season (Exh. KED-1, at 2-24 to 2-25).

3. The Eastern Segment

The Eastern Segment along the primary route would consist of 1.6 miles of 200-psig, 12-inch diameter pipeline in Harwich (Exhs. KED-1, at 1-4; EFSB-E-1(3)). The primary route runs along Route 39 in Harwich, from the intersection with Depot Road to the intersection with Church Street, ending at the KeySpan Church Street regulator station (Exh. KED-1, at fig. 4-4).

KeySpan stated that it would construct the Eastern Segment in time to increase capacity beginning with the 2010/2011 heating season, subject to the actual rate of growth of demand (Exh. KED-1, at 2-25; Tr. 1, at 147-150). The Company stated that it would either construct the Eastern Segment in three stages, beginning in 2010 and ending in 2013, or in a single year, depending largely on the expressed preference of the Town of Harwich (Exhs. KED-1, at 3-4; EFSB-S-4; EFSB-E-24; Tr. 2, at 270-272).

B. Procedural History

On June 3, 2005, KeySpan filed a petition with the Siting Board seeking approval, pursuant to G.L. c. 164, § 69J, to construct the proposed pipeline project. The Siting Board petition was docketed as EFSB 05-2. The Siting Board conducted public comment hearings on the Company's petition in the Barnstable on July 27, 2005 and in Harwich on July 28, 2005.

On August 30, 2005, the Presiding Officer issued a ruling granting two petitions to intervene and three petitions for limited participant status in the proceeding. The Town of Yarmouth and the Town of Dennis (jointly, “Towns”) and Andrew Collentro were granted intervenor status. Russell DeTore and Suzanne DeTore, jointly, Diane Pinto, and NSTAR were granted limited participant status.

The Siting Board staff issued one preliminary and two additional sets of information requests to the Company; the Towns issued two sets of information requests to the Company. The Company issued one set of information requests to the Towns.

On September 15, 2005, the Company submitted its direct case, in the form of written prefiled direct testimony. Thereafter KeySpan presented the testimony of three witnesses: Walter F. Fromm, Manager of Project Engineering for KeySpan and Project Manager for the proposed project; Theodore E. Poe, Jr., Manager of Energy Planning for KeySpan; and Theodore A. Barten, Managing Principal of Epsilon Associates, the Company’s engineering and environmental consultant.

On October 13, 2005, the Towns submitted their prefiled direct testimony. Thereafter the Towns presented the testimony of three witnesses: Joseph A. Rodricks, Town Engineer for the Town of Dennis; Edmond R. Nickerson, Chairman of the South Dennis Historical District; and George Allaire, Town of Yarmouth Public Works Director.

Adjudicatory hearings were held on November 17 and 29, 2005, and December 1, 6, and 9, 2005. Approximately 370 exhibits were entered into evidence. On January 6, 2006, the Company and the Towns filed initial briefs and on January 13, the Company filed a reply brief. The evidentiary record was closed on January 4, 2006.

C. Jurisdiction and Scope of Review

The Company filed its petition to construct the proposed pipeline project in accordance with G.L. c. 164, § 69H, which requires the Siting Board to implement the energy policies in its statute to provide a reliable energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost, and pursuant to G.L. c. 164, § 69J, which requires a

project applicant to obtain Siting Board approval for the construction of proposed energy facilities before a construction permit may be issued by another state agency.

As a new gas pipeline with a normal operating pressure in excess of 100 psig and a length in excess of one mile, the Company's proposed project falls within the definition of facility set forth in G.L. c. 164, § 69G, which provides that a "facility" includes:

a new pipeline for the transmission of gas having a normal operating pressure in excess of 100 pounds per square inch gauge which is greater than one mile in length except restructuring, rebuilding, or relaying of existing transmission lines of the same capacity.

In accordance with G.L. c. 164, § 69J, before approving a petition to construct facilities, the Siting Board requires an applicant to justify its proposal in three phases. First, the Siting Board requires the applicant to show that additional energy resources are needed (see Section II.A, below). Next, the Siting Board requires the applicant to establish that, on balance, its proposed project is superior to alternative approaches in terms of cost, environmental impact, reliability, and ability to address the identified need (see Section II.B, below). Finally, the Siting Board requires the applicant to show that it has considered a reasonable range of practical facility siting alternatives and that the proposed site for the facility is superior to a noticed alternative site in terms of cost, environmental impact, and reliability of supply (see Sections III.A and III.C, below).

II. ANALYSIS OF THE PROPOSED PROJECT

A. Need Analysis

1. Standard of Review

In accordance with G.L. c. 164, § 69H, the Siting Board is charged with the responsibility for implementing energy policies in its statute to provide a reliable energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost. G.L. c. 164, § 69H. In carrying out this statutory mandate with respect to proposals to construct natural gas pipelines, the Siting Board evaluates whether there is a need for additional natural gas facilities in the Commonwealth to meet reliability, economic efficiency, or environmental

objectives. See The Berkshire Gas Company, EFSB 05-1, at 3-4 (2006) (“2006 Berkshire Gas Decision”); Boston Edison Company, d/b/a NSTAR Electric, 14 DOMSB 233 (2005) (“2005 NSTAR Electric Decision”); Massachusetts Electric Company and New England Power Company, 18 DOMSC 383, at 393 (1989) (“MECo/NEPCo Decision”).

In evaluating the need for new energy facilities to meet reliability objectives, the Siting Board may evaluate the ability of its existing system to accommodate changes in aggregate demand or supply,² to serve major new loads, or to maintain reliable service in certain contingencies. The Siting Board previously has approved proposals to construct gas pipelines to accommodate load growth within a utility’s service territory (Boston Gas Company, 17 DOMSC 155 (1988)) and to transport natural gas to generating facilities. See NSTAR Gas Company, 13 DOMSB 143 (2001) (“2001 NSTAR Gas Decision”); Massachusetts Municipal Wholesale Electric Company, 12 DOMSB 18 (2001) (“MMWEC Decision”); Berkshire Gas Company, 20 DOMSC 109 (Phase II) (1990). In such cases, the proponent must demonstrate that additional energy resources are necessary to meet reliability objectives by establishing that its existing system is inadequate to serve the anticipated load with acceptable reliability.

2. Description of the Existing System

The Company stated that KeySpan’s existing Sagamore Line is an approximately 42-mile, high-pressure natural gas distribution line serving about 89,000 residential and 8300 commercial customers in the Company’s Cape Cod service territory (Exh. KED-1, at 2-1, 2-4 to 2-5). The Company indicated an average and peak daily gas throughput on its Cape Cod system of approximately 31,500 million Btu (“MMBtu”) and 114,000 MMBtu, respectively (id.). The Company explained that natural gas supplies currently reach the Cape by the G Lateral, which is a feeder line off the Algonquin pipeline system, and by truck to the Company’s LNG facilities (id.). The Company stated that the G Lateral is at present the sole interstate pipeline

² With respect to changes in demand or supply, the Siting Board has found that new capacity is needed where projected future capacity available to the system is found to be inadequate to satisfy projected load. ANP Blackstone Energy Company, 8 DOMSB 1, at 27 (1999) (“ANP Blackstone Decision”); Cabot Power Corporation, 7 DOMSB 233, at 249 (1998); New England Electric System, 2 DOMSC 1, at 9 (1977).

facility supplying southern Massachusetts (id. at 2-5). Gas from Algonquin enters the KeySpan system at the Bourne and Sagamore take stations (id.).

The Company stated that the principal supply lines of its Cape Cod distribution system are the Sagamore and Bourne Lines (id. at 2-5). The Company indicated that the Sagamore Line, the principal feeder line for customers on the northern side of the Cape, starts at the Sagamore take station and runs through Bourne, Sandwich, Barnstable, and Yarmouth to an interconnection with the South Yarmouth LNG facility (id.). From South Yarmouth, the Sagamore Line continues through Dennis, Harwich, and Brewster (id.). The Company stated that the Bourne Line starts at the Bourne take station, continues to the southwestern portion of the Cape to serve customers in Bourne, Sandwich, Falmouth, and Mashpee, and connects with the Sagamore Line in Barnstable, where it terminates at a regulator station on Oak Street (id. at 2-5 to 2-6).

The Company indicated that the Sagamore Line generally operates at 270 psig in winter and 200 psig in summer (id.). The Company noted that smaller 60 psig distribution lines feed gas into the easternmost part of its Cape Cod system in Chatham, Orleans, and Eastham as well as into the areas of the Cape adjoining the length of the Sagamore and Bourne Lines (id.). The Company stated that gas pipeline supplies to the Cape and pipeline pressure to serve the eastern extremities of KeySpan's Cape distribution system originate at the western Cape and the interstate pipeline system (id.).

The Company explained that, in addition to the Sagamore and Bourne Lines, another key component of its Cape Cod system is the South Yarmouth LNG facility (Exh. KED-1, at 2-6). The Company stated that it operates the South Yarmouth LNG facility to provide a source of gas supply during peak demand periods and to help maintain system pressures for gas flows to the easternmost portion of the Cape (id.). The Company stated that its South Yarmouth LNG facility has an operational sendout capability of approximately 27,600 MMBtu/day, and a storage capacity of 165,073 MMBtu (id.). The Company reported that the South Yarmouth LNG facility includes a single LNG storage tank, an LNG tanker truck unloading station and four heated vaporizers (id.).

The Company indicated that since 1999, it has supplemented the Cape Cod distribution system with two portable LNG vaporizer units at the eastern extremity of the system (id.).

One of these units is in Chatham and has a maximum output of 250 MMBtu/hr; the other, in Eastham, has a maximum output of 45 MMBtu/hr (id.).³ The Company stated that the portable LNG units are intended for use a few days a year to bolster pressure when demand for gas is especially high (id. at 2-7). The Company indicated that it also operates, supplemental to its other Cape Cod system facilities, a small LNG facility off Cape Cod in Wareham (id.). The Company stated that its Wareham facility has a storage capacity of 9130 MMBtu and a maximum output of 120 MMBtu/hr (id. at 2-6 to 2-7).

3. Need for Additional Resources

a. Sendout Projections

To document the future requirements of its Cape Cod customers, the Company provided a copy of its most recently approved forecast, the Long-Range Resource and Requirements Plan for the years 2001/2002 to 2005/2006, developed in 2001 (“2001 LRRP”) (Exh. EFSB-N-1(1)). In addition, the Company submitted its current Long-Range Resource and Requirements Plan for the years 2005/2006 to 2009/2010, developed in 2005 (“2005 LRRP”) (Exh. EFSB-N-1(2)(S)).⁴

The Company stated that, in its 2001 LRRP, it forecasted an average annual growth rate of 3.3% for design day sendout over the 2001/2002 to 2005/2006 period (Exhs. EFSB-N-1(1); EFSB-N-7). For the period 2004/2005 to 2008/2009, the Company’s forecast projected an average annual growth rate of 2.3% for design day sendout (Exhs. EFSB-N-1(1); EFSB-N-1(2)(S); EFSB-N-7). The Company asserted that, in a review of forecast accuracy, it determined its 2001 LRRP sendout amounts (i.e., projected sendout) had provided reasonable approximations of actual firm sendout for its forecast period (Exh. EFSB-N-7).

To assess need for the proposed project, the Company prepared a project-specific forecast (described by the Company as a ten-year forecast) to establish load and resource requirements in

³ The Company indicated that, for back-up purposes, it maintains a second, identical unit at the Chatham site, but not in Eastham (Exh. KED-1, at 2-6 to 2-7) .

⁴ The Company indicated that the 2005 LRRP, pending with the Department, is docketed as D.T.E. 05-68 (Exh. EFSB-N-1(2)(S)).

the Cape Cod Division for the period 2004/2005 to 2014/2015 (Exh. KED-1, at 2-22 to 2-24).⁵ The Company noted that based on its analysis for the period, design day sendout for Cape Cod would increase by an annual average of 2.1% over the first five years, 2005/2006 through 2010/2011 (Exh. RR-EFSB-3). The Company also explained that as part of its analysis, it calculated customer load growth on Cape Cod by town (*id.*).⁶ The Company stated that the five-year growth rate broke down by region as follows: 2.4% across the western Cape, comprised of Bourne, Falmouth, Mashpee, Sandwich, and Wareham; 1.5% across the mid-Cape, Barnstable, Dennis, and Yarmouth; and 3.2% across the fastest growing of the three regions, the eastern Cape (Brewster, Chatham, Eastham, Harwich, and Orleans) (*id.*).

KeySpan conducted a sensitivity analysis of the need for the proposed project. The Company provided high load growth (“high case”) and low load growth (“low case”) scenarios in addition to its base load growth (“base case”) projection developed from the project-specific forecast (Exhs. KED-1, at 2-14 to 2-25, table 2-5; EFSB-N-8(S); RR-EFSB-8). The Company used a yearly load growth rate of 2.6% for the high case and 1.8% for the low case, compared to 2.1% for the base case (Exh. RR-EFSB-8).

With respect to forecast methods, the Company indicated that it used the same forecast methods approved by the Department in the Company’s 2001 LRRP to develop the 2005 LRRP and the project-specific forecast for 2004/2005 to 2014/2015 (Exhs. KED-1, at 2-8 to 2-25; EFSB-N-1(1); EFSB-N-1(2)(S)). The Company explained that it examined the actual sendout data for the twelve-month period May 1, 2003 through April 30, 2004, then weather-normalized these data to establish sendout for a reference year (Exhs. KED-1, at 2-15 to 2-18; EFSB-N-1(1)).

⁵ The Company indicated that it relied primarily on the Advantica/SynerGEE gas flow model (“SynerGEE model”) to evaluate KeySpan’s Cape Cod distribution system (Exh. KED-1, at 2-22 to 2-23). The Company explained that it used the SynerGEE model to simulate performance of the distribution system under defined conditions (design day weather conditions, for example) and to identify specific locations and conditions where pressure problems would likely occur (*id.*).

⁶ The Company explained that it determined a growth factor for each town in conjunction with use of the SynerGEE model (Exh. RR-EFSB-3). The Company further explained that its determination of growth factors reflected a review of the geographic distribution of recent load additions associated with new customers on the Cape (*id.*).

With a reference year developed, the Company then used forecasted incremental sales volumes and reference year sendout to project its split-year normalized customer requirements over the project-specific forecast period; load requirement subsequently became an input in the Company's forecasted year-by-year, design year and design day resource requirements for future years (id.).⁷ The Company indicated that it thus took into consideration the total resources available to the KeySpan consolidated resource portfolio and the firm sendout requirement (id.).⁸

b. Delivery Volumes and Pressures

KeySpan presented results of hourly system pressure analyses, using the SynerGEE model to predict the ability of the existing Cape Cod distribution system to deliver gas over the project-specific forecast period (Exh. KED-1, at 2-22 to 2-25, table 2-5).⁹

The Company indicated that it first analyzed the ability of its existing Cape Cod system to deliver gas to customer connections at a minimum pressure of 10 psig (id.). The Company's model predicted that in 2006/2007, delivery pressures of less than 10 psig would occur under design weather and load conditions in two areas of the Cape Cod system, including modeled pressures of 9 psig at a location in Dennis and zero at a location in Harwich (id. at 2-22 to 2-23,

⁷ The Company indicated that sendout requirements were developed using Department-approved design year and design day weather-planning standards (Exh. KED-1, at 2-15 to 2-18).

⁸ KeySpan indicated that, contingent on enhancement of its ability to distribute gas to its Cape Cod system customers, the Company anticipated contracting for incremental increases in deliveries from Algonquin beginning with 2000 MMBtu/day of added gas supplies over 2005 levels in the 2005/2006 heating season (Exh. KED-1, at 2-16). Based on its sendout analysis, the Company estimated it would need added gas supplies for its Cape Cod system, after the 2005/2006 heating season, as follows: an added 6000 MMBtu/day by 2006/2007, an added 10,000 MMBtu/day by 2008/2009 and an added 23,000 MMBtu/day by 2014/2015 (id. at 2-24).

⁹ The Company indicated that, to ensure that the peak-hour capability of its distribution system was sufficient to meet the peak hour requirement of the system under design day conditions, it assumed the peak-hour capability must be at least 5% of the peak-day requirement (Exh. KED-1, at 2-24).

table 2-5; Exh. RR-EFSB-2).¹⁰ In 2007/2008, according to the Company's analysis, a modeled pressure of zero is shown under design conditions at locations in Eastham and Dennis, as well as at the Harwich location (Exh. KED-1, at 2-22 to 2-23, table 2-5). The Company's analysis showed a modeled pressure of zero recurring in those locations under design conditions by 2008/2009, and also occurring at an additional location, in Chatham (id.).

The Company stated that it also analyzed the ability of its Cape Cod system to deliver gas consistent with other Company operating criteria, including maintaining a minimum inlet pressure of 70 psig at all regulators supplying the system's 60 psig lines from higher pressure lines.¹¹ Along KeySpan's high pressure system, the results of the Company's analysis show that, beginning in 2006/2007, declining pressures would occur along eastern portions of the Sagamore Line and along the connecting Depot Street lateral,¹² including at two modeled transfer points to the 60 psig system – 41 psig at the Church Street regulator and 40 psig at the Depot Street regulator (Exh. KED-1, at table 2-5). Inlet pressures would drop to 22 psig and 20 psig at the Church Street regulator and the Depot Street regulator, respectively, in 2007/2008, and to a modeled inlet pressure at zero at both regulators by 2008/2009 (Exh. KED-1, at table 2-5).

The Company also analyzed the ability of its Cape Cod distribution system to deliver gas consistent with operating its Chatham and Eastham LNG units at no more than 45 MMBtu/hr

¹⁰ The Company indicated that, without the proposed project, it would expect to operate the Chatham LNG facility at up to 218 MMBtu/hr in 2006/2007 and at up to 250 MMBtu/hr in subsequent years (Exh. KED-1, at 2-23, table 2-5).

¹¹ The Company explained that a pressure of at least 70 psig at each regulator inlet is necessary to maintain a pressure of 60 psig coming out of the regulator (Exhs. KED-1, at 2-23; EFSB-RR-2). The Company used the level of 60 psig coming out of the regulator as an intermediate criterion, i.e., an indicator of the system's ability to maintain 10 psig at the eastern end of its distribution system on the Cape (Exh. KED-1, at 2-23).

¹² The Company noted that its analysis showed significant drops in pressure for successive points extending eastward along some portions of the Sagamore Line – in particular, the portion extending eastward from the connection of the line at the South Yarmouth LNG facility (Exh. KED-1, at 2-22 to 2-23, table 2-5). In 2006/2007, for example, the pressure was modeled as dropping from 140 psig at the South Yarmouth LNG facility to 77 psig at Depot Street/Main Street in Harwich near the Dennis boundary (these are the endpoints of the Middle Segment of the proposed project), a distance of 4.9 miles (id.).

(id. at 2-18, 2-22 to 2-23, table 2-5). The Company asserted that its current level of reliance on its portable units in Chatham and Eastham presents a growing operational and related reliability issue that completion of the proposed project would resolve (Exh. KED-1, at 2-7).¹³ The Company indicated that results of its analysis show a pressure of zero under design conditions beginning in year 2006/2007 at extremity locations of the 60 psig system in Dennis, Harwich, Eastham, and Chatham, as well as at transfer points to the 60 psig system including the Stony Brook, Church Street, and Depot Street regulators (id. at 2-25, table 2-5).

Based on its analyses, KeySpan asserted there would be a need for 751 MMBtu/hr of added peak-hour flow capability by the 2006/2007 heating season to meet the peak-hour requirement of its Cape Cod system under design day conditions (Exh. KED-1, at 2-24). The Company stated that its base case shows a need for an increase in its Cape Cod peak-hourly flow capacity of 961 MMBtu/hr by 2008/2009 and 1591 MMBtu/hr by 2014/2015, relative to its current system capacity (id.). KeySpan's sensitivity analysis showed an incremental need in 2014/2015 of 1311 MMBtu/hr for the low case and 2575 MMBtu/hr for the high case (Exh. RR-EFSB-8, at 3).

In conjunction with analyzing required increases in gas deliverability over the project-specific forecast period, KeySpan also undertook an analysis relating to the location and timing of the principal bottlenecks (i.e., areas of capacity constraint) along the Sagamore Line. KeySpan's analysis identified Sagamore Line constraints (1) extending eastward from the intermediate point on the Sagamore Line where the South Yarmouth LNG facility is connected; (2) existing near the eastern extremity of the line; and (3) existing along western portions of the line downstream of the present and prospective delivery points for gas volumes supplied via the Algonquin G Lateral (Exhs. KED-1, at 2-22, 2-23; EFSB-N-5). The Company provided results of its analyses of bottlenecks along the Sagamore Line, in support of its selection of a project approach. These are discussed in Section II.B.6, below.

¹³ The Company indicated that trucks now deliver LNG to fuel its portable units: when operating, the Chatham unit requires one truckload of LNG every 3 to 4 hours; the Eastham unit requires one truckload of LNG every 15 to 18 hours (Exh. KED-1, at 2-7). The Company noted that truck deliveries to Chatham and Eastham are in addition to those needed for deliveries at its South Yarmouth LNG facility (id.).

c. Demand Side Management

KeySpan considered accelerated implementation of demand side management (“DSM”) programs to offset need for the proposed project (Exh. KED-1, at 3-6 to 3-7, 3-12 to 3-14). The Company indicated that such an effort would require finding DSM measures to counter anticipated growth in normalized sendout on the Cape (id.). KeySpan indicated that with its current 3% participation rate, existing DSM program savings provide total annual savings of 58,911 MMBtu/yr across all customer sectors (id.).

The Company asserted that each year through 2014/2015, it would need to achieve 315,000 MMBtu of new DSM savings, on average, beyond that achieved in the previous year, in order to offset forecasted load growth (id.). KeySpan estimated that by the winter heating season of 2014/2015, it would need cumulative DSM program savings of 3,500,000 MMBtu/yr (id.). KeySpan further estimated that, to achieve DSM savings of 3,500,000 MMBtu/yr through annual increments of 315,000 MMBtu/yr, immediate participation in all of the Company’s existing energy-efficiency programs by more than 50% of its residential as well as its commercial and industrial customers would be required (id. at 3-13 to 3-14). The Company concluded, based on its forecast of sendout and its evaluation of the likely availability of DSM, that DSM measures alone would not address the identified need (id. at 3-6 to 3-7, 3-12 to 3-14; Exh. EFSB-A-1).

d. Analysis

In order to meet its statutory mandate, the Siting Board first evaluates whether there is a need for additional energy resources to meet reliability, economic efficiency, or environmental objectives. The Siting Board must find that additional energy resources are needed as a prerequisite to approving a proposed energy facility. 2006 Berkshire Gas Decision, EFSB 05-1, at 9; 2005 NSTAR Electric Decision, 14 DOMSB 233, at 7; MECo/NEPCo Decision, 18 DOMSC 383, at 396-403.

Here, KeySpan has proposed to increase its distribution system capacity by constructing additional pipeline, in segments, to augment the existing Sagamore Line. KeySpan has argued its need for gradually increasing peak hourly flow capability over the long-term planning horizon 2004/2005 to 2014/2015 to meet the peak-hour requirement of its Cape Cod system under design

day conditions. Specifically, the Company has indicated a need for added peak-hour flow capability of 751 MMBtu/hr by the 2006/2007 heating season, increasing to 961 MMBtu/hr by 2008/2009, and to 1591 MMBtu/hr by planning year 2014/2015.

KeySpan has submitted information and analyses to the Siting Board demonstrating a need for expanded system capacity on Cape Cod to provide increased gas supply deliverability within the project-specific forecast period. With respect to distribution system criteria, KeySpan has demonstrated a need for additional gas resources: (1) to ensure continued gas delivery to the eastern extremities of KeySpan's distribution system on Cape Cod at a minimum operating pressure of 10 psig, and to the regulator outlets serving those extremities at a minimum operating pressure of 60 psig; and (2) to avoid operating the Company's LNG facilities in excess of its operating criteria. The Company has demonstrated that bringing additional energy resources to the Company's Cape Cod distribution system would allow it to operate its LNG facilities without exceeding injection rates of 120 MMBtu/hr at KeySpan's Wareham facility, 1150 MMBtu/hr at the South Yarmouth facility, and 45 MMBtu/hr each at portable facilities in Chatham and Eastham.

The Company has explored the potential to meet the identified resource need through accelerated implementation of DSM. In so doing, the Company has compared its forecast of normalized sendout on the Cape with its evaluation of existing and potential DSM availability over the planning horizon, 2004/2005 through 2014/2015. KeySpan has estimated that over this forecast period it would need annual incremental DSM program savings of 315,000 MMBtu/yr – a cumulative DSM program savings of 3,500,000 MMBtu/yr by the winter of 2014/2015. The Company's estimates show that, for the 2004/2005 to 2014/2015 forecast period, annual incremental DSM program savings would have to be five times the current cumulative level. To reach cumulative DSM savings of 3,500,000 MMBtu/yr would require immediate enrollment of 50% of KeySpan's Cape Cod customers across all sectors in 100% of the Company's existing energy-efficiency programs.

The level of DSM required to offset projected sendout growth on Cape Cod, given levels of DSM attained there currently, and feasibly attainable through 2014/2015, supports the Company's conclusion that it is unlikely that accelerated DSM could reasonably be implemented

to meet the identified need. Therefore, the Siting Board finds that accelerated DSM would not eliminate the need for additional energy resources.

Overall, the Company has provided information showing the need for the proposed project, in combination with the Algonquin G Lateral extension, to meet KeySpan's gas supply needs and pressure requirements on the Cape. The Siting Board finds, therefore, that there is a need for additional energy resources to maintain reliable gas service to customers of KeySpan's Cape Cod distribution system.

4. Consistency with Long-Range Forecast

G.L. c. 164, § 69J requires that a facility proposed by a gas company required to file a long-range forecast pursuant to G.L. c. 164, § 69I be consistent with that company's most recently approved long-range forecast. G.L. c. 164, § 69J. KeySpan is a gas company required to file a long-range forecast pursuant to G.L. c. 164, § 69I. See G.L. c. 164, §§ 75B, 75H. Consequently, to satisfy the statutory requirement, the Siting Board reviews the consistency of the proposed gas pipeline with KeySpan's most recently approved long-range forecast.

In keeping with G.L. c. 164, § 69J, the Company submitted for its proposed project a forecast analysis over the 2004/2005 to 2014/2015 planning horizon that it developed using the same methods approved by the Department in the 2001 LRRP, the Company's most recently approved forecast (Exhs. KED-1, at 2-8 to 2-25; EFSB-N-1(1)). See Section II.A.3.a, above. The Company further provided a detailed explanation as to how it established load and resource requirements over the ten-year planning horizon 2004/2005 to 2014/2015. The Company provided base case, low case, and high case scenarios. In addition, the Company submitted growth factors, and an explanation of their development and application, for each town served by its Cape Cod system.

In this case, the Company has identified a need for incremental design day and design year capacity that begins with the 2006/2007 heating season and increases with load growth throughout the ten-year planning horizon. The Company's forecast analysis drives the projections of need for additional energy resources and infrastructure to serve the Cape Cod area. The Company has established that the load assumptions in its system analysis for the proposed

project are consistent with forecasts for its Cape Cod system and stem from the information presented in its most recently approved long-range forecast. Accordingly, the Siting Board finds that the proposed project is consistent with the Company's most recently approved long-range forecast.

B. Comparison of Proposed Project and Alternative Approaches

1. Standard of Review

G.L. c. 164, § 69H requires the Siting Board to evaluate proposed projects in terms of their consistency with providing a reliable energy supply to the Commonwealth with a minimum impact on the environment at the lowest possible cost. General Laws, c. 164, § 69H requires a project proponent to present "alternatives to planned action" which may include: (a) other methods of generating, manufacturing, or storing electricity or natural gas; (b) other sources of electrical power or natural gas; and (c) no additional electric power or natural gas.¹⁴

In implementing its statutory mandate, the Siting Board requires an applicant to show that, on balance, its proposed project is superior to alternative approaches in terms of cost, environmental impact, and ability to meet the identified need. 2005 NSTAR Electric Decision, 14 DOMSB 233, at 266; Cambridge Electric Light Company, 12 DOMSB 305, at 321 (2001) ("CELCo Decision"); Boston Edison Company - Hopkinton and Milford, 6 DOMSB 208, at 252 (1997) ("1997 BECo Decision"). In addition, the Siting Board requires a petitioner to consider reliability of supply as part of its showing that the proposed project is superior to alternative project approaches. 2005 NSTAR Electric Decision, 14 DOMSB 233, at 266; CELCo Decision, 12 DOMSB 305, at 321 (2001); 1997 BECo Decision, 6 DOMSB 208, at 253-257.

2. Identification of Approaches for Analysis

The Company indicated that, based on its analysis of need, it sought project alternatives that would meet the following objectives: (1) ensure continued gas delivery to the eastern

¹⁴ G.L. c. 164, § 69J also requires an applicant to provide a description of "other site locations." G.L. c. 164, § 69J. The Siting Board reviews the Company's primary route, as well as other possible routes, in Section III.B, below.

extremities of KeySpan's 60 psig distribution system on Cape Cod at a minimum operating pressure of 10 psig, and to the regulator outlets serving those extremities at a minimum operating pressure of 60 psig; and (2) avoid over-reliance on the on-system peaking facilities maintained by KeySpan (Exhs. KED-1, at 2-23, 3-1 to 3-4; RR-EFSB-2; see Section II.A.3.b, above. The Company stated that to meet the enumerated objectives reliably through the Company's ten-year planning horizon, potential project alternatives would have to incorporate either additional pipeline facilities or additional storage and vaporization capability (Exh. KED-1, at 3-1 to 3-4).

The Company presented in-depth analyses of five project approaches¹⁵ with the potential to resolve the identified gas-supply and system-pressure issues: (1) the proposed project; (2) expansion of the South Yarmouth LNG facility; (3) construction of new LNG satellite facilities; (4) construction of propane/air facilities; and (5) installation of additional compression (id. at 3-3 to 3-4).

The Company indicated that while primarily addressing delivery capability, its identified project alternatives would also entail the use of higher gas volumes over time, whether from pipeline gas, LNG, or propane, to meet higher sendout requirements. In the case of the proposed project, the Company indicated that obtaining the required gas volumes would entail procurement of incremental transportation capacity on Algonquin's G Lateral (Exh. EFSB-G-4). The Company stated that it had approached Algonquin in 2004 to determine whether KeySpan would be able to secure additional pipeline capacity on the G Lateral (id.). The Company

¹⁵ G.L. c. 164, § 69J requires the Company to consider the alternative of no additional gas. The Company considered a no-build alternative, but concluded that it would not be an effective long-term solution to supply and pressure issues associated with increasing growth on the Cape (Exh. KED-1, at 3-5 to 3-6). The Siting Board notes that the no-build alternative would not meet the needs identified in Section II.A.3, above, and therefore eliminates it from further consideration. In Section II.A.3.d, above, KeySpan also analyzed additional conservation and load management options and the Siting Board determined that these options would not meet the identified need.

indicated that Algonquin, in response to the Company's inquiry, is now undertaking a pipeline extension within the time frame required by KeySpan (id.).¹⁶

a. The Proposed Project

The Company proposes supplementing the Sagamore Line with new construction (id. at 3-4 to 3-5). The new construction would consist of three segments (the Middle Segment, Western Segment, and Eastern Segment) constructed sequentially, in the order listed, over an approximately ten-year period (id.).¹⁷ The Company's reasoning with respect to development of its proposed project in three segments is discussed at greater length in Section II.B.6, below. Along with constructing the proposed project, the Company would require gas deliveries from Algonquin at 270 psig at a new take station at Route 130 (Exhs. EFSB-G-4; EFSB-N-3).

b. South Yarmouth LNG Expansion Approach

The South Yarmouth LNG expansion approach would enlarge the Company's existing South Yarmouth LNG facility, which is supplied with LNG by truck from Distrigas of Massachusetts in Everett (Exh. KED-1, at 3-15 to 3-16). Specifically, off-load, storage and vaporization at South Yarmouth would be increased (id.). KeySpan indicated that, to pursue the South Yarmouth LNG expansion approach, the Company would need to demolish the existing LNG storage tank at South Yarmouth and replace it with a larger unit (id. at 3-20; Exh. EFSB-A-5). KeySpan explained that the limited size of the present site and the lack of abutting parcels would constrain the Company's ability to expand at South Yarmouth (Exh. KED-1, at 3-20).

¹⁶ The Company explained that although the interconnection for KeySpan's distribution system and Algonquin's pipeline extension could be placed in a number of locations along the Sagamore Line, the point of interconnection would have to allow for the construction of a new take station accessible by both Algonquin and KeySpan (Exh. EFSB-G-4). The Company indicated that, to ensure the required access, the intersection of Route 130 and Service Road would be the optimal location for the take station (id.).

¹⁷ See Summary of the Proposed Project, Sections I.A.1 to I.A.3, above.

c. New LNG Facility Approach

This approach would involve construction of a new LNG satellite facility in Harwich and would provide KeySpan with greater LNG storage and vaporization capacity (Exh. KED-1, at 3-16 to 3-17). The new LNG facility would have a maximum hourly vaporization output of 1000 MMBtu/hr and storage capacity of 300,000 MMBtu, and would, in addition, include truck unloading, gas liquefaction, and odorization capability, along with spill containment structures, piping, and controls (id.). The Company indicated the new LNG facility approach would be sized to meet both seasonal gas-supply requirements and hourly output requirements only through 2008/2009 (id.). The Company noted it would not be practical to develop the new LNG facility approach to meet identified needs including seasonal gas supply requirements on the Cape through the ten-year planning horizon (id.; see Section II.B.3.c, below). The Company explained that this was due to the large size of the storage tank that would be required and associated difficulties with its siting in Harwich near the Sagamore Line (id.). KeySpan suggested that even this scaled-down version of the new LNG facility approach would require a fairly large block of land near the eastern end of the Sagamore Line to construct, and therefore siting such a facility would be controversial and permitting would be difficult (id.).

d. New Propane/Air Facility Approach

This approach would involve construction of four propane/air storage and vaporization facilities in the Company's Cape Cod service area (Exh. KED-1, at 3-14 to 3-15). Specifically, the Company would locate a 550 MMBtu/hr facility in South Yarmouth (storage capability of 350,000 MMBtu), a 500 MMBtu/hr unit at Depot Road and Main Street in Harwich (storage capability of 300,000 MMBtu), plus two 50 MMBtu/hr units at separate locations in Harwich (with storage capability of 35,000 MMBtu each) (id.).

e. Compression Addition Approach

The compression addition approach would include construction of five compressor stations, adding a total of 6600 horsepower ("hp") along the Sagamore and Bourne Lines (Exh. KED-1, at 3-17 to 3-18). The Company stated that three compressor stations would be

installed on the Sagamore Line, one each in Barnstable (2300 hp), South Yarmouth (1000 hp), and Dennis (1000 hp); compressor stations would be installed on the Bourne Line in Falmouth (1250 hp) and Mashpee (1050 hp) (id.). The Company indicated that the compression addition approach would include a backup compressor station at each location and appropriate controls to ensure continuous service in the event of a compressor failure (id.).¹⁸

f. Analysis

KeySpan has identified five approaches, described in Sections II.B.2.a to II.B.2.e, above, with the potential to address gas supply and pressure issues in its Cape Cod service area. Below, the Siting Board compares these approaches with respect to reliability, environmental impacts, and cost. The Siting Board then considers the three-segment configuration of the proposed project.

3. Reliability Comparison

a. The Proposed Project

The Company stated that the proposed project along either the primary or the alternative route would provide KeySpan with the necessary pressure and additional gas supply to meet the requirements of its Cape Cod area system reliably through the forecast period (Exh. KED-1, at 3-18 to 3-19). The Company indicated that the first phase of the Middle Segment could be completed in time to alleviate projected low-pressure problems on the eastern end of the Cape by the 2006/2007 heating season (id. at 3-4 to 3-5, 3-18 to 3-19). See Sections II.A.3.b, above, and II.B.7, below. The Company stated that the Middle Segment would also help reduce reliance on KeySpan's on-system peaking facilities, beginning in 2006/2007 (id.). The Company stated that it did not anticipate increased mechanical or operational control complexity to its Cape system as a result of construction of the proposed project (id. at 3-18 to 3-19).

¹⁸ The Company indicated that the compression addition approach assumed that sufficient gas supply would be available over the forecast period at the Bourne and Sagamore take stations to meet customer requirements (Exh. KED-1, at 3-18).

b. South Yarmouth LNG Expansion Approach

The Company stated that implementation of the South Yarmouth LNG expansion approach would improve the Company's ability to regulate system pressures as well as increase the sendout capabilities of KeySpan's Cape Cod system (Exh. KED-1, at 3-15 to 3-16). The Company stated, however, that the South Yarmouth LNG expansion approach also would present several reliability concerns (*id.* at 3-20). The Company noted that the operation of its existing South Yarmouth LNG facility is critical to maintaining distribution system pressures and gas supply (*id.*). KeySpan anticipated that replacement of the storage tank would likely require temporarily shutting down the South Yarmouth LNG facility with attendant impacts on the reliability of its distribution system on the Cape (*id.*). Furthermore, the Company anticipated that it would not be able to complete the South Yarmouth LNG expansion approach in sufficient time to alleviate the identified low-pressure problems on the eastern end of the Cape by the 2006/2007 heating system (*id.*).

The Company also indicated that the equipment needed to store and vaporize LNG involved greater potential for mechanical failure during periods of high gas consumption and/or cold weather than did the proposed project and some of the other considered alternatives (*id.*; Exh. EFSB-A-9).

c. New LNG Facility Approach

KeySpan stated this approach would provide the Company with additional LNG supplies, located to support the Company's ability to maintain adequate system pressures and increase sendout capabilities (Exh. KED-1, at 3-16 to 3-17). The Company indicated, however, that the large size of the storage facility that would be required would make the new LNG facility approach impractical with respect to meeting identified needs including seasonal gas-supply requirements on the Cape through the ten-year planning horizon (*id.*). Instead, the Company considered construction of an LNG facility adequate to meet both seasonal gas-supply requirements and hourly output requirements through 2008/2009 (*id.*).

The Company indicated that even its scaled-down version of the new LNG facility approach would involve purchase of at least ten to twelve acres for construction of an LNG

storage facility (Exhs. KED-1, at 3-20 to 3-21; EFSB-A-15). The Company expressed concern with respect to the potential difficulty of securing ten to twelve industrially-zoned acres near the eastern end of the Sagamore Line (Exh. EFSB-A-15). The Company specifically expressed concern that a short supply of appropriately-zoned parcels of sufficient size might result in permitting and construction delays that would prevent timely resolution (prior to the 2006/2007 heating season) of low-pressure issues on the eastern end of the Cape (id.; Exh. KED-1, at 3-21).

The Company also anticipated that equipment for storage and vaporization required in conjunction with the new LNG facility approach would likely fail more frequently during periods of high gas consumption and/or cold weather than would equipment required for the proposed project and some of the other considered alternatives (id. at 3-20 to 3-21; Exh. EFSB-A-10).

d. New Propane/Air Facility Approach

KeySpan indicated that, with respect to the Company's Cape Cod distribution system, the new propane/air facility approach would potentially: (1) increase maximum peak hourly flow capability; (2) meet design day gas supply requirements; and (3) alleviate low-pressure problems at the eastern end of the system (Exh. KED-1, at 3-14 to 3-15). However, the Company indicated the new propane/air facility approach would present a significant reliability concern if inadequate volumes of pipeline gas were available along the eastern end of the Sagamore Line to blend with propane (id. at 3-20). The Company explained that using propane in its system required injecting the propane with air and mixing it with the proper amount of pipeline gas, a consequence of the higher specific gravity and Btu content of propane relative to pipeline gas (id.). KeySpan indicated that release of propane into its distribution system in improper proportions to pipeline gas might adversely affect the operation of its customers' appliances (id.). The Company stated that a second reliability concern potentially associated with the new propane/air facility approach would involve the equipment for storing and vaporizing propane and compressing air for its use (id.). The Company stated that this equipment involved greater potential for mechanical failure during periods of high resource consumption and/or cold weather than did the proposed project and some of the other considered alternatives (id.; Exh. EFSB-A-8).

The Company noted that it would need to secure a minimum of 16 acres of cleared land

to accommodate the new propane/air facility approach (Exh. KED-1, at 3-14 to 3-15). The Company stated that these acres would have to be located near the Sagamore Line or that additional pipeline facilities would have to be constructed to tie the new propane/air facility unit into the Sagamore Line (id.). The Company stated that due to the likely difficulties of siting, permitting and construction, completion of the new propane/air facility approach in time for operation by the 2006/2007 heating season would not be feasible (id.).

e. Compression Addition Approach

The Company stated that the compression addition approach would involve construction of five compressor stations, each with backup facilities, to maintain system reliability (Exh. KED-1, at 3-21). The Company indicated that the five compressor stations would be located at sites in Barnstable, South Yarmouth, Dennis, Falmouth, and Mashpee, with attendant permitting and construction issues (id. at 3-18, fig. 3-2). The new construction would increase the maximum peak hourly flow capability of KeySpan's Cape Cod distribution system and increase pressure at its eastern end (id. at 3-17 to 3-18). KeySpan indicated, however, that it was unlikely that construction for the compression addition approach could be completed by the 2006/2007 heating season, when the Company projects pressure problems at the eastern end of its distribution system on the Cape (id. at 3-21; Exh. EFSB-A-11). The Company also indicated that the installation of additional compression would not resolve gas supply constraints projected over the project-specific forecast period (Exh. KED-1, at 3-21). The Company maintained, therefore, that the installation of additional system compression would not compare favorably to the proposed project in terms of ensuring the reliability of its distribution system on Cape Cod (id.; Exh. EFSB-A-11).

f. Analysis

The record shows that the five approaches analyzed by the Company would meet the projected needs of KeySpan customers on the Cape in some years of the forecast period. However, only the proposed project would provide additional energy resources by the 2006/2007 heating season.

In addition to the common issue of untimely completion of all the alternative approaches to the proposed project, the record shows each alternative approach to be flawed by at least one other significant reliability concern. The record shows the South Yarmouth LNG expansion would involve a temporary shut down of the existing South Yarmouth LNG facility with attendant impacts on the reliability of KeySpan's Cape Cod distribution system. With respect to the new LNG facility approach, the record shows that siting constraints would likely require the Company to construct a scaled-down unit too small to meet hourly output requirements on the Cape through the ten-year planning horizon. The record shows the new propane/air facility approach would present a significant reliability concern if inadequate volumes of pipeline gas were available along the eastern end of the Sagamore Line to blend with propane. With respect to the compression addition approach, the record shows that the need to install facilities in five locations for this approach, with associated permitting and construction issues, could result in partial or delayed implementation.

The record also shows that, during periods of high resource consumption and/or cold weather, mechanical failure would be somewhat more likely for the South Yarmouth LNG expansion, new LNG facility, or new propane/air facility approaches than for the proposed project or the compression addition approach. The record further shows that installation of additional compression would not resolve gas supply constraints projected over the project-specific forecast period.

Accordingly, with respect to reliability, the Siting Board finds that the proposed project along either the primary or the alternative route would be superior to the South Yarmouth LNG expansion approach, the new LNG facility approach, the new propane/air facility approach, and the compression addition approach.

4. Environmental Impacts

a. The Proposed Project

The Company explained that it would confine construction of the proposed project along the primary route to the shoulders or pavement of existing state and local roads, and, similarly, confine installation of the alternative route to the shoulders or pavement of an electric

transmission utility easement, a railroad right-of-way and existing state and local roads (Exhs. KED-1, at 3-21; EFSB-A-13; EFSB-A-14). The Company anticipated some tree-trimming along portions of the Western and Middle Segments, but no significant long-term environmental impacts with use of the primary route (Exhs. KED-1, at 3-21; EFSB-A-13; EFSB-A-14; EFSB-E-4).

With respect to the proposed project along the portion of the primary route through the South Dennis Historic District, the Company indicated that impacts to traffic and roadside shrubbery and plants might occur as a result of construction, but that these impacts could be mitigated and would be temporary (Exh. YAR/DEN 1-57). The Company stated, in addition, that it would not disturb mature trees or historic homes in the South Dennis Historic District in the process of constructing and operating the proposed project (*id.*). KeySpan also indicated that it anticipated no significant or permanent impact on wetlands, water resources, protected species or protected lands with construction of the proposed project along either the primary or the alternative route (Exh. KED-1, at 3-21 to 3-22). The Company further stated that it would, as a matter of general practice, use all appropriate erosion controls and other mitigation measures as necessary to limit environmental impacts of the proposed project (*id.*; Exhs. RR-EFSB-5; RR-EFSB-5(1)).

b. South Yarmouth LNG Expansion Approach

KeySpan stated that it would need to acquire, and clear for construction, additional property for the South Yarmouth LNG expansion approach (Exhs. RR-EFSB-5; RR-EFSB-5(1); Tr. 1, at 110-111). The Company also anticipated that vaporizers operating in conjunction with the identified approach would emit increased air emissions and low-level continuous noise (Exhs. KED-1, at 3-22; RR-EFSB-5; RR-EFSB-5(1)). The Company further stated that the South Yarmouth LNG expansion approach would require increased trucking to meet system needs over the forecast period (Tr. 1, at 110-111).

c. New LNG Facility Approach

The Company indicated that the new LNG facility approach would involve both temporary, construction-related, environmental impacts and permanent environmental impacts (Exhs. KED-1, at 3-23; RR-EFSB-5; RR-EFSB-5(1)). Permanent environmental impacts would likely include visual impacts of an industrial facility in a non-industrial setting and a long-term increase in truck traffic (Exhs. KED-1, at 3-23; RR-EFSB-5; RR-EFSB-5(1); Tr. 1, at 110).

d. New Propane/Air Facility Approach

KeySpan asserted that implementation of the new propane/air facility approach would involve land clearing and tree removal impacts at four locations (Exhs. RR-EFSB-5; Tr. 1, at 110; see Section II.B.2.d, above). The Company further indicated that the new propane/air facility approach would likely produce low-level background noise over the long term as a result of the air-compression process and air emissions in conjunction with vaporizer operation (Exh. KED-1, at 3-22). The Company also stated that the new propane/air facility approach would result in a long-term increase in truck traffic associated with delivery of propane (id.).

e. Compression Addition Approach

According to the Company, the compression addition approach would involve construction of five compression stations, each of which would require construction of an enclosure to protect equipment against the weather and to buffer sensitive receptors against noise from compressor operation (Exhs. KED-1, at 3-23; RR-EFSB-5; RR-EFSB-5(1); Tr. 1, at 110). The Company explained that it would site each enclosure in a small cleared area adjoining pipelines, and that each enclosure would contain natural gas-fired reciprocating engine sets, a compressor and associated piping, and valves and other control equipment (Exh. KED-1, at 3-23). The Company anticipated temporary environmental impacts at five locations due to construction of facilities for the compression addition approach, in addition to modest increases to air emissions and noise impacts on a permanent basis as a result of compressor operation (id.).

f. Analysis

The record shows there would be temporary environmental impacts from construction of the proposed project along the primary or alternative route. However, as the Company has asserted, the construction would result in no significant long-term environmental impacts, with use of the primary route and some tree-clearing for widening along portions of the Western and Middle Segments. The record shows that due to land acquisition and clearing for the South Yarmouth LNG expansion, new LNG facility, new propane/air facility and compression addition approaches, environmental impacts related to the construction of the identified approaches would likely be more extensive than for the proposed project. The record also shows that, for each of the alternative project approaches, overall environmental impacts of operation, including noise, visual, air and traffic impacts, would likely be comparable or greater than those of the proposed project. Consequently, the Siting Board finds that the proposed project along either the primary or alternative route would be superior to the South Yarmouth LNG expansion approach, the new LNG facility approach, the new propane/air facility approach, and the compression addition approach with respect to environmental impacts.

5. Cost

a. Description

The Company estimated costs at: (1) \$15,280,000 to \$24,500,000 for construction of the proposed project, depending on route, with fixed annual operating costs of approximately \$10,600; (2) \$55,000,000 for construction of the South Yarmouth LNG expansion approach, with fixed annual operating costs of approximately \$600,000; (3) \$50,000,000 for construction of the new LNG facility approach, with fixed annual operating costs of approximately \$850,000; (4) \$50,000,000 for the propane/air facilities approach; and (5) \$104,100,000 for construction of the compression addition approach, with fixed annual operating costs of \$100,000 or more.

b. Analysis

The Siting Board analyzed costs projected by the Company for installation of the proposed project and four project alternatives. The record shows that installation costs of the

proposed project would be at least \$25,000,000 less over the Company's planning horizon than those of the other four project alternatives. In addition, the record shows lower fixed annual costs for the proposed project. Based on its review, the Siting Board concludes that costs for the proposed project would be significantly less than for the four evaluated alternatives.

Consequently, the Siting Board finds that the proposed project would be superior to the South Yarmouth LNG expansion approach, the new LNG facility approach, the new propane/air facility approach, and the compression addition approach with respect to cost.

6. Configuration of the Proposed Project

As previously noted in Section II.A.3.b, above, KeySpan analyzed the location and timing of three principal gas delivery bottlenecks along the Sagamore Line over the project-specific forecast period: (1) one extending eastward from the intermediate point on the Sagamore Line where the South Yarmouth LNG facility is connected; (2) one existing near the eastern extremity of the line; and (3) one existing along western portions of the line downstream of present and prospective delivery points for gas volumes supplied via the Algonquin G Lateral.

The Company indicated that the Middle Segment, which would address pipeline constriction issues with respect to the first bottleneck, would facilitate distribution of new gas supplies and ensure adequate system pressure primarily for the geographic area from the outlet of the South Yarmouth LNG facility to Harwich (Exh. EFSB-N-5). The Company explained that construction of the Middle Segment was critical because it would mitigate pressure drops that, according to KeySpan's engineering models, are already occurring on the existing Sagamore Line in Yarmouth, Dennis and surrounding communities east of the South Yarmouth LNG facility (*id.*). The Company further explained that the Sagamore Line east of the South Yarmouth LNG facility was the section of KeySpan's existing Cape Cod supply system experiencing the highest pressure drop per unit length of pipe (*id.*). The Company stated that it proposed starting construction of the Middle Segment at the South Yarmouth LNG terminal because this was the point from which the Company needed to move combined pipeline gas and vaporized LNG supplies eastward (*id.*). The Company projected that, without construction of the proposed project, the modeled pressure drop would be 63 psig (from 140 psig to 77 psig) in 2005/2006 and

that by 2014/2015 the modeled pressure at the end of that length of main would be zero (Exh. KED-1, at table 2-5). The Company noted that with construction of the proposed project, the pressure drop on the Middle Segment would be only 16 psig (from 160 psig to 144 psig) as of 2013/2014 (id.).

The Company indicated that the Eastern Segment, which would address pipeline constriction issues with respect to the second bottleneck, would serve to maintain acceptable pressures at one supply point, the Church Street Regulator Station (Exh. EFSB-N-6). The Company explained that the Church Street Regulator Station is key to maintaining acceptable pressures on the 60-psig distribution system in the greater Chatham area and to limiting the Company's dependence on portable LNG in Chatham (id.). The Company stated that the Eastern Segment, as proposed, would start at Depot Road, the location of the beginning of the lateral that extends to the Church Street Regulator Station (id.). The Company projected that, without construction of the proposed project, the modeled pressure drop would be 14 psig (from 55 psig to 41 psig) in 2005/2006 and that by 2014/2015 the modeled pressure for that length of main would be zero (Exh. KED-1, at table 2-5). The Company noted that with construction of the proposed project, the pressure drop on the Eastern Segment would be only 1 psig (from 87 psig to 86 psig) as of 2014/2015 (id.).

KeySpan indicated that the Western Segment would address pipeline constriction issues with respect to the third bottleneck (Exhs. EFSB-N-3). The Company indicated that pressures at the western end of its system would be inadequate to maintain pressures at the eastern end of the system (id.). The Company stated that its proposed Western Segment would start at Route 130 to make use of a new take station to interconnect KeySpan's facilities with those of Algonquin's planned G Lateral extension (Exh. EFSB-N-5). The Company stated that its modeling indicated that, absent construction of the Western Segment, significant pressure drops would develop between the proposed start and terminus of the Western Segment at Routes 130 and 149, respectively, over a ten-year horizon (Exh. EFSB-N-3). Specifically, the Company projected that, assuming construction of the Algonquin project but without construction of the proposed project, the modeled pressure drop across the existing service main along the length of the proposed Western Segment would be 39 psig (from 234 psig to 195 psig) in 2005/2006, and that

by 2014/2015 the modeled pressure drop over that length of main would increase to 96 psig (from 198 psig to 102 psig) (id.). The Company noted that with construction of the proposed project, the pressure drop on the Western Segment would be only 4 psig (from 270 psig to 266 psig) as of 2014/2015 (id.).

The Company indicated that, due to continuing load growth across the Cape, a need exists for KeySpan to ensure reliability to its customers on an immediate, widespread and sustained basis along the Company's existing Sagamore Line (see Sections II.A and II.B, above). The Company also indicated the relationship of the three segments of the proposed project in time, place and function with respect to their overall purpose: each segment loops additional pipeline along specific portions of KeySpan's Cape Cod distribution system to optimize system pressures and the Company's ability to deliver energy resources to its customers (see Section II.A.3.b, above). The Company stated that because construction of each segment affects installation of the others, the timing of construction of the three segments would overlap during a ten-year construction schedule (Exh. KED-1, at 1-5 to 1-6). The Company noted that in conducting its analysis of potential project alternatives, it investigated options to meet the need for the proposed project as a whole, not for each of the segments individually, and argued that this was further support for the integral relationship of the configuration of its proposed project (id. at 2-2 to 2-3; Company Brief at 6).

The Company's analysis indicates that the phased construction, as the Company proposes, of three segments of pipeline would reinforce KeySpan's Cape Cod system and, in addition, would enable KeySpan to tie into a planned Algonquin pipeline extension. Therefore, the Company's proposed project, as indicated in Sections II.B.3 through II.B.5, above, would best serve the Company's gas supply and system pressure needs on the Cape over the long term. Consequently, the Siting Board concludes that the Company's decision to construct three separate segments of pipeline – two 200 psig segments and one 270 psig segment – is reasonable.

7. Conclusions

The Company presented seven project approaches to meet the long-term gas-supply and distribution system pressure issues on Cape Cod identified in Section II.A.3, above. In Sections

II.B.2 to II.B.6, above, the Siting Board reviewed the information provided by the Company and determined that two of the presented approaches, demand side management and the no-build alternative, did not have the potential to meet the identified need. The Siting Board therefore focused its review on the remaining five approaches – the proposed project, new propane/air facilities, the South Yarmouth LNG expansion, new LNG facilities, and installation of additional compression. Based on its analysis, the Siting Board found that the proposed project along either the primary or the alternative route would be superior to the South Yarmouth LNG expansion approach, the new LNG facility approach, the new propane/air facility approach, and the compression addition approach with respect to reliability, environmental impacts and cost. In addition, in Section II.B.6, above, the Siting Board reviewed the Company’s proposal to conduct construction in three segments over an approximately ten-year construction period. The Siting Board concluded that with respect to the Company’s phased construction plan, the Company’s proposed project would again, of all the considered project alternatives, best serve the Company’s gas supply and system pressure needs on Cape Cod over the long term.

Accordingly, the Siting Board finds that the proposed project would be superior to the South Yarmouth LNG expansion approach, the new LNG facility approach, the new propane/air facility approach, and the compression stations approach with respect to providing a reliable energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost.

III. ANALYSIS OF THE PRIMARY AND ALTERNATIVE ROUTES

The Siting Board has a statutory mandate to implement the policies of G.L. c. 164, §§ 69J-69Q to provide a reliable energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost. G.L. c. 164, §§ 69H and 69J. Further, G.L. c. 164, § 69J requires the Siting Board to review alternatives to planned projects, including “other site locations.” In implementing this statutory mandate, the Siting Board requires a petitioner to demonstrate that it has examined a reasonable range of practical siting alternatives, and that its proposed facilities are sited at locations that minimize costs and environmental impacts while ensuring supply reliability. 2006 Berkshire Gas Decision, EFSB 05-1, at 21;

2005 NSTAR Electric Decision, 14 DOMSB 233, at 277; New England Power Company, 21 DOMSC 325, at 376 (1991).

A. Site Selection

1. Standard of Review

G.L. c. 164, § 69J provides that a petition to construct a proposed facility must include “a description of alternatives to [the applicant’s] planned action” including “other site locations.” G.L. c. 164, § 69J. In past reviews of alternative site locations identified by an applicant, the Siting Board has required the applicant to demonstrate that it examined a reasonable range of practical siting alternatives. See 2006 Berkshire Gas Decision, EFSB 05-1, at 22; 2005 NSTAR Electric Decision, 14 DOMSB 233, at 277; New England Power Company, 7 DOMSB 333, at 374 (1998) (“1998 NEPCo Decision”). In order to determine whether an applicant has considered a reasonable range of practical alternatives, the Siting Board has required the applicant to meet a two-pronged test. First, the applicant must establish that it developed and applied a reasonable set of criteria for identifying and evaluating alternative sites or routes in a manner which ensures that it has not overlooked or eliminated any sites or routes which, on balance, are clearly superior to the proposed site or route. 2006 Berkshire Gas Decision, EFSB 05-1, at 22; 2005 NSTAR Electric Decision, 14 DOMSB 233, at 277; 1998 NEPCo Decision, 7 DOMSB 333, at 374. Second, the applicant must establish that it identified at least two noticed sites or routes with some measure of geographic diversity. 2006 Berkshire Gas Decision, EFSB 05-1, at 22; 2005 NSTAR Electric Decision, 14 DOMSB 233, at 277-278; 1998 NEPCo Decision, 7 DOMSB 333, at 374.

2. Site Selection Process

a. Company Position

i. Screening Criteria and Weights

KeySpan stated that its route selection process included the development of route selection guidelines, identification of a study area for each of the three identified segments, initial route selection, development of route evaluation criteria, and scoring of the alternative routes

based on the route evaluation criteria (Exh. KED-1, at 4-3 to 4-5).

The Company developed the following guidelines for use in identifying possible routes:

- Use direct routes, as opposed to more circuitous routes;
- Use existing corridors, rights of way, and easements where possible;
- Avoid crossing cemeteries, war memorials, and similar public or quasi-public lands;
- Minimize crossings of public lands that have been acquired for purposes of wildlife conservation, public recreation or other uses subject to Article 97 of the Massachusetts Constitution;
- Minimize routing in residential areas and densely developed commercial and mixed use areas;
- Minimize potential disruption of existing utilities;
- Minimize routing that would require significant disruption of rare and endangered species habitat; and
- Minimize routing in wetlands and significant water resources (id. at 4-9 to 4-10).

KeySpan characterized the principal land uses in the study areas for each of the three segments. After reviewing aerial photos or other mapping to assess the availability of existing rights-of-way for each segment, KeySpan stated that it selected a study area corridor that encompassed a number of reasonable route alternatives with a measure of geographic diversity (Exh. KED-1, at 4-6). The Western Segment study area encompassed Route 6A, the Bay Colony Railroad right-of-way, and the multi-circuit electric transmission right-of-way operated by NSTAR (id., at 4-6, 4-12). The Middle Segment study area encompassed the Bay Colony Railroad right-of-way, Route 6, and the existing Sagamore Line alignment (id., at 4-7). The Eastern Segment study area included Route 39 as well as a potential street alignment along Queen Anne Road and Church Street (id., at 4-8).

The Company identified four potential routes for the Western Segment:

- *Service Road:* From the intersection of Route 130 and Service Road, this route follows Service Road 6.6 miles to Route 149. KeySpan's existing 12-inch diameter pipeline follows Service Road along this section.

- *NSTAR right-of-way:* From the intersection of Route 130 and Service Road, this route runs southerly on Route 130 approximately one mile, then easterly on the NSTAR multi-circuit transmission right-of-way to its intersection with Service Road just to the west of the Route 6 / Route 149 interchange. The total length is approximately 6.6 miles.
- *Railroad right-of-way:* From the intersection of Route 130 and Service Road, this route runs northerly on Route 130 to Old Main Street to Beale Street to Dewey Avenue to the Bay Colony Railroad right-of-way, which it follows easterly 6.8 miles, then runs southerly along Route 149 to Service Road. The total length is approximately 9.7 miles.
- *Route 6A:* From the intersection of Route 130 and Service Road, this route runs northerly on Route 130 and Old Main Street, easterly 7.1 miles on Route 6A, and southerly on Route 149 to Service Road, for a total distance of 9.9 miles (Exh. KED-1, at 4-10 to 4-12).

The Company identified three potential routes for the Middle Segment:

- *Whites Path:* From the Company's South Yarmouth LNG facility driveway, this route runs easterly on Whites Path, southerly on North Main Street, easterly on Great Western Road, which becomes Highbank Road, and continues over the Bass River into Dennis. In Dennis, the route continues easterly on Highbank Road, Upper County Road, Great Western Way, and Great Western Road, to the intersection with Depot Street in Harwich, then northeasterly on Depot Street to its intersection with Main Street. This 4.9-mile route follows KeySpan's existing Sagamore pipeline.
- *Old rail right-of-way:* From the South Yarmouth LNG facility, this route runs easterly on the old Bay Colony Railroad right-of-way approximately 2.6 miles, including crossing the Bass River into Dennis, then easterly for 1.3 miles on the Cape Cod Rail Trail to the intersection of the Rail Trail with Depot Street in Harwich, then northerly on Depot Street to its intersection with Main Street. The total length is approximately 4.6 miles.
- *Route 6:* From the South Yarmouth LNG facility, this route runs easterly on Whites Path, continues ahead on the adjacent Route 6 right-of-way, crossing the Bass River into Dennis, and continuing on Route 6 until it diverges onto Main Street in Harwich, which it follows southeasterly to its intersection with Depot Street. The total length is approximately 4.7 miles (Exh. KED-1, at 4-12 to 4-14, fig. 4-3).

The Company identified two potential routes for the Eastern Segment:

- *Route 39:* From the intersection of Depot Road and Route 39 in Harwich, this route runs northeasterly on Route 39 to the Church Street regulator station, located at the intersection of Route 39 and Church Street in Harwich. This 1.6-mile route parallels KeySpan's existing 6-inch diameter Sagamore pipeline.
- *Queen Anne Road:* From the intersection of Depot Road and Route 39, this route runs northerly on Route 39, easterly on Queen Anne Road, and then northerly on Church Street to the end point. For 3000 feet on Queen Anne Road, the route runs along the boundary between Harwich and Chatham; otherwise, the route is in Harwich. The total length is approximately 2.2 miles (*id.* at 4-14 to 4-15, fig. 4-4; Exh. EFSB-S-1).

The Company stated that it undertook a comparison of these various routes based on the environmental, reliability, and cost attributes of the routes (Exh. KED-1, at 4-15 to 4-16). To compare the routes' environmental attributes, the Company developed nine environmental criteria, grouped into two categories: natural resources and community resources (*id.* at 4-16). Each criterion was given a weight of 1, representing the lowest weight, to 3, representing the highest weight (*id.*), as follows (weights are in parentheses):

Natural Resources

- Wetlands and vernal pools (3)
- Streams and water bodies (2)
- Groundwater protection (2)
- Vegetation clearing (2)
- Protected lands (3)

Community Resources

- Residences (2)
- Sensitive receptors (2)
- Traffic (2)
- Historic districts (1)

In its site selection process, the Company rated the potential route alternatives for each of these enumerated criteria, then weighted the ratings, using the weights listed above.

The Company described the impacts that would warrant particular ratings for each criterion

(id. at 4-16 to 4-17). For each criterion, the Company rated each route according to a scale of 1 to 5, with “1” representing the lowest potential impact, “5” representing the highest potential impact, and “3” representing the midpoint (Exh. KED-1, at 4-16). Next, the Company multiplied each rating by the weight for the criterion to arrive at a weighted score (one for each criterion) (id. at 4-17). For each route, the Company then summed the weighted scores for all the criteria, to calculate an overall environmental screening score (id.).

ii. Western Segment

The Company noted that in its Western Segment study area, located between Route 130 in Sandwich and the intersection of Route 149 and Service Road in Barnstable, existing land use is a mix of residential development and open space/conservation areas, with mostly residential land north of Route 6 and both municipal lands and residential subdivisions to the south of Route 6 (Exh. KED-1, at 4-6 to 4-7). Table 1, below, shows how KeySpan scored the four potential Western Segment routes based on the Company’s chosen environmental criteria:

Table 1. Weighted Environmental Criteria Scores for the Four Western Segment Routes

Environmental Criteria	Service Road	NSTAR Right-of-Way	Railroad Right-of-Way	Route 6A
Wetlands & Vernal Pools	3	3	15	15
Streams & Water Bodies	2	2	10	10
Groundwater Protection	6	10	4	4
Vegetation Clearing	2	4	10	2
Protected Lands	3	15	12	15
Residences	2	2	6	10
Sensitive Receptors	6	2	4	10
Traffic	4	4	6	10
Historic Districts	1	1	5	5
Total	29	43	72	81

Source: Exh. KED-1, at table 4-3

With respect to natural resource criteria, the Company indicated that the railroad right-of-way and Route 6A alternatives would include numerous stream crossings, some direct wetlands crossings, and extensive work near water bodies and/or vernal pools, resulting in the potential for permanent changes in wetlands vegetation and temporary impacts to other water resources, and that these two routes therefore received the highest (least favorable) scores of 5 for both the wetlands-and-vernal-pools and the streams-and-water-bodies criteria (Exh. KED-1, at 4-18, table 4-3). Along the railroad right-of-way, the Company expects that it would be necessary to route the pipeline directly through wetlands, due to space constraints (Tr. 3, at 557). Tree clearing would be required for pipeline location and construction access for most of the railroad right-of-way route; consequently, only that route received a high (unfavorable) score of 5 for vegetation clearing (Exh. KED-1, at 4-18, table 4-3). The Company indicated that it gave the NSTAR right-of-way route a high (unfavorable) score of 5 for the groundwater-protection criterion because only that route is largely within designated groundwater protection areas (*id.* at 4-19, table 4-3). Article 97 approval would be required for a small section on each of the Western Segment routes, for facilities associated with the future Algonquin gate station (Exhs. EFSB-G-2(a)(Supp), att.; EFSB-G-3 (Supp. 2), att. at 1-15).¹⁹ Only the NSTAR right-of-way route would cross additional Article 97 lands (Exh. KED-1, at table 4-1). With respect to priority and estimated rare species habitat, only the Service Road route crosses none of these protected lands (*id.*).”

For community resource criteria, the Route 6A alternative passes more than 15 residences per mile, passes several sensitive receptors, could cause significant traffic delays during

¹⁹ In its petition, KeySpan indicated that no portion of the Western Segment would require Article 97 approval (Exh. KED-1, at 5-24). However, KeySpan later indicated during the proceeding that, pursuant to subsequent discussions with Algonquin regarding the G lateral expansion, KeySpan would own certain facilities within the gate station as well as approximately 150 feet of pipeline between the gate station and the roadway layout of Route 130. KeySpan stated that Article 97 approval would be required for construction of the gate station and the 150 feet of interconnecting pipeline, using any of the Western segment routes (Exhs. EFSB-G-2 (Supp.); EFSB-G-3 (Supp. 2), att. at 1-15; EFSB-G-2 (a)(Supp.), att.).

construction, and is largely within a historic district; thus, it was scored unfavorably overall for community resources criteria compared to the NSTAR right-of-way and Service Road routes (id. at 4-21 to 4-22, table 4-3). As shown in Table 1, above, the Company concluded that the Service Road route had the best overall environmental score (id. at 4-33).

KeySpan indicated that the lengths of the four Western Segment route alternatives range in length from 6.6 to 9.9 miles and that, once in place, each route would have a similar degree of reliability (id. at 4-27, table 4-1). The Company indicated that, regardless of route, the pipeline would be a 20-inch diameter coated steel pipe buried with a minimum of three feet of cover and operated at 270 psig (Exhs. EFSB-S-2; EFSB-S-5). The Company stated that all four routes would be accessible for periodic inspection (Exh. EFSB-S-5). The Company indicated that the NSTAR right-of-way and railroad right-of-way route alternatives may have a lower chance of disruption from utility work than the Service Road route, but any unauthorized excavations would be less detectable away from public roads (id.). On the other hand, the Company pointed out that the greater density of development and length of the Route 6A alternative could lead to a higher chance of such disruption (id.). The Company asserted, however, that regardless of route differences, the risk of disruption is low (id.; Exh. EFSB-S-3).

KeySpan stated that there would likely be differences among the Western Segment alternatives with respect to the certainty with which they could be placed into service in a timely manner, due to differing needs for easements or other means of access, and potential permitting complications (Exh. KED-1, at 4-27).²⁰ The Company also differentiated the segments in terms of the availability of tie-in locations to link the new pipeline to the existing Sagamore Line, and

²⁰ The Company indicated that some route alternatives would require more significant permitting with local Conservation Commissions, the Massachusetts Natural Heritage and Endangered Species Program (“NHESP”), the Army Corps of Engineers, and the Massachusetts Department of Environmental Protection (“MADEP”) due to work in wetlands, water bodies or areas mapped by NHESP (Exh. KED-1, at 4-28). Some would require extensive work in historical districts, thus requiring consultation with and review by the Massachusetts Historical Commission and local historic commissions (id.). The Company stated that it considered route alternatives requiring Article 97 approval for one or more parcels as the most unfavorable with respect to difficulty of permitting (id.). See fn. 20, below.

indicated that flexibility in selecting tie-in locations provides greater certainty for making newly constructed pipeline useable (id. at 4-27). The Company presented these construction certainty and tie-in flexibility differences as differences in the reliability of the various potential routes (id. at 4-27 to 4-28). Because no private easements would be required, permitting complexity would be minimized, and tie-in flexibility would be maximized, the Company indicated that the Service Road route would be the most reliable among the four potential Western Segment routes (id. at 4-28, table 4-4).

KeySpan also estimated the costs of construction and construction access for the four Western Segment route alternatives. The Company derived cost estimates based on unit costs per foot of installation for each type of roadway or easement location; costs for clearing, repaving, and reseeding, as applicable; present value (“PV”) savings from phasing construction work; and the need to obtain easements from private property owners (id. at 4-23 to 4-27; Exh. EFSB-S-4). Although unit construction costs would be lower along the NSTAR right-of-way, the Service Road route was considered least costly because the PV cost would be reduced by approximately \$1,050,000 by phasing construction; because the NSTAR right-of-way route has an estimated \$3,000,000 in easement costs which could be avoided with the Service Road route; and because the Service Road route is significantly shorter than the Route 6A and railroad right-of-way alternatives (Exhs. EFSB-S-4; EFSB-S-8). Table 2, below, presents the Company’s cost estimates for the four Western Segment route alternatives:

Table 2. Cost Estimates for the Four Western Segment Routes

Service Road	NSTAR Right-of-Way	Railroad Right-of-Way	Route 6A
\$10,450,000	\$11,600,000 *	\$18,550,000 **	\$18,100,000

* Includes \$3,000,000 cost of easements from landowners but no payment to NSTAR as compensation for co-locating on NSTAR’s easements.

** Includes present value of lease payment to railroad right-of-way owner, \$5,850,000 over 30 years.

Source: Exh. KED-1, at 4-32

Based on this analysis, the Company concluded that the Service Road route had the lowest estimated cost (Exh. KED-1, at 4-33). KeySpan stated that it chose the Service Road route as the primary route for the Western Segment because it had the best environmental score, the best reliability evaluation, and the lowest cost (id. at 4-32 to 4-33).

In selecting a route to serve as the noticed alternative, KeySpan observed that the NSTAR right-of-way route had an environmental score better than the remaining two alternatives and a significantly lower cost, but that its reliability score was worse because of the Article 97 approvals and approximately 75 or 80 individual easements that would be needed (id. at 4-33; Tr. 2, at 254-266).²¹ The Company predicted that with enough money and effort, it could overcome the potential difficulties in obtaining easements and Article 97 approvals by 2009, and noted that the Route 6A and railroad right-of-way routes also carry some uncertainties with respect to permitting the project (Tr. 2, at 254-257). Overall, KeySpan concluded any differential uncertainty associated with right-of-way acquisition costs for the NSTAR right-of-way route was small enough to be outweighed by the route's significant environmental and cost advantages relative to the Route 6A and railroad right-of-way alternatives (id. at 254-257). The Company therefore selected the NSTAR right-of-way as the noticed alternative route (id.).

The Company added that the Service Road and NSTAR right-of-way routes would provide better pipeline performance, relative to the other two alternatives, because their shorter lengths would result in less pressure drop between endpoints (id. at 222-227). The Company noted that this factor was not included in the Company's site selection scoring and fortifies its choice of Service Road and the NSTAR right-of-way as the two noticed routes (id. at 223-230).

iii. Middle Segment

In its Middle Segment study area, located between the South Yarmouth LNG facility and the intersection of Depot Street and Main Street in Harwich, the Company identified extensive residential areas, several commercial/industrial developments, and limited conservation land open space (Exh. KED-1, at 4-7 to 4-8, fig. 4-3). Table 3, below, presents KeySpan's scoring of the three potential Middle Segment routes based on its chosen environmental criteria:

²¹ See Mass. Const. art. amend. 97 (1972) (disposition by a municipality of certain open space land requires a two-thirds vote of the state legislature). Disposition of Article 97 land also may require a unanimous vote of the municipal Conservation Commission and Park Commission, and a two-thirds vote of Town Meeting. See EOEPA Article 97 Land Disposition Policy (February 19, 1998).

Table 3. Weighted Environmental Criteria Scores for the Three Middle Segment Routes

Environmental Criteria	Whites Path	Old Rail Right-of-Way	Route 6
Wetlands & Vernal Pools	3	15	15
Streams & Water Bodies	2	2	2
Groundwater Protection	6	6	8
Vegetation Clearing	2	10	6
Protected Lands	3	9	9
Residences	10	6	6
Sensitive Receptors	4	4	2
Traffic	6	2	6
Historic Districts	3	3	1
Total	39	57	55

Sources: Exh. KED-1, at table 4-3; Tr. 1, at 22-23

The old rail right-of-way and Route 6 alternatives each received the highest (least favorable) scores of 5 for the wetlands-and-vernal-pools criterion, while the Whites Path route received the lowest score of 1 (Exh. KED-1, at table 4-3). According to the Company, the old rail right-of-way and Route 6 alternatives directly cross 400 and 500 feet of wetlands, respectively, and cross 100-foot wetland buffer areas for 2000 and 2400 feet, respectively, compared to 1400 feet of buffer area on the Whites Path route (id. at table 4-1; Exh. YAR/DEN 1-8). The Company stated that it would attempt to avoid any impacts to the wetlands along the old rail right-of-way route, and indicated that differences between the two routes, with respect to wetland impacts, are relatively subtle (Tr. 3, at 444).

With respect to vegetation, the Company stated that west of Route 134 in Dennis, the old rail right-of-way is overgrown with trees and brush (Exh. KED-1, at 4-13). The Company stated that tree clearing would be required for pipeline location and construction along the old rail right-of-way route, and only that route received a high (unfavorable) score of 5 for vegetation clearing; the Whites Path route is located within roadways, so vegetative impacts would likely be limited to minor tree trimming (id. at 4-19, table 4-3). With respect to protected lands none of the routes

cross Article 97 protected open space (Exh. KED-1, at table 4-1). Maps provided by the Company show that the Route 6 and old rail right of way pass through priority habitat for rare species;²² only the White's path route crosses no protected lands and therefore received a low (favorable) score of 1 in that category (id. at tables 4-1, 4-3; fig. 4-6).

For community resource criteria, the Whites Path route score was overall relatively unfavorable, largely because it has three and four times the number of residences within 100 feet, compared to the old rail right-of-way and Route 6 alternatives (id. at tables 4-1, 4-3). Under the Company's weighted scoring procedure, the Whites Path route was better than the other two routes on natural resources criteria by 25 to 27 points, and worse than each by 8 points on community resources criteria (id. at table 4-3; Tr. 1, at 22-23). Combining all environmental criteria, the Company concluded that the Whites Path route had the best overall environmental score (id. at 4-33, table 4-3).²³

KeySpan indicated that the three Middle Segment route alternatives, once in place, would compare closely with respect to the reliability of gas delivery (Exh. KED-1, at 4-27). The Company indicated that, regardless of route, the pipeline would be constructed of the same material, would be buried with a minimum of three feet of cover, and would operate at the same pressure (Exhs. EFSB-S-2; EFSB-S-6). The Company also indicated that the three route alternatives were comparable in length (4.6 to 4.9 miles) and that all would be accessible for periodic inspection (Exhs. EFSB-S-6; EFSB-S-9). The Company asserted that there are no meaningful differences among the three route alternatives with respect to the potential for third-party disruption (Exh. EFSB-S-6).

The Company asserted that the routes present differences with respect to the certainty with which they can be placed into service in a timely manner (Exh. KED-1, at 4-27). The

²² The maps are not sufficiently precise to determine whether the old rail right-of-way runs just inside or just outside the edge of the estimated rare species habitat.

²³ During hearings, KeySpan acknowledged that a closer scoring of the two routes could reasonably be adopted (Tr. 3, at 442-445, 455-456). However, the Company argued that under any reasonable scoring of the Middle Segment, the selection of the primary route and the noticed alternative would not change (Company Brief at 73, n.19).

Company indicated that, among the three potential Middle Segment routes, the Whites Path route could most reliably be timely constructed, because no private easements would be required and permitting complexity would be minimized (*id.* at 4-28, table 4-4). The Company stated that, to construct along the alternative route, it would need to negotiate a license agreement with the Massachusetts Executive Office of Transportation, which currently owns the old railroad right-of-way, and that the Office of Transportation would first have to obtain a precedent agreement from the Bay Colony Railroad Corporation, the railroad of record (*id.* at 4-33, 5-46; Tr. 3, at 461). The Company estimated that negotiating the lease agreement with the Office of Transportation would require approximately six to nine months (Tr. 3, at 463). Additionally, for the segment of the alternative route that would be co-located on a section of the Cape Cod Rail Trail (“Rail Trail”), an agreement with the Massachusetts Department of Conservation and Recreation (“DCR”), the operator of the Rail Trail, would be required (Exhs. KED-1, at 5-46 to 5-47; YAR/DEN 1-40(1)).²⁴ The Company further indicated that the Whites Path route offers maximum flexibility for tie-ins (Exhs. KED-1, at 4-28, 4-33, table 4-4; EFSB-S-11).

KeySpan estimated the costs of construction and access for construction for the three Middle Segment route alternatives. The Company derived cost estimates based on unit costs per foot of installation for each type of roadway or easement location; costs for clearing, repaving,

²⁴ The Company’s list of required approvals assumes that KeySpan would approach the Commonwealth for rights to use the old railroad right-of-way. The Towns described the approvals that would be necessary if the Company were required to seek access rights from the Town of Yarmouth, rather than the state, which the record indicates is a possible outcome. The Towns stated that the Rail Trail currently begins in Wellfleet and ends in Dennis, and that the Town of Yarmouth has been working for many years to extend it into and through Yarmouth, to Barnstable (Exh. YAR/DEN-GA at 2). Mr. Allaire of Yarmouth stated that approximately four to six years ago, the Massachusetts Department of Capital Asset Management declared the old rail right-of-way surplus property and offered it to the Town of Yarmouth (*id.*). Mr. Allaire stated that the Yarmouth Town Meeting voted in 2002 to accept the property and further stated that it is his understanding that the state will transfer title to the Town as soon as the state receives permission from the National Transportation Board to abandon the line (*id.*; Exh. KED-GA-10(1)). Should the Company seek to construct on the old rail right-of-way after title is transferred to the Town of Yarmouth, the record indicates that Article 97 approval from the state legislature may be required (Exh. YAR/DEN 1-32(1)).

and re-seeding, as applicable; savings from phasing construction work; and the need to obtain easements from private property owners (Exhs. KED-1, at 4-23 to 4-27; EFSB-S-9). The Company also estimated that the Route 6 alternative would have a 20% cost premium for fast-track construction because the entire segment would have to be completed in the fall of 2006 due to the absence of an intermediate tie-in point (Exhs. KED-1, at 4-32; EFSB-S-9; Tr. 2, at 266-268). The Company asserted that the Whites Path route would be least costly because construction can be divided into three segments over a four-year period and also because the Company would not be charged for any lease payments (Exh. EFSB-S-9). Table 4, below, presents the Company's cost estimates for the three Middle Segment route alternatives:

Table 4. Cost Estimates for the Three Middle Segment Routes

Route	Whites Path	Old Rail Right-of-Way	Route 6
Estimated Cost *	\$3,500,000	\$4,200,000 **	\$3,900,000 ***

* All costs assume Bass River will be crossed on bridges, not by directional drill.

** Includes PV lease payment to railroad, estimated as \$116,000 per year for 30 years.

*** Does not include any payments to Massachusetts Highway Department.

Sources: Exh. KED-1, at 4-32; Tr. 2, at 216.

Based on this analysis, the Company concluded that the Whites Path route had the lowest estimated cost (Exh. KED-1, at 4-33).

The Company noted that the Whites Path route had the best environmental score, the best reliability score, and the lowest cost, and therefore was the Company's choice as the primary route along the Middle Segment (id.). In selecting a route to serve as the noticed alternative, the Company noted that the two remaining routes had comparable environmental scores and that the Route 6 alternative had a lower cost (id.). However, the Company noted that obtaining Massachusetts Highway Department ("MHD") approval for the Route 6 alternative is uncertain because at least one viable alternative exists and it is MHD's policy to deny access when there is any feasible alternative (id.; Tr. 3, at 568-569). The Company therefore decided that the old rail right-of-way route was the more appropriate choice for the noticed alternative (Exh. KED-1, at 4-33 to 4-34).

iv. Eastern Segment

In the Eastern Segment study area, located between the intersection of Depot Road and Route 39 and the Church Street regulator station in Harwich, land use includes commercial development, a gravel pit, residential areas, and privately owned open space (Exh. KED-1, at 4-8). Table 5, below, presents KeySpan's scoring of the two potential Eastern Segment routes based on its chosen environmental criteria:

Table 5. Weighted Environmental Criteria Scores for the Two Eastern Segment Routes

Environmental Criteria	Route 39	Queen Anne Road
Wetlands & Vernal Pools	3	3
Streams & Water Bodies	2	2
Groundwater Protection	10	10
Vegetation Clearing	2	2
Protected Lands	3	3
Residences	6	10
Sensitive Receptors	6	4
Traffic	6	6
Historic Districts	3	5
Total	41	45

Source: Exh. KED-1, at table 4-3

The two routes were scored differently only with respect to sensitive receptors, for which the Queen Anne Road route was scored as slightly more favorable, and residences and historic districts, for which the Route 39 alternative scored more favorably (Exh. KED-1, at 4-33). Based on this analysis, the Company concluded that the Route 39 alternative had the best overall environmental score (id. at 4-34).

KeySpan indicated that the Route 39 alternative would be more reliable than the Queen Anne Road route, based on the certainty with which the Route 39 alternative can be placed into service in a timely manner, because permitting complexity would be minimized, and because the

Route 39 alternative offers maximum flexibility for tie-ins (id. at 4-28, table 4-4). The Company also stated that the shorter length of the Route 39 alternative would afford better pipeline performance because the pressure drop would be less (Tr. 2, at 233-234). The Company asserted that there would be no meaningful difference between the routes with respect to the potential for disruption (Exh. EFSB-S-7).

KeySpan estimated the costs of construction and access for construction for the two Eastern Segment route alternatives. The Company derived cost estimates based on unit costs per foot of installation for each type of roadway or easement location; costs for clearing, repaving, and reseeding, as applicable; and the necessity of obtaining easements from private property owners (Exh. KED-1, at 4-23 to 4-27). According to the Company, the Route 39 alternative would allow for construction in three separate segments over a four-year period; however, the associated savings from the time value of money would be offset by the cost of multiple crew mobilizations (id. at table 4-5).²⁵ The Route 39 alternative was modeled to be less costly primarily due to its shorter length (Exh. EFSB-S-10). Table 6, below, presents the Company's cost estimates for the two Eastern Segment route alternatives:

Table 6. Cost Estimates for the Two Eastern Segment Routes

Route	Route 39	Queen Anne Road
Estimated Cost	\$1,330,000	\$1,750,000

Source: Exh. KED-1, at 4-32

Based on this analysis, the Company concluded that the Route 39 alternative had the lowest estimated cost (Exh. KED-1, at 4-33).

The Company stated that it selected the Route 39 alternative as its primary route because it had the best environmental score, the best reliability score, and the lowest cost (id. at 4-32 to

²⁵ The Siting Board notes that if the Eastern Segment were to be built in stages, each stage would be relatively short, and therefore mobilization/demobilization costs would be significant relative to the reduction in PV cost that would be obtained by postponing some construction costs.

4-33). The Company selected Queen Anne Road route as the noticed alternative route (id. at 4-34).

v. Geographic Diversity

KeySpan indicated that on the Western Segment, the primary and alternative routes do not overlap and are located 1000 to 6000 feet apart for most of the segment (Exh. KED-1 at fig. 4-2; Tr. 2, at 269). The Company indicated that on the Middle Segment, the primary route and the alternative route overlap for about 2000 feet along Depot Street in Harwich but are otherwise distinct (Exh. KED-1 at fig. 4-3; Tr. 2, at 269). The Company indicated that the two Eastern Segment routes overlap for about 700 feet at the Depot Road end, but are otherwise distinct (Exh. KED-1 at fig. 4-4; Tr. 2, at 269).

b. Intervenor Position

The Towns disagreed with the scores given by KeySpan for the Whites Path and old rail right-of-way routes for the Middle Segment. The Towns advocated changing raw scores for several criteria, changing weights for two criteria, and adding one criterion (Towns Brief at 4 to 15). The Towns did not contest scoring for the Western or Eastern segments.

The Towns argued that wetlands impacts would be greater on the Whites Path route and less on the old rail right-of-way route than indicated by Company scoring, that the two routes should have the same scores for vegetation clearing impacts, and that the score for protected lands should be lower (to show less impact) for the old rail right-of-way route (id. at 4 to 9, 36). Compared to the Company's scoring, the Towns would give wetlands impacts a weight of 2, not a 3, and would weight historic impacts with a 2, not a 1, thus giving a medium level weight to each of these criteria (id. at 6, 12, 36). The Towns would score the old rail right-of-way route as having the least impact on residences among the three routes, and would score impacts on historic resources to indicate that the Whites Path route has higher impacts while the old rail right-of-way route has minimum historic impacts (id. at 9 to 13, 36). The Towns repeatedly expressed concerns about preserving the ambience of the South Dennis Historical District along the primary route of the Middle Segment (Exh. YAR/DEN-ERN; Tr. 3, at 499-547). The Towns

also expressed concern about maintaining traffic flow through South Dennis and indicated that potential detour routes are long and congested (Tr. 4, at 262-263).

The Towns argued in essence that the primary and alternative routes are roughly comparable with regard to natural resources impacts, but that the alternative route would have fewer impacts on residences and traffic (Towns Brief at 16). In such circumstances, the Towns argued that, based on Siting Board precedent, the impacts on residents and traffic are decisive (id.). Therefore, according to the Towns, because the alternative route would have significantly fewer impacts on residences and traffic, the alternative route is superior to the primary route (id.).

The Towns noted that the Company's route selection criteria did not contain a criterion for community acceptance (id. at 14). Citing Siting Board precedent, the Towns argued that community acceptance is an important consideration and recommended its inclusion with a score indicating maximum acceptance for the old rail right-of-way route, versus minimal acceptance for the Whites Path route (id. at 14,15, 36).²⁶

The Towns did not propose changing the scores of the Route 6 alternative, even for criteria for which it proposed to change weightings, and did not propose a score for the proposed community acceptance criterion for the Route 6 alternative (id. at 35). Table 7, below, presents the Towns' proposed revised scoring of the three potential Middle Segment routes based on environmental criteria:

²⁶ In a rebuttal to the Towns' comments regarding community acceptance, KeySpan asserted that Siting Board precedent does not require that a community acceptance criterion be included among an applicant's site selection criteria (Company Reply Brief at 25). The Company stated that its site selection process did account for community concerns, because it included criteria pertaining to commonly raised community issues such as impacts on traffic and local residences (id.). KeySpan also stated that, for each Company project, it is standard practice for community relations staff to coordinate with local governments and private individuals that may be affected by a project, and that this coordination continues throughout the life of the project (Exh. YAR/DEN 1-42). With respect to the proposed pipeline project, KeySpan stated that, beginning in 2004, it has held numerous meetings with public officials from each of the affected municipalities (id.). The Company asserted that inclusion of a community acceptance criterion in the Company's site selection criteria would not have resulted in a conclusion that the alternative route was superior to the primary route (id.).

Table 7. Environmental Scores Proposed by the Towns for the Middle Segment Routes

Environmental Criteria	Whites Path	Old Rail Right-of-Way	Route 6
Wetlands & Vernal Pools	4	6	15
Streams & Water Bodies	2	2	2
Groundwater Protection	6	6	8
Vegetation Clearing	4	4	6
Protected Lands	3	6	9
Residences	10	4	6
Sensitive Receptors	4	4	2
Traffic	6	2	6
Historic Districts	8	2	1
Community Acceptance	8	2	no score given
Total	55	38	55

Source: Towns Brief at 36

The Towns also questioned the Company's reliability and cost evaluations for the Middle Segment routes. The Towns indicated that the Town of Yarmouth is pursuing acquisition of the old rail right-of-way to extend the existing Rail Trail (Exh. YAR/DEN-GA at 2). With respect to ability to construct in a short time-frame, the Towns argued that had the Company persevered in efforts to acquire rights to use the old rail right-of-way, it might have been able to acquire those rights in a timely manner (Towns Brief at 17-19). The Towns argued further that acquiring the necessary approvals from the Towns to use the Whites Path route presents a yet greater probability of rejection or delay (*id.* at 19-20). The Towns suggested that there is insufficient time in any case to obtain the set of necessary approvals for either route before the 2006/2007 heating season (*id.* at 22). With regard to the Company's stated preference for the Whites Path route because of flexibility to tie in to the existing lines, the Towns pointed out that the old rail right-of-way route can tie in to the existing Sagamore Line at an intermediate point in Yarmouth and also at an intermediate point in Dennis (*id.* at 23-24).

With respect to cost, the Towns pointed out that, absent the assumed cost of lease payments for use of the old rail right-of-way, KeySpan's estimates of construction costs show the old rail right-of-way route to be less expensive than the Whites Path route by \$400,000 (id. at 24). Furthermore, the Towns asserted that the Company's estimate for lease payments lacked reliable supporting evidence, and that the difference in total cost is small both by percentage and in total dollars (id.).

c. Analysis

KeySpan has developed a set of route selection guidelines and a set of environmental criteria that address environmental impacts, land use concerns, and community issues – types of criteria that the Siting Board has found to be appropriate for the siting of energy facilities. See NSTAR Gas Company, 13 DOMSB 143, at 177 (2001) (“NSTAR Gas Decision”); MMWEC Decision, 12 DOMSB 18, at 125; New England Power Company, 4 DOMSB 109, 167 (1995).

The Company considered route options separately for each of the three identified pipeline segments. To develop route options for further evaluation, the Company identified study areas that would encompass the starting and ending points for the three pipeline segments and a reasonable selection of routes to connect those points. The Company then created multiple possible routes, each of which made use of existing roadways and/or utility easements within each study area. The Company next rated the routes based on environmental criteria, weighted the scores, and presented the total environmental score for each route. The Company also evaluated the reliability of each route and estimated the cost of each route. In each segment, the route that had the best environmental score, the best evaluation for reliability, and the lowest cost was selected as the Company's primary route. With a few exceptions, the route selected by the Company to be the noticed alternative route had the second-best environmental score, the second-best reliability, and the second-lowest cost.²⁷

²⁷ One exception to the noticed alternative being second best in three categories was in the Western Segment, where the NSTAR right-of-way route presented somewhat greater potential difficulties in acquiring permits and approvals than other routes, but a much better environmental score and lower costs. On the Middle Segment, the Route 6
(continued...)

For certain of the criteria used by the Company, the Towns disagreed with the relative scoring of the primary route and noticed alternative for the Middle Segment.²⁸ In addition, the Towns argued that KeySpan's set of siting criteria was deficient because it did not include a criterion for community acceptance.

The Towns' criticism of the large difference in the wetland criterion scores between the Whites Path route and the old rail right-of-way route has merit because the evidence suggests that wetlands will not be adversely impacted along either route. In elucidating some subtle distinctions about the nature of work that would be required for each route – in all cases to be done at a distance from wetlands – it is not reasonable to score the two routes at extremes; the least favorable rating should be reserved for circumstances such as the railroad right-of-way route on the Western Segment, where it was anticipated that actual construction in wetlands would be needed. Additionally, though both noticed routes pass through the South Dennis Historic District, the old center of South Dennis is traversed only by the Whites Path route. The Towns' argument that the Whites Path route should have scored higher for the historical resources criterion is therefore reasonable.

The Towns' contention that tree clearing is equivalent among the route alternatives does not appear as reasonable as its other arguments because the Whites Path route would be within paved streets, while extensive secondary vegetation has grown up on the old rail right-of-way. The maps of protected habitat indicate that a portion of the old rail right-of-way runs inside an area of Priority Habitat. However, at a screening level, it is uncertain whether actual impacts to endangered species would result. Thus, the differential between the White's Path route (score of 3) and the old rail right-of-way (worse score of 6) with respect to protected lands at a screening

²⁷ (...continued)
alternative generally scored slightly better than the old rail right-of-way route; the route was excluded based on the Company's expectation that MHD would likely deny the Company access to work along the highway.

²⁸ The Siting Board views the numerical scoring of routes in the site selection section as a screening level analysis only. 2006 Berkshire Gas Decision, EFSB 05-1, at 27. A separate and more in-depth analysis occurs in the facility-level comparison of the proposed and alternative routes. Id. See Section III.C, below.

level may be overstated.

As noted above, the Towns objected that the Company did not incorporate a criterion for community acceptance in its site selection methodology. However, while the Siting Board encourages applicants to develop a site selection process, or other mechanism, to provide for community input in the siting of proposed energy facilities, Siting Board precedent does not require the inclusion of a community acceptance criterion, or any other specific criterion, in an applicant's set of site selection criteria. ANP Blackstone Decision, 8 DOMSB 1, at 106, 113; US Generating Company, 6 DOMSB 1, 113-115 (1997); Berkshire Gas Company (Phase II), 20 DOMSB 109, 163 (1990). The absence of a community acceptance criterion does not render the Company's site selection process invalid.²⁹

If KeySpan's screening scores are adjusted to incorporate the Towns' suggested scores specifically for the wetlands/vernal pools and historic districts criteria, the Whites Path environmental score would increase to 45 and the old rail right-of-way would be reduced to 48; some other combination of reasonable adjustments could readily give these two routes screening scores that are essentially equivalent.

With respect to KeySpan's screening-level reliability analysis, it is not unreasonable that KeySpan, as a company whose business involves the routine installation of gas supply lines, is experienced in assessing the relative difficulty of permitting routes. The record shows that use of the old rail right-of-way route would require a series of approvals and agreements. The Siting Board notes that some agreement would need to be made with railroad system managers, which could entail some consideration of the residual value of the right-of-way, and some determination as to whether installation of a gas pipeline along the old rail right-of-way would be compatible with potential future use. The record supports the Company's view that timely completion of

²⁹ Consistent with the Towns' argument, a fuller consideration of community views might have usefully informed the site selection process. First, the weighting of various impacts could have been refined if the Company had had a more timely understanding of issues of interest to the community. Second, community input might have helped to identify potential consistency with local land use plans (e.g., town aspirations for future use of the old rail right-of-way) as a worthwhile criterion for site selection screening. Third, the Company might well have decided to add community acceptance as a separate criterion for site selection screening.

the necessary permitting for the Whites Path route would be more certain than for the old rail right-of-way route. Also, the record supports the Company's position that ability to tie in to the existing line at virtually any point, available only on the Whites Path route, offers more construction flexibility than the availability on the old rail right-of-way route of only two tie-in points. This flexibility could be useful in the event of weather, construction, or permitting issues that arise during the construction process. The Company's approach to evaluating reliability was reasonable for screening purposes. On a screening-level basis, the reliability of the Whites Path route, in terms of whether the Company can rely on being able to permit and construct it in advance of 2006/2007 winter peak use, was reasonably scored as better than the Route 6 and old rail right-of-way routes.

With respect to cost, the uncertainty in lease payments and other costs on the old rail right-of-way route appears to exceed KeySpan's predicted cost differential. On a screening-level basis, KeySpan reasonably concluded that distinguishing among the routes on the basis of expected cost was unwarranted at that point in project development, given the uncertainty as to costs of leasing arrangements or other property-use rights.

The Whites Path and old rail right-of-way routes could reasonably have been scored differently by the Company on environmental screening criteria, and additional engineering work could have provided firmer cost projections for the two routes. However, within the site selection screening process, the Company was reasonable in concluding that the Whites Path route was better than the old rail right-of-way route, when reliability, environmental impacts, and cost were considered together. Furthermore, and more importantly for the result of the site selection screening process, there is no record evidence that another route would be better than the two noticed routes, or hybrid combinations of these routes (see Section III.B.1.b, below). While the Towns criticized the relative scoring of the Whites Path and the old rail right-of-way routes, the Towns did not address the scoring of the Route 6 alternative. The Towns also did not show or argue that a superior route was eliminated when the Whites Path and old rail right-of-way routes were selected for further evaluation. Thus, there is no evidence that the Company was unreasonable in selecting the two Middle Segment routes that it brought forward to the detailed facility evaluation.

The Company's site selection process used reasonable criteria and methods to select two routes for further consideration and did not exclude a superior route. On this basis, the Siting Board finds that the Company has developed and applied a reasonable set of criteria for identifying and evaluating alternative routes in a manner that ensures that it has not overlooked or eliminated any routes that are, on balance, clearly superior to the proposed route.

3. Geographic Diversity

For the Western Segment, the two routes selected by KeySpan for further evaluation are separated by at least 1000 feet for most of their length. The two routes offer different sets of constraints and advantages with respect to many environmental factors, as well as the difficulty and cost of acquiring easements. For the Middle Segment, the two routes selected for further evaluation overlap for about 2000 feet along Depot Street in Harwich but are otherwise distinct. The two routes offer different sets of constraints and advantages with respect to many environmental factors, as well as the difficulty and cost of acquiring easements. For the Eastern Segment, the two routes selected for further evaluation overlap for about 700 feet at the Depot Road end, but are distinct for most of their length.

Consequently, the Siting Board finds that the Company has identified a range of practical gas pipeline routes with some measure of geographic diversity.

4. Conclusions on Site Selection

The Siting Board has found that the Company has developed and applied a reasonable set of criteria for identifying and evaluating alternative routes in a manner that ensures that it has not overlooked or eliminated any routes that are clearly superior to the proposed route. In addition, the Siting Board has found that the Company identified a range of practical pipeline routes with some measure of geographic diversity. Consequently, the Siting Board finds that KeySpan examined a reasonable range of practical siting alternatives.

B. Construction Plans for the Primary and Alternative Routes

1. Route Descriptions and Construction Schedule

a. Western Segment

The Company stated that it selected the 6.6-mile long Service Road route as its primary route for the Western Segment (Exh. KED-1, at 4-10, 4-34). The primary route begins on the west side of Route 130 at its intersection with Service Road in Sandwich, then runs east along Service Road, crossing Quaker Meetinghouse Road and Chase Road (id. at 4-10, fig. 4-2). Continuing in an easterly direction on Service Road in Barnstable, the route ends at the NSTAR right-of-way crossing of Service Road, just short of Route 149 (id. at 4-10 to 4-11, fig. 4-2; Tr. 1, at 15; Tr. 2, at 219). KeySpan would complete construction of one section of the Service Road route in 2009, with the remaining work to be completed in stages between 2010 and 2014 (Exhs. KED-1, at 3-4, 4-11, 4-33; EFSB-S-4).³⁰

The Company selected the 6.6-mile NSTAR right-of-way route as its noticed alternative route (Exh. KED-1, at 4-11, 4-34). The Company envisioned building pipeline primarily along the south side of the existing NSTAR easement (Exh. KED-1, at 5-7). From the west side of Route 130 in Sandwich, at its intersection with Service Road, the alternative route runs one mile south along Route 130 to the existing NSTAR right-of-way and then continues east along the right-of-way to the Service Road crossing, just short of Route 149 in Barnstable (Exh. KED-1, at 4-11; Tr. 1, at 15). This alternative would be built in a single year (Exh. KED-1, at 4-11). To allow use of a hybrid route combining parts of the primary route and the alternative route, the Company proposed 0.6 miles of Great Hill Road in Sandwich, between the primary route at Service Road and the alternative route at the NSTAR right-of-way, as a connector (id. at 4-15).

³⁰ The Company explained that construction in phases would be possible because the primary route is adjacent to the existing pipeline, allowing the new pipeline to be tied back into the existing pipeline at intermediate points (Exh. KED-1, at 4-11, 4-28, 4-31). Dates for future construction would depend on the actual rate of growth in customer demand, and might vary from dates projected here (Tr. 1, at 147-148).

b. Middle Segment

The Company stated that it selected the 4.9-mile long Whites Path route as its primary route for the Middle Segment (Exh. KED-1, at 4-13, 4-34). The primary route begins at KeySpan's South Yarmouth LNG facility, runs generally easterly through Yarmouth on Whites Path, Great Western Road, a short stretch of North Main Street, Great Western Road, and then Highbank Road (id. at 4-13, fig. 4-3). The route crosses the Bass River on the Highbank Road bridge from Yarmouth into Dennis (id.). The route continues in an easterly direction in Dennis on Highbank Road and Upper County Road, crossing Main Street and Route 134, then continues northerly on Great Western Way, and easterly on Great Western Road into Harwich, where it turns northerly on Depot Street and ends at the intersection of Depot Street and Main Street (id.). KeySpan stated it would complete construction of one section of the Whites Path route in 2006, with the remaining work to be completed between 2007 and 2009 (id. at 4-29; Exh. EFSB-S-4).³¹

Subject to final discussions with the Towns of Yarmouth and Dennis, the new pipeline for the Middle Segment would be installed on the north side of Whites Path, the southwest side of North Main Street, the south side of Great Western Road in Yarmouth, and the south side of Great Western Road in Dennis (Exhs. EFSB-E-2; RR-EFSB-9; Tr. 1, at 13-14; Tr. 2, at 185-186, 194-197).

The Company selected the 4.6-mile old rail right-of-way route as its noticed alternative route (Exh. KED-1, at 4-13, 4-34). From the South Yarmouth LNG facility, the alternative route runs east along an inactive railroad right-of-way to Route 134 in Dennis (id. at 4-13, fig. 4-3). East of Route 134, the right-of-way becomes the Rail Trail (id. at 4-14). The alternative route follows the Rail Trail to Depot Street, heads north along Depot Street, and ends at the intersection of Depot Street and Main Street in Harwich (id.). The Company would build this entire alternative for use in the 2006/2007 heating season (id. at 4-34). To allow use of a hybrid route combining parts of the primary route and the alternative route, the Company also evaluated

³¹ The Company explained that construction in phases would be possible because the primary route is adjacent to the existing pipeline, allowing the new pipeline to be tied back into the existing pipeline at intermediate points (Exhs. KED-1, at 4-13, 4-28, 4-31; EFSB-S-11).

using 0.3 miles of Route 134 in Dennis, between the alternative route at the start of the Rail Trail and the primary route along Great Western Road, for routing of the pipeline (id. at 4-15).

c. Eastern Segment

The Company stated that it selected the 1.6-mile long Route 39 alternative as its primary route for the Eastern Segment (Exh. KED-1, at 4-14, 4-34). The primary route runs along Route 39 in Harwich from the intersection of Route 39 with Depot Road to the Church Street regulator at the intersection of Route 39 and Church Street (id. at 4-14, fig. 4-7). KeySpan indicated that it had not yet determined which side of the road to install the pipeline, but that, prior to actual construction, it would make that determination in consultation with the Town of Harwich (Exh. EFSB-E-2). KeySpan stated that it could construct the Eastern Segment in one phase (i.e., in a single year), in two phases, or in three phases (e.g., in 2010, 2011, and 2013), depending largely on the expressed preference of the Town of Harwich (Exhs. KED-1, at 3-4; EFSB-S-4; EFSB-E-24; Tr. 2, at 270-272).³²

The Company selected the 2.2-mile Queen Anne Road route as its noticed alternative route (Exh. KED-1, at 4-15, 4-34). From the intersection of Depot Road and Route 39 in Harwich, the alternative route continues east on Route 39 and Queen Anne Road in Harwich and along the boundary between Harwich and Chatham, and then continues north in Harwich along Church Street, ending at the existing Church Street regulator station (id. at 4-15, fig. 4-4; Exh. EFSB-S-1).

2. Methods of Pipeline Installation

KeySpan stated that where it follows roads (i.e., along all of the primary route in each segment, all of the Eastern Segment alternative route, and parts of the alternative routes for the Western and Middle Segments) the pipeline would be constructed primarily within roadway layouts, either in the shoulder or near the edge of pavement (Exhs. KED-1, at 5-3;

³² The Company explained that construction in phases would be possible because the primary route is adjacent to the existing pipeline, allowing the new pipeline to be tied back into the existing pipeline at intermediate points (Exh. KED-1, at 4-14, 4-28, 4-31).

YAR/DEN 1-43). Along roadways, the Company would use so-called “stove-pipe construction” methods, in which one to three lengths of pipe are installed at a time, with welding, radiography, and coating work completed within the trench (Exhs. KED-1, at 5-4; EFSB-E-3). The trench would be 4 feet wide and 5 to 6 feet deep for 20-inch pipeline and 3 feet wide and 4 to 5 feet deep for 12-inch pipeline (Exhs. KED-1, at 5-4; EFSB-E-13).

Pipe sections would be trucked in as needed; excavated soil would be stored next to the trench when space is available (Exh. KED-1, at 5-4 to 5-5). The width of work space required for the stove-pipe construction method would typically be 20 to 25 feet (Exh. EFSB-E-3). Generally, construction equipment would be in the shoulder and all or part of one lane of travel (Exh. KED-1, at 5-4). Each day, new pipeline would be backfilled and pavement would be replaced (*id.*). The Company stated that it would comply with G.L. c. 164, § 70, which it quotes as requiring gas companies to “put all streets, lanes and highways in as good a repair as they were when opened” (Exh. YAR/DEN 1-44). In addition, the Company committed to following the Department’s road restoration standards established in D.T.E. 98-22 (“D.T.E. Road Restoration Standards”) (Tr. 2, at 321-322).³³ The Company indicated that it would not necessarily repave entire roadways except for streets that had been repaved in the previous five years (Exh. YAR/DEN 1-45).

Away from roads (*i.e.*, for much of the alternative routes for the Western and Middle Segments), the Company would use either stove-pipe construction or cross-country construction (Exh. EFSB-E-3). With the cross-country method, many sections would be welded together into a long string of pipe that is then lowered into a long trench (*id.*). The Company indicated that the typical work space for the cross-country method is 75 feet wide (*id.*).

On any route, valves and cathodic protection test station boxes and covers would be installed at various points (Exh. EFSB-E-18). These boxes and covers would be constructed to be flush with the ground (*id.*). According to the Company, the only above-ground structures

³³ See Public Utility Road Restoration Standards, D.T.E. 98-22, att., §§ 1.0-12.0 (August 26, 1999).

constructed as part of the project would be vent posts for casing pipes for pipeline constructed by pipe jacking or boring and warning markers (id.).

The Company proposes to cross the Bass River by placing the new pipeline in an existing utility chase under the north side of the Highbank Road bridge, if it follows the primary route for the Middle Segment (Exh. KED-1, at 5-14; Tr. 2, at 201). The Company stated that it would construct pipeline rollers, attach the pipeline rollers to the bridge and install the pipeline on the pipeline rollers (Tr. 1, at 11). Construction under the bridge would be supported with spud barges in the river or similar technology (Tr. 2, at 285-287). If it follows the alternative route for the Middle Segment, the Company stated that the pipeline would cross the Bass River at the no-longer-used railroad bridge (“railroad bridge”) (Exh. KED-1, at 5-15). The Company indicated that it would support the pipeline on a new lattice bridge which would be installed between the existing railroad bridge abutments (Tr. 2, at 287-296). The Company indicated that it would likely need to reconstruct the existing granite railroad abutments prior to their use as supports for the pipe bridge (id. at 287-293).

After installation, the pipeline would be pressure tested with air or nitrogen before being put into service (Exh. KED-1, at 5-5). In areas subject to regrowth of vegetation, the Company would keep a 10- to 25-foot corridor clear for inspection and maintenance of the pipeline (Tr. 2, at 206-207).

C. Environmental Impacts, Cost, and Reliability of the Primary and Alternative Routes

1. Standard of Review

In implementing its statutory mandate to ensure a reliable energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost, the Siting Board requires a petitioner to show that its proposed facility is sited at a location that minimizes costs and environmental impacts while ensuring a reliable energy supply. To determine whether such a showing is made, the Siting Board requires a petitioner to demonstrate that the proposed site for the facility is superior to the noticed alternatives on the basis of balancing cost, environmental impact, and reliability of supply. 2006 Berkshire Gas Decision,

EFSB 05-1, at 31; 2005 NSTAR Electric Decision, 14 DOMSB 233, at 296; 1997 BECo Decision, 6 DOMSB 208, at 287.

An assessment of all impacts of a proposed facility is necessary to determine whether an appropriate balance is achieved both among conflicting environmental concerns as well as among environmental impacts, cost, and reliability. A facility which achieves that appropriate balance thereby meets the Siting Board's statutory requirement to minimize environmental impacts at the lowest possible cost. 2006 Berkshire Gas Decision, EFSB 05-1, at 31; 2005 NSTAR Electric Decision, 14 DOMSB 233, at 297; 1997 BECo Decision, 6 DOMSB 208, at 287.

The Siting Board recognizes that an evaluation of the environmental, cost and reliability trade-offs associated with a particular proposal must be clearly described and consistently applied from one case to the next. Therefore, in order to determine if a petitioner has achieved the proper balance among various environmental impacts and among environmental impacts, cost and reliability, the Siting Board must first determine if the petitioner has provided sufficient information regarding environmental impacts and potential mitigation measures to enable the Siting Board to make such a determination. The Siting Board then can determine whether environmental impacts would be minimized. Similarly, the Siting Board must find that the petitioner has provided sufficient cost and reliability information in order to determine if the appropriate balance among environmental impacts, cost, and reliability would be achieved. 2006 Berkshire Gas Decision, EFSB 05-1, at 31-32; 2005 NSTAR Electric Decision, 14 DOMSB 233, at 297; Commonwealth Electric Company, 5 DOMSB 273, at 337 (1997).

Accordingly, in the sections below, the Siting Board examines the environmental impacts, reliability, and cost of the proposed facilities along KeySpan's primary and noticed alternative routes to determine: (1) whether environmental impacts would be minimized; and (2) whether an appropriate balance would be achieved among conflicting environmental impacts as well as among environmental impacts, cost, and reliability. In this examination, the Siting Board compares the primary and alternative routes to determine which is superior with respect to providing a reliable energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost.

2. Western Segment

a. Environmental Impacts - Western Segment

In this section, the Siting Board compares the environmental impacts of the proposed facilities along the primary and alternative routes for the Western Segment, considers the proposed mitigation for such impacts, evaluates any options for additional mitigation and determines whether the environmental impacts along the primary route would be minimized. The subsections below consider wetlands and water resources impacts, land use and land resources impacts, and noise and traffic impacts.

i. Wetlands and Water Resources

KeySpan stated that, with use of the primary route, the Western Segment would be built primarily along the edge of pavement of existing roads and within roadway layouts (Exh. KED-1, at 5-3). The Company stated that there are no bordering vegetated wetlands, isolated wetlands, or wetland buffer crossings along the primary route for the Western Segment (id. at 5-13). The Company stated that Massachusetts Geographic Information System (“MassGIS”) mapping shows a perennial stream near the Western Segment primary route, but that neither the U.S. Geological Survey (“USGS”) topographic map nor the Company’s field surveys confirm the existence of such a water body (id. at 5-17 and fig. 4-5; Exh. EFSB-G-18; Tr. 2, at 219-222). Also, although small pools of standing water containing mosquito larvae were observed, there are no mapped certified or potential vernal pools within 100 feet of the route (Exh. KED-1, at 5-13).

KeySpan stated that the Western Segment alternative route does not cross any streams, bordering vegetated wetlands, isolated wetlands, or associated wetland buffer zones (id. at 5-14, 5-17). The Company stated that it would manage construction to avoid adverse effects on the one mapped potential vernal pool within 100 feet of the alternative route (id. at 5-14; Tr. 2, at 284-285).

The Company concluded that the Western Segment primary and alternative routes would be comparable with respect to streams and water bodies (Exh. KED-1, at 5-18). However, based on the one potential vernal pool within 100 feet of the alternative route, the Company identified the primary route as advantageous with respect to wetlands and vernal pools (id. at 5-14).

The Company stated that it would use filter fabric barriers and would sweep road surfaces to keep soil materials from washing into storm drains (id. at 5-11). KeySpan stated that it would develop and implement a Spill Prevention Control and Countermeasures (“SPCC”) Plan to ensure against inadvertent releases of fuel or equipment maintenance materials during pipeline construction (id.). The Company indicated that it would prepare a Stormwater Pollution Prevention Plan (“SWPPP”) and implement erosion and sedimentation control best management practices (id. at 5-11; Exh. EFSB-E-26). The Company also indicated that it would prepare an Environmental Construction Plan, that would address erosion control, dust control, and vehicle fueling and maintenance (Exh. YAR/DEN 1-5).

KeySpan stated that there are no mapped public water supply wells proximate to the proposed routes (Exh. KED-1, at 5-19). However, the Company stated that the primary route for the Western Segment crosses through a total of 10,100 linear feet of Wellhead Protection Area as identified by the Cape Cod Commission (id.). The alternative route crosses through 17,500 linear feet of Wellhead Protection Area and 22,300 linear feet of Potential Public Water Supply Area as identified by the Cape Cod Commission (id.).³⁴ Based on the shorter distance in groundwater resource areas, the Company identified the primary route as advantageous with respect to groundwater (id. at 5-20).

KeySpan noted that all of Cape Cod has been designated as a Sole Source Aquifer under the federal Safe Drinking Water Act (id. at 5-19). The Cape Cod Commission has identified groundwater protection areas based on their importance for drinking water supplies (id.). The Company indicated that development and implementation of an SPCC Plan would protect against impacts to groundwater (id. at 5-20). Further, the Company stated that it would perform no equipment maintenance within 100 feet of a wellhead protection area (Tr. 3, at 549-551).

KeySpan asserted that current information from the MADEP Bureau of Waste Site Cleanup indicates that Massachusetts Contingency Plan (“MCP”) sites identified in accordance with 310 CMR 40.0000 would not affect pipeline construction (Exh. KED-3, at 12-1 to 12-2). Notwithstanding, the Company indicated that it would follow Utility-related Abatement Measure

³⁴ The Company did not quantify the linear distance over which the primary route traverses Potential Public Water Supply area.

(“URAM”) procedures required under the MCP, in the event that contamination is encountered (id. at 12-2 to 12-3; Exh. EFSB-G-3(1) at A-1; Tr. 2, at 311).

The record shows that the primary route on the Western Segment is along roads and not in wetland areas. The record also shows that the Company is committed to erosion and sedimentation control and spill prevention procedures that would minimize water impacts. To further reduce the risk of contaminating groundwater supplies, the Siting Board directs the Company to refrain from all refueling and equipment-maintenance activities that have the potential for fluid spills, when vehicles are within identified Wellhead Protection Areas. Based on the use of roadway layouts, the limited encroachment into wetland buffer areas, and the Company’s expressed commitment to control erosion and sedimentation, the Siting Board concludes that construction of the proposed pipeline along the primary route would result in no permanent impacts, and only minimal temporary impacts to wetlands and water resources. With the specified mitigation, the Siting Board finds that the wetlands and water resources impacts of the proposed pipeline along the Western Segment primary route would be minimized.

The record shows neither the primary nor the alternative route on the Western Segment traverses significant wetland resources. According to the record, the primary route would be confined to roads and not traverse wetland areas, while the alternative route along the NSTAR right-of-way would traverse the 100-foot buffer zone of a potential vernal pool. However, it is expected that impacts could be avoided or mitigated during construction of the alternative route. Therefore, there do not appear to be significant differences between the primary and alternative routes on the Western Segment with respect to surface water and wetlands impacts. The record shows that the primary route would extend through Wellhead Protection Areas for a considerably shorter distance than the alternative route. Considering wetlands, surface water, and groundwater impacts, the Siting Board finds that, on the Western Segment, the primary route would be preferable to the alternative route with respect to wetlands and water resources impacts.

ii. Land Use and Land Resources

KeySpan indicated that the areas traversed by the primary route are largely residential and woodland (Exh. KED-1, at fig. 4-5). The Company indicated that a total of 27 homes are within

100 feet of Service Road on the primary route (id.). The Company stated that these residences are on the south side of the Service Road, while it would generally install the pipeline on the north side of the street (id. at 5-25). The Company listed three sensitive receptors along the primary route: a church, a rehabilitation hospital, and a hospice – all with entrances or addresses on Service Road (id. at 5-27 to 5-28).

KeySpan stated that it did not expect any extensive clearing of roadside vegetation, which includes oaks and pitch pine, along the Western Segment if the primary route were selected (id. at 5-21). The Company noted that to install the proposed pipeline along the primary route, it might clear some scrub vegetation along pavement edges (id. at 5-4). However, the Company indicated that few trees would need to be removed on the primary route (Exh. KED-3, at 5-2). The Company stated that it would assess the potential for damage to trees with a professional arborist and local tree wardens (id. at 5-2). The Company stated that graded areas would be fertilized, seeded, and mulched, and that these areas would be inspected after the first and second growing seasons (id.). The Company stated that shrubs would be restored in accordance with any individual landowner agreements (id.).

KeySpan indicated that 3700 linear feet of the primary route, along Service Road, is adjacent to Estimated Habitat designated by NHESP, and 10,500 linear feet of the route is adjacent to town-owned open land (Exh. KED-1, at 5-23, fig. 4-5). The Company stated that, except for the proposed Algonquin gate station and approximately 150 feet of pipeline between the gate station and the roadway layout of Route 130, the primary route does not cross lands for which approval of the Legislature under Article 97 would be required to allow such use (id. at 5-24; Exhs. EFSB-G-2 (Supp.); EFSB-G-3 (Supp. 2), att. at 1-15).

The Company indicated that no stone walls would likely be disturbed along roadsides (Exh. KED-3, at 5-2). However, if either stone walls or fences were to be temporarily removed for construction, the Company committed to their restoration (id.).

KeySpan indicated that it hired Public Archaeology Lab, Inc. (“PAL”) to identify documented locations of archaeological sites, historic structures, cemeteries, and areas of archeological sensitivity within the project area (Exh. EFSB-E-5). In response to comments from the Massachusetts Historical Commission, PAL conducted an archaeological reconnaissance

survey of the primary and alternative routes, to identify areas that may require further testing to locate and identify any important archaeological resources (id.). The Company stated that there are no above-ground historic resources along the primary route for the Western Segment, and that a preliminary assessment indicated that the segment is unlikely to contain unidentified archaeological resources (Exh. KED-1, at 5-35). The Company stated that it would perform additional surveys as directed by the Massachusetts Historical Commission (Exh. EFSB-E-5). The Company stated that if significant eligible deposits are found in any further survey directed by the Massachusetts Historical Commission, KeySpan would consult with the Massachusetts Historical Commission, and would consider using alternative alignments and reducing its workspace; if avoidance were not feasible, the Company would undertake a site examination (Exh. EFSB-E-6).

KeySpan indicated that the areas traversed by the Western Segment alternative route are largely residential and woodland (Exh. KED-1, at fig. 4-5, fig. 5.3-3). The Company stated that vegetation along the alternative route alignment is regularly cleared by NSTAR (id. at 5-21). The Company stated that 23 homes are within 100 feet of the alternative route and that 20 of these homes are located along the southern edge of the NSTAR right-of-way portion of the route, where there would be permanent changes to vegetation (id. at 5-25, 5-26). The Company stated that there are no sensitive receptors along the alternative route (id. at 5-28). The Company stated that larger construction equipment would likely be used along the alternative route, but that paving equipment would not be required (Exh. EFSB-E-15).

The Company stated that the alternative route extends approximately 15,000 linear feet across Priority Habitat for rare species mapped by NHESP in Sandwich and Barnstable and a total of 14,800 linear feet across open space protected by Article 97; these distances partly overlap (Exh. KED-1, at 5-23; Tr. 2, at 305-306). A map printed from MassGIS data shows the Priority Habitat as closely aligned with the NSTAR right-of-way (Exh. KED-1, at fig. 4-5). However, the Company stated that pipeline construction would have no impacts on rare species (Exh. KED-3, at 16-4). The Company did state that if the alternative route were selected, it would conduct further evaluations of how to protect rare species (Exh. KED-1, at 5-8).

The Company stated that there also are no above-ground historic resources along the alternative route, but that a preliminary assessment indicated that the segment is sensitive for containing previously unidentified archaeological resources (id. at 5-35). The Company concluded that the Western Segment primary route is better than the alternative route with respect to historic resources (id.).

The Company concluded that the primary route would be advantageous with respect to residential impacts, because the alternative route would require some vegetation clearing near homes along the NSTAR right-of-way and thus have more permanent adverse impacts (id. at 5-26). However, the Company concluded that the primary and alternative routes are essentially comparable with respect to sensitive receptors because of limited impacts and use of mitigation (id. at 5-28). The Company concluded that the primary and alternative routes would be comparable with respect to vegetation, and that the primary route is significantly better than the alternative route with respect to protected lands (id. at 5-21, 5-24).

The record demonstrates that the land resources impacts of the proposed pipeline along the primary route would be temporary and minimal due to the placement of the pipeline under and directly adjacent to streets and because the Company has stated that it will assess the potential for damage to trees on the route with a professional arborist and local tree wardens.³⁵ To protect shade trees and other landscaping features, the Siting Board directs the Company: (1) to arrange for a professional arborist to conduct an on-site inspection of the construction zone within 6 months before construction begins in an area; (2) based on recommendations by the arborist and, where applicable, tree wardens, to take all reasonable precautions to avoid removing or damaging trees; (3) to minimize damage to shrubbery and other plantings, as well as damage to or removal of fences, stone walls, lampposts, and other landscaping features; (4) to repair or replace any damaged or removed trees, shrubbery, or plantings, in consultation with the arborist and, where applicable, tree wardens, and with the agreement of the owner of damaged or removed vegetation; and (5) to repair or replace any damaged or removed fences, walls, or other landscaping features, with the agreement, as applicable, of the owner of the landscaping feature.

³⁵ The Company is required by § 6.8 of the D.T.E. Road Restoration Standards to hand-cut around roots of trees.

With the specified mitigation and implementation of the above condition, the Siting Board finds that the land resources impacts of the proposed pipeline along the Western Segment primary route would be minimized.

The record shows that both routes pass fewer than 30 houses but that as a result of edge-of-right-of-way vegetation near homes, the alternative route would have more permanent impacts on residential areas. The record shows that there are more sensitive receptors along the primary route than the alternative route. While the alternative route would therefore be advantageous with respect to sensitive receptors, adherence to limits on construction hours, described in Section III.C.2.a.iii, below, should mitigate the impacts.

The record shows that the alternative route would extend directly through protected rare species habitat and Article 97 land, while the primary route, with the exception of the small segment of Article land associated with the Algonquin gate station, generally is adjacent to such areas. It was not established whether species inhabiting the disturbed habitats along the NSTAR right-of-way would be sensitive to disturbance caused by pipeline construction. However, the record does show that natural upland habitats would be minimally affected by the primary route. Therefore, the primary route would be advantageous with respect to upland habitat impacts. The record shows that the alternative route would go through an area that may contain archaeological resources. Therefore, for purposes of avoiding possible disturbance to archaeological resources, the primary route would be advantageous.

While the primary route follows existing roadways, the alternative route is largely away from roads. Underground pipelines are generally compatible with roads from a land use perspective, while pipelines might restrict future land use at off-road locations. Roads and road shoulders tend to have relatively little in the way of land resources such as undisturbed archaeological resources, vegetation, and valuable upland habitat; as discussed above, construction on the alternative route would have greater impacts on land resources. Therefore, the Siting Board finds that, on the Western Segment, the primary route would be preferable to the alternative route with respect to land use and land resources impacts.

iii. Noise and Traffic

KeySpan indicated that the project would have noise and traffic impacts only during its construction (Exh. KED-1, at 5-9 to 5-10). These impacts are evaluated below, for the primary and alternative routes.

KeySpan stated that the principal sources of noise during construction would be pavement saws, a backhoe, and a welding rig (Exh. EFSB-E-15). The Company indicated that other sources of noise such as dump trucks and crew vehicles would be present intermittently (id.). The loudest piece of equipment evaluated by the Company, the pavement saw, has a maximum sound level of approximately 90 decibels, A-weighted (“dBA”) at 50 feet (id.).

KeySpan noted that sound levels at any given location would be dominated by the piece of equipment nearest the receptor of interest (id.). According to KeySpan’s calculations, construction would typically generate sound levels that would be exceeded for 10% of a time period (“L₁₀”) in excess of 60 dBA outside a residence located 50 feet back from pipeline construction in a road for a total of approximately 7 to 9 days, as machinery used in the construction sequence moves along the roadway (Exh. RR-EFSB-12). The Company indicated that it measured ambient L₁₀ sound levels in the project area on May 19, 2005 (id.). The Company reported that ambient sound levels ranged from 66 dBA to 78 dBA on various primary route segments, and from 42 dBA to 76 dBA on various alternative route segments (id.).

The Company stated that the typical work hours would be on weekdays between 7:00 a.m. and 6:00 p.m. (Exhs. KED-1, at 5-9; EFSB-E-15). However, the Company indicated that night or weekend work might on occasion be needed to meet construction deadlines (Exhs. KED-1, at 5-9; EFSB-E-15; EFSB-E-16). The Company indicated that days and hours of work would be circumscribed by the street opening permits issued by each town (Tr. 2, at 316-317). The Company indicated its belief that it would be able to obtain permission from the various towns to extend the scheduled construction hours if it became essential to do so (id. at 315-316).

The Company noted that traffic impacts would occur along all 6.6 miles of the primary route on Service Road, compared to just 1.0 mile along the alternative route where it follows Route 130 (Exh. KED-1, at 5-31). However, the Company also stated that traffic volumes on

Route 130 are more than ten times the volumes on Service Road (id.). Also, the Company stated that Route 6 is available as an alternative route for Service Road traffic, while there is no practical alternative for most drivers on Route 130 (id.). The Company stated that one of the two travel lanes would be closed on Service Road (the primary route), while no travel lanes would be closed on Route 130 (part of the alternative route) (id.). The Company concluded that the two routes would be comparable with respect to traffic impacts (id.).

The record shows that KeySpan has not yet developed final engineering plans for construction on any of the three proposed pipeline segments (Exhs. EFSB-A-13; RR-EFSB-10; Tr. 2, at 196). The Company has developed 95%-complete engineering plans for the first 12,000 feet of the Middle Segment (Exh. RR-EFSB-9; Tr. 2, at 189). KeySpan stated that once a set of engineering plans is approximately 95% complete, the Company will meet with appropriate town officials, provide a copy of the engineering plans for comment and input, and then finalize the plans (Tr. 2, at 189-190). With respect to the first phase of the Middle Segment specifically, the Company indicated that it would meet with the Town of Yarmouth engineers and public works officials several times to review the 95%-complete plans, and would discuss the engineering on which the plans were based, traffic management issues, and any other issues that the town wishes to address either in the engineering plans or in contract specifications (Tr. 2, at 194-196). KeySpan estimated that, depending on how quickly the town could review the plans and provide its comments to the Company, this review process would likely require 4 to 6 weeks (Tr. 2, at 196).

KeySpan stated that it would develop traffic management plans for construction (Exh. KED-1, at 5-6). The Company indicated that it would limit construction along roads to the off-season – from after Labor Day to before Memorial Day – except in any locations such as along Service Road for which the Towns of Sandwich or Barnstable may determine that traffic impacts would be acceptable in the summer (Tr. 2, at 313-314). The Company indicated that the traffic management plans could limit construction to outside rush hour periods, specify the use of traffic control officers, and require maintenance of at least one lane of traffic flow (Exh. YAR/DEN 1-25). The primary route crosses Route 130 and then, following Service Road, also crosses Quaker Meetinghouse Road and Chase Road, all in Sandwich (Exh. KED-1, at 5-31;

Tr. 1, at 15). KeySpan stated that it expects to prepare site-specific traffic management plans for the crossings of Route 130, Quaker Meetinghouse Road, and Chase Road, each of which would be crossed by a direct cut (Exhs. EFSB-G-2(S); EFSB-E-8; YAR/DEN 1-4; Tr. 1, at 17). The Company stated that it would cover any street openings with steel plates at the end of the day, and that it would protect and barricade openings in the shoulder to ensure traffic and pedestrian safety (Exh. KED-1, at 5-6). The Company stated that it would restore streets in accordance with the D.T.E. Road Restoration Standards (Exh. YAR/DEN 1-45; Tr. 3, at 487).

The record demonstrates that the noise impacts of the proposed project would be limited to temporary noise associated with construction activities. The record shows that, given the presence of residences along substantial portions of the route, construction noise impacts would be minimized by confining construction work to daytime hours, 7:00 a.m. to 6:00 p.m., unless contingencies require work outside such hours. The Siting Board understands that the Company will communicate with the various municipalities regarding the extent of any work outside of normal daytime hours. To underscore this commitment, the Siting Board directs the Company to limit construction work on the Western Segment to the hours from 7:00 a.m. to 6:00 p.m. unless otherwise authorized by the affected municipality. With the identified mitigation and implementation of the above condition, the Siting Board finds that the noise impacts of the proposed project along the Western Segment primary route would be minimized.

The record shows that construction would be on the road shoulder where practical, and otherwise along the edge of pavement. The record also shows that the Company would follow D.T.E. Road Restoration Standards after pipeline installation.

The record shows that the Company has committed to finalizing engineering plans for the proposed project in consultation with the affected municipalities, and that this review process likely would require approximately 4 to 6 weeks, based on experience with the first stage of the project (see Section III.C.3, below). The record shows that the Company has committed to mitigate traffic impacts during construction in accordance with traffic management plans to be approved by each municipality, including site-specific traffic management plans the Company expects to prepare at key intersections. Further, the record shows that the Company has committed to avoid work between Memorial Day and Labor Day, and to limit work to the hours

from 7:00 a.m. to 6:00 p.m., except by approval of the affected municipality. In addition, the record shows that the Company would need to obtain road opening permits from the municipalities, which gives the Towns of Sandwich and Barnstable the opportunity to limit work to reasonable dates and hours.

The Siting Board notes that, to allow effective coordination between the Company and the municipalities in the development of engineering and traffic plans for the project, there must be a reasonable lead time for municipal review of the plans before they are finalized. Therefore, the Siting Board directs the Company to provide the municipalities, at least 60 days prior to commencement of construction, with substantially completed engineering plans, and substantially completed traffic management plans including all site-specific traffic management plans, for review and comment. The Company is further directed to file with the Siting Board a copy of each traffic management plan, including each site-specific traffic management plan, when the plan has been finalized.

Therefore, with the above condition, the Siting Board finds that traffic impacts along the Western Segment primary route would be minimized.

The record indicates that fewer than 30 homes are immediately adjacent to each route. The Siting Board notes that while some noisy construction activities are common to both routes, noise from pavement cutting would be predominantly on the primary route and that noise from tree clearing would be predominately on the alternative route. However, no comparison of modeled sound levels was made between abutters to the primary route and abutters to the alternative route. Based on the information in the record, noise levels generated by construction would be generally comparable between the primary and alternative routes, and the number of receptors is generally comparable.

The record shows that on the Western Segment, there would be more construction with the potential to directly affect traffic on the primary route than the alternative route because the primary route involves a greater length of in-street construction. However, construction on the alternative route would occur on Route 130, which has heavy traffic and no ready detours, while construction on the primary route would occur on Service Road, which has light traffic and ready

detours. These are countervailing factors and lead to a conclusion that traffic disturbance would be of similar magnitude on the two routes.

Noise impacts on the two routes appear to be comparable. Traffic impacts on the two routes also appear to be comparable. Therefore, the Siting Board finds that, on the Western Segment, the primary route and the alternative route would be comparable with respect to noise and traffic impacts.

iv. Conclusions on Environmental Impact - Western Segment

In the sections above, the Siting Board has reviewed the evidence presented regarding the environmental impacts of the proposed project along the primary and alternative routes. The Siting Board finds that KeySpan has provided sufficient information on the environmental impacts of the proposed project, including information on the potential for mitigation, for the Siting Board to determine whether the environmental impacts would be minimized.

In Sections III.C.2.a.i, ii, and iii, above, the Siting Board found that, on the Western Segment primary route, wetlands and water resources, land use and land resources, and noise and traffic impacts would be minimized. Therefore, the Siting Board finds that, for the Western Segment, environmental impacts would be minimized. The Siting Board further found that the Western Segment primary route would be preferable to the alternative route with respect to wetlands and water resources impacts and with respect to land use and land resources impacts, and comparable to the alternative route with respect to noise and traffic impacts. Therefore, the Siting Board finds that, for the Western Segment, the primary route would be preferable to the alternative route with respect to environmental impacts.

b. Facility Cost - Western Segment

KeySpan estimated that the PV cost of constructing the Western Segment along the primary route would be \$10,450,000, based on construction in three phases (Exh. KED-1, at 4-32, 5-48). The Company estimated that the PV cost of constructing the project along the alternative route would be \$11,600,000, based on construction in a single phase (*id.*). KeySpan stated that its cost evaluation was based primarily on two factors: (1) construction labor and

material costs; and (2) costs of obtaining easements or other access to rights-of-way (id. at 4-23). The Company discounted the cost of phased construction by calculating PV costs based on a 10% per year cost of capital (id. at 4-25; Exh. EFSB-S-4). KeySpan indicated that it did not refine or alter its cost estimates between its site selection process and facilities comparison (Exh. KED-1, at 5-48).

The Company indicated that it assumed unit prices of \$330 per foot and \$146 per foot for construction in public roadways of 20-inch and 12-inch pipeline, respectively (id. at 4-25). The Company assumed construction costs of \$229 per foot for 20-inch pipeline in the NSTAR right-of-way and construction costs of \$131 per foot for 12-inch pipeline along inactive railroad right-of-way (id.). Additional costs representing mobilization and demobilization, and for crossing state highways were added to these unit costs (id.; Exh. YAR/DEN 2-3). The cost estimate for the alternative route includes \$3,000,000 to obtain easements from private landowners along the NSTAR right-of-way, but does not include any figure for possible payments to NSTAR (Exh. KED-1, at 4-27, 4-32).

The record shows that the alternative route would cost approximately \$1,000,000 more than the primary route. Based on the lower cost of constructing the primary route rather than the alternative route, the Siting Board finds that, on the Western Segment, the primary route would be preferable to the alternative route with respect to cost.

c. Reliability - Western Segment

KeySpan stated that the proposed pipeline along either the primary route or the alternative route would provide the necessary pressure and supply on a safe and reliable basis over the forecast period (Exh. KED-1, at 3-18). The Company stated that the proposed project would not add complexity to its gas distribution or to KeySpan's operation of the system (id. at 3-19). In these terms, the Company stated that the primary route and the alternative route are very similar (id. at 5-45). Also, the Company indicated that the primary and alternative routes are essentially the same length, 6.6 miles (id. at table 4-3). As a second-order consideration, the Company indicated that the proposed pipeline on the primary route would be built with multiple tie-ins to the existing line, which would afford later opportunities to isolate shorter sections of pipeline to

perform maintenance work without shutting down a long section of gas main (Tr. 2, at 241-246). In addition, the Company stated that it could more reliably construct the pipeline using the primary route because it would require less extensive property rights acquisition and Article 97 legislation than required for the alternative route (Exhs. KED-1, at 5-46; EFSB-G-2 (Supp.); Tr. 2, at 256).

The record shows that the primary route and the alternative route are of similar length, but that legislative approval would be necessary to construct the alternative route. Given the greater certainty with which the segment can be approved and constructed, the Siting Board finds that, on the Western Segment, the primary route would be preferable to the alternative route with respect to reliability.

d. Conclusions on Proposed Facilities - Western Segment

The Siting Board has found, for the Western Segment, that environmental impacts would be minimized, that the primary route would be preferable to the alternative route with respect to environmental impacts and cost, and reliability. Accordingly, the Siting Board finds that the Western Segment primary route would be superior to the alternative route with respect to providing a reliable energy supply to the Commonwealth with a minimum impact on the environment at the lowest possible cost.

The Siting Board finds that KeySpan has provided sufficient cost and reliability information in order to determine whether the appropriate balance among environmental impacts, cost, and reliability would be achieved. The Siting Board also finds that the Western Segment of the proposed project along the primary route would achieve an appropriate balance among conflicting environmental concerns, as well as among environmental impacts, reliability and cost.

3. Middle Segment

a. Environmental Impacts - Middle Segment

In this section, the Siting Board compares the environmental impacts of the proposed facilities along the primary and alternative routes for the Middle Segment, considers the proposed mitigation for such impacts, evaluates any options for additional mitigation and determines

whether the environmental impacts along the primary route would be minimized. The subsections below consider wetlands and water resources impacts, land use and land resources impacts, impacts to the South Dennis Historic District, and noise and traffic impacts.

i. Wetlands and Water Resources

(a) Company

KeySpan indicated that the Middle Segment would traverse the Bass River and one unnamed stream, as well as associated buffer zones defined under the Massachusetts Wetland Protection Act (Exh. KED-1, at 5-14 to 5-18). In addition, the pipeline would cross groundwater protection districts (id. at 5-20). If the primary routing is used, the Middle Segment pipeline would be constructed generally along the edge of pavement of existing roads and within roadway layouts (id. at 5-3).

KeySpan stated that the Bass River is a tidal estuary that includes designated Riverfront Area (id. at 5-14, 5-18). The Company indicated that to cross the Bass River it would install the pipeline in an existing utility chase under the existing Highbank Road bridge (Tr. 3, at 383). According to the Company, such an installation would likely require the use of spud barges, but that spud holes in the riverbed would fill back in with sand, resulting in minimal impact (Tr. 2, at 285-287). The Company stated that the Bass River shoreline is stabilized with stone rip-rap at the base of the bridge (Exh. KED-1, at 5-14).

KeySpan stated that the primary route also crosses an unnamed perennial stream which passes in a culvert beneath Great Western Road (id. at 5-18). The Company stated that along Great Western Road in Yarmouth, the primary route also travels alongside Cat Swamp Pond, which has banks 15 feet from the road pavement (id. at 5-14). Altogether, the Middle Segment primary route would require approximately 1400 linear feet of work in wetland buffer area (id. at 5-15). The Company stated that there are no mapped vernal pools within 100 feet of the primary route (id.).

KeySpan stated that for the Middle Segment alternative route Bass River crossing, it would position the pipeline on a new supporting structure (e.g., a pipe bridge) that would extend across the Bass River at the railroad bridge, using the existing abutments (Tr. 2, at 287-288;

Tr. 3, at 491). The Company asserted that restorative work on the existing stone abutments of the railroad bridge could be required, which would entail in-water or shoreline construction (Exh. YAR/DEN 1-9).³⁶ The alternative route also crosses the same unnamed perennial stream as the primary route, running through a culvert beneath the Rail Trail approximately 1000 feet west of Depot Street (Exh. KED-1, at 5-18).

The Company stated that the Middle Segment alternative route traverses wetlands defined under the Massachusetts Wetland Protection Act; these include Riverfront Area at the Bass River, which would be spanned; a wetland adjacent to the Bass River containing saltmarsh vegetation, phragmites, and forested upland buffer;³⁷ and the unnamed stream west of Depot Street (id. at 5-15 to 5-16). According to the Company, the Middle Segment alternative route would require approximately 400 linear feet of work in wetland resource areas and 2000 linear feet of work in wetland buffer area (id. at 5-16). The Company stated that there are no mapped vernal pools within 100 feet of the alternative route (id.).

KeySpan concluded that the primary route has a substantial advantage over the alternative route with respect to the potential for sedimentation and erosion impacts during construction, noting both the greater number of wetland resources sensitive to sedimentation along the alternative route and the asserted difficulties of effecting a crossing at the railroad bridge (id. at 5-45). The Company concluded that the primary and alternative routes would be comparable with respect to spill control, asserting that prevention and containment measures would be implemented equally on the two routes (id.).

KeySpan stated that there are no mapped public water supply wells proximate to the primary or alternative route for the Middle Segment (Exh. KED-1, at 5-19). However, the Company stated that the primary route crosses through 9900 linear feet of Wellhead Protection

³⁶ The Company did not compare the need for or extent of in-water or shoreline construction work between the primary route on the Highbank Road bridge and the alternative route on the railroad bridge.

³⁷ Plans and aerial photos provided by the Company indicate that there is an unpaved vehicle track between the old rail right-of-way and the wetland adjacent to the Bass River; the distance between the edge of the right-of-way and the wetland appears to be at least 40 feet, according to these sources (Exhs. EFSB-E-25(1); EFSB-E-28(1)).

Area and 600 linear feet of Potential Public Water Supply Area, as identified by the Cape Cod Commission (id. at 5-20). The Company stated that the alternative route crosses through 8000 linear feet of Wellhead Protection Area (id.). The Company stated that it considered the distances of the primary and alternative routes through groundwater resource areas to be comparable and therefore concluded that the primary and alternative routes are comparable with respect to groundwater impacts (id.).

The Company noted that all of Cape Cod has been designated as a Sole Source Aquifer under the federal Safe Drinking Water Act and that the Cape Cod Commission has identified groundwater protection areas based on their importance for drinking water supplies (id. at 5-19). The Company indicated that development and implementation of an SPCC Plan would protect against impacts to groundwater (id. at 5-20). Further, the Company stated that it would perform no equipment maintenance within 100 feet of a wellhead protection area (Tr. 3, at 549-551).

For both the primary and alternative routes, the Company stated that it would use filter fabric barriers and would sweep road surfaces to keep soil materials from washing into storm drains (Exh. KED-1, at 5-11). KeySpan stated it would also develop and implement an SPCC Plan to ensure against inadvertent releases of fuel or equipment maintenance materials during pipeline construction (id.). For areas subject to the Massachusetts Wetland Protection Act, KeySpan stated that it would obtain and comply with all necessary Determinations of Applicability and Orders of Conditions (id.). The Company also stated that it would comply with all local wetlands bylaws (id.). The Company indicated that it would prepare an SWPPP and implement erosion and sedimentation control best management practices (id.; Exh. EFSB-E-26). The Company also indicated that it would prepare an Environmental Construction Plan, that would address erosion control, dust control, and vehicle fueling and maintenance (Exh. YAR/DEN 1-5).

KeySpan asserted that current information from the MADEP Bureau of Waste Site Cleanup indicates that MCP sites would not affect pipeline construction (Exh. KED-3, at 12-1 to 12-2). Notwithstanding, the Company indicated that it would follow URAM procedures required under the MCP, in the event that contamination is encountered (id. at 12-2 to 12-3; Tr. 2, at 311).

(b) Intervenor

According to Mr. Joseph A. Rodricks, witness for the Towns and Town Engineer for the Town of Dennis, removal of railroad tracks and pine saplings appears unlikely to have any impact on the saltmarsh and cranberry bog wetland adjacent to the Bass River near the alternative route or on adjacent upland areas (Exh. YAR/DEN-JAR; Tr. 4, at 616-620). Mr. Rodricks pointed out that based on his own knowledge and on evidence presented by the Company, an NSTAR right-of-way with an access road separates the old rail right-of-way from the saltmarsh and cranberry bog, so the old rail right-of-way route is not directly adjacent to any wetlands at that point (Tr. 4, at 616-620; see Exhs. KED-1, at fig. 4-6; EFSB-E-25(1); EFSB-E-28(S)). The Towns suggested that, with respect to wetlands impacts, the primary route is only marginally advantageous compared to the alternative route (Towns Brief at 6).

(c) Analysis

The record shows that the primary route on the Middle Segment is along roads and not in wetland areas. The record also shows that the Company would implement erosion control, sedimentation control, and spill prevention procedures that would minimize water impacts. To further reduce the risk of contaminating groundwater supplies, the Siting Board directs the Company to refrain from all refueling and equipment-maintenance activities that have the potential for fluid spills, when vehicles are within identified Wellhead Protection Areas. Based on the use of roadway layouts, the limited encroachment into wetland buffer areas, and the Company's expressed commitment to control erosion and sedimentation, the Siting Board concludes that construction of the proposed pipeline along the primary route would result in no permanent impacts, and only minimal temporary impacts to wetlands and water resources. With the identified mitigation and implementation of the above condition, the Siting Board finds that the wetlands and water resources impacts of the proposed pipeline along the Middle Segment primary route would be minimized.

The record shows that both the primary and alternative routes would cross the Bass River at existing bridge locations and that both routes cross bridges that may require in-water construction work. Otherwise, as noted by the Towns, neither route would be constructed in

wetlands resource areas. Along the primary route, the pipeline would be installed below pavement up to the bridge span and then, continuing in a straight line, hung underneath the bridge in an existing pipe chase. The railroad embankment on the alternative route is narrower than the road on the primary route, so work would be close to wetlands areas where the railbed crosses wetlands, including in areas next to the Bass River; a new structure would likely be required to support the pipeline between the railroad bridge abutments; and there are large rocks on the facing of the embankment, which may complicate construction. The record shows that in-water work could be necessary to recondition the abutments of the railroad bridge. However, evidence of the nature and extent of required in-water work is not sufficient for either river crossing to determine which crossing would likely have greater impacts on wetlands or water resources.

On the primary route, construction would occur in a paved road or immediately adjacent shoulder, affording greater control over surface water and wetland impacts than would be available on the alternative route. Therefore, the primary route would be more advantageous with respect to surface water and wetlands impacts. However, the difference is likely to be minor because proper construction practices would minimize adverse effects on surface water and wetlands on either route.

The record also shows that the alternative route crosses through Wellhead Protection Areas for a slightly shorter distance than does the primary route. However, on the primary route, construction would occur in a paved road or immediately adjacent shoulder, affording greater control over any inadvertent spills than would be available on the alternative route. Both of these differences are minor because proper construction practices would minimize potential impacts to groundwater. Overall, the primary and alternative routes would be comparable with respect to the potential for impacts to groundwater. Considering wetlands, surface water, and groundwater impacts, the Siting Board finds that, on the Middle Segment, the primary route would be preferable to the alternative route with respect to wetlands and water resources impacts.

ii. Land Use and Land Resources

(a) Company

KeySpan indicated that the primary route traverses areas that are residential and areas that are of commercial use (Exh. KED-1, at fig. 4-6). The Company stated that, in Yarmouth, the primary route goes past Wilbur Park, which contains a boat ramp, beach, and picnic area (id. at 5-24). KeySpan stated that 135 homes, along with commercial and industrial uses, are located along the primary route (id. at 5-26). The Company stated that one sensitive receptor – a church – is located on the primary route (id. at 5-28).

KeySpan indicated that it expects vegetation clearing along the primary route for the Middle Segment to be limited to tree branch trimming and some shrubbery removal (id. at 5-21 to 5-22; Tr. 3, at 457-459). The Company stated that it would assess the potential for damage to trees with a professional arborist and local tree wardens (Exh. KED-3, at 5-2). The Company stated that graded areas would be fertilized, seeded, and mulched, and that these areas would be inspected after the first and second growing seasons (id.). The Company stated that shrubs would be restored in accordance with any agreements it may make with individual landowners (id.).

The Company stated that Highbank Road in Dennis is a designated scenic road, and construction along that portion of the primary route would require a scenic roadway approval from the Town of Dennis Board of Selectmen (id. at table 1.6-1; Tr.3, at 385).³⁸ The Company indicated that no stone walls would likely be disturbed along roadsides (Exh. KED-3, at 5-2). However, if stone walls or fences were to be temporarily removed for construction, the Company committed to their restoration (id.).

The Company indicated that there is Priority Habitat for rare species behind several homes on Highbank Road in Dennis, where the primary route passes in front of those homes (Exh. KED-1, at fig. 4-6). The Company stated that pipeline construction would have no impacts

³⁸ Pursuant to M.G.L. c. 40, § 15C, a city or town may designate certain roads within its boundaries as scenic roads. Once designated as a scenic road, repair, maintenance, construction, or paving of the road may not involve the cutting or removal of trees, or the tearing down or destruction of stone walls, except with prior written permission of the planning board or the board of selectmen.

on rare species (Exh. KED-3, at 16-4). The Company stated that the primary route does not cross lands for which approval of the Legislature under Article 97 would be required to allow such use (Exh. KED-1, at 5-24).

KeySpan indicated that PAL reviewed the documented locations of archaeological sites, historic structures, cemeteries, and areas of archeological sensitivity within the project area (Exh. EFSB-E-5). In response to comments from the Massachusetts Historical Commission, PAL conducted an archaeological reconnaissance survey to identify areas that may require further testing to locate and identify any important archaeological resources (id.). The Company stated that large portions of the primary route were identified as sensitive for containing previously unidentified archaeological resources (Exh. KED-1, at 5-35). The Company stated that it would perform additional surveys as directed by the Massachusetts Historical Commission (Exh. EFSB-E-5). The Company stated that if significant eligible deposits are found in any further survey directed by the Massachusetts Historical Commission, KeySpan would consider alternative alignments, reduce its workspace, or undertake a site examination and consult with the Massachusetts Historical Commission (Exh. EFSB-E-6).

KeySpan stated that the primary route also passes by the North Harwich Cemetery, which is included in the Inventory of Historic and Archaeological Assets of the Commonwealth (Exh. KED-1, at 5-34 to 5-35). According to the Company, implementation of a traffic management plan (see Section III.C.3.a.iv(a), below) and dust controls would mitigate any impacts to cemeteries or historical structures (id. at 5-35).

KeySpan indicated that the alternative route traverses areas that are residential, areas that are woodland, and areas that are of commercial use (Exh. KED-1, at fig. 4-6). The Company stated that 44 homes are within 100 feet of the alternative route (id. at 5-26). The Company stated that one sensitive receptor – a church – is located on the alternative route (id. at 5-28).

KeySpan noted that there has been local interest in extending the Rail Trail into Yarmouth, along the abandoned or inactive rail right-of-way comprising a portion of the alternative route (Exh. YAR/DEN 1-12). The Company indicated that elements of its construction work – tree clearing, and removal of tracks and ties – could potentially facilitate extension of the Rail Trail (id.). The Company asserted that any such extension, and thus any

potential benefit, was speculative and not directly related to the project (id.). The Company stated that if the pipeline were placed in the old rail right-of-way, maintenance or repairs of the pipeline would not interfere with its possible future use as a bike trail (Exh. YAR/DEN 1-37).

KeySpan indicated that over half of the length of the alternative route is unimproved railroad bed that has grown in with young pitch pines, except for a 5- to 15-foot wide gap in the middle with no trees (Exh. KED-1, at fig. 4-3, 5-22, fig. 5.3-6; Tr. 3, at 459). The Company indicated that about one quarter of the length of the alternative route is Rail Trail, and indicated that the Rail Trail is densely vegetated to the sides and has overhanging branches, so vegetation clearing would be needed in this area as well (Exh. KED-1, at fig. 4-3, 5-22). The Company stated that clearing of vegetation, including some mature trees, would be required along approximately 21,000 linear feet of the alternative route and that this would include loss of existing vegetation near approximately 44 residences (id. at 4-24, 5-22; Exh. YAR/DEN 1-15; Tr. 3, at 459). For this area, the Company indicated that it would use either the stovepipe construction method, which uses a construction area 20 to 25 feet wide, or the cross-country construction method, which typically has a construction width of 75 feet (Exh. EFSB-E-3). The Company indicated that, assuming the corridor it cuts were to include the existing clearing along the tracks, it would widen the existing clearing (e.g., by cutting an additional 15 feet on one side in a location where the existing gap in vegetation is 10 feet wide) (Tr. 3, at 401-402). The Company explained that this would diminish the vegetative screening that exists for residents along the old rail right-of-way, and noted that there are several locations along the old rail right-of-way where there are rows of homes, some of which are opposite commercial and industrial facilities (Exh. KED-1, at 4-3; Tr. 3, at 402). The Company stated that, following construction, it would maintain a cleared width of 20 to 25 feet (Tr. 2, at 206-209). The Company noted the concerns expressed at the Siting Board's public comment hearing about the loss of vegetation along the old rail right-of-way (Reply Brief at 14, citing Tr. July 28, 2005, at 33, 37-38, 40).

According to the Company, the existing Rail Trail east of Route 134 was slated to be rehabilitated and improved beginning in September 2005 (Exh. YAR/DEN 1-1). The Company indicated that it expects that its construction vehicles would be excluded from what will be newly

repaved Rail Trail, so supplemental clearing along the Rail Trail would be required for pipeline construction to take place (Tr. 2, at 210-211, 215).

KeySpan indicated that in Dennis, the alternative route extends along the edge of approximately 1600 linear feet of Priority Habitat, overlapping 1200 linear feet of Estimated Habitat; and the route is adjacent to municipal open land in both Dennis and Yarmouth (Exh. KED-1, at 5-24, fig. 4-6). The Company stated that it would not need a scenic roadway approval for construction of the pipeline on the alternative route (Tr. 3, at 385).

KeySpan stated that a preliminary assessment identified the majority of the alternative route as sensitive for containing previously unidentified archaeological resources (Exh. KED-1, at 5-35). The alternative route also passes by the North Harwich Cemetery, which is included in the Inventory of Historic and Archaeological Assets of the Commonwealth (id. at 5-34, 5-35).

The Company asserted that, with implementation of a traffic management plan, dust controls, and avoidance of working at noise-sensitive times, there would be no anticipated impacts at residences (id. at 5-26). The Company concluded that the primary route would be advantageous with respect to residential impacts, on the basis that vegetation clearing along the alternative route would be permanent and would occur in the vicinity of approximately 44 residences (id.). With the same church identified for both routes, the Company concluded that the two routes are comparable with respect to sensitive receptors (id. at 5-28). With considerably more tree clearing required for construction and maintenance, the Company concluded that the primary route is significantly better than the alternative route with respect to vegetation clearing (id. at 5-22). Noting that both routes are adjacent to Article 97 property, but only the alternative route extends along Priority and Estimated Habitat, the Company concluded that the primary route is significantly better than the alternative route with respect to impacts on protected lands (id. at 5-24). Asserting that potential impacts on historic resources can be mitigated, the Company concluded that the primary route and alternative routes are comparable with respect to historical resources (id. at 5-35 to 5-36).

(b) Intervenor

Regarding the alternative route, the Towns discounted the value of the existing vegetation that may be cleared for the project, along the old rail right-of-way, describing the vegetation as pine saplings with minimal value as a vegetative buffer (Exhs. YAR/DEN-JAR at 4; YAR/DEN-GA at 3). Mr. George Allaire, witness for the Towns and Director of the Yarmouth Public Works Department, stated that the old rail right-of-way had been cleared of trees by the railroad within the last 10 years (Tr. 4, at 614, 657). With respect to the identified rare species or rare species habitat, the Towns point out that there is no record evidence showing that installing a pipeline along the alternative route would cause harm to any rare species (Towns Brief at 9).

The Towns asserted that the old rail right-of-way in Yarmouth will soon be converted to use as an extension of the Rail Trail, which currently extends east from Route 134 in Dennis to South Wellfleet (see Exhs. EFSB-E-22(1); YAR/DEN-GA at 2).³⁹ The Towns asserted that at least some of the vegetation along the old rail right-of-way will therefore eventually be removed, indicating its loss for construction of the proposed project would be of little consequence (Tr. 4, at 773). Mr. Allaire also stated that the tree clearing which would be performed along the alternative route would be of benefit to the Town of Yarmouth because it would greatly facilitate use of the right-of-way for the proposed extension of the Rail Trail (Exh. YAR/DEN-GA at 2-3).

(c) Analysis

The record demonstrates that the land resources impacts of the proposed pipeline along the primary route would be temporary and minimal due to the placement of the pipeline under and directly adjacent to streets and because the Company has stated that it will assess the potential for damage to trees on the route with a professional arborist and local tree wardens.⁴⁰ To protect shade trees and other landscaping features, the Siting Board directs the Company:

³⁹ The Towns argued that the existing Rail Trail is popular and its extension to Yarmouth is logical and foreseeable (Towns Brief at 7). Mr. Allaire stated that he hoped to start design of an extension within six months (Tr. 4, at 737).

⁴⁰ The Company is required by § 6.8 of the D.T.E. Road Restoration Standards to hand-cut around roots of trees.

(1) to arrange for a professional arborist to conduct an on-site inspection of the construction zone within 6 months before construction begins in an area; (2) based on recommendations by the arborist and, where applicable, tree wardens, to take all reasonable precautions to avoid removing or damaging trees; (3) to minimize damage to shrubbery and other plantings, as well as damage to or removal of fences, stone walls, lampposts, and other landscaping features; (4) to repair or replace any damaged or removed trees, shrubbery, or plantings, in consultation with the arborist and, where applicable, tree wardens, and with the agreement of the owner of damaged or removed vegetation; and (5) to repair or replace any damaged or removed fences, walls, or other landscaping features, with the agreement, as applicable, of the owner of the landscaping feature. With the specified mitigation and implementation of the above condition, the Siting Board finds that the land resources impacts of the proposed pipeline along the Middle Segment primary route would be minimized.

While the primary route would be placed within or near the edge of existing roadways, the alternative route would entail considerable clearing of vegetation. The width of the vegetation to be cleared west of Route 134 would be up to 15 feet along the old railbed, to establish a permanent right-of-way of approximately 25 feet. West of Route 134, much of the vegetation may be cleared for the proposed extension of the Rail Trail. Based on the record, the Siting Board notes it is possible that the old rail right-of-way will be cleared of some amount of vegetation at some point in the future, in connection with an extension of the Rail Trail. Based on the evidence, it is unclear whether the Rail Trail extension project, including associated vegetation clearing, will go forward in the near future. Areas east of Route 134 where the Rail Trail is scheduled for rehabilitation would likely require less clearing.⁴¹

There is no record evidence that this vegetation serves as habitat for any species of notable rarity. Also, because some of the old rail right-of-way may be cleared in some future

⁴¹ Using a hybrid route consisting of the old rail right-of-way route east to Route 134, following Route 134 south one-half mile and then the Whites Path route east to the end of the Middle Segment would result in fewer impacts to vegetation and consequently less visual impact than the old rail right-of-way route in its entirety. However, the vegetation and visual impacts would still be considerably greater than on the Whites Path route in its entirety. See fn. 41, below.

year even without the project, the differential impact of much of the clearing of the alternative route might exist only for a few years, and thus it is possible that the buffer effect of the existing vegetation that would be lost might have only persisted for a relatively short time. Nevertheless, until the vegetation is cleared for other purposes, the young pitch pine trees along the abandoned right-of-way serves as a vegetative buffer and as a belt of woods habitat. By comparison, upland impacts of the primary route would be generally limited to a small amount of tree limb removal. Therefore, the primary route is advantageous with respect to impacts to vegetation and upland habitat.

While the primary route follows existing roadways, the alternative route is largely away from roads. Underground pipelines are generally compatible with roads from a land use perspective, while pipelines might restrict future use of the area traversed in off-road locations. In general, roads and road shoulders have relatively little in the way of land resources such as undisturbed archaeological resources, vegetation, and valuable upland habitat. For the Middle Segment, no significant differences between routes were found relative to impacts on rare species or archaeological resources. However, construction on the alternative route would involve considerable clearing of existing trees, which could be a long-lasting effect of the project, depending to some extent on whether the Rail Trail is extended in the future. Therefore, the Siting Board finds that, on the Middle Segment, the primary route would be preferable to the alternative route with respect to land use and land resources impacts.

iii. South Dennis Historic District

(a) Company

KeySpan stated that for 2400 linear feet, the primary route for the Middle Segment passes through the South Dennis Historic District and that six properties on Highbank and Upper County Roads are listed on the State Register as contributors to this district (Exh. KED-1, at 5-35). The Company stated that the proposed project would be installed in the existing roadway and that it would not cause permanent impacts to buildings or structures within the historical district (Exh. KED-3, at 10-12). According to the Company, no blasting and no jackhammering is anticipated in the South Dennis Historic District (Exh. YAR/DEN 1-6).

KeySpan indicated that, where the pipeline is under pavement, it would install in-street pipeline markers, and where the pipeline is in the road shoulder, it would install upright markers or place placards on utility poles along the route (Exh. RR-EFSB-14). The Company indicated that upright markers would generally be placed at shrub-lines or at otherwise visually sheltered locations (Tr. 3, at 589). The Company indicated that in the South Dennis Historic District, it would be placing the pipeline under pavement, so it would install cast-iron in-street markers and it would also inset, at grade level, valve boxes and possibly test box covers of approximately 8-inch diameter (Exh. RR-EFSB-14; Tr. 3, at 579-585).

KeySpan stated that for 4300 linear feet, the alternative route also passes through the South Dennis Historic District (Exh. KED-1, at 5-35). However, the Company indicated that no individually listed or inventoried property within the South Dennis Historic District is located along the alternative route (id. at 5-34 to 5-35).

The Company indicated that although both routes pass through the South Dennis Historic District, there are individually listed historic properties only along the primary route (id.). However, the Company anticipated that there would be no permanent impacts to historic structures with use of either route (Exh. YAR/DEN 1-20). Also, the Company anticipated that, using the primary route, it would cut down no trees in the historic district (Tr. 3, at 460). Asserting that the potential for any impacts to historic structures can be mitigated, the Company concluded that the primary route and the alternative route are comparable with respect to impacts to historic and archaeologic resources (Exh. KED-1, at 5-36).

(b) Intervenor

Mr. Edmond R. Nickerson, witness for the Towns and Chairman of the South Dennis Historic District Commission, stated that, given the location of streets, trees, and structures, it seems difficult to imagine that the pipeline can be installed in the South Dennis Historic District without tree cutting or alteration of fences or lampposts (Exh. YAR/DEN-ERN). The Towns noted that Highbank Road is designated as a local scenic road, which affords some protection to mature trees and other scenic features (Exh. YAR/DEN-JAR at 3). Mr. Nickerson asserted that

the two routes are not comparable with respect to historic resources because the old rail right-of-way route is not near the architecturally significant buildings of the district (Exh. YAR/DEN-ERN).

The Towns requested that the Siting Board require that KeySpan consult with the South Dennis Historic District Commission before applying for any local permits for work in Dennis (id.). The Towns requested that a condition be written to require that if the South Dennis Historic District Commission determines that the work will impair any mature trees in the district, that KeySpan would be required to replace such trees with trees of comparable species, size and maturity and that KeySpan would be responsible for feeding and watering, and possibly replacing such trees for at least two years (id.). Finally, the Towns requested that KeySpan be required to replace any damaged fences, street signs, or other structures to the reasonable satisfaction of the South Dennis Historic District Commission (id.).

(c) Analysis

There is merit to the Towns' interest in preserving the historic qualities of the South Dennis area. The record shows that the Company has stated that it will cut down no trees in the Historic District along the primary route. In Section III.C.3.a.ii(c), above, the Siting Board has already established a condition relative to vegetation and landscaping. We note that this condition includes the South Dennis Historic District. To further protect historic resources, the Siting Board directs the Company: (1) to consult with the South Dennis Historic District Commission prior to finalizing construction plans for the district; and (2) in consultation with the South Dennis Historic District Commission, to restore vegetation and any fences or other structures that are disturbed in the South Dennis Historic District due to construction of the proposed pipeline.

The record indicates that in most locations, the only permanent visible features of the proposed pipeline would be pipeline safety markers. The record indicates that safety markers along Highbank Road in the South Dennis Historic District would be mounted flush with the pavement surface. In other locations, where free-standing safety markers may be used, the record indicates that the safety markers would be discreetly sited. With the identified mitigation and

implementation of the above condition, the Siting Board finds that impacts of the proposed pipeline to the South Dennis Historic District would be minimized.

The record shows that the alternative route would traverse more linear feet of historic district but pass no individual registered properties. Because the primary route would pass closer to recognized historical features within the district, more care may be necessitated on the part of the Company during construction along the primary route, relative to the alternative route, to avoid historical features located close to the construction zone. The Siting Board recognizes that, as a result of the tight working space along the primary route, there remains some possibility of unanticipated impacts. However, the only expected permanent impact to the South Dennis Historic District would be pipeline markers, expected to consist of only a few cast iron markers embedded into the street surface. Overall, the record indicates that, based on this minor impingement and the limited risk of any additional impact resulting from the tight working space, the impact to the South Dennis Historic District would be small. Therefore, the Siting Board finds that the alternative route for the Middle Segment would be preferable to the primary route with respect to potential impacts to the South Dennis Historic District.

iv. Noise and Traffic

(a) Company

KeySpan indicated that the project would have noise and traffic impacts only during its construction (Exh. KED-1, at 5-9 to 5-10). These impacts are evaluated below, for the primary and alternative routes.

KeySpan stated that the principal sources of noise during construction would be pavement saws, a backhoe, and a welding rig (Exh. EFSB-E-15). The Company indicated that other sources of noise such as dump trucks and crew vehicles would be present intermittently (id.). The loudest piece of equipment evaluated by the Company, the pavement saw, has a maximum sound level of approximately 90 dBA at 50 feet (id.). KeySpan noted that sound levels at any given location would be dominated by the piece of equipment nearest the receptor of interest (id.). According to KeySpan's calculations, the L_{10} of construction noise, outside a residence located 50 feet back from pipeline construction in a road typically would exceed

60 dBA for a total of approximately 7 to 9 days, as machinery used in the construction sequence moves along the roadway (Exh. RR-EFSB-12). The Company indicated that it measured ambient sound levels measured on May 19, 2005 (id.). The Company reported ambient L_{10} sound levels ranged from 66 dBA to 78 dBA on various primary route segments, and from 42 dBA to 76 dBA on various alternative route segments (id.).

The Company stated that the typical work hours would be on weekdays between 7:00 a.m. and 6:00 p.m. (Exhs. KED-1, at 5-9; EFSB-E-15). However, the Company indicated that night or weekend work might on occasion be needed to meet construction deadlines (Exhs. KED-1, at 5-9; EFSB-E-15; EFSB-E-16). The Company indicated that days and hours of work would be circumscribed by the street opening permits issued by each town (Tr. 2, at 316-317). The Company indicated its belief that it would be able to obtain permission from the towns to extend the scheduled construction hours if it became essential to do so (id. at 315-316).

As noted in Section III.C.3.a.ii(a), above, the Company stated that there are 135 residences along the primary route and 44 residences along the alternative route (Exh. KED-1, at 5-26). The Company stated that mechanized vegetation clearing equipment would likely be used along the old rail right-of-way route (Exh. EFSB-E-15).

KeySpan stated that it would develop traffic management plans for construction (Exh. KED-1, at 5-6). The Company stated that it would limit construction along roads to the off-season – from after Labor Day to before Memorial Day – except in any locations such as along Service Road for which the appropriate town determines that traffic impacts would be acceptable in the summer (Tr. 2, at 313-314). The Company indicated that the traffic management plans could limit construction to outside rush hour periods, specify the use of traffic control officers, and require maintenance of at least one lane of traffic flow (Exh. YAR/DEN 1-25). The Company stated that it would cover any street openings with steel plates at the end of the day, and that it would protect and barricade openings in the shoulder to ensure traffic and pedestrian safety (Exh. KED-1, at 5-6).

KeySpan indicated that it likely would use jacking or drilling to cross Route 134 (Exh. EFSB-E-8). KeySpan committed to preparing a site-specific traffic management plan for

the intersection of Highbank Road and Main Street in Dennis and possibly would also prepare such a plan for the Bass River crossing (Exh. YAR/DEN 1-4; Tr. 1, at 16).

The Company stated that it would restore streets in accordance with the D.T.E. Road Restoration Standards (Exh. YAR/DEN 1-45; Tr. 3, at 487). Also, the Company stated that, in Yarmouth and Dennis, it intends to repave to a minimum depth of four inches (Exh. YAR/DEN 1-49).

KeySpan stated that the primary route is almost entirely along traveled roads, while the alternative route is off roads except for road crossings (Exh. KED-1, at 5-32). The Company concluded that the alternative route would be better with respect to traffic (id.).

(b) Intervenor

The Towns stated that the intersection of Highbank Road and Main Street in Dennis currently operates at a poor level of service due to the combination of heavy traffic on Highbank Road and poor roadway geometry (Exh. YAR/DEN-JAR at 2). Under an assumption that the pipeline would be installed under the pavement of Highbank Road, the Towns anticipated major disruptions to traffic at this location (id.). Also, having resurfaced the area in 2002, the Town of Dennis strongly opposes cutting and patching Highbank Road, according to Mr. Joseph A. Rodricks, witness for the Towns and Town Engineer for the Town of Dennis (id. at 3).

The Towns requested that the Siting Board impose a number of conditions on the Company relative to road restoration following installation of the pipeline on the primary route in Yarmouth and Dennis. The Towns requested that the Siting Board require KeySpan to:

- fill trenches under the pavement with flowable fill for the full width, length, and depth of the trench or, in the alternative, to provide independent certification that the backfill meets the 95% modified Proctor density;
- sawcut and tack coat pavement edges or, in the alternative, to specifically allow the Towns to impose this standard if the Towns deem it warranted;
- ensure a replacement pavement thickness equal to the existing thickness or four inches, whichever is greater or, in the alternative, to specifically allow the Towns to impose this standard if the Towns deem it warranted;

- ensure that this new pavement be placed on six inches of a dense graded stone base and 12 inches of gravel or, in the alternative, to specifically allow the Town of Dennis to impose this standard if the Town of Dennis deems it warranted;
- mill and overlay with 1.5 inches of hot-mix asphalt the entire width and length of Highbank Road from the Highbank Road bridge over the Bass River to Route 134 approximately one year after the completion of the pipeline installation;
- inspect all pavement excavations within one year, to notify the Yarmouth Public Works Department or Dennis Town Engineer, as applicable, of the inspection at least 14 days before the inspection, and to repair any pavement that deviates more than 0.25 inches from the existing street surface;
- reinspect the trenches after the first winter, and mill off and replace the top one inch of the pavement on any failed portions; and
- pay for inspection by the Towns of the Company's work (Exhs. YAR/DEN-GA at 6-7; YAR/DEN-JAR at 5-7).⁴²

The Towns stated that the Highbank Road bridge is a critical feature of regional traffic flow, and that possible detour routes may be several miles in length (Tr. 4, at 646, 762-763).

The Towns stated that Highbank Road carries heavy traffic in a constricted area (id. at 645).

⁴² The Towns requested that the Siting Board determine that the Company would be subject to D.T.E. Road Restoration Standards § 9.16, which would apply when the pavement of existing streets has been installed for less than five years, for two streets in Yarmouth, on the basis that a rubberized membrane has been laid down within the five year span, and for one street in Dennis, on the basis that the five-year period should end at the date of the Company's petition, should the primary route be selected (Towns Brief at 30-33). Under D.T.E. Road Restoration Standards § 9.16, the Towns would seek to require the Company to use pavement repair methods selected by the Towns, should the primary route be chosen (see Exh. YAR/DEN-GA at 5). Several of the Towns' pavement repair requests were phrased as alternatives to a Siting Board ruling that D.T.E. Road Restoration Standards § 9.16 would apply. In response, the Company argued that its work would be outside of the five-year window for the Towns to specify pavement repair methods pursuant to § 9.16, and further that street restoration is a matter to be discussed between the Company and the Towns and, if unsatisfied, the Towns can take any concerns to the Department for enforcement (Company Reply Brief at 44-46). Application of Department standards is not a Siting Board role. The Siting Board therefore interprets the Towns' alternative recommendations regarding pavement repair methods to be outright requests for conditions on approval.

The Towns also stated that the intersection of Highbank Road and Main Street is the most sensitive and most difficult intersection in which to do work within Dennis (Exh. YAR/DEN-JAR at 2). In contrast, the Towns pointed out that the alternative route would avoid this constricted area (id. at 3).⁴³

The Towns noted that summer residents would have a major portion of their season disrupted if work occurred during the summer, and that the area is at peak use during this time (id. at 8). The Towns requested that the Siting Board impose conditions that no work occur in Dennis and Yarmouth between Memorial Day and Labor Day, and no work occur before 7:00 a.m. or after 6:00 p.m., unless advance permission is given in writing by the Towns (id.; Exh. YAR/DEN-GA at 8). The Towns requested that work at the intersection of Highbank Road and Main Street in Dennis be limited to the hours between 8:30 a.m. and 4:00 p.m. (Exh. YAR/DEN-JAR at 8).⁴⁴

Responding to several of the Towns' requests with respect to street restoration work, the Company asserted that flowable fill is inappropriate for use with an underground gas line, citing potential concerns about corrosion, deformation stress from frost, leak detection, and difficulty of re-excavating the backfill (Exh. YAR/DEN 1-47). The Company re-iterated that it would restore streets in accordance with the D.T.E. Road Restoration Standards, and also stated that it would place backfill to achieve a 95% modified Proctor density (id.; Exh. YAR/DEN 1-48). With respect to the Towns' request for a minimum of four inches of replacement asphalt, the Company indicated that it would repave to a minimum of four inches in Dennis and Yarmouth (Exh. YAR/DEN 1-49). The Company also committed to inspect the replacement asphalt between 30 and 60 days after completion of repair, and again after one year, and to repair any pavement that deviates more than 0.25 inches from the existing street surface, in compliance with

⁴³ Route 134 crossover would allow use of a hybrid route, substantially routing along roads, in lieu of the Bike Path between Route 134 and the crossing of the primary and alternative routes further to the east. The hybrid would have fewer advantages with respect to traffic impacts than the alternative route. See fn. 39, above.

⁴⁴ According to the Towns, the Town of Yarmouth has a noise bylaw which does not allow noise to be generated significantly before 7:00 a.m. or after 6:00 p.m. (Tr. 4, at 660).

the D.T.E. Road Restoration Standards (Exh. YAR/DEN 1-50). With respect to reimbursing the Towns for the cost of their inspection of the Company's work, the Company indicated that it did not plan to pay for the costs of on-site inspections done by a municipality (Exh. YAR/DEN 1-46).

(c) Analysis

The record demonstrates that the noise impacts of the proposed project would be limited to temporary noise associated with construction activities. The record shows that, given the presence of residences along substantial portions of the route, construction noise impacts would be minimized by confining construction work to daytime hours, 7:00 a.m. to 6:00 p.m., unless contingencies require work outside such hours. The Siting Board understands that the Company will communicate with the various municipalities regarding the extent of any work outside of normal daytime hours. To underscore this commitment, the Siting Board directs the Company to limit construction work on the Middle Segment to the hours from 7:00 a.m. to 6:00 p.m. unless otherwise authorized by the affected municipality. With application of this condition, the Siting Board finds that the noise impacts of the proposed project along the Middle Segment primary route would be minimized.

The record shows that construction would be on the road shoulder where practical, and otherwise along the edge of pavement. However, on Highbank Road, construction would be within the travel lane. The Towns have requested various specific conditions on restoring roadways after pipeline installation. The record shows that the Company will follow D.T.E. Road Restoration Standards after pipeline installation and has committed to achieving a 95% modified Proctor density for backfill. In addition, the record shows that the Company stated its intentions to repave the in-street trenches in Yarmouth and Dennis with four inches of asphalt and to repair any areas where road settlement causes a deviation from the existing road surface of more than 0.25 inch. The above commitments, together with the Department's standards including provisions therein regarding coordination between the Company and municipalities and steps municipalities can take to ensure compliance with the standards, reasonably ensure that

road restoration will be undertaken so as to minimize any impacts on traffic as well as the Towns' responsibilities for maintaining roads.

The Town of Dennis argued that the Siting Board should require full-width repaving of Highbank Road between the bridge crossing of the Bass River and the intersection with Route 134, traversing the South Dennis Historical District. The record shows this length of road was repaved recently, in 2002. Further, the record shows that unlike proposed construction along other portions of the primary route, it is likely that the use of this length of road would generally entail in-road trenching within or proximate to travel lanes.

As mentioned, the Department road restoration standards would allow the Town to require restoration measures such as full-width repaving for additional gas company work, were the work to be undertaken within five years after the previous repaving project. However, the year of the Company's proposed installation along the Highbank Road portion of the Middle Segment is 2007 at the earliest – just at the end of five years from the Town's recent repaving – although the work also may occur one to two years later than 2007 if the proposed Algonquin supply is available for the 2007/2008 heating season.

The Company has maintained that adhering to the specific requirements of the Department's restoration standards is all that is warranted. However, the record indicates that the proposed primary route along Highbank Road is sensitive for two reasons related to possible impact of pipeline construction on community concerns during and after construction. First, the route traverses an important traffic link in the Dennis-Yarmouth area, crossing the Bass River, which consists of narrow two-way road with little or no shoulder. While road restoration would be subject to Department standards intended to ensure adequate road performance consistent with pre-existing road conditions, full-width repaving would best ensure the continuing performance of Highbank Road consistent with pre-existing road conditions, in light of its narrow width and important traffic function. Second, the route traverses the central area of the South Dennis Historic District and a designated scenic roadway, representing a visually sensitive area of importance to the Town (see Sections III.C.2.a.i and ii, above). Full-width repaving would best ensure that the visual integrity of Highbank Road following construction, consistent with the pre-existing road conditions.

Overall, the Siting Board concludes that full-width repaving is warranted to minimize environmental impacts from the Company's proposed use of Highbank Road in Dennis as part of the primary route. Therefore, in order to help ensure the quality of road restoration in terms of both its performance as a travel surface and its visual integrity as a part of the South Dennis Historic District and a scenic roadway, and provided the Town continues to so request, the Siting Board requires that the Company use full-width repaving to restore Highbank Road in Dennis following construction of the proposed pipeline.

In order to minimize environmental impacts, the Siting Board directs the Company to provide for the repaving of Highbank Road for its full width from the Bass River to Route 134, unless directed by the Town of Dennis not to provide for such full-width repaving. In implementing the required repaving, the Company should: (1) coordinate with the Town regarding specifications the Town may request, and (2) follow the Town's specifications to the greatest extent possible, consistent with other applicable requirements.

The record shows that the Company has committed to finalizing engineering plans for the proposed project in consultation with the affected municipalities, and that this review process likely would require approximately 4 to 6 weeks. The record shows that the Company has committed to mitigate traffic impacts during construction in accordance with traffic management plans to be approved by each municipality, including site-specific traffic management plans the Company expects to prepare at key intersections. Further, the record shows that the Company has committed to avoid work between Memorial Day and Labor Day, and to limit work to the hours from 7:00 a.m. to 6:00 p.m., except by approval of the affected municipality. Also, the record shows that the Company would need to obtain road opening permits from the municipalities, which gives the Towns of Yarmouth, Dennis, and Harwich the opportunity to limit work to reasonable dates and hours. Specifically with respect to the intersection of Highbank Road and Main Street, the Company will need to work with the Town of Dennis to determine appropriate hours for times of construction and the geographic delineation of any additional limitations to be reflected in the traffic management plan and street opening permit.

The Siting Board notes that, to allow effective coordination between the Company and the municipalities in the development of engineering and traffic plans for the project, there must

be a reasonable lead time for municipal review of the plans before they are finalized. Therefore, the Siting Board directs the Company to provide the municipalities, at least 60 days prior to commencement of construction, with substantially completed engineering plans, and substantially completed traffic management plans including all site-specific traffic management plans, for review and comment. The Company is further directed to file with the Siting Board a copy of each traffic management plan, including each site-specific traffic management plan, when the plan has been finalized.

With the above conditions, the Siting Board finds that traffic impacts along the Middle Segment primary route would be minimized.

No comparison of sound levels was made between abutters to the primary route, who would experience street excavation, and abutters to the alternative route, who would experience noise from tree clearing and soil excavation but not from pavement cutting. The record shows that the primary route is close to a larger number of residences than the alternative route. Construction noise impacts to neighbors would likely be greater along the primary route, due to the larger number of nearby homes. Based on the lower number of nearby residents, the alternative route is preferable with respect to noise impacts.

The record shows that construction along the primary route would have an adverse impact on traffic flow when construction was ongoing, especially on Highbank Road. The record shows that the alternative route crosses roads but only follows roads at the east end of the Middle Segment. It would thus include less construction in heavily traveled roadways. Thus, the alternative route is also preferable with respect to traffic impacts. Therefore, the Siting Board finds that, for the Middle Segment, the alternative route would be preferable to the primary route with respect to noise and traffic impacts.

v. Conclusions on Environmental Impact - Middle Segment

(a) Company

KeySpan asserted that loss of vegetation near approximately 44 residences on the Middle Segment alternative route would be more consequential than temporary construction effects that would affect 135 residences on the primary route (Exhs. KED-1, at table 4-1; YAR/DEN 1-15;

Tr. 3, at 563-565). So, overall, the Company asserted that the primary route for the Middle Segment would have fewer construction impacts than the alternative route (Exh. KED-1, at 5-43).

(b) Intervenor

Mr. George Allaire, witness for the Towns and Director of the Yarmouth Public Works Department, and Mr. Joseph A. Rodricks, witness for the Towns and Town Engineer for the Town of Dennis, each stated that the Towns urge the Siting Board in the strongest possible terms to approve the alternative route rather than the primary route (Exhs. YAR/DEN-GA at 3; YAR/DEN-JAR at 5). Mr. Allaire stated that the major advantage of the alternative route is lack of disruption to homeowners along the primary route and to motorists using the streets of the primary route (Exh. YAR/DEN-GA at 1). Mr. Rodricks stated that the issue of most concern to the Town of Dennis is construction on streets extending through the intersection of Highbank Road and Main Street, which can be avoided by selection of the alternative route (Exh. YAR/DEN-JAR; Tr. 4, at 710, 762). The Towns therefore argued that the alternative route is far superior to the primary route for the Middle Segment (Towns Brief at 1).

(c) Analysis

In the sections above, the Siting Board has reviewed the evidence presented regarding the environmental impacts of the proposed project along the primary and alternative routes. The Siting Board finds that KeySpan has provided sufficient information on the environmental impacts of the proposed project, including information on the potential for mitigation, for the Siting Board to determine whether the environmental impacts would be minimized.

In Sections III.C.3.a.i, ii, iii, and iv, above, the Siting Board found that, for the Middle Segment, wetland and water resources, land use and land resources, South Dennis Historic District, and noise and traffic impacts along the primary route would be minimized. Therefore, the Siting Board finds that, for the Middle Segment, environmental impacts would be minimized.

The Siting Board further found that the Middle Segment primary route would be preferable to the alternative route with respect to wetlands and water resources impacts, and with

respect to land use and land resources impacts; and also that the Middle Segment alternative route would be preferable to the primary route with respect to impacts to the South Dennis Historic District, and with respect to noise impacts and traffic impacts. Land uses and land resources impacts and noise and traffic impacts would occur along much or all of the routes. The noise and traffic impacts would appear to affect a greater number of people; however, the land use and land resources impacts would appear to be more long-lasting. Potential wetlands and water resources impacts and potential impacts to the South Dennis Historic District would generally be mitigated with erosion and sediment controls and with in-street construction, respectively.

The advantages of the primary route with respect to expected land use and land resources impacts and potential wetlands and water resources impacts are balanced by the advantages of the alternative route with respect to expected noise and traffic impacts and potential impacts to the South Dennis Historic District. Therefore, the Siting Board finds that, for the Middle Segment, the primary and alternative routes would be comparable with respect to environmental impacts.

b. Facility Cost - Middle Segment

i. Company

KeySpan estimated that the PV cost of constructing the Middle Segment along the primary route would be \$3,500,000, based on construction in three phases (Exh. KED-1, at 4-25, 5-48). The Company estimated that the PV cost of constructing the project along the alternative route would be \$4,200,000, based on construction in two phases (*id.* at 4-32). KeySpan stated that its cost evaluation was based primarily on two factors: (1) construction labor and material costs; and (2) costs of obtaining easements or other access to rights-of-way (*id.*). The Company calculated discounted costs of phased construction by assuming a 10% per year cost of capital (*id.* at 4-25; Exhs. EFSB-S-4; YAR/DEN 2-3). KeySpan indicated that it did not refine or alter its cost estimates between its site selection process and facilities comparison (Exh. KED-1, at 5-48).

The Company indicated that it assumed unit prices of \$330 per foot and \$146 per foot for construction in public roadways of 20-inch and 12-inch pipeline, respectively (id. at 4-25). The Company assumed construction costs of \$229 per foot for 20-inch pipeline in the NSTAR right-of-way and construction costs of \$131 per foot for 12-inch pipeline along inactive railroad right-of-way (id.). Additional costs representing mobilization and demobilization, and for crossing state highways were added to these unit costs (id.; Exh. YAR/DEN 2-3). The cost estimate for the alternative route includes \$1,100,000 as the net present value of paying \$116,000 per year for 30 years to lease rights along the old rail right-of-way (Exh. KED-1, at 4-32). The Company may incur additional costs on the alternative route, such as building a support structure for the pipe across the Bass River at the railroad bridge (Tr. 2, at 287-294). However, the cost estimate for the alternative route does not include the expected higher costs to bridge the Bass River, or possible additional costs to repair the railroad bridge abutments (Exh. KED-1, at 4-32; Tr. 2, at 287-294). The Company stated that the actual lease cost for the old rail right-of-way would be the subject of future negotiations between KeySpan and the Massachusetts Executive Office of Transportation (Exh. YAR/DEN 1-36).

ii. Intervenor

The Towns argued that the alternative route could be less expensive than the primary route because the cost of rights to the old rail right-of-way make the difference in the Company's estimate, and the cost of those rights are speculative; because construction challenges on Highbank Road may not have been incorporated into the Company's cost estimate; and because the Company should have assumed it would pay for full pavement restoration in parts of Yarmouth and Dennis (Towns Brief at 24-27). The Towns suggested that a way to reduce the cost of the Middle Segment alternative route would be to combine the western part of the alternative route with the eastern part of the primary route by using Route 134 to join the routes; however, the Towns' witnesses did not project specific cost savings (Exh. YAR/DEN-JAR at 4-5; Tr. 4, at 710-711).

iii. Analysis

The record shows that the difference in costs between the two Middle Segment route options would be fairly small, relative to the total cost of the Middle Segment. The record shows that engineering a pipe bridge at the railroad bridge location was not carried out in sufficient detail to obtain an accurate cost estimate for this element of the work. The record also shows that lease costs for the right-of-way would be subject to negotiations and that without going through the negotiation process, it is not possible to accurately estimate this cost. As a result, the uncertainties with respect to the cost of bridge construction, lease costs, and other issues appear to be greater than the cost differential estimated by the Company. The cost savings of a hybrid route, relative to the alternative route, depend on costs to obtain rights to use the existing Rail Trail, which are also unknown. Based on the high uncertainties relative to the calculated cost differential, the Siting Board finds that, on the Middle Segment, the primary route and the alternative route would be comparable with respect to cost.

c. Reliability - Middle Segment

i. Company

KeySpan stated that the proposed pipeline along either the primary route or the alternative route would provide the necessary pressure and supply on a safe and reliable basis over the forecast period (Exh. KED-1, at 3-18). The Company stated that the proposed project would not add complexity to the operation of the gas distribution system (id. at 3-19). In these terms, the Company stated that the primary and alternative routes are very similar (id. at 5-45). As a second-order consideration, the Company indicated that regular tie-ins, available only on the primary route, would afford later opportunities to close a series of valves and to perform maintenance work without shutting down a long section of gas main (Tr. 2, at 241-246).

KeySpan indicated that the Middle Segment primary route is 0.3 miles longer than the alternative route (Exh. KED-1, at table 4-1). The Company stated that the alternative route would have a pressure drop approximately 1.0 pounds per square inch less than the primary route (Exh. RR-EFSB-11). For perspective, the Company noted that this improvement in pressure is less than the modeled pressure reduction due to one year's modeled growth on the system

(Exh. RR-EFSB-11; Tr. 2, at 246-248). The Company indicated that it did not believe the difference in length would create any meaningful difference with respect to the potential for third-party disruption (Exh. EFSB-S-6).

KeySpan stated that the Middle Segment alternative route requires negotiation of a lease agreement with the Commonwealth's Executive Office of Transportation, which in turn requires a precedent agreement with Bay Colony Railroad (Exh. KED-1, at 5-46). The Company indicated its understanding that reaching these agreements could be a long process (*id.*; Tr. 3, at 461-462). In addition, the Company stated that use of the Rail Trail section of the alternative route would require the Company to obtain an access agreement with the DCR (Exh. KED-1, at 5-46 to 5-47).

The Company asserted that the primary route, being entirely within road layouts, would be more quickly and reliably permitted (*id.*). The Company identified several local permits that might be required on the primary or alternative routes: a determination of applicability or an order of conditions from the Yarmouth and Dennis Conservation Commissions; grants of location from the Yarmouth and Dennis Boards of Selectmen; street opening permits from the Yarmouth and Dennis Departments of Public Works; a certificate of appropriateness for work within the South Dennis Historic District (or a determination that the certificate is not required) from the South Dennis Historic Commission; and approval under scenic roadway bylaws from the selectmen; and permission under water resource protection overlay districts from zoning boards or selectmen (Exhs. EFSB-G-2(1); YAR/DEN 1-40(1)).

KeySpan stated that its modeling shows that the Company needs to build 12,000 feet of new pipeline on the Middle Segment by the fall of 2006 (Exh. EFSB-S-4; Tr. 2, at 238-240). The primary route could be tied back to the existing pipeline at 12,000 feet after the first year of construction (Exh. KED-1, at 5-46). The Company stated that, using the alternative route, it would have to build a total of 18,500 feet of new pipeline by the fall of 2006 in order to reach the next tie-in point beyond the required 12,000 feet of new pipeline (*id.* at 5-47; Tr. 2, at 239).⁴⁵

⁴⁵ Maps provided by the Company indicated that, using a hybrid route using Route 134, the Company could reach a tie-in point approximately 16,000 feet from the Middle Segment
(continued...)

The Company argued that there is uncertainty about whether it could obtain the necessary rights in a timely fashion from the Executive Office of Transportation in order to build the Middle Segment alternative route by the winter of 2006/2007 (Company Brief at 106). The Company asserted that this uncertainty represented a significant difference from the primary route, and categorized this difference as a reliability factor (Exh. KED-1, at 5-47).

ii. Intervenor

The Towns argued that any difference in the level of permitting uncertainty between the primary and alternative routes is the fault of the Company's, asserted that the permitting the primary route poses at least as much uncertainty due to local opposition to the primary route, and argued that the issue should not be considered by the Siting Board as an advantage (Towns Brief at 17, 19-20). Responding to questioning by the Towns, the Company indicated that it had identified the old rail right-of-way as a potential route for the proposed pipeline in early 2005 (Tr. 3, at 466). The Towns argued that licensing should have been seriously pursued starting at that time, and that if it had done so, the approvals would now be in hand (Towns Brief at 17-19).

iii. Analysis

The difference in lengths between the primary and alternative routes is not large enough to create a substantial difference in pipeline performance, and the two routes are otherwise similar in physical reliability. The record shows that the Company and its environmental consultants have significant experience in permitting the installation of gas pipelines, including the acquisition of access rights and necessary permits and approvals. In this case, the opinion of the Company and its consultants is that permitting of the proposed project in the roadways along the primary route can be accomplished with reasonable certainty in time to allow construction of

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(...continued)

start point (Exh. KED-1, at fig. 4-3). The hybrid route would avoid the need to obtain DCR approval. However, use of the hybrid route would not avoid the use of the railroad bridge over the Bass River, which would need to be engineered, nor use of the old rail right-of-way, which would require a licensing agreement. Also, the hybrid route would require construction along a state highway, which would require approval from MHD.

the first 12,000 feet of the Middle Segment prior to the peak loads of the 2006/2007 heating season. It is the Company's opinion, supplemented by its consultants, that it is less certain, and perhaps not possible, to obtain rights to build on the railroad right-of-way within the same period of time. In addition, because it would not follow the route of the existing Sagamore Line, the alternative route would require significantly more extensive pipeline construction during 2006 to reach a possible tie-in point in Dennis, as necessary to meet need in winter 2006-2007. The added construction would include not only an additional 4000 to 6000 feet of pipeline to reach a possible tie-in point, compared to the 12,000 feet required for the primary route, but also the completion of the spanning of the Bass River, which would not be required as part of the 12,000 feet to be constructed in 2006 under the primary route. The ability of the project to reliably serve customers for all years of the forecast period is dependent on its being timely constructed. Given the greater certainty with which the proposed work can be completed in a timely fashion, the Siting Board finds that on the Middle Segment, the primary route would be preferable to the alternative route with respect to reliability.

d. Conclusions on Proposed Facilities - Middle Segment

i. Company

The Company argued that the primary route is superior to the alternative route in terms of cost, reliability, and environmental impacts (Company Brief at 108).

ii. Intervenor

Mr. Joseph A. Rodricks, witness for the Towns and Town Engineer for the Town of Dennis, stated that the alternative route appears to be superior to the primary route for the Middle Segment and urged its selection (Exh. YAR/DEN-JAR at 1, 5).

iii. Analysis

The Siting Board has found, for the Middle Segment, that environmental impacts would be minimized, that the primary route and the alternative route would be comparable with respect to environmental impacts and with respect to cost, and that the primary route would be preferable

with respect to reliability. Accordingly, the Siting Board finds that the Middle Segment primary route would be superior to the alternative route with respect to providing a reliable energy supply to the Commonwealth with a minimum impact on the environment at the lowest possible cost.

The Siting Board finds that KeySpan has provided sufficient cost and reliability information in order to determine whether the appropriate balance among environmental impacts, cost, and reliability would be achieved. The Siting Board also finds that the Middle Segment of the proposed project along the primary route would achieve an appropriate balance among conflicting environmental concerns, as well as among environmental impacts, reliability and cost.

4. Eastern Segment

a. Environmental Impacts - Eastern Segment

In this section, the Siting Board compares the environmental impacts of the proposed facilities along the primary and alternative routes for the Eastern Segment, considers the proposed mitigation for such impacts, evaluates any options for additional mitigation and determines whether the environmental impacts along the primary route would be minimized. The subsections below consider wetlands and water resources impacts, land use and resources impacts, and noise and traffic impacts.

i. Wetlands and Water Resources

KeySpan stated that the Eastern Segment would be built primarily along the edge of pavement of existing roads and within roadway layouts, if the primary route were selected (Exh. KED-1, at 5-3). The Company stated that there are no surface water bodies, mapped vernal pools, or wetlands adjacent to either the primary or alternative route for the Eastern Segment (*id.* at 5-17 to 5-18; Tr. 2, at 204, 305). Therefore, the Company concluded that the primary and alternative routes would be comparable with respect to wetlands and vernal pools and also comparable with respect to streams and water bodies (Exh. KED-1, at 5-17, 5-19).

KeySpan stated that the primary route for the Eastern Segment crosses through 8600 linear feet of Wellhead Protection Area as identified by the Cape Cod Commission (*id.* at 5-20). The alternative route crosses through 11,500 linear feet of Wellhead Protection Area (*id.*). Based

on the shorter distance in groundwater resource areas, the Company identified the primary route as advantageous with respect to groundwater (id. at 5-21).

The Company stated that it would use filter fabric barriers and would sweep road surfaces to keep soil materials from washing into storm drains (id. at 5-11). For both the primary and the alternative routes, KeySpan would develop and implement an SPCC Plan to ensure against inadvertent releases of fuel or equipment maintenance materials during pipeline construction (id.). For areas subject to the Massachusetts Wetland Protection Act, KeySpan stated that it would obtain and comply with all necessary Determinations of Applicability and Orders of Conditions (id.). The Company also stated that it would comply with all local wetlands bylaws (id.). The Company indicated that it would prepare an SWPPP and implement erosion and sedimentation control best management practices (id.; Exh. EFSB-E-26). The Company also indicated that it would prepare an Environmental Construction Plan, that would address erosion control, dust control, and vehicle fueling and maintenance (Exh. YAR/DEN 1-5).

KeySpan stated that there are no mapped public water supply wells proximate to the proposed routes (Exh. KED-1, at 5-19). However, the Company noted that all of Cape Cod has been designated as a Sole Source Aquifer under the federal Safe Drinking Water Act (id.). The Cape Cod Commission has identified groundwater protection areas based on their importance for drinking water supplies (id.). The Company indicated that development and implementation of an SPCC Plan would protect against impacts to groundwater (id. at 5-20). Further, the Company stated that it would perform no equipment maintenance within 100 feet of a wellhead protection area (Tr. 3, at 549-551).

KeySpan asserted that current information from the MADEP Bureau of Waste Site Cleanup indicates that MCP sites would not affect pipeline construction (Exh. KED-3, at 12-1 to 12-2). Notwithstanding, the Company indicated that it would follow URAM procedures required under the MCP, in the event that contamination is encountered (id. at 12-2 to 12-3; Tr. 2, at 311).

The record shows that the primary route on the Eastern Segment is along roads and not in wetland areas. The record also shows that the Company is committed to erosion control, sedimentation control, and spill prevention procedures that would minimize water impacts. To further reduce the risk of contaminating groundwater supplies, the Siting Board directs the

Company to refrain from all refueling and equipment-maintenance activities that have the potential for fluid spills, when vehicles are within identified Wellhead Protection Areas. Based on the use of roadway layouts, the limited encroachment into wetland buffer areas, and the Company's expressed commitment to control erosion and sedimentation, the Siting Board concludes that construction of the proposed pipeline along the primary route would result in no permanent impacts, and only minimal temporary impacts to wetlands and water resources. Consequently, the Siting Board finds that the wetlands and water resources impacts of the proposed pipeline along the Eastern Segment primary route would be minimized.

The record shows that there are no significant wetland resources along either the primary or alternative route, so there would be no significant differences between the primary and alternative routes on the Eastern Segment with respect to surface water and wetlands impacts. The record also shows that the primary route on the Eastern Segment crosses through Wellhead Protection Areas for a somewhat shorter distance than does the alternative route. Considering wetlands, surface water, and groundwater impacts, the Siting Board finds that, on the Eastern Segment, the primary route would be preferable to the alternative route with respect to wetlands and water resources impacts.

ii. Land Use and Land Resources

KeySpan indicated that the Eastern Segment primary route traverses areas that are a mix of residential, woodland, and commercial use (Exh. KED-1, at fig. 4-7). KeySpan listed three sensitive receptors along the primary route: a fire station, a police station, and a church (id. at 5-28). However, the Company asserted that its mitigation would lead to no anticipated impacts to sensitive receptors (id. at 5-29).

KeySpan noted that to install the proposed pipeline along the primary route, it may clear some scrub vegetation along pavement edges (id. at 5-4). However, the Company indicated that few trees would need to be removed on the primary route (Exh. KED-3, at 5-2). KeySpan stated that the primary route is on roadways with overhanging tree branches in various locations (Exh. KED-1, at 5-22 to 5-23). The Company indicated that these branches are high enough to allow truck traffic, but that some might have to be trimmed to permit construction (id.; Tr. 2,

at 306-307). The Company stated that it would assess the potential for damage to trees with a professional arborist and local tree wardens (Exh. KED-3, at 5-2). The Company stated that graded areas would be fertilized, seeded, and mulched, and that these areas would be inspected after the first and second growing seasons (id.). The Company stated that shrubs would be restored in accordance with any individual landowner agreements (id.).

KeySpan stated that there are no protected lands along the primary route for the Eastern Segment (Exh. KED-1, at 5-24). In addition, the Company stated that pipeline construction would have no impacts on rare species (Exh. KED-3, at 16-4).

KeySpan indicated that no stone walls would likely be disturbed along roadsides (id. at 5-2). However, if stone walls or fences were to be temporarily removed for construction, the Company committed to their restoration (id.).

KeySpan indicated that PAL reviewed documented locations of archaeological sites, historic structures, cemeteries, and areas of archeological sensitivity within the project area (Exh. EFSB-E-5). In response to comments from the Massachusetts Historical Commission, PAL conducted an archaeological reconnaissance survey to identify areas that may require further testing to locate and identify any important archaeological resources (id.). KeySpan stated that the primary route for the Eastern Segment passes no historical resources and is not considered sensitive for archaeological resources (Exh. KED-1, at 5-36). The Company stated that it would perform additional surveys as directed by the Massachusetts Historical Commission (Exh. EFSB-E-5). The Company stated that if significant eligible deposits are found in any further survey directed by the Massachusetts Historical Commission, KeySpan would consider alternative alignments, reduce its workspace, or undertake a site examination and consult with the Massachusetts Historical Commission (Exh. EFSB-E-6).

KeySpan indicated that the alternative route for the Eastern Segment traverses areas that are a mix of residential use and woodland (Exh. KED-1, at fig. 4-7, fig. 5.3-9). The Company stated that there is one sensitive receptor – a church – along the alternative route (id. at 5-28). The Company asserted that its mitigation would lead to no anticipated impacts with respect to sensitive receptors (id. at 5-29).

As with the primary route, KeySpan stated that the alternative route is on roadways with overhanging tree branches in various locations (id. at 5-22 to 5-23). The Company indicated that these branches are high enough to allow truck traffic, but that some might have to be trimmed to permit construction (id.; Tr. 2, at 306-307).

KeySpan stated that there are no protected lands along the alternative route (Exh. KED-1, at 5-24). In addition, the Company stated that pipeline construction would have no impacts on rare species (Exh. KED-3, at 16-4).

KeySpan indicated that no stone walls would likely be disturbed along roadsides (id. at 5-2). However, if stone walls or fences were to be temporarily removed for construction, the Company committed to their restoration (id.).

On behalf of the Company, PAL conducted an archaeological reconnaissance survey to identify areas that may require further testing to locate and identify any important archaeological resources (Exh. EFSB-E-5). The Company stated that the alternative route passes many above-ground historical resources, approximately 4100 linear feet of historical area in East Harwich, and areas sensitive for containing previously unidentified archaeological resources (Exh. KED-1, at 5-36).

The Company concluded that the primary route would be advantageous with respect to residential impacts, on the basis of there being fewer residents on the primary route (id. at 5-27). While the number of sensitive receptors differs between routes, KeySpan anticipated that mitigation would lead to no impacts to sensitive receptors, and concluded that the primary and alternative routes are therefore comparable with respect to sensitive receptors (id. at 5-29). With only roadside vegetation and no protected lands on either route, the Company concluded that the primary route and the alternative route would be comparable with respect to impacts to both vegetation and protected lands (id. at 5-23, 5-25). Based on an extensive historical area in East Harwich, and the potential for archaeological resources along the alternative route, the Company concluded that the primary route is substantially better than the alternative route with respect to impacts to historic resources (id. at 5-36).

The record demonstrates that the land resources impacts of the proposed pipeline along the primary route would be temporary and minimal due to the placement of the pipeline under and directly adjacent to streets and because the Company has stated that it will assess the potential for damage to trees on the route with a professional arborist and local tree wardens.⁴⁶ To protect shade trees and other landscaping features, the Siting Board directs the Company: (1) to arrange for a professional arborist to conduct an on-site inspection of the construction zone within 6 months before construction begins in an area; (2) based on recommendations by the arborist and, where applicable, tree wardens, to take all reasonable precautions to avoid removing or damaging trees; (3) to minimize damage to shrubbery and other plantings, as well as damage to or removal of fences, stone walls, lampposts, and other landscaping features; (4) to repair or replace any damaged or removed trees, shrubbery, or plantings, in consultation with the arborist and, where applicable, tree wardens, and with the agreement of the owner of damaged or removed vegetation; and (5) to repair or replace any damaged or removed fences, walls, or other landscaping features, with the agreement, as applicable, of the owner of the landscaping feature. With the specified mitigation and implementation of the above condition, the Siting Board finds that the land resources impacts of the proposed pipeline along the Eastern Segment primary route would be minimized.

The record shows that the primary and alternative routes would be within roadways and that, as a result, impacts to upland habitats would be minimal. Neither Eastern Segment route is superior with respect to upland habitat impacts. The record shows that the alternative route would go through an area with historic and potential archaeologic resources, whereas the primary route would not. Accordingly, the primary route would be preferable with respect to cultural resources. Therefore, the Siting Board finds that, on the Eastern Segment, the primary route would be preferable to the alternative route with respect to land use and land resources.

⁴⁶ The Company is required by § 6.8 of the D.T.E. Road Restoration Standards to hand-cut around roots of trees.

iii. Noise and Traffic

KeySpan indicated that the project would have noise and traffic impacts only during its construction (Exh. KED-1, at 5-9 to 5-10). These impacts are evaluated below, for the primary and alternative routes.

KeySpan stated that the principal sources of noise during construction would be pavement saws, a backhoe, and a welding rig (Exh. EFSB-E-15). The Company indicated that other sources of noise such as dump trucks and crew vehicles would be present intermittently (id.). The loudest piece of equipment evaluated by the Company, the pavement saw, has a maximum sound level of approximately 90 dBA at 50 feet (id.). KeySpan noted that sound levels at any given location would be dominated by the piece of equipment nearest the receptor of interest (id.). According to KeySpan's calculations, the L_{10} of construction noise, outside a residence located 50 feet back from pipeline construction in a road would typically exceed 60 dBA for a total of approximately 7 to 9 days, as machinery used in the construction sequence moves along the roadway (Exh. RR-EFSB-12). The Company indicated that it measured ambient sound levels on May 19, 2005 (id.). The Company reported that ambient L_{10} sound levels ranged from 66 dBA to 78 dBA on various primary route segments, and from 42 dBA to 76 dBA on various alternative route segments (id.).

The Company stated that the typical work hours would be on weekdays between 7:00 a.m. and 6:00 p.m. (Exhs. KED-1, at 5-9; EFSB-E-15). However, the Company indicated that night or weekend work might on occasion be needed to meet construction deadlines (Exhs. KED-1, at 5-9; EFSB-E-15; EFSB-E-16). The Company indicated that days and hours of work would be circumscribed by the street opening permits issued by each town (Tr. 2, at 316-317). The Company indicated its belief that it would be able to obtain permission from the towns to extend the scheduled construction hours if it became essential to do so (id. at 315-316).

KeySpan stated that 24 residences are located along Route 39, generally set back at least 100 feet from the road (Exh. KED-1, at 5-26). KeySpan stated that 97 homes are within 100 feet of the alternative route, as well as a church, several small businesses and an animal hospital (id. at 5-27). The Company stated that there would no permanent changes on the Eastern

Segment (id.). On the basis of the lower number of adjacent residents that would be affected by construction impacts, the Company concluded that the primary route would be advantageous with respect to residences (id.).

KeySpan stated that it would develop traffic management plans for construction (id. at 5-6). The Company indicated that it would limit construction along roads to the off-season – from after Labor Day to before Memorial Day – except in any locations such as along Service Road for which the Town of Harwich determines that traffic impacts would be acceptable in the summer (Tr. 2, at 313-314). The Company indicated that the traffic management plans could limit construction to outside rush hour periods, specify the use of traffic control officers, and require maintenance of at least one lane of traffic flow (Exh. YAR/DEN 1-25). The Company indicated that it expects to use jacking or drilling to cross Route 137 on the primary route (Exh. EFSB-E-8). The Company stated that it would cover any street openings with steel plates at the end of the day, and that it would protect and barricade openings in the shoulder to ensure traffic and pedestrian safety (Exh. KED-1, at 5-6). The Company stated that it would restore streets in accordance with the D.T.E. Road Restoration Standards (Exh. YAR/DEN 1-45; Tr. 3, at 487).

KeySpan stated that the primary route, along Route 39, is broad and straight with an adequate shoulder in which to work (id. at 5-33). The alternative route is longer and narrower, with a number of bends and grade changes, resulting in worse sight-lines for motorists (id.; Exh. EFSB-E-17). On this basis, the Company concluded that the primary route would be better with respect to traffic (Exh. KED-1, at 5-33). The Company stated that it would consult with the Town of Harwich to determine local preference regarding scheduling work over either one, two, or three seasons (Tr. 2, at 270).

The record demonstrates that the noise impacts of the proposed project would be limited to temporary noise associated with construction activities. The record shows that, given the presence of residences along substantial portions of the route, construction noise impacts would be minimized by confining construction work to daytime hours, 7:00 a.m. to 6:00 p.m., unless contingencies require work outside such hours. The Siting Board understands that the Company will communicate with the various municipalities regarding the extent of any work outside of

normal daytime hours. To underscore this commitment, the Siting Board directs the Company to limit construction work on the Eastern Segment to the hours from 7:00 a.m. to 6:00 p.m. unless otherwise authorized by the Town of Harwich. With the identified mitigation and implementation of the above condition, the Siting Board finds that the noise impacts of the proposed project along the Eastern Segment primary route would be minimized.

The record shows that construction would be on the road shoulder where practical, and otherwise along the edge of pavement. The record shows that the Company would follow the D.T.E. Road Restoration Standards after pipeline installation.

The record shows that the Company has committed to finalizing engineering plans for the proposed project in consultation with the affected municipalities, and that this review process likely would require approximately 4 to 6 weeks, based on experience with the first stage of the project (see Section III.C.3, above). The record shows that the Company has committed to mitigate traffic impacts during construction in accordance with traffic management plans to be approved by the Town of Harwich, including site-specific traffic management plans the Company expects to prepare at key intersections. Further, the record shows that the Company has committed to avoid work between Memorial Day and Labor Day, and to limit work to the hours from 7:00 a.m. to 6:00 p.m., except by approval of the Town of Harwich. Also, the record shows that the Company would need to obtain road opening permits from the municipalities, which gives the Town of Harwich the opportunity to limit work to reasonable dates and hours.

The Siting Board notes that, to allow effective coordination between the Company and the municipalities in the development of engineering and traffic plans for the project, there must be a reasonable lead time for municipal review of the plans before they are finalized. Therefore, the Siting Board directs the Company to provide the municipalities, at least 60 days prior to commencement of construction, with substantially completed engineering plans, and substantially completed traffic management plans including all site-specific traffic management plans, for review and comment. The Company is further directed to file with the Siting Board a copy of each traffic management plan, including each site-specific traffic management plan, when the plan has been finalized.

Therefore, with the above condition, the Siting Board finds that traffic impacts along the Eastern Segment primary route would be minimized.

No comparison of sound levels was made between abutters to the primary route and abutters to the alternative route, but the two Eastern Segment routes both follow streets and would involve the same type of work. The alternative route has more residents in the immediate vicinity, so the primary route would be preferable with respect to noise impacts. The record shows that the primary route is shorter by comparison, and is on a road with wider shoulders and better sight-lines. Thus, the primary route is preferable with respect to traffic impacts. Therefore, the Siting Board finds that, on the Eastern Segment, the primary route would be preferable to the alternative route with respect to noise and traffic impacts.

iv. Conclusions on Environmental Impact - Eastern Segment

In the sections above, the Siting Board has reviewed the evidence presented regarding the environmental impacts of the proposed project along the primary and alternative routes. The Siting Board finds that KeySpan has provided sufficient information on the environmental impacts of the proposed project, including information on the potential for mitigation, for the Siting Board to determine whether the environmental impacts would be minimized.

In Sections III.C.4.a.i, ii, and iii, above, the Siting Board found that, for the Eastern Segment, wetlands and water resources, land use and land resources, and noise and traffic impacts would be minimized. Therefore, the Siting Board finds that, for the Eastern Segment, environmental impacts would be minimized. The Siting Board further found that the Eastern Segment primary route would be preferable to the alternative route with respect to wetlands and water resources impacts, land use and land resource impacts, and noise and traffic impacts. Therefore, the Siting Board finds that, for the Eastern Segment, the primary route would be preferable to the alternative route with respect to environmental impacts.

b. Facility Cost - Eastern Segment

KeySpan estimated that the PV cost of constructing the Eastern Segment along the primary route would be \$1,330,000, based on construction in three phases (Exh. KED-1, at 4-32, 5-48). The Company indicated that the PV cost would be nearly the same if construction were performed along the primary route were completed in a single phase (id. at 4-32). The Company estimated that the PV cost of constructing the project along the alternative route would be \$1,750,000 (id. at 5-48; Tr. 2, at 243-244). KeySpan stated that its cost evaluation was based primarily on two factors: (1) construction labor and material costs; and (2) costs of obtaining easements or other access to rights-of-way (Exh. KED-1, at 4-23). The Company calculated discounted cost of phased construction by assuming a 10% per year cost of capital (id. at 4-25; Exh. EFSB-S-4). However, the Company noted that, for the Eastern Segment, the financial savings from phasing would be lost due to the need for additional mobilizations and demobilizations (Exh. KED-1, at 4-32). KeySpan indicated that it did not refine or alter its cost estimates between its site selection process and facilities comparison (id. at 5-48).

The Company indicated that it assumed unit prices of \$330 per foot and \$146 per foot for construction in public roadways of 20-inch and 12-inch pipeline, respectively (id. at 4-25). The Company assumed construction costs of \$229 per foot for 20-inch pipeline in the NSTAR right-of-way and construction costs of \$131 per foot for 12-inch pipeline along inactive railroad right-of-way (id.). Additional costs representing mobilization and demobilization, and for crossing state highways were added to these unit costs (id.; Exh. YAR/DEN 2-3).

The record shows that the alternative route would cost approximately \$400,000 more than the primary route. Based on the lower cost of constructing the primary route rather than the alternative route, the Siting Board finds that, on the Eastern Segment, the primary route would be preferable to the alternative route with respect to cost.

c. Reliability - Eastern Segment

KeySpan stated that the proposed pipeline along either the primary route or the alternative route would provide the necessary pressure and supply on a safe and reliable basis over the forecast period (Exh. KED-1, at 3-18). The Company stated that the proposed project would not

add complexity to its gas distribution or to KeySpan's operation of the system (id. at 3-19).

In these terms, the Company stated that the primary and the alternative routes are very similar (id. at 5-45). As a second-order consideration, the Company indicated that regular tie-ins, available on the primary route, would afford later opportunities to close a series of valves and to perform maintenance work without shutting down a long section of gas main (Tr. 2, at 241-246).

KeySpan stated that there would be less pressure drop along the primary route for the Eastern Segment, compared to the alternative route, due to its shorter length, 1.6 miles versus 2.2 miles (Exh. KED-1, at table 4-1; Tr. 2, at 233-234). The Company stated that inlet pressures at the Church Street regulator would be reduced with the primary route, relative to the alternative route (Tr. 2, at 233-235). The Company indicated that it did not expect that the difference in length would create any meaningful difference with respect to the potential for disruption (Exh. EFSB-S-7).

The record shows that the primary route and the alternative route differ in length by less than one mile. Therefore, any length-based reliability differences would be relatively minor. The record indicates that the integrity of the pipeline would be similar on the two routes, and the pipeline could reliably be constructed using either route. Therefore, the Siting Board finds that, on the Eastern Segment, the primary route is comparable to the alternative route with respect to reliability.

d. Conclusions on Proposed Facilities - Eastern Segment

The Siting Board has found, for the Eastern Segment, that environmental impacts would be minimized, that the primary route would be preferable to the alternative route with respect to environmental impacts and cost, and that the two routes would be comparable with respect to reliability. Accordingly, the Siting Board finds that the Eastern Segment primary route would be superior to the alternative route with respect to providing a reliable energy supply to the Commonwealth with a minimum impact on the environment at the lowest possible cost.

The Siting Board finds that KeySpan has provided sufficient cost and reliability information in order to determine whether the appropriate balance among environmental impacts, cost, and reliability would be achieved. The Siting Board also finds that the Eastern Segment of

the proposed project along the primary route would achieve an appropriate balance among conflicting environmental concerns, as well as among environmental impacts, reliability and cost.

IV. DECISION

The Siting Board's enabling statute directs the Siting Board to implement the energy policies contained in G.L. c. 164, §§ 69H to 69Q, to provide a reliable energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost. G.L. c. 164, § 69H. In addition, the statute requires that the Siting Board determine whether plans for the construction of energy facilities are consistent with current health, environmental protection, and resource use and development policies as adopted by the Commonwealth. G. L. c. 164, § 69J.

In Section II.A, above, the Siting Board found that there is a need for all three segments of the proposed project in combination to meet KeySpan's gas supply needs and pressure requirements in its Cape Cod service territory for the Company's ten-year forecast period, beginning with the 2006/2007 heating season and extending through 2014/2015. Further, in Section II.A, above, the Siting Board found that the proposed project is consistent with the Company's most recently approved long-range forecast.

In Section II.B, above, the Siting Board found that the proposed project would be superior to alternative approaches with respect to providing a reliable energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost.

In Section III.B, above, the Siting Board found that the Company has examined a reasonable range of practical siting alternatives for each of the three segments.

In Section III.C, above, the Siting Board found that (1) with the implementation of specified mitigation measures regarding wetlands and water resources; land use and land resources; and noise and traffic; and (2) with implementation of specified conditions regarding water resources; land use and land resources; and noise and traffic, construction of the project on the primary route on each of the three segments would be preferable to construction on the alternative route with respect to providing a reliable energy supply for the Commonwealth with a

minimum impact on the environment at the lowest possible cost. The Siting Board also found that, with the implementation of the specified mitigation and conditions, the environmental impacts of the proposed project along the primary route on each of the three segments would achieve an appropriate balance among conflicting environmental concerns as well as among environmental impacts, reliability and cost. Therefore, based on the above, the Siting Board finds that the proposed pipeline project would achieve an appropriate balance among conflicting environmental concerns as well as among environmental impacts, reliability and cost.

In Section III, above, the Siting Board reviewed the environmental impacts of the proposed project in light of related regulatory or other programs of the Commonwealth, including programs related to wetlands protection, groundwater protection, rare and endangered species' habitat, historic preservation, and scenic roads. As evidenced by the above discussions and analyses, the Siting Board finds that the proposed project along the primary route would be generally consistent with the identified requirements of all such programs. Consequently, the Siting Board finds that the construction of the proposed project is consistent with current health, environmental protection, and land resource and development policies as adopted by the Commonwealth.

Accordingly, the Siting Board finds that, upon compliance with the mitigation measures in Section III., above, and the conditions set forth in Section III. and below, the construction and operation of the proposed project will provide a reliable energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost.

Accordingly, the Siting Board APPROVES the proposal of Colonial Gas Company, d/b/a KeySpan Energy Delivery New England, to construct approximately 13.1 miles of natural gas pipeline to augment its existing Sagamore Line on Cape Cod, in the Towns of Sandwich, Barnstable, Yarmouth, Dennis and Harwich, along the primary route, subject to the following conditions:

- A. In order to minimize construction and traffic impacts, the Siting Board directs the Company to provide the municipalities, at least 60 days prior to commencement of construction, with substantially completed engineering plans, and substantially completed traffic management plans including all site-specific traffic management plans, for review and comment. The Company is further directed to file with the Siting Board a copy of each traffic management plan, including each site-specific traffic management plan, when the plan has been finalized.
- B. In order to minimize land use and land resources impacts, the Siting Board directs the Company: (1) to arrange for a professional arborist to conduct an on-site inspection of the construction zone within 6 months before construction begins in an area; (2) based on recommendations by the arborist and, where applicable, tree wardens, to take all reasonable precautions to avoid removing or damaging trees; (3) to minimize damage to shrubbery and other plantings, as well as damage to or removal of fences, stone walls, lampposts, and other landscaping features; (4) to repair or replace any damaged or removed trees, shrubbery, or plantings, in consultation with the arborist and, where applicable, tree wardens, and with the agreement of the owner of damaged or removed vegetation; and (5) to repair or replace any damaged or removed fences, walls, or other landscaping features, with the agreement, as applicable, of the owner of the landscaping feature.
- C. In order to minimize environmental impacts, the Siting Board directs the Company to provide for the repaving of Highbank Road for its full width from the Bass River to Route 134, unless directed by the Town of Dennis not to provide for such full-width repaving. In implementing the required repaving, the Company should: (1) coordinate with the Town regarding specifications the Town may request, and (2) follow the Town's specifications to the greatest extent possible, consistent with other applicable requirements.

- D. In order to minimize noise impacts, the Siting Board directs the Company to limit construction work on the Western, Middle, and Eastern Segments to the hours from 7:00 a.m. to 6:00 p.m. unless otherwise authorized by the affected municipality.
- E. In order to minimize water resources impacts, the Siting Board directs the Company to refrain from all refueling and equipment-maintenance activities that have the potential for fluid spills, when vehicles are within identified Wellhead Protection Areas.
- F. In order to minimize historic resources impacts, the Siting Board directs the Company:
(1) to consult with the South Dennis Historic District Commission prior to finalizing construction plans for the district; and (2) in consultation with the South Dennis Historic District Commission, to restore vegetation and any fences or other structures that are disturbed in the South Dennis Historic District due to construction of the proposed pipeline.

In addition, because the issues addressed in this Decision relative to the Company's proposed project are subject to change over time, construction of the proposed project must begin within three years of the date of this Decision.

Also, because of the Company's intention to phase project construction over a number of years, this Decision approves construction of the proposed project over a specific period ending on December 31, 2015. This Decision does not authorize any work after December 31, 2015. If the Company has not completed work by December 31, 2015, and wishes to continue, the Company must first seek a new approval from the Siting Board. The procedure for reviewing a request for a new construction approval will be determined by the Siting Board after receiving such a request.

Further, the Siting Board notes that the findings in this Decision are based upon the record in this case. A project proponent has an absolute obligation to construct and operate its facility in conformance with all aspects of its proposal as presented to the Siting Board. Therefore, the Siting Board requires KeySpan to notify the Siting Board of any changes other than minor variations to the proposal so that the Siting Board may decide whether to inquire further into a particular issue. KeySpan is obligated to provide the Siting Board with sufficient information on changes to the proposed project to enable the Siting Board to make these determinations.

M. Kathryn Sedor
Presiding Officer

Dated this 17th day of May, 2006

APPROVED by the Energy Facilities Siting Board at its meeting of May 16, 2006, by the members and designees present and voting: John Chapman (Acting EFSB Chairman/Designee for Ranch Kimball, Secretary of Economic Development), W. Robert Keating (Commissioner, DTE); David L. O'Connor, (Commissioner, Division of Energy Resources), Stephen Pritchard, (Secretary of Environmental Affairs), and James Connelly (Commissioner, DTE).

John Chapman, Acting Chairman
Energy Facilities Siting Board

Dated this 16th day of May, 2006

Appeal as to matters of law from any final decision, order or ruling of the Siting Board may be taken to the Supreme Judicial Court by an aggrieved party in interest by the filing of a written petition praying that the order of the Siting Board be modified or set aside in whole or in part.

Such petition for appeal shall be filed with the Siting Board within twenty days after the date of service of the decision, order or ruling of the Siting Board, or within such further time as the Siting Board may allow upon request filed prior to the expiration of the twenty days after the date of service of said decision, order or ruling. Within ten days after such petition has been filed, the appealing party shall enter the appeal in the Supreme Judicial Court sitting in Suffolk County by filing a copy thereof with the clerk of said court. (Massachusetts General Laws, Chapter 25, Sec. 5; Chapter 164, Sec. 69P).