

Decisions and Orders

Massachusetts Energy Facilities Siting Board

VOLUME 5

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COMMONWEALTH OF MASSACHUSETTS
Energy Facilities Siting Board

In the Matter of:

The Petition of New England Power Company
for Approval of its Occasional Supplement and
Conversion of an Existing 23 kV Transmission
Line to a 69 kV Transmission Line in
Belchertown, Massachusetts

The Joint Petitions of New England Power
Company and Massachusetts Electric Company
for Approval of an Exemption of a Proposed
Transmission Line Conversion, Switching
Station and Additions to an Electric Substation
from the Operation of the Zoning By-Laws of the
Town of Belchertown, Massachusetts and for a
Determination that the Proposed Electric
Transmission Conversion Will Serve the Public
Convenience and be Consistent With the Public
Interest

EFSB 95-2

FINAL DECISION

Robert W. Ritchie
Robert P. Rasmussen
Hearing Officers
September 27, 1996

On the Decision:
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FOR: New England Power Company
Petitioner

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The Energy Facilities Siting Board hereby APPROVES the petitions of New England Power Company and Massachusetts Electric Company for (1) approval to convert an existing 2.1 mile 23 kilovolt ("kV") electric transmission line to 69 kV, using the Petitioners' proposed route in the Town of Belchertown; (2) a determination that the proposed electric transmission line conversion is necessary and will serve the public convenience and be consistent with the public interest; (3) an exemption from the operation of certain sections of the zoning by-laws of the Town of Belchertown for the proposed transmission line conversion and the construction and operation of a switching facility; and (4) an exemption from the operation of certain sections of the zoning by-laws of the Town of Belchertown with respect to the construction and operation of proposed additions to an existing electric substation.

I. INTRODUCTION

A. Summary of the Proposed Project and Facilities

New England Power Company ("NEPCo") is the wholesale generation and transmission subsidiary of the New England Electric System ("NEES"), a public utility holding company. New England Power Company, EFSB 94-1, at 1 (1995). NEPCo supplies almost all of the electricity distributed by the Massachusetts Electric Company ("MECo"), the NEES retail subsidiary serving customers in the Commonwealth. Id., New England Electric System, 18 DOMSC 229, 230 (1989). (NEPCo and MECo will also be referred to jointly herein as "the Companies" or "the Petitioners").

NEPCo and MECo have proposed to convert the existing 23 kV supply to the Belchertown substation in Belchertown to 69 kV (Exh. NEP/MEC-1, at 2-5). The Companies have proposed to convert to 69 kV transmission level, an existing overhead 23 kV sub-transmission line section, 2.1 miles in length, that would extend from two 69 kV transmission lines, known as the E-5 and F-6 lines, to the Belchertown No. 509 substation ("Belchertown substation") in Belchertown (Petition for Approval of a Converted Electric Transmission Line at 1; Exh. NEP/MEC-1, at 1). NEPCo and MECo also have identified two alternative routes that extend from the E-5/F-6 lines to the Belchertown substation: (1) a

3.0 mile long 69 kV overhead line that would be overbuilt along existing residential distribution lines with a 0.2-mile section of new 69 kV overhead line ("Alternative Route B"); and (2) a 2.5-mile long 69 kV overhead line that would include sections of both the Companies' proposed route and Alternative Route B ("Alternative Route C") (Exh. NEP/MEC-1, at 3-25, 3-28). A map of the Companies' primary and alternative routes is included as Figure 1.

In addition to the proposed transmission line upgrade, NEPCo and MECo have proposed to install a new 69/13.2 kV transformer, two 13.2 kV regulators, and a capacitor bank at the Belchertown substation (*id.* at 2-5; Exhs. A-8; NEP/MEC-5, at 3). The Companies also have proposed to install two 69 kV tap lines leading to the existing E-5/F-6 line, and an automatic switching station within a fenced area near the E-5/F-6 tap point (Exh. NEP/MEC-1 at 2-5, 3-19).

Pursuant to G.L. c. 164, § 69J, no electric company shall commence construction of a jurisdictional energy facility (see Section I.C, below) unless a petition for approval of construction has been approved by the Massachusetts Energy Facilities Siting Board ("Siting Board"). In addition, in the case of an electric company which is required by G.L. c. 164, § 69I to file a long-range forecast with the Department of Public Utilities ("Department"), the facility must be consistent with the electric company's most recently approved long-range forecast. G.L. c. 164, § 69J. MECo is required to make such a filing. After reviewing MECo's most recent long-range forecast filing, the Department approved the forecast. Massachusetts Electric Company, D.P.U. 94-112 (1994).

B. Procedural History

On December 21, 1995, NEPCo and MECo filed with the Siting Board their petition to convert an existing 2.1 mile, 23 kV electric transmission line to 69 kV, and to upgrade and install related facilities as described herein. This petition was docketed as EFSB 95-2. On January 11, 1996, the Companies filed three related petitions with the Department. The first petition, originally docketed as D.P.U. 96-15, sought a determination by the Department under G.L. c. 164, § 72, that the Companies' proposed electric transmission line conversion

is necessary and will serve the public convenience and be consistent with the public interest. The second petition, originally docketed as D.P.U. 96-16, sought an exemption under G.L. c. 40A, § 3 from the zoning by-laws of the Town of Belchertown for the proposed transmission line and switching station. The third petition, originally docketed as D.P.U. 96-17, sought an exemption under G.L. c. 40A, § 3 from the zoning by-laws of the Town of Belchertown for proposed additions to the Belchertown electric substation. At the time these three petitions were submitted, the Companies requested that the Department and the Siting Board consolidate discovery and hearings on all four petitions.

On February 22, 1996, the Siting Board and the Department conducted a public hearing on the four petitions in the Town of Belchertown. In accordance with the direction of the Hearing Officer, the Companies provided notice of the public hearing and adjudication. No petitions to intervene or participate as an interested person were submitted.

On April 25, 1996, acting under the provisions of G.L. c. 25, § 4, in order to promote efficiency in administration, the Chairman of the Department referred the three petitions filed with the Department to the Siting Board for review and approval or rejection pursuant to G.L. c. 164, § 69H(2). The Chairman also consolidated the three petitions filed with the Department with the Companies' Siting Board petition in one docket, EFSB 95-2, on the grounds that all of these matters are related to the need for, construction of, or siting of facilities, as defined in G.L. c. 164, § 69G.

The Siting Board conducted evidentiary hearings on the consolidated petitions on May 8, 10, and 13, 1996. The Companies presented six witnesses: Jennifer L. Grimsley, manager of engineering for the western district of MECo, who testified regarding electric and magnetic fields ("EMF"), safety issues, and the need for, and costs of, the proposed project and alternatives thereto; Steven P. Damiano, an environmental scientist in the Environmental and Safety Department of NEPCo, who testified regarding environmental impacts of the proposed facility; Joel McKinstry, an arborist with the western district of MECo, who testified regarding tree clearing, screening of the proposed facilities, and the use of herbicides in the transmission line right-of-way ("ROW"); Richard E. Costa, an engineer in the Transmission Line Engineering Department of New England Power Service Company,

who testified regarding the layout, design, engineering, and construction of the proposed facility, the site selection process, and the cost of the proposed project and alternatives thereto; Robert Fougere, an engineer, who testified regarding proposed construction at the Belchertown substation, and installation of the proposed switching station; and Dr. Peter A. Valberg of Gradient Corporation, an adjunct associate professor of environmental health at the Harvard School of Public Health, who testified regarding EMF.

The Hearing Officer entered 65 exhibits into the record, consisting of the Companies' responses to information and record requests. The Companies entered nine exhibits into the record.

C. Jurisdiction

The Companies' joint petition is filed in accordance with G.L. c. 164, § 69H, which requires the Siting Board "to implement the energy policies ... to provide a necessary 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 electric companies to obtain Siting Board approval for construction of proposed facilities at a proposed site before a construction permit may be issued by another state agency.

The Companies' proposal to convert a 2.1 mile, 23 kV electric transmission line to 69 kV falls squarely within the second definition of "facility" set forth in G.L. c. 164, § 69G. That section states, in part, that a facility is:

- (2) any new electric transmission line having a design rating of sixty-nine kilovolts or more and which is one mile or more in length except reconductoring or rebuilding of existing transmission lines at the same voltage.

The Petitioners also proposed to install a new 69/13.2 kV transformer, two 13.2 kV regulators, and a capacitor bank at the Belchertown substation; and two, 0.1-mile long, 69 kV tap lines and an automatic switching station near the E-5/F-6 line tap point. The third definition of facility set forth in G.L. c. 164, § 69G, is pertinent in determining whether these structures are jurisdictional facilities. In that third definition a facility is defined as:

(3) any ancillary structure including fuel storage facilities which is an integrated part of the operation of any electric generating unit or transmission line which is a facility.

The Siting Board has stated that a structure is a facility if (1) the structure is subordinate or supplementary to a jurisdictional facility, and (2) the structure provides no benefit outside of its relationship to the jurisdictional facility. New England Power Company, EFSB 94-1, at 4; see also, New England Power Company, 21 DOMSC 325, 331-333 (1991); Commonwealth Electric Company, 17 DOMSC 249, 263 (1988).

With respect to the proposed 69/13.2 kV transformer, the Companies stated that the transformer is required to support the proposed line conversion from 23 kV to 69 kV and would not provide a benefit outside of its relationship to the proposed line conversion (Exh. N-14(b)). The Siting Board notes that the proposed transformer, which would step voltage down from 69 kV to 13.2 kV, could not be used at the Belchertown substation without the installation of a 69 kV transmission line to the substation. Therefore, the proposed 69/13.2 kV transformer is subordinate or supplementary to the jurisdictional transmission line, and provides no benefit outside of its relationship to the jurisdictional facility. Accordingly, the Siting Board finds that the proposed 69/13.2 kV transformer is a facility within the meaning of the third definition of facility in G.L. c. 164, § 69G.

Similarly, the proposed switching station and 69 kV taplines are subordinate or supplementary to the jurisdictional transmission line, and provide no benefit outside of the relationship to the transmission line. Therefore, the Siting Board finds that these proposed structures are "facilities" within the meaning of the third definition of facility in G.L. c. 164, § 69G.

The Companies also have filed petitions pursuant to G.L. c. 164, § 72 and G.L. c. 40A, §3 that relate to the need for, construction of, and siting of the proposed facilities. Although the Department has initial jurisdiction over such petitions, G. L. c. 164, §69H(2) provides that the Siting Board may accept such matters for review and approval or rejection, provided that it shall apply Department and Siting Board standards in a consistent manner. The Siting Board hereby accepts for review the three petitions filed by the Companies with the Department, docketed by the Department as D.P.U. 96-15, 96-16, and 96-17.

D. Scope of Review

In accordance with G.L. c. 164, § 69H, before approving an application to construct facilities, the Siting Board requires applicants to justify facility proposals 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 its project is superior to alternative approaches in terms of cost, environmental impact, reliability, and ability to address the previously identified need (see Section II.B, below). Finally, the Siting Board requires the applicant to show that its site selection process has not overlooked or eliminated clearly superior sites, and that the proposed site for the facility is superior to a noticed alternative site¹ in terms of cost, environmental impact, and reliability of supply (see Sections III.B and III.C, below).

In this proceeding, the Siting Board will also determine whether the Companies' proposed transmission line will serve the public convenience and be consistent with the public interest under G.L. c. 164, § 72, and whether to grant the Companies' requests for exemptions from the operation of certain zoning by-laws of the Town of Belchertown for the proposed transmission line, switching facility, and certain additions to the Belchertown substation (see Section IV, below).

¹ When a facility proposal is submitted to the Siting Board, the petitioner is required to present (1) its preferred facility site or route, and (2) at least one alternative facility site or route. These sites and routes often are described as the "noticed" alternatives because these are the only sites and routes described in the notice of adjudication published at the commencement of the Siting Board's review. In reaching a decision in a facility case, the Siting Board can approve a petitioner's preferred site or route, approve an alternative site or route, or reject all sites and routes. The Siting Board, however, may not approve any site, route, or portion of a route which was not included in the notice of adjudication published for purposes of the proceeding.

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 to provide a necessary energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost. In carrying out this statutory mandate with respect to proposals to construct energy facilities in the Commonwealth, the Siting Board evaluates whether there is a need for additional energy resources² to meet reliability, economic efficiency, or environmental objectives. The Siting Board must find that additional energy resources are needed as a prerequisite to approving proposed energy facilities.

2. Description of the Existing System

The Companies stated that the facilities to be upgraded constitute that portion of the Palmer Power Supply Area ("PSA") that serves Belchertown in its entirety (Exh. NEP/MEC-1, at 2-1 to 2-2). The Companies indicated that the Town of Belchertown obtains all electrical power service from the Belchertown substation (Exh. N-7c). The Belchertown substation is supplied by the Five Corners substation in Granby ("Five Corners substation") via a single 9.2 mile, 23 kV sub-transmission line known as the 13/3W line,³ and by the Ware No. 501 substation ("Ware substation") in Ware, via a single 9.3-mile, 23 kV sub-transmission line known as the 3E line (Exh. NEP/MEC-1, at 2-1). The

² In this discussion, the term "additional energy resources" is used generically to encompass both energy and capacity additions, including, but not limited to, electric generating facilities, electric transmission lines, energy or capacity associated with power sales agreements, and energy or capacity associated with conservation and load management ("C&LM").

³ The Companies indicated that the 13/3W line represents a continuous sub-transmission line of two sections: (1) The 13 line, which extends 1.5 miles easterly from the Five Corners substation to where it joins (2) the 3W line, which extends 7.7 miles easterly to the Belchertown substation (Exh. NEP/MEC-1, at 2-1 to 2-3).

Companies indicated that both the 13/3W and the 3E sub-transmission lines are supported on a single series of single circuit wooden poles (id. at 3-20).

The Companies stated that both of these sub-transmission lines terminate at the Belchertown substation where two transformers transfer power to two distribution circuits, designated 509L1 and 509L2, by stepping down the voltage level from 23 kV to 13.2 kV (id. at 2-1; Exhs. NEP/MEC-5, at 2; N-7a). The Five Corners substation is supplied by two 115 kV transmission lines from Western Massachusetts Electric Company (Exhs. NEP/MEC-1, at 2-2; N-8a, att.; N-8b). The Ware substation is supplied by two of the Companies' 69 kV transmission lines, known as the E-5 and F-6 lines (id.).

The Companies testified that the Belchertown substation is located approximately two miles west of the E-5 and F-6 transmission lines, which pass through the northern portion of Belchertown (Public Hearing Tr. at 17-19). The Companies noted that the E-5 and F-6 transmission lines are 66 miles long and extend from Buckland to Millbury, Massachusetts (id.; Exh. N-9a). A map of the existing system and project alternatives is included as Figure 2.

3. Reliability of Supply

The Companies asserted that the proposed project is needed in order to provide a reliable supply of electricity to the area served by the Belchertown substation (Exh. NEP/MEC-5, at 4). The Companies identified two problems with the existing 23 kV supply configuration that result in reduced system reliability (Exhs. NEP/MEC-1, at 2-3, 2-10; N-7a; N-7b, att.; Tr.1, at 69-71, 96). First, the Companies stated that the present demand from the Belchertown area exceeds the capability of equipment under normal operating conditions, which is inconsistent with the Companies' reliability criteria (Exh. N-5; Tr. 1, at 69-70). Second, the Companies stated that the length of the existing sub-transmission lines serving the Belchertown substation renders the lines susceptible to a high number of faults, including incidences of lightning and falling trees (Exh. NEP/MEC-1, at 2-10). In the event of a loss of either of the existing sub-transmission lines during a

contingency, the Companies stated that the remaining line would be able to carry only a small portion of the load normally carried by the lost line (*id.* at 2-5 to 2-6; Exh. A-7).

In this Section, the Siting Board first examines the reasonableness of the Companies' system reliability criteria. The Siting Board then evaluates: (1) whether the Companies use reviewable and appropriate methods for assessing system reliability based on load flow analyses; (2) whether existing and projected loads, under certain contingencies, exceed the Companies' reliability criteria, thereby requiring additional energy resources; and (3) whether acceleration of C&LM programs could eliminate the need for such additional energy resources.

a. Reliability Criteria

In regard to reliability objectives, the Companies described service reliability and system design criteria applicable to the classes of transmission and distribution found in the proposed project area (Exhs. N-7b, att.; NEP/MEC-1, Appendix A-2; Tr. 1, at 69-71). The Companies provided their Guide for Area Supply Planning ("Supply Planning Guide"), revised in June, 1992, that contained criteria relevant to the proposed project and the area it would serve (Exh. N-7b, att.; Tr. 1, at 70-71).

First, the Companies indicated that their system design criteria require that "normal equipment capabilities must not be exceeded" under normal operating conditions (Exh. NEP/MEC-1, Appendix A-2, sec. 2.3; Tr. 1 at 71). Second, with regard to reliability of service to customer load, the Companies stated that the indices of the level of service reliability are frequency and duration of customer outages (Exh. N-7b, att. at 1). The Companies testified, however, that the proposed project was not developed as a result of the frequency and/or the duration of customer outages on the existing Belchertown supply system (Tr. 1, at 24, 96). Neither the present nor the proposed supply system for the Belchertown area is a firm supply (Exh. N-7b, att.; Tr. 1, at 24, 96).⁴ The Companies explained that the

⁴ The Companies stated that their system design criteria for areas below the firm supply threshold require the use of manual switching to restore service in the event of an outage of any one major facility or supply (Exhs. N-12a; N-12b; Tr. 1, at 69-70).

load in the Belchertown area is approximately 12 MW, which is below the threshold for firm supply set forth in their Supply Planning Guide (Exh. N-12a; Tr. 1, at 69-70).⁵

As a general matter, the Siting Board consistently has found that if the loss of any single major component of a supply system would cause significant customer outages, unacceptable voltage levels, or thermal overloads on system components, then there is justification for additional energy resources to maintain system reliability. New England Power Company, EFSB 94-1 at 89; New England Power Company, 21 DOMSC at 339; Holyoke Gas and Electric Department, 3 DOMSC 1, 7 (1978).

With respect to the Companies' design criteria precluding exceedances of normal equipment capabilities under normal operations, the Siting Board agrees that operation within such constraints helps avoid thermal overloads, and therefore is essential for providing a reliable, least-cost energy supply.

Accordingly, based on the foregoing, the Siting Board finds that the Companies' reliability criteria are reasonable for purposes of this review.

b. Load Forecasts

(1) Description

The Companies provided load information for the Palmer PSA, including historical system-coincident peak demand for the years 1980 through 1995⁶ and forecasted base-case

⁵ The Supply Planning Guide defined a supply as firm if loss of a single element will not cause a loss of load for longer than the time required for automatic switching (Exh. N-7b, att. at 1). The Supply Planning Guide states that a firm supply system should be designed so that: (1) the nonfirm peak load in a contiguous area does not exceed 30 MW; and (2) a 3-hour outage once in three years, or a 24-hour outage once in ten years are not exceeded for load above 20 MW (id.).

The Companies stated that their system design criteria for areas below the firm supply threshold require the use of manual switching to restore service in the event of an outage of any one major facility or supply (Exhs. N-12a; N-12b; Tr. 1, at 69-70).

⁶ The Companies stated that the seasonal coincident historic peaks attributed to a PSA
(continued...)

and high-case system-coincident peak demand for the years 1996 through 2014 (Exhs. N-1a, att.; N-2a, att.). The Companies stated that their PSA forecasts are statistical forecasts of seasonal system-coincident peak demand that are used for purposes of system transmission and area supply planning (Exh. N-2b).

The Companies indicated that the PSA forecasts are developed by allocating to each PSA its proportional share of the long-term load forecast of system peak demand, developed in the Companies' Integrated Resource Plan ("IRP") (id.). Specifically, the Companies project allocated PSA load by (1) regressing historical coincident PSA peaks for both summer and winter against the historical seasonal peaks for the system, and (2) applying coefficients from the regressions to the IRP forecast of seasonal peaks for the system (id.). The Companies added that the PSA forecasts are then (1) calibrated so that the growth of the sum of the PSAs matches the IRP forecast, and (2) adjusted to reflect the gain or loss of large customers or other events which are not reflective of the historical pattern of the PSA load (id.). The Companies noted that, in order to reflect uncertainties inherent in system-coincident and peak-day weather, a high-case forecast of seasonal peaks is also developed for each PSA by adding two standard errors of the regression to each year's base case PSA forecast (id.).

The Companies stated that the forecasted long-term growth rates for the Monson/Palmer area during the winter and summer are 2.1 percent and 1.5 percent, respectively (Exh. NEP/MEC-1, at 2-4). The Companies stated that the PSA is the smallest unit for which forecasts are developed and that it does not prepare separate forecasts of load growth for areas within a PSA, such as the Belchertown substation (id.).⁷ However, the Companies stated that the load growth in the area served by the Belchertown substation is consistent with load growth in the Monson/Palmer area, and added that continued load

⁶(...continued)

are calculated as the total of meter readings at substations within the PSA (Exh. N-2b).

⁷

The Companies stated that the area served by the Belchertown substation represents 7.6 percent of the load of the Palmer PSA (Exh. N-4b).

growth is predicted in the Belchertown area (id.). The Companies also provided historical information on winter and summer peak load levels for the Belchertown substation (id.). The Companies indicated that winter levels increased from 6.3 megavoltamperes ("MVA") in 1985 to 11 MVA in 1995, with peaks of 11.5 MVA in 1993 and 12.1 MVA in 1994,⁸ and summer levels increased from 5.2 MVA in 1985 to 10.6 MVA in 1995 (id.). The Companies' witness, Jennifer Grimsley, testified that the Belchertown substation facilities and service area are a winter peaking system (Tr. 1, at 86-87).

(2) Analysis

In forecasting load for the Belchertown substation, the Companies first prepared the Palmer PSA forecast and then derived substation load estimates based on the historical relationship between substation load and PSA load. In presenting its PSA forecast, the Companies adequately explained the derivation of historic trends used to prorate the system-wide forecast into separate PSA forecasts. In addition, the Companies provided actual peak loads measured at the Belchertown substation from 1985 to 1995. Thus, the Companies relied on both quantitative and judgmental techniques in their forecast of Palmer PSA load growth and its impact at the Belchertown substation.

The Siting Board previously has stated that, in facility reviews where a company projects load growth for a portion of its service territory, the company must use quantitative techniques, where sufficient data is available, or other systematic techniques, and document all pertinent assumptions to support the allocation of system-wide growth to service areas and to individual substations within the service areas. New England Power Company, 21 DOMSC at 344.

Here, the Companies have relied on quantitative techniques with adjustments for forecasting load at the PSA level, and have provided a reasonable explanation for their estimation of load growth at the substation level, based on both the PSA forecast and actual

⁸ The Companies indicated that the 1993 and 1994 winter peak load levels exceeded the 1995 winter peak level due to a milder winter in 1995 (Exh. NEP/MEC-1, at 2-4).

measurements of increasing substation load. Further, as will be discussed in Section II.A.3.c, below, the proposed facilities are needed based on existing peak load levels. Accordingly, the Siting Board finds that the Companies' load forecast methods are reasonable and acceptable for purposes of this review.

c. Equipment Loading Analysis

The Companies asserted that electrical facilities serving Belchertown are presently operating at or above normal capacity ratings (Exhs. NEP/MEC-1, at 2-1; N-13a; Public Hearing Tr. at 18). In support of their assertion, the Companies provided: (1) the winter and summer normal capabilities of equipment serving the Belchertown substation load; (2) 1995 summer peak load flow analyses demonstrating power and voltage conditions on the facilities; and (3) the actual measured loads handled by the facilities during the years 1993-1995 (Exhs. NEP/MEC-1, at 2-3; N-13, att.).

Regarding the equipment's normal capabilities, the Companies provided the following respective winter and summer ratings: (1) the No. 13 sub-transmission line, 21.7 and 7.6 MVA; (2) the No. 3W sub-transmission line, 14.3 and 5.5 MVA; (3) transformer T1, 6.3 and 5.6 MVA; (4) 509L1 regulators, 7.3 and 5.7 MVA; (5) the No. 3E sub-transmission line (3.1-mile Belchertown section), 7.1 and 3.2 MVA; (6) the No. 3E line sub-transmission line (remaining 6.2-mile Ware section), 9.7 and 4.2 MVA; (7) transformer T2, 5.8 and 5.1 MVA; and (8) 509L2 regulators, 7.3 and 5.7 MVA (*id.*).⁹

The Companies indicated that normal ratings were exceeded on one or more of these components during the winter and summer of 1993 and 1994,¹⁰ and during the summer of

⁹ The Companies indicated that items 1 through 4 are associated with the 509L1 distribution circuit (Exh. NEP/MEC-1, at 2-3). Items 5 through 8 are associated with the 509L2 distribution circuit (*id.*). Both the 509L1 and 509L2 distribution circuits extend from the Belchertown substation and serve the surrounding area (Tr. 1, at 35-36).

¹⁰ The Companies stated that in order to optimize loading and relieve some of the overloaded facility components, the 509L1 and 509L2 distribution feeders were
(continued...)

1995 (Exh. NEP/MEC-1, at 2-3).¹¹ The Companies' peak load measurements indicated that the greatest overload above the normal power rating of a facility component occurred during the summer of 1995 on the 3.1-mile section of the 3E sub-transmission line directly extending from the Belchertown substation (id.).¹²

The Companies' load flow analyses, using actual 1995 summer peak load measurements from the Belchertown substation, indicated greatest overloads over the normal power rating on the 13/3W and 3E lines of 11 percent and 60 percent, respectively (Exh. N-13a, att.).¹³ The Companies' load flow analyses further indicated that transformer T1 was loaded beyond its normal rating by 3 percent during 1995 summer peak conditions (id.).

The Companies also analyzed the contingency of the loss of either the 13/3W or 3E supply lines, or transformers T1 or T2 during summer peak load (Exh. N-13a). The Companies stated that, under such contingencies, some portion of the Belchertown distribution load would have to be manually transferred using feeder ties that connect to nearby distribution circuits, since the normal rating of the remaining 23 kV supply line would already be exceeded (id.).

¹⁰(...continued)

swapped at the Belchertown substation during 1994 (Exh. NEP/MEC-1, at 2-3). The distribution feeder swap that occurred resulted in more load being transferred from the lower capacity 3E sub-transmission line to the higher capacity 13/3W sub-transmission line.

¹¹ The Companies indicated that no winter loading at or near historic peaks occurred on the facilities during 1995 due to the extremely mild weather (Exh. NEP/MEC-1, at 2-4, Table 2-2).

¹² The load of 5.1 MVA exceeded the normal rating of 3.2 MVA by 1.9 MVA (Exh. N-13a, att.).

¹³ Although the supply system in the Belchertown area is winter peaking, the Companies indicated that loading becomes more critical in the summer months due to lower seasonal ampacity ratings of different supply system components such as lines, transformers, and regulators (Exh. NEP/MEC-1, at 2-3; Tr. 1, at 38-45, 86-87).

The Siting Board finds that the Companies used reviewable and appropriate methods for assessing the reliability of supply based on actual load measurements and load flow analyses. The Siting Board also finds that the Companies' measurements and load flow analyses both demonstrate that under 1995 and earlier peak load conditions, equipment at and supplying the Belchertown substation was loaded above normal capabilities in contravention of the Companies' reliability criteria. Accordingly, the Siting Board finds that there is a need for additional energy resources based on the Companies' reliability criteria with regard to equipment loadings. In addition, although the Companies' reliability criteria do not require a firm supply, the Siting Board notes that the present 23 kV supply configuration is unable to serve the Belchertown area during a contingency such as the outage of one of the two 23 kV supply lines, transformers, or other related components, with present and expected loading levels.

d. Accelerated Conservation and Load Management

G.L. c. 164, § 69J requires a petitioner to include a description of actions planned to be taken to meet future needs and requirements, including the possibility of reducing requirements through load management. The Companies asserted that, given the amount of load reduction necessary, accelerated C&LM efforts¹⁴ would not address the need for

¹⁴ Load management is a measure or action designed to modify the time pattern of customer electricity requirements, for the purpose of improving the efficiency of an electric company's operating system. 220 CMR § 10.02. For example, a utility may reach an agreement with a manufacturer that uses electricity whereby that manufacturer will curtail its use during peak times when the utility's system, as a whole, is facing increasing demands for electricity for cooling or heating purposes. During non-peak times the manufacturer may then resume its use of electricity. The utility providing electricity has, therefore, managed its load, thereby decreasing its need for additional peak capacity.

Conservation, on the other hand, is a technology, measure, or action designed to decrease the kilowatt or kilowatthour requirements of an electric end-use, thereby reducing the overall need for electricity. Id. Both conservation and load management are demand side management ("DSM") measures.

additional energy resources in the Belchertown area based on expected future load growth (Exh. A-3). The Companies testified that most DSM savings are obtained from commercial and industrial programs, and indicated that heavily residential areas like Belchertown are unlikely to supply significant DSM savings (Tr. 1, at 46-47).

The Companies provided a list of their current DSM programs (Exh. N-3a, att.). The Companies stated that they did not prepare forecasts of DSM savings at the PSA level, but rather estimated the incremental winter DSM savings for the Palmer PSA by multiplying the total projected MECo DSM savings by the share of the Companies' load represented by the Palmer PSA (Exh. N-3b, att.). The Companies indicated that the allocated share of incremental DSM savings above 1995 levels for the Palmer PSA was projected to be 1.50 MW in summer 1996 and 2.59 MW in summer 1997 (*id.*). The Companies estimated the allocated share of incremental DSM savings for the Palmer PSA to be 1.32 MW in winter 1996 and 3.03 MW in winter 1997 (*id.*). The Companies acknowledged that DSM savings would not necessarily be evenly apportioned to the Companies' load as assumed under their method of allocation (*id.*).

In past reviews, the Siting Board has considered whether need could be met either by accelerating planned DSM within an area, such as a PSA, or by reallocating DSM for that area to a particular problem area, such as the area served by a substation. New England Power Company, EFSB 94-1, at 20-22; New England Power Company, 21 DOMSC at 365-367. Here, need is represented by overloads on equipment, with the highest overload of 1.9 MVA -- equal to approximately 1.6 MW¹⁵ -- occurring on the 3E sub-transmission line during summer weather, coincident with a seasonal reduction in the 3E line's MVA rating. Further, the Companies project annual increases in peak load of 2.1 percent during the winter, and 1.5 percent during the summer, over a 19 year span (forecast years 1996 to 2014). The Siting Board notes that the present Belchertown substation load served by the 3E line would have to be reduced by at least 1.6 MW and maintained at that level indefinitely in

¹⁵ The Siting Board, in order to express the DSM requirement in terms of MWs, assumed an area power factor of 0.85, yielding 1.6 MW using the formula:
$$\text{MW} = (\text{Power Factor}) \times (\text{MVA}).$$

order to avoid the need for a new transmission line or equivalent facilities. In addition, present Belchertown substation load served by the 13/3W line would have to be maintained at a level below its maximum rating to avoid the need for new facilities.

As noted in Section II.A.3.b.(1), above, the Belchertown substation load is 7.6 percent of the Palmer PSA load. The record indicates that projected incremental summertime DSM for the entire Palmer PSA is 1.50 MW in 1996 and 2.59 MW in 1997. In order to meet the identified need by the summer of 1997, it would be necessary to reallocate at least 1.6 MW of the expected incremental DSM for the Palmer PSA -- 2.59 MW -- to that portion of Belchertown served via the 3E sub-transmission line. However, such an approach would represent an approximately 16 fold increase above projected DSM for the service area supplied by the 3E line, assuming proportional allocation of the PSA DSM to the two sub-transmission lines -- 13/3W and 3E -- at the Belchertown substation. In addition, load growth above 1995 levels in the affected service area would have to be offset entirely by DSM each year to prevent need from recurring.

Further, record evidence indicates that the Belchertown service area is overwhelmingly residential in composition. The Siting Board acknowledges the likely inability of this area to achieve the magnitude of DSM acceleration or reallocation necessary to offset present overloads and expected future load growth.

Accordingly, the Siting Board finds that acceleration of C&LM programs would not meet the identified need for additional energy resources based on the Companies' reliability criteria. The Siting Board notes that it may require a more extensive analysis of the feasibility and cost-effectiveness of a C&LM alternative in cases where a less significant acceleration of planned DSM programs could be sufficient to meet an identified need.

e. Conclusions on Reliability of Supply

The Siting Board has found that: the Companies' reliability criteria are reasonable for purposes of this review; the Companies' load forecast methods are reasonable and acceptable for purposes of this review; and the Companies used reviewable and appropriate methods for assessing the reliability of supply based on actual load measurements and load flow analyses.

In addition, the Siting Board has found that the Companies' actual measurements and load flow analyses both demonstrate that under 1995 and earlier peak load conditions, equipment at and supplying the Belchertown substation was loaded above normal capabilities in contravention of the Companies' reliability criteria. Accordingly, the Siting Board has found that there is a need for additional energy resources based on the Companies' reliability criteria with regard to equipment loadings. Finally, the Siting Board has found that acceleration of C&LM programs would not meet the identified need for additional energy resources based on the Companies' reliability criteria.

Based on the foregoing, the Siting Board finds that the Companies have demonstrated that the existing supply system is inadequate to satisfy existing load supplied by the Belchertown substation. Accordingly, the Siting Board finds that additional energy resources are needed for reliability purposes in the Belchertown area.

B. Comparison of the 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 necessary energy supply to the Commonwealth with a minimum impact on the environment at the lowest possible cost. In addition, G.L. c. 164, § 69J requires a project proponent to present "alternatives to planned action" which may include: (a) other methods of generating, manufacturing, or storing; (b) other sources of electrical power or natural gas; and (c) no additional electric power or natural gas.¹⁶

In implementing its statutory mandate, the Siting Board requires a petitioner to show that, on balance, its proposed project is superior to alternative approaches in terms of cost, environmental impact, and ability to meet the previously identified need. New England Power Company, EFSB 94-1, at 23; New England Power Company, 21 DOMSC, at 359-375; Boston Edison Company, 13 DOMSC 63, 67-68, 73-74 (1985).

¹⁶ G.L. c. 164, § 69J also requires a petitioner to provide a description of "other site locations." The Siting Board reviews the petitioner's proposed site, as well as other site locations, in Section III.B, below.

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.

New England Power Company, EFSB 94-1, at 24; New England Power Company, 21 DOMSC at 374-375; Massachusetts Electric Company, 18 DOMSC 383, 404-405 (1989).

2. Project Approaches

NEPCo and MECo stated that the need for the proposed project was identified in the 1990 Monson Area Supply and Distribution Study Report ("Monson Study"), prepared by the Companies' affiliate, New England Power Service Company (Exhs. NEP/MEC-1, at 2-1; NEP/MEC-5, att. JLG-4). The Monson Study recommended the removal of the majority of the 23 kV facilities in the entire Monson area (Exh. NEP/MEC-5, att. JLG-4).

The Companies stated that the Monson Study identified four alternative approaches to meet the identified need in Belchertown, three of which remain viable (Exh. NEP/MEC-1, at 2-4).^{17,18} The three project alternatives are: (1) the proposed project, which would upgrade the Belchertown supply to 69 kV by reconductoring the 2.1-mile long segment of the existing 3E sub-transmission line between the E-5/F-6 ROW and the Belchertown substation

¹⁷ The Petitioners explained that the fourth and now obsolete approach was a phased combination of two of the other alternatives, and that its phasing aspect became undesirable due to load growth in the years since the Monson report was issued (Exh. NEP/MEC-1, at 2-4).

¹⁸ The Siting Board also asked the Companies to consider whether the identified need could be met using distributed generation. The Companies asserted that adding generation of any sort to the transmission grid would not alleviate the overload of existing transmission lines and transformers (Exh. A-2; Tr. 1 at 83). The Companies also indicated that off-grid distributed generation would have to total several megawatts in order to address the identified need even in the short term (Tr. 1 at 85).

The Siting Board recognizes that distributed generation does not appear to be able to meet the identified need in the instant case. However, in future transmission line cases, the Siting Board expects applicants to provide a more complete analysis of the ability of distributed generation to meet the identified need, or to provide an explanation of why distributed generation is not appropriate.

("Alternative One" or "proposed project"); (2) an upgrade of the existing 9.2-mile, 23 kV 13/3W line from the Five Corners substation to the Belchertown substation ("Alternative Two"); and (3) a reconductoring of the existing 9.3-mile, 23 kV, 3E sub-transmission line from the Ware substation to the Belchertown substation ("Alternative Three") (*id.* at 2-5 and 2-9; Exh. A-3).^{19,20}

The Companies noted that there were several possible routing options for the proposed project (Exh. NEP/MEC-1, at 3-8 to 3-11). For the purpose of comparison, the Companies assumed that the proposed project would involve an upgrade of the existing 23 kV line that extends from the Belchertown substation to the vicinity of the Quabbin Reservoir where, following the upgrade, it would connect to the area 69 kV grid via the existing E-5/F-6 lines (*id.*).

3. Ability to Meet the Identified Need

In its analysis of the ability of each of these approaches to meet the identified need, the Siting Board evaluates whether each approach would provide a reliable supply to the area served by the Belchertown substation consistent with the Companies' criteria for equipment loadings.

¹⁹ The Companies indicated that they would remove the entire 13/3W sub-transmission line between the Five Corners substation and the Belchertown substation as well as the approximately seven-mile segment of the 3E sub-transmission line between the E-5/F-6 ROW and the Ware substation, within approximately one year after the proposed project is complete, with the precise timetable dependent on the needs of the affected customer (Exh. E-23).

²⁰ General Laws c. 169, § 69J requires the companies to consider the alternative of "no additional electrical power." However, the Siting Board has found that the Companies' existing supply system is inadequate to satisfy the existing load supplied by the Belchertown substation (see Section II.A.3.e, above). Consequently, the Siting Board finds that the alternative of "no additional electric power" would be unable to meet the identified need. A more detailed analysis of this alternative is therefore unnecessary.

a. Proposed Project

The Companies asserted that the proposed project would meet the identified need, including future load growth, for at least 30 years (Exh. A-4). In support thereof, the Companies provided analyses of equipment loadings with the proposed project under normal operating conditions, and under the contingency of an outage of the E-5 transmission line from which the proposed project normally would be supplied (Exh. N-14a, atts.). In their load flow analyses, the Companies assumed an 11.2 MVA summer peak load at the Belchertown substation, an amount five percent higher than the summer peak load experienced in 1995 (*id.*; Exh. N-13a). The load flow analyses demonstrated that during normal operating conditions, or during an outage of the E-5 transmission line, with 69 kV power supplied via the F-6 transmission line tap, equipment would be loaded well within normal, summer capabilities (Exh. N-14a, atts.).

Based on the foregoing, the Siting Board finds that the proposed project would meet the Companies' criteria for equipment loading. Accordingly, the Siting Board finds that the proposed project would meet the identified need.

b. Alternative Two

The Companies asserted that Alternative Two would meet the identified need, including future load growth, for at least 30 years (Exhs. NEP/MEC-1, at 2-10; A-4). The Companies stated that under Alternative Two, the Belchertown substation would be fully supplied by the Five Corners substation (Exh. NEP/MEC-1, at 2-5; Public Hearing Tr. at 18). The Companies stated that the existing 9.2-mile, 13/3W sub-transmission line would be upgraded for operation at higher temperatures through the replacement of a number of poles and associated structural members in order to obtain additional clearance (*id.*). In addition, the Companies indicated that a 23 kV capacitor bank would be installed, and two existing 23 kV/13.2 kV transformers and associated voltage regulators would be replaced with larger capacity units at the Belchertown substation (*id.*). The Companies added that the 3E line from Ware to Belchertown would remain in service, but would not be capable of supplying the entire Belchertown load (*id.*).

In order to demonstrate that Alternative Two would meet the identified need, the Companies provided load flow analyses assuming a 12.0 MVA summer peak load at the Belchertown substation, assuming normal operating conditions once Alternative Two is in operation (Exh. A-7a, att.). The analyses demonstrate that equipment would be loaded well within normal summer capabilities (id.). The Companies stated that, in the event of an outage along the 13/3W line, manual switching would be required to restore customer load (Exh. A-7). The Companies added that during such an outage, the remaining 3E line could provide approximately 3 MVA, with the remaining 9 MVA provided through the use of distribution ties (id.). Based on the foregoing, the Siting Board finds that Alternative Two would meet the Companies' criteria for equipment loading. Accordingly, the Siting Board finds that Alternative Two would meet the identified need.

c. Alternative Three

The Companies asserted that Alternative Three would meet the identified need, including future load growth, for at least 30 years (Exhs. NEP/MEC-1, at 2-10; A-4). The Companies stated that under Alternative Three, the Belchertown substation would be fully supplied by the Ware substation (Exh. NEP/MEC-1, at 2-5, 2-9; Public Hearing Tr. at 18-19). The Companies stated that the existing 9.3-mile, 3E sub-transmission line would be reconductored with larger diameter line (Exh. NEP/MEC-1, at 2-5, 2-9). The Companies stated that nearly all poles and attached structural members would be replaced in order to obtain the additional strength necessary to support the larger line (id.). In addition, the Companies indicated that, as with Alternative Two, a 23 kV capacitor bank would be installed and two existing 23 kV/13.2 kV transformers and associated voltage regulators would be replaced with larger capacity units at the Belchertown substation (id.). The Companies added that the 13/3W line from Granby to Belchertown would remain in service, but would not be capable of supplying the entire Belchertown load (id.).

In order to demonstrate that the Ware to Belchertown upgrade would meet the identified need, the Companies provided load flow analyses assuming a 12.0 MVA summer peak load at the Belchertown substation, assuming normal operating conditions once

Alternative Three is in operation (Exh. A-7b). The analyses demonstrate that equipment would be loaded well within normal, full-seasonal capabilities (id.). The Companies stated that in the event of an outage along the 3E line, manual switching would be required to restore customer load (Exh. A-7). The Companies added that during such an outage, the remaining 13/3W line could provide approximately 5 MVA, with the remaining 7 MVA provided through the use of distribution ties (id.).

Based on the foregoing, the Siting Board finds that Alternative Three would meet the Companies' criteria for equipment loading. Accordingly, the Siting Board finds that Alternative Three would meet the identified need.

d. Conclusions on Ability to Meet the Identified Need

The Siting Board has found that the Companies have demonstrated that the proposed project, Alternative Two, and Alternative Three would meet the Companies' criteria for equipment loading. Further, the Siting Board has found that the Companies have demonstrated that the proposed project, Alternative Two and Alternative Three would meet the identified need.

Accordingly, the Siting Board next evaluates the reliability, environmental impacts, and cost of the proposed project, Alternative Two, and Alternative Three.

4. Reliability

The Companies asserted that the proposed project would be more reliable than either of the alternatives (Exh. NEP/MEC-1, at 2-10). In support of their assertion, the Companies explained that the possibility of line outages, due to incidences of lightning or falling trees, is directly related to power line length (id.). The Companies' witness, Ms. Grimsley, noted that Alternatives Two and Three both have the disadvantage of significant additional exposure relative to the proposed project (Public Hearing Tr. at 20).

The record demonstrates that the proposed project's double tap configuration would maintain supply to the Belchertown substation via automatic switching in the event of an outage along either the E-5 or F-6 host transmission lines. The record also indicates that the

overall length of the proposed 2.1-mile transmission line is shorter than either alternative project, thereby decreasing the chances of length-sensitive outages along its span. In the event of a fault along the proposed transmission line, this shorter length would likely improve the prospect of an expeditious fault location, determination, and repair.

In the event of a fault, however the planned removal of the 13/3W and 3E sub-transmission lines under the proposed project would place an additional burden on the nearby distribution network, as use of the distribution ties would be necessary to restore some or all of the power to the Belchertown area. In contrast, Alternatives Two and Three would retain a back-up sub-transmission line, thus reducing the burden on the nearby distribution network in case of a fault on the upgraded line under each alternative.

The Siting Board recognizes that any of the Companies' three project alternatives would significantly reduce exposure in comparison to the present supply situation, which includes over 18 miles of exposed line. However, the proposed project reduces this exposure by a factor of nine, while the alternative project approaches reduce the exposure by a factor of two. The significantly shorter length of the proposed project's transmission line, when compared to either alternative project, best minimizes the exposure to contingencies that would necessitate burdening nearby distribution systems. On balance, this line-exposure advantage outweighs the possible additional stress that the proposed project would place on the distribution system relative to the alternative project approaches should a fault occur.

Accordingly, the Siting Board finds that the proposed project would be preferable to Alternative Two and Alternative Three with respect to reliability.

5. Environmental Impacts

In this Section, the Siting Board compares the proposed project to the two alternative projects with respect to environmental impacts resulting from: (1) facility construction, (2) permanent land use, and (3) magnetic field levels.

a. Facility Construction Impacts

The Companies asserted that the facility construction impacts of Alternatives Two and Three would be greater than those of the proposed project, due primarily to the shorter line length of the proposed project (Exhs. NEP/MEC-1, at 2-11; A-6). The Companies stated that all three alternatives would require the installation of new wood poles and wood crossarms,²¹ and that new line conductors would be required for the proposed project and for Alternative Three (id.). The Companies explained that construction techniques for all three project alternatives would be the same (Exh. A-6(a)).

However, the Companies stated that, because Alternatives Two and Three cross a larger number of environmental resources, the potential for environmental impacts from each of the alternatives is greater than that from the proposed project (Exh. NEP/MEC-1, at 2-11). For example, the Companies indicated that the proposed project would cross one wetland (4400 feet) and three streams (id. at 2-12). In contrast, the Companies stated that Alternative Two would cross four wetlands (5700 feet), five streams, and one pond (id.). The Companies stated that Alternative Three would cross nine wetlands (7600 feet), two rivers, ten streams, and one pond (id.).

In addition, the Companies stated that they would install one 69/13.2 kV transformer, two 13.2 kV regulators, and a capacitor bank at the Belchertown substation as part of the proposed project (id. at 2-5; Exhs. A-8; NEP/MEC-5, at 3). The Companies indicated that Alternatives Two and Three each would require replacement of the existing 23/13.2 kV transformers, replacement of voltage regulators, and installation of a 23 kV capacitor bank at the Belchertown substation (Exh. NEP/MEC-1, at 2-5 and 2-9). The Companies noted that

²¹ The Companies stated that the proposed project would involve replacing 51 existing wood poles with approximately 47 wood poles, nine feet taller in height (Exh. NEP/MEC-1, at 3-19, 3-20). The Companies stated that six existing poles would be permanently removed from wetlands (id. at 3-21; Tr. 2, at 70-71). The Companies indicated that Alternative Two would require replacement of "a number of" poles and arms for additional clearance, while Alternative Three would require replacement of almost all of the poles and arms for additional strength to support the larger conductor (Exh. NEP/MEC-1, at 2-5 and 2-9).

the substation yard area would be expanded under each alternative to allow better access to the existing equipment for operation and maintenance reasons, but stated that no new electrical equipment would be installed in the expanded area under any of the three project alternatives (Exh. A-8).

The record demonstrates that the potential facility construction impacts are significantly greater for Alternatives Two and Three than for the proposed project. Facility construction impacts could occur through use of construction equipment in wetland and water resource areas, particularly where the only access to such areas is through a wetland or other water resource. While the types of impacts may be similar for all three project alternatives, the quantity of resources affected is likely to be significantly less for the proposed project simply because it would be significantly shorter -- 2.1 miles in contrast to 9.2 miles for Alternative Two, and 9.3 miles for Alternative Three. Thus, the Companies have demonstrated that the potential for transmission line construction impacts are greater for Alternatives Two and Three than for the proposed route.

Further, the Siting Board notes that the extent of construction and installation of equipment required at the Belchertown substation is comparable under all three project alternatives. Thus, the proposed project and the two project alternatives are comparable with respect to facility construction impacts at the Belchertown substation.

Consequently, the Siting Board finds that the proposed project would be preferable to Alternative Two and Alternative Three with respect to facility construction impacts.

b. Magnetic Field Levels²²

In order to compare magnetic field impacts associated with the three project approaches, the Companies calculated maximum magnetic field levels along upgraded ROW segments, with and without the proposed project, for locations within the ROW, at the ROW edge, and at the closest residence along each route corridor using projected 1997

²² In this case the Siting Board focuses on magnetic field levels rather than electric field levels because perceived health impacts generally relate to magnetic field levels. See, New England Power Company, EFSB 94-1, at 32, n. 51.

Belchertown substation loads (Exhs. A-6b; NEP/MEC-5, att. JLG-3). For their calculations, the Companies assumed 6.0 MVA of power flow on the 3E line with the existing system, and 12.7 MVA of load on each line for the three project approaches (*id.*).²³ In addition, the Companies provided the testimony of Dr. Peter A. Valberg, an adjunct associate professor of environmental health who has analyzed epidemiological and biological studies concerning the effects of exposure to electromagnetic fields such as those associated with the proposed project (Exh. NEP/MEC-8, at 2; Tr. 2, at 130-132, 134-145; Public Hearing Tr. at 28-38, 49-52).

The Companies indicated that, under the proposed project, maximum magnetic field levels would decrease from the current level of 3.9 milligauss ("mG") to 3.5 mG at the residence with the highest magnetic field impact and at the ROW edge,²⁴ and from the current maximum level of 17.8 mG to 10.8 mG within the ROW (Exh. NEP/MEC-5, att. JLG-3). The Companies stated that no special design considerations were necessary to achieve the expected reductions (Exh. E-19).²⁵ The Companies further stated that they would use conductor phase configurations that would reduce magnetic field levels in the vicinity of

²³ The Siting Board notes that the Companies' assumption of 6.0 MVA of power flow on the 3E line reflects an amount equal to approximately half of the current Belchertown substation peak load. The Companies indicated that the remainder of the peak load would be met by power supplied via the 13/3W line, resulting in similar EMF impacts along that ROW.

²⁴ The Companies' witness, Ms. Grimsley, testified that the closest residence to the ROW edge, for the proposed project, was also the residence with the highest magnetic field level (Tr. 2, at 134-135). The Companies added that the closest residence was located at the ROW edge, approximately 30 feet from the existing and proposed overhead line (Exh. NEP/MEC-5, att. JLG-3, at 2).

²⁵ The Companies stated that the proposed project would have lower magnetic fields due to two major factors: (1) less current on the 69 kV transmission line than on the existing 23 kV sub-transmission lines; and (2) taller wooden poles to support the 69 kV transmission line (Exh. E-19).

the Belchertown substation (id.).²⁶ However, the Companies added that such phase optimization would not be effective for the remainder of the proposed 2.1-mile transmission line due to the presence of only one circuit along the proposed ROW (id.).

With respect to Alternative Three, the Companies indicated that maximum magnetic fields would increase from the current level of 3.9 to 8.3 mG or less at the residence with the highest magnetic field impact and at the 3E ROW edge (Exh. NEP/MEC-5, att. JLG-3). Under Alternative Two, the companies indicated that magnetic field level would increase to a level less than 8.3 mG at any residence along the 13/3W ROW (id.). For Alternatives Two and Three, the Companies further indicated that magnetic fields within the ROW would increase from the current maximum level of 17.8 mG to 37.6 mG (id.).

Dr. Valberg indicated that, although many organizations have examined the issue of potential health risks associated with exposure to magnetic field levels similar to those expected during operation of the proposed project, current research has failed to establish demonstrable health hazards associated with power lines or other sources of extremely low-frequency electric and magnetic fields (Exh. NEP/MEC-8, at 7).

The record demonstrates that under the proposed project, magnetic field levels at the closest residence, ROW edge, and on the ROW itself would be decreased from existing levels along the proposed 69 kV transmission line. Under Alternatives Two and Three, magnetic field levels would increase along upgraded segments of the existing 23 kV system, including locations within the ROW, at the ROW edge, and at the closest residences, and would be significantly higher than at corresponding locations along the new 69 kV line segment with the proposed project. Accordingly, the Siting Board finds that the proposed project would be preferable to Alternative Two and Alternative Three with respect to magnetic fields.

²⁶ The Companies indicated that the closest residence to the Belchertown substation is located 276 feet to the west along the north side of Jensen Street (Exh. E-17).

c. Permanent Land Use Impacts

The Companies' filing indicates that each of the three project alternatives would involve the upgrade or rebuilding of an existing line within existing ROWs (Exh. NEP/MEC-1, at 1-1, 2-5, 2-9, 3-19 to 3-21). The Companies stated that, if the proposed project is constructed, the remaining seven-mile portion of the existing 3E sub-transmission line between the Ware substation and the E-5/F-6 ROW, and the existing 9.2-mile, 13/3W line between the Five Corners substation and the Belchertown substation, would be removed within approximately one year after the proposed project is completed (Exh. E-23). The Companies stated that these lines would remain in service under Alternatives Two and Three (Exh. NEP/MEC-1, at 2-5, 2-9).

The Companies noted that, as part of the interconnection between the proposed project and the Companies' existing 69 kV transmission system, a transmission switching station would be installed within a fenced area, approximately 60' x 80', near the E-5/F-6 tap point (id. at 2-5). The Companies stated that the switching equipment would be located in the existing ROW on Metropolitan District Commission ("MDC") property near the Quabbin Reservoir, but outside of the Quabbin watershed, with a design that ensures drainage away from the reservoir (id. at 3-7, Appendix D). The Companies stated that construction of the switching station for the proposed project would require the removal of some nearby trees that would pose a hazard to the equipment (Tr. 1, at 122). The Companies' arborist, Joel McKinstry, testified that the switching station would be landscaped around its entire perimeter with arborvitae trees, six to eight feet tall (id. at 116). The Companies also stated that the proposed project would necessitate the clearing of a half-acre of trees in the portion of the ROW located in the Quabbin watershed, where the proposed 69 kV transmission line would tap into the E-5/F-6 line (id. at 120-122). The Companies indicated that Alternatives Two and Three would remain interconnected to the existing sub-transmission systems at existing substations and gave no indication that additional ROW acquisition or clearing would be necessary under either of these alternatives (Exh. NEP/MEC-1, at 2-5 to 2-9).

The Siting Board previously has found that "in many cases, the use of an existing [ROW] as the site of new lines is the most appropriate way to achieve the proper statutory balance [among need, environmental impacts, and cost]" and that the environmental impact of such use is "prima facie minimal". See Commonwealth Electric Company, 17 DOMSC 249, at 327; Boston Edison Company, 3 DOMSC 44, 53-54, 61 (1978). Thus, because the proposed and alternative projects would be located in existing ROWs, the Siting Board expects that incremental permanent land use impacts would be minimal and that the types of impacts would be similar for all three alternatives. However, the Siting Board notes that, because the Companies plan to remove the remaining seven miles of 3E line from the Ware Substation to the Quabbin Reservoir and the entire 9.2-mile, 13/3W line from the Five Corners substation to the Belchertown substation within approximately one year after the proposed project is constructed, overall permanent land use impacts will be substantially less for the proposed project than for either project alternative.

The record also demonstrates that the proposed project would require construction of a switching station in the existing ROW near the Quabbin Reservoir, but outside of the Quabbin watershed. The Companies stated that this construction would necessitate the removal of some trees posing a hazard in the switching station area, and a half-acre of trees inside the Quabbin watershed where the 69 kV transmission line will tap into the E-5/F-6 line. Based on the evidence submitted by the Companies, the Siting Board concludes that any environmental impacts from this construction would be minimal. However, because Alternatives Two and Three would not require the construction of a switching station, the alternative projects would be preferable to the proposed project with respect to permanent land use impacts of the proposed switching station.

The Siting Board notes that the incremental adverse visual impacts of the proposed project and Alternative Two would be limited, since both alternatives involve the upgrade of an existing sub-transmission line.²⁷ There is no evidence in the record of any incremental

²⁷ The only incremental visual impact would be attributable to an increase in the height of the poles along the power line corridors.

visual impact resulting from Alternative Three. However, the proposed project, unlike Alternatives Two and Three, is likely to have a positive visual impact overall because the Companies would remove seven miles of the 3E sub-transmission line and all 9.2 miles of the 13/3W sub-transmission line within approximately one year after the proposed project is completed. In addition, due to the Companies' plan to landscape the entire perimeter of the switching station required for the proposed project, the visual impact of the switching station will be minimal. Consequently, the Siting Board concludes that the visual impacts of the proposed project are preferable to those of Alternatives Two and Three.

Based on the foregoing, the Siting Board concludes that the overall land use and visual impacts of the proposed project would be significantly less than those of Alternatives Two and Three following removal of the remaining seven-mile portion of the 3E sub-transmission line and all of the 13/3W sub-transmission line after the proposed project is completed.²⁸ Accordingly, the Siting Board finds that the proposed project would be preferable to Alternative Two and Alternative Three with respect to permanent land use impacts.

d. Conclusions on Environmental Impacts

In comparing the overall environmental impacts of the proposed project to the 23 kV alternatives, the Companies stated that the proposed project would be favored over Alternative Two and Alternative Three with respect to environmental considerations (Exh. NEP/MEC-1, at 2-11). The Siting Board has found that the proposed project would be preferable to Alternative Two and Alternative Three with respect to facility construction impacts, magnetic field level impacts, and permanent land use impacts.

Accordingly, the Siting Board finds that the proposed project would be preferable to Alternative Two and Alternative Three with respect to environmental impacts.

²⁸ The Siting Board notes that if the 3E and 13/3W sub-transmission lines were not removed, overall land use and overall visual impacts would be comparable for the three project alternatives.

6. Cost

The Companies asserted that the proposed project would be the least-cost alternative to meet the identified need (Exh. NEP/MEC-1, at 2-10 to 2-11; Public Hearing Tr. at 19). In support of their assertion, the Companies provided comparative analyses of the capital cost and cumulative present worth of revenue requirements ("CPWRR"), including line loss differences, for the proposed project and each of the alternative approaches (Exhs. NEP/MEC-1, at 2-11, Appendix A-7; RR-14, atts.).²⁹

In comparing the proposed project and the alternative approaches, the Companies indicated that the capital cost of the proposed project, including the cost of removal of existing facilities, would be greater than that of Alternative Two, and comparable to that of Alternative Three (Exhs. NEP/MEC-1, at 2-11, Appendix A-7; RR-14, atts.; Tr. 3, at 105-109). With consideration of operating costs, however, the Companies' analyses showed that the proposed project would be more economical than both alternative approaches, as a result of the proposed project's lower line loss and maintenance costs, and the avoidance of wheeling costs (Exhs. NEP/MEC-1, at 2-11; RR-14, atts.).

The Companies indicated that the approximate installation cost of the proposed project would be \$2,257,000 (1995 dollars), including \$718,000 for upgrading the existing 23 kV sub-transmission line to 69 kV, \$973,000 for installing new substation transformers and the switching station, and \$566,000 for licensing and engineering (Exh. NEP/MEC 1, Appendix F). Citing their comparative cost study (1990 dollars), the Companies indicated that the installation costs of Alternative Two would be over \$500,000 less than that of the proposed project, because Alternative Two would not require new pole installations and a new switching station (id., App. A-7; NEP/MEC-2, exh. B). The Companies' comparative

²⁹ The Companies confirmed that the various costs used to determine the most economically advantageous plan were based on 1990 dollar values (Tr. 3, at 84-85). However, the Companies' witness, Ms. Grimsley, testified that while the entirety of the Companies' cost information was not updated to reflect more current dollar values, the relative economic ranking of the three project approaches would not change (id.).

cost study also suggested that the installation costs of Alternative Three would be \$750,000 greater than that of the proposed project, because of its significantly longer length (*id.*).

In addition, the Companies estimated a cost of \$828,000 (1995 dollars) for removal of remaining, unneeded sections of the 13/3W and 3E sub-transmission lines, to be completed within approximately a year after the proposed project comes on-line. Inclusion of the cost for removal of those unneeded lines results in an overall capital cost of \$3,085,000 for the proposed project (Tr. 3, at 105-109).³⁰ The Companies indicated that they do not expect to incur line removal costs under either Alternative Two or Alternative Three (*id.* at 105-109). Thus, the total capital cost of the proposed project, including line removal costs, would be significantly higher than that of Alternative Two and roughly comparable to that of Alternative Three.

With respect to operating costs, the Companies cited their comparative cost study of line losses (1990 dollars), indicating that 20-year CPWRR losses under the proposed project would be \$5,062,000 less than under Alternative Two and \$2,226,000 less than under Alternative Three (Exhs. RR-14a to RR-14e). The Companies provided separate estimates of maintenance costs (1995 dollars), amounting to \$2,500 per year for the proposed project, as compared to \$20,000 per year for Alternative Two or Alternative Three (Exh. RR-11). Finally, the Companies indicated that Alternatives Two and Three would require the payment of a \$12 per kW wheeling charge to Northeast Utilities for continued use of the 13/3W line (Exh. RR-13).³¹

The record demonstrates that, due primarily to lower line losses, the proposed project would provide a significant long-term cost advantage relative to Alternative Two and

³⁰ The Companies' witness, Richard E. Costa, estimated that the removal of 16.4 miles of the 23 kV sub-transmission line would cost \$50,476 per mile in 1995 dollars (Exh. NEP/MEC-2, exh. B; Tr. 3, at 105-109). Mr. Costa added that the final cost for removing the 23 kV sub-transmission lines could increase due to additional project-specific costs (Tr. 3, at 109).

³¹ The Companies estimated that annual wheeling costs would be \$132,000, based on the 1995 peak load of approximately 11 MW (*id.*).

Alternative Three. Accordingly, the Siting Board finds that the proposed project would be preferable to Alternative Two and Alternative Three with respect to cost.

7. Conclusions: Weighing Need, Cost, Environmental Impacts and Reliability

In comparing the proposed project to both Alternative Two and Alternative Three, the Siting Board has found that: (1) the proposed project, Alternative Two, and Alternative Three would meet the identified need; (2) the proposed project would be preferable to Alternative Two and Alternative Three with respect to reliability; (3) the proposed project would be preferable to Alternative Two and Alternative Three with respect to environmental impacts; and (4) the proposed project would be preferable to Alternative Two and Alternative Three with respect to cost.

Accordingly, the Siting Board finds that the proposed project is preferable to Alternative Two and Alternative Three.

III. ANALYSIS OF THE PROPOSED AND ALTERNATIVE FACILITIES

The Siting Board has a statutory mandate to implement the policies of G.L. c. 164, §§ 69H-69Q to provide a necessary energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost. G.L. c. 164, §§ 69H and J. Further, G.L. c. 164, § 69J requires the Siting Board to review alternatives to planned projects, including "other site locations." In its review of other site locations, the Siting Board requires a petitioner to show that its proposed facilities' siting plans are superior to alternatives and that its proposed facilities are sited at locations that minimize costs and environmental impacts while ensuring supply reliability. New England Power Company, EFSB 94-1, at 47; Cabot Power Corporation, 2 DOMSB 241, 371 (1994); New England Power Company, 21 DOMSC at 376.

A. Description of the Proposed Facilities and Alternative Facilities

1. Proposed Facilities

The Companies propose to convert an existing 2.1-mile, 23 kV overhead electric transmission line in the Town of Belchertown to 69 kV ("primary route") (Exh. NEP/MEC-1, at 1-1). The proposed transmission line along the primary route would be placed in an existing electric utility ROW for its entire route (id. at 3-19 to 3-21, 4-2, 4-3). The primary route would begin at the existing 69 kV E-5/F-6 transmission line located 170 feet west of the Quabbin Reservoir in Belchertown, and would travel in a westerly direction, within the existing 3E ROW, for 2.1 miles to the Belchertown substation (id. at 1-1, 3-9, Figure 3-2; Exh. RR-5(a), attachment). The primary route would cross three streams, one wetland, and four roads, including one crossing of State Route 9 (Exh. NEP/MEC-1, at 2-12).

In order to upgrade the 23 kV lines along the primary route, the Companies would: replace 51 wood poles 34 feet in height, with approximately 47 wood poles 43 feet in height; replace existing eight-foot crossarms with new seven-foot crossarms; and install new wires along the existing ROW (id. at 1-1, 3-19, 3-21; Exh. E-24). The Companies also propose to install a switching station off Blue Meadow Road in Belchertown, on MDC-owned land, with

two 69 kV tap lines extending 0.1 mile to the existing 69 kV E-5/F-6 transmission lines in order to facilitate supply from either of those lines (Exh. NEP/MEC-1, at 1-1, 3-19).

In addition, the Companies propose to install one 69/13.8 kV transformer, two 13.2 kV regulators, and a capacitor bank at the Belchertown substation (id. at 1-2, 2-5; Exhs. NEP/MEC-5, at 3; A-8). The Companies stated that they also plan to expand the substation yard area, but indicated that the expanded area would be used to permit better access to the existing substation equipment, and that no new facilities would be installed in that area (Exh. A-8).

2. Alternative Facilities

The Companies proposed two alternative routes -- Alternative Route B, a 3.0-mile long, 69 kV overhead line that would be overbuilt along existing roadways, utility ROWs, and MDC-owned land, and Alternative Route C, a 2.6-mile long, 69 kV overhead line that combines sections of the Primary Route and Alternative Route B (Exh. NEP/MEC-1, at 1-2, 1-3, 3-8). Both alternative routes are located within the Town of Belchertown and would extend from the E-5/F-6 transmission line near the Quabbin Reservoir to the Belchertown substation (id. at 3-9).

Alternative Route B would require the overbuilding of 2.8 miles of residential distribution lines along Jensen Street, State Route 21, Jabish Street, and State Route 9 (id. at 3-8). From State Route 9, a 0.2-mile section of new overhead line would extend along an existing distribution ROW running across MDC property to the primary route ROW off Blue Meadow Road (id. at 3-8, 3-9, 3-26). This alternative would require the replacement of existing wood poles with taller wood poles, typically 43 feet in height, installation of new conductors, and the transfer of existing residential distribution, communication, and CATV lines to new poles (id. at 3-26, 3-27). The Companies indicated that this alternative would also require the construction of a switching station and two tap lines from Blue Meadow Road, and construction and installation of equipment at the Belchertown substation, similar to that required for the primary route (id. at 2-5, 3-7).

Alternative Route C, which would combine sections of the primary route and Alternative Route B, would include 1.3 miles of 69 kV transmission line overbuilt along existing residential distribution lines along Jensen Street, State Routes 21 and 9, and 1.2 miles of transmission line upgraded from 23 kV to 69 kV along the ROW from State Route 9 to the interconnection with the existing E-5/F-6 lines (*id.* at 3-28). As with the primary route and Alternative Route B, Alternative Route C also would require the construction of a switching station and construction and installation of equipment at the Belchertown substation (*id.* at 2-5, 3-7).

As explained in Section II.B.5.b, above, the proposed project would allow the removal of 16.4 miles of unneeded 23 kV sub-transmission lines along the 13/3W and 3E ROWs within one year of installation of the proposed 69 kV transmission line. In addition, construction of Alternative Route B would allow removal of all existing facilities along the primary route between the Belchertown substation and the proposed switching station. Construction of Alternative Route C would allow the removal of all existing facilities along the primary route between the Belchertown substation and Route 9, near the mid-point of that route. In comparing the visual and magnetic field impacts of the primary and alternative routes, the Siting Board includes consideration of the effect of removing existing 23 kV facilities where this is possible.

B. Site Selection Process

1. Standard of Review

In order to determine whether a facility proponent has shown that its proposed facilities' siting plans are superior to alternatives, the Siting Board requires a facility proponent to demonstrate that it examined a reasonable range of practical facility siting alternatives. Berkshire Power Development, Inc.; EFSB 95-1, at 110 (1996); New England Power Company, EFSB 94-1, at 50; Northeast Energy Associates, 16 DOMSC 335, 381-409 (1987). In order to determine that a facility proponent has considered a reasonable range of practical alternatives, the Siting Board requires the proponent to meet a two-pronged test. First the facility proponent must establish that it developed and applied a reasonable set of

criteria for identifying and evaluating alternatives in a manner which ensures that it has not overlooked or eliminated any alternatives which are clearly superior to the proposal.

Berkshire Power Development, Inc., EFSB 95-1, at 114-116; New England Power Company, EFSB 94-1, at 54-55; Berkshire Gas Company (Phase II), 20 DOMSC 109, 148-149, 151-156 (1990). Second, the facility proponent must establish that it identified at least two noticed sites or routes with some measure of geographic diversity. Berkshire Power Development, Inc., EFSB 95-1, at 118-120; New England Power Company, EFSB 94-1, at 57-59; Northeast Energy Associates, 16 DOMSC at 381-409.

In the sections below, the Siting Board reviews the Companies' site selection process, including NEPCo and MECo's development and application of siting criteria as part of their site selection process.

2. Development of Siting Criteria

a. Description

The Companies stated that, in order to investigate potential routing options for the proposed transmission line, they identified a study area that would encompass every viable routing option between the Belchertown substation and the E-5/F-6 transmission lines to the east (Exh. NEP/MEC-1, at 3-1). The Companies indicated that the potential study area was limited because the E-5/F-6 transmission lines are the only 69 kV transmission lines in the vicinity of the Belchertown substation (id.). The Companies stated that the selected study area is a triangular area of approximately three square miles (1,700 acres) bounded by: (1) State Route 21 and Jabish Street (Old Enfield Road) to the northwest; (2) an existing 69 kV transmission line ROW and the Quabbin Reservoir Watershed to the northeast; and (3) State Route 9 to the south (id.).

In order to identify potential routes within the selected study area, the Companies stated that they next established two types of siting criteria: (1) opportunities, or factors which favor the placement of a transmission line by minimizing potential impacts; and (2) constraints, or factors which could be adversely affected by the routing of a transmission line (id.). The Companies stated that routing opportunities consist of existing transmission

line ROWs and active or abandoned railroads (id. at 3-1, 3-5). The Companies indicated that constraints relate to environmental impacts, construction difficulties and licensability (id. at 3-5).³² The Companies identified 26 constraints and classified each as high, medium or low level based on its significance for, or impact on, routing (id. at 3-2).³³

Using information from state and local agencies and field reconnaissance, the Companies then identified and mapped the specific constraints and opportunities that exist within the selected study area (id.). The Companies indicated that the specific constraints in and near the study area include: (1) sensitive cultural or historical resources, and significant wildlife habitat, classified as high level; (2) medium/high density residential areas, recreation areas, scenic area/road, and conservation/watershed protection land, classified as medium level; and (3) active farmland, woodlands, aquifer, 100-year floodplain, road crossing,

³² The Companies stated that the list of constraints and opportunities was developed by a six-member group of ecologists, engineers, and environmentalists (Tr. 2, at 98-99).

³³ The Companies explained that: (1) routes with high level constraints should be used only where circumstances preclude avoidance; (2) routes with medium level constraints should be used only in areas where circumstances preclude the use of routing opportunities, areas without constraints or areas with low level constraints; and (3) routes with low level constraints should be used only in areas where circumstances preclude the use of routing opportunities or areas without constraints (Exh. NEP/MEC-1, at 3-2).

Constraints classified as high include: (1) home relocation; (2) sensitive cultural or historical resource; (3) federal or state endangered, threatened, or rare species location; (4) significant wildlife habitat; (5) significant natural plant community; (6) non-spannable lake, reservoir or river; (7) cemetery; (8) conservation/watershed protection land; and (9) navigable airspace around airport (id. at 3-4). Constraints classified as medium include: (1) non-spannable wetland; (2) medium to high density residential area, school or business adjacent to edge of ROW; (3) recreation area; (4) federal and state park/forest/other dedicated land; (5) very erodible soil; (6) major ridgeline; (7) wildlife refuge; (8) scenic area/road; and (9) open space/recreation land (id.). Constraints classified as low include: (1) active farmland or agricultural district; (2) spannable lake, reservoir, river or wetland; (3) woodland; (4) aquifer or aquifer protection district; (5) 100-year floodplain or floodplain protection district; (6) erodible soil; (7) low density residential area adjacent to the edge of the ROW; and (8) road or railroad crossing (id.).

erodible soil, and low density residential area, classified as low level (id. at 3-6). The Companies indicated that specific routing opportunities in and near the study area included: (1) the E-5/F-6 transmission line corridor and ROW; and (2) a residential distribution/transportation corridor (id.).

The Companies then identified three potential overhead routes and one potential underground route,³⁴ all of which follow existing utility and/or transportation corridors for at least part of the route (id. at 3-8; Public Hearing Tr. at 22-24). The Companies stated that all four routes were less than three miles in length (Public Hearing Tr. at 22). The Companies noted that the route proposed for underground transmission would be inappropriate for overhead lines due to its narrow width, scenic setting, dense tree canopy and its location in a densely populated residential area (Exh. NEP/MEC-1, at 3-8).

In order to assess the cultural/environmental impacts of the four identified routes, the Companies conducted a paired analysis where each of the four routes was compared to the others using individual route selection criteria (id. at 3-11). The Companies then assigned a weighting factor to each of the constraints and opportunities used to identify the routes (id.).³⁵ The Companies indicated that the weights reflected the importance of the constraint in the study area (id.). The Companies indicated that generally the weights were higher for high level constraints than low level constraints, ranging from 1.17 for low level constraints such as agricultural districts to 7.58 for high level constraints such as sensitive cultural/historical resources and significant wildlife habitat (id. at 3-15). However, the Companies further indicated that the weight for a specific constraint category was not dependent on its classification as a high, medium or low level constraint and that the weights

³⁴ The underground route, designated Alternative Route A, and considered in the Companies' site selection process, was not among the three final noticed alternative routes (see Section III.B.3, below).

³⁵ The Companies' witness, Mr. Damiano, indicated that the numerical weights represent an average of individual scores submitted by the same six-member group of ecologists, engineers, and environmentalists who identified the routing constraints and opportunities (Tr. 2, at 98-99).

for specific low level constraints could be higher or equal to the weight for specific medium level constraints (id.). In addition, the Companies assigned a weight of 9.83 to the opportunity of existing transmission corridors (id.). Finally, the Companies mathematically combined the paired analysis and the weights to develop a weighted paired analysis (id. at 3-11).

The Companies also assessed the four identified routes based on cost and reliability (id. at 3-14 to 3-16). In preparing a cost estimate for each of the identified routes, the Companies included the cost of engineering, transmission line materials and construction, removal, and licensing (id. at Appendix F). With respect to reliability, the Companies computed the minutes per year of unavailability ("UA") for each identified route based on: (1) the type of construction (overhead or underground); (2) the total of line length exposure; (3) the mean time between failures; and (4) the mean time to repair (id. at 3-16).

b. Analysis

The Companies have developed a set of site selection criteria that include the general categories of land use compatibility, physical and topographical constraints, culturally/environmentally sensitive areas, cost and reliability -- general categories that the Siting Board has found to be appropriate for the siting of transmission lines. See, New England Power Company, EFSB 94-1, at 54. After selecting an area that would encompass all viable routing options, the Companies identified a comprehensive list of the specific cultural/environmental criteria that exist within this area in order to identify and evaluate potential routes. The Companies also appropriately assigned weights to the specific cultural/environmental criteria that were based on the importance of these criteria. In addition, the Companies' numerical weighting of cultural/environmental factors appropriately stresses the importance of siting transmission lines within existing corridors where possible.

The Companies provided a separate analysis of the cost and reliability of each identified route and adequately explained the factors that were considered in preparing the cost and reliability analyses. However, although the Companies' weighting method provides for a quantitative comparison among competing cultural/environmental criteria, the

Companies did not provide overall weights for the cost, cultural/environmental impact and reliability categories. The Companies have indicated that quantitative methods were not necessary in evaluating the potentially competing criteria of cost, cultural/environmental impact and reliability.

Here, the reliability of all identified routes is essentially the same, and the primary route has the lowest cultural/environmental impact and lowest cost (see Section III.C.3.c.3, below). Therefore, in this case, an explicit explanation of the balancing of cost, cultural/environmental impact and reliability is not essential. Accordingly, for purposes of this review, the Siting Board finds that the Companies have developed a reasonable set of criteria for identifying and evaluating alternative routes. However, in future reviews where such balancing is necessary, applicants should fully explain how they balance competing environmental impact, cost and reliability criteria.

3. Application of Siting Criteria

a. Description

In order to evaluate the four identified routes, the Companies ranked the routes in three separate categories -- cultural/environmental impact, cost and reliability (Exh. NEP/MEC-1, at 3-12 to 3-17). With respect to cultural/environmental impact, the Companies indicated that they applied their cultural/environmental criteria to the identified routes using a two-step paired analysis (*id.*). The Companies performed a paired analysis of each individual route to differentiate the routes and establish their relative rankings (*id.*).

The Companies first performed an unweighted paired analysis which compared each route to each other route for each cultural/environmental criterion (*id.* at 3-11). To perform the unweighted paired analysis, the Companies compared each route to each of the other routes for each cultural/environmental category, by scoring a "one" to the route with the lower impact and a "zero" to the route with the greater impact (*id.* at 3-12). The Companies stated that scores were based on "judgments ... regarding which route would have the least impact on each constraint and would maximize the use of each opportunity" (*id.* at 3-11). The Companies then computed an overall score for each route for each category by totalling

the comparative scores within each category (id. at 3-12). Thus, scores for each route for each category ranged from zero to three and a route that received a score of "three" (i.e., a "one" when compared to each other route) would have the least impact in that category as compared to the other routes (id.).

As the second step of its analysis, the Companies used the results of the unweighted paired analysis to perform a weighted analysis (id. at 3-11 to 3-14). The Companies computed a weighted value for each cultural/environmental constraint and opportunity for each route by multiplying the weight factor derived for each cultural/environmental constraint and opportunity by the unweighted total (id. at 3-14). The Companies then added together the weighted values for each cultural/environmental constraint and opportunity to derive the total score for each route, with a higher score signifying lower cultural/environmental impact (id.). The Companies noted that this assessment provided an approximate assessment of the cultural/environmental impacts of the identified routes and that small disparities in total scores did not signify a difference in overall cultural/environmental impacts (id.).

The Companies identified three groups of routes based on their cultural/environmental impacts (id.). The Companies identified two routes as having the least cultural/environmental impact, including the primary route with a score of 156.1, and Alternative Route C, with a score of 102.8 (id.). The Companies identified one route, Alternative Route A, with a score of 88.3, as falling in the middle range of cultural/environmental impacts (id.). The Companies identified Alternative Route B, with a score of 44.4, as having the greatest environmental impact (id.).

The Companies next compared the identified routes on the basis of cost (id. at 3-14 to 3-16). The Companies prepared cost estimates of each of the routes which included the cost of line materials and construction, engineering, licensing, substation improvements, transmission switching station construction, and maintenance (id. at 3-14). The Companies explained that ROW acquisition costs were minimal and not included (id.). The Companies indicated that cost estimates ranged from \$2.3 million for the primary route to \$6.8 million for Alternative Route A (id. at 3-16). The Companies further indicated that Alternative

Route C was the second least expensive route at \$2.6 million, followed by Alternative Route B at \$3.1 million (id. at 3-14, 3-16).³⁶

The Companies also compared the four routes with respect to reliability based on the calculated UA for each route (id. at 3-16). The Companies concluded that the UA of all routes was insignificant and that, therefore, there was no difference in reliability between the routes (id.).³⁷

Based on the results of the cultural/environmental, cost, and reliability analyses, the Companies selected three alternative routes for further evaluation: the primary route, Alternative Route B, and Alternative Route C, which are described in Sections III.A.1 and 2, above.

The Companies stated that the primary route was selected because it had the lowest cultural/environmental impacts and cost (id. at 3-17). The Companies noted that Alternative Route C was the second lowest in cost and cultural/environmental impacts, and that Alternative Route B ranked third overall because it ranked forth in cultural/environmental impacts and third in cost (id.). Alternative Route A was removed from further evaluation because it ranked fourth overall -- third in cultural/environmental impacts and fourth in cost (id.). In ranking it fourth overall, the Companies indicated that the cost of Alternative Route A was significant at approximately three times the cost of the primary route and over twice the cost of Alternative Routes B and C (Exh. NEP/MEC-1, at 3-16).

b. Analysis

The record demonstrates that the Companies identified and evaluated four potential routes within a specified area based on a comprehensive set of criteria. To evaluate the routes with respect to cultural/environmental impacts, the Companies compared each route to

³⁶ The Companies indicated that the primary route would have the lowest line losses among all routes because it was the shortest in length (Exh. NEP/MEC-1, at 3-8 to 3-9).

³⁷ The Companies indicated that none of the four routes had a UA value that exceeded 78 seconds/year (Exh. NEP/MEC-1, at 3-16).

each other route for each cultural/environmental criterion and incorporated a quantitative method of scoring and weighting. The Companies performed a comprehensive quantitative comparison of the identified routes based on weighted environmental criteria as well as quantitative cost data. The Companies also considered quantitative reliability criteria in their evaluation of routes. Accordingly, the Siting Board finds that the Companies have applied their site selection criteria consistently and appropriately, and in a manner which ensures that they have not overlooked or eliminated any siting options which are clearly superior to the proposal.

The Siting Board also has found, above, that the Companies have developed a reasonable set of criteria for identifying and evaluating alternative routes. Accordingly, the Siting Board finds that the Companies have developed and applied a reasonable set of criteria for identifying and evaluating alternatives in a manner which ensures that they have not overlooked or eliminated any alternatives which are clearly superior to the proposal.

4. Geographic Diversity

The Companies considered three different routes for the proposed transmission line. All three routes commence at a common point along the existing E-5/F-6 ROW. Two of the routes overlap for approximately 1.3 miles, diverging at State Route 9 and continuing to where they approach the Belchertown substation from different directions. From the E-5/F-6 ROW tap point, the remaining route proceeds approximately 0.2 miles to State Route 9 where it proceeds and eventually overlaps one of the alternative route sections for approximately 1.8 miles. In considering overhead routes, and different types of corridors (an existing sub-transmission line ROW, and different roadways), the Companies considered routes with significantly different characteristics. Based on the foregoing, the Siting Board finds that the Companies have identified three practical overhead routes with some measure of geographic diversity.³⁸

³⁸ The Siting Board notes that while their final route selection process contained no underground route option, the Companies nevertheless considered such an option in
(continued...)

5. Conclusions on the Site Selection Process

The Siting Board has found that the Companies developed and applied a reasonable set of criteria for identifying and evaluating alternatives in a manner which ensures that they have not overlooked or eliminated any alternatives which are clearly superior to the proposal. In addition, the Siting Board has found that the Companies have identified three practical overhead routes with some measure of geographic diversity.

Accordingly, the Siting Board finds that the petitioners have considered a reasonable range of practical siting alternatives.

C. Environmental Impacts, Cost and Reliability of the Proposed and Alternative Facilities

1. Standard of Review

In implementing its statutory mandate to ensure a necessary energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost, the Siting Board requires project proponents to show that proposed facilities are sited at locations that minimize costs and environmental impacts, while ensuring a reliable energy supply. In order to determine whether such a showing is made, the Siting Board requires project proponents to demonstrate that the proposed project site for the facility is superior to the noticed alternatives on the basis of balancing cost, environmental impact, and reliability of supply. New England Power Company, EFSB 94-1, at 60; Boston Edison Company (Phase II), 1 DOMSB at 37-38; Berkshire Gas Company, 23 DOMSC 294, 324 (1991).

An assessment of all impacts of a 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. New England Power Company, EFSB 94-1, at 60; Cabot Power Corporation, 2 DOMSB at 389; Eastern Energy Corporation, 22 DOMSC 188, 334, 336 (1991). A facility which achieves that appropriate balance thereby

³⁸(...continued)

their preliminary route assessment process, enabling a thorough assessment of a variety of practical and geographically diverse routing options.

meets the Siting Board's statutory requirement to minimize environmental impacts at the lowest possible cost. New England Power Company, EFSB 94-1, at 60; Cabot Power Corporation, 2 DOMSB at 389; Eastern Energy Corporation, 22 DOMSC at 334, 336.

An overall assessment of the impacts of a facility on the environment, rather than a mere checklist of a facility's compliance with regulatory standards of other government agencies, is consistent with the statutory mandate to ensure a necessary energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost. New England Power Company, EFSB 94-1, Cabot Power Corporation, 2 DOMSB at 389; Eastern Energy Corporation, 22 DOMSC at 334, 336. The Siting Board previously has found that compliance with other agencies' standards clearly does not establish that a proposed facility's environmental impacts have been minimized. Id. Furthermore, the levels of environmental control that the project proponent must achieve cannot be set forth in advance in terms of quantitative or other specific criteria, but instead, must depend on the particular environmental, cost and reliability trade-offs that arise in respective facility proposals. New England Power Company, EFSB 94-1, at 60-61; Cabot Power Corporation, 2 DOMSB at 389; Eastern Energy Corporation, 22 DOMSC at 334-335.

The Siting Board recognizes that an evaluation of the environmental, cost and reliability trade-offs associated with a particular review must be clearly described and consistently applied from one case to the next. Therefore, in order to determine if a project proponent has achieved the appropriate balance among 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 in order to make such a determination. New England Power Company, EFSB 94-1, at 61; Cabot Power Corporation, 2 DOMSB at 389-390; Boston Edison Company (Phase II), 1 DOMSB at 39-40. The Siting Board can then determine whether environmental impacts would be minimized. Similarly, the Siting Board must find that the project proponent has provided sufficient cost information in order to determine if the appropriate balance among environmental impacts, costs, and reliability would be achieved.

New England Power Company, EFSB 94-1, at 61; Cabot Power Corporation, 2 DOMSB at 390; Boston Edison Company (Phase II), 1 DOMSB at 40.

Accordingly, in the sections below, the Siting Board examines the environmental and cost related impacts of the proposed facilities along the Company's primary and alternative routes to determine (1) whether the environmental impacts of the proposed facilities would be minimized, and (2) whether the proposed facilities would achieve an appropriate balance among conflicting environmental concerns as well as between environmental impacts and cost.³⁹ In this examination, the Siting Board conducts a comparison of the primary and alternative routes to determine which is preferable with respect to providing a necessary energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost.

2. Analysis of the Proposed Facilities along the Primary Route

a. Environmental Impacts of the Proposed Facilities along the Primary Route

In this section, the Siting Board evaluates the environmental impacts of the proposed facilities along the primary route and potential mitigation for such impacts, including the proposed mitigation and, as necessary, any identified options for additional mitigation. As part of its evaluation, the Siting Board first addresses whether the petitioner has provided sufficient information for the Siting Board to determine: (1) whether environmental impacts of the proposed facilities would be minimized; and (2) whether the proposed facilities achieve the appropriate balance among environmental impacts and between environmental impacts and cost. The Siting Board then addresses whether the environmental impacts of the proposed facilities along the primary route would be minimized.

³⁹ The Companies indicated that there was no difference in reliability between the primary and alternative routes (Exh. NEP/MEC-1, at 3-16). See Section III.B.3.a, below.

In reviewing the environmental impacts of the proposed project in this particular proceeding, the Siting Board also considers the environmental benefits of removing the 13/3W and 3E sub-transmission lines, as discussed in Section II.B.4, above.

(1) Water Resources

(a) Wetlands and Surface Water

The Companies asserted that construction of the proposed facilities along the primary route would result in temporary alterations of wetland resources, but would not have long-term adverse impacts on the freshwater wetland areas located on and near the preferred route (Exh. NEP/MEC-1, at 4-2, 4-3). The Companies stated that the existing ROW, which would be used for the proposed route, crosses 14 bordering vegetated wetland segments totaling approximately 4.2 acres on the ROW (id. at 3-31). The Companies indicated that the principal temporary alteration of wetland resources resulting from construction of the proposed route would result from accessing pole sites and installing poles in existing wetland areas (id. at 4-2).⁴⁰ NEPCo and MECo stated that access to existing pole locations would require wetland crossings in several locations primarily associated with the Jabish Brook wetland complex (id. at 3-31). NEPCo and MECo explained that currently there are eight existing wood poles in two wetland areas, which would be sawed off at ground level with the pole butt left in place to minimize disturbance to wetlands (id. at 3-21, 3-32). The Companies stated that six of these poles would be replaced with poles relocated to upland sites, while two new poles would be placed in wetland areas (id. at 3-21, 3-32). The Companies stated that both of these new pole sites would be accessed using swamp mats (id. at 3-19). The Companies indicated that, once construction is completed, disturbed areas

⁴⁰ The Companies indicated that they would be required to file a Notice of Intent under the Wetlands Protection Act and the Belchertown Wetlands Protection By-Law in order to construct along the primary route (Exh. NEP/MEC-1, at 3-32).

would be regraded if necessary to pre-existing grades and vegetation would be allowed to re-establish itself (id. at 4-2).⁴¹

With respect to surface water impacts, the Companies indicated that the preferred route would tap into the E-5 and F-6 transmission lines at a point 170 feet west of the Quabbin Reservoir, a drinking water supply for the metropolitan Boston area (Exh. RR-5(a), attachment). The Companies asserted that the proposed switching station would be located outside of the Quabbin Reservoir hydrologic drainage divide (Exh. NEP/MEC-1, at 3-34).

The Companies submitted a letter from the MDC indicating that agency's approval of the proposed switching station site (id. at Appendix D). This letter noted that the proposed location is along an existing easement outside of the Quabbin Watershed boundary and would result in minimal impact to MDC property and activities (id.).

The Companies also asserted that operation of construction equipment would be unlikely to have adverse effects on reservoir water quality (id.). The Companies indicated that construction and operation of the switching station would conform to applicable MDC standards and requirements, and be subject to regulatory review under the Watershed Protection Act (id. at 3-34). The Companies also stated that they would implement hazardous release prevention practices to minimize the potential for adverse impacts to the reservoir from annual maintenance visits (id.; Tr. 2, at 84). For example, the Companies' witness, Mr. Damiano, testified that, when not in use, equipment would be stored away from the reservoir on Blue Meadow Road (Tr. 2, at 84). Mr. Damiano also testified that contractors would be required to have spill prevention equipment on site, and would be prohibited from refueling their equipment in close proximity to the reservoir (id. at 84-85).

The Companies stated that they would consult with the MDC prior to any application of herbicides to control vegetation growth along the portion of the ROW near the Quabbin and within the MDC reservation boundary (Exh. E-10; Tr. 2, at 58-60). The Companies' witness, Joel McKinstry, testified that herbicides would not be applied within 100 feet of the

⁴¹ The Companies' witness, Mr. Damiano, did not expect that any tree clearing would be required in order to access wetlands areas (Tr. 2, at 67).

Quabbin Reservoir or of any other surface water protected as a public water supply under state herbicides regulations (Tr. 2, at 58-61).⁴² He also indicated that the Companies would abide by stricter state requirements prohibiting herbicide use within 400 feet of a public water supply where required to do so by regulation (id.).

Finally, the Companies asserted that none of the proposed work would take place in surface waters (Exh. NEP/MEC-1, at 3-34). They stated that the potential for sediment runoff into waterways would be significantly reduced through the use of erosion and sedimentation control measures (id.).

The record demonstrates that construction of the proposed facilities along the primary route would require a minimal amount of construction within wetland areas to remove and install wood transmission line poles. Six of these poles will be permanently removed from wetland areas, thus reducing long-term impacts to wetlands. The record also demonstrates that construction impacts in wetlands will be mitigated with the use of swamp mats.

With respect to potential impacts to the Quabbin Reservoir, the record demonstrates that the proposed switching station will be located on that side of the drainage divide which drains away from the reservoir, and that the Companies will implement hazardous release prevention practices and will consult with the MDC prior to the application of any herbicides on MDC Reservation Land. The Companies also have agreed to avoid the use of herbicides within 100 feet of Jabish Brook and to otherwise comply with state and local laws regarding application of herbicides. Finally, the Companies will mitigate potential impacts to surface water bodies by using erosion and sedimentation control measures.

Accordingly, the Siting Board finds that, with the implementation of proposed mitigation measures and planned compliance with all applicable state, MDC, and local

⁴² The Companies indicated that the preferred route crosses the Jabish Brook, which flows into the Swift River, a public water supply, at a point 4.9 miles southeast of the route (Exh. RR-6). They also noted that Jabish Brook feeds a pond located 0.9 miles south of the preferred route, which in turn connects to a canal which flows into the Springfield Water District Reservoir in Ludlow, a public water supply which serves the City of Springfield (Exhs. RR-6; RR-5(a), attachment).

requirements regarding herbicides, the environmental impacts of the proposed facilities along the primary route would be minimized with respect to wetlands and surface water.

(b) Groundwater and Wells

The Companies asserted that the potential for impacts to groundwater supply due to equipment operation is minimal because of the limited construction period (Exh. NEP/MEC-1, at 3-35). The Companies noted that the primary route crosses a known aquifer associated with the Jabish Brook drainage area, which has been designated as an Aquifer Protection District pursuant to the Town of Belchertown's Bylaws (id.; Exh. E-11, attachment, § 4.2). The Companies also stated that the eastern portion of the primary route traverses an area underlain by deposits known or believed to be capable of yielding small amounts of water to individual wells (Exh. NEP/MEC-1, at 3-35). The Companies added that much of the town center west of the Belchertown substation is supplied by a municipal water system, whereas most of the remainder of the town, including Blue Meadow Road, is served by private wells (id.).

With respect to the municipal water system, the Companies stated that the Town of Belchertown's two public drinking water wells derive water from the aquifer located within the Aquifer Protection District (id.). The Companies indicated that one of these wells is located approximately 500 feet to the north of the existing ROW and adjacent to an upstream section of Jabish Brook (id.).⁴³ The Companies also stated that the primary route crosses restricted use town-owned land where a town well pumping station is located (id.). The Companies explained that the pumping station is located to the north of the primary route and is approximately 500 feet from that route at the nearest location (Exh. E-10).

The Belchertown Zoning Bylaw establishing the Aquifer Protection District prohibits certain uses outright, restricts other uses, and allows extensions or alterations of non-conforming uses by special permit (Exh. E-11, attachment, §§ 4.23 to 4.26). For

⁴³ The Companies stated that the second public well is located further from the ROW in the northern part of town (Exh. NEP/MEC-1, at 3-35).

example, the Bylaw prohibits outdoor storage of herbicides and the disposal of liquid or leachable wastes in such a district (Exh. E-11, attachment, §§ 4.2306, 4.2308). The Bylaw also places restrictions on the use of herbicides, and establishes drainage requirements for Aquifer Protection Districts (*id.* at §§ 4.242, 4.250).

The Companies indicated that herbicides will not be used during the construction of the proposed facilities (Exh. E-6). However, they noted that herbicides were used to maintain the existing ROW in 1988, and that they expect to apply herbicide along the primary route in 1997 or 1998, with periodic applications thereafter (Exhs. E-7, E-8(b)).⁴⁴ The Companies' witness, Mr. McKinstry, asserted that herbicides are used in preference to other methods of ROW maintenance for environmental, cost and effectiveness reasons (Tr. 1, at 108-109).⁴⁵ Mr. McKinstry testified that the herbicides used by the Companies have been approved by the state pesticides board for use in sensitive areas (*id.* at 125-126).

The Companies' witness, Mr. Damiano, testified that the Companies would comply with state and local regulations regarding the use of herbicides, and in particular with § 4.242 of the Belchertown Zoning Bylaw, which restricts the use of herbicides in amounts that would result in groundwater contamination (Tr. 2, at 23). The Companies asserted that their vegetation management practices are consistent with Belchertown's Aquifer Protection District requirements, and Mr. Damiano testified that the Companies would comply with the Aquifer Protection District regulations "in every way" (Exh. E-11; Tr. 2, at 39).

Based on aerial maps, the Companies estimated that there are approximately seven residences within 100 feet of the primary route (Exh. E-10).⁴⁶ The Companies provided

⁴⁴ The Companies stated that information was unavailable regarding any applications of herbicides on the existing ROW prior to 1988 (Exh. E-7).

⁴⁵ For example, the Companies stated that mechanical clearing would result in relatively rapid re-growth of vegetation, would create unwanted noise, could cause damage to wetlands, and could result in spills of hazardous materials (Tr. 1, at 108-109).

⁴⁶ Mr. McKinstry testified that it is not the Companies' policy to notify individuals along the ROW prior to application of herbicides; instead, he indicated that the town and the state are notified (Tr. 2, at 35). The Companies stated that private well

(continued...)

transmission line sheets ("T sheets") indicating that at least six private wells are located in close proximity to the ROW along the primary route (Exh. RR-5(b), attachment).⁴⁷ The Companies also indicated that, as of February 7, 1994, Belchertown Board of Health regulations prohibit the location of new private wells within 100 feet of a utility ROW (Exh. RR-5(b)).

The Companies' witness, Mr. Damiano, testified that the Companies would limit blasting along the ROW and that the effect of blasting on any groundwater present would be minimal (Tr. 2, at 12).⁴⁸ The Companies' witness, Mr. Costa, testified that typically, the largest hole excavated during construction would be eight feet deep and three to four feet in diameter (*id.* at 13-14).

The Companies stated that the proposed additions to the Belchertown substation would be located within the Aquifer Protection District (Exhs. E-12; NEP/MEC-4, at 3).⁴⁹ The Companies noted that they have a spill prevention, containment and countermeasures plan ("SPCC Plan") in place for the existing substation and that the unused portion of the substation yard is covered with three to six inches of crushed stone to reduce the flow of any

⁴⁶(...continued)

location information is supplied by the towns, and is included in all Company Yearly Operational Plans for herbicide use. In addition, the Companies stated that they will identify any further specific well locations along the ROW in conjunction with future herbicide application, where necessary (Exh. E-10).

⁴⁷ The Companies indicated that these well locations were found after a walk-through on the primary route on May 16, 1996 (Exh. RR-5(b)-1).

⁴⁸ The Companies stated that blasting might be required for pole installation along any routes, but that such blasting would be conducted by licensed Company personnel adhering to all safety regulations (Exh. E-16(c)). Mr. Costa estimated that 15 percent of the pole locations along any of three route alternatives would require blasting (Tr. 2, 15-16).

⁴⁹ The "T" sheets indicate that the parcel on which the Belchertown substation is located also is partially within the Aquifer Protection Overlay District, but that the placement of the substation and proposed additions is fully within the portion of the parcel outside of that overlay district (Exh. NEP/MEC-4, exh. B).

spilled substance (Tr. 2, at 39, 43-47). The Companies stated that the substation also contains a sump to collect up to 873 gallons of spilled substances, but noted that the substation's largest transformer has a volume of 1780 gallons (id. at 44, 49). The Companies' witness testified that a release of hazardous material during the installation of new equipment at the Belchertown substation would be unlikely, since oil would be removed from the existing transformers prior to deinstallation, and oil would not be added to the new transformer until after it is installed (id. at 51).

The record demonstrates that a portion of the primary route crosses the aquifer used for the Town of Belchertown's water supply, as well as the Town of Belchertown's Aquifer Protection District. The record also shows that the Companies plan to use herbicides to maintain and control vegetation in the ROW of the primary route. The Companies have stated their intention to comply with state herbicide regulations which prohibit application of herbicides within 400 feet of public water supply wells, within 100 feet of public surface water supplies including tributaries thereto, and within 50 feet of private drinking water wells. The Companies also intend to comply with the substantive provisions of the Town of Belchertown's Aquifer Protection District Bylaw. Finally, the Companies intend to identify specific water well locations along the ROW prior to the application of herbicides. The Siting Board concludes that these actions will be adequate to prevent the contamination of drinking water supplies as a result of herbicides.

The record also demonstrates that any effects of blasting on groundwater would be minimal. Finally, the record indicates that the Companies have a spill prevention, containment and countermeasures plan in place to address possible spills at the Belchertown substation.

Based on the foregoing, the Siting Board finds that, with the implementation of proposed mitigation measures, and planned compliance with all applicable state and local requirements regarding herbicides, the environmental impacts of the proposed facilities along the primary route would be minimized with respect to groundwater and wells.

(c) Conclusions

The Siting Board has found that (1) with the implementation of proposed mitigation measures, and planned compliance with all applicable state, MDC, and local requirements regarding herbicides, the environmental impacts of the proposed facilities along the primary route would be minimized with respect to wetlands and surface water, and (2) with the implementation of proposed mitigation measures, and planned compliance with all applicable state and local requirements regarding herbicides, the environmental impacts of the proposed facilities along the primary route would be minimized with respect to groundwater and wells.

Accordingly, the Siting Board finds that, with the minimization of environmental impacts with respect to wetlands, surface water, groundwater, and wells, the environmental impacts of the proposed facilities along the primary route would be minimized with respect to water resources.

(2) Land Resources

In this Section, the Siting Board reviews the impact of the proposed facilities along the primary route with respect to tree clearing and upland vegetation, potential soil erosion and wildlife habitat.

The Companies asserted that construction of the proposed facilities along the primary route would not have a significant impact on vegetation or forest habitat characteristics, since the primary route is located along an existing ROW (Exh. NEP/MEC-1, at 3-36). The Companies indicated that only minor tree trimming and removal and brush clearing would be required along the ROW, which has been well maintained since the 1940's (*id.* at 3-19, 3-21).⁵⁰ The Companies stated that approximately one-half an acre of trees would need to be cleared at the intersection of the ROW with the E-5/F-6 transmission line ROW to provide

⁵⁰ The Companies stated that they would need to clear trees to the full 80 foot width of the existing ROW only in the approximately 500-foot long section between Blue Meadow Road and the Quabbin Reservoir (Exh. E-24). They stated that the remainder of the ROW, which is presently cleared to a width of 50 feet, would require only the trimming and removal of dangerous trees to provide adequate conductor clearance and vehicle access (*id.*).

adequate clearance for the switching station (id.). The Companies submitted a letter to the MDC which asserted that the proposed clearing of a conifer stand located on the Companies' existing easement would be consistent with the MDC 1995-2004 Quabbin Land Management Plan ("QLM Plan") (Exh. E-2d, attachment). The Companies added that vegetation along the ROW would be managed to provide clearance for electrical conductors and supporting structures and to facilitate access for inspections, maintenance and repair (Exh. NEP/MEC-1, at 3-21). The Companies stated that ongoing maintenance of the ROW would sustain existing vegetative conditions (id. at 3-36).

With respect to soil erosion, the Companies asserted that the primary route does not include any areas susceptible to soil erosion and that potential soil disturbance and the associated erosion potential is relatively minor along this corridor (id. at 3-40). The Companies also stated that any disturbed areas would be stabilized by mulching and, if necessary, seeding (id. at 3-21).

Finally, the Companies asserted that construction of the proposed facilities along the primary route would have minimal impacts on wildlife habitat because the route uses an existing transmission corridor; however, they did indicate that there may be some temporary construction impacts along the eastern portion of the route (id. at 3-47). The Companies stated that the federal and state endangered bald eagle is the only rare or endangered species known to exist in proximity to the proposed project, according to the Massachusetts Natural Heritage and Endangered Species Program ("MNHESP") (id. at 3-44).⁵¹ The Companies stated that the MNHESP agreed that the proposed project is unlikely to affect the bald eagles and their nesting habits at the reservoir (id.).

⁵¹ The Companies stated that a breeding bald eagle pair uses the Quabbin Reservoir eastern shoreline as a nesting site 1.5 miles from the proposed tap site (Exh. NEP/MEC-1, at 3-44). The Companies do not expect, however, that construction noise and activities will disturb the bald eagles due to the distance between the construction work site and the nesting site, the short construction period in that particular area, and the presence of tall tree cover screening the construction activities and noise (id.).

The record demonstrates that construction of the proposed facilities along the primary route would require the clearing of one-half acre of trees for the construction of the switching station and tap lines. Otherwise, because the primary route is in an existing transmission line ROW, tree clearing along the primary route would be minimal and the existing vegetative conditions along the ROW would not change. In addition, the record demonstrates that the potential for soil erosion along the primary route is minimal and that erosion control measures would be used during construction to prevent erosion and sedimentation along the ROW, if necessary.

With respect to wildlife habitat, the Siting Board notes that short-term disruptions could occur during facility construction. The record shows that the only known rare or endangered species in the vicinity of the proposed project would likely not be adversely affected by the proposed construction.

Accordingly, the Siting Board finds that, with the implementation of proposed mitigation measures, the environmental impacts of the proposed facilities along the primary route would be minimized with respect to land resources.

(3) Land Use

In this Section, the Siting Board reviews the impact of the construction and maintenance of the proposed facilities along the primary route with respect to existing land uses, noise, traffic, and safety.

The Companies asserted that construction of the proposed project along the primary route would have no impact on the adjacent existing land uses (Exh. NEP/MEC-1, at 3-37). The Companies indicated that the primary route traverses the following zoning districts: (1) a Primary Agricultural District for a distance of approximately 6300 feet; (2) a Rural Residential District for a distance of approximately 860 feet; (3) a second Primary Agricultural District for a distance of approximately 2900 feet; and (4) a second Rural Residential District for a distance of approximately 1040 feet (Exhs. NEP/MEC-3, at exhibit B; RR-10). The Companies noted that, except for approximately 6210 feet within the first Primary Agricultural District, the entire primary route is in an Aquifer Protection Overlay

District, and that approximately 1170 feet of the route lying within the second Primary Agricultural District also is in a Wetland Protection Overlay District (id.). The Companies indicated that public utility uses are not specifically permitted uses in any of these zoning districts or overlay districts and therefore petitioned the Department for exemptions from various zoning bylaws of the Town of Belchertown (Exh. E-5(b), attachment).⁵²

The Companies stated that existing land uses along the western portion of the route include residences, agricultural fields, undeveloped lands, wetlands, and a sand and gravel excavation operation (Exh. NEP/MEC-1, at 3-37). The Companies stated that land uses along the eastern portion of the ROW include new residences off Route 9 and on Blue Meadow Road, and that the easternmost 0.7 mile segment is located within the undeveloped MDC Quabbin Reservation (id.). The Companies acknowledged that some wooded land in the reservation would be converted to utility use for the proposed switching station and tap line arrangement, but submitted a copy of a letter from the MDC, Division of Watershed Management, Quabbin Section, indicating approval of the proposed switching station site by various MDC officials (id. at exhibit D).

The Companies stated that NEPCo reviewed the QLM Plan in order to evaluate the consistency of the proposed project with the goals of the plan, which include:

(1) regeneration of forest cover in the Quabbin watershed; (2) minimization or mitigation of point and non-point sources of water pollution; (3) continuation of a non-intensive silviculture program to establish a diverse, stable, multi-layered forest within the next 60 years; and (4) development of a method for evaluating the relative importance to water supply of the many "subbasins" at the Quabbin Reservation (id. at 3-45). The Companies asserted that the proposed project would be consistent with the goals of the QLM Plan (id.). Specifically, the Companies argued that the proposed project along any of the routes would require minimal cutting and trimming of trees and therefore would not have a measurable effect on forest regeneration (id.). The Companies also asserted that the maintenance of vegetation along the

⁵² The Siting Board addresses the Companies' request for exemption from these provisions in Section IV, below.

existing ROW is consistent with the regeneration goal because vegetation is maintained as a relatively diverse plant community affording the nutrient assimilative quality sought in the QLM Plan (Exh. NEP/MEC-1, at 3-45). The Companies also noted that the proposed project would minimize point and non-point sources of water pollution (id.).

The Companies indicated that there are 10 residences within 100 feet of the ROW along the primary route, including one residence, located ten feet from the ROW, which is used as a licensed day care center (Exhs. E-22; E-22, attachment). The Companies indicated that they have no records of any complaints within the last ten years concerning off-road vehicle use or other unauthorized access to the existing ROW along the primary route (Exh. E-13). The Companies stated that when the ROW consists of easement rights, which is the case for the primary route, the Companies will provide barriers at the request of any landowners who have an ongoing problem with unauthorized access (Exh. E-15).

The Companies stated that they did not expect the proposed facilities to produce audible noise under most operating conditions, and noted that they have no records of any complaints within the last ten years regarding noise from the existing facilities (Exhs. NEP/MEC-1, at 3-47; E-13). However, some residents complained about noise at the public hearing in this proceeding (Public Hearing Tr. at 39-48). The Companies indicated that there would be a temporary increase in noise during the construction phase due to the operation of construction equipment (Exh. NEP/MEC-1, at 3-21). The Companies stated that control measures such as mufflers would be used to minimize the noise at nearby residences (id.).

The Companies stated that construction activities also would result in exhaust emissions and dust, but that such impacts would be minimal and short-term (id.). The Companies stated that dust would be controlled as needed by suppression measures acceptable to local officials (id.). The Companies' witness, Mr. Costa, indicated that construction traffic impacts will be almost negligible if the primary route is built, because the construction activity would take place on the ROW (Tr. 2, at 124).

The Companies stated that the primary route is not adjacent to any National or State Historic Register properties (Exh. NEP/MEC-1, at 3-43).⁵³ However, the Companies noted that, according to Massachusetts Historical Commission ("MHC") files, several buildings and structures associated with the Quabbin Reservoir have been included in the MHC's list for Belchertown (id. at 3-44). The Companies submitted a determination by the MHC that the proposed project is unlikely to affect significant historic or archaeological resources (Exh. E-4a, attachment).

The record shows that abutters have raised two concerns regarding the proposed transmission alignment, including the passage of the transmission line ROW over a hill which is part of a sand and gravel excavation operation (Public Hearing Tr. at 58-59), and the placement of a pole traversing a residential yard at Edelcey Drive (Exh. E-2h; Tr. 3, at 16). The Companies' witness, Mr. Costa, indicated that the Companies have agreed to temporarily relocate the transmission line while the gravel is being removed at a future date from the area on the ROW (Public Hearing Tr. at 60).⁵⁴ The Companies also have agreed to pursue relocation of the pole traversing the yard on Edelcey Drive (Exh. E-2h).

With respect to the Belchertown substation, the Companies propose to install, maintain, and operate a 69 kV/13kv transformer and associated equipment in the existing substation, and to extend an existing fence and regrade a driveway within the extended fenced area (Exh. NEP/MEC-4, at 1). The Companies stated that the existing substation and proposed new facilities are located on a parcel owned by NEPCo (id.). The Companies seek an exemption of an additional 0.56 acres of NEPCo-owned land from the Belchertown Zoning Bylaws in order to allow construction of the proposed substation additions (id. at 2). The Companies submitted a Belchertown Zoning Map and "T" sheets indicating that the substation additions will be located within a Rural Residential District (id. at exhibit B).

⁵³ The Companies stated that the nearest historic district is the Belchertown Center Historic District, located .25 miles west of the Belchertown substation (Exh. NEP/MEC-1, at 3-43).

⁵⁴ The Companies' witness indicated that they have taken similar measures in other areas with sand and gravel operations (Public Hearing Tr. at 60).

With respect to noise impacts created by the substation additions, the Companies stated that the existing nighttime ambient sound level at the nearest residence to the substation is approximately 33 dB (Exh. NEP/MEC-7, at 3). The Companies calculated that the sound level from the new transformer would be 30.4 dB at the nearest residence, or approximately 3 dB below that nighttime ambient sound level (id. at 3, and exh. DRS-5). The Companies concluded that, in light of ambient sound levels, noise emitted by the new transformer should not be objectionable (id.). In fact, the Companies' sound survey indicated that noise impacts would decrease at the three closest residences after the removal of the existing transformers and the installation of the new transformer (id. at exh. DRS-5).

In response to concerns raised at the public hearing regarding lightning strikes at or near the Belchertown substation, the Companies' witness, Jennifer Grimsley, testified that she was aware of one lightning-related outage that occurred at the substation in the previous five years (Tr. 3, at 18-19, 21). Another witness for the Companies, Robert Fougere, stated that the Companies install lightning rods in all of their new construction substations, and anticipated that there would be no problem with installing a lightning rod at the Belchertown substation (id. at 21-23).

The record demonstrates that land use along the primary route is varied with a small number of residences, one of which is a licensed day care center. In order to minimize construction impacts and ensure safety in the vicinity of the day care center, the Siting Board recommends that the Companies provide advance notice of their construction schedule in the vicinity of the day care center to its operator.

The Companies also plan to construct a switching station and a double tap on MDC Quabbin Reservation property, in close proximity to the Quabbin Reservoir. The Companies propose limited tree clearing of one-half acre on the MDC Quabbin Reservation property. With the use of mitigation measures described in Section III.C.2.a.(1), above, impacts to the MDC Quabbin Reservation property will be kept to a minimum. Although the Companies seek exemption from certain zoning requirements of the Town of Belchertown, the Companies have stated that they intend to comply with substantive town zoning bylaw requirements that are applicable to the proposed project.

The record demonstrates that temporary construction impacts such as noise and dust would be minor, particularly with the implementation of the Companies' mitigation measures. Traffic impacts during construction of the primary route would be almost negligible.

With respect to long-term land use impacts, the Siting Board notes that the primary route has been maintained continuously for an extended period of time. Construction of the proposed facilities along the primary route would not interfere with existing land uses along the route. The MHC determined that the project is unlikely to affect significant historic or archaeological resources. Further, any expansion of the Belchertown substation would take place within Company-owned land.

Accordingly, the Siting Board finds that, with the implementation of proposed mitigation including measures described in Sections III.C.2.a.(1), the environmental impacts of the proposed facilities along the primary route would be minimized with respect to land use.

(4) Visual Impacts

The Companies asserted that construction of the proposed facilities along the primary route would result in minimal visual impacts (Exh. NEP/MEC-1, at 3-41, 4-2). The Companies indicated that they intend to replace 51 existing wood poles, approximately 34 feet in height, with 47 new wood poles approximately nine feet taller than the existing poles (*id.* Figure 3-3; Exh. E-24). The Companies stated that existing trees will be taller than the new poles in most locations (Exh. NEP/MEC-1, at 3-41). The Companies asserted that, because of the reduction in the number of poles, the proposed project would have a positive visual impact for abutters to the existing 23 kV sub-transmission line (*id.* at 3-42).⁵⁵

The Companies indicated that they plan to screen the entire perimeter of the switching station, and the Jensen Street side of the Belchertown substation, with arborvitae (Exhs.

⁵⁵ The Companies indicated that they are considering relocating certain poles located on residential properties closer to property lines or across streets to reduce visual impacts (Exh. E-2, attachments E-2b, E-2c, E-2g, E-2h, E-2i).

E-2d, attachment; NEP/MEC-7, at 3; Tr. 1, at 115-116). The Companies stated that they do not presently maintain a vegetative screen at road crossings along the proposed route, and noted that their policy on road buffers is to maintain a natural vegetative shrub species cover where possible (Exh. E-14).⁵⁶

The record demonstrates that vegetative screening would be effective in minimizing the visual impacts of the proposed substation and switching station facilities, and that the incremental visual impacts of the proposed transmission facilities would be minimal. Further, with regard to transmission facilities, the Siting Board notes that the proposed project would result in a significant positive visual impact as a result of the Companies' plan, discussed in Section II.B.4, above, to remove 16.4 miles of the 23 kV, 13/3W and 3E sub-transmission lines after the completion of the proposed project (Exh. E-23).

Accordingly, the Siting Board finds that, with the implementation of proposed mitigation including screening of the switching station and Belchertown substation with arborvitae, the environmental impacts of the proposed facilities along the primary route would be minimized with respect to visual impacts.

(5) Magnetic Field Levels

The Companies calculated the highest magnetic field levels for the existing sub-transmission and proposed transmission lines along the primary route, based on projected 1997 maximum normal loads,⁵⁷ at three locations including: (1) the residence closest to the ROW; (2) the ROW edge; and (3) within the ROW (Exh. NEP/MEC-5, att. JLG-3). The Companies' calculations indicated that magnetic field levels would decrease from present

⁵⁶ The Companies' witness, Mr. McKinstry, testified that the Companies do not normally plant a vegetative screen for transmission lines at road crossings unless a substation would be visible from a main road (Tr. 1, at 113-114).

⁵⁷ The Companies stated that magnetic field calculations for the proposed transmission line assumed a projected total 1997 normal load of 12.7 MVA, and calculations for the existing 3E sub-transmission line assumed a normal load of 6.0 MVA with the remaining load supplied via the 13/3W sub-transmission line from Granby (Exh. NEP/MEC-5, att. JLG-3, at 2).

levels at all three locations (id.). See Table 1. The Companies attributed this decrease to both a reduction in the magnitude of current carried on the new transmission line within the affected ROW segment and an increase in the height of the wooden poles supporting the new transmission line (Exh. E-19).⁵⁸ The Companies stated that no special design configurations were necessary to achieve the expected reductions along the affected ROW with the proposed project (id.). However, the Companies indicated that the conductor phase configurations of the proposed line relative to nearby distribution lines in the vicinity of the Belchertown substation would be designed to reduce magnetic field levels in that area (id.).⁵⁹ The Companies noted that there would be no opportunity to use phase configurations in this manner along the remaining length of the proposed transmission line due to the absence of nearby distribution lines (id.).

With respect to current research concerning the potential health risks associated with exposure to magnetic field levels, the Companies' witness, Dr. Valberg, stated that the results of epidemiological and biological studies have not established any cause-and-effect relationship (Exh. NEP/MEC-8).

In a previous review of proposed transmission line facilities which included 345 kV transmission lines, the Siting Board accepted edge-of-ROW levels of 85 mG for the magnetic field. Massachusetts Electric Company/New England Power Company, 13 DOMSC 119, 228-242 (1985). Here, with operation of the proposed project, magnetic field levels would actually decrease from present levels, and would be well below the levels previously found

⁵⁸ The Companies' witness, Dr. Valberg, confirmed that magnetic field levels decrease with a decrease in current and as the distance from a transmission line increases (Tr. 2, at 135-139). Dr. Valberg added that in a transmission line configuration consisting of several conductors, the separation between the conductors also contributes to the decrease in magnetic field levels realized as the distance from the line increases, with closer spaced conductors having a more pronounced decrease (id. at 138-139).

⁵⁹ The Companies indicated that the highest magnetic field level at the Belchertown substation property line would decrease from its existing level of 24 mG to 15 mG with operation of the proposed project and implementation of optimal phase configurations in the vicinity of the substation (Exh. E-18, atts.).

acceptable by the Siting Board. In addition, the Companies have developed phase configuration plans that would decrease magnetic field levels in the vicinity of the Belchertown substation. Accordingly, the Siting Board finds that, with the implementation of proposed mitigation, the environmental impacts of the proposed facilities along the primary route would be minimized with respect to magnetic field levels.

(6) Conclusions on Environmental Impacts

In Section III.C.2.a, above, the Siting Board has reviewed the information provided by the Companies regarding environmental impacts of the proposed facilities along the primary route and the potential mitigation measures. The Siting Board finds that the Companies have provided sufficient information regarding environmental impacts of the proposed facilities along the primary route and potential mitigation measures for the Siting Board to determine whether environmental impacts would be minimized and whether the appropriate balance among environmental impacts and between environmental impacts and cost would be achieved.

In Section III.C.2.a, above, the Siting Board has found that: (1) with the implementation of proposed mitigation, and compliance with all applicable state, MDC and local requirements regarding herbicides, the environmental impacts of the proposed facilities along the primary route would be minimized with respect to water resources; (2) with the implementation of proposed mitigation, the environmental impacts of the proposed facilities along the primary route would be minimized with respect to land resources; (3) with the implementation of proposed mitigation including measures described in Section III.C.2.a.(1), the environmental impacts of the proposed facilities along the primary route would be minimized with respect to land use; (4) with the implementation of proposed mitigation including screening of the proposed switching station and Belchertown substation with arborvitae, the environmental impacts of the proposed facilities along the primary route would be minimized with respect to visual impacts; and (5) with the implementation of proposed mitigation, the environmental impacts of the proposed facilities along the primary route would be minimized with respect to magnetic field levels.

Accordingly, the Siting Board finds that, with the implementation of proposed mitigation and planned compliance with applicable state, MDC and local requirements set forth above, the environmental impacts of the proposed facilities along the primary route would be minimized. In Section III.C.2.c, below, the Siting Board addresses whether an appropriate balance among environmental impacts and between environmental impacts and cost would be achieved.

b. Cost of the Proposed Facilities along the Primary Route

The Companies asserted that the construction of the proposed transmission line along the primary route is the least cost alternative based on construction costs (Exh. NEP/MEC-1, at 3-14; Appendix F). The Companies estimated that construction costs, including material, labor, permitting, and substation costs, would total \$2,257,000 (*id.*). The Companies estimated an additional cost of \$828,000 for removal of the aggregate 16.4 miles of 13/3W and the remaining portion of 3E sub-transmission line not directly replaced by the proposed facilities (Exh. NEP/MEC-2, exh. B; Tr. 3, at 105-109). In addition, the Companies stated that annual maintenance costs would be \$2,500 for the primary route, based on its relatively short length of 2.1 miles (EFSB-RR-11).

The Siting Board finds that the Companies have provided sufficient cost information for the Siting Board to determine whether an appropriate balance would be achieved between environmental impacts and cost.

c. Conclusions

The Siting Board has found that the Companies have provided sufficient information regarding the environmental impacts of the proposed facilities along the primary route and potential mitigation measures for the Siting Board to determine whether environmental impacts would be minimized and whether the appropriate balance among environmental impacts and between environmental impacts and cost would be achieved. In addition, the Siting Board has found that the environmental impacts of the proposed facilities along the primary route would be minimized. The Siting Board has also found that the Companies

have provided sufficient cost information for the Siting Board to determine whether an appropriate balance would be achieved between environmental impacts and cost.

In Section III.C.2.a, above, the Siting Board reviewed the environmental impacts of the proposed facilities and proposed mitigation along the primary route with respect to water resources, land resources, land use, visual impacts, and magnetic field levels. For each category of environmental impacts, the Companies demonstrated that, with the mitigation discussed above, the impacts would be minimized.

Accordingly, based on the foregoing, the Siting Board finds that the proposed facilities along the primary route would achieve an appropriate balance among conflicting environmental concerns as well as between environmental impacts and cost.

3. Analysis of the Proposed Facilities along the Alternative Routes and Comparison

a. Environmental Impacts of the Proposed Facilities along the Alternative Routes and Comparison

In this Section, the Siting Board evaluates the environmental impacts of the proposed facilities along the alternative routes and potential mitigation for such impacts, and compares the primary and alternative routes. First, as part of its evaluation, the Siting Board addresses whether the petitioner has provided sufficient information regarding alternative routes for the Siting Board to determine whether the environmental impacts of the proposed facilities would be minimized, and whether the proposed facilities would achieve the appropriate balance among environmental impacts and between environmental impacts and cost. If necessary for its review, the Siting Board separately addresses whether the environmental impacts of the proposed facilities along the alternative routes would be minimized, with potential mitigation. Finally, in order to determine a best route, the Siting Board compares the environmental impacts of the primary route to the environmental impacts of each of the alternative routes.

In reviewing the environmental impacts of the proposed project in this particular proceeding, the Siting Board also reviews the environmental benefits of removing the 13/3W and 3E sub-transmission lines, as discussed in Section II.B.4, above.

(1) Water Resources

NEPCo and MECo asserted that any adverse impacts on natural resources due to construction of the proposed facilities along Alternative Routes B or C would be temporary because existing transmission or transportation corridors would be used (Exh. NEP/MEC-1, at 4-1). The Companies stated that wetland areas along Alternative Route B consist primarily of small emergent shrub wetlands adjacent to Route 9 (id. at 3-33). The Companies asserted that all construction along Alternative Route B could be performed without permanent alterations to these wetlands and that small streams would be crossed within existing road crossings without physical disturbance (id. at 3-33, 4-3).

The Companies asserted that wetland impacts associated with Alternative Route C, which is a hybrid of the primary route and Alternative Route B, would be the same as those impacts that would be found along the eastern portion of the primary route and the western portion of Alternate Route B (id. at 3-33). The Companies stated that Alternative Route C would have one pole located in a wetland area (Exh. RR-7).

The Companies stated that none of the proposed work along any of the routes would be located in surface waters (Exh. NEP/MEC-1, at 3-34). However, the Companies indicated that the eastern portions of both alternative routes would be located within 500 feet of the Quabbin Reservoir (Exh. E-10). The Companies indicated that, should one of the alternative routes be chosen, they would consult with the MDC regarding the segment of the route lying within the MDC reservation boundary, and would discuss the application of herbicides with the MDC prior to any such application (id.). The Companies noted the potential for sedimentation to occur in nearby surface water bodies resulting from erosion and temporary impacts in wetland areas, but asserted that restoration of disturbed areas would be likely to occur within two to three years (Exh. NEP/MEC-1, at 4-1).

With respect to groundwater and wells, the Companies stated that both alternative routes cross approximately the same area of the Aquifer Protection District as the primary route (id. at 3-35). The Companies asserted that the likelihood of impacts to ground water supply due to construction equipment operation would be minimal because of the brief construction period (id. at 3-35). The Companies indicated that, should one of the

alternative route be chosen, herbicides might be used periodically to manage vegetation along the existing utility corridors, including approximately half of Alternative Route C and the 0.3 mile portion of Alternative Route B between Route 9 and the E5/F6 ROW (Exh. E-10). The Companies stated that they would comply with all state and local regulations concerning use of herbicides, including the Town of Belchertown's Bylaw that restricts the use of herbicides to amounts that would not result in groundwater contamination (Tr. 2, at 23).

The Companies estimated that 15 percent of the holes required for the installation of wood poles would have to be blasted because of the geology of the area (*id.* at 15-16). The Companies' witness, Mr. Costa, testified that the alternative routes would require considerably more wood poles than the primary route, because of the shorter spans that are typical along residential distribution lines (*id.* at 69-70).

The Companies stated that planned additions to the Belchertown substation are identical for all three routes (Exh. E-12). The Companies also noted that the location of the proposed switching station and tap lines outside the drainage area of the Quabbin watershed would be identical for all three routes (Exh. NEP/MEC-1, at 3-34, 3-46).

The record demonstrates that construction of the proposed facilities along Alternative Route B would have little or no impact on wetlands because wetlands would be crossed within existing road crossings. The record also demonstrates that construction of the proposed facilities along Alternative Route C would have a minimal impact on wetlands because wetlands would be crossed within existing road crossings on the western portion of the route, although one pole would be placed in wetlands along the eastern portion of the route. The record further demonstrates that impacts to surface water, groundwater and wells along both Alternative Routes B and C would be minimal, with implementation of the proposed mitigation measures and compliance with state, MDC, and local requirements regarding herbicides.

As discussed in Section III.C.2.a.(1), above, the primary route would require installation of two poles in wetlands, at locations to be accessed by swamp mats, and also require periodic use of herbicides for maintenance purposes along most of the route. The Siting Board concludes that, because Alternative Route B would have little or no impact on

wetlands, and would avoid use of herbicides along most of the route, the potential water resource impacts of Alternative Route B are preferable to the potential water resource impacts of the primary route. The Siting Board also concludes that, because Alternative Route C would have fewer wetlands impacts than the primary route, and avoid use of herbicides along the western portion of the route, the potential water resource impacts of Alternative Route C are preferable to the potential water resource impacts of the primary route.

Accordingly, the Siting Board finds that Alternative Route B and Alternative Route C would be preferable to the primary route with respect to water resources.

(2) Land Resources

NEPCo and MECo asserted that Alternative Routes B and C primarily follow routinely managed ROW corridors, and that construction of the proposed facilities along these routes would not create significant changes in forest characteristics, vegetation or wildlife habitat (Exh. NEP/MEC-1, at 3-36).

The Companies noted that, as with the primary route, construction of the proposed project along either alternative route would require some tree clearing at the switching station and along the 0.1-mile tap line connection (id.). In addition, NEPCo and MECo noted that Alternative Route B would require tree clearing to widen the distribution ROW by 10 to 15 feet along the 0.2 mile segment from Route 9 to the switching station (id. at 3-27; Tr. 2, at 106-107).⁶⁰ The Companies' witnesses were unable to estimate of how many acres of trees would have to be cleared in that area (Tr. 2, at 106-107).

NEPCo and MECo indicated that minimal vegetation and soil disturbance may result from digging pole holes and from cut and fill operations (Exh. NEP/MEC-1, at 3-36, 3-40).

⁶⁰ The Companies stated that this route segment, which is located on MDC property, traverses mature forested habitat dominated by white pine (Exh. NEP/MEC-1, at 4-2 and 4-3). Mr. Costa testified that the Companies would have to negotiate with the MDC to obtain a wider easement for that portion of Alternative Route B (Tr. 2, at 105-106).

However, the Companies stated that revegetation of disturbed areas would likely occur within two to three years, with no noticeable long term effect on existing vegetation (id. at 4-1). The Companies noted that sites requiring restoration will be identified and appropriate measures such as regrading, seeding and mulching for erosion control will be included in construction plans (id. at 3-41). The Companies indicated that vegetation along the roadway portion of both alternative routes would be managed to provide adequate clearance between vegetation and electrical conductors and supporting structures and to facilitate access for inspections, maintenance, and repair work (id. at 3-27).

The Companies indicated that wildlife habitat impacts of construction of the proposed facilities along the alternative routes would be minimal, and would be comparable to those under the primary route (id. at 3-44, 3-47).

The record demonstrates that construction of the proposed facilities along Alternative Route B would require more tree clearing, particularly on MDC property, than would be required if either the primary route or Alternative Route C were used. The record also demonstrates that use of Alternative Routes B and C would result in minimal impacts to wildlife and, with the implementation of appropriate mitigation measures, minimal soil erosion. Finally, the record shows that wildlife and soil erosion impacts would be comparable for Alternative Routes B and C and the primary route.

The Siting Board finds that, because use of Alternative Route B would require significant tree clearing on MDC property, the primary route would be preferable to Alternative Route B, and comparable to Alternative Route C, with respect to land resource impacts.

(3) Land Use

The Companies asserted that the proposed facilities would have minimal impact on the use of adjacent lands, businesses, or residences located along Alternative Routes B and C (Exh. NEP/MEC-1, at 3-39). The Companies indicated that Alternative Routes B and C each would pass through residential, business, agricultural, aquifer protection and wetland protection zoning districts (id. at 3-38).

NEPCo and MECo stated that, along the route segment common to both Alternative Routes B and C, land uses include low density residential, a townhouse development on Jabish Street, agricultural and undeveloped land, a General Business District, a farm, a townhouse development, a sand and gravel business, a kennel, and some low density, single family residential areas (id.). The Companies indicated that the remaining portion of Alternative Route B passes some single family residential areas and undeveloped areas along Route 9, and undeveloped lands within the MDC Reservation from Route 9 to the E5/F6 transmission line (id.). The remaining portion of Alternative Route C would pass through the front yards of some single family homes on Blue Meadow road before entering the MDC Reservation for the final 0.7 miles (id.). A map submitted by the Companies indicates that there are considerably more residences and businesses along Alternative Routes B and C than along the primary route (id., Appendix B, Figure B-4).

The Companies noted that both route alternatives would traverse approximately the same length of ROW within the MDC Reservation as the primary route, but asserted that because all of the routes follow existing ROW corridors, no significant change in land use would occur within the MDC Reservation (id. at 3-41). The Companies stated that the alternative routes would not result in any long-term vegetation management changes due to their location along existing ROWs, and would be consistent with the MDC's QLM Plan concerning forest management and water quality objectives (id. at 3-45).

The Companies stated that projected operating noise levels from the proposed transmission line along Alternative Routes B and C would be slightly greater than existing levels, but would remain very low (id. at 3-47). The Companies noted that during construction there would be noise due to the operation of equipment, but control measures such as mufflers would be used to reduce noise at nearby residences (id.). The Companies also stated that construction would result in exhaust emissions and dust, but noted that dust would be controlled as needed by suppression measures acceptable to local officials (id. at 3-27).

The Companies noted that traffic control measures would be required for the alternative routes during construction, and stated that construction would be scheduled and

coordinated with town fire and police departments to ensure public safety (id. at 3-50). The Companies' witness, Mr. Costa, testified that traffic impacts would primarily result from construction along existing roadways, particularly Routes 9 and 21, which are major thoroughfares in Belchertown (Tr. 2, at 123-124). Mr. Costa noted that traffic would not be a problem if the Companies construct along the primary route because it is located along the transmission line ROW (id. at 124).

The Companies stated that neither of the alternative routes are near or adjacent to any National or State Historic register properties, and noted that the nearest historic district is the Belchertown Historic District, located 0.25 miles west of the Belchertown substation (Exh. NEP/MEC-1, at 3-43). However, the Companies stated that a colonial period brick residence is located on Route 9 along Alternative Route B (id. at 3-44). Furthermore, the Companies stated that several buildings and structures associated with the Quabbin Reservoir have been included in the MHC's list of historical structures (id.). These structures and buildings appear to be adjacent to Alternative Route B (id. at Appendix B, Figure B-1).

The record demonstrates that Alternative Routes B and C would traverse zoning districts comparable to those along the primary route, but would be located along roadways, and near more residences, including two townhouse developments, and some businesses. Thus, construction impacts such as noise and dust are likely to be more significant along Alternative Routes B and C than along the primary route. Traffic impacts during construction would clearly be greatest along Alternative Route B, which primarily consists of roadways, including State Routes 21 and 9. Traffic impacts also would be greater along Alternative Route C, which travels along roadways for 1.5 miles, than along the primary route.

The record also demonstrates that the potential for impacts to historic properties and structures is slightly greater along Alternative Route B than along the primary route. The record demonstrates that impacts to historic properties along Alternative Route C would be negligible and comparable to those of the primary route. The record demonstrates that operating noise impacts along Alternative Routes B and C would be minimal and comparable to those of the primary route.

Accordingly, based on the foregoing, the Siting Board finds that the primary route would be preferable to Alternative Route B and Alternative Route C with respect to land use impacts.

(4) Visual Impacts

The Companies asserted that the proposed facilities would create noticeable visual impacts if constructed along Alternative Routes B and C (Exh. NEP/MEC-1, at 3-39). The Companies explained that the replacement of existing distribution system poles with new poles that are nine feet taller, and associated tree trimming, would greatly increase the visibility of the electrical system along Alternative Route B (*id.*). The Companies asserted that the construction of the proposed project would have minimal visual impacts along that portion of Alternative Route C which follows the primary route, with noticeable impacts to existing residences and businesses along the segment of Alternative Route C that is shared with Alternative Route B (*id.* at 3-43, 4-3). The Companies added that Alternative Routes B and C would traverse Jensen Street adjacent to an athletic field (*id.* at 3-42). The Companies indicated that they plan to screen the entire switching station and the Jensen Road side of the Belchertown substation regardless of which route is selected (Tr. 1, at 115-116).

The Siting Board notes that construction of the proposed facilities along any of the three routes would involve the replacement of existing wood poles with taller poles. However, the record demonstrates that use of Alternative Routes B and C would require more wood poles and more tree trimming and clearing than would the primary route, and that there are significantly more residences and businesses along Alternative Routes B and C than along the primary route. The presence of an additional set of conductors with transmission-level clearances along roadways, and the extent of roadside tree trimming to allow such conductors, would result in a substantial visual impact along either alternative route. Thus, the incremental visual impacts of the construction of the proposed project along the primary route clearly would be less than those of Alternative Routes B and C.

The Siting Board notes, however, that the use of Alternative Route B would allow the removal of all existing facilities along most of the primary route, while use of Alternative

Route C would allow the removal of existing facilities along the 0.9 mile segment of the primary route which is not shared by both routes. Clearly, the removal of the existing 23 kV line would have a significant positive visual impact at the ten affected residences and five road crossings along the primary route, or at the five residences and three road crossings along the portion of the primary route that is not shared by Alternative Route C. However, such advantages do not outweigh the adverse visual impacts of the proposed facilities, as noted above, on the significant number of residences and businesses along Alternative Routes B and C, as well as travellers along the roadways. On balance, therefore, the Siting Board finds that the primary route would be comparable to Alternative Route B and Alternative Route C with respect to visual impacts.

(5) Magnetic Field Levels

Based on projected 1997 maximum normal loads of 12.7 MVA, the Companies calculated the highest magnetic field levels for the proposed facilities at two locations along Alternative Routes B and C: (1) at the residence with the highest magnetic field impact; and (2) within the ROW (Exh. NEP/MEC-5, att. JLG-3).⁶¹ The Companies noted that, if the proposed facilities were built along either alternative route, existing magnetic field levels created by distribution lines common to both routes would decrease by a maximum of 2.7 mG at the residence with the highest magnetic field impact and by a maximum of 3.8 mG within the ROW, due to phase cancellation effects between the new transmission line and the existing distribution lines (*id.*). These net impacts are shown on Table 1.

⁶¹ The Companies indicated that they did not calculate the maximum magnetic field strength along the ROW edge because the ROW width is not defined along existing public transportation corridors common to both alternative routes (Exh. NEP/MEC-5, att. JLG-3).

TABLE 1

| MAGNETIC FIELD LEVELS (mG) AT ONE METER ABOVE GROUND | | | | |
|--|----------------------------|--------|-------|--------|
| ROUTE | LOCATION | BEFORE | AFTER | CHANGE |
| PRIMARY ⁶² | ON ROW | 17.8 | 10.8 | 7.0 |
| PRIMARY ⁶² | AT RESIDENCE ⁶³ | 3.9 | 3.5 | 0.4 |
| ALTERNATIVE B ⁶⁴ | ON ROW | 14.9 | 11.1 | 3.8 |
| ALTERNATIVE B ⁶⁴ | AT RESIDENCE ⁶⁵ | 6.5 | 3.8 | 2.7 |
| ALTERNATIVE C ⁶⁴ | ON ROW | 14.9 | 11.1 | 3.8 |
| ALTERNATIVE C ⁶⁴ | AT RESIDENCE ⁶⁵ | 6.5 | 3.8 | 2.7 |

As Table 1 demonstrates, magnetic field levels would be marginally higher along Alternative Routes B and C than along the primary route, both at the residence with the highest magnetic field impact, and within the ROW. However, the net result of constructing the proposed facilities along either alternative route would be to reduce the existing magnetic field levels by up to 3.8 mG in the ROW along the Route 21 portion of that route.⁶⁶

⁶² For a typical cross sectional area along Blue Meadow Road (Exh. NEP/MEC-5, att. JLG-3, at 2 of 3).

⁶³ The residence with the maximum field level along the route corridor, located approximately 30 feet from the overhead line (Exh. NEP/MEC-5, att. JLG-3, at 2 of 3).

⁶⁴ For a typical cross sectional area along State Route 21 (Exh. NEP/MEC-5, att. JLG-3, at 2 of 3).

⁶⁵ The residence with the maximum field level along the route corridor, located approximately 35 feet from the overhead line (Exh. NEP/MEC-5, att. JLG-3, at 2 of 3).

⁶⁶ The Siting Board notes that there may be more direct options to achieve similar reductions in the magnetic fields produced by existing distribution lines. For example, the distribution lines could be converted from their present open construction design to spacer construction design, which could reduce magnetic field

In addition, if the proposed facilities were constructed along Alternative Route B, the existing 23 kV sub-transmission line along the 2.1-mile primary route could be removed, thus eliminating magnetic fields along that ROW. If Alternative Route C were chosen, the 23 kV sub-transmission line could be removed along approximately 0.9 miles of the primary route, thus eliminating magnetic fields along that portion of the ROW. In contrast, construction of the proposed facilities along the primary route would reduce, rather than eliminate, magnetic fields along that route, and would have no effect on the magnetic fields created by existing distribution lines proximate to the alternative routes. Thus, while use of any of the three routes would reduce existing magnetic field levels, the incremental benefits of Alternative Routes B and C are greater than those of the primary route.

Consequently, the Siting Board finds that Alternative Route B and Alternative Route C would be preferable to the primary route with respect to magnetic field levels.

(6) Conclusions on Environmental Impacts

In Sections III.C.3.a.(1) to (5), above, the Siting Board has found that the primary route would be preferable to Alternative Route B and Alternative Route C with respect to land use, preferable to Alternative Route B and comparable to Alternative Route C with respect to land resources, and comparable to Alternative Route B and Alternative Route C with respect to visual impacts. The Siting Board has also found that Alternative Route B and Alternative Route C would be preferable to the primary route with respect to water resources and magnetic field impacts. In order to determine which route would be preferable with respect to overall environmental impacts, the Siting Board must consider the nature of the various environmental impacts.

The record demonstrates that many of the identified environmental impacts would be relatively minor, easily mitigated, or temporary. For example, although the primary route would result in a greater level of water resource impacts than the alternative routes, these

levels due to the increased cancellation effect of closely spaced conductors.

impacts would consist of: (1) the temporary effects of removing poles and installing two new poles in wetlands; and (2) the continued use of herbicides along the ROW consistent with state and local safeguards. Similarly, the primary route is preferable to Alternative Route B with respect to land resources, primarily due to the additional tree clearing required for the segment of Alternative Route B between Route 9 and the switching station. These differences are minimal and warrant relatively little weight in our overall comparison.

The difference in land use impacts between the primary and alternative routes is somewhat more substantial, since the record indicates the potential for construction-related noise and traffic disruption along the significant lengths of roadway segments under Alternative Routes B and C, including sections of state Routes 9 and 21. In addition to affecting traffic along roadways, construction along the alternative routes would result in greater disruption to abutting residences and businesses than along the primary route. These impacts, although temporary, could cause considerable inconvenience while they last.

With respect to visual impacts, the primary route would result in incremental impacts related to pole height increases in proximity to approximately ten residences and a limited number of road crossings. The alternative routes would involve significantly greater incremental impacts as they would require not only higher poles but also additional conductors and potentially significant removal of limbs and trimming from roadside trees, along routes with more nearby residences, businesses and passers-by, and thus more visibility, than the preferred route. As discussed in Section III.C.3.a.(4), however, an offsetting factor to this greater incremental visual impact of roadway segments of Alternative Routes B and C would be the Companies' plan to remove the existing 3E sub-transmission line from the avoided portions of the primary route, rather than retain and upgrade that line to 69 kV as proposed under the primary route. The incremental visual impacts along the roadway segments of Alternative Routes B and C, and the issue of retaining versus removing what would be the sole transmission line along the primary route ROW, each represent relatively significant visual impacts in their own right warranting considerable weight in our analysis. However, as the Siting Board found in Section III.C.3.a.(4), these visual impacts

constitute offsetting advantages for the primary and alternative routes, with no net advantage for our overall comparison.

Finally, with respect to magnetic field impacts, all of the routes would result in a reduction of magnetic field levels, although Alternative Routes B and C would result in more reduction based on (1) greater projected reduction along the Route 21 portion of those routes, relative to the preferred route, and on (2) the plan to cease operation of rather than upgrade the existing 3E sub-transmission line along the portions of the preferred route avoided by the respective alternative routes. In considering the significance of the identified differences in magnetic field impacts, however, the Siting Board notes three important factors that reduce the weight we place on those differences. First, the magnetic field levels along all three routes would be not only lower than existing levels, but also well below the 85 mG level accepted by the Siting Board in a previous review. Second, the record includes evidence indicating that no cause-and-effect relationship between magnetic field levels and adverse health effects has been established. Finally, other more direct options for reducing magnetic field impacts from existing on-street distribution lines likely could be employed should reduction become a priority in the future. Consequently, we afford relatively little weight to these differences.

Overall, the environmental impacts warranting the most weight in our comparison include the land use impacts of the alternative routes, relating to traffic and noise disruption during construction, the visual impacts of the alternative routes, relating to tree limb clearing and additional conductors along roadways, and the visual impacts of the primary route, relating to retaining versus removing transmission lines along portions of the primary route ROW. We have concluded that the visual impacts of the respective routes are offsetting. Therefore, the greater land use impact of Alternative Routes Band C relative to the primary route, results in an overall advantage for the primary route with respect to environmental impacts.

Accordingly, the Siting Board finds that, on balance, the primary route would be preferable to Alternative Route B and Alternative Route C with respect to environmental impacts.

b. Cost of the Proposed Facilities Along the Alternative Routes and Comparison

(1) Description

As noted in Section III.C.2.b, above, the Companies asserted that the construction of the proposed transmission line along the primary route is the least-cost alternative based on construction costs (Exh. NEP/MEC-1, at 3-14; Appendix F). In order to demonstrate the cost advantage of the primary route over the two remaining route alternatives, the Companies provided a comparison of construction and route-specific preparation costs as follows:

TABLE 2

| CONSTRUCTION COST COMPARISON (1995 \$) | | | |
|--|---------------|---------------|---------------|
| Category | Primary Route | Alternative B | Alternative C |
| Construction labor and equipment | \$544,000 | \$846,000 | \$669,700 |
| Materials | 111,000 | 216,000 | 143,300 |
| Engineering | 426,000 | 533,000 | 510,500 |
| Permitting | 140,000 | 140,000 | 140,000 |
| Substation & Switching station | 973,000 | 973,000 | 973,000 |
| Removal | 63,000 | 194,000 | 121,500 |
| Route preparation ⁶⁷ | | 173,000 | 67,000 |
| TOTAL | \$2,257,000 | \$3,075,000 | \$2,625,000 |

(id.).

⁶⁷

The Companies' witness, Ms. Grimsley, testified that the maintenance costs listed under Alternative Route B and Alternative Route C in Appendix F of their filing are one-time costs associated with the initial preparation required to site the proposed facilities along either alternate route (Tr. 3, at 85-86).

(2) Analysis

The record demonstrates that the Companies have provided sufficient information regarding the construction and route preparation costs of the proposed facilities along the Alternative Routes for the Siting Board to compare such costs with the cost of the proposed facilities along the primary route.

In comparing the cost of the primary route to both alternative routes, the Companies' analysis indicates that the construction costs and route preparation costs of Alternative Route B and Alternative Route C would be greater by 36 percent and 16 percent, respectively. Accordingly, based on the foregoing, the Siting Board finds that the primary route would be preferable to Alternative Route B and Alternative Route C with respect to cost.

c. Conclusions

In comparing the primary route to Alternative Routes B and C, the Siting Board has found that the primary route would be preferable to Alternative Routes B and C with respect to environmental impacts and cost.

Accordingly, the Siting Board finds that the proposed facilities along the primary route would be preferable to the proposed facilities along Alternative Route B and Alternative Route C with respect to providing a necessary energy supply to the Commonwealth with a minimum impact on the environment at the lowest possible cost.

IV. ZONING EXEMPTIONS/PUBLIC CONVENIENCE AND INTEREST

As noted in Section I.B, above, the Companies filed three petitions with the Department, which are related to the proposed project under consideration by the Siting Board in the present proceeding. With these three petitions, the Companies (1) pursuant to G.L. c. 164, § 72, sought a determination by the Department that the Companies' proposed electric transmission line conversion is necessary and will serve the public convenience and be consistent with the public interest, and (2) pursuant to G.L. c. 40A, § 3, sought exemptions from the zoning by-laws of the Town of Belchertown for (a) the proposed transmission line and switching station and (b) the proposed additions to the Belchertown substation. These three petitions were consolidated by the Chairman of the Department and referred to the Siting Board for review pursuant to authority granted him under the provisions of G.L. c. 25, § 4. When a petition has been referred to the Siting Board pursuant to G.L. c. 25, § 4, the Siting Board shall apply Department standards in a manner consistent with Department reviews. G.L. c. 164, § 69H(2). Accordingly, in the following sections, the Siting Board reviews the Department's standards of review for such petitions, and applies those standards to the subject matter of the Companies' petitions in a manner consistent with the above findings of the Siting Board.

A. Standard of Review

In its petition for a zoning exemption, the Company seeks approval under G.L. c. 40A, § 3, which, in pertinent part, provides:

Land or structures used, or to be used by a public service corporation may be exempted in particular respects from the operation of a zoning ordinance or by-law if, upon petition of the corporation, the [D]epartment of [P]ublic [U]tilities shall, after notice given pursuant to section eleven and public hearing in the town or city, determine the exemptions required and find that the present or proposed use of the land or structure is reasonably necessary for the convenience or welfare of the public....

Under this section, the Company first must qualify as a public service corporation (see Save the Bay, Inc. v. Department of Public Utilities, 366 Mass. 667 (1975)), and establish that it requires an exemption from the local zoning by-laws. The Company then

must demonstrate that the present or proposed use of the land or structure is reasonably necessary for the public convenience or welfare.

In determining whether a company qualifies as a "public service corporation" for purposes of G.L. c. 40A, § 3, the Supreme Judicial Court has stated:

among the pertinent considerations are whether the corporation is organized pursuant to an appropriate franchise from the State to provide for a necessity or convenience to the general public which could not be furnished through the ordinary channels of private business; whether the corporation is subject to the requisite degree of governmental control and regulation; and the nature of the public benefit to be derived from the service provided.

Save the Bay, 366 Mass. at 680.

In determining whether the present or proposed use is reasonably necessary for the public convenience or welfare, the Department must balance the interests of the general public against the local interest. Id. at 685-686; Town of Truro v. Department of Public Utilities, 365 Mass. 407 (1974). Specifically, the Department is empowered and required to undertake "a broad and balanced consideration of all aspects of the general public interest and welfare and not merely [make an] examination of the local and individual interests which might be affected." New York Central Railroad v. Department of Public Utilities, 347 Mass. 586, 592 (1964). When reviewing a petition for a zoning exemption under G.L. c. 40A, § 3, the Department is empowered and required to consider the public effects of the requested exemption in the State as a whole and upon the territory served by the applicant. Save the Bay, supra, at 685; New York Central Railroad, supra, at 592.

With respect to the particular site chosen by a petitioner, G.L. c. 40A, § 3 does not require the petitioner to demonstrate that its preferred site is the best possible alternative, nor does the statute require the Department to consider and reject every possible alternative site presented. Martarano v. Department of Public Utilities, 401 Mass. 257, 265 (1987); New York Central Railroad, supra, at 591; Wenham v. Department of Public Utilities, 333 Mass. 15, 17 (1955). Rather, the availability of alternative sites, the efforts necessary to secure them, and the relative advantages and disadvantages of those sites are matters of fact bearing solely upon the main issue of whether the preferred site is reasonably necessary for the convenience or welfare of the public. Id.

Therefore, when making a determination as to whether a petitioner's present or proposed use is reasonably necessary for the public convenience or welfare, the Department examines: (1) the present or proposed use and any alternatives or alternative sites identified (see Massachusetts Electric Company, D.P.U. 93-29/30, at 10-14, 22-23 (1995) ("1995 MECo Decision"); New England Power Company, D.P.U. 92-278/279/280, at 19 (1994) ("1994 NEPCo Decision"); Tennessee Gas Pipeline Company, D.P.U. 85-207, at 18-20 (1986) ("1986 Tennessee Decision"); (2) the need for, or public benefits of, the present or proposed use (see 1995 MECo Decision, *supra* at 10-14; 1994 NEPCo Decision, *supra* at 19-22; 1986 Tennessee Decision, *supra* at 17); and (3) the environmental impacts or any other impacts of the present or proposed use (see 1995 MECo Decision, *supra* at 14-21; 1994 NEPCo Decision, *supra* at 20-23; 1986 Tennessee Decision, *supra* at 20-25).

After examining these three issues, the Department balances the interests of the general public against the local interest, and determines whether the present or proposed use is reasonably necessary for the convenience or welfare of the public.⁶⁸

With respect to the Company's petition filed pursuant to G.L. c. 164 § 72, the statute requires, in relevant part, that an electric company seeking approval to construct a transmission line must file with the Department a petition for:

⁶⁸ In addition, the Massachusetts Environmental Policy Act ("MEPA") provides that "[a]ny determination made by an agency of the commonwealth shall include a finding describing the environmental impact, if any, of the project and a finding that all feasible measures have been taken to avoid or minimize said impact." G.L. c. 30, § 61. Pursuant to 301 C.M.R. § 11.01(3), these findings are necessary when an Environmental Impact Report ("EIR") is submitted by the company to the Secretary of Environmental Affairs, and should be based on such EIR. Where an EIR is not required, c. 30, § 61 findings are not necessary. 301 C.M.R. § 11.01(3). In the present case, the Secretary of Environmental Affairs issued her determination that no EIR was required for the proposed project (See Certificate of the Secretary of Environmental Affairs on the Environmental Notification Form, EOEa No. 10840, dated August 30, 1996), and, therefore, a finding is not necessary in this case under G.L. c. 30, § 61.

authority to construct and use ... a line for the transmission of electricity for distribution in some definite area or for supplying electricity to itself or to another electric company or to a municipal lighting plant for distribution and sale ... and shall represent that such line will or does serve the public convenience and is consistent with the public interest. ... The [D]epartment, after notice and a public hearing in one or more of the towns affected, may determine that said line is necessary for the purpose alleged, and will serve the public convenience and is consistent with the public interest.⁶⁹

The Department, in making a determination under G.L. c. 164, § 72, is to consider all aspects of the public interest. Boston Edison Company v. Town of Sudbury, 356 Mass. 406, 419 (1969). Section 72, for example, permits the Department to prescribe reasonable conditions for the protection of the public safety. Id. at 419-420. All factors affecting any phase of the public interest and public convenience must be weighed fairly by the Department in a determination under G.L. c. 164, § 72. Town of Sudbury v. Department of Public Utilities, 343 Mass. 428, 430 (1962).

As the Department has noted in previous cases, the public interest analysis required by G.L. c. 164, §72 is analogous to the Department's analysis of the "reasonably necessary for the convenience or welfare of the public" standard under G.L. c. 40A, § 3. See, New England Power Company, D.P.U. 89-163, at 6 (1993); New England Power Company, D.P.U. 91-117/118, at 4 (1991); Massachusetts Electric Company, D.P.U. 89-135/136/137, at 8 (1990). Accordingly, in evaluating petitions filed under G.L. c. 164, § 72, the Department relies on the standard of review for determining whether the proposed project is reasonably necessary for the convenience or welfare of the public under G.L. c. 40A, § 3. Id.

B. Analysis and Findings

NEPCo is an electric company as defined by G.L. c. 164, § 1, authorized to generate, distribute and sell electricity. New England Power Company, EFSB 94-1 at 2.

⁶⁹ Pursuant to the statute, the electric company must file with its petition a general description of the transmission line, provide a map or plan showing its general location, and estimate the cost of the line in reasonable detail. G.L. c. 164, § 72.

MECo is a retail subsidiary of the New England Electric System, the parent company of NEPCo, and distributes electricity to its electric customers in the Commonwealth. Id. MECo, therefore, also meets the G.L. c. 164, § 1 definition of an electric company. Accordingly, both Companies are authorized to petition the Department as public service corporations for the determinations sought under G.L. c. 40A, § 3, in this proceeding.

G.L. c. 40A, § 3, authorizes the Department to grant to public service corporations exemptions from local zoning ordinances or by-laws if the Department determines that the exemption is required and finds that the present or proposed use of the land or structure is reasonably necessary for the convenience or welfare of the public. With respect to the Companies' petitions filed pursuant to G.L. c. 40A, § 3, the Companies seek exemptions from the operation of the following sections of the Town of Belchertown Zoning By-laws: Section III (use regulations); Section IV, specifically sub-sections 4.01, 4.21 and 4.26 (wetland protection and aquifer protection overlay districts); and Section VI, specifically sub-sections 6.02 and 6.020 (non-conforming use permits). Based on its review of these sections of the by-laws, the Siting Board concludes that said sections could impede the construction, operation and maintenance of the Companies' proposed transmission line and associated facilities, and proposed additions to the Belchertown substation. Therefore, the Siting Board finds that the Companies require the petitioned exemptions from operation of the Town of Belchertown Zoning By-laws for the construction, operation and maintenance of the proposed project.

Pursuant to G.L. c. 40A, § 3, the Siting Board next examines whether the companies' proposed use of the land and structures as set forth in its petitions is reasonably necessary for the convenience or welfare of the public. In making its findings, the Siting Board relies on the analyses in Sections II and III, above. In those sections, the Siting Board found that the Companies' reliability criteria are reasonable for purposes of this review, and that the Companies' actual measurements and load flow analyses both demonstrate that under 1995 and earlier peak load conditions, equipment at and supplying the Belchertown substation was loaded above normal capabilities in contravention of the Companies' reliability criteria (see Sections II.A.3.a. and c, above). The Siting Board also found that the Companies have

demonstrated that the existing supply system is inadequate to satisfy existing load supplied by the Belchertown substation, and that acceleration of C&LM programs could not eliminate the need for additional energy resources (see Sections II.A.3.d. and e, above). Consequently, the Siting Board finds that additional energy resources are reasonably necessary for the convenience or welfare of the public in the Belchertown area.

The Siting Board notes that the Companies evaluated a reasonable range of alternatives to the proposed project, including two project alternatives and two alternative routes, in developing its strategy to supply the Palmer PSA with a reliable supply of electrical power. The record further indicates that the Companies considered possible environmental impacts of the proposed transmission line, associated equipment and expansion of the Belchertown substation that may be of concern to the surrounding community, including water resources, land resources, land use, visual, and magnetic field level impacts. The record indicates that the Company would implement measures to mitigate these impacts.

The Siting Board notes that Section 4.26 of the Town of Belchertown Zoning By-law provides for site plan review of facilities such as the proposed project with respect to storage and handling of hazardous materials and related matters. In Section III.C.2.a.(1), above, the Siting Board discussed the Companies' spill prevention, containment and countermeasures plan for the Belchertown substation. Since exemption from Section 4.26 of the Town of Belchertown Zoning By-law forestalls such site plan review, and in order to ensure that local officials are aware of the Companies' spill prevention, containment and countermeasures plan, the Siting Board directs the Companies to file with the Belchertown Water Department and other appropriate officials an up-to-date spill prevention, containment and countermeasures plan, which shall include all mitigation measures proposed by the Companies in this proceeding to prevent releases of hazardous substances.

Thus, with the implementation of the mitigation measures identified by the Companies, and the above-noted condition relative to a spill prevention, containment and countermeasures plan, the Siting Board finds that the general public interest in the construction, operation and maintenance of the proposed converted 69 kV transmission line and associated equipment, and expansion of the Belchertown substation outweighs the

minimal impacts of the Companies' proposed project on the local community. Accordingly, the Siting Board finds that the proposed transmission line, associated equipment and expansion of the Belchertown substation are reasonably necessary for the convenience or welfare of the public.

Pursuant to Chapter 164, § 72, of the General Laws, a company wishing to build a transmission line is required to file with the Department a petition for authority to construct and use a line for the transmission of electricity for distribution or for supplying electricity to itself. The Department must determine, after the prescribed notice and public hearing, whether "[the] line is necessary for the purpose alleged, and will serve the public convenience and is consistent with the public interest." G.L. c. 164, § 72. The Siting Board notes that in the Companies' filing under G.L. c. 164, § 72, they have complied with the requirement of § 72 that it describe the proposed transmission line, provide diagrams showing its general location, and estimate its cost in reasonable detail.

As noted in Section IV.A, above, the Department relies on the standard of review for determining whether the proposed project is reasonably necessary for the convenience or welfare of the public under G.L. c. 40A, § 3, in evaluating petitions filed under G.L. c. 164, § 72. Therefore, based on the record in this proceeding, and the above analyses, and with the implementation of the mitigation measures identified by the Companies and the condition relative to a spill prevention, containment and countermeasures plan, the Siting Board finds, pursuant to G.L. c. 164, § 72, that the proposed conversion to 69 kV of an existing 23 kV transmission line and associated equipment are necessary for the purpose alleged, will serve the public convenience, and are consistent with the public interest.

V. DECISION

The Siting Board has found that the Companies have demonstrated that the existing supply system is inadequate to satisfy existing load supplied by the Belchertown substation, and, therefore, that additional energy resources are needed for reliability purposes in the Belchertown area.

The Siting Board also has found that the proposed project is preferable to both the upgrade of the existing 9.2-mile, 23 kV 13/3W line from the Five Corners substation to the Belchertown substation, and the reconductoring of the existing 9.3-mile, 23 kV, 3E sub-transmission line from the Ware substation to the Belchertown substation.

The Siting Board further has found that the Companies have considered a reasonable range of practical siting alternatives.

The Siting Board further has found that, with the implementation of proposed mitigation and planned compliance with state, MDC and local requirements as set forth in Section III.C.5.a, the environmental impacts of the proposed facilities along the primary route would be minimized.

The Siting Board further has found that the proposed facilities along the primary route would achieve an appropriate balance among conflicting environmental concerns as well as between environmental impacts and cost.

Finally, the Siting Board has found that the proposed facilities along the primary route would be preferable to the proposed facilities along Alternative Route B and Alternative Route C with respect to providing a necessary energy supply to the Commonwealth with a minimum impact on the environment at the lowest possible cost.

In addition, the Siting Board finds that the proposed project is consistent with the most recently approved long-range forecast of MECo.

Accordingly, the Siting Board APPROVES the Companies' petition to convert to 69 kV an existing 2.1 mile 23 kV electric transmission line, using the Petitioners' proposed route in the Town of Belchertown.

In addition, the Siting Board finds that the proposed conversion to 69 kV of an exiting 23 kV transmission line and associated equipment are necessary for the purpose alleged, will serve the public convenience, and are consistent with the public interest; and

The Siting Board GRANTS the Companies' petition for an exemption from the operation of certain sections of the zoning by-laws of the Town of Belchertown for the proposed transmission line conversion and the construction and operation of a switching facility; and

The Siting Board GRANTS the Companies' petition for an exemption from the operation of certain sections of the zoning by-laws of the Town of Belchertown with respect to the construction and operation of proposed additions to an existing electric substation, subject to the following condition.

(A) In order to ensure that local officials are aware of the Companies' spill prevention, containment and countermeasures plan, the Companies shall file with the Belchertown Water Department and other appropriate officials an up-to-date spill prevention, containment and countermeasures plan, which shall include all mitigation measures proposed by the Companies in this proceeding to prevent releases of hazardous substances.

The Siting Board notes that the findings in this decision are based on 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 the Company 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. The Company 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.

A handwritten signature in black ink, appearing to read "Robert P. Rasmussen", written over a horizontal line.

Robert P. Rasmussen
Hearing Officer

Dated this 27th day of September, 1996

Figure 1

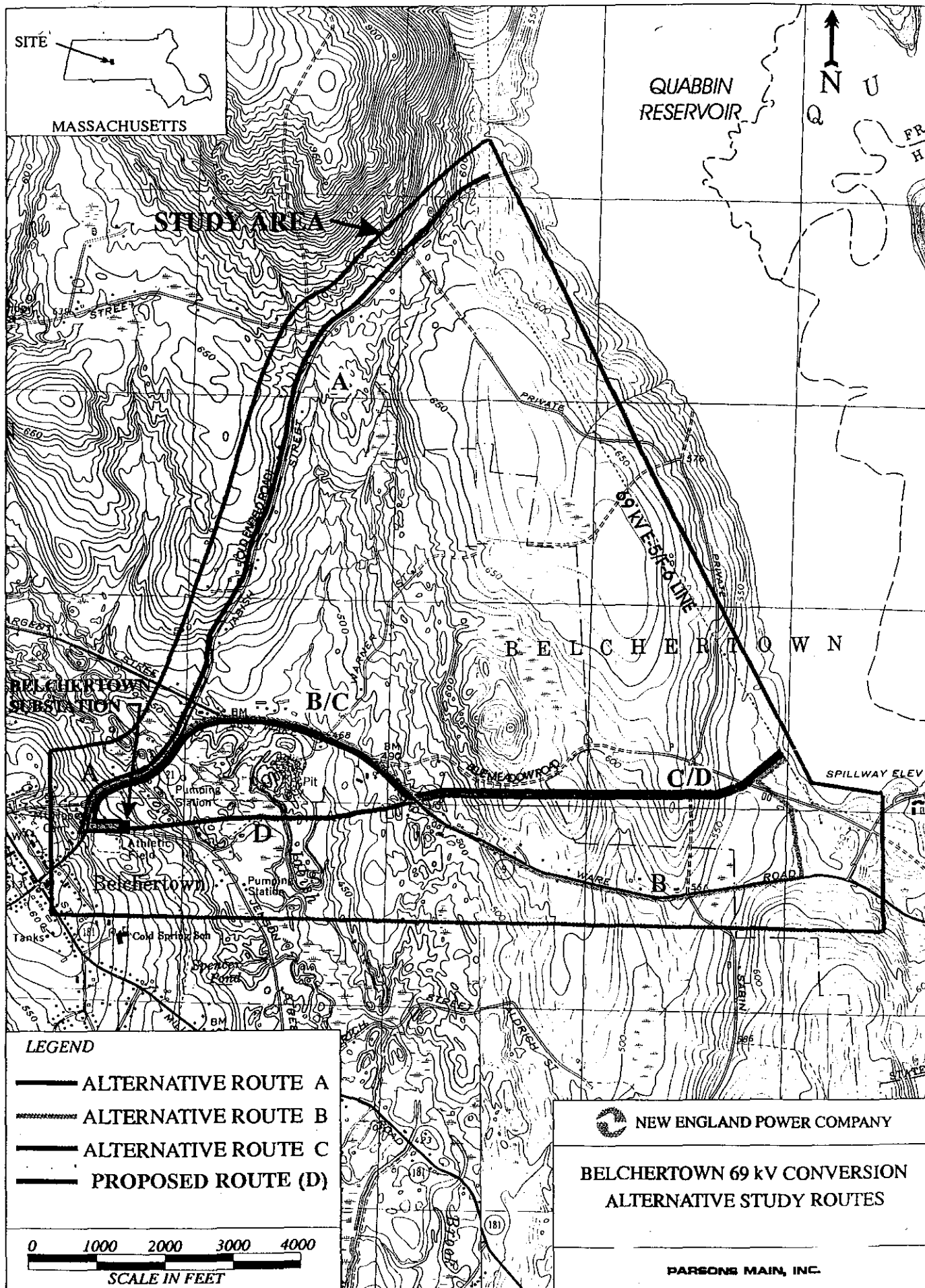
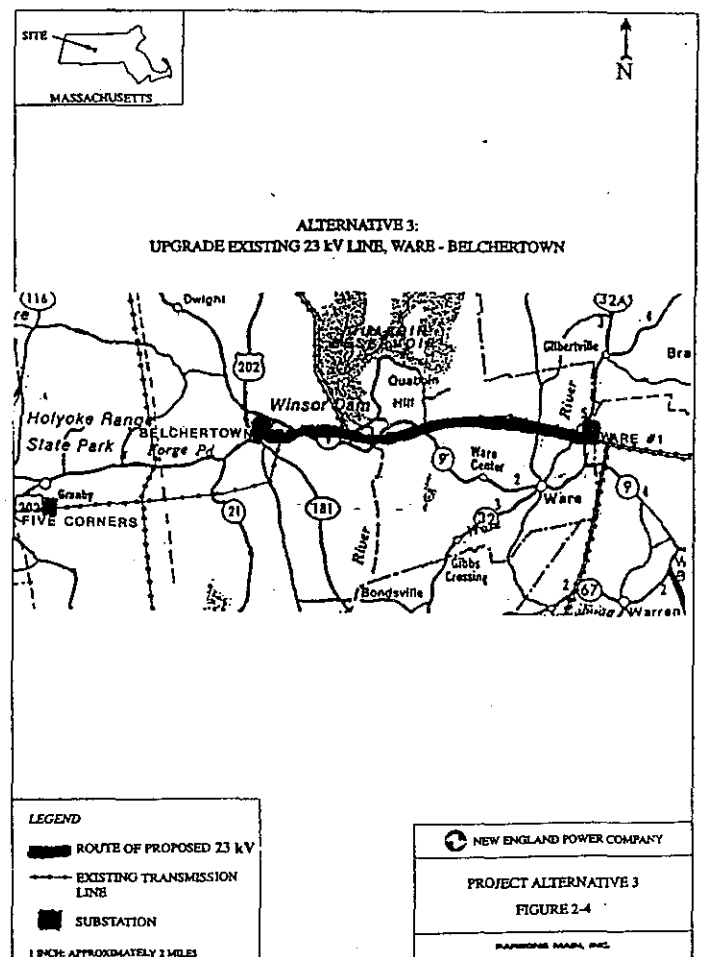
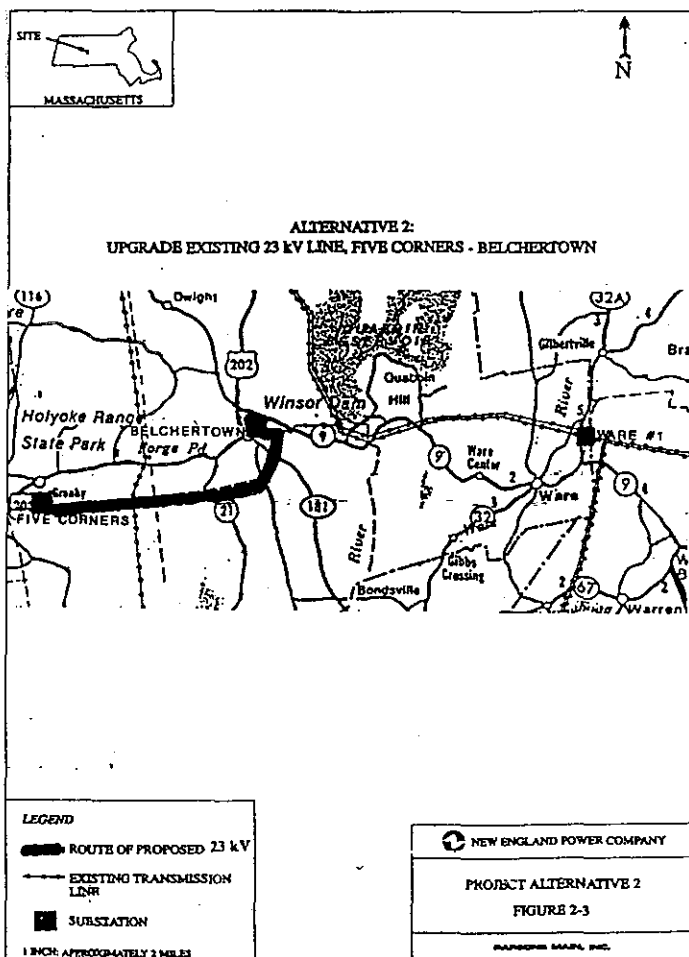
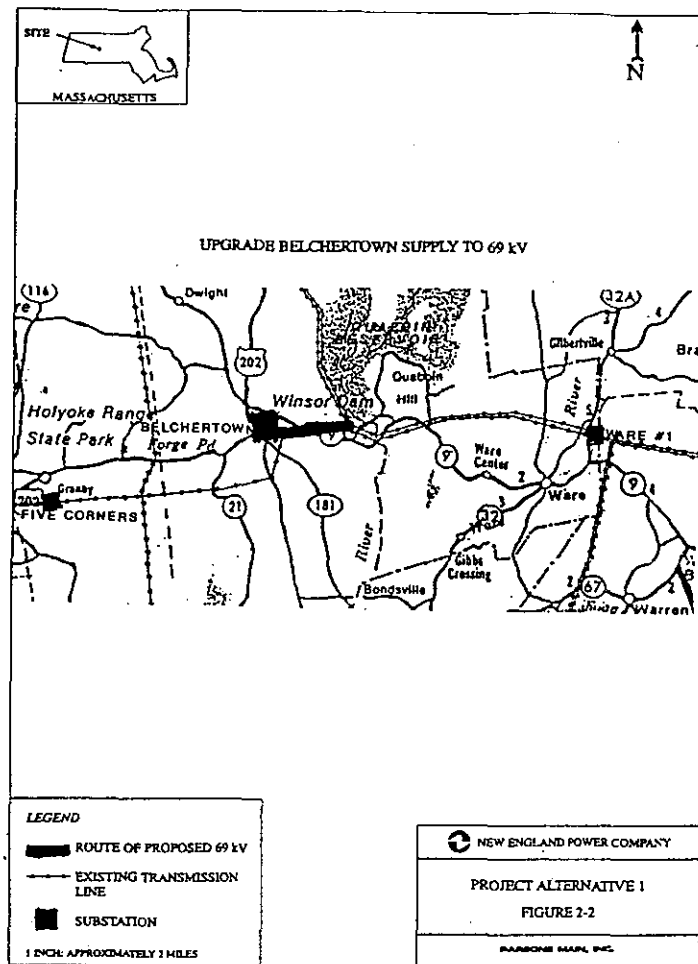


Figure 2



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).

COMMONWEALTH OF MASSACHUSETTS
Energy Facilities Siting Board

Proposed Rulemaking Regarding The
Rescission of 980 Code of Massachusetts
Regulations Sections 12.00 through 12.08

EFSB 96-5

FINAL ORDER ON RULEMAKING

Robert P. Rasmussen
Hearing Officer
December 3, 1996

On the Decision:

Barbara Shapiro

I. INTRODUCTION

On February 7, 1996, Executive Order 384 ("E.O. 384") was issued requiring all state agencies under the Governor's supervision to review their regulations and to retain or modify only those regulations which are mandated by law or essential to the health, safety, environment or welfare of the Commonwealth's residents. The Energy Facilities Siting Board ("Siting Board") conducted such a review, and pursuant to G.L. c. 164 § 69H and G.L. c. 30A §§ 2-7 proposes to rescind 980 C.M.R. § 12.00 entitled "The Procedure by Which Additional Resources are Planned, Solicited and Procured by Investor-Owned Electric Companies," known as the Integrated Resource Management ("IRM") regulations.

In 1990, both the Department of Public Utilities ("Department") and the Energy Facilities Siting Council ("Siting Council") promulgated regulations governing the administration and enforcement of the IRM process for electric companies. IRM Rulemaking, D.P.U. 89-239 (1990); 220 C.M.R. § 10.00; Siting Council's Final Order on IRM Rulemaking, 21 DOMSC 91 (1990); 980 C.M.R. § 12.00. Pursuant to Chapter 141 of the Acts of 1992 ("Reorganization Act"), the Department was granted jurisdiction over the entire IRM process for electric companies. Section 46 of the Reorganization Act also stated that the Siting Council's regulations were to "continue in force and the provisions thereof shall thereafter be enforced, until superseded, revised, rescinded or cancelled in accordance with law" by the Department or the newly created Siting Board.

In December 1992, the Department amended its IRM regulations, 220 C.M.R. § 10.00, to substantially incorporate the Siting Board's IRM regulations, 980 C.M.R. § 12.00. See D.P.U. 92-191 (1992). In preparing the amended 220 C.M.R. § 10.00, comments were sought from all interested persons and a public hearing was held. No substantive changes were intended or made in combining the Siting Council's IRM regulations with the Department's IRM regulations. The Department has subsequently amended these regulations, which now require the filing with the Department of an integrated resource plan by certain Massachusetts investor-owned electric utilities not less often than every twenty-four months. 220 C.M.R. §§ 10.01(2), 10.03(1).

In the instant proceeding, the Siting Board proposes to rescind 980 C.M.R. § 12.00, on the grounds that the Siting Council's IRM regulations have been superseded by the Department's regulations and that the Siting Board no longer has any jurisdiction in the IRM process.

II. COMMENTS

On October 18, 1996, the Siting Board solicited comments in this proceeding from all interested persons by November 8, 1996. No comments were received.

III. DECISION

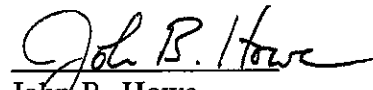
Accordingly, after notice and consideration, the Siting Board orders that 980 C.M.R. § 12.00 be rescinded, effective upon publication of notice in the Massachusetts Register.

A handwritten signature in dark ink, appearing to read "Robert P. Rasmussen", is written over a horizontal line.

Robert P. Rasmussen
Hearing Officer

Dated this 3rd day of December, 1996

Unanimously APPROVED by the Energy Facilities Siting Board at its meeting of December 3, 1996 by the members and designees present and voting. Voting for approval of the Order on Proposed Rulemaking: John B. Howe (Chairman, EFSB/DPU); Andree Gagnon (for David A. Tibbetts, Director, Department of Economic Development); Joseph Faherty, (Public Member); Nancy Brockway, (Public Member).


John B. Howe
Chairman

Dated this 3rd day of December, 1996

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).

COMMONWEALTH OF MASSACHUSETTS
Energy Facilities Siting Board

In the Matter of the Petition of Norwood Municipal Light)
Department for Approval to Construct Two 115/13.8 kV) EFSB 96-2
Transmission Lines, a 115/13.8 kV Substation)
and Associated Equipment, and an Associated 13.8 kV)
Distribution Line in Norwood, Massachusetts)

FINAL DECISION

Jolette A. Westbrook
Hearing Officer
April 14, 1997

On the Decision:
Enid Kumin
William S. Febiger

APPEARANCES: Kenneth M. Barna, Esq.
JoAnne Aylward Pierce, Esq.
Robert D. Shapiro, Esq.
Rubin and Rudman
50 Rowes Wharf
Boston, MA 02110
FOR: Norwood Municipal Light Department
Petitioner

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FIGURE 1

The Energy Facilities Siting Board hereby APPROVES the petition of Norwood Municipal Light Department to construct two 115/13.8 kilovolt ("kV") transmission lines, a 115/13.8 kV substation and associated equipment, and an associated 13.8 kV distribution line in the Town of Norwood, Massachusetts using the Light Department's proposed configuration and route.

I. INTRODUCTION

A. Summary of the Proposed Project and Facilities

Norwood Municipal Light Department ("NMLD" or "Light Department") is a municipal electric system that provides electric power to customers in the Town of Norwood ("Town" or "Norwood") (Exh. NM-1, at 1). NMLD's service territory, the Town of Norwood, is approximately ten square miles (id. at 2). The Light Department is an all-requirements power purchase customer of New England Power Company ("NEPCo") (Exhs. EFSB-N-3; EFSB-N-3-S; EFSB-N-3-S2; EFSB-N-3-S-C at 1).

NMLD has proposed to construct: (1) two underground parallel 115 kV transmission lines, located primarily within the layout of Route 1 in the Town; (2) a new 115/13.8 kV substation¹ to be built on a 0.5-acre site owned by the Norwood Water Department ("NWD") and located on the east side of Route 1, opposite Ellis Avenue ("Ellis Avenue substation");² and (3) a 0.7-mile 13.8 kV distribution line located within the layout of Route 1, to interconnect the proposed Ellis Avenue substation with the existing distribution system (id. at 51).³

¹ The new substation facilities will consist of a control house and an attached switchgear building, with all of the equipment except the transformers located indoors (Exh. NM-1, at 54).

² The area needed for the new substation, including cleared areas surrounding the fenceline to prevent damage from falling trees or vegetation, is 0.8 acres (Exh. NM-1, at 53-54; Tr. 2, at 140-141).

³ All construction along Route 1 will occur outside of the traveled way (Exh. NM-1, at 85-86).

For its primary configuration and route, NMLD has proposed to construct two parallel underground 115 kV transmission lines, each 2.2 miles in length, which will extend from the Dean Street substation to the Ellis Avenue substation site primarily traversing Route 1 (id. at 56).⁴ The proposed route for the 13.8 kV underground distribution line will exit the Ellis Avenue substation site, cross Route 1 and then run parallel to Route 1 for approximately 0.7 miles to Pleasant Street, where it will interconnect with the existing distribution system (id. at 52).⁵

NMLD has identified two alternative configurations. Under the first alternative ("Alternative One"), NMLD would construct two underground 115 kV transmission lines, each 2.6 miles in length, which would traverse predominately residential areas on Dean Street, Neponset Street and Pleasant Street (id. at 55). Alternative One would be identical to the Primary Configuration with respect to the proposed Ellis Avenue substation site, the upgrade to the existing Dean Street substation, and the 13.8 kV distribution system from the proposed substation to Pleasant Street (id.). Under the second alternative ("Alternative Two"), NMLD would use the same distribution and transmission line routes as the primary route with a 0.8-mile extension from the Ellis Avenue substation site to an alternative substation site on the north side of University Avenue ("University Avenue substation site" or "University Avenue site") (id. at 56).⁶ The substation configuration at the University Avenue substation site would be the same as that proposed for the Ellis Avenue substation

⁴ The Light Department's proposal also states that modifications will be made to the Dean Street substation within the existing fenceline in order to connect the new 115 kV lines to the 115 kV source of supply (Exh. NM-1, at 53; Tr. 1, at 49; Tr. 2, at 174).

⁵ For purposes of this discussion, the proposed transmission and distribution line routes together constitute NMLD's primary route ("primary route"). The primary route, the proposed modifications to the existing Dean Street substation and the proposed Ellis Avenue substation comprise the primary configuration of NMLD's proposed project ("Primary Configuration").

⁶ The University Avenue substation site is owned by the NWD and is within the control of members of the Board of Selectmen in their capacity as Water Department Commissioners of the Town (Exh. NM-1, at 56). The site is zoned for limited manufacturing and the land surrounding the site has not been developed (Brief at 92).

site (id. at 57). A map of the Light Department's Primary Configuration, Alternative One and Alternative Two is included as Figure 1.

Pursuant to G.L. c. 164, § 69J, no electric company shall commence construction of a jurisdictional energy facility (see Section I.C, below) unless a petition for approval of construction has been approved by the Massachusetts Energy Facilities Siting Board ("Siting Board") and, in the case of an electric or gas company which is required to file a long-range forecast pursuant to G.L. c.164, § 69I, that facility is consistent with the most recently approved long-range forecast for that company. NMLD asserted that it is not required to file a long-range forecast and supply plan pursuant to G.L. c. 164, § 69I in light of the Department's approval of NEPCo's forecast and supply plan by the Department of Public Utilities ("Department") in Massachusetts Electric Company, D.P.U. 94-112 (1994) ("D.P.U. 94-112 forecast") (Exh. NM-1, at 10).⁷ Instead, to meet the requirements of G.L. c. 164, § 69J, NMLD filed with the Siting Board the D.P.U. 94-112 forecast, the most recently approved supply plan that incorporates NMLD's load. The Siting Board notes that the D.P.U. 94-112 forecast has served as a basis for findings of need in other transmission line cases and, in this case, has the advantage of providing an independent check on the internal demand forecast which NMLD has submitted in support of its petition (id.; Exhs. EFSB-N-3-S-C; EFSB-RR-4, EFSB-RR-4-S). Consequently, the Siting Board will evaluate the consistency of the proposed facility with the D.P.U. 94-112 forecast.

B. Procedural History

On May 10, 1996, NMLD filed a petition with the Siting Board for approval to construct two 115/13.8 kV transmission lines, a 115/13.8 kV substation and associated equipment, and an associated 13.8 kV distribution line as described herein. This petition was docketed as EFSB 96-2. On July 22, 1996, the Siting Board conducted a public hearing on the petition in the Town. In accordance with the direction of the Hearing Officer, NMLD provided notice of the public hearing and adjudication. No petitions to intervene or to participate as an interested person were submitted.

⁷ Massachusetts Electric Company ("MECo") is a subsidiary of NEPCo.

The Siting Board conducted evidentiary hearings on October 16 and October 24, 1996. NMLD presented six witnesses: Peter J. Thalmann, a principal with Power Line Models, Inc. ("PLM"), who provided testimony regarding need, project approach and electric and magnetic field impacts; Allan M. Rice, principal engineer with PLM, who provided testimony regarding project approach and cost issues; Mayhew D. Seavey, an engineer, who testified regarding demand forecast issues; Pamela M. Chan, an environmental consultant with EARTH TECH, who provided testimony regarding the site and route selection process; Daniel J. Stuart, a senior professional for EARTH TECH, who provided testimony regarding facility alternatives and the environmental comparison of the facility alternatives; and Douglas L. Sheadel, a senior scientist with EARTH TECH, who testified regarding noise issues. The Hearing Officer entered 105 exhibits into the record, consisting primarily of NMLD's responses to information and record requests. NMLD entered 6 exhibits into the record. On November 15, 1996, the Siting Board issued a supplemental record request and an additional briefing question. NMLD filed its brief on December 18, 1996.

C. Jurisdiction

The Light Department's petition is filed in accordance with G.L. c. 164, § 69H, which requires the Siting Board "to implement the energy policies ... to provide a necessary 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 electric companies to obtain Siting Board approval for construction of proposed facilities at a proposed site before a construction permit may be issued by another state agency.

The Light Department's proposal to construct two 115 kV electric transmission lines falls squarely within the second definition of "facility" set forth in G.L. c. 164, § 69G. That section states, in part, that a facility is:

- (2) any new electric transmission line having a design rating of sixty-nine kilovolts or more and which is one mile or more in length except reconductoring or rebuilding of existing transmission lines at the same voltage.

The Light Department also proposes to construct a new substation and underground 13.8 kV distribution lines. The third definition of facility set forth in G.L. c. 164, § 69G is

pertinent in determining whether the substation and distribution lines are jurisdictional facilities. In that third definition a facility is defined as:

(3) any ancillary structure including fuel storage facilities which is an integrated part of the operation of any electric generating unit or transmission line which is a facility.

In Commonwealth Electric Company, 17 DOMSC 249, 263 (1988) ("1988 ComElectric Decision"), the Siting Board⁸ established a two-part standard for determining whether a structure is a facility under the third definition of facility set forth in G.L. c. 164, § 69G. In that case, the Siting Board determined that a structure is a facility if (1) the structure is subordinate or supplementary to a jurisdictional facility, and (2) the structure provides no benefit outside of its relationship to the jurisdictional facility. Id.

With regard to the first part of the definition, both the substation and the distribution line are subordinate to the proposed transmission lines.

With regard to the second part of the definition, the record indicates that there are no existing 115 kV transmission lines in the vicinity of the proposed substation. Therefore, the proposed substation provides no benefit outside of its relationship to the proposed 115 kV transmission lines, which are jurisdictional. Further, there is no evidence on the record that the proposed distribution line would provide service connections or interconnections with other distribution lines at intermediate locations along the proposed distribution line route. Therefore, the proposed 13.8 kV distribution line would not be capable of providing a benefit outside of its relationship to the proposed transmission lines.

Accordingly, pursuant to the definition of facility set forth in the 1988 ComElectric Decision, the Siting Board finds that the proposed 115/13.8 kV substation and 13.8 kV distribution line are facilities within the meaning of the third definition of facility in G.L. c. 164, § 69G.

⁸ Prior to 1992, the Siting Board was known as the Energy Facilities Siting Council. See St. 1992, c. 141.

D. Scope of Review

In accordance with G.L. c. 164, § 69H, before approving an application to construct facilities, the Siting Board requires applicants to justify facility proposals 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 its project is superior to alternative approaches in terms of cost, environmental impact, reliability, and ability to address the previously identified need (see Section II.B, below). Finally, the Siting Board requires the applicant to show that its site selection process has not overlooked or eliminated clearly superior sites, and that the proposed site for the facility is superior to a noticed alternative site⁹ in terms of cost, environmental impact, and reliability of supply (see Section III, below).

⁹ When a facility proposal is submitted to the Siting Board, the petitioner is required to present (1) its preferred facility site or route, and (2) at least one alternative facility site or route. These sites and routes often are described as the "noticed" alternatives because these are the only sites and routes described in the notice of adjudication published at the commencement of the Siting Board's review. In reaching a decision in a facility case, the Siting Board can approve a petitioner's preferred site or route, approve an alternative site or route, or reject all sites and routes. The Siting Board, however, may not approve any site, route, or portion of a route which was not included in the notice of adjudication published for purposes of the proceeding.

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 to provide a necessary energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost. In carrying out this statutory mandate with respect to proposals to construct energy facilities in the Commonwealth, the Siting Board evaluates whether there is a need for additional energy resources¹⁰ to meet reliability, economic efficiency, or environmental objectives. The Siting Board must find that additional energy resources are needed as a prerequisite to approving proposed energy facilities.

2. Description of the Existing System

NMLD indicated that the existing NMLD power system consists of two 115 kV overhead transmission supply circuits, one 115/13.8 kV power delivery distribution substation, and 17 13.8 kV feeders (Exh. NM-1, at 6). The Light Department stated that all customer loads are supplied via the 17 13.8 kV feeders, but that some customers are served locally at 4.16 kV via 13.8/4.16 kV substations (*id.*).

The Light Department further stated that its single 115/13.8 kV Dean Street substation is supplied by two 115 kV aerial transmission lines owned by NMLD in Norwood and by Boston Edison Company ("BECo") beyond the Norwood border (*id.*). NMLD stated that each 115 kV circuit is on its own wooden structures (*id.*). The Light Department also indicated that the 115 kV circuits are supplied from the West Walpole and Holbrook substations on the BECo system, enter Norwood from the south, and terminate at the Dean

¹⁰ In this discussion, the term "additional energy resources" is used generically to encompass both energy and capacity additions, including, but not limited to, electric generating facilities, electric transmission lines, energy or capacity associated with power sales agreements, and energy or capacity associated with conservation and load management.

Street substation in the southern portion of Norwood (id.). NMLD stated that its 115 kV taps connect BECo's 115 kV lines to the Dean Street substation (id. at 6-7).

NMLD stated that the Dean Street substation, constructed in 1970, consists of three 50/66/83/93 mega-volt ampere ("MVA") 115/13.8 kV transformers, one of which, a spare, is normally open (id. at 7). The Light Department stated that each of the two Dean Street transformers in operation has two 13.8 kV secondary windings, resulting in four 13.8 kV buses which supply two 13.8 kV switchgear lineups (id.). NMLD indicated that the two switchgear lineups together have 18 feeder positions, with each switchgear lineup consisting of nine feeder positions (id.). NMLD stated that all of the 13.8 kV switchgear is contained in a control house which, NMLD asserted, has no room for expansion (id.). NMLD further indicated that 17 of the 18 feeder positions are already in service, connected to lines exiting the substation via underground ductbanks (id. at 8). The Light Department asserted that there is no room available at the substation for feeder expansion, and that its ductbank along Dean Street is full (id.).

NMLD stated that the Dean Street substation yard was created by diverting the Neponset River, culverting Meadow Brook, and filling local wetlands (id.). NMLD indicated that wetland areas and the 100-year floodplain currently border the Dean Street substation on three sides and that the remaining side is bordered by Dean Street and the access driveway to the substation (id.). The Light Department asserted that significant environmental constraints would make any expansion at the Dean Street substation infeasible (id.).

In addition, NMLD stated that it currently uses express 13.8 kV feeders which are up to four miles in length originating at the Dean Street substation to service significant load concentrations in northern Norwood (id.).

NMLD indicated that its distribution system could serve a maximum load of 83 MVA without system overloads (id.). The Light Department estimated that this 83 MVA level would be exceeded around the year 2000 (id.).

3. Reliability of Supply

NMLD asserted that the proposed project is needed in order to provide a reliable supply of electricity to its customers consistent with the Light Department's reliability planning and design standards (id. at 31). Specifically, the Light Department stated that: (1) the maximum system loading of 83 MVA would be exceeded within the Light Department's planning horizon, based on NMLD's projected load growth; (2) 17 of the 18 feeder positions exiting its single substation are in use and the last feeder position is expected to be required in the near term; (3) sixteen cables exit the substation in a single 16-way ductbank with no spare duct positions, and this 16-way ductbank supplies approximately 93 percent of the total NMLD system load; and (4) the load served by the single NMLD substation exceeds industry norms for a single substation and results in a less reliable supply of power to Norwood (id. at 31-32). The Light Department asserted that these conditions are a direct result of load growth in Norwood since the initial construction of the Dean Street substation 25 years ago, and that as a result of such conditions, the NMLD system has the potential to fail to meet one or more of its fundamental reliability planning criteria (id.).

In this Section, the Siting Board first examines the reasonableness of NMLD's system reliability criteria. The Siting Board then evaluates: (1) whether NMLD used reviewable and appropriate methods for assessing system reliability based on load flow analyses; (2) whether existing and projected loads, under certain contingencies, exceed NMLD's reliability criteria, thereby requiring additional energy resources; and (3) whether acceleration of conservation and load management ("C&LM") programs could eliminate the need for such additional energy resources.

a. Reliability Criteria

The Light Department stated that the NMLD system does not currently meet, or, within the short-term forecast horizon, would no longer be in compliance with, NMLD's three basic reliability criteria, which are: (1) to maintain single contingency firm service at all load levels; (2) to avoid degradation in reliability; and (3) to prevent system overloads (Exh. EFSB-N-2).

The Light Department stated that, to maintain a single-contingency firm supply, its system planning calls for avoidance of substantial and sustained (greater than 5 minutes) loss of load in the event of an unscheduled loss of any single piece of supply system equipment such as a transmission circuit or substation transformer (Exh. NM-1, at 16). NMLD stated that its second criterion, avoiding degradation in reliability, pertained to balancing the number of system circuits, the number of customers on a circuit and the length of feeders (id.). NMLD indicated that increases in the number of customers on a circuit could compound reliability problems, even without a change in the rate of outages, because each single circuit outage would affect more customers (id.). With respect to its third criterion, the Light Department indicated that an unscheduled loss of equipment at any load level should not result in overloading of the remaining facilities, and that operations at above-normal ratings during a contingency should not exceed 24 hours (id. at 16, 32).

The Light Department stated that it also uses specific design criteria objectives to assess whether the NMLD system could meet its reliability requirements (Exh. EFSB-N-2). These are: to prevent loading of the NMLD system above 83 MVA; to maintain a distribution system with spare feeders for reliability and planning purposes; to avoid excessive dependence on a single, full ductbank; and to avoid excessive dependence on a single delivery substation (id.).

With respect to preventing loading of the NMLD system above 83 MVA, NMLD indicated that its consultant, PLM, recommended an 83 MVA loading limit for the existing NMLD system to meet the reliability criterion of preventing system overloads (Exh. NM-1, at 25-30). NMLD stated that its consultant's recommended loading limit was based on computer modelling of the existing system, assuming a maximum distribution system loading of 65 percent of the sum of the individual feeder line emergency ratings and other standards accepted elsewhere in the industry (id. at 25-27).

With respect to its second specific design criterion, NMLD indicated that a lack of spare feeder positions would allow insufficient flexibility to address unknowns associated with future load growth, spot loads and circuit routing constraints, and that over time projected system growth would result in increased load on existing feeders (id. at 17-18). NMLD indicated that increased load on existing feeders would in turn affect normal and

emergency loading conditions, impact firm capacity, degrade voltage regulation and increase system losses (id.). With respect to its third design criterion, avoiding dependence on a single, full ductbank, NMLD indicated that cable life, ratings, and repair times would all improve if the Light Department were able to maintain 20-25 percent spare duct capacity in accordance with its long-range planning standard (id. at 18-21).

Finally, with respect to dependence on a single delivery substation, NMLD indicated that supplying all of its system from the Dean Street substation resulted in long feeder lines, creating voltage concerns and line losses. The Light Department further indicated that all other Massachusetts municipal electric systems with peak loads exceeding 65 MVA use more than one distribution delivery substation (id. at 21-22). NMLD also stated, however, that its existing transformers at the Dean Street substation are 56 MVA each, or approximately twice the normal 25-33 MVA of most distribution substation transformers (id. at 23-24).

As a general matter, the Siting Board consistently has found that if the loss of any single major component of a supply system would cause significant customer outages, unacceptable voltage levels, or thermal overloads on system components, then there is justification for additional energy resources to maintain system reliability. New England Power Company, EFSB 95-2, at 10 (1996); New England Power Company, 4 DOMSB 109, 202 (1995); New England Power Company, 21 DOMSC 325, 339 (1991).

With respect to the Light Department's reliability criteria requiring conformance to normal equipment capabilities under normal operations, i.e., maintenance of single contingency firm service at all load levels, no deterioration of reliability below the Light Department's specified standards and prevention of system overloads, the Siting Board agrees that operation with such constraints is essential for providing a reliable, least-cost energy supply in Norwood.

With respect to NMLD's specific design criteria, the Siting Board agrees that NMLD has appropriately determined the use of a loading limit of 83 MVA as a measure of the reliability of the NMLD system. We note the loading limit is based on an analysis that focused on system overload.

In addition, the Siting Board agrees that the availability of spare distribution feeders and the level of dependence on a single, full ductbank are appropriate measures of the Light

Department's ability to meet its reliability requirements. We note that the Light Department cites issues of both degradation in reliability and increased potential for overloads to support its design objectives.

However, the Siting Board is unpersuaded that NMLD's reliance on an industry norm relative to a single delivery substation is an appropriate standard for judging the ability of the NMLD system to provide a reliable, least-cost energy supply. NMLD argues that such a standard is justified by the voltage concerns and line losses that arise with reliance on extended feeder lines. The Siting Board concludes that dependence on a single delivery substation is not per se an obstacle to system reliability, since a single delivery substation may well serve a small municipal system reliably, depending on its location.¹¹ The Siting Board notes, however, that more direct indicators of voltage concerns, for example, a high average feeder line length coupled with outage and complaint records that show reduced reliability, might well be an appropriate reliability-based design criterion for a system such as NMLD's. Overall, however, NMLD has developed design criteria that adequately assess the ability of the NMLD system to meet the Light Department's reliability requirements.

Accordingly, the Siting Board finds that the Light Department's reliability criteria, excluding the single substation design criterion, are reasonable for purposes of this review.

b. Load Forecast

i. Description

In support of its position that the proposed facilities are needed, NMLD provided a load forecast and supply plan, including forecasts of total energy requirements and system peak demand, for the NMLD system developed as an integral part of NMLD's planning process (Exh. EFSB N-3-S-C). NMLD stated that it prepared its forecast and supply plan using the methodology approved by the Siting Board and the Department for the municipal light plants in Taunton, Middleborough and Braintree (Exh. EFSB-RR-12). The Light Department also provided measurements of energy demand for fiscal years 1995 and 1996,

¹¹ The Siting Board notes that this general conclusion does not preclude the possibility that conditions specific to NMLD's existing substation may require construction of a second substation at this time as proposed.

the two intervening years since the development of NMLD's load forecast and supply plan. In addition, NMLD, an all-requirements customer of NEPCo, provided NEPCo's integrated least cost resource plan for 1994-2008, approved by the Department in the D.P.U. 94-112 forecast (Exh. EFSB-N-3-S-B).

NMLD indicated that it began its forecast of total energy requirements at the point of delivery to its system by forecasting energy sales for each of six distinct customer classes (Exh. NM-1, at 11). NMLD stated that its econometric forecast of sales predicted an average annual compound growth rate of 2.0 percent in energy usage over the period from 1995 through 2004, and that individual class growth rates varied from -2.5 percent to 2.4 percent (*id.* at 11-12).¹² The Light Department indicated that in forecasting each customer class, it used appropriate exogenous, independent variables and relied on independent data from its consultant, Data Resources, Inc. of Lexington, MA (*id.*). The Light Department also indicated that it evaluated several alternate forecast models for each customer class, in each case choosing the model which had the greatest explanatory power and statistical significance as measured by the adjusted R², F-test, t-statistic and Durbin-Watson statistic (*id.* at 13). NMLD then adjusted forecasted energy sales to reflect the impact of utility-sponsored C&LM measures, as well as distribution system losses and internal use (*id.* at 11).

NMLD stated that it forecasted annual peak demand with a regression analysis of summer peak demand against total system energy requirements and average daily temperature for the month of the summer peak using historic data from the years 1981 to 1994 (*id.*).¹³ The Light Department stated that the system peak demand was first forecast using energy requirements before adjustment for utility-sponsored C&LM and then adjusted for the impact of C&LM on NMLD's summer peak demand (*id.* at 12). NMLD indicated that, based on its

¹² As noted above, NMLD also provided energy demand data for 1995 and 1996 (Exh. EFSB-RR-4). NMLD indicated that actual adjusted energy demand was approximately 18,000 megawatthours ("MWh") less than forecasted demand in 1995 and approximately 28,000 MWh less in 1996 (Exhs. NM-2, at exhibit 2-3; EFSB-RR-4). NMLD stated that the intent of econometric forecasts was not to determine growth in the short run, but to determine growth over the forecast period (Exh. EFSB-RR-4).

¹³ NMLD is a summer peaking system (Exh. NM-1, at 12).

forecast model, summer peak demand could exceed 83 MVA as early as 2001 under extreme weather conditions and as early as 2002 under average weather conditions at an assumed equivalent power factor of 93 percent (id. at 12-13).

The Light Department also indicated that in the D.P.U. 94-112 forecast, NEPCo assumed that for each of the years 1994 to 2008, sales to NMLD would be 1.5 percent of sales to NEPCo's primary retail customers, MECo, Granite State Electric Company and the Narragansett Electric Company (Exhs. EFSB-N-3-S-A; EFSB-N-3-S-B).¹⁴ Using this information and the no demand side management ("DSM") base case forecast for NEPCo's primary retail customers in the D.P.U. 94-112 forecast, the Siting Board calculated projected sales to NMLD for the years 1994 to 2008 as reflected in the DPU 94-112 forecast (Exh. EFSB-N-13). The Siting Board's calculations indicated that, with adjustments for NMLD's projected DSM and NYPA purchases, NEPCo's forecast of NMLD's energy requirements differed from NMLD's forecast by less than 3 percent for each year of the ten year period 1995 to 2004 (Exhs. EFSB-N-13; NM-2, at exhibit 2-3).

ii. Analysis

NMLD has submitted two forecasts of load in support of its petition, the D.P.U. 94-112 forecast, which has been reviewed by the Department, and an internal forecast, which has not been previously reviewed. The Siting Board statute requires that forecasts are based on substantially accurate historical information and reasonable statistical projection methods. See G.L. c. 164, §§ 69J and 69I. To ensure that this standard has been met, the Siting Board and the Department have consistently required forecasts to be reviewable, appropriate

¹⁴ NMLD's witness testified that NEPCo's sales to NMLD would not equal NMLD's total energy requirements because NEPCo's sales would not reflect purchases by NMLD from the New York Power Authority ("NYPA") (Tr. 2, at 181-182). The Light Department indicated that for the 12 months ending in June, 1996, NMLD purchased 18,000 MWh from NYPA, typical of annual NMLD purchases from NYPA for the last five-year period (id. at 182-183). The Light Department further indicated that 18,000 MWh was the order of magnitude of the difference between NMLD's forecasted energy requirements and NEPCo's forecast of NMLD's energy requirements (id.; Exhs. EFSB-N-13; EFSB-N-3-S-C at 62).

and reliable. Colonial Gas Company, D.P.U. 96-18, at 5 (1996); Bay State Gas Company, D.P.U. 93-129, at 5 (1996); Northeast Utilities, 17 DOMSC 1 (1988).

In preparing its internal forecast, NMLD has relied on quantitative techniques similar to those used in other municipal forecasts approved by the Siting Board and the Department, and has provided reasonable explanations of its estimation of load growth at the substation level, based on both NMLD's forecast of system load and measurements of increasing substation load. No additional subdivision of the load forecast for the NMLD system is necessary, as NMLD supplies its entire system via one substation. Consequently, the Siting Board finds that NMLD's internal forecast is reviewable and appropriate.

To validate its forecast, NMLD has compared it with the derivation of load for the NMLD system based on the D.P.U. 94-112 forecast. The Siting Board finds that there is reasonable consistency between the two forecasts. Based on this comparison and on its evaluation of NMLD's forecasting techniques, the Siting Board finds that, for the purposes of this review, NMLD's internal forecast is reliable.¹⁵

c. Equipment Loading and Configuration Analysis

In this Section the Siting Board considers whether there is a need for additional energy resources based on the Light Department's reliability and design criteria.

NMLD indicated that, under its high case scenario, peak load would exceed its previously identified maximum system loading of 83 MVA in the 2000-2001 timeframe (Exh. NM-2, at exhibit 2-12). NMLD also indicated that the number of feeders for backup was constrained at the existing Dean Street substation (Exh. NM-1, at 35). The Light Department stated that the one remaining spare feeder position would be in service by 1999,

¹⁵ The Siting Board notes that municipal gas and electric companies are no longer required to file long range forecast and supply plans with the Department pursuant to G.L. c. 164, § 69I. St. 1996, c. 97. In addition, pending legislation would allow the Department to exempt investor-owned utilities from this requirement. The Siting Board notes that, in the absence of regular Department review of long range forecasts, it may become necessary for the Siting Board to conduct more extensive reviews of utility load forecasts in the context of petitions to construct jurisdictional facilities such as electric transmission lines and gas pipelines.

leaving NMLD without the flexibility to provide for new spot loads (id. at 27). Finally, NMLD stated that the 16-way ductbank contained no spare ducts, and added that the loading of the ductbank was approaching its limit (id. at 36; Tr. 1, at 62-71).

The Light Department indicated that the maintenance of firm service under a single contingency without overloading equipment was NMLD's primary reliability criterion (see Section II.A.3.a, above) (Exh. NM-1, at 32). The Light Department asserted that its existing exposure to contingencies was inconsistent with its system reliability planning and design criteria given the lack of spare ducts and ductbanks (id. at 36).

NMLD indicated that it first analyzed the contingency of an unscheduled loss of a single circuit within the 16-way ductbank (id.). The Light Department stated that to satisfy the system reliability criteria under such a single contingency, it currently had to shift load to backup circuits, also within the 16-way ductbank, without causing any overloading of other circuits (id.). NMLD noted that, under its system reliability criteria, a faulted circuit should be repaired within 24 hours (id.).

The Light Department stated that its analysis showed the ductbank approaching its recommended limit of 65 percent of the sum of the emergency ratings, and that, due to unequal load splits, some feeders were already loaded at or beyond the 65 percent limit (id.). NMLD stated that heavy loading of these feeders had reduced their ability to provide backup for adjacent feeders (id.).

The Light Department stated that inadequate backup conditions were not confined to heavily loaded feeders (id.). The Light Department explained that some feeders loaded to less than 65 percent of their emergency ratings also could involve complex backup arrangements (id.). As a case in point, NMLD referred to the University Avenue 1 and 2 feeders which provide mutual backup (id. at 32-33). NMLD stated that the University Avenue 2 feeder is only tied to the University Avenue 1 feeder, and that both feeders are presently loaded to 60 percent of their emergency ratings (id.). NMLD stated that if the University Avenue 2 feeder were lost due to a cable fault, it would be necessary to switch load from the University Avenue 1 feeder to another adjacent feeder or feeders to avert an overload (id.). NMLD indicated that cascading switching procedures such as those required to back up loss of the University Avenue 2 feeder could become complicated and time

consuming and, in addition, if occurring during the summer peak period, could significantly increase the potential for cable overload and a lengthy repair process (*id.* at 33-34).¹⁶

The Light Department further noted that the 16-way ductbank serves approximately 93 percent of its system load, and that it had no other source from which to supply the load of this ductbank (*id.* at 34). The Light Department indicated that it therefore also considered the contingency of a catastrophic failure in the ductbank involving more than one feeder (*id.*). NMLD stated that multiple feeder failures in the ductbank would most likely result from a manhole explosion or fire or from a partial dig-in caused by work unrelated to NMLD activities (*id.*).¹⁷ With respect to a manhole explosion or fire, NMLD stated that the sixteen circuits in its ductbank were split into two manholes with eight circuits per manhole at four locations along the ductbank route, and that a serious manhole failure could therefore impact up to eight circuits at a time (*id.* at 35).

The Siting Board finds that the Light Department used reviewable and appropriate methods for assessing the reliability of its supply based on appropriate system reliability planning and design criteria. The Siting Board also finds that the Light Department's analysis demonstrates that: (1) under the current configuration, peak load would exceed a maximum system loading of 83 MVA in the 2000-2001 timeframe in contravention of

¹⁶ The Light Department indicated that, in the event of a faulted cable, emergency service would likely be provided to the load in less than two hours (Exh. NM-1, at 33). NMLD indicated, however, that under certain fault conditions, removal and replacement of the faulted cable might be required (*id.*). NMLD indicated that, if spare ducts were available in a ductbank, a new cable could be pulled into an available duct within 24 hours and the failed cable could be removed at a later time under non-emergency conditions (*id.*). The Light Department stated that without spare ducts, the system would have to operate for more than 24 hours with emergency service, and possibly significantly longer, exceeding the cable's 24-hour emergency rating (*id.*). NMLD also indicated that extended operation with emergency service arrangements in place would increase the potential for loss of another strategic feeder and prolonged outages (*id.* at 33-34).

¹⁷ The Light Department noted that Polaroid, its largest single customer with a peak load of 7000 kilowatts, is served by two physically adjacent feeders in NMLD's ductbank (Exh. NM-1, at 34-35). The Light Department stated that the loss of the feeders serving Polaroid would interrupt service to the Polaroid facility until the cables and/or ductbank could be repaired, resulting in an extended outage (*id.*).

NMLD's design criteria; (2) by 1999, feeder position capabilities would constrain NMLD's ability to meet load growth, particularly large customer growth, because the existing system would not have the flexibility to serve new spot loads; and (3) at present, the contingency of the loss of a single circuit in the 16-way ductbank could result in system operation at emergency levels for more than 24 hours, in contravention of system reliability criteria.

Accordingly, the Siting Board finds that there is a need for additional energy resources based on the Light Department's reliability criteria.

d. Accelerated Conservation and Load Management

G.L. c. 164, § 69J requires a petitioner to include a description of actions planned to be taken to meet future needs and requirements, including the possibility of reducing requirements through load management. NMLD asserted that, given the amount of load reduction necessary, accelerated C&LM efforts would not address the identified reliability need (Exh. NM-1, at 37). The Light Department further asserted that its system was already out of compliance with certain of its design criteria and that C&LM could not address such system shortcomings as a lack of spare duct space and feeder positions or system reliance on a single distribution substation (*id.*).¹⁸ See Section II.A.3, above.

NMLD stated that it expected its base unadjusted peak load to reach 79 megawatts ("MW") or 84.9 MVA in 2001, and that adjusted to account for NMLD's C&LM program, the base case load in 2001 would be 76.7 MW or 82.4 MVA (Exh. NM-2, at exhibit 2-11). The Light Department stated that under its high case forecast, peak load adjusted to account for NMLD's C&LM program would be 77.65 MW or 83.5 MVA in 2001

¹⁸ NMLD provided a list and description of the C&LM programs which it indicated were incorporated into its demand forecast (Exhs. NM-1, at 38; NM-2, at exhibit 2-10). In addition, the Light Department provided projections of coincident peak reductions due to utility-sponsored C&LM for the years 1995 through 2000 (Exh. NM-2, at exhibit 2-10). The Light Department indicated that reductions ranged from a total of 1.4 MW in 1995 to 2.3 MW in the year 2000 (*id.*). NMLD stated that the Light Department had achieved additional significant reductions in MVA requirements with the installation of capacitors (Exh. NM-1, at 37, 38).

(id. at exhibit 2-12). NMLD asserted that while C&LM had slowed the growth of NMLD's peak load, and would continue to do so, C&LM alone would not prevent NMLD's load from exceeding its emergency rating of 83 MVA (Exh. NM-1, at 38). NMLD further asserted that C&LM would therefore fail to meet the reliability criterion of preventing system overloads (id.). NMLD also indicated that even a 50 percent increase in its C&LM program effective in 1996 would result in an adjusted base case peak load of approximately 83 MVA in 2002 (id.; Exh. NM-2, at exhibit 2-13). NMLD stated that, under its high case forecast, adjusted peak load would reach approximately 83 MVA a year earlier, in 2001 (Exh. NM-2, at exhibit 2-14).

The record demonstrates that the existing NMLD system will not meet its reliability criterion of avoiding system overloads in the short-term forecast period even when load reductions due to accelerated C&LM are considered. Further, the record demonstrates that C&LM will not enable the Light Department to reduce its system load sufficiently to meet its specific design requirements with regard to spare ducts and feeders.

Accordingly, the Siting Board finds that acceleration of C&LM programs could not eliminate the identified need for additional energy resources based on the Light Department's reliability criteria.

e. Conclusions on Reliability of Supply

The Siting Board has found that the Light Department's reliability criteria, excluding the single substation design criterion, are reasonable for purposes of this review. The Siting Board has also found that NMLD's internal forecast is reviewable, appropriate and reliable for the purposes of this review.

The Siting Board has further found that the Light Department used reviewable and appropriate methods for assessing the reliability of its supply based on appropriate system reliability planning and design criteria. The Siting Board has also found that the Light Department's analysis demonstrates that: (1) under the current configuration, peak load would exceed a maximum system loading of 83 MVA in the 2000-2001 timeframe in contravention of NMLD's design criteria; (2) by 1999, feeder position capabilities would constrain NMLD's ability to meet load growth, particularly large customer growth, because

the existing system would not have the flexibility to serve new spot loads; and (3) at present, the contingency of the loss of a single circuit in the 16-way ductbank could result in system operation at emergency levels for more than 24 hours, in contravention of system reliability criteria. The Siting Board has therefore found that there is a need for additional energy resources based on the Light Department's reliability criteria.

Finally, the Siting Board has found that acceleration of C&LM programs could not eliminate the identified need for additional energy resources based on the Light Department's reliability criteria.

Accordingly, the Siting Board finds that additional energy resources currently are needed for reliability purposes in the area supplied by the NMLD system.

B. Comparison of the Proposed Project and Alternative Approaches

1. Standard of Review

G.L. c. 164, §69 H requires the Siting Board to evaluate proposed projects in terms of their consistency with providing a necessary energy supply to the Commonwealth with a minimum impact on the environment at the lowest possible cost. In addition, G.L. c. 164, § 69J requires a project proponent to present "alternatives to planned action" which may include: (a) other methods of generating, manufacturing, or storing; (b) other sources of electrical power or natural gas; and (c) no additional electric power or natural gas.¹⁹

In implementing its statutory mandate, the Siting Board requires a petitioner to show that, on balance, its proposed project is superior to alternative approaches in terms of cost, environmental impact, and ability to meet the previously identified need. New England Power Company, EFSB 95-2, at 18; New England Power Company, 4 DOMSB at 136; New England Power Company, 21 DOMSC at 359-375.²⁰

¹⁹ G.L. c. 164, § 69J also requires a petitioner to provide a description of "other site locations." The Siting Board reviews the Petitioner's proposed site, as well as other site locations, in Section III.B, below.

²⁰ In New England Power Company, EFSB 95-2, the Siting Board stated that it expected applicants, when appropriate, to analyze the ability of distributed generation to meet
(continued...)

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.

New England Power Company, EFSB 95-2, at 19; New England Power Company, 4 DOMSB at 137; New England Power Company, 21 DOMSC at 374-375.

2. Project Approaches

In its petition, NMLD identified three possible approaches for meeting the identified need: (1) the proposed project; (2) the expansion of the existing Dean Street substation ("Dean Street Expansion Plan"); and (3) improvements to ductbanks on the low voltage distribution system ("Low Voltage Plan") (Exhs. NM-1, at 40-50; EFSB-RR-3; EFSB-RR-3-S; Tr. 1, at 12-18, 56, 57).²¹

NMLD stated that the proposed project, to be constructed in 2000, would consist of a new substation and associated 13.8 kV distribution facilities in northern Norwood, a new 2.2 mile 115 kV transmission line connecting the new substation to the existing Dean Street

²⁰(...continued)

the identified need. The submission in the instant case predates the Siting Board's requirement, which is therefore not applicable. Nonetheless, NMLD provided the Siting Board with a discussion of why distributed generation could not meet the identified need. This is examined in Section II.B.3.d, below.

²¹ Two other alternatives were presented that are not discussed here at length. The first of these was largely the same as the Low Voltage Plan, except that (1) construction of the new substation in the year 2011 would occur at the Dean Street substation site, and (2) a minimum of two 8-way, 13.8 kV ductbanks from Dean Street substation to Route 1 (with a total capacity of 12 cables) would be constructed in the year 2000 (Exhs. EFSB-RR-3; EFSB-RR-3S; Tr. 1, at 58-60). The conclusions in Section II.B.3.c, below, apply equally to this approach.

The second alternative presented, but ultimately dismissed, was the possibility of expanding the Dean Street substation to accommodate a three-transformer layout (Exh. EFSB-RR-3; Tr. 1, at 17, 22-25). The Light Department stated that a three-transformer layout would be constrained by the transformer windings: there would be an increased chance of multiple feeder outages with a resultant loss of reliability (Exh. EFSB-RR-3). The Light Department also indicated that a three-transformer scheme would not result in additional feeder positions at Dean Street and therefore would not meet NMLD's identified need and reliability criteria (*id.*).

substation, and modifications to the Dean Street substation (Exh. NM-1, at 40). NMLD indicated that the Dean Street Expansion Plan, which also would be constructed in 2000, would consist of a new 115 kV/13.8 kV substation at the existing Dean Street site, together with modifications to the existing Dean Street substation, and new 13.8 kV distribution facilities, including lines extending into northern Norwood along portions of the transmission line route associated with the proposed project (Exh. EFSB-RR-3-S at 3).²² Finally, NMLD indicated that the Low Voltage Plan would consist of two stages: first, the construction in 2000 of a new 13.8 kV, four-circuit ductbank to interconnect the Dean Street substation with the existing distribution system at Route 1; and second, the construction in 2011 of a 115/13.8 kV substation and associated 13.8 kV distribution facilities in northern Norwood (*id.* at 2-3).

The Siting Board's examination of project approaches will include analysis of the proposed project, identified alternative approaches, and the ability of distributed generation to meet the identified need.²³

3. Ability to Meet the Identified Need

In its analysis of the ability of the above approaches to meet the identified need, the Siting Board evaluates whether each approach would provide a reliable supply to the area served by the existing Dean Street substation and ancillary transmission and distribution equipment, consistent with the Light Department's criteria for equipment loadings.

²² In its petition, NMLD discussed the Dean Street Expansion Plan primarily in terms of adding additional equipment to the existing substation (Exh. NM-1, at 45-47). However, during the course of the proceedings, at the request of the Siting Board, NMLD expanded its discussion to include the possibility of constructing a second substation and new feeder lines and ductbanks at the existing substation site (Exh. EFSB-RR-3-S at n.1).

²³ G.L. c. 164, § 69J requires the Light Department to consider the alternative of "no additional electrical power." However, the Siting Board has found that there is a need for additional energy resources based on the Light Department's reliability criteria (see Section II.A.3.c, above). Consequently, the Siting Board finds that the alternative of "no additional electric power" would be unable to meet the need identified in Section II.A.3.c, above. A more detailed analysis of this alternative is therefore unnecessary.

a. Proposed Project

The Light Department asserted that the proposed project would meet the identified need (Exh. NM-1, at 45). NMLD indicated that the construction of a new substation in northern Norwood would relieve existing system overload, contingency and associated reliability problems (*id.* at 44). Specifically, NMLD indicated that the proposed new substation would: add approximately 55 MVA of firm system capacity; increase the system loading limitation above 83 MVA; make spare ducts or circuitry available in the existing 16-way ductbank; relieve many of the existing, heavily-loaded distribution feeders and circuits at the Dean Street substation and improve thermal ratings of the remaining circuits; and create new feeder positions to prevent system overloads and to provide service for future loads (*id.* at 43-45; Exhs. NM-2, at 3-1; EFSB-N-8; EFSB-N-9; EFSB-N-10). The Light Department also stated that the proposed project would eliminate NMLD's dependence on a single delivery distribution substation (see Section II.A.2, above) (Exh. NM-1, at 44).

The record demonstrates that the proposed project would meet the Light Department's reliability and design criteria. Accordingly, the Siting Board finds that the proposed project would meet the identified need.

b. Dean Street Expansion Plan

The Light Department asserted that the Dean Street Expansion Plan would meet the identified need (Brief at 60). NMLD provided supporting documentation indicating that the addition of a new 115/13.8 kV substation at the existing Dean Street substation site would add spare ducts and feeders (Exh. EFSB-RR-3-S). NMLD also indicated that the new 115/13.8 kV substation at the Dean Street substation site would increase the loading limitation of the NMLD system above 83 MVA (*id.*; Tr. 1, at 33-34).²⁴

²⁴ The Light Department indicated that the Dean Street Expansion Plan, while theoretically able to meet the identified need, would be impractical from a construction engineering standpoint (see Section II.B.5.a, below) (Exh. EFSB-RR-3-S; Tr. 1, at 61).

The record demonstrates that the Dean Street Expansion Plan would meet the Light Department's criteria for reliability and design criteria. Accordingly, the Siting Board finds that the Dean Street Expansion Plan would meet the identified need.

c. Low Voltage Plan

NMLD asserted that the Low Voltage Plan would not meet the identified need (Exh. NM-1, at 48). The Light Department stated that the Low Voltage Plan would create some spare duct positions, meeting NMLD's design criteria regarding spare duct and ductbank capacity (*id.*). The Light Department indicated, however, that while ductbank improvements would increase the NMLD system's emergency rating to 93 MVA, this load level would be inadequate to meet system load between 2007 and 2011 (*id.*; Exhs. EFSB-A-1, EFSB-RR-3-S). The Light Department explained that because the Low Voltage Plan would initially rely on ductbank improvements, and would not add new feeders until 2011, NMLD would be left with limited options in the short run for handling and accommodating spot loads (Exhs. NM-1, at 48-50; EFSB-A-1; EFSB-RR-3-S; EFSB-RR-11; Tr. 1, at 57-58).²⁵

The record demonstrates that under the Low Voltage Plan, NMLD would face feeder constraints that would likely restrict the ability of the NMLD system to provide in the near term for new spot loads. Accordingly, the Siting Board finds that the Low Voltage Plan would not meet the identified need.

²⁵ NMLD also indicated that, because no new feeders would be added as part of the initial improvement, the Low Voltage Plan would merely defer to the year 2011, rather than eliminate, construction of a new 115/13.8 kV substation in northern Norwood (Exh. EFSB-RR-3-S). The Siting Board notes that to address the problem associated with the feeders the Light Department could choose to construct a new substation at an earlier date, essentially the approach of the proposed project and the Dean Street Expansion Plan.

d. Distributed Generation

The Light Department also provided an analysis of the ability of distributed generation to meet the identified need alone or in combination with other modifications to the existing system (Exh. EFSB-RR-2). NMLD anticipated a number of operational problems associated with the use of distributed generation including, but not limited to the following: (1) distributed generation would not provide for more feeder positions at the existing Dean Street substation, and (2) with distributed generation, feeders at the Dean Street substation might improperly trip for faults on other feeders (*id.*).²⁶ The Light Department further indicated that larger generation would be most advantageous in terms of relieving its existing 16-way ductbank, but that smaller generation would be desirable to prevent islanding, *i.e.*, the incidence of a feeder breaker staying "live" if the distributed generation exactly matched the feeder load (*id.*).²⁷

The record demonstrates that distributed generation would not meet NMLD's design criteria with respect to spare feeders and avoiding excessive dependence on a single, full ductbank. Accordingly, the Siting Board finds that distributed generation would not meet the identified need.

e. Conclusions on Ability to Meet the Identified Need

The Siting Board has found that the Light Department has demonstrated that the proposed project and the Dean Street Expansion Plan would meet the identified need, but that the Low Voltage Plan and distributed generation would not meet the identified need.

²⁶ The Light Department indicated that improper tripping could result in the loss of feeders that were not faulted (Exh. EFSB-RR-2). NMLD explained that, in the case of such feeder loss, the feeder generators would backfeed fault current toward the Dean Street substation, requiring NMLD to plan for normal and emergency conditions, including ties to backup feeders (*id.*).

²⁷ In addition, the Light Department stated that, as a legal matter, it is not permitted to develop and operate distributed generation facilities because of its obligations as an all-requirements customer of NEPCo (Exh. EFSB-RR-2). NMLD stated that by operating generation it would violate agreements with NEPCo, including an antitrust settlement and its Tariff 1 agreement, filed with and approved by FERC (*id.*).

Accordingly, the Siting Board next evaluates the reliability, environmental impacts, and cost of the proposed project and the Dean Street Expansion Plan.

4. Reliability

The Light Department evaluated the proposed project and the Dean Street Expansion Plan based on its stated reliability criteria: (1) to maintain single contingency firm service at all load levels; (2) to avoid degradation in reliability; and (3) to prevent system overloads (Exh. EFSB-N-2).

The Light Department asserted that the proposed project would be more reliable than the Dean Street Expansion Plan (Brief at 64). NMLD noted that the new distribution lines associated with the Dean Street Expansion Plan would be 2.2 to 2.6 miles long, as compared to 0.7 to 1.5 miles long under the proposed project (Exhs. EFSB-RR-3(c); EFSB-RR-3S). NMLD stated that the longer distribution lines of the Dean Street Expansion Plan would result in increased line losses, poorer voltage conditions, increased outages and other reliability problems (Exh. EFSB-RR-3(c)). NMLD also stated that the Dean Street Expansion Plan, but not the proposed project, would require construction of a second substation and associated feeders at the Dean Street substation site (*id.*). The Light Department explained that 30 to 36 feeders, requiring many independent, underground routes, would eventually exit from a second substation and that tying the feeders into the NMLD system at the Dean Street location would create levels of congestion unacceptable under prudent engineering practice (*id.*).

The record demonstrates the potential for line losses, degraded voltage and other reliability problems associated with the length of the distribution lines required for the Dean Street Expansion Plan. The record also demonstrates the likelihood that construction of a second or expanded substation with associated feeders at the Dean Street substation site would involve congested underground feeder lines, with resultant reductions to reliability.

Accordingly, the Siting Board finds that the proposed project would be preferable to the Dean Street Expansion Plan with respect to reliability.

5. Environmental Impacts

In this Section, the Siting Board compares the proposed project to the Dean Street Expansion Plan with respect to environmental impacts resulting from: (1) facility construction; (2) magnetic field levels; and (3) permanent land use.

a. Facility Construction Impacts

NMLD asserted that impacts associated with construction of the proposed facility would be minimized for all environmental categories (Brief at 65). In support of its assertion, the Light Department provided documentation addressing impacts and mitigation with respect to water resources, land resources, land use and visual aspects of the proposed facility which are reviewed in more detail by the Siting Board in Section III.A, below.

The record demonstrates that along much of the proposed facility route, facility construction impacts would be limited by the combination of NMLD's planned mitigation and the fact that construction for the proposed transmission and distribution lines would take place in the grassed and paved shoulder of an existing state highway in an area predominantly commercial in use. With respect to the new substation at the Ellis Avenue site, the Light Department's planned mitigation would ensure that construction would not impact water resources, that any trees removed would be replaced on a one-to-one basis and that existing arboreal screening would prevent visual impacts during construction. Modifications of the Dean Street substation would have minor and temporary environmental impacts.

The Light Department asserted that the Dean Street Expansion Plan would be impossible to build without undue environmental impacts at the Dean Street substation site (Brief at 66). NMLD indicated that 0.8 acres would be required for construction of expanded facilities for the Dean Street Expansion Plan at the Dean Street substation site (Exh. NM-1, at 53-53). The Light Department also indicated that adequate space was not available at the Dean Street substation site for construction of additional transformers and ancillary equipment without adverse environmental impacts, including filling and construction impacts to wetlands and floodplains (Exh. EFSB-RR-3; Tr. 1, at 128-130). NMLD stated that, depending on the location of the substation expansion, such impacts would likely affect

riverfront and bordering vegetated wetlands, and include filling of wetlands, filling of bordering land subject to flooding, increases to impervious surface area, elimination of flood storage and other indirect impacts (Exhs. EFSB-RR-3; Tr. 1, at 128-130). In addition, NMLD asserted that expansion of the Dean Street substation would not be permissible under current environmental regulations because of the existence of economically viable alternatives to such expansion (Exhs. EFSB-RR-3; EFSB-RR-3-S).

The record demonstrates that construction of the Dean Street Expansion Plan would involve significant environmental impacts, and, in addition, that the expansion of the Dean Street substation might not be permissible due to associated environmental impacts. The record further demonstrates that the environmental impacts associated with construction of the proposed project would be relatively minor and temporary.

Accordingly, the Siting Board finds that the proposed project would be preferable to the Dean Street Expansion Plan with respect to facility construction impacts.

b. Magnetic Field Levels

NMLD asserted that construction and operation of the proposed project would result in minimal magnetic field impacts (Brief at 124). The Light Department also asserted that construction of the proposed project would permanently reduce magnetic field levels on existing feeders emanating from the Dean Street substation (*id.* at 125). NMLD explained that the magnetic field level reductions would occur due to shifting of load from certain Dean Street substation feeders to new feeders extending from the proposed Ellis Avenue substation (Tr. 2, at 167-170).

NMLD indicated that magnetic field levels ranged from 0 to 16 milliGaus ("mG") along its existing transmission lines and at the Dean Street substation (Exh. NM-1, at 101-102).²⁸ NMLD further indicated that modelled magnetic field levels for its proposed transmission lines ranged from 3.3 mG directly above the centerline of the proposed underground transmission cables to 0.7 mG and 0.1 mG at distances of ten and 20 feet from

²⁸ NMLD indicated that existing magnetic field levels were highest at the Dean Street substation getaway cables (Exh. NM-1, at 102).

the centerline, respectively (Exhs. EFSB-E-8; EFSB-E-8B). The Light Department stated that, at the Route 1 crossing, magnetic field levels associated with the distribution lines for its proposed project would range from 2.8 mG initially to 18 mG 20 years after construction, assuming two cables at a 15 MVA load (Exh. EFSB-A-3). NMLD provided no magnetic field impact estimates for the remainder of the distribution line route, but indicated that land use along the identified portion of the route was primarily business and commercial (see Section III.C.2.v, below) (Exh. NM-1, at 100).

NMLD indicated that transmission line construction for the Dean Street Expansion Plan would be limited to two 115 kV transmission interconnects at the Dean Street substation site (Exh. EFSB-RR-3-S). NMLD indicated that distribution lines associated with the Dean Street Expansion Plan would also emanate from the Dean Street location and would continue along portions of the route of the 115 kV transmission lines for the proposed project (*id.*). In addition, the Light Department noted the generally residential character of Dean Street and indicated that residences were located to the east and west of the existing Dean Street substation site (Exh. EFSB-E-29).

While NMLD has not provided magnetic field data specific to the Dean Street Expansion Plan, the record indicates that any additional 115 kV magnetic fields would be limited to a short 115 kV transmission interconnection to be sited within the Dean Street substation site. We note, however, that the new distribution feeder lines required for the Dean Street Expansion Plan, like those in northern Norwood under the proposed project, may be expected to produce higher magnetic field levels than the proposed 115 kV transmission improvements under either approach. In addition, the proposed project should reduce magnetic fields from existing distribution lines exiting the Dean Street substation -- a benefit that would be foregone or diminished under the Dean Street Expansion Plan.

Accordingly, the Siting Board finds that the proposed project is preferable to the Dean Street Expansion Plan with respect to magnetic fields.

c. Permanent Land Use Impacts

NMLD indicated that the proposed project would avoid significant disruption of developed or open spaces by routing transmission and distribution lines underground,

primarily in the grassed and paved shoulder of the layout of Route 1 (Exh. NM-1, at 51-52, 59; Tr. 2, at 145). In addition, the Light Department indicated that the one-half acre site for the proposed new substation would be entirely shielded by existing trees and that other mitigation planned by NMLD, including one-to-one replacement of trees and measures to protect soil and water resources, would minimize permanent impacts on land resources and surrounding land use (Exh. NM-1, at 53-55). NMLD stated that it would undertake minimal construction within the existing Dean Street substation yard, and would regrade and stabilize with crushed stone any excavated areas in the yard (see Section II.B.5.a, above) (Tr. 2, at 136, 143).

NMLD indicated that the Dean Street Expansion Plan would involve the filling of wetlands and bordering lands subject to flooding (Exh. EFSB-RR-3; Tr. 1, at 128-130). NMLD also stated that the new substation facilities, which would be a part of the Dean Street Expansion plan, would be built in a residential area within 200 feet of homes, and that such construction would raise zoning issues (Exhs. EFSB-RR-3, EFSB-RR-3-S).

The record shows that the distribution lines for the Dean Street Expansion Plan would follow portions of the proposed project's transmission line route. In addition, the Dean Street Expansion Plan would not require development of a new substation site in northern Norwood. However, as discussed in Section II.B.5.a, above, the record also demonstrates not only the likelihood that the Dean Street Expansion Plan would involve significant permanent impacts to resources, and particularly to wetland resources, at the Dean Street substation site, but that the severity of the impacts involved could prevent NMLD from obtaining the necessary permits for construction. Further, the record demonstrates the potential for significant visual impacts associated with the Dean Street Expansion Plan, due to the proximity of abutters to the Dean Street substation and the lack of space to provide vegetative screening if substation facilities were enlarged.

The Siting Board therefore concludes that the permanent land use impacts of the Dean Street Expansion Plan would likely be greater than those of the proposed project. Accordingly, the Siting Board finds that the proposed project would be preferable to the Dean Street Expansion Plan with respect to permanent land use impacts.

d. Conclusions on Environmental Impacts

In Sections II.B.5.a, b and c, above, the Siting Board has found that the proposed project would be preferable to the Dean Street Expansion Plan with respect to facility construction impacts, magnetic field impacts and permanent land use impacts.

Accordingly, the Siting Board finds that the proposed project would be preferable to the Dean Street Expansion Plan with respect to environmental impacts.

6. Cost

NMLD asserted that the proposed project was, on balance, preferable to the Dean Street Expansion Plan in light of the cost advantages of the proposed project with respect to line losses (Brief at 73). In support of its assertion, the Light Department submitted estimates of installation costs for the proposed project, including costs related to 115 kV transmission, 13.8 kV distribution, a new 115/13.8 kV substation, Dean Street modifications, and future distribution improvements (Exhs. EFSB-RR-3-S; NM-1, at 135; NM-2, at exhibit 5-1). The Light Department also provided estimates of the net present value, in 1996 dollars, of the total project costs, including initial construction costs, anticipated distribution system additions and modifications, and differential line losses, over the 2001-2019 analysis period ("discounted total costs") (Exhs. EFSB-RR-3-S; NM-1, at 135; NM-2, at exhibit 5-1).

NMLD stated that it estimated installation costs of \$13,984,000 for the proposed project and of between \$13,410,000 and \$13,642,000 for the Dean Street Expansion Plan (Exhs. NM-2, at Exhibit 5-1; EFSB-RR-3-S).²⁹ In addition, NMLD estimated that the discounted total costs would be \$23,720,000 for the proposed project and \$24,063,000 for the Dean Street Expansion Plan, including differential line losses of \$268,000 under the Dean Street Expansion Plan (Exh. EFSB-RR-3-S; NM-2, at exhibit 5-1).³⁰

²⁹ The Light Department indicated that it calculated total installation costs for the Dean Street Expansion Plan without regard to the possibility of environmental, physical space, zoning or other constraints which might render the Dean Street Expansion Plan unbuildable (Exh. EFSB-RR-3-S at 5).

³⁰ NMLD estimated the cost of differential line losses for all alternative project
(continued...)

The record demonstrates that the cost of the proposed project and the Dean Street Expansion Plan would be comparable, considering NMLD's estimates of both installation costs and discounted total costs. The discounted total cost comparison shows that, in the long run, the proposed project would be the least expensive approach. Further, the Siting Board notes that the final installation cost of the Dean Street Expansion Plan could well be higher than estimated, given the environmental, space and zoning constraints present at the Dean Street substation site (see Section II.B.5, above).

Accordingly, the Siting Board finds that the proposed project would be preferable to the Dean Street Expansion Plan with respect to cost.

7. Conclusions: Weighing Need, Cost, Environmental Impacts and Reliability

In comparing the proposed project to the Dean Street Expansion Plan, the Low Voltage Plan and distributed generation, the Siting Board has found that the proposed project and the Dean Street Expansion Plan would meet the identified need, and that the Low Voltage Plan and distributed generation would not meet the identified need.

With respect to the reliability, environmental impacts and cost of the proposed project and the Dean Street Expansion Plan, the Siting Board has found that: the proposed project would be preferable to the Dean Street Expansion Plan with respect to reliability; the proposed project would be preferable to the Dean Street Expansion Plan with respect to environmental impacts; and the proposed project would be preferable to the Dean Street Expansion Plan with respect to cost.

Accordingly, the Siting Board finds that the proposed project is preferable to the Dean Street Expansion Plan, the Low Voltage Plan and distributed generation.

³⁰(...continued)

approaches and alternative routes using the proposed project and route as a reference case, i.e., assuming a line loss cost of \$0 for the proposed project and route (Exh. EFSB-RR-3-S).

III. ANALYSIS OF THE PROPOSED AND ALTERNATIVE FACILITIES

The Siting Board has a statutory mandate to implement the policies of G.L. c. 164, §§ 69H-69Q to provide a necessary energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost. G.L. c. 164, §§ 69H and J. Further, G. L. c. 164, § 69J requires the Siting Board to review alternatives to planned projects, including "other site locations." In its review of other site locations, the Siting Board requires a petitioner to show that its proposed facilities' siting plans are superior to alternatives and that its proposed facilities are sited at locations that minimize costs and environmental impacts while ensuring supply reliability. New England Power Company, EFSB 95-2, at 35; New England Power Company, 4 DOMSB at 160; Cabot Power Corporation, 2 DOMSB 241, 371 (1994).

A. Description of the Proposed Facilities and Alternative Facilities

1. Proposed Facilities

NMLD proposes to construct two 2.2-mile underground parallel 115 kV transmission lines, to be located primarily within the layout of Route 1 in the Town of Norwood; a new substation and associated facilities on NWD property on the east side of Route 1 opposite Ellis Avenue;³¹ and a 0.7-mile underground segment of 13.8 kV distribution line, also to be located within the layout of Route 1 in Norwood (Exh. NM-1, at 51).³² The proposed 115 kV transmission lines would leave NMLD's existing Dean Street substation, proceed west along Dean Street and turn to the northeast along Route 1 (id. at 52). The transmission lines would thereafter continue generally northeast along Route 1, primarily in the grassed and paved shoulder, to the proposed substation site (id.).

³¹ The facilities associated with the new substation would consist of two 33/44/45 MVA transformers and 12 distribution feeder positions, and distribution circuitry to establish four new 13.8 kV distribution feeders (Exh. NM-1, at 1).

³² The proposed underground 13.8 kV distribution line would run along Route 1 to Pleasant Street, Norwood (Exh. NM-1, at 53).

In order to construct the two proposed 115 kV transmission lines along the primary route, NMLD proposes excavating a trench, five to six feet deep, outside the traveled way and breakdown lane of Route 1 to bury a concrete ductbank (id.). The proposed concrete ductbank would consist of a three-by-three matrix of 5-inch PVC pipes and would be buried a minimum of 30 inches below the ground surface within the shoulder of the roadway (id.). NMLD stated that at stream culverts the Light Department would use a "flatter" arrangement of ducts to avoid disturbing culverts while maintaining a minimum 24-inch cover over the proposed ductbank (id.). The Light Department indicated that nine pairs of manholes would be placed at 1,200-foot to 1,600-foot intervals along the proposed transmission line route to facilitate care and maintenance of the two 115 kV transmission lines (id. at 52-53).

NMLD stated that the proposed new Ellis Avenue substation would have a 72- by 36-foot control building and an attached 30- by 60-foot switchgear building; that all equipment except for the 115/13.8 kV power transformers would be indoors; and that the control building and the outdoor equipment would be enclosed by a fenced yard of approximately 130 by 150 feet (id. at 54). The Light Department stated it would clear the area immediately outside the fence for approximately 15 feet to allow for construction of slopes connecting the yard elevation to the surrounding existing grade and to facilitate construction generally (id.). NMLD indicated that to prevent damage from falling trees or vegetation it would maintain clearances of 35 feet, 40 feet and 15 feet from the rear, sides and front of the fenceline, respectively (id. at 54-55). The Light Department noted that the Ellis Avenue substation would be screened from Route 1 by existing trees (id.). NMLD also stated that a 70-foot access road would be constructed to the Ellis Avenue substation from an existing access road running to an inactive pumping station on the NWD property (id. at 55).

NMLD stated that the proposed new underground 13.8 kV distribution line would consist of 12, five-inch ducts encased in concrete and buried with a minimum of 30 inches of cover except at the crossing of the culvert at Plantingfield Brook where cover depth would be 24 inches (id. at 53).³³ To install the proposed 13.8 kV distribution line segment, the Light

³³ The Light Department indicated that the location of the Plantingfield Brook culvert determined the depth of cover possible over the distribution line duct at the Plantingfield Brook crossing (Exh. NM-1, at 53).

Department stated that a trench would be excavated within the grassed shoulder of Route 1 to a depth of five to six feet on the southbound side of the highway (id.). NMLD also indicated that nine distribution manholes would be placed at 450-foot intervals to facilitate cable pulling, splicing and maintenance (id.).

In addition, NMLD indicated that modification of the 115 kV bus structure at the existing Dean Street substation would be necessary to create terminal positions there for the proposed two new 115 kV transmission lines (id.). NMLD stated that each transmission cable would rise from the underground concrete ductbank to connect to an extension of the existing air insulated 115 kV overhead bus structure through a new 115 kV circuit breaker (id.). The Light Department stated that miscellaneous additional equipment such as isolation disconnects and surge arresters would also be required (id.). The Light Department noted that no new enclosed structures were proposed, that all work for the station upgrade would occur within the existing substation fenceline and that the existing grade of the substation yard would not be altered (id.).

2. Alternative Facilities

The Light Department submitted detailed information for two alternative routes (id. at 55-57). NMLD stated that Alternative One would use the same new substation site and specifications, the same transmission/distribution line specifications, the same distribution line route, and the same modifications to the existing Dean Street substation as for the Primary Configuration (id. at 55-56). NMLD indicated that Alternative One and the Primary Configuration were distinguished by their respective transmission line routes (id.). The Light Department stated that the Alternative One transmission line route would be 2.6 miles long or 0.4 miles longer than the primary transmission line route, and that more than 70 percent of the route of the Alternative One transmission line would traverse a geographically different area than would the primary transmission line route (id. at 56). The Light Department stated that the Alternative One route would begin at the Dean Street substation, extend east on Dean Street to Neponset Street, continue along Neponset Street to Route 1, cross Route 1, continue along Neponset Street to Pleasant Street, continue on Pleasant Street for one block, re-cross Route 1 and then follow Route 1 parallel to the northbound side to

the preferred substation site (id. at 55). NMLD noted that the Alternative One route would be in predominantly residential areas along Dean, Neponset and Pleasant Streets in contrast to the primary route which would for most of its distance traverse the right of way of a commercial highway (id. at 55-56). NMLD also stated that Alternative One would require ten sets of transmission line manholes (id. at 56).

NMLD stated that for Alternative Two, new substation and transmission/distribution line specifications as well as modifications to the existing Dean Street substation would be the same as for the Primary Configuration and Alternative One (id. at 56). In addition, NMLD stated that the transmission and distribution line routes for Alternative Two would be the same as for the Primary Configuration in all respects except that they would extend 0.8 miles further to an alternative substation site (id. at 56).³⁴ The Light Department also stated that Alternative Two would require twelve sets of transmission line manholes (id. at 57).

The Light Department stated that the Alternative Two substation site, i.e., the University Avenue site, was: located in the midst of undeveloped land to the northeast of the Ellis Avenue substation site on the north side of University Avenue; owned by the Town of Norwood; zoned for limited manufacturing; and, surrounded by undeveloped land (id. at 56-57). In addition, NMLD stated that the University Avenue site was outside any Area of Critical Environmental Concern ("ACEC"), 100-year floodplain, and wetlands buffer zone (id.).

B. Site Selection Process

1. Standard of Review

In order to determine whether a facility proponent has shown that the siting plans of its proposed facilities are superior to alternatives, the Siting Board requires a facility proponent to demonstrate that it examined a reasonable range of practical facility siting alternatives. New England Power Company, EFSB 95-2 at 37; Berkshire Power Development, Inc., 4 DOMSB at 347 (1996); New England Power Company,

³⁴ NMLD indicated that the greater length of Alternative Two would also require an additional 4,000 feet of underground 13.8 kV distribution ductbank (Exh. NM-1, at 57).

4 DOMSB 221, 347. In order to determine that a facility proponent has considered a reasonable range of practical alternatives, the Siting Board requires the proponent to meet a two-pronged test. First the facility proponent must establish that it developed and applied a reasonable set of criteria for identifying and evaluating alternatives in a manner which ensures that it has not overlooked or eliminated any alternatives which are clearly superior to the proposal. New England Power Company, EFSB 95-2, at 38; Berkshire Power Development, Inc., 4 DOMSB at 351-353; New England Power Company, 4 DOMSB at 167-168. Second, the facility proponent must establish that it identified at least two noticed sites or routes with some measure of geographic diversity. New England Power Company, EFSB 95-2, at 38; Berkshire Power Development, Inc., 4 DOMSB at 355-357; New England Power Company, 4 DOMSB at 170-172.

In the sections below, the Siting Board reviews the Light Department's site selection process, including NMLD's development and application of siting criteria as part of its site selection process.

2. Development of Siting Criteria

a. Description

NMLD indicated that it identified site selection criteria to use in a comprehensive evaluation of alternative substation sites and related transmission and distribution routes (Exh. NM-1, at 63). NMLD stated that most of the criteria were related to the potential substation site because location of the substation was the driving force in the identification of possible facility siting alternatives (id.).

NMLD listed five siting criteria pertaining specifically to selection of a site for the proposed substation: ownership of land; zoning; impacts to sensitive receptors; wetland resources; and proximity to the load center (id. at 65-67).³⁵ NMLD stated that the identified criteria addressed planning, environmental and reliability issues (id. at 65). In addition to

³⁵ The Light Department stated that impacts were identified through site investigations, review of applicable regulations and resource data, evaluations by NMLD and its consultants, and public input solicited during the development of alternatives (Exh. NM-1, at 68).

criteria for selecting a substation site, NMLD identified two criteria pertaining to potential impacts of constructing underground transmission and distribution lines: (1) the length of transmission line in residential areas; and (2) the length of distribution line in residential areas (id. at 67-68).³⁶ Finally, the Light Department identified project cost, including the cost to purchase property and materials and to construct facilities, as a siting criterion (id. at 68). The Light Department asserted that its comprehensive evaluation process reflected prudent planning standards and the Siting Board's standard of review (id. at 61).

NMLD stated that it assigned quantitative weights to the substation site criteria as follows: proximity to the load center (5); impact to sensitive receptors (4); ownership of land (3); wetland resources (2); and zoning (1) (id. at 65-67). NMLD stated that it assigned the highest weight to the criterion "proximity to load center" because it judged reliability to be essential (id. at 66-67). NMLD also stated that non-substation criteria, including cost and the potential impacts of underground transmission and distribution line construction, each received a weight of (2) (id. at 65-68). NMLD explained that the weight assigned to these criteria reflected their lesser importance relative to reliability and critical cultural and environmental impacts (id.). The Light Department stated that the number and total weight of the criteria for the substation site reflected the preeminent importance of the substation site in determining the configuration of the proposed facilities (id. at 65).

b. Analysis

The Light Department has developed a set of site selection criteria that include the general categories of land use compatibility, environmentally sensitive areas, site acquisition and construction constraints, cost and reliability -- general categories that the Siting Board has found to be appropriate for the siting of transmission lines. See New England Power Company, EFSB 95-2, at 41; New England Power Company, 4 DOMSB at 167; New England Power Company, 21 DOMSC at 386. After selecting an area that would encompass all viable siting options, NMLD identified a comprehensive list of the specific cultural/

³⁶ The Light Department stated that both the transmission and the distribution line routes were rated by measuring the length of the routes in residential areas based on the Town of Norwood zoning map (Exh NM-1, at 68).

environmental criteria that exist within this area in order to identify and evaluate potential routes and substation sites. NMLD's weighting of specific cultural/environmental factors appropriately reflects the relative significance of these criteria; in particular, the importance of siting transmission lines within existing corridors where possible is appropriately stressed. The Light Department's weighting method provides for a quantitative comparison among competing cultural/environmental criteria, and among cultural/environmental, cost and reliability criteria. NMLD also provided a separate analysis of the cost and reliability of each identified route and adequately explained the factors that were considered in preparing the cost and reliability analyses.

In previous cases, the Siting Board has emphasized the need for project proponents to explain fully how they balance cost, reliability and environmental impacts when analyzing siting alternatives. Here, the Light Department has assigned weights which, it asserts, reflect the preeminent importance of reliability and certain types of environmental impacts, as well as the determinative nature of the substation site in route selection. Thus, NMLD has provided an explanation of how reliability, environmental impacts and cost were balanced. However, NMLD has not provided the level of justification for these weights that might be necessary, if for example, one siting alternative was preferable with regard to reliability, while another was preferable with regard to cost. In this instance, the record demonstrates that the Primary Configuration is comparable or preferable to all other identified routing alternatives with respect to reliability, environmental impacts and cost, so an extensive justification of the weights is unnecessary. Consequently, the Siting Board finds that NMLD has developed a reasonable set of criteria for identifying and evaluating alternatives to the Primary Configuration. The Siting Board notes, however, that in future reviews where no one alternative is comparable or preferable to all other alternatives with regard to reliability, environmental impacts and cost, applicants should provide clear justification for the weighting of these factors in their analysis of siting alternatives.

3. Application of Siting Criteria

a. Description

NMLD stated that, as a municipal light department, it has authority to construct facilities only within the Norwood municipal boundary; therefore, its site selection study area was limited to sites and routes within the Town (Exh. MN-1, at 2, 58-59). NMLD indicated that, as a result of that limitation, its process was driven by locating a site for the proposed substation rather than by identifying a broad range of transmission line options that might depend on construction in neighboring towns (*id.* at 58-59). With respect to the transmission line route, NMLD stated that it sought to minimize environmental impacts (*id.* at 59). The Light Department stated that, therefore, after identifying a primary and an alternative substation site, it focused on routing the transmission lines along roadways to avoid disruption of developed or open space (*id.*).

NMLD indicated that its status as a municipal light department also impelled it to rely heavily on input from town officials, town boards, other town organizations, and citizens as well as from expert consultants (*id.* at 59).³⁷ The Light Department stated that from a list of 22 potential substation sites, it selected six as suitable for further evaluation (*id.* at 61). NMLD stated that each facility alternative was evaluated relative to all the other facility alternatives in a paired analysis of each criterion (*id.* at 68). The Light Department explained that, as a basis for comparison, each project alternative was assigned a rating of high, medium or low for each criterion (*id.* at 68-69). The Light Department stated that if a project alternative rated better than the alternative to which it was compared, it received a score of 1; if it was worse or tied, it received a score of 0 (*id.*).

³⁷ NMLD listed the following sources of Norwood community input: the Future Electrical Power Needs Committee, a citizens advisory committee; an independent substation site analysis conducted by the Norwood Town Planner; a study by PLM which evaluated NMLD's system needs and identified potential substation sites; public meetings held by the Norwood Board of Selectmen regarding the siting, environmental impacts, costs and need for the proposed substation; zoning board and Conservation Commission meetings regarding potential substation sites and routes; and a public hearing and report on NMLD's planning process conducted by the Norwood League of Women Voters (Exh. NM-1, at 60).

To score and rank the facility alternatives, NMLD stated that it first compiled scores for each criterion, multiplied the results by the weight factor of between one and five assigned to each criterion, then totalled the weighted results to arrive at final scores (id. at 68). NMLD further indicated that the facilities alternatives were ranked from first to last based on the Light Department's weighted paired analysis and that these results in turn had determined NMLD's selection of facilities alternatives for further evaluation (id. at 69). NMLD stated that the Primary Configuration, Alternative One and Alternative Two were the three facilities alternatives selected for further evaluation on the basis of the weighted paired analyses conducted by the Light Department (id. at 70-71). The Primary Configuration received a combined score of 64, 12 points more than the combined score for Alternative One and 14 points more than the combined score for Alternative Two (Exh. NM-2, at exhibit 4-6).

b. Analysis

The record demonstrates that NMLD fully evaluated siting of its proposed transmission/distribution line routes and new substation for six of 22 identified substation sites. In addition, for one of the six potential substation sites the Light Department evaluated two alternatives for siting its proposed transmission/distribution line routes. The Siting Board notes that this represents an initial examination of a broadly inclusive range of siting possibilities, and a selection of a practical range of options for more complete evaluation. The Siting Board further notes the exceptional effort made by NMLD to solicit public, agency and professional input both in the preliminary and subsequent stages of its site selection process.

To evaluate its seven siting alternatives, NMLD considered quantitative reliability criteria, cultural/environmental impacts and cost data. With respect to cultural/environmental impacts, NMLD compared each facility alternative against all the other facility alternatives in a paired analysis for each cultural/environmental criterion and incorporated a quantitative method of scoring and weighting. NMLD performed a comprehensive quantitative comparison of the identified substation sites and transmission/distribution line routes based on weighted environmental criteria as well as quantitative cost data.

Based on its examination of the methods and results of NMLD's weighted pair analysis, the Siting Board determines that the Primary Configuration is comparable or superior to Alternatives One and Two with respect to reliability. The Siting Board further considers environmental impacts and quantitative cost data of the proposed facilities in Section III.C, below. Finally, the Siting Board determines that NMLD's selection of the Primary Configuration, Alternative One and Alternative Two for further evaluation is appropriate.

Accordingly, the Siting Board finds that NMLD has applied its site selection criteria consistently and appropriately, and in a manner which ensures that it has not overlooked or eliminated any siting options which are clearly superior to the proposed project.

The Siting Board has also found, above, that NMLD has developed a reasonable set of criteria for identifying and evaluating alternative routes. Accordingly, the Siting Board finds that the Light Department has developed and applied a reasonable set of criteria for identifying and evaluating alternatives in a manner which ensures that it has not overlooked or eliminated any alternatives which are clearly superior to the proposed project.

4. Geographic Diversity

The Light Department considered six geographically diverse substation sites and two transmission/distribution line routes. The identified transmission/distribution line routes both start at the existing Dean Street substation and overlap for approximately 1/3 mile when entering the Light Department's preferred new substation site. However, the two routes are clearly distinct: one route is located primarily in residential roads; the second route is located primarily in the grassed and paved shoulder of a state highway.

Based on the foregoing, the Siting Board finds that the Light Department has identified a range of practical substation sites and transmission/distribution line routes with some measure of geographic diversity.

5. Conclusions on the Site Selection Process

The Siting Board has found that the Light Department developed and applied a reasonable set of criteria for identifying and evaluating alternatives in a manner which

ensures that it has not overlooked or eliminated any alternatives which are clearly superior to the proposal. In addition, the Siting Board has found that the Light Department has identified a range of practical substation sites and transmission/distribution line routes with some measure of geographic diversity.

Accordingly, the Siting Board finds that NMLD has considered a reasonable range of practical siting alternatives.

C. Environmental Impacts, Cost and Reliability of the Proposed and Alternative Facilities

1. Standard of Review

In implementing its statutory mandate to ensure a necessary energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost, the Siting Board requires project proponents to show that proposed facilities are sited at locations that minimize costs and environmental impacts, while ensuring a reliable energy supply. In order to determine whether such a showing is made, the Siting Board requires project proponents to demonstrate that the proposed project site for the facility is superior to the noticed alternatives on the basis of balancing cost, environmental impact, and reliability of supply. New England Power Company, EFSB 95-2, at 46; New England Power Company, 4 DOMSB at 173; Boston Edison Company (Phase II), 1 DOMSB 1, 37-38 (1993).

An assessment of all impacts of a 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. New England Power Company, EFSB 95-2, at 46; New England Power Company, 4 DOMSB at 173; Cabot Power Corporation, 2 DOMSB at 389. A facility which achieves that appropriate balance thereby meets the Siting Board's statutory requirement to minimize environmental impacts at the lowest possible cost. New England Power Company, EFSB 95-2, at 46-47; New England Power Company, 4 DOMSB at 173; Cabot Power Corporation, 2 DOMSB at 389.

An overall assessment of the impacts of a facility on the environment, rather than a mere checklist of a facility's compliance with regulatory standards of other government agencies, is consistent with the statutory mandate to ensure a necessary energy supply for the

Commonwealth with a minimum impact on the environment at the lowest possible cost. New England Power Company, EFSB 95-2, at 47; New England Power Company, 4 DOMSB at 173; Cabot Power Corporation, 2 DOMSB at 389. The Siting Board previously has found that compliance with other agencies' standards clearly does not establish that a proposed facility's environmental impacts have been minimized. Id. Furthermore, the levels of environmental control that the project proponent must achieve cannot be set forth in advance in terms of quantitative or other specific criteria, but instead, must depend on the particular environmental, cost and reliability trade-offs that arise in respective facility proposals. New England Power Company, EFSB 95-2, at 47; New England Power Company, 4 DOMSB at 173-174; Cabot Power Corporation, 2 DOMSB at 389.

The Siting Board recognizes that an evaluation of the environmental, cost and reliability trade-offs associated with a particular review must be clearly described and consistently applied from one case to the next. Therefore, in order to determine if a project proponent has achieved the appropriate balance among 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 in order to make such a determination. New England Power Company, EFSB 95-2, at 47; New England Power Company, 4 DOMSB at 174; Cabot Power Corporation, 2 DOMSB at 389-390. The Siting Board can then determine whether environmental impacts would be minimized. Similarly, the Siting Board must find that the project proponent has provided sufficient cost information in order to determine if the appropriate balance among environmental impacts, costs and reliability would be achieved. New England Power Company, EFSB 95-2, at 47-48; New England Power Company, 4 DOMSB at 174; Cabot Power Corporation, 2 DOMSB at 390.

Accordingly, in the sections below, the Siting Board examines the environmental and cost-related impacts of the proposed facilities along the Light Department's primary and alternative configurations to determine (1) whether the environmental impacts of the proposed facilities would be minimized, and (2) whether the proposed facilities would achieve an appropriate balance among conflicting environmental concerns as well as between

environmental impacts and cost.³⁸ In this examination, the Siting Board conducts a comparison of the primary and alternative configurations to determine which is preferable with respect to providing a necessary energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost.

2. Analysis of the Proposed Facilities Under the Primary Configuration

a. Environmental Impacts of the Proposed Facilities Under the Primary Configuration

In this section, the Siting Board evaluates the environmental impacts of the proposed facilities under the Primary Configuration and potential mitigation for such impacts, including the proposed mitigation and, as necessary, any identified options for additional mitigation. As part of its evaluation, the Siting Board first addresses whether the petitioner has provided sufficient information for the Siting Board to determine (1) whether environmental impacts of the proposed facilities would be minimized, and (2) whether the proposed facilities achieve the appropriate balance among environmental impacts and between environmental impacts and cost. The Siting Board then addresses whether the environmental impacts of the proposed facilities under the Primary Configuration would be minimized.

i. Water Resources

(a) Wetlands and Surface Water

NMLD asserted that construction of the proposed facilities would avoid any direct impacts to water resources in the vicinity of the Primary Configuration and that appropriate mitigation measures would be installed to minimize any indirect impacts associated with construction (Exh. NM-1, at 73). The Light Department indicated that at the Dean Street

³⁸ The Siting Board has previously determined that the reliability of the Primary Configuration is comparable or superior to the reliability of Alternatives One and Two (see Section III.B.3.b, above). In this case, the Siting Board further determines that additional analysis of the comparative reliability of the Primary Configuration, Alternative One and Alternative Two is unnecessary because such analysis would not alter the Siting Board's finding with respect to the preferability of the Primary Configuration relative to the two alternative configurations (see Section III.C.3.c, below).

substation and at the proposed Ellis Avenue substation site, NMLD would avoid impacts to water resources by constructing upland of any river, floodplain or wetland areas (id. at 74). The Light Department stated that there would likewise be no impacts to water resources -- including water resources associated with a bordering ACEC -- along the route of the proposed ductbank, transmission lines and distribution lines because the Light Department would install the ductbank and lines alongside or within existing paved roadways, and would incorporate a modified "flatter" ductbank configuration over culverts (id. at 74, 82; Exhs. NM-2, exhibit 4-13, Att. C; EFSB-A-5; EFSB-E-27).

With respect to indirect impacts to water resources, NMLD indicated that construction of portions of the proposed ductbank and electric lines and related modifications at the Dean Street substation would take place within the 100-foot buffer zone associated with bordering vegetated wetlands (Exh. NM-1, at 75). The Light Department indicated that a variety of mitigation measures would be used to minimize construction impacts in the buffer zone, including keeping the area of impact and the amount of trench spoil to a minimum and installing silt fences/hay bale barriers and other such erosion control measures (id.; Tr. 2, at 145).³⁹ The Light Department further stated that it would limit ongoing construction activities to 450-foot segments at any one location to minimize the duration of any impacts (Exh. NM-1, at 75; Tr. 2, at 145). The Light Department indicated that, upon completion of construction, grassed areas would be reseeded and steps would be taken to stabilize all disturbed areas and return them as much as possible to their original condition (Tr. 2, at 145).

Along the entire route of the proposed transmission and distribution lines, and at the Ellis Avenue substation site, NMLD stated that it would use hay bales and burlap basins in roadway catch basins, as necessary, to prevent washoff via drainage systems of sediments as a result of construction (id.). The Light Department also noted that dewatering of groundwater might be required during construction at manhole locations, where excavation

³⁹ At the Dean Street substation, NMLD stated that it would place hay bales within the fenceline of the substation yard, along the edge of the substation driveway out to Dean Street and around any stored excavated materials in order to prevent migration of any sediments excavated at the site (Tr. 2, at 142-143).

depths would be nine to ten feet (Exh. NM-2, exhibit 4-7, Att. C at C-2). The Light Department stated that such dewatering would be controlled and filtered, as necessary, to prevent the introduction of silt in nearby drainage areas (id.).

The record demonstrates that construction of the proposed facilities under the Primary Configuration would require no construction within, and minimal potential impacts to, wetlands or surface water. Specifically, the record indicates that the Light Department would install the proposed ductbanks for electric lines within existing road layouts and would use appropriate mitigation measures during construction to avoid or minimize adverse water-related impacts. Accordingly, the Siting Board finds that, with the implementation of the proposed mitigation measures, the environmental impacts of the proposed facilities under the Primary Configuration would be minimized with respect to wetlands and surface water.

(b) Groundwater and Wells

The Light Department asserted that construction of the proposed facilities would avoid direct impacts to groundwater along the primary route and that appropriate mitigation measures would be used to minimize any indirect impacts associated with construction (id. at 76-77; Exh. NM-2, exhibit 4-7, Att. C at C-2). The Light Department also asserted that such construction would not impact any future water supply development at the Ellis Avenue well-field, a now inactive well-field bordering the proposed site for the Ellis Avenue substation (Exh. NM-1, at 76-77).

The Light Department stated that it did not expect that installation of the proposed facilities would intrude below the groundwater table, except perhaps at manhole locations, which would require temporary dewatering during construction (Exh. NM-2, exhibit 4-7, Att. C at C-2) (see Section III.B.2.a.i.(a), above). With respect to impacts to the Ellis Avenue well-field, the Light Department indicated that NWD had no plans to reactivate any of the Ellis Avenue wells because (1) NWD had determined that the cost of reactivating wells and installing the required treatment system at this site would be prohibitive; and (2) contamination problems and incompatible land use at the site would make reactivating the Ellis Avenue well-field a high risk investment decision for the Town (id.). NMLD also stated that the Town presently receives an adequate supply of water from the Massachusetts

Water Resources Authority ("MWRA") and was investigating the feasibility of using the Buckminster Pond well site in Westwood as a back-up water supply source (id.; Exh. NM-1, at 78). The Light Department indicated that it had nonetheless asked its consultant, Fay Spofford and Thorndike ("FST"), to review the potential for redevelopment of the Ellis Avenue well-field and that FST had identified a location at the Ellis Avenue substation site that would not interfere with options for future water supply development (id.).

NMLD indicated that it had discussed the proposed Ellis Avenue substation with both the MWRA and the Massachusetts Department of Environmental Protection ("MDEP") (Exh. NM-2, exhibit 4-7, Att. C at C-2). The Light Department indicated that the MWRA was aware of the contamination at the Ellis Avenue well-field and had concluded that the new substation had been sited to allow future development of a groundwater source in the area in the event that NWD pursued such development (id., exhibit 4-9). The Light Department stated that MDEP also concurred with NMLD's plan for siting the proposed new substation, but had recommended the abandonment of certain existing inactive wells at Ellis Avenue (id. at exhibits 4-7, Att. C at C-2, and 4-10).⁴⁰

NMLD indicated that the abandonment process required a vote for abandonment by the Norwood Board of Selectmen and submission of a formal request for abandonment to MDEP by the Norwood Public Works Department (Exhs. EFSB E-2; EFSB E-2S; EFSB E-2R). The Light Department stated that the Norwood Board of Selectmen had voted to abandon the identified wells on April 11, 1995, and the Norwood Public Works Department had submitted a formal request for abandonment to MDEP on January 16, 1997

⁴⁰ MDEP recommended abandonment of existing inactive wells within 400 feet of the proposed new substation in the case of gravel-packed wells, and within 250 feet for tubular wells with a diameter of 2-1/2 inches or less (Exh. NM-2, exhibit 4-10). The Light Department noted that with abandonment of existing inactive wells in accordance with MDEP's recommendations, the proposed Ellis Avenue substation would be sited outside the protective radius for water supply wells under MDEP purview (Exhs. NM-1, at 79; NM-2, sec. 4-10). Abandonment of the identified wells would thus eliminate need for further MDEP review of the proposed new substation at the primary site (Exhs. NM-1, at 79; NM-2, exhibit 4-10).

(Exhs. EFSB E-2; EFSB E-2R).⁴¹ On February 26, 1997, MDEP approved NMLD's request for abandonment (Exh. EFSB-E-2R2).

NMLD also indicated that it would implement design, operation and maintenance measures to avoid potential releases of oils or contaminated materials that could affect the Ellis Avenue well-field (Exh. NM-1, at 80). Specifically, NMLD stated that it would install spill containment vessels for the proposed transformers sized for over 100 percent of the transformer oil in use, prepare a Spill Prevention, Control and Countermeasure Plan, and install continuous monitoring devices connected to NMLD's offices (*id.*).

The record demonstrates that construction of the proposed transmission and distribution facilities, which would primarily be within existing paved roadways, would avoid direct impacts to groundwater along the primary route and that appropriate mitigation measures would be used to minimize any indirect impacts associated with construction. The record also demonstrates that, with the abandonment, as planned, of certain existing inactive wells in accordance with MDEP recommendations, the proposed new substation facilities can be sited without impacts to any future water supply development at the Ellis Avenue well-field. The record also demonstrates that NMLD has developed measures to avoid accidental release of oils or contaminated materials at the Ellis Avenue substation site.

Accordingly, the Siting Board finds that, (1) with the conveyance of land from the Norwood Public Works Department to NMLD, and (2) with the implementation of proposed mitigation measures, the environmental impacts of the proposed facilities under the Primary Configuration would be minimized with respect to groundwater and wells.

⁴¹ The Light Department also stated that it plans to lease from the Norwood Public Works Department the land necessary for construction for the Ellis Avenue substation (EFSB-E-2(a)). The Light Department stated that the MDEP has no objection to the conveyance but MDEP is of the opinion that such conveyance requires legislative approval by two-thirds vote of both branches of the State Legislature (*id.*). NMLD stated that it respectfully disagrees with MDEP's opinion that such legislative vote is necessary (*id.*).

(c) Conclusions

The Siting Board has found that with the implementation of the proposed mitigation measures in wetland areas and wetland buffer zones, the environmental impacts of the proposed facilities under the Primary Configuration would be minimized with respect to wetlands and surface water. In addition, the Siting Board has found that (1) with the conveyance of land from the Norwood Public Works Department to NMLD, and (2) with the implementation of proposed mitigation measures the environmental impacts of the proposed facilities under the Primary Configuration would be minimized with respect to groundwater and wells.

Accordingly, the Siting Board finds that, with the implementation of the proposed mitigation measures, the environmental impacts of the proposed facilities under the Primary Configuration would be minimized with respect to water resources.

ii. Land Resources

In this Section, the Siting Board reviews the impact of the proposed facilities under the Primary Configuration with respect to tree clearing and upland vegetation, potential soil erosion and wildlife habitat.

NMLD stated that it would limit construction at the Dean Street substation to the existing substation yard and that removal of vegetation would therefore be unnecessary at this location (Tr. 2, at 136). NMLD indicated that after construction in the Dean Street substation yard was completed, excavated areas would be backfilled and regraded (id.). The Light Department stated that the construction area would be covered with crushed stone to stabilize the area and prevent any subsequent erosion (id. at 143).

The Light Department indicated that the proposed underground transmission and distribution lines would extend for a distance of 2.2 and 0.7 miles respectively, primarily in the grassed and paved shoulder of the layout of Route 1 (Exh. NM-1, at 51-52). The Light Department stated that it focussed on routing its proposed facilities along roadways to avoid disruption of developed or open spaces (id. at 59). NMLD also indicated that, upon completion of construction, steps would be taken to stabilize all disturbed areas and to return them as much as possible to their original condition (Tr. 2, at 145).

The Light Department indicated that the one-half acre site for the Ellis Avenue substation is entirely shielded by existing trees (Exh. NM-1, at 53-54). NMLD stated that it would replace on a one-to-one basis the trees removed for construction and maintenance of the proposed new substation site (id. at 88; Tr. 2, at 147-148) (see Section 2.a.iv, below).

NMLD provided documentation from the Massachusetts Natural Heritage and Endangered Species Program in support of its assertion that no rare or endangered species or habitat would be affected by the proposed facilities (Exh. NM-2, exhibit 4-12).

The record demonstrates that the Light Department would take steps to restrict the land resource impacts of the proposed facilities. The record demonstrates that the proposed facilities would in large part be located in areas which are already paved. The record further demonstrates that NMLD plans to implement measures to limit erosion impacts, and is committed to implement measures to stabilize areas disturbed by construction and to return them as much as possible to their original condition. Such measures include, but are not limited to, reseeding grassed areas and replacing trees removed during construction on a one-to-one basis.

In addition, the record demonstrates that there are no known rare or endangered species in the vicinity of the proposed facilities that would be adversely affected by the proposed construction.

Accordingly, the Siting Board finds that, with the implementation of the proposed mitigation measures, the environmental impacts of the proposed facilities under the Primary Configuration would be minimized with respect to land resources.

iii. Land Use

In this Section, the Siting Board reviews the impact of the construction and maintenance of the proposed facilities under the Primary Configuration with respect to land use, zoning, traffic, safety and noise.

NMLD stated that the zoning on both sides of Route 1 is non-residential except for a portion of NWD land along Route 1 near the Ellis Avenue substation site (Exh. NM-1, at 81). The Light Department stated that the areas of non-residential uses along Route 1 included areas zoned for business, manufacturing and limited manufacturing (id.). NMLD

indicated that the remainder of the primary route, the short segment extending along Dean Street between the existing Dean Street substation and Route 1, was primarily residential (id.).

The Light Department stated that transmission and distribution line construction within public rights-of-way is not restricted under municipal zoning regulation in Norwood (id. at 83; Exh. EFSB E-3A). NMLD further indicated that the Town Building Inspector, the zoning officer for the Town, has determined that the new substation would be permitted as of right at the Ellis Avenue site (Exh. NM-1, at 84).

NMLD also stated that the proposed Ellis Avenue substation site was within the Water Protection Overlay District ("WPD") of the Ellis Avenue well-field (id. at 82). The Light Department stated that the WPD was established to regulate land uses potentially affecting the inactive Ellis Avenue well-field (id.). The Light Department indicated that it had cooperated with the NWD, MWRA, MDEP and the Norwood Board of Selectmen to address fully the potential impacts from the proposed facilities at the Ellis Avenue site on any future water supply uses at the well-field, and that it intended to file for a special permit with the Town of Norwood Zoning Board of Appeal ("ZBA") for approval of construction and operation of the substation within the WPD (see Section III.C.2.a.i, above) (id.; Exh. EFSB-E-4).⁴²

Based on the Town Building Inspector's determination that the proposed substation would be permitted as a matter of right at the Ellis Avenue site, NMLD stated that no other special permit or variance would be required to authorize the land use under consideration for the proposed new substation site (Exh. NM-1, at 84). NMLD therefore indicated that receipt of the WPD special permit would allow for construction and operation of the proposed new substation consistent with Norwood zoning regulations (Exhs. NM-1, at 82; EFSB-E-4; EFSB-E-4, Att.).

⁴² NMLD stated that its special permit request would be filed with the Town's ZBA in November, 1997 on the basis of section 6552 of the Town's Zoning Bylaws (Exhs. EFSB-E-3A; EFSB-E-4).

NMLD also indicated that approximately 50 percent of the Primary Configuration along Route 1 was within an ACEC (the Fowl Meadow/Ponkapoag Bog), including the existing Dean Street substation and the proposed Ellis Avenue substation site (Exh. NM-1, at 81). The Light Department provided information to support its claim that the proposed facilities under the Primary Configuration would not interfere with or adversely impact the uses or resources that the ACEC was created to protect (see Section III.C.2.a.i, above) (id. at 82-83).

With respect to impacts on historic or archeological resources, NMLD submitted documentation to show that no known historic or archaeological resources were located along the primary route or at the Dean Street or Ellis Avenue substation sites (Exh. NM-2, exhibit 4-11).

NMLD asserted that traffic impacts associated with the proposed facilities along the primary route would be minimal and limited for the most part to periods of construction (id. at 85). The Light Department indicated that in response to recommendations from the Massachusetts Highway Department ("MHD"), it would undertake construction (1) in the grassed and paved shoulder of Route 1, outside both the traveled way and the break down lane, and (2) at hours other than those of peak traffic flow, i.e., outside of the morning and afternoon rush hours (Exhs. NM-2, sec. 4-15; EFSB-E-12).

The Light Department also indicated that it would institute all appropriate measures to mitigate impacts to local traffic, including traffic accessing driveways, from construction associated with installing the proposed facilities along the primary route (Exh. NM-1, at 85). NMLD's witness, Mr. Stuart, stated that paved areas disturbed by construction would be repaved (Tr. 2, at 145). NMLD noted that construction for the proposed facilities would impact 11 driveways on Dean Street, two business and nine residential, and 41 driveways, all business related, along Route 1 (Exh. NM-1, at 86). The Light Department indicated that disruption of business would be minimized by a variety of measures including avoiding construction during rush hours, using steel plates to maintain access to driveways at all times, covering trenches overnight, minimizing construction space requirements, applying a temporary patch after backfilling, having a community liaison on-site to address concerns,

and holding weekly construction update meetings with town officials to provide information and identify complaints (id. at 85-86).

With respect to safety, the Light Department indicated that it would use snow fencing to restrict access to active construction areas and that police details would be assigned to direct traffic around construction activities and to ensure safe passage of emergency vehicles during construction (id. at 86; Exh. EFSB-E-13).

With respect to noise impacts of the proposed project, NMLD indicated that the proposed modifications at the Dean Street substation would not change the ambient noise level there after the completion of construction (Tr. 2, at 149). The Light Department provided estimated noise levels for sensitive receptors in the area of the Ellis Avenue substation site (Exh. NM-1, at 89-95). In addition, the Light Department provided a map marking the distance from the Ellis Avenue substation site within which the increase in the ambient noise level at L_{90} would be 8 dBA or greater under nighttime conditions (Exh. EFSB-RR-5). Based on its noise estimates and map, NMLD stated that increases in L_{90} ambient noise at the 8 dBA level or above would not be experienced at any existing commercial or residential structure (id.). NMLD further stated that, because of the extent of the property owned by NWD in the vicinity of the Ellis Avenue substation site, new commercial or residential structures would be precluded from locating where nighttime noise levels at L_{90} might increase by 8 dBA or more as a result of the proposed project (id.).

The Light Department indicated that all appropriate measures would be taken to mitigate the noise impacts of construction, including use of standard construction equipment sound muffling devices, limiting construction activities to daylight hours, and adhering to federal truck-noise regulations (Exh. NM-1, at 96-99).⁴³

The record demonstrates that traffic, safety and noise impacts associated with the construction of the proposed facilities under the Primary Configuration would be temporary

⁴³ NMLD specified that construction activities would be planned for normal working hours, 9 a.m. to 5 p.m., and that in no instance would construction occur earlier than 6 a.m. or later than 7 p.m. (Exh. EFSB-E-20; Tr. 2, at 146-147).

and acceptable, with implementation of mitigation measures proposed by the Light Department. Specifically, according to the record, the Light Department would repave streets and driveways disturbed by construction, take steps during construction to minimize impacts to Route 1 traffic as well as local businesses and residents, and maintain a community liaison during construction to address concerns of the public and town officials. The record also demonstrates that NMLD intends to file for a special permit from the Town's ZBA approving NMLD's construction and operation of the proposed new substation within the WPD in the Town. The record demonstrates that, assuming the receipt of this special permit, the Light Department will have shown that the construction of the proposed facilities under the Primary Configuration would not interfere with existing land uses. In addition, the record demonstrates that in the vicinity of the proposed facilities there are no known historic or archaeological resources that would be adversely affected by the proposed construction.

Accordingly, the Siting Board finds that, with the approval by the Town's ZBA of NMLD's application for a special permit to construct and operate the proposed new substation within the Water Protection Overlay District in Norwood, and with the implementation of all proposed mitigation including those in Sections III.C.2.a.i to III.C.2.a.ii, above, the environmental impacts of the proposed facilities under the Primary Configuration would be minimized with respect to land use.

iv. Visual Impacts

NMLD asserted that constructing the proposed facilities under the Primary Configuration, including proposed modifications to the existing Dean Street substation, underground installation of transmission and distribution lines, and construction of a new substation, would result in very limited visual impacts (Exh. NM-1, at 87). The Light Department indicated that modifications to the existing Dean Street substation would be within the fenced area behind the existing substation building and lower in height than existing structures (*id.*). The Light Department stated that the overall size and visual appearance of the Dean Street substation after construction would therefore be similar to its appearance before construction (*id.*). The Light Department also indicated that no visual

impacts would result from installation of the proposed transmission and distribution lines due to their placement underground (id. at 51, 87).

The Light Department stated that it would minimize visual impacts of the proposed substation at the Ellis Avenue site by selecting switchgear for which overhead bus structures would not be required and by locating the proposed substation in conformance with local zoning setback requirements and at some distance from residential and commercial buildings (id. at 87-88). The Light Department stated that NWD ownership of the property at and around the Ellis Avenue site had prevented residential and commercial development in the area and would continue to do so in the future (id.). NMLD indicated that the closest residence or sensitive receptor was a nursing center 550 feet from the Ellis Avenue site, on the opposite side of Route 1 (id.). NMLD indicated that in addition to distance, a buffer of mature existing trees between the Ellis Avenue substation site and Route 1 would mitigate potential visual impacts of the proposed facilities on the nursing center (id. at 87-88). NMLD also indicated that new trees would be planted between the proposed substation and Route 1 and to the north of the substation along the proposed driveway entrance (id.; Tr. 2, at 147-148). In addition, NMLD indicated that it would file with the Town's Planning Board a landscaping plan for the Ellis Avenue site, and that said landscaping plan would incorporate one-to-one replacement of any trees removed for construction and maintenance of the identified site (Tr. 2, at 147-148).

The record demonstrates that, with the implementation of the proposed screening of the proposed new substation, the incremental visual impacts of the proposed facilities under the Primary Configuration would be minimal. Accordingly, the Siting Board finds that, with the mitigation proposed to screen the proposed facilities at the Ellis Avenue substation site, the environmental impacts of the proposed facilities under the Primary Configuration would be minimized with respect to visual impacts.

v. Magnetic Field Levels

NMLD provided data on magnetic field levels for the existing and proposed transmission lines along the Primary Configuration and at the Dean Street and proposed new substation terminals (Exh. NM-1, at 101-102). Specifically, NMLD provided measurements

of current magnetic field levels for the existing transmission lines and Dean Street substation, which ranged from 0 mG to a maximum of 16 mG (at the Dean Street getaway cables) (id. at 102). NMLD indicated that it took all measurements on the sidewalk or, where there was no sidewalk, just off the edge of the paved way (Exh. EFSB-E-8). The Light Department also modelled magnetic field levels for its proposed transmission lines both assuming a load of 15 MVA and assuming a peak substation capacity load of 55 MVA (id.; Exh. EFSB-E-8B). According to the modelling undertaken at 55 MVA by NMLD, magnetic field levels would be 3.3 mG directly above the centerline of the proposed underground transmission cables, and would decrease to 0.7 mG and 0.1 mG at distances from the centerline of ten feet and 20 feet, respectively (Exhs. EFSB-E-8; EFSB-E-8B). NMLD stated that its use of close phase spacing would reduce magnetic field levels associated with its proposed 115 kV transmission system (Exh. NM-1, at 101).

With respect to the proposed distribution lines, NMLD indicated that the proposed distribution line route would extend initially across undeveloped Town-owned land from the proposed Ellis Avenue substation to a crossing of Route 1 and southward toward Plantingfield Brook along an approximately 1000-foot frontage of undeveloped Town-owned land on the west side of Route 1 (id., at 87; Exh. EFSB-E-1, EFSB-E-1A, Att.). NMLD provided estimates of the expected magnetic field levels associated with the distribution lines at the Route 1 crossing, which would range from 2.8 mG (at initial build, with two cables at a 15 MVA load) to 18 mG (twenty years after construction, with 6 cables at a 39.7 MVA load) (Exh. EFSB-A-3).⁴⁴ In constructing the distribution lines under Route 1, the Light Department stated that it would locate the ductbank so as to maximize the distance from any receptor above (id.).⁴⁵ NMLD provided no magnetic field impact estimates for the remainder

⁴⁴ NMLD indicated that the crossing would be routed through an existing but sealed tunnel, historically used for passage of livestock, and also later as a route for other utilities (Exh. EFSB-A-3).

⁴⁵ NMLD provided maps showing developed uses on nearby Ellis Avenue, but indicated that such uses are either across the street from the proposed distribution line route, or separated by an approximately 200-foot width of undeveloped Town-owned land (Exhs. NM-1, exhibit 4-1; EFSB-E-1, EFSB-E-1A, Att.).

of the distribution line route, extending approximately 2500 feet along the west side of Route 1 from Plantingfield Brook to Pleasant Street, but indicated that commercial and business uses were located along that portion of the route.⁴⁶ The Light Department also noted that its overall proposal to transmit bulk power at 115 kV to meet load in the northern area of the Town would off-load some of the Dean Street distribution feeders, and thus reduce magnetic fields along those feeder routes (Exh. EFSB-E-24).

The record demonstrates that the proposed transmission and substation improvements to the NMLD system would result in minimal contributions to existing magnetic field levels. The record further indicates that the proposed distribution lines emanating from the proposed new substation, although projected to produce potentially higher magnetic field levels than the proposed transmission lines, would be routed initially in an area of undeveloped Town-owned land, and then along primarily commercial frontages on the west side of Route 1 with setbacks to occupied buildings. The record also demonstrates that any change in magnetic fields as a result of installation of the proposed facilities would be greatest directly over the centerlines of the proposed underground transmission and distribution cables, and would fall off rapidly with distance to the either side of the respective centerlines. Finally, the record demonstrates that the design of the transmission and distribution lines, including the underground alignment and the close phase spacing of cables in ductbanks, and the placement of the distribution line ductbank at the Route 1 crossing to maximize separation from receptors, would help minimize magnetic field impacts from the proposed facilities.

In a previous review of proposed transmission line facilities which included 345 kV transmission lines, the Siting Board accepted edge-of-right-of-way ("ROW") levels of 85 mG for magnetic fields. Massachusetts Electric Company/New England Power Company, 13 DOMSC 119, 228-242 (1985). The Siting Board has also applied these edge-of-ROW levels in subsequent reviews of facilities which included 115 kV transmission lines. See Enron, 23 DOMSC at 227 (1991); MASSPOWER, 20 at DOMSC 401-403.

⁴⁶ Information provided by NMLD indicates that many of the existing uses are set back from Route 1, and at several locations within the route segment there are ditch-type wetlands on the abutting land closest to the Route 1 layout (Exh. NM-2, exhibit 4-7, Att. A at A-4 to A-8).

Here the Siting Board notes that projected magnetic field levels for all facility elements would be well below the levels previously found acceptable by the Siting Board. In addition, the Light Department has developed proposed siting and design provisions, as discussed above, that would minimize the magnetic field impacts of the proposed facilities. Accordingly, the Siting Board finds that, with implementation of the proposed facility design and mitigation, the environmental impacts of the proposed facilities along the Primary Configuration would be minimized with respect to magnetic field impacts.

vi. Conclusions on Environmental Impacts

In Section III.C.2.a, above, the Siting Board has reviewed the information provided by the Light Department regarding environmental impacts of the proposed facilities under the Primary Configuration and the potential mitigation measures. The Siting Board finds that the Light Department has provided sufficient information regarding environmental impacts of the proposed facilities under the Primary Configuration and potential mitigation measures for the Siting Board to determine whether environmental impacts would be minimized and whether the appropriate balance among environmental impacts and among environmental impacts, cost, and reliability would be achieved.

In Section III.C.2.a, above, the Siting Board has found that: (1) with the implementation of the proposed mitigation measures, the environmental impacts of the proposed facilities under the Primary Configuration would be minimized with respect to water resources; (2) with the implementation of the proposed mitigation measures, the environmental impacts of the proposed facilities under the Primary Configuration would be minimized with respect to land resources; (3) with the approval by the Town's ZBA of the Light Department's application for a special permit to construct and operate the proposed new substation within the Water Protection Overlay District in Norwood, and with the implementation of all mitigation proposed in Sections III.C.2.a.i to III.C.2.a.ii, above, the environmental impacts of the proposed facilities under the Primary Configuration would be minimized with respect to land use; (4) with the proposed mitigation to screen the proposed facilities at the proposed new substation site, the environmental impacts of the proposed facilities under the Primary Configuration would be minimized with respect to visual

impacts; and (5) with implementation of the proposed facility design and mitigation, the environmental impacts of the proposed facilities under the Primary Configuration would be minimized with respect to magnetic field levels.

Accordingly, the Siting Board finds that with the implementation of proposed mitigation and planned compliance with applicable state and local requirements set forth above, the environmental impacts of the proposed facilities under the Primary Configuration would be minimized. In Section III.C.2.c, below, the Siting Board addresses whether an appropriate balance among environmental impacts and among environmental impacts, cost and reliability would be achieved.

b. Cost of the Proposed Facilities Under the Primary Configuration

The Light Department asserted that it had provided sufficient cost information regarding the proposed facilities for the Siting Board to determine whether an appropriate balance would be achieved between environmental impacts and costs (Brief at 131). In support of its assertion, the Light Department submitted estimates of both installation costs and discounted total costs for all three alternatives (Exhs. EFSB-RR-3-S; NM-2, at exhibits 5-1 to 5-3).⁴⁷ NMLD stated that it estimated the installation costs of the proposed project at \$13,984,000, and the discounted total costs at \$23,720,000 (Exhs. EFSB-RR-3-S; NM-1, at 135).⁴⁸

⁴⁷ As indicated in Section II.B.6, above, discounted total costs are the costs, in 1996 dollars, of initial construction, anticipated distribution system additions and modifications, and differential line losses over the 2001-2019 analysis period (Exh. NM-1, at 135). Installation costs include costs of 115 kV transmission, 13.8 kV distribution, a new 115/13.8 kV substation, Dean Street modifications and future distribution costs (Exhs. EFSB-RR-3-S; NM-2, at exhibit 5-1).

⁴⁸ NMLD indicated that its 20-year analysis assumed construction of four distribution lines at the time of the initial build, and subsequent construction of two additional distribution circuits to the east and west of the new substation site, respectively (Exh. EFSB-C-1).

The Siting Board finds that NMLD has provided sufficient cost information for the Siting Board to determine whether an appropriate balance would be achieved between environmental impacts and cost.

c. Conclusions

The Siting Board has found that NMLD has provided sufficient information regarding the environmental impacts of the proposed facilities under the Primary Configuration and potential mitigation measures for the Siting Board to determine whether environmental impacts would be minimized and whether the appropriate balance among environmental impacts and between environmental impacts and costs would be achieved. The Siting Board has also found that NMLD has provided sufficient cost information for the Siting Board to determine whether the appropriate balance would be achieved between environmental impacts and cost.

In Section III.C.2.a, above, the Siting Board reviewed the environmental impacts of the proposed facilities and proposed mitigation under the Primary Configuration with respect to water resources, land resources, land use, visual impacts, and magnetic field levels. For each category of environmental impacts, NMLD demonstrated that, with the mitigation discussed above, the impacts would be minimized.

Accordingly, the Siting Board finds that the proposed facilities under the Primary Configuration would achieve an appropriate balance among conflicting environmental concerns as well as between environmental impacts and cost.

3. Analysis of the Proposed Facilities along the Alternative Routes and Comparison

a. Environmental Impacts of the Proposed Facilities along the Alternative Routes and Comparison

In this Section, the Siting Board evaluates the environmental impacts of the proposed facilities along the alternative routes and potential mitigation for such impacts, and compares the primary and alternative routes. First, as part of its evaluation, the Siting Board addresses whether the petitioner has provided sufficient information regarding alternative routes for the

Siting Board to determine whether the environmental impacts of the proposed facilities would be minimized, and whether the proposed facilities would achieve the appropriate balance among environmental impacts and between environmental impacts and cost. If necessary for its review, the Siting Board separately addresses whether the environmental impacts of the proposed facilities along the alternative routes would be minimized, with potential mitigation. Finally, in order to determine a best route, the Siting Board compares the environmental impacts of the Primary Configuration to the environmental impacts of each of the alternative routes.

i. Water Resources

(A) Alternative One

NMLD indicated that wetland resource areas encountered in the vicinity of Alternative One would be essentially the same as those in the vicinity of the Primary Configuration (Exh. NM-1, at 103). NMLD noted that the Alternative One transmission line route would be located within existing roadways, avoiding direct disturbance of wetland resources adjacent to the roadway layout (*id.* at 103). NMLD stated that, like the primary route, the Alternative One route would cross two culverted streams; further, the divergent route segment would not traverse any wetlands or result in additional impacts to floodplains or water supply (*id.* at 103-105). The Light Department indicated that potential impacts to water supply from construction and operation of the proposed facilities under Alternative One would be comparable to those under Alternative Two or the Primary Configuration (*id.* at 118).

The record demonstrates that impacts to existing and future water resources from the construction of the proposed facilities could be minimized under Alternative One. The record also demonstrates that the impacts to water resources of Alternative One and the Primary Configuration would be identical. Accordingly, the Siting Board finds that the Primary Configuration and Alternative One would be comparable with respect to water resources.

(B) Alternative Two

NMLD indicated that the Alternative Two transmission line route would extend 0.8 mile beyond the end of the primary route to reach the University Avenue site (id. at 115-116). NMLD stated that the longer transmission and distribution lines would result in additional impacts to wetland resources, as they would cross an additional 2100 square feet of wetland buffer zone (Exhs. NM-1, at 116-117; NM-2, exhibit 4-20; Tr. 2 at 144).⁴⁹

The Light Department indicated that it would minimize impacts to wetland buffer zone under Alternative Two with mitigation of the same type and scope as is proposed for the Primary Configuration (Exh. NM-1, at 116-117). NMLD also stated that because the University Avenue site was in an upland area away from wetland resources, any impacts to wetlands, buffer zone, floodplains and surface water of constructing and operating the proposed new substation at that site would be comparable to those at the Ellis Avenue site (Exhs. NM-1, at 116-117; NM-2, exhibit 4-20). NMLD noted, however, that, due to the greater extent of construction in buffer zones associated with Alternative Two, the potential for impacts to wetlands from construction and operation of the proposed facilities under Alternative Two would be slightly greater than those under either Alternative One or the Primary Configuration (id. at 117).

With respect to water supply impacts of Alternative Two, NMLD stated that the portion of the transmission line and 13.8 kV distribution line routes running from Route 1 along University Avenue to the University Avenue site would be adjacent to the WPD for the Ellis Avenue well-field (id. at 117-118). The Light Department indicated that the University Avenue site was on Town-owned land which could not be used for wells due to the proximity of land not controlled or owned by the NWD (id. at 118). NMLD stated that the University Avenue site was located outside of the area of any existing or potential future well sites and would therefore allow for potential, but unlikely, future development at the Ellis Avenue

⁴⁹ NMLD also indicated that the Alternative Two transmission line route would pass through an additional 4,800 linear feet of the ACEC (Exh. NM-1, at 120). The Light Department stated, however, that potential impacts to the ACEC from Alternative Two would be comparable to those from the Primary Configuration since neither facilities configuration directly impacts resources protected by the ACEC (id.).

well-field (id.). The Light Department indicated that the University Avenue site was slightly further than the Ellis Avenue site from existing or potential future well sites (Exh. NM-2, exhibit 4-20).

NMLD stated that placement of the transmission and distribution lines along University Avenue would require construction adjacent to, but not in, wetlands that drain to water supply land. The Light Department indicated that it would prevent migration of sediments with appropriate mitigation measures, and that the potential impacts to water supply from construction and operation of the proposed facilities under Alternative Two would be comparable under those of Alternative One and the Primary Configuration (id.).

The record demonstrates that impacts to existing and future water resources from the construction of the proposed facilities could be minimized under Alternative Two. The record further shows that construction of transmission and distribution lines for Alternative Two may result in greater wetlands impacts than those associated with the Primary Configuration, but that such impacts would be temporary and minimized with the use of appropriate mitigation techniques. In addition, the record shows that use of the University Avenue substation site might result in slightly less impact to water resources because of its greater distance from the Ellis Avenue well-field. The record thus demonstrates that the Primary Configuration and Alternative Two would result in slight and offsetting advantages with respect to wetland resources and groundwater and well resources, respectively. Accordingly, the Siting Board finds that the Primary Configuration and Alternative Two would be comparable with respect to water resources.

ii. Land Resources

(A) Alternative One

NMLD indicated that the land resource impacts of the construction of the proposed facilities under Alternative One would be identical to those under the Primary Configuration, except where the Alternative One transmission line route deviates from the primary route (Exh. NM-1, at 56, 103, 106) (see Section II.C.2.a.ii, above). NMLD stated that it would limit the tree-clearing, vegetation and soil erosion impacts of Alternative One by installing

the transmission lines within roadway layouts of Dean Street, Neponset Street and Route 1 (id. at 103, 107).

The Light Department indicated that it would coordinate with the MHD and the Norwood DPW to ensure the use of appropriate mitigation to minimize erosion during construction and that it would replace any trees removed for construction of the proposed facilities on a one-to-one basis (id.; Tr. 2, at 148). NMLD further stated that no rare or endangered species or habitat would be adversely affected by the construction or operation of the proposed facilities under Alternative One (Exhs. NM-1, at 121; NM-2, exhibit 4-2; EFSB-Att.-E-11-C).

The record demonstrates that impacts of the construction of the proposed facilities under Alternative One with respect to tree clearing, upland vegetation and potential soil erosion would be minimized. The record also demonstrates that there are no known rare or endangered species that would be adversely affected by the proposed construction under Alternative One. The Siting Board notes, however, that the primary transmission line route would be shorter than the Alternative One route by 0.4 mile.

Accordingly, the Siting Board finds that the Primary Configuration would be slightly preferable to Alternative One with respect to land resource impacts.

(B) Alternative Two

NMLD indicated that the land resources impacts of Alternative Two would differ from those of the Primary Configuration due to the use of the University Avenue substation site and the longer transmission and distribution line routes, which extend 0.8 mile beyond the end of the primary route (id. at 56, 115). See Section II.C.2.a.ii, above. NMLD stated that it would limit the tree-clearing, vegetation and soil erosion impacts of the Alternative Two transmission and distribution lines by installing the extended portion of such lines within the layout of Route 1, Everett Street and University Avenue (id. at 120).

As with Alternative One, the Light Department indicated that it would coordinate with the MHD and the Norwood DPW to ensure the use of appropriate mitigation to minimize erosion during construction, and that it would replace any trees removed for construction of the proposed facilities on a one-to-one basis (id.; Tr. 2, at 148). NMLD further stated that

no rare or endangered species or habitat would be adversely affected by the construction or operation of the proposed facilities under Alternative Two (Exhs. NM-1, at 121; NM-2, exhibit 4-2; EFSB-Att.-E-11-C).

The record demonstrates that impacts of the construction of the proposed facilities under Alternative Two with respect to tree clearing, upland vegetation and potential soil erosion would be minimized. The record also demonstrates that there are no known rare or endangered species that would be adversely affected by the proposed construction under Alternative Two. The Siting Board notes, however, that the primary transmission line route would be shorter than the Alternative Two route by 0.8 mile.

Accordingly, the Siting Board finds that the Primary Configuration would be slightly preferable to Alternative Two with respect to land resource impacts.

iii. Land Use

(A) Alternative One

NMLD indicated that differences between Alternative One and the Primary Configuration with respect to zoning and land use would be limited to the divergent routing for a portion of the 115 kV transmission lines (Exh. NM-1, at 106-109). The Light Department stated that 1.2 miles more of the Alternative One transmission line route than of the primary route would be located in residential areas, with correspondingly less commercial area traversed (id. at 108).⁵⁰ NMLD stated that construction and operation of the proposed facilities under Alternative One would not adversely impact historic or archaeological resources (id. at 106, 119).

NMLD stated that traffic impacts associated with Alternative One would be limited primarily to periods of construction, and that no construction would be undertaken in the travel lanes of Route 1 (id. at 109, 122). The Light Department indicated that, although construction for Alternative One would impact fewer commercial driveways along Route 1

⁵⁰ The Norwood League of Women Voters ("LWV") study documented the preference of the LWV -- and other Town residents attending public meetings held by the LWV -- for minimizing the residential areas traversed by the proposed facilities (Exh. EFSB-S-4A). (See Section III.B, above.)

than the Primary Configuration, other commercial and apartment complex driveways along Neponset Street would be affected, as would driveways in residential sections of Neponset and Pleasant Streets (*id.* at 109-111). NMLD stated that construction of the proposed facilities under Alternative One would also require two crossings of Route 1, one at Neponset Street and the other at Pleasant Street, which would likely result in additional traffic disruption (*id.* at 110).⁵¹ NMLD indicated that it would coordinate the development of a traffic management plan with the Town and the MHD, and that it would use the same measures developed to mitigate the traffic and safety impacts associated with construction of the proposed facilities along the Primary Configuration if Alternative One were selected instead (Exh. NM-1, at 110, 112, 123; Exh. EFSB-E-13). See Section III.C.2.iii, above.

NMLD indicated that construction of the proposed facilities under Alternative One would result in greater noise impacts than those for the Primary Configuration, because the Alternative One transmission line route would be longer and would pass through a higher proportion of residential streets (Exh. NM-1, at 113-114).

The record demonstrates that the Alternative One transmission line route would in large part traverse zoning districts comparable to those of the primary route, but would traverse more area zoned for residential use. Because significantly more of the Alternative One route would pass through residential streets, the traffic, safety and noise impacts of its construction would be greater than those for the Primary Configuration. The record demonstrates, however, that such impacts would be temporary.

Accordingly, the Siting Board finds that the Primary Configuration would be preferable to Alternative One with respect to land use impacts.

⁵¹ NMLD indicated that boring under Route 1 to avoid traffic disruption was possible but costly, and that the Light Department had based its cost estimates on less expensive open cut crossings (Exh. NM-1, at 110). NMLD indicated that the traffic impacts of open cut crossings could be limited by planning construction to avoid times when the roadway would be heavily travelled (*id.*).

(B) Alternative Two

NMLD stated that the land use impacts of Alternative Two differ from those of the Primary Configuration primarily due to the different substation site, and the extension of the transmission and distribution lines from the endpoint of the primary route to the University Avenue site (id. at 119-122). NMLD noted that the transmission and distribution line extensions would traverse areas zoned for business and manufacturing, and that the University Avenue site would be in an area zoned for limited manufacturing, in contrast to the residentially zoned Ellis Avenue site (id. at 121). The Light Department indicated that the University Avenue site, like the Ellis Avenue site, would be located within the WPD and therefore would require the same permitting (id.). See Section III.C.2.iii, above. NMLD stated that construction and operation of the proposed facilities under Alternative Two would not adversely impact historic or archaeological resources (id. at 106, 119).

NMLD stated that traffic impacts associated with Alternative Two would be limited primarily to periods of construction, and that no construction would be undertaken in the travel lanes of Route 1 (id. at 109, 122). NMLD stated that the extension of the transmission and distribution line routes along Route 1 and University Avenue to the University Avenue site would result in traffic disruption along University Avenue and additional traffic disruption along Route 1 beyond that associated with the Primary Configuration (id. at 122). NMLD indicated, however, that it would take appropriate steps to mitigate traffic impacts along University Avenue, including keeping open two lanes of traffic during construction, and that the same measures used to mitigate traffic impacts elsewhere along Route 1 would be used to minimize traffic impacts along the Route 1 extension (id.). In addition, NMLD indicated that it would coordinate the development of a traffic management plan with the Town and the MHD, and that it would use the same measures developed to mitigate the traffic and safety impacts associated with construction of the proposed facilities along the primary route if Alternative Two were selected instead (Exh. NM-1, at 110, 112, 123; Exh. EFSB-E-13). See Section III:C.2.iii, above.

NMLD indicated that construction of the proposed facilities under Alternative Two would result in a longer duration of construction noise impacts than under the

Primary Configuration because of the greater length of its transmission and distribution lines (id. at 129). The Light Department stated that construction practices planned for the Primary Configuration would also be used to minimize potential construction noise impacts of Alternative Two (id.). The Light Department indicated that no long-term noise impacts were anticipated as a result of construction of the proposed transmission and distribution facilities under Alternative Two (id. at 113, 129).

The Light Department provided estimated noise levels for sensitive receptors in the area of the University Avenue site (id. at 124-128). In addition, the Light Department provided a map marking the distance from the University Avenue site within which the increase in the ambient noise level at L_{90} would be 8 dBA or greater under nighttime conditions (Exh. EFSB-RR-6). Based on its noise estimates and map, NMLD stated that increases in L_{90} ambient noise at the 8 dBA level or above would not be experienced at any existing commercial or residential structure (id.). The Light Department indicated that while most of the property in the vicinity of the University Avenue site was owned by NWD and would likely not be developed, development of a privately owned parcel to the southeast of the site might be possible (id.). NMLD noted, however, that the parcel was located in a limited manufacturing zone where noise sensitive uses such as residences would not be allowed under the Town zoning by-laws (id.).

The record demonstrates that the Alternative Two transmission line route would in large part traverse zoning districts comparable to those of the primary route, but would traverse less area zoned for residential use. The record also demonstrates that the traffic and safety impacts of Alternative Two would be slightly greater than for those of the Primary Configuration due to the longer transmission and distribution lines associated with Alternative Two. Further, due to the greater length of Alternative Two and the potential for future development in the vicinity of the University Avenue site, noise impacts associated with Alternative Two may be greater than those for the Primary Configuration.

Accordingly, the Siting Board finds that the Primary Configuration would be slightly preferable to Alternative Two with respect to land use impacts.

iv. Visual Impacts(A) Alternative One

NMLD indicated that all modifications to existing equipment and construction of new facilities under Alternative One would be identical to those under the Primary Configuration and therefore would have identical visual impacts (Exh. NM-1, at 112-113). NMLD further indicated that, because the proposed transmission line would be built underground, the visual impacts of the transmission line would be identical under Alternative One and the Primary Configuration (id. at 112).

The record demonstrates that visual impacts of the proposed facility under Alternative One would be minimized and would be comparable to the impacts under the Primary Configuration. Accordingly, the Siting Board finds that Alternative One would be comparable to the Primary Configuration with respect to visual impacts.

(B) Alternative Two

The Light Department stated that visual impacts of Alternative Two and the Primary Configuration would be identical with respect to the existing Dean Street substation and along the route of the proposed underground transmission and distribution lines (id. at 123-124). NMLD also indicated that visual impacts of the proposed substation at the University Avenue site would be minimal and comparable to those at the Ellis Avenue substation site (Exh. EFSB-E-16). The Light Department indicated that it based its statement on the fact that the University Avenue site is surrounded by forested, undeveloped parcels which are zoned for limited manufacturing (id.). NMLD stated that the University Avenue site is large enough to allow for a buffer of vegetation outside the fence line of the substation that could screen the site from view of any development that might occur in surrounding areas in the future (id.).

The record demonstrates that visual impacts of the proposed facility under Alternative Two would be minimized and would be comparable to the impacts under the Primary Configuration. Accordingly, the Siting Board finds that Alternative Two would be comparable to the Primary Configuration with respect to visual impacts.

v. Magnetic Field Levels(A) Alternative One

NMLD provided data on existing and anticipated magnetic field levels for that portion of the Alternative One transmission line route which diverges from the primary route (Exhs. NM-1, at 114, 130; NM-2, exhibits 4-19, 4-22; EFSB-E-24; EFSB-E-25). The Light Department stated that all measurements were taken on the sidewalk, or where there was no sidewalk, just off the edge of the paved way (Exhs. EFSB-E-24, EFSB-E-25). NMLD indicated that measured magnetic field levels ranged from 0 mG to 8 mG along the divergent part of the route (Exh. NM-2, exhibit 4-19). The Light Department asserted that its analysis of maximum magnetic field levels for the proposed transmission and distribution lines under the Primary Configuration would also apply to Alternative One (Exhs. EFSB-E-24, EFSB-E-25).

The record demonstrates that the magnetic field level impacts of Alternative One and the Primary Configuration would be comparable, and would be well below the level of 85 mG previously accepted by the Siting Board. The record also demonstrates that the Light Department would take steps to minimize the magnetic field impacts of operating the proposed underground transmission and distribution lines, including the use of close phase spacing, regardless of which route is chosen.

Accordingly, the Siting Board finds that Alternative One would be comparable to the Primary Configuration with respect to magnetic field levels.

(B) Alternative Two

NMLD also provided data on existing and anticipated magnetic field levels for those portions of the Alternative Two transmission and distribution line routes which do not overlap the primary route (Exhs. NM-1, at 114, 130; NM-2, exhibits 4-19, 4-22; EFSB-E-24; EFSB-E-25). The Light Department stated that all measurements were taken on the sidewalk, or where there was no sidewalk, just off the edge of the paved way (Exhs. EFSB-E-24, EFSB-E-25). NMLD indicated that measured magnetic field levels ranged from 0 mG to 4 mG along the divergent portion of the Alternative Two transmission and

distribution line routes (Exh. NM-2, exhibit 4-22). The Light Department asserted that its analysis of maximum magnetic field levels for the proposed transmission and distribution lines under the Primary Configuration would also apply to Alternative Two (Exhs. EFSB-E-24, EFSB-E-25).

The record demonstrates that the magnetic field level impacts of Alternative Two and the Primary Configuration would be comparable, and would be well below the level of 85 mG previously accepted by the Siting Board. The record also demonstrates that the Light Department would take steps to minimize the magnetic field impacts of operating the proposed underground transmission and distribution lines, including the use of close phase spacing, regardless of which route is chosen.

Accordingly, the Siting Board finds that Alternative Two would be comparable to the Primary Configuration with respect to magnetic field levels.

vi. Conclusions on Environmental Impacts

In Sections III.C.3.a(i) to (v), above, the Siting Board has found that the Primary Configuration would be slightly preferable to both Alternative One and Alternative Two with respect to land resources, preferable to Alternative One and slightly preferable to Alternative Two with respect to land use impacts and comparable to both Alternative One and Alternative Two with respect to water resources, visual and magnetic field impacts.

The Siting Board notes that the Light Department's effort to solicit input from a wide variety of sources during the early stages of its planning process has produced a Primary Configuration and two alternatives, each of which would involve temporary, relatively minor and/or readily mitigated environmental impacts. Nonetheless, the Primary Configuration clearly offers certain advantages over the two alternatives. These advantages are primarily due to (1) the shorter transmission line route of the Primary Configuration, which results in fewer land use impacts over a shorter construction period, and (2) the fact that the primary route transmission line would be installed in the grassed and paved shoulder of an existing state highway rather than in residential streets.

Accordingly, the Siting Board finds that, on balance, the Primary Configuration would be preferable to Alternative One or Alternative Two with respect to environmental impacts.

b. Cost of the Proposed Facilities along the Alternative Routes and Comparison

NMLD asserted that the Primary Configuration would be more economical to construct and operate over the years 2001-2019 than either Alternative One or Alternative Two (Exh. NM-1, at 139). NMLD submitted estimates of installation costs and discounted total costs (including differential line losses) for the years 2001-2019 for the two alternative configurations (Exhs. EFSB-RR-3-S; NM-2, at exhibits 5-2, 5-3). NMLD explained that its estimates of installation costs for the two alternative configurations included costs of 115 kV transmission, 13.8 kV distribution, a new 115/13.8 kV substation, Dean Street substation modifications and future distribution costs (Exhs. EFSB-RR-3-S; NM-2, at exhibits 5-2, 5-3).

i. Alternative One

NMLD stated that it estimated installation costs at \$14,421,000 for Alternative One, as compared to \$13,984,000 for the Primary Configuration (Exh. EFSB-RR-3-S). NMLD further stated that discounted total costs for Alternative One would be \$24,502,000, as compared to \$23,720,000 for the Primary Configuration (Exhs. NM-1, at 137; NM-2, at exhibit 5-2). The Light Department indicated that discounted total cost included differential line losses of \$6,000 over the line losses expected under the Primary Configuration (Exh. EFSB-RR-3-S).

NMLD indicated that costs of the Primary Configuration would be lower than those of Alternative One due primarily to the lower transmission and distribution costs of the Primary Configuration (Exh. NM-1, at 138). NMLD explained that initial 115 kV transmission costs would be lower for the Primary Configuration than for Alternative One because the route of the proposed transmission lines would be shorter (*id.*).

The record demonstrates that both the installation and discounted total costs of Alternative One would be 3 percent more than corresponding costs for the Primary Configuration. According, the Siting Board finds that the Primary Configuration would be preferable to Alternative One with respect to cost.

ii. Alternative Two

NMLD stated that it estimated total installation costs at \$17,004,000 for Alternative Two (Exh. EFSB-RR-3-S). NMLD further stated that discounted total costs for Alternative Two would be \$29,546,000 (Exhs. NM-1, at 138; NM-2, at exhibit 5-3). The Light Department indicated that the discounted total cost included differential line losses of \$116,000 over the line losses expected under the Primary Configuration (Exh. EFSB-RR-3-S).

NMLD indicated that transmission and distribution costs would be lower for both the Primary Configuration and Alternative One than for Alternative Two (Exh. NM-1, at 138). NMLD also indicated that future distribution costs for Alternative Two would be higher than for the Primary Configuration and Alternative One due to the greater distance from the load center of the University Avenue substation site (id.). NMLD explained that longer ductbanks and cable circuits would be needed to reach the load from the University Avenue site than from the Ellis Avenue site (id.).

The record demonstrates that installation and discounted total costs of Alternative Two are 22 and 25 percent greater, respectively, than those of the Primary Configuration.⁵² Accordingly, the Siting Board finds that the Primary Configuration would be preferable to Alternative Two with respect to cost.

c. Conclusions

In comparing the Primary Configuration to Alternative One and Alternative Two, the Siting Board has found that the proposed facilities under the Primary Configuration would be preferable to both Alternative One and Alternative Two with respect to (1) environmental impacts, and (2) costs.

Accordingly, the Siting Board finds that the Primary Configuration would be preferable to Alternative One and Alternative Two with respect to providing a necessary

⁵² The record also demonstrates that installation and discounted total costs of Alternative Two are 18 and 21 percent greater, respectively, than those of Alternative One.

energy supply to the Commonwealth with a minimum impact on the environment at the lowest possible cost.

4. DECISION

The Siting Board has found that the Light Department's analysis demonstrates that (1) under the current configuration, peak load would exceed a maximum system loading of 83 MVA in the 2000-2001 timeframe in contravention of NMLD's design criteria; (2) by 1999, feeder position capabilities would constrain NMLD's ability to meet load growth, particularly large customer growth, because the existing system would not have the flexibility to serve new spot loads; and (3) at present, the contingency of the loss of a single circuit in the 16-way ductbank could result in system operation at emergency levels for more than 24 hours, in contravention of system reliability criteria. The Siting Board therefore has found that there is a need for additional energy resources based on the Light Department's reliability criteria.

The Siting Board also has found that there is reasonable consistency between the D.P.U. 94-112 forecast and NMLD's internal forecast, which supports the Siting Board's finding of need for additional energy resources. Consequently, the Siting Board finds that the proposed project is consistent with the most recently approved long-range forecast that encompasses NMLD's load, namely, the D.P.U. 94-112 forecast.

The Siting Board further has found that the proposed project is preferable to the Dean Street Expansion Plan, the Low Voltage Plan and distributed generation.

The Siting Board further has found that NMLD has considered a reasonable range of practical siting alternatives.

The Siting Board further has found that with the implementation of proposed mitigation and planned compliance with applicable state and local requirements set forth above, the environmental impacts of the proposed facilities under the Primary Configuration would be minimized.

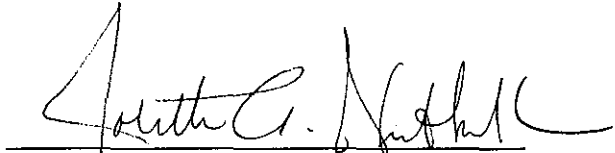
The Siting Board further has found that the proposed facilities under the Primary Configuration would achieve an appropriate balance among conflicting environmental concerns as well as between environmental impacts and cost.

The Siting Board further has found that the Primary Configuration would be preferable to Alternative One and Alternative Two with respect to providing a necessary energy supply

to the Commonwealth with a minimum impact on the environment at the lowest possible cost.

Accordingly, the Siting Board APPROVES the Light Department's petition to construct (1) two underground parallel 115 kV transmission lines, (2) a new 115/13.8 kV substation, and (3) a 0.7-mile 13.8 kV distribution line using the Petitioner's proposed configuration in the Town of Norwood.

The Siting Board notes that the findings in this decision are based on 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 the Light Department 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. The Light Department 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.


Jolette A. Westbrook
Hearing Officer

Dated this 14th day of April, 1997

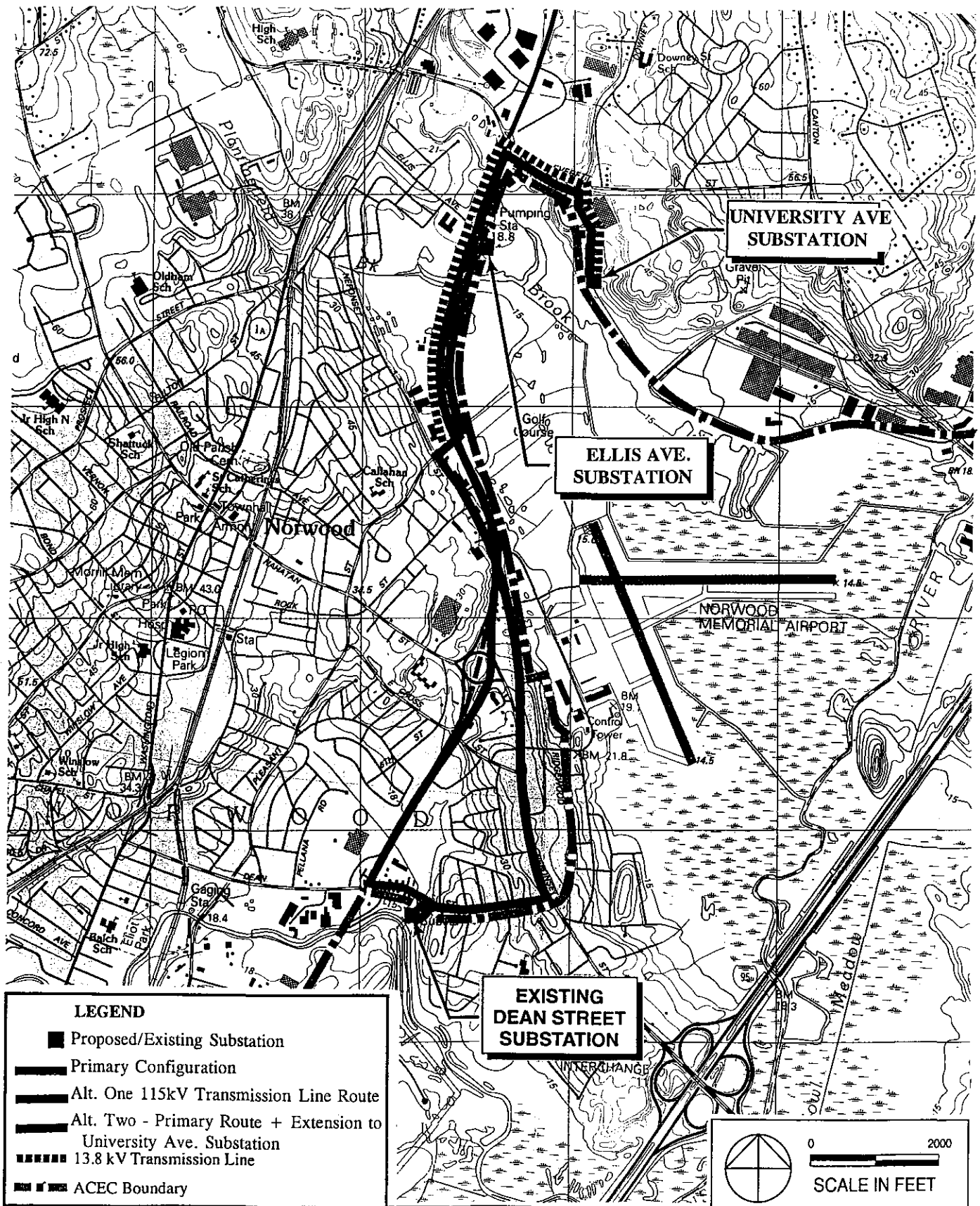


FIGURE 1

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).

COMMONWEALTH OF MASSACHUSETTS

ENERGY FACILITIES SITING BOARD

In the Matter of the Petition of Dighton)
Power Associates for Approval to)
Construct a Bulk Generating Facility)
and Ancillary Facilities)

EFSB 96-3

FINAL DECISION

Cheryl Kimball
Hearing Officer
July 8, 1997

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The Energy Facilities Siting Board ("Siting Board") hereby approves subject to conditions the petition of Dighton Power Associates Limited Partnership to construct a 170 megawatt ("MW"), gas-fired combined cycle generating facility and ancillary facilities in Dighton, Massachusetts.

I. INTRODUCTION

A. Summary of the Proposed Project and Facilities

Dighton Power Associates Limited Partnership ("DPA" or "Company") has proposed to construct a nominal net 170 MW natural gas-fired, combined cycle independent power plant in the Town of Dighton ("Dighton" or "Town"), Massachusetts which would commence commercial operation in 1999 (Exh. DPA-1(A) at 1-2, 1-3). The proposed site consists of two adjacent parcels: a 17.5-acre industrial zoned parcel of which approximately six acres will be developed for the proposed facility; and a 28-acre business zoned property which abuts the 17.5 acre parcel to the south ("Beckwith parcel") (id. at 1-3). The Company proposes to use the Beckwith parcel primarily for buffer and wetlands replication, as well as for a portion of the facility access road and utility interconnects (id. at 1-3, 1-7). The Company stated that it has entered into option agreements to purchase both parcels (id. at 1-7).

The proposed facility would be powered with natural gas provided under a long-term firm supply and transportation contract via the existing Algonquin Gas Transmission Company ("Algonquin") pipeline which traverses the southern portion of the 17.5-acre parcel (id. at 1-3, 1-7). An existing Eastern Utilities Associates ("EUA") easement with three 115 kilovolt ("kV") transmission lines traverses the west side of the 17.5-acre parcel (id. at 1-7). The electricity generated by the proposed facility would be transmitted via an approximately 750-foot underground transmission cable from the proposed facility to the existing EUA lines (id.).

The major components of the proposed project include: (1) a 110 MW Asea Brown Boveri ("ABB") GT 11N2 combustion turbine generator which will generate approximately 110 MW of electricity; (2) a heat recovery steam generator ("HRSG"); (3) a steam turbine generator which will produce an additional 65 MW of electricity; (4) an air-cooled

condenser; (5) a selective catalytic reduction system for nitrogen oxides ("NOx") control; (6) a carbon monoxide ("CO") catalyst; (7) a 150-foot exhaust stack; and (8) ancillary facilities (id. at 1-2, 1-3).

The Company stated that the principal structure of the proposed project would be the power generation building, which houses the combustion turbine generator, steam turbine and HRSG (id. at 1-3). The Company further stated that the generation building would be acoustically treated and at completion would be approximately 70 feet tall, with two raised enclosures over the HRSG extending ten feet beyond the top of the generation building (id.). The Company stated that the proposed facility also includes an air-cooled condenser, miscellaneous storage tanks and a step-up transformer for the transmission interconnect, as well as on-site interconnects to existing gas pipeline and electric transmission lines (id.).

The Company's proposed site is located in an area of Dighton zoned for industrial use (id.). The combined site is generally level and covered with a mix of even-aged secondary growth trees and shrubs and includes some wetlands areas (id. at 1-7). The site is abutted on the north by agricultural land owned by the Bristol County Agricultural School ("Agricultural School") (id. at 1-7, 6-32). To the east, the combined site is bound by an industrial facility ("Advanced Loose Leaf"), Route 138 and Elm Street (id.). To the south, the combined site is bound by an undeveloped residentially-zoned parcel beyond which are two residences and a historic cemetery (id.). To the west, the combined site is bound by property owned by the Town of Somerset and the Segreganset River (id.).

The proposed project would cost approximately \$108 million in 1997 dollars (Exh. DPA-LF-12; Tr. 6, at 88).

The proposed facility is being developed by Energy Management, Inc. ("EMI"), a Massachusetts corporation with over 20 years of experience in the industrial energy business and the development of cogeneration and independent power facilities (Exh. DPA-1 at 1-1). The proponent of this petition, DPA, is a Massachusetts limited partnership of which EMI's affiliate, EMI/Dighton, Inc., is the general partner (id.). Other projects developed by EMI include the 68 MW Pawtucket Power project and the 68 MW Dartmouth Power project, both of which are owned and operated by EMI and its affiliates (id.). EMI will provide complete administrative and management services for the proposed project from the commencement of

construction, as well as operation and maintenance services for the completed facility (*id.* at 4-3).

B. Jurisdiction

DPA filed its petition to construct a bulk generating facility in accordance with G.L. c. 164, § 69H, which requires the Siting Board to implement the energy policies embodied in the statute to provide a necessary 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 companies to obtain Siting Board approval for construction of proposed facilities at a proposed site before a construction permit may be issued by another state agency.

As an independent power plant with a design capacity of approximately 170 MW, DPA's proposed generating unit falls within the first definition of "facility" set forth in G.L. c. 164, § 69G. That section states, in pertinent part, that a facility is:

- (1) any bulk generating unit, including associated buildings and structures, designed for, or capable of operating at a gross capacity of 100 megawatts or more.

At the same time, DPA's proposals to construct a transmission interconnect and other structures at the proposed site fall within the third definition of "facility" set forth in G.L. c. 164, § 69G, which states that a facility is:

- (3) any ancillary structure including fuel storage facilities which is an integrated part of the operation of any electric generating unit or transmission line which is a facility.

C. Procedural History

On June 28, 1996,¹ DPA filed with the Siting Board a petition to construct and

¹ The Company made an initial filing on May 17, 1996, which did not include a need analysis. Thus, the Company's filing was not complete until June 28, 1996 when the Company filed its need analysis. In addition, the Siting Board notes that on October 16, 1996, the Company notified the Siting Board of its decision to make two
(continued...)

operate a 170 MW natural gas-fired independent power plant in Dighton, Massachusetts. The Siting Board docketed this petition as EFSB 96-3. On August 7, 1996, the Siting Board conducted a public hearing in Dighton and on August 12, 1996, the Siting Board held a second public hearing in Taunton, Massachusetts. In accordance with the direction of the Hearing Officer, the Company provided notice of the public hearings and adjudication.

The Siting Board received timely petitions to intervene from: Thomas and Penny E. Cartin ("the Cartins"); Alfred D. Kennedy, Jr. and Lisa Kennedy ("the Kennedys"); Bruce N. and Sharon C. Clark ("the Clarks"); and the International Brotherhood of Electrical Workers, Local Union No. 223. In addition, the Siting Board received timely petitions to participate in the proceeding as an interested person from: U.S. Generating Company ("USGen");² R. Melody Phinney; Mr. and Mrs. Mark Grassie ("the Grassies"); William Graban; Raymond Dougherty; and Berkshire Power Development, Inc. ("BPD").

The Hearing Officer allowed the petitions to intervene of the Cartins³ and the Clarks as to any and all matters associated with this proceeding (Hearing Officer Procedural Order, September 27, 1996, at 2). The Hearing Officer also allowed the petitions to participate as an interested person of the Kennedys, the Grassies, R. Melody Phinney, Raymond Doherty, William Graban, USGen and BPD (*id.* at 2-3).

The Siting Board conducted eight days of evidentiary hearings commencing on January 23, 1997 and ending on February 24, 1997. DPA presented the testimony of six witnesses: Robert Graham, senior associate with La Capra Associates, who testified as to regional need, Massachusetts need and alternative technology issues; George S. Lipka, senior

1(...continued)

design changes to the project in response to concerns raised subsequent to the Company's initial filing (DPA Letter of October 16, 1996). Specifically, the Company eliminated the proposed use of oil as a secondary fuel and substituted an air-cooled design for the proposed water-cooled design (*id.*).

² USGen amended its petition to intervene to a petition to participate as an interested person on August 23, 1996.

³ The Cartins withdrew as intervenors at the close of evidentiary hearings on February 24, 1997.

project manager with EARTH TECH, who testified as to environmental issues and site selection; David N. Keast, a consultant in acoustics, who testified as to noise analysis issues; Mitchell H. Jacobs, Esq., treasurer and general counsel for EMI, who testified as to financing and viability, site selection, local permitting, and carbon dioxide ("CO₂") and NO_x offset acquisition plans; James E. Doggart, vice president of finance for EMI, who testified as to pro-forma financial analysis, project financing and marketing; and Leonard J. Fagan, vice president of engineering for EMI, who testified as to project design, engineering, construction, operation and maintenance. The Hearing Officer entered 479 exhibits into evidence, consisting primarily of information and record request responses. DPA entered 39 exhibits into the record. No other party presented any witnesses or introduced any evidence into the record.

After the close of evidentiary hearings, the Siting Board staff determined that an attempt to resolve the issues presented in this case through a series of conferences on the record ("record conferences") would be beneficial for both the parties and the Siting Board (Hearing Officer Procedural Memorandum, March 20, 1997, at 1). The Siting Board subsequently held three record conferences⁴ with the Company and the intervenors to discuss and attempt to resolve open issues in the case and to produce a Draft Tentative Decision.

D. Scope of Review

In accordance with G.L. c 164, §§ 69H and 69J, before approving a petition to construct facilities, the Siting Board requires applicants to justify generating facility proposals in five phases. First, the Siting Board requires the applicant to show that additional energy resources are needed. Berkshire Power Development, Inc., 4 DOMSB 221, 242 (1996) ("Berkshire Power Decision"); Silver City Energy Limited Partnership, 3 DOMSB 1, 31 (1994) ("Silver City Decision"); Northeast Energy Associates, 16 DOMSC 335, 343 (1987) ("NEA Decision") (see Section II.A, below). Second, the Siting Board requires the applicant to show that, on balance, its proposed project is superior to alternative approaches in the ability to address the previously identified need and in terms of cost, environmental

⁴ The record conferences were held on April 3, April 10 and April 18, 1997.

impact, and reliability. Berkshire Power Decision, 4 DOMSB at 243; Silver City Decision, 3 DOMSB at 32; NEA Decision, 16 DOMSC at 364 (see Section II.B, below). Third, the Siting Board requires the applicant to show that the project is viable. Berkshire Power Decision, 4 DOMSB at 243; Silver City Decision, 3 DOMSB at 32; NEA Decision, 16 DOMSC at 364 (see Section II.C, below). Fourth, the Siting Board requires the applicant to show that its site selection process did not overlook or eliminate clearly superior sites, and in cases where an alternative site has been noticed, that the proposed site for the facility is superior to the alternative site in terms of cost, environmental impact, and reliability of supply. Berkshire Power Decision, 4 DOMSB at 243; Silver City Decision, 3 DOMSB at 32; NEA Decision, 16 DOMSC at 343 (see Section III.A, below). Finally, the Siting Board requires that a proposed project minimize environmental impacts and achieve an appropriate balance among conflicting environmental concerns, as well as among environmental impacts, cost and reliability of supply at the site which is approved. Berkshire Power Decision, 4 DOMSB at 243; Boston Edison Company, 1 DOMSB 1, 149-153, 186-195 (1993) ("1993 BECo Decision") (see Section III.B, 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 of implementing energy policies to provide a necessary energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost. The Siting Board, therefore, must find that additional energy resources are needed as a prerequisite to approving proposed energy facilities. With respect to proposals to construct energy facilities in the Commonwealth, the Siting Board evaluates whether there is a need for additional energy resources to meet reliability, economic, or environmental objectives directly related to the energy supply of the Commonwealth.

In City of New Bedford v. Energy Facilities Siting Council, 413 Mass. 482 (1992) (“City of New Bedford”), the Supreme Judicial Court (“Court”) concluded that the Siting Board’s finding that New England needed additional energy resources for reliability purposes was inadequate in light of the statutory mandate that an energy supply must be necessary for the Commonwealth.⁵ 413 Mass. at 489. In addition, the Court noted that, although the Siting Board had argued that its mandate was to ensure an adequate energy supply at minimum cost, “[e]nsuring an adequate supply is not the same as ‘provid[ing] a necessary energy supply for the commonwealth’ (emphasis added).” Id. at 490, citing, G.L. c. 164, § 69H.

In response to the Court’s directive in City of New Bedford, the Siting Board set forth a standard of review for the analysis of need for non-utility developers consistent with its statutory mandate to implement the Commonwealth’s energy policies to provide a necessary energy supply for the Commonwealth with a minimum impact on the environment

⁵ In Point of Pines Beach Association v. Energy Facilities Siting Board, the Court further found that the Siting Board’s statutory requirement to make an independent finding of Commonwealth need is not satisfied where the finding is based solely upon the existence of signed and approved purchase power agreements (“PPAs”). 419 Mass. 281, 285-286 (1995). The Court referenced Point of Pines, in vacating a final decision of the Siting Board for that reason in Attorney General v. Energy Facilities Siting Board, 419 Mass. 1003 (1995).

at the lowest possible cost. Eastern Energy Corporation (on remand), 1 DOMSB 213, 421-423 (1993) ("EEC (remand) Decision").

With respect to the issue of regional need versus Massachusetts need, the Siting Board noted the integration of the Massachusetts electricity system with the regional electricity system and the resulting link between Massachusetts and regional reliability. Id. at 416. The Siting Board noted the inherent reliability and economic benefits which flow to Massachusetts as a result of this integration. Id. Thus, the Siting Board concluded that consideration of regional need must be a central part of any need analysis for a power generation project not yet linked to individual utilities by PPAs. Id. The Siting Board also noted that the Massachusetts Legislature clearly foresaw the need for "cooperation and joint participation in developing and implementing a regional bulk power supply of electricity" when it enacted G.L. c. 164A, §§ 3 and 4, and in this same enactment acknowledged that power generating facilities would provide electric power across state lines. Id. Accordingly, the Siting Board found that an analysis of regional need must serve as a foundation for an analysis of Massachusetts need. Id. at 417.

In evaluating the need for new energy resources to meet reliability objectives, the Siting Board may evaluate the reliability of supply systems in the event of changes in demand or supply, or in the event of certain contingencies. With respect to changes in demand or supply, the Siting Board has found that new capacity is needed where projected future capacity available to a system is found to be inadequate to satisfy projected load and reserve requirements. Berkshire Power Decision, 4 DOMSB at 245, 275-276, 284-285, 303-304; Silver City Decision, 3 DOMSB at 83, 126-127, 140-143; New England Electric System, 2 DOMSC 1, 9 (1977). With regard to contingencies, the Siting Board has found that new capacity is needed in order to ensure that service to firm customers can be maintained in the event that a reasonably likely contingency occurs. Middleborough Gas and Electric Department, 17 DOMSC 197, 216-219 (1988); Boston Edison Company, 13 DOMSC 63, 70-73 (1985) ("1985 BECo Decision"); Eastern Utilities Associates, 1 DOMSC 312, 316-318 (1977).

Further, while acknowledging that G.L. c. 164, § 69H, requires the Siting Board to ensure a necessary supply of energy for Massachusetts, the Siting Board interprets this

mandate broadly to encompass not only evaluations of specific need within Massachusetts for new energy resources,⁶ but also the consideration of whether proposals to construct energy facilities within the Commonwealth are needed to meet New England's energy needs.

Berkshire Power Decision, 4 DOMSB at 246, 275-76; Silver City Decision, 3 DOMSB at 39, 83; Massachusetts Electric Company/New England Power Company, 13 DOMSC 119, 129-131, 133, 138, 141 (1985). In doing so, the Siting Board fulfills the requirements of G.L. c. 164, § 69J, which recognizes that Massachusetts' generation and transmission system is interconnected with the region and that reliability and economic benefits flow to Massachusetts from Massachusetts utilities' participation in the New England Power Pool ("NEPOOL").

The Siting Board has found that a demonstration of Massachusetts need based on reliability, economic efficiency or other benefits associated with additional energy resources from a proposed project remains a necessary element of a need review. Berkshire Power Decision, 4 DOMSB at 276-285; Silver City Decision, 3 DOMSB at 95-147; EEC (remand) Decision, 1 DOMSB at 417-418. However, in response to the Court's reminder in City of New Bedford that our statutory mandate is limited to ensuring that a necessary energy supply is provided for the Commonwealth, the Siting Board has found that reliability, economic, or environmental benefits associated with the additional energy resources from a proposed project must directly relate to the energy supply of the Commonwealth to be considered in support of a finding of Massachusetts need. EEC (remand) Decision, 1 DOMSB at 418. Berkshire Power Decision, 4 DOMSB at 246-247; Cabot Power Decision, 2 DOMSB at 241, 258 (1994) ("Cabot Decision").

Where a non-utility developer has proposed a generating facility for a number of power purchasers that include purchasers that are as yet unknown, or for purchasers with retail service territories outside of Massachusetts, the need for additional energy resources must be established through an analysis of regional capacity and a showing of Massachusetts need based either on reliability, economic or environmental grounds directly related to the

⁶ See Hingham Municipal Lighting Plant, 14 DOMSC 7 (1985); 1985 BECo Decision, 13 DOMSC at 70-73.

energy supply of the Commonwealth. Berkshire Power Decision, 4 DOMSB at 248; Silver City Decision, 3 DOMSB at 39-40; West Lynn Cogeneration, 22 DOMSC 1, 9-47 (1991) ("West Lynn Decision"). Therefore, consistent with Siting Board precedent and reflecting the directives of the Court in City of New Bedford, the Siting Board here reviews the need for the proposed project for reliability purposes.

2. Capacity Need

The Siting Board has found that it is appropriate to consider the need for capacity beyond the first year of proposed facility operation as part of assessing need for reliability purposes in review of non-utility generation ("NUG") projects. Berkshire Power Decision, 4 DOMSB at 248; Cabot Decision, 2 DOMSB at 289-290; West Lynn Decision, 22 DOMSC at 14, 33-34. The Siting Board has acknowledged that the longer time frame is potentially useful regardless of whether need has been established for the first year of proposed operation. If need has been established for the first year, the longer time frame helps ensure that the need will continue over a number of years, and is not a temporary aberration. If need has not been established for the first year of proposed operation, a demonstration of need within a limited number of years thereafter may still be an important factor in reaching a decision as to whether a proposed project should go forward. For the purposes of this review, the Siting Board finds that it is appropriate to explicitly consider the need for the proposed facility during the 1998/1999 to 2002 time period.

a. New England

DPA maintains that there is a need for at least 170 MW of additional energy resources in New England beginning in the year 1999 and beyond (Exh. DPA-1(C) at 2-14). In support of this assertion, the Company presented a series of forecasts of demand and supply for the region, based upon two primary reference sources: (1) the December 1996 report of the New England Governors' Conference ("NEGC") entitled "Assessing New England's Energy Future, A Report of the Regional Energy Assessment Project, Phase II Final Report to the U.S. Department of Energy ("1996 NEGC Report"); and (2) the 1996 Capacity, Energy, Loads and Transmission Report published by NEPOOL ("1996 CELT

Report") (id. at 2-3; Exhs. HO-N-1 (att.); HO-RR-1). The Company combined the demand and supply forecasts to produce a series of need forecasts (Exhs. DPA-1(C) at 2-2; HO-RR-6; HO-RR-37). Table 1 summarizes the range of regional need cases presented by the Company. As in prior cases, the Siting Board reviews the Company's demand forecasts, including its demand forecast methods and estimates of demand-side management ("DSM") savings over the forecast period, and the Company's supply forecast, including its capacity assumptions and required reserve margin assumptions. The Siting Board then analyzes the resulting need forecasts.

In order to develop its forecasts of the timing and magnitude of capacity need, the Company stated that it first developed individual forecasts of several underlying factors relevant to need for both summers and winters (Exh. DPA-1(C) at 2-2). The Company further stated that these factors were: (1) unadjusted peak loads; (2) utility-sponsored DSM resources available on peak; (3) NUG netted from load; (4) supply resources; and (5) required reserve margin (id.). The Company developed "adjusted" summer and winter peak load by subtracting the DSM and NUG factors from the unadjusted peak load, and the resulting adjusted peak load was then multiplied by a factor reflecting the required reserve margin to yield a forecast of total capacity requirements generally referred to as adjusted objective capability (id.). Projected supply resources were then subtracted from the adjusted objective capability in each year of the forecast to provide a forecast of the magnitude and timing of the need for new energy resources (id.).

The Company presented forecasts of regional unadjusted summer and winter peak load that were derived directly from the 1996 CELT Report reference forecast ("1996 CELT forecast"), the 1996 CELT Report high case forecast ("1996 CELT high forecast"), and the demand forecast contained in the 1996 NEGC Report ("1996 NEGC forecast") (Exhs. DPA-1(C) at 2-4; HO-N-1 (att.); HO-RR-1). DPA maintained that the 1996 CELT forecast, developed by the utility members of NEPOOL, is not an independent forecast of demand, but instead contains certain biases that cause demand to be underestimated, and that the 1996 NEGC forecast is a more objective analysis of future need for energy in the region (Exh. HO-N-9; Tr. 1 at 15-19, 69-70).

To develop forecasts of adjusted load, the Company combined the demand forecasts

with (1) the 1996 CELT Report forecast of NUG netted from load, and (2) three forecasts of DSM savings based on the 1996 CELT Report forecast of DSM savings -- a base DSM scenario, which is the forecast of company-sponsored DSM used in the 1996 CELT Report, a high DSM scenario, which assumes an increase of ten percent in the annual post-1996 growth rate of the base scenario, and a low DSM forecast, which assumes a decrease of 25 percent in the annual post-1996 growth rate of the base scenario (Exhs. DPA-1(C) at 2-7; HO-RR-6; HO-RR-37).

The Siting Board has previously acknowledged that the CELT Report is generally an appropriate starting point for resource planning in New England, and has accepted the use of CELT forecasts for the purposes of evaluating regional need in previous reviews of NUG facilities. Berkshire Power Decision, 4 DOMSB at 257; Silver City Decision, 3 DOMSB at 55; NEA Decision, 16 DOMSC at 354. In addition, the Siting Board recognizes that the 1996 NEGC report offers an alternative perspective on need and sets forth reasonable projections of need for purposes of this proceeding. Therefore, the Siting Board accepts the alternative forecast based on the 1996 NEGC Report. Accordingly, the Siting Board accepts the 1996 CELT forecast and the 1996 NEGC forecast as base case peak load forecasts for purposes of this review.

The Siting Board has recently reviewed and accepted forecasts of DSM comparable to the Company's base, high and low DSM forecasts. Berkshire Power Decision, 4 DOMSB at 262. Accordingly, the Siting Board accepts the NEPOOL base DSM scenario as the base case forecast of DSM savings for use in the regional need analysis. The Siting Board also accepts the Company's high DSM scenario as the high case forecast of DSM savings for use in the regional need analysis. The Siting Board further accepts the Company's low DSM scenario as the low case forecast of DSM savings for use in the regional need analysis.

The Company presented three supply scenarios based on the capacity projections in the 1996 CELT report -- a base supply scenario, a high supply scenario, and a low supply scenario (Exhs. DPA-1(C) at 2-8 to 2-13; HO-RR-6; HO-RR-37). For the base supply scenario, DPA included all existing plants, external purchases and sales, and committed utility and non-utility generation owned or contracted for by NEPOOL utilities, adjusted to reflect new information on actual changes in NEPOOL supplies and DPA-assumed changes

in NEPOOL supplies (Exhs. DPA-1(C) at 2-8 to 2-10; HO-RR-6; Tr. 1, at 114-116). DPA also developed a low supply scenario which included less optimistic assumptions as to unit availability and retirements and a high supply scenario which included corresponding adjustments to reflect the possibility of greater than anticipated availability of supply sources in the region (Exhs. DPA-1(C) at 2-10 to 2-13; HO-RR-6; HO-RR-37). Although the Siting Board questions some of the Company's supply assumptions, such as the retirement of the Millstone 1 unit in the base case, the Siting Board agrees with the Company that all of the Company's need cases, even those incorporating the high supply case, show a need for the proposed facility by 1999. Therefore, for the purposes of this review, the Siting Board finds that the Company submitted a reasonable range of supply scenarios.

With respect to reserve margin, DPA utilized NEPOOL's current projections of required reserve margin reflected in the 1994 Annual Report of NEPOOL Objective Capability and Associated Parameters for the years projected and assumed a constant requirement thereafter (Exh. DPA-1(C) at 2-13). The Siting Board has recently reviewed and accepted reserve margin projections comparable to the Company's reserve margin projections. Berkshire Power Decision, 4 DOMSB at 272. Therefore, the Siting Board finds that the Company's projected reserve margins requirements are appropriate for the purposes of this review.

The Company's analysis demonstrated a need in New England of 364 MW in 1999, increasing over the forecast period, under the most conservative need forecast for summer peak load (1996 NEGC forecast, high supply forecast, high DSM forecast) (HO-RR-37). The Company's analysis also demonstrated a need of 216 MW in 1998/1999, increasing over the forecast period, under the most conservative need forecast for winter peak load (1996 CELT forecast, high supply forecast, high DSM forecast) (*id.*). Accordingly, the Siting Board finds a need for 170 MW or more of additional energy resources in New England for reliability purposes beginning in the winter of 1998/1999 and beyond.

b. Massachusetts

DPA also maintains that there is a need for at least 170 MW of additional energy resources in Massachusetts beginning in the year 1999 and beyond (Exh. DPA-1(C) at 2-15).

In support of this assertion, the Company presented a series of demand and supply forecasts for Massachusetts based upon the 1996 NEGC Report, the 1996 CELT Report, the 1994 CELT Report (the last CELT Report to include state-specific load forecasts) and a state-specific load forecast provided by the Massachusetts Division of Energy Resources ("DOER") (id. at 2-15, 2-16; Exhs. HO-N-1 (att.); HO-N-18 (att.); HO-RR-1). DPA applied essentially the same methodology to this data as that discussed above for determining regional need (Exh. DPA-1(C) at 2-15). The Company combined the resulting demand and supply forecasts to produce the a series of Massachusetts need forecasts (id.). Table 2 summarizes the range of Massachusetts need cases presented by the Company. As in prior cases, the Siting Board reviews the Company's Massachusetts demand forecasts, including its demand forecast methods and estimates of DSM savings over the forecast period, and the Company's supply forecasts, including its capacity assumptions and required reserve margin assumptions. The Siting Board then analyzes the resulting Massachusetts need forecasts.

In order to develop forecasts of Massachusetts adjusted summer and winter peak load corresponding to the 1996 CELT forecast, DPA multiplied the 1996 CELT adjusted⁷ reference forecast by the ratio of (1) the 1994 Massachusetts adjusted reference forecast and (2) the 1994 CELT adjusted reference forecast in each year of the forecast period ("1996 Massachusetts CELT forecast") (id. at 2-15, 2-16; HO-RR-38). The Company considered the 1996 Massachusetts CELT forecast to be a low case forecast (id.). To develop forecasts of Massachusetts adjusted summer and winter peak load corresponding to the 1996 CELT high forecast, DPA multiplied the 1996 CELT adjusted high forecast by the ratio of (1) the 1994 Massachusetts adjusted reference forecast and (2) the 1994 CELT adjusted reference forecast in each year of the forecast period ("1996 Massachusetts high forecast") (Exh. DPA-1(C) at 2-16; HO-RR-38). To develop forecasts of Massachusetts adjusted summer and winter peak load corresponding to the 1996 NEGC forecast, DPA used the adjusted Massachusetts load forecast provided by DOER in connection with the 1996 NEGC Report, which assumed a level of DSM savings based on NEPOOL's projections for

⁷ As noted above, an "adjusted" forecast is a demand forecast combined with a forecast of DSM and NUG netted from load.

the Commonwealth ("1996 Massachusetts NEGC forecast") (Exhs. HO-N-19; HO-N-20; HO-RR-38).

The Company indicated that NEPOOL did not release state-specific DSM forecasts for 1996 as it had in previous years, and therefore, discrete Massachusetts DSM forecasts were not available (Exhs. DPA-1(C) at 2-15; HO-N-19). However, the Company maintained that Massachusetts DSM could be estimated using each of the foregoing adjusted load forecasts for Massachusetts (Exh. HO-RR-7; Tr. 1, at 147-149).⁸

Consistent with its findings concerning the regional demand forecasts, the Siting Board accepts the 1996 Massachusetts CELT forecast and the 1996 Massachusetts NEGC forecast as base case forecasts for purposes of this review.

With respect to the Massachusetts supply forecast, DPA reflected the energy supply resources owned or contracted for by Massachusetts utilities to meet the needs of the Commonwealth, regardless of where that supply is located (Exh. DPA-1(C) at 2-17). DPA developed base, high, and low supply scenarios corresponding to the supply scenarios presented in its regional analysis (*id.* at 2-17 to 2-19, Tables 2.3-3 to 2.3-6; HO-RR-8). Therefore, consistent with its findings concerning the New England supply scenarios, the Siting Board finds that the Company submitted a reasonable range of Massachusetts supply scenarios.

With respect to reserve margins, DPA assumed that Massachusetts would have the same percentage reserve margin requirements as those projected for the region as a whole (Exh. DPA-1(C) at 2-20). Therefore, consistent with its findings relative to the New England need analysis, the Siting Board finds that, for purposes of this review, the Company's projected reserve margin requirements are appropriate.

The Company's analysis demonstrated a need in Massachusetts for 734 MW in 1999,

⁸ The Company noted that to develop an approximated Massachusetts DSM forecast, the 1996 CELT Report DSM forecast for New England could be prorated by the ratio of Massachusetts to New England DSM for the most recent year that NEPOOL released state-specific DSM forecasts (Tr. 1, at 147-149). However, the Company further noted that because NEPOOL's DSM forecast has been lowered in each successive CELT Report, the Massachusetts DSM forecast would likewise be lowered, thereby increasing the need forecasts (*id.*).

increasing over the forecast period, under the most conservative need forecast for summer peak load (1996 NEGC Massachusetts forecast, high supply forecast) (Exh. HO-RR-38). The Company's analysis also demonstrated a Massachusetts need for 190 MW in 2001/2002, increasing over the forecast period under the most conservative need forecast for winter peak load (1996 Massachusetts CELT forecast, high supply forecast) (*id.*). Therefore, the Siting Board finds a need for 170 MW or more of additional energy resources in Massachusetts for reliability purposes beginning in 1999 and beyond. The Siting Board notes that, although a high case DSM forecast was not expressly presented, there is a clear need for at least 170 MW in Massachusetts beginning in 1999 because the margin of need, 734 MW, is significant. Any likely reduction in demand resulting from a high DSM forecast would not be sufficient to reduce the margin to 170 MW or less.

3. Conclusions on Need

The Siting Board has found that a need exists for 170 MW or more of additional energy resources in New England for reliability purposes beginning in the winter of 1998/1999 and beyond. In addition, the Siting Board has found a need for 170 MW or more of additional energy resources in Massachusetts for reliability purposes beginning in 1999 and beyond. Therefore, the Siting Board finds that the proposed project is needed to provide a necessary energy supply for the Commonwealth beginning in 1999 and beyond.

B. Alternative Technologies Comparison

1. Standard of Review

G.L. c. 164, § 69H, requires the Siting Board to evaluate proposed projects in terms of providing a necessary energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost. In addition, G.L. c. 164, § 69J requires a project proponent to present "alternatives to planned action" which may include: (a) other methods of generating, manufacturing, or storing, and other site locations; (b) other sources of electrical power or gas, including facilities which operate on solar or geothermal energy and wind or facilities which operate on the principle of cogeneration or hydrogeneration; and (c) no additional electric power or gas.

In implementing its statutory mandate, the Siting Board requires a petitioner to show that, on balance, the proposed project is superior to alternative approaches in the ability to address the previously identified need in terms of cost, environmental impact and reliability. Berkshire Power Decision, 4 DOMSB at 304; Silver City Decision, 3 DOMSB at 153; EEC (remand) Decision, 1 DOMSB at 296.

2. Identification of Resource Alternatives

As an initial step, DPA stated that it assembled a list of all electric generation technologies included in the latest Electric Power Research Institute ("EPRI"), Technical Assistance Guide: Electricity Supply-1993, EPRI Tr. 102275-V-R7 (1993) ("TAG Report") and NEPOOL's Summary of Generation Task Force Long-Range Study Assumptions (June 1995) ("1995 GTF Report") that are capable of operating in the same mode (base load or intermediate) as the proposed facility (Exh. DPA-1(A) at 3-3). These included a number of different fuel technologies, as well as renewable energy technologies (id.). The Company indicated that, in the first stage of the analysis, it evaluated each technology for any fatal flaw that would render the technology clearly unable to meet the identified need, including flaws as to siting/permitting feasibility, lack of significant requisite resources in the region, lack of cost-effectiveness, and inconsistency with long-standing regional policies to diversify away from oil (id. at 3-3, 3-4). As a result of the first stage of the analysis, DPA stated that it determined that nine technologies were at least theoretically capable of meeting the identified need for new capacity: (1) generic gas-fired combined cycle ("GCC"); (2) coal-fired atmospheric fluidized bed ("AFB"); (3) coal-fired pressurized fluidized bed ("PFB"); (4) integrated coal gasification ("IGCC"); (5) pulverized coal ("PC"); (6) wind energy; (7) municipal solid waste; (8) biomass; and (9) fuel cells (id. at 3-4). As the second phase of the review process, DPA reviewed the foregoing nine technologies for significant flaws that would render the technology practically incapable of meeting the identified need and eliminated any technologies with two or more of such flaws (id. at 3-9). The criteria employed by DPA in this stage were: (1) technical maturity based upon EPRI's technical development rating presented in the TAG report as "mature" or "commercial;" (2) siting/permitting feasibility based upon regional siting/permitting constraints;

(3) reliability/availability; (4) cost-effectiveness based upon a 20-year nominal levelized cost per megawatt hour; and (5) ability to meet the identified need at a single site (id.). On the basis of the foregoing, the generic GCC, AFB, PFB, IGCC, and PC units each had one or less identified significant flaws and were therefore considered to be practical alternatives for further consideration (id. at 3-12, 3-13).

Based on its review of the above-referenced analysis, the Siting Board recognizes that the criteria applied by the Company are reasonable for the purposes of identifying resource alternatives which will yield a reliable energy supply. Therefore, the Siting Board finds that DPA appropriately limited further evaluation to such options.

3. Comparison of Environmental Impacts

The Company compared the alternative technologies and the proposed project with respect to environmental impacts in the areas of air quality, water supply and wastewater, noise, fuel transportation, land use and solid waste (Exh. DPA-1(A) at 3-13). The Company compared technologies assuming location at the proposed site in Dighton, to the extent possible (id.).

a. Air Quality

DPA compared the air quality impacts of the proposed project and alternatives based on emissions of sulfur dioxide ("SO₂"), NO_x, particulates, CO, volatile organic compounds ("VOCs") and CO₂ (Exh. DPA-1(A) at 3-13, 3-14). In addition to comparisons based on tons per year of emissions, DPA also compared tons of emissions per gigawatt-hour ("GWH"), which it believes to be a more meaningful comparison that takes into account differences in unit capacity, availability and heat rate (id. at 3-13). Emissions for the coal alternatives were calculated based on data from various sources, including the U.S. Environmental Protection Agency's ("USEPA") Best Available Control Technology ("BACT")/Lowest Achievable Emission Rate ("LAER") clearinghouse and the 1995 GTF Report, and are considered to represent BACT/LAER technologies (id. at 3-14). The Company's analysis indicated that the proposed project would produce less tons/GWH for each of the pollutants than all of the alternatives evaluated, with the exception of VOCs,

where the PFB, PC, and IGCC alternatives have slightly lower, though still comparable, VOCs emissions (id.). The Company's analysis further indicated that, with respect to the coal alternatives, emissions for all pollutants except VOCs are much higher than those in both the proposed project and the generic GCC alternative (id.). In addition, pollutants of significant concern with respect to regional air quality, SO₂ and NO_x are substantially higher for the coal-based alternatives (id.). Further, the proposed project would be slightly preferable to the generic GCC on a per-GWH basis due to its higher operating efficiency (id.).

Therefore, the Siting Board finds that, on balance, considering all pollutants, the annual emissions of the proposed project would be preferable to those of all of the technology alternatives. Accordingly, the Siting Board finds that, for the purposes of this review, the proposed project is slightly preferable to the generic GCC alternative and preferable to the AFB, PFB, IGCC, and PC alternatives with respect to air quality.

b. Water Supply and Wastewater

With respect to water supply and wastewater, the proposed facility and the alternative generic GCC unit were assumed to have similar process water and wastewater generation requirements at the proposed site, so as to be comparable for such factors (Exh. DPA-1(A) at 3-14). Each of the coal alternatives however, requires substantially greater water supplies and wastewater volumes than the proposed project or the generic GCC alternative (id.). Accordingly, the Siting Board finds that, for purposes of this review, the proposed project is comparable to the generic GCC alternative and preferable to the AFB, PFB, IGCC, and PC alternatives with respect to water supply and wastewater discharge.

c. Noise

In comparing noise impacts of the various technologies, DPA assumed that it would be possible to design each of the alternatives to achieve the same degree of general continuous noise levels as that of the proposed facility (Exh. DPA-1(A) at 3-15). DPA pointed out, however, that each of the coal-based alternatives would require coal deliveries that would generate significant intermittent noise that would be difficult to mitigate (id.). In

addition, each would require a coal crusher (id.). The IGCC alternative would also include as a significant noise source a coal gasification plant, including a flare stack (id.). Thus, even assuming that the coal-based technologies could achieve the same continuous levels of noise impact as the proposed facility, each of the coal-based alternatives include significant additional sources of noise that would result in greater overall impacts to the surrounding community (id.). Accordingly, the Siting Board finds that, for purposes of this review, the proposed project is comparable to the generic GCC alternative and preferable to the AFB, PFB, IGCC, and PC alternative with respect to noise impacts.

d. Fuel Transportation

DPA maintains that the fuel transportation impacts associated either with the proposed facility or the generic GCC alternative would be superior to those associated with fuel transportation for coal-based technologies (Exh. DPA-1(A) at 3-16). In particular, DPA notes that for either gas-fired technology, natural gas would be delivered to the facility via existing high-pressure interstate pipeline facilities which traverse the proposed site (id.). Even if the coal-based technologies are presumed to be located in proximity to existing rail lines with adequate capacity, deliveries by rail would necessarily still involve additional impacts to other rail users in abutting communities far greater than those associated with pipeline deliveries (id.). Further, the coal-based alternatives would require significantly greater on-site unloading and storage areas than the proposed project (id. at 3-16, 3-17). Accordingly, the Siting Board finds that, for purposes of this review, the proposed project would be comparable to the generic GCC alternative, and preferable to the AFB, PFB, IGCC, and PC alternatives with respect to fuel transportation.

e. Land Use

With respect to land use requirements, DPA indicated that the proposed facility and the generic GCC unit could be designed to fit within the same six-acre footprint of the proposed project and therefore would be comparable to the proposed facility (Exh. DPA-1(A) at 3-17). However, with respect to the coal-based technologies, the 1995 GTF Report indicates that the AFB, PFB, or PC units would require at least 40 acres, and the IGCC

alternative at least 100 acres for the facility footprint, rail unloading and fuel storage areas (id.). In addition, the scale of the coal-based facilities would be significantly larger, including the height of stacks and buildings and larger cooling towers (id.). With respect to total land requirements, the coal alternatives would have greater land use impacts than the proposed facility and generic GCC alternative. In light of the foregoing facility footprint and building size requirements and the land use impacts of the technologies, the Siting Board finds that, for purposes of this review, the proposed facility would be comparable to the generic GCC alternative and preferable to the AFB, PFB, IGCC and PC alternatives with respect to land use impacts.

f. Solid Waste

DPA maintains that the proposed project and the generic GCC alternative would generate only minimal solid waste, consisting of incidental office and maintenance waste estimated at 15 tons per year (Exh. DPA-1(A) at 3-17, 3-18). In contrast, each of the coal-based technologies would produce far greater amounts of solid waste, ranging from 110,774 tons per year in the case of the IGCC, to 145,166 tons per year for the AFB, which would consist primarily of ash or slag (id. at 3-18). Even assuming that ash or slag could be shipped-off site via the return trip of the coal delivery trains, the Siting Board has previously found that, in the absence of detailed plans for the transport and disposal of solid waste in an environmentally beneficial way, solid waste impacts are greater for those technologies that generate greater amounts of wastes. EEC (remand) Decision, 1 DOMSB at 351-352. Accordingly, the Siting Board finds that, for the purposes of this review, the proposed facility would be comparable to the generic GCC alternative and preferable to the AFB, PFB, IGCC, and PC alternatives with respect to solid waste impacts.

g. Findings and Conclusions on Environmental Impacts

Based on the foregoing analysis, the Siting Board finds that the proposed facility would be slightly preferable to the generic GCC alternative with respect to environmental impacts. Also based on the foregoing analysis, the Siting Board finds that the proposed facility would be preferable to the AFB alternative, the PFB alternative, the IGCC alternative

and the PC alternative with respect to environmental impacts.

4. Cost

DPA performed detailed 20-year levelized cost analyses of the proposed facility and each of the nine alternative technologies that were considered in the second stage of its evaluation process (Exh. DPA-1(A) at 3-10, 3-13). DPA calculated the cost of each alternative technology on a bus-bar basis that did not include any wheeling costs or allow for potential variations in unit economic dispatch, and DPA assumed that the alternative technologies would operate on a must-run basis, limited only by their projected equivalent availability factors (*id.* at 3-11). DPA based its analysis on a consistent set of financial assumptions for all alternatives (including debt and equity ratios, interest rates, taxes and inflation) and assumed that each unit would begin commercial operation on April 1, 1999 (*id.* at 3-10, 3-11). DPA used cost performance data for the proposed facility from its pro forma, and the cost and performance data for generic units from the TAG Report and the 1995 GTF Report (*id.* at 3-11).

The results of DPA's cost analysis shows a significantly lower 20-year levelized cost for the proposed facility in comparison to any of the alternative technologies (*id.* at 3-11, Att. 3.5.3). Accordingly, the Siting Board finds that, for purposes of this review, the proposed facility would be preferable to the generic GCC, AFB, PFB, IGCC and PC alternatives with respect to cost.

5. Reliability

DPA asserted that the proposed facility is superior to the alternative technologies with respect to reliability, considering both unit availability and technical maturity (Exh. DPA-1(A) at 3-18, Att. 3.5.1). In terms of availability, the proposed project has an expected average annual availability of 93.5 percent, which compares favorably to the expected availability of 88.9 percent for the generic GCC alternative, as well as to the expected availabilities of the AFB alternative (90.4 percent) the PFB alternative (80.8 percent), the IGCC alternative (85.7 percent) and the PC alternative (85.5 percent) (*id.* at 3-18). With respect to technical maturity, DPA differentiated the technologies according to the most

recent TAG Report, which classified both the proposed facility and the generic GCC alternative as mature technologies, and thus comparable in terms of reliability (id. at 3-19). DPA asserted that although the PC technology alternative was also classified by EPRI as mature, due to the more complex nature of the coal plan technology, the plant may be somewhat less reliable (id.). In contrast, DPA stated that the AFB alternative is classified as commercial (a lesser classification) and the PFB and IGCC units are both classified as demonstration level technologies, and thus are significantly less proven than combined cycle technology (id.).

Accordingly, the Siting Board finds that the proposed facility would be comparable to the generic GCC and PC alternatives and preferable to the AFB, PFB and IGCC alternatives with respect to reliability.

6. Comparison of the Proposed Project and Technology Alternatives

In order to establish that a proposed facility is preferable to technology alternatives in its ability to provide a necessary 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, on balance, its proposed facility is superior to alternative approaches in the ability to address the previously identified need in terms of environmental impact, cost, and reliability.

In Sections II.B.3, II.B.4, and II.B.5, above, the Siting Board has compared the proposed facility to generating technology alternatives that have been determined capable of meeting the identified need, on the basis of specific environmental impacts, costs, and reliability. Based on its comparison, the Siting Board has found that the proposed project would be: (1) slightly preferable to the generic GCC alternative and preferable to the AFB, PFB, IGCC and PC alternatives with respect to environmental impacts; (2) slightly preferable to the generic GCC alternative and preferable to the AFB, PFB, IGCC, and PC alternatives with respect to costs; and (3) comparable to the generic GCC and PC alternatives and preferable to the AFB, PFB, and IGCC alternatives with respect to reliability.

Accordingly, the Siting Board finds that the proposed facility is superior to the GCC alternative, the AFB alternative, the PFB alternative, the IGCC alternative and the PC

alternative with respect to providing a necessary energy supply with a minimum impact on the environment at the lowest possible cost.

C. Project Viability

1. Standard of Review

The Siting Board determines that a proposed non-utility generating project is likely to be a viable source of energy if (1) the project is reasonably likely to be financed and constructed so that the project will actually go into service as planned, and (2) the project is likely to operate and be a reliable, least-cost source of energy over the planned life of the proposed project. Berkshire Power Decision, 4 DOMSB at 328, 346; Silver City Decision, 3 DOMSB at 236; NEA Decision, 16 DOMSC at 380.

In order to meet the first test of viability, the proponent must establish (1) that the project is financiable, and (2) that the project is likely to be constructed within the applicable time frames and will be capable of meeting performance objectives. In order to meet the second test of viability, the proponent must establish (1) that the project is likely to be operated and maintained in a manner consistent with appropriate performance objectives and (2) that the proponent's fuel acquisition strategy reasonably ensures a low cost, reliable source of energy over the planned life of the proposed project. Berkshire Power Decision, 4 DOMSB at 328-329, 343; Silver City Decision, 3 DOMSB at 236-237; NEA Decision, 16 DOMSC at 378-380.

Here, DPA has argued that the project fully meets each of the Siting Board's viability tests, and that the proposed project will be a viable source of energy (Exh. DPA-1(A) at 4-1).

2. Financiability and Construction

a. Financiability

In considering a proponent's strategy for financing a proposed project, the Siting Board considers whether a project is reasonably likely to be financed so that the project will actually go into service as planned. DPA asserted that a number of factors, including the project's low cost and low environmental impacts, the successful experience of the

developers, the interest and commitment of the fuel supplier, and the need for the proposed project at the time of commercial operation, will assure that the proposed project is financially (id. at 4-1).

DPA presented evidence regarding the experience of its development team, which indicated that DPA's key personnel have developed and arranged financing for four power generation projects in New England, including Pawtucket Power, Dartmouth Power and two smaller projects, representing over \$250 million in project financing (id.; Exhs. HO-V-7; HO-V-33). In addition, DPA indicated that its development team includes Fieldstone Private Capital Group ("Fieldstone") as financial advisors and that Fieldstone was ranked by Project Finance International in 1996 as the top American project finance firm and one of the world's leading project finance advisory firms, having served as advisor for over \$7 billion in transactions for its clients (Exh. HO-V-33 (att.)). Thus, the record indicates that the project proponents have a broad range of experience in overall project development, including project financing.

DPA maintains that the financiality of the project is further demonstrated by its unique fuel procurement strategy (Tr. 5, at 49-50). The Company submitted to the Siting Board an executed 20-year gas supply contract with a wholly-owned natural gas marketing subsidiary of a major diversified natural gas holding company with gas markets and investments throughout North America providing for the firm supply and delivery of up to 33,000 MMBtu per day of the natural gas required to operate the facility (Exhs. DPA-1(A) at 4-4; HO-V-17 (supp.); HO-V-22 (att.)). The gas supply contract further provides that (1) the price for gas is tied to the market price of electricity, and (2) the non-gas operating expenses and debt service of the project will be paid out of electric sales revenue prior to payment to the gas supplier (Exh. HO-V-22 (att.); Tr. 5, at 21-23, 49-50). The Company explained that under these terms, the gas supplier effectively bears the risk of uncertainties in the electricity market, and therefore, the fuel procurement strategy assures financiality by effectively insulating prospective lenders from the risks of low load factor operation and uncertainties in energy market pricing (Tr. 5, at 21-23, 49-50).

DPA will finance the project as a "merchant plant," which assumes that electricity will be sold at market price rather than pursuant to long-term PPAs (Tr. 5, at 12). In order

to demonstrate its financiability, the Company prepared pro forma financial statements reflecting a wide range of electric and gas market pricing scenarios (Exhs. HO-RR-29; HO-RR-29(a)). DPA indicated that, for the combined worst case scenario of low electric price revenues and high gas price expenses, the pro formas showed an after-tax internal rate of return ("IRR") of 16.8 percent and debt coverage ratios ("DCRs") of a minimum of 3.3 and an average of 5.06, which DPA maintains, is an extremely attractive level to project lenders (Exh. HO-RR-29). Further, under the more likely situation of must-run dispatch and the most likely gas pricing, the pro formas showed even more favorable DCRs under various scenarios -- an average of 6.40 and a minimum of 4.17 -- which DPA maintains is in excess of the ratios typically required of project financiers (Exh. HO-RR-29(a)).

Accordingly, the Siting Board finds that DPA has established that its proposed project is financiabile.

b. Construction

In considering a proponent's construction strategy for a proposed facility, the Siting Board considers whether the project is reasonably likely to be constructed and to go into service as planned. In this regard, the Company submitted to the Siting Board an executed turnkey contract for the construction and installation of a power production facility with Parsons Power Group, Inc. ("Parsons") (Exh. HO-V-12). The record indicates that Parsons has substantial experience in the development of such projects, having completed 15 major engineering, procurement, and construction services contracts totaling 1,400 MW, most of which are gas-fired combined cycle projects (Exh. DPA-1(A) at 4-2). The contract with Parsons provides for the turnkey construction of the facility at a fixed price by a date certain, and establishes liquidated damages for delay and performance shortfalls (id.; Exh. HO-V-12). Under the terms of the contract, Parsons is responsible for providing complete design, engineering, procurement, equipment delivery and construction services for the proposed project as necessary to bring the facility on-line consistent with the guaranteed performance standard and schedule (id.). In prior decisions, the Siting Board has found that a signed agreement for the design and construction of a generating project provides reasonable assurance that the proposed project is likely to be constructed on schedule and will be able to

perform as expected. Berkshire Power Decision, 4 DOMSB at 335; Silver City Decision, 3 DOMSB at 245; Altresco-Pittsfield, Inc., 17 DOMSC 351, 380 (1988) ("Altresco-Pittsfield Decision"). Furthermore, DPA submitted to the Siting Board an executed interconnection agreement between DPA and EUA for the requisite interconnect services (Exh. HO-V-26(b) (supp. 2)).

DPA has also received the requisite zoning relief from local municipal authorities, including a special permit granted by the Dighton Zoning Board of Appeals ("ZBA") allowing structures over 65 feet in height and a variance granted by the Dighton ZBA allowing partial access to the site in a business-zoned district (Exhs. HO-RR-10(A) and (B)). The Company noted that the respective appeal periods of such decisions have expired without the filing of a timely appeal (HO-RR-10 (supp.)). DPA has further obtained approval of the project's site plan and a special permit for planned development from the Dighton Planning Board (Exh. HO-E-36 (supp. 2) (att.)).

Accordingly, the Siting Board finds that DPA has established that the proposed project is likely to be constructed within the applicable time frames and be capable of meeting performance objectives. The Siting Board has found, above, that DPA has established that its proposed project is financially viable. Therefore, the Siting Board finds that DPA has established that its proposed project meets the Siting Board's first test of viability.

3. Operations and Fuel Acquisition

a. Operations

In determining whether a proposed non-utility generation project is likely to be viable as a reliable, least-cost source of energy over the planned life of the proposed project, the Siting Board evaluates the ability of the project proponent or its agent(s) to operate and maintain the facility in a manner which ensures a reliable energy supply. Berkshire Power Decision, 4 DOMSB at 337-339; Silver City Decision, 3 DOMSB at 247-249; Altresco-Pittsfield Decision, 17 DOMSC at 381-382. In this case, DPA submitted an executed Operation and Maintenance ("O&M") Agreement with EMI to the Siting Board (Exh. HO-V-16 (supp. 2) (att.)). The O&M Agreement provides that EMI will operate and maintain the facility in accordance with the appropriate industry standards, including

preventative maintenance activities, operating procedures, availability requirements and other pertinent operational characteristics (*id.*; Exh. DPA-1(A) at 4-3). DPA maintains that EMI has had a successful history in providing operating and management services to the Pawtucket Power project and the Dartmouth Power project (Exh. DPA-1(A) at 1-1).

In past cases, the Siting Board has found that an executed O&M Agreement with an appropriate, experienced entity provided sufficient assurance that a project is likely to be operated and maintained in a manner consistent with reliable performance. Berkshire Power Decision, 4 DOMSB at 338; Silver City Decision, 3 DOMSB at 249; Altresco-Pittsfield Decision, 17 DOMSC at 382. Here, DPA has provided an executed O&M Agreement with EMI, a qualified entity that is familiar with similar projects, that includes provisions similar to those reviewed and approved in prior decisions. Accordingly, the Siting Board finds that DPA has established that the proposed project is likely to be operated and maintained in a manner consistent with appropriate performance objectives.

b. Fuel Acquisition

In considering an applicant's fuel acquisition strategy, the Siting Board considers whether such a strategy reasonably ensures low-cost, reliable energy resources over the planned life of the proposed project. Berkshire Power Decision, 4 DOMSB at 343. In so doing, the Siting Board has recognized that it is appropriate to consider the need for flexibility, the expected shorter time frame of electric sales arrangements in a restructured electric industry, and the industry-wide shift away from long-term gas supply contracts (*id.*). As noted above, the Company executed a 20-year gas supply contract with the wholly-owned natural gas marketing subsidiary of a major diversified natural gas holding company with gas markets and investments throughout North America (Exhs. DPA-1(A) at 4-4; HO-V-17 (supp.); HO-V-22 (att.)). That agreement provides for the firm supply and delivery of up to 33,000 MMBtu per day of the natural gas required to operate the facility (Exh. HO-V-22 (att.)). Under the terms of the contract, the seller is obligated to make firm deliveries to DPA at the Mendon station of the Algonquin system in Mendon, Massachusetts (Exhs. HO-V-18; HO-V-22 (att.); HO-V-40). The supplier will have access to multiple gas sources and multiple transportation routes to enhance the supplier's ability to contend with any

interruptions or contingencies, which are the contractual responsibility of the supplier (Exh. HO-V-40). DPA will hold firm capacity on the Algonquin system to transport the gas from Mendon to the facility and Algonquin has confirmed that such firm capacity is available (Exh. HO-V-25 (supp.)). As noted above, the price for gas will be tied to the market price of electricity.

DPA indicated that backup fuel oil was not required because of the high reliability of the gas pipeline transportation system (Exh. HO-V-40; Tr. 6, at 46-49). The Company stated that gas service interruptions would be infrequent and if an interruption lasted several days, the Company would take the opportunity to perform maintenance at the facility (*id.*). The Company noted that over a five-year period at the Dartmouth Power and Pawtucket Power projects, it had only experienced several days of gas pipeline interruption (Tr. 6, at 46-47).

Accordingly, the Siting Board finds that DPA has established that its fuel acquisition strategy reasonably ensures a low-cost reliable source of energy over the planned life of the proposed project. The Siting Board has found, above, that DPA has established that the proposed project is likely to be operated and maintained in a manner consistent with appropriate performance objectives. Therefore, the Siting Board finds that DPA has established that its proposed project meets the Siting Board's second test of viability.

4. Findings and Conclusion on Viability

The Siting Board has found that DPA has established that its proposed project is (1) reasonably likely to be financed and constructed so that the project will be operational as planned, and (2) likely to operate and be a reliable, least-cost source of energy over the planned life of the proposed facility. Accordingly, the Siting Board finds that DPA has established that its proposed facility is likely to be a viable source of energy.

III. ANALYSIS OF THE PROPOSED FACILITIES

A. Site Selection Process

The Siting Board has a statutory mandate to implement the energy policies embodied in G.L. c. 164, §§ 69H-69Q to provide a necessary 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 show that the proposed facility’s siting plans are superior to alternatives and that its proposed facility is sited at a location that minimize costs and environmental impacts while ensuring supply reliability. Berkshire Power Decision, 4 DOMSB at 347; Silver City Decision, 3 DOMSB at 256; 1993 BECo Decision, 1 DOMSB at 27.

1. Standard of Review

In order to determine whether a facility proponent has shown that its proposed facility’s siting plans are superior to alternatives, the Siting Board requires a facility proponent to demonstrate that it examined a reasonable range of practical facility siting alternatives. Berkshire Power Decision, 4 DOMSB at 347; Silver City Decision, 3 DOMSB at 257-258; NEA Decision, 16 DOMSC at 381-409. In order to determine that a facility proponent has considered a reasonable range of practical alternatives, the Siting Board requires the proponent to meet a two-pronged test. First, the facility proponent must establish that it developed and applied a reasonable set of criteria for identifying and evaluating alternatives in a manner which ensures that it has not overlooked or eliminated any alternatives which are clearly superior to the proposal. Berkshire Power Decision, 4 DOMSB at 347; Silver City Decision, 3 DOMSB at 258; Berkshire Gas Company (Phase II), 20 DOMSC 109, 156 (1990) (“1990 Berkshire Decision”). Second, the facility proponent must establish that it identified at least two noticed sites or routes with some measure of

geographic diversity.⁹ Berkshire Power Decision, 4 DOMSB at 347-348; Silver City Decision, 3 DOMSB at 258; NEA Decision, 16 DOMSC at 381-409. In the sections below, the Siting Board reviews DPA's site selection process, including its development and application of siting criteria, and the geographic diversity of DPA's primary and alternative sites.

2. Development and Application of Siting Criteria

As an initial step, DPA identified its search area as those portions of southeastern Massachusetts traversed by the Algonquin "G" high pressure gas pipeline system (Exh. DPA-1(A) at 5-2). DPA maintains that its search area was reasonable for several reasons. First, DPA chose southeastern Massachusetts because the area is relatively close to the operating generation facilities of DPA's affiliates and is close to EMI's principal offices, leading to efficiencies in O&M activities and optimized personnel and materials utilization (*id.* at 5-2, 5-3; Exh. HO-S-12). Second, DPA stated that it focused on portions of southeastern Massachusetts located in proximity to the Algonquin G system because this system is the only viable source for transporting necessary gas supplies within the geographic area (Exh. DPA-1(A) at 5-3). Third, DPA stated that southeastern Massachusetts is an optimal location due to the proximity to demand centers and the need for transmission system support, voltage support and reserve capacity (*id.*; Exh. HO-S-11 (supp.)). Lastly, DPA stated that EMI's established presence in the region would provide significant assurances to

⁹ When a facility proposal is submitted to the Siting Board, the petitioner generally is required to present (1) its preferred facility site or route, although this requirement has been waived for certain types of cogeneration projects and (2) at least one alternative site or route. These sites and routes often are described as the "noticed" alternatives because these are the only sites and routes described in the notice of adjudication published at the commencement of the Siting Board's review. In reaching a decision in a facility case, the Siting Board can approve a petitioner's preferred site or route, approve an alternative site or route, or reject all sites and routes. The Siting Board, however, may not approve any site, route or portion of a route which was not included in the notice of adjudication published at the commencement of the proceeding.

communities considering such a project (Exh. DPA-1(A) at 5-3).

DPA stated that it established two threshold criteria, based largely upon EMI's extensive experience in developing successful projects, and aimed at assuring the viability of the potential sites (id.). Thus, DPA indicated that it first ruled out potential sites that would require new electric interconnects of a mile or more, or gas interconnects of a one-half mile or more (id.). Second, DPA indicated that it ruled out potential sites that were not zoned for industrial use (id. at 5-4).¹⁰ Citing the importance of the above criteria, DPA indicated that it implicitly weighted these initial criteria heavily by eliminating sites that failed to comply (id.; Tr. 2, at 94). DPA stated that the Company and its consultants reviewed each of the twenty communities in southeastern Massachusetts along the Algonquin "G" system and identified four industrially zoned sites that satisfied the threshold for proximity to gas and electric interconnects (Exh. DPA-1(A) at 5-5). These sites were located in the towns of Attleboro, Somerset, Dighton and Taunton (id.).

DPA stated that it evaluated the four identified sites on a comparative basis according to seven screening criteria designed to reflect factors significant to the successful development of the facility (id. at 5-7). DPA indicated that these criteria included: (1) four criteria related to site suitability (physical site characteristics, length and ease of natural gas interconnect, length and ease of electric interconnect, and potential for site contamination); (2) one natural resource criterion (the potential for impacts to surface water and/or land resources); and (3) two criteria related to community impacts (proximity of noise/visual sensitive receptors to the site and community acceptance/support) (id. at 5-7 to 5-11). The four sites were compared for the foregoing criteria, and were evaluated as being "high," "medium" or "low" for each criterion (id.). Based on the comparative evaluation of the four identified sites, DPA confirmed the Dighton site as the primary site and selected the Taunton site as the alternative site (id. at 5-12).

During the course of the proceedings, Siting Board staff directed DPA to conduct

¹⁰ DPA also initially limited its analysis to communities with adequate water supply for a water-cooled facility. However, DPA later included consideration of potential sites lacking such water supply capability.

additional comparative evaluation of all the potential sites that DPA disqualified for failure to meet only one of the following threshold criteria: (1) electric interconnect of a mile or more; (2) gas interconnect of one-half mile or more; (3) lack of available industrial zoned land; and (4) lack of apparent potential water source (Exh. HO-S-27). Pursuant to that request, DPA broadened the scope of the comparative screening analysis contained in the Company's original petition to qualitatively compare the six most preferable such sites to the primary site (*id.*). The results of the expanded evaluation confirmed that none of the additional potential sites were superior to the primary site with respect to minimizing costs and environmental impacts while ensuring supply reliability, which supported the Company's assertion that no clearly superior site was overlooked or eliminated (*id.*).

However, the Siting Board has certain concerns with the site selection process presented by DPA in its petition. Specifically, the Siting Board is concerned with DPA's development and use of the threshold criterion reflecting proximity to interconnects. Although the Siting Board has previously recognized proximity to interconnects as a legitimate siting concern,¹¹ the Siting Board questions the basis for the disparity between a one-mile limit for electric interconnects and a one-half mile limit for gas interconnects. The Siting Board is further concerned that the maximum distances specified in DPA's threshold criterion had the potential to limit the pool of prospective sites that were analyzed. In addition, while the seven screening criteria identified and applied by DPA are generally consistent with criteria previously accepted by the Siting Board, the Siting Board is concerned that such criteria may not reflect the full range of expected environmental impacts. Finally, the Siting Board is concerned that DPA employed an unweighted analysis as a scoring mechanism rather than a weighted analysis, as accepted in recent decisions.

¹¹ See Bay State Gas Company, 21 DOMSC 1, 55 (1990), "[T]he Siting Council stated that installation and operation of a new pipeline always poses some risk of accident. Further it is reasonable to assume that the degree of risk bears some relationship to the length of pipeline in the extent of human exposure along the route." Moreover, the regulations of the Department of Public Utilities, 220 C.M.R. § 111.03, and the Policy of Accommodation of Utilities Longitudinally and Controlled Access Highways of the Massachusetts Highway Department impose practical limitations to extensive placements of new gas pipelines (Exh. HO-RR-9, Att.).

Berkshire Power Decision, 4 DOMSB at 351, 353; Silver City Decision, 3 DOMSB at 262, 264.

Based on the above concerns, the Siting Board finds that DPA failed to justify the parameters for its threshold criteria concerning electric and gas interconnects, and failed to justify the lack of the use of weights for application of the screening criteria. However, the Company did conduct additional analysis on other sites, including qualitative comparison to the primary site, and thereby broadened the scope of the original site selection analysis contained in the petition. The record confirms that no identified potential site, including those evaluated through additional analysis, was clearly superior to DPA's primary site. Thus, DPA has minimally supported the selection of its primary and alternative sites.

Therefore, the Siting Board finds that: (1) DPA has developed a minimally acceptable set of criteria for identifying and evaluating alternative sites; and (2) DPA has appropriately applied a minimally acceptable set of criteria for identifying and evaluating alternative sites in a manner that ensures that it has not overlooked or eliminated any clearly superior sites.

3. Geographic Diversity

In this section, the Siting Board considers whether DPA's site selection process included consideration of site alternatives with some measure of geographic diversity. DPA asserted that it has identified at least two sites with some measure of geographic diversity (Exh. DPA-1(A) at 1-3, 1-7, 1-9).

The Siting Board requires applicants to provide at least one noticed alternative with some measure of geographic diversity. Berkshire Power Decision, 4 DOMSB at 357; Silver City Decision, 3 DOMSB at 274; 1990 Berkshire Decision, 20 DOMSC at 181-182. The Siting Board notes that there is no minimum distance that is sufficient to establish geographic diversity in any given case. The Siting Board has previously determined that two sites in the same town can provide adequate geographic diversity for a generating facility review. Berkshire Power Decision, 4 DOMSB at 357; Silver City Decision, 3 DOMSB at 274; NEA Decision, 16 DOMSC at 385-388. Further, in a transmission line case, the Siting Board stated that simple quantitative diversity thresholds were not appropriate for evaluating

geographic diversity. New England Power Company, 21 DOMSC 325, 393 (1991).

Here, DPA has provided two sites located approximately five miles apart in neighboring towns with significantly different environmental characteristics, such as site size and natural resource conditions. Accordingly, the Siting Board finds that DPA has identified at least two practical sites with a sufficient measure of geographic diversity.

4. Conclusions on Site Selection Process

While the Siting Board notes the above-referenced concerns with DPA's original site evaluation process, the Siting Board has found that: (1) DPA has developed a minimally acceptable set of criteria for identifying and evaluating alternative sites; (2) DPA has appropriately applied a minimally acceptable set of criteria for identifying and evaluating alternative sites in a manner that ensures that it has not overlooked or eliminated any clearly superior sites; and (3) DPA has identified at least two practical sites with a sufficient measure of geographic diversity. Accordingly, the Siting Board finds that DPA has considered a reasonable range of practical facility siting alternatives.

B. Comparison of the Proposed Facilities at the Primary and Alternative Sites

1. Standard of Review

In implementing its statutory mandate to ensure a necessary energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost, the Siting Board requires project proponents to show that proposed facilities are sited at locations that minimize costs and environmental impacts, while ensuring a reliable energy supply. In order to determine whether such a showing is made, the Siting Board requires project proponents to demonstrate that the proposed site for the facility is superior to the noticed alternative on the basis of balancing cost, environmental impact and reliability of supply. Berkshire Power Decision, 4 DOMSB at 358; Silver City Decision, 3 DOMSB at 276; Berkshire Gas Company, 23 DOMSC 294, 324 (1991).

An assessment of all impacts of a 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. Berkshire Power Decision, 4 DOMSB at 358; Silver City Decision, 3 DOMSB at 276; Eastern Energy Corporation, 22 DOMSC 188, 334, 336 (1991) ("EEC Decision"). A facility proposal which achieves that appropriate balance is one that meets the Siting Board's statutory requirement to minimize environmental impacts. Berkshire Power Decision, 4 DOMSB at 358; Silver City Decision, 3 DOMSB at 276; EEC Decision, 22 DOMSC at 334, 336.

An overall assessment of the impacts of a facility on the environment, rather than a mere checklist of a facility's compliance with regulatory standards of other government agencies, is consistent with the statutory mandate to ensure a necessary energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost. Berkshire Power Decision, 4 DOMSB at 358; Silver City Decision, 3 DOMSB at 276-277; EEC Decision, 22 DOMSC at 334, 336. Compliance with other agencies' standards clearly does not establish that a proposed facility's environmental impacts have been minimized. Berkshire Power Decision, 4 DOMSB at 358; Silver City Decision, 3 DOMSB at 277; EEC Decision, 22 DOMSC at 334, 336. Furthermore, the levels of environmental control that the project proponent must achieve cannot be set forth in advance in terms of quantitative or other specific criteria, but instead, must depend on the particular environmental, cost and reliability trade-offs that arise in specific facility proposals. Berkshire Power Decision, 4 DOMSB at 358-359; Silver City Decision, 3 DOMSB at 277; EEC Decision, 22 DOMSC at 334, 335.

The Siting Board recognizes that an evaluation of the environmental, cost, and reliability trade-offs associated with a particular review must be clearly described and consistently applied, to the extent practicable, from one case to the next. Therefore, in order to determine if a project proponent has achieved the appropriate balance among environmental impacts, costs and reliability, the Siting Board must first determine if the petitioner has provided sufficient information regarding environmental impacts and potential mitigation measures in order to make such a determination.¹² Berkshire Power Decision,

¹² The Siting Board notes that project proponents are required to submit to the Siting
(continued...)

4 DOMSB at 359; Silver City Decision, 3 DOMSB at 277; 1993 BECo Decision, 1 DOMSB at 39-40, 154-155, 197. The Siting Board can then determine whether environmental impacts have been minimized. Similarly, the Siting Board must find that the project proponent has provided sufficient cost information in order to determine if the appropriate balance among environmental impacts, costs, and reliability has been achieved. Berkshire Power Decision, 4 DOMSB at 359; Silver City Decision, 3 DOMSB at 278; 1993 BECo Decision, 1 DOMSB at 40.

Accordingly, in the sections below, the Siting Board examines the environmental impacts of the proposed facilities at the Company's primary and alternative sites to determine (1) whether the Company's proposal minimizes specific sets of environmental impacts, and (2) which site is preferable based on each specific set of environmental impacts. The Siting Board then examines the cost of the proposed facility, including costs of further mitigation, in order to determine whether an appropriate balance would be achieved among conflicting environmental concerns and among environmental impacts, costs and reliability. Finally, the Siting Board compares the two sites to determine which is preferable with respect to providing a necessary energy supply for the Commonwealth at the least cost with a minimum environmental impact.

2. Environmental Impacts

a. Air Quality

DPA maintains that the proposed facility will have an insignificant impact upon air quality (Exh. DPA-1(A) at 6-2). The Company indicated that emissions will be controlled to

12(...continued)

Board a description of the environmental impacts of the proposed facility. G.L. c. 164, § 69J. Specifically, Siting Board regulations require that a proponent of a generating facility provide a description of the primary and alternative sites and the surrounding areas in terms of: natural features, including, among other things, topography, water resources, soils, vegetation, and wildlife; land use, both existing and proposed; and an evaluation of the impacts of the facility in terms of its effect on the natural resources described above, land use, visibility, air quality, solid waste, noise, and socioeconomics. 980 C.M.R. § 7.04(8)(e).

a significant degree through the use of clean burning natural gas, advanced pollution control technology, a highly-efficient gas combustion turbine, and elimination of oil as a secondary fuel (id. at 6-15; Exh. HO-E-76). DPA stated that acquisition of NOx and CO₂ offsets will further mitigate air quality impacts (Exh. DPA-1(A) at 6-15).

The Company indicated that the project will be subject to comprehensive air quality regulation by the Massachusetts Department of Environmental Protection ("MDEP") and the USEPA, including regulation as to: (1) national ambient air quality standards; (2) New Source Review requirements; and (3) New Source Performance Standards (id. at 6-2). DPA further indicated that the project will be required to meet BACT standards for specified pollutants and LAER technology requirements for NOx, which will be demonstrated by the use of dry low-NOx combustion and selective catalytic reduction (id. at 6-3, 6-6). The Company stated that compliance with all federal and state requirement is reviewed in the MDEP Air Plan Approval process (id. at 6-2).

With respect to ambient air quality impacts, DPA conducted air quality modeling according to the prescribed standards of the USEPA and MDEP to compare the predicted concentrations from the proposed project to significant impact levels ("SILs") to ensure compliance with applicable ambient air quality standards (id. at 6-9 to 6-14). The Company conducted air quality modeling for a Good Engineering Practices ("GEP") stack of 183 feet and a lower stack of 150 feet and indicated that air quality impacts would be acceptable at both stack heights (id. at 6-12; Exhs. HO-E-6 (supp.); HO-E-44). The Company indicated that refined air quality modeling demonstrated that, with a 150-foot stack, combined background and facility ambient concentrations would be below SILs and comply with all ambient standards (id.). The Company indicated that a 183-foot stack would have greater visual impacts than a 150-foot stack and would likely require additional construction and visual screening costs (Exh. HO-E-7). Therefore, the Siting Board concludes that any air quality benefits associated with a 183-foot GEP stack would not outweigh its additional visual impacts and costs.

DPA indicated that it will obtain required NOx offsets from qualifying shut-downs or surplus emission reduction credits (Exhs. DPA-1(A) at 6-5; HO-E-74).

DPA calculated that the maximum predicted CO₂ emissions from the proposed facility

would be 651,220 tons per year (Exh. HO-E-112). During the course of the proceedings, the Company presented a number of options for attaining CO₂ offsets, including: (1) a seedling distribution program that would offset more than 0.385 percent of facility emissions by the fifth year of facility operation and more than 0.55 percent of facility emissions by the seventh year of facility operation;¹ (2) a donation to the UtiliTree Carbon Company ("UtiliTree"), a utility-led effort to help reduce greenhouse gases, that would offset one percent of facility emissions each year for 20 years at a cost of \$1.00 per ton of CO₂;² and (3) a donation to Massachusetts ReLeaf ("ReLeaf"), a program to facilitate the planting of landscape trees in Massachusetts cities and towns, in the same amount as the proposed donation to UtiliTree.³

In the record conferences discussions, the Company agreed to a CO₂ mitigation donation in the amount of \$150,000 in the first year of facility operation to a cost-effective CO₂ mitigation program(s), to be selected upon consultation with Staff of the Siting Board. The basis of this amount is an offset of one percent of emissions at up to \$1.50 per ton.⁴

¹ DPA's calculation of the offset potential of the seedling distribution program assumed planting of blue spruce seedlings with a 100 percent seedling survival rate (Exhs. HO-E-112; HO-RR-19).

² DPA indicated that UtiliTree had provided grants to a number of domestic and foreign rural tree planting, forest preservation and forest management projects, with an average cost of \$1.00 per ton of CO₂ removed (Exh. DPA-6). The record in this case does not indicate whether UtiliTree expects to continue to provide CO₂ offsets at this cost.

³ In previous cases the Siting Board assumed a ReLeaf cost of \$3.33 per ton of CO₂ removed. Eastern Energy Corporation (Compliance), 25 DOMSC 296, 350 (1992). Documentation from ReLeaf presented in this case suggests the cost may be higher (Exh. DPA-8). However the Siting Board recognizes that the calculation of the ReLeaf cost per ton of CO₂ removed does not take into account many of the benefits of shade trees including energy conservation due to shading of buildings (*id.*).

⁴ The Siting Board notes that an offset of one percent of facility emissions, 651,220 tons, at \$1.50 per ton equals \$9,768.30 per year or \$195,366 for twenty years. The agreed donation, in 1999 dollars, is based on the net present value of the identified twenty-year amount, assuming expenditure of that amount over a period of approximately five years following facility start-up.

In Enron Power Enterprise Corporation, the Siting Board established the requirement that all proponents of proposed facilities that emit CO₂ must comprehensively address the mitigation of CO₂ impacts. 23 DOMSC 1, 196 (1991) ("Enron Decision"). In Berkshire Power, the Siting Board required the applicant to provide CO₂ offsets through an annual seedling distribution program or comparable tree planting or forestation program, or combination thereof, so as to attain an annual offset level equivalent to 0.385 percent of annual facility emissions within five years of facility start-up and 0.550 percent of annual facility emissions within 20 years of facility start-up. 4 DOMSB at 373. However, in that case, the Siting Board noted that this CO₂ offset level, although larger than that required in earlier reviews of gas-fired generating facilities, still represents a small percentage reduction amounting to less than one percent of facility emissions. Id. The Siting Board further recognized the applicant's attempt to develop a more cost-effective CO₂ mitigation approach, which potentially would allow a significantly larger offset level and encouraged future applicants to pursue such approaches. Id. In that case, the Siting Board stated that it would accept implementation of a plan to offset one percent or more of the proposed facility's emissions, in lieu of implementation of the seedling distribution, provided that the applicant's plan would lead to proven, incremental reductions in CO₂ emissions, consistent with Siting Board criteria. Id. at 374.

Here, the Company has considered alternative means to attain CO₂ offsets, and has proposed to attain an increased level of offsets in a cost-effective manner. DPA proposes to contribute \$150,000 in the first year of facility operation to cost-effective CO₂ mitigation program(s) selected in consultation with the Siting Board staff. The record in this case indicates that UtiliTree makes CO₂ emissions offset programs available at a cost of \$1.00 per ton. Based on the current cost of CO₂ offsets that can be purchased through UtiliTree, DPA proposes to offset over one percent of facility emissions over the 20-year life of the project, and to fund that offset level within the first year of facility operation.

Given its commitment to a dollar amount rather than an offset level, DPA's proposal also provides for some flexibility to partially include CO₂ mitigation programs that appear to be less cost-effective than Utilitree, but which provide advantages that are not quantifiable, such as the ReLeaf program. Coincident with that flexibility, however, is the possibility that

the actual CO₂ mitigation program(s) selected under DPA's proposal may differ from the targeted amount of one percent of facility CO₂ emissions. For example, assuming a potential overall program cost of \$1.50 per ton in 1999, which is the basis of DPA's proposal, the program would provide offsets of less than one percent.¹⁷ Conversely, assuming availability of a future CO₂ mitigation program(s) that are more cost-effective, with overall program costs of \$1.00 per ton or less, the percent of emissions offset would be greater than one percent.

The Siting Board recognizes that DPA proposes an increase in CO₂ offsets over previous Siting Board requirements, and that the Company's up-front contribution would make the CO₂ offsets more fully available during the early years of operation of the proposed facility. Further, the Siting Board recognizes the overall environmental mitigation included as features of the proposed project, most notably elimination of fuel oil as a back-up fuel source and use of an air-cooled condenser. Thus, considering the increase in CO₂ offsets, the timing of the contribution and other environmental advantages of the project, DPA's CO₂ mitigation proposal is an acceptable means of achieving CO₂ offsets.

The Siting Board herein sets forth a CO₂ mitigation requirement for DPA in dollar terms, recognizing that the actual dollar commitment may vary in cost-effectiveness from what is set forth in the record. Accordingly, the Siting Board requires DPA to provide CO₂ offsets through a donation in the first year of facility operation of \$150,000 in 1999 dollars, to a cost-effective CO₂ offset program(s), to be selected upon consultation with Staff of the Siting Board.

Accordingly, the Siting Board finds that, with the foregoing NO_x and CO₂ offset measures, the environmental impacts of the proposed facility at the primary site would be minimized with respect to air quality.

The record shows that there is no significant difference between air quality at the primary and alternative sites with construction of the proposed facilities (Exhs. DPA-1(A) at 7-1, 7-2; DPA-GL-7). Therefore, the Siting Board finds that the primary site would be

¹⁷ The Siting Board notes that the calculation of DPA's donation assumed constant annual amounts in current dollars, without taking into account cost escalation.

comparable to the alternative site with respect to air quality.

The Siting Board notes that this requirement represents a new approach to meeting the CO₂ mitigation requirements established in the Enron Decision. In previous cases, the Siting Board has required developers to commit to a specific program of CO₂ mitigation, such as a tree planting or forestation program, designed to offset a certain percentage of facility emissions within the early years of facility operation. Here, the Siting Board instead has required DPA to make a monetary contribution within the first year of facility operation to one or more cost effective CO₂ offset programs to be selected in consultation with Siting Board staff.

The Siting Board considers this new approach to be preferable to earlier approaches to CO₂ mitigation for a number of reasons. First, we recognize the difficulties of designing and accurately quantifying the benefits of specific CO₂ offset programs in the context of an adjudicatory proceeding. In particular, calculations of CO₂ benefits of the specific tree planting/forestry programs that have been proposed in this and previous proceedings: (1) are based on tree characteristics and survival rates that may not be realistic; and, (2) may not take into account subsidiary benefits such as a reduction in energy demand due to shading of buildings.

Second, based on the record in this and previous proceedings, we note that the most cost-effective CO₂ mitigation programs that are currently available appear to be forestry-related programs that are implemented outside of New England. However, we recognize that there are many potential non-forestry options for cost-effective CO₂ mitigation, and that cost-effective mitigation programs may be developed in Massachusetts and the New England region during the approximately two-year time period between the issuance of this decision and commencement of facility operation. The monetary contribution approach allows DPA the flexibility to support newly-developed Massachusetts or regional CO₂ offset programs and to include, within a mix of programs, existing Massachusetts programs such as Mass Re-Leaf, which may not be the most cost-effective of CO₂ mitigation options but are reliable offset programs and offer other advantages.

For these reasons, the Siting Board intends to pursue this monetary contribution approach to CO₂ mitigation in future generating facility proceedings. We will no longer

require project proponents to develop a record of the offset potential and cost of various CO₂ mitigation options in each facility case, but instead will expect proponents to commit to a certain level of support for cost-effective CO₂ mitigation programs selected in consultation with Siting Board staff. This approach should both simplify the evidentiary phase of our proceedings, and provide project proponents with a measure of certainty regarding the likely costs of CO₂ mitigation during the project planning stage.

In this instance, the Siting Board has accepted a contribution towards CO₂ mitigation that is based on an offset of one percent of facility emissions at \$1.50 per ton, to be donated in the early years of the project. We would expect future monetary commitments to be in this range. However, the Siting Board may revisit this standard at a later date, particularly if there are significant improvements in the cost effectiveness of CO₂ mitigation approaches.

b. Water-Related Impacts

In this section, the Siting Board addresses the water-related impacts of the proposed facility, including: (1) the water supply requirements of the facility and related impacts on affected water supply systems and on wetlands and other water resources; (2) the water-related discharges from the facility, including wastewater discharges and discharges from on-site stormwater management facilities, and related impacts on wastewater systems and on wetlands and other water resources; and (3) the construction impacts of the proposed facility and associated interconnection facilities on wetlands and other water resources.

The Company stated that water supply and wastewater impacts for the project at the primary site will be substantially reduced by the use of air-cooled condenser technology and the elimination of oil as a backup fuel which, in turn, eliminates the need for water injection for NO_x control (Exhs. DPA-GL-1, at 3; HO-E-81). The Company also stated that the total facility water demand would be 112,320 gallons per day ("GPD") on average and 184,320 GPD maximum, which is approximately 1 million GPD less than that required by conventional water-cooled technologies (Exhs. DPA-GL-1, at 3; HO-E-81; HO-RR-20). DPA indicated that the water necessary for facility operation will be obtained from the Dighton municipal system, which currently has the capability to supply the project with no adverse impact to existing customers (Exhs. DPA-GL-1, at 3; HO-E-86 (supp.)).

The Company indicated that the wastewater discharge from the proposed facility would be, at a minimum, 44,640 GPD and, at a maximum, 86,400 GPD (Exh. DPA-LF-5). Wastewater from the proposed facility will be discharged through a new main to an existing Dighton municipal system main, where it will travel through the Dighton municipal sewer system to the Taunton municipal sewerage system, where it will be treated at the Taunton wastewater treatment plant (Exh. DPA-1(A) at 6-30). The Company has committed to extend the existing sewer main along Route 138 by 2000 feet and to provide stub connections for any property along such extension (Exh. HO-E-95). The Company has indicated that the wastewater generated by the proposed project will be well within the current capability of such municipal systems and the Taunton wastewater treatment plant system, and that the project has been designed to ensure minimal impacts to this system and other municipal users (Exhs. DPA-1(A) at 6-30; HO-E-91; HO-E-92 (supp.)).

The Company maintains that water resources in the vicinity of the project will not be significantly impacted by the project and that the facility has been designed to minimize impacts to water resources, wetlands, surface waters and ground water (Exh. DPA-1(A) at 6-16). The Company stated that the main facility structure would be located outside of wetland areas and that wetland impacts would be limited to the construction of one access roadway, a service roadway and utility interconnects (id. at 6-20; Exh. HO-E-85). The Company added that by designing the access road to cross the wetlands area at the narrowest point available on-site, and by making the access road as narrow as possible, the area of disturbance would be minimized where construction within wetlands was unavoidable (id.). The Company further stated that, during construction, comprehensive erosion and sediment control measures would be used and maintained along all limits of work and that unavoidable wetlands impacts would be compensated for on a 1:1 ratio in accordance with state and federal requirements (id. at 6-21).

The Company stated that stormwater discharge during construction and operation would be subject to the federal and state stormwater discharge permit program (id. at 6-25). Stormwater discharges would be attenuated by means of an on-site drainage system consisting of catch basins, vegetated swales and detention basins which will detain the excess runoff and release it back into the existing wetlands at a peak rate no greater than the pre-development

rate (id.). DPA noted that this system design would prevent the flow of pollutants to wetlands and the Segreganset River, while maintaining pre-construction flow characteristics (id.; Exh. HO-E-84).

On the basis of the foregoing, the Siting Board finds that the water supply impacts of the proposed facility at the primary site would be minimized. The Company has demonstrated that impacts on all water resources resulting from wastewater and stormwater discharge from the proposed project would be minimized at the primary site. The Company has also demonstrated that wetlands and construction impacts associated with the project at the primary site would be minimized. Accordingly, the Siting Board finds that the environmental impacts of the proposed facility at the primary site would be minimized with respect to water-related impacts.

With respect to the alternative site, the project would likely utilize treated sewage effluent from the Taunton wastewater treatment facility for its cooling requirement and Taunton municipal water supply for its higher-quality requirements (Exhs. DPA-1(A) at 7-8, 7-9; HO-E-97; HO-E-98). Due to the availability of less valuable non-potable effluent and the constraints of the alternative site as to noise and space, the alternative site would utilize wet-cooling technology (Tr. 3, at 71-73). Construction of the proposed facility at the alternative site would impact a smaller area of wetland resources. However, the alternative site would involve significantly greater supply and wastewater volumes than the primary site (Tr. 3, at 71-73; Exh. HO-RR-20). Accordingly, on balance the Siting Board finds that the primary site would be preferable to the alternative site with respect to water-related impacts.

c. Visual Impacts

Dighton maintains that the visual impacts of the proposed facility at the primary site will be minimal and that the site offers significant natural and structural buffer from surrounding visually-sensitive receptors (Exh. DPA-1(A) at 6-37). DPA stated that the primary site is located in a mixed industrial, commercial and residential section of Dighton (id.). Specifically, the Company stated that to the east of the primary site is an existing industrial facility, beyond which is a multi-family residence and Route 138 (id.). The

Company stated that the southern portion of the primary site, the Beckwith parcel, is heavily wooded and will remain a visual buffer pursuant to a conservation easement granted by DPA to the Town (id.; HO-RR-10). The Company also stated that property to the west of the primary site along the Segreganset River, is owned by the Town of Somerset, and beyond that, is undeveloped wooded land (Exh. DPA-1(A) at 6-37). To the north is the agricultural land managed by the Agricultural School, beyond which are schools and residential developments (id.).

The Company indicated that views of the facility from the south and west will primarily be limited to the top of the stack due to the significant intervening vegetation and that views from the east along Route 138 will be screened by the existing industrial facility now along Route 138 (id.). The Company further indicated that the most prominent views of the facility will be from the north across the Agricultural School land and from isolated locations to the north and east along Route 138 through gaps in intervening development and vegetation (id. at 6-37, 6-38). In order to demonstrate the foregoing, DPA submitted a comprehensive computer-generated evaluation of potential visual impacts of the proposed facility at the primary and alternative sites from multiple vantage points (id. at 6-38, Fig. 6.6-1, 6.6-2; Exh. HO-E-46(supp.)).

To minimize visual impacts of the facility, the Company stated that the facility structures will be painted a neutral color and that landscaping plans will focus on mitigating views from the east and the north (Exh. DPA-1(A) at 6-37). DPA has further proposed to plant an on-site vegetated buffer of evergreen trees between the facility and the agricultural lands to the north (Tr. 2, at 139, 140). In addition, DPA has committed to minimize exterior lighting, consistent with GEP and code requirements by utilizing sodium directional lighting, which will direct exterior lighting downward and result in a softer, less noticeable light (Record Conference, April 10, 1997, Tr. at 12-13). DPA noted that the use of an air-cooled condenser, which eliminates the cooling tower plume, and the absence of night-time stack lighting, will minimize the visual impacts at the primary site (id. at 9, 12-13). DPA further noted that it has committed to maintain an open dialogue with neighbors respecting any disturbances related to visual impacts and to have a direct phone line available 24 hours per day to respond to neighbor concerns or problems (id. at 18-19).

As noted above, DPA has proposed to plant an on-site vegetated buffer consisting of a row of evergreen trees for mitigation of visual impacts to the north and northeast of the proposed facility. However, the Siting Board is concerned that while this on-site landscaping will diminish the visual impacts of the proposed facility, there are areas to the north and northwest of the primary site, specifically the elementary school and associated playing fields, and residences located to the south of Center Street, that would benefit from additional off-site tree planting. Therefore, in order to ensure that visual impacts will be minimized, the Company will develop and implement an off-site tree planting plan that includes, as agreeable to affected school officials and landowners, evergreen plantings of eight to ten feet in height spaced ten feet apart, or selectively placed trees of greater height, or other screening: (1) along the southern boundary of the Dighton school property beginning along the stone wall at the southern corner of the middle school extending easterly to the end of the school property; and (2) along the southern property line of the Cartin, Clarke, and Kennedy properties.

Further, in past reviews the Siting Board has also required that proponents provide selective tree planting in residential areas up to one mile from the proposed stack location to help ensure no more than intermittent visibility of the stack and other facility structures in such areas. Berkshire Power Decision, 4 DOMSB at 394-395; NEA Decision, 16 DOMSC at 408-409. Accordingly, in order to ensure that visual impacts are minimized, the Siting Board directs the Company to provide reasonable and mutually agreeable off-site shrub and tree plantings to help screen the proposed facility at locations other than those identified above that are within one mile of the proposed facility, where requested by property owners or appropriate municipal officials. In implementing its plan for off-site shrub and tree planting, DPA: (1) shall provide shrub and tree plantings on private property only with the permission of the property owner and along public ways only with the permission of the appropriate municipal officials; (2) shall provide written notice of this requirement to appropriate officials in Dighton and to all affected property owners prior to commencement of construction; (3) may limit requests from local residents and town officials for shrub and tree plantings to a specified period ending no less than six months after initial operation of the plant; (4) shall complete all such requested plantings within one year after

commencement of construction, or if based on a request after commencement of construction, within one year after such request; and (5) shall be responsible for the reasonable maintenance or replacement of such plantings as necessary to ensure that healthy plantings become established. In addition, the Siting Board encourages DPA to work with affected local residents, entities and institutions to develop other reasonable forms of cost-effective visual mitigation.

Accordingly, the Siting Board finds that with implementation of the aforementioned conditions and mitigation proposed by the Company, the environmental impacts of the proposed facility at the primary site would be minimized with respect to visual impacts.

The Company maintains that, although the alternative site is located in an area primarily utilized for industrial activities, the visual impacts to the surrounding community will be substantially greater than those at the primary site. The Company explained that this difference is attributable to several factors at the alternative site, including: (1) a more limited natural vegetated or wooded buffer; (2) more densely developed residential areas surrounding the site; and (3) more direct views of the facility buildings and stack from all surrounding areas (Exh. DPA-1(A) at 7-15). The Company provided a comprehensive evaluation of the potential visual impacts at the alternative site (id., Fig. 7.5-1; Exh. HO-E-47 (supp)).

Based upon the foregoing, construction of the project at the alternative site would affect a significantly greater number of sensitive visual receptors including residences in close proximity to the facility. Moreover, use of the alternative site would afford unbuffered views of both the main facility and stack. Therefore, the Siting Board finds that the primary site is preferable to the alternative site with respect to visual impacts.

d. Noise

DPA maintains that the projected noise impacts of the proposed facility at the primary site would not adversely affect neighboring residences or properties and would be minimized in accordance with Siting Board standards of balancing environmental impacts consistent with minimizing cost (Exh. DPA-1(A) at 6-52). DPA also maintains that the projected noise from operation of the facility as proposed (1) would produce noise increases at nearby residences

within the applicable ten-dBA limit imposed by MDEP's Policy 90-001 ("MDEP Guideline"), while providing less residential noise than other generating facilities reviewed by the Siting Board; and (2) would cause no adverse impacts at the facility property lines based on existing non-residential land uses and zoning and applicable federal guidelines for non-residential exposure (Exhs. HO-E-1(C), App. M at 38; HO-RR-27; Tr. 4, at 7). DPA further maintains that the worst-case construction noise levels would be intermittent and temporary, and noise from construction traffic would be comparable to the daytime noise environment in which heavy traffic is a common occurrence (*id.* at 15-16).

To determine the noise impacts from operation of the facility as proposed, DPA studied and provided estimates of combined facility and background noise at receptors for daytime and nighttime periods¹⁸ (Exhs. HO-E-1(C), App. M; HO-E-14 (supp.), (supp.2)). Such analysis indicates that, during facility operation, daytime L_{90} levels would increase by one to five dBA at residential receptors and that nighttime L_{90} levels would increase by five to ten dBA at such receptors, thereby satisfying the MDEP Guideline at the residences (Exh. HO-E-14 (supp. 2) (att. 4); HO-RR-36).¹⁹ The study also indicates L_{90} increases at the property lines of the facility site ranging from six to 23 dBA during the daytime, and 14 to 29 dBA at night (Exhs. HO-E-14 (supp. 2) (att. 4); HO-E-60). At such levels, the ten-dBA limit imposed by the MDEP Guideline would be exceeded at the eastern and

¹⁸ The Company indicated that there are various measures of noise, and noted that the MDEP Guideline is based on a relatively quiet measure of ambient noise, specifically that level of noise that is exceeded 90 percent of the time (" L_{90} "), which essentially is the residual sound level observed when there are no transient, louder sounds (Exh. HO-E-1(C), App. M at 5). Another common indicator of ambient noise is the equivalent sound level (" L_{eq} "), which is the time average of the fluctuating sound level over a 24-hour period (*id.* at 6). A variation of the L_{eq} indicator is the day-night sound level (" L_{dn} "), which is the time average of the fluctuating sound level over a 24-hour period with a ten-dBA penalty factor added for a nine-hour nighttime period, to reflect the higher sensitivity to noise of people in their homes at night (*id.*).

¹⁹ The Company's estimates showed expected nighttime L_{90} increases of eight dBA or more at four residential receptors, including increases of ten dBA at the RP-1 receptor east of the site, the RP-2 receptor south of the site and the RP-4 receptor north of the site, and an increase of nine dBA at the Holton residence east of the site (Exhs. HO-E-14 (supp. 2) (att. 4); HO-RR-36).

southern property lines at night, and at the northern and southwestern property lines both during the day and at night (id.).

The Company indicated, however, that there are no residences, noise-sensitive receptors or likely nighttime uses near such property line locations (Exhs. HO-E-1(C), App. M at 38; HO-E-14(supp. 2) (att. 4)). DPA stated that the site is directly abutted by the Advanced Loose Leaf facility on the east, and by largely undeveloped land in other directions (id.). DPA further stated that the abutting land to the north is an agricultural preserve, zoned as open recreation and conservation land,²⁰ and restricted by deed to the "use and benefit" of the Agricultural School (id.; Exh. HO-RR-25). The Company further stated that land to the west and southwest, which borders the Segreganset River, is owned by the Town of Somerset and is also zoned as open conservation land (Exh. HO-E-1(C), App. M at 38). DPA added that the vacant parcel directly south of the site contains significant wetlands and topographical grading that effectively restrict future residential development, and that the vacant parcel abutting the northwest corner of the site, identified as Lot #64, has no street frontage and, on its eastern portions nearest the site boundary, also contains wetlands and flood plain area (Exhs. HO-E-1(C), App. M at 38; HO-RR-15; HO-RR-18; HO-RR-26). DPA cited prior instances in which MDEP relaxed its noise guidelines respecting property lines, where there was no possibility for residential development of abutting land due to zoning, wetlands or topographical grade limitations (Exh. HO-RR-27).

²⁰ Although the Company maintains that the abutting property to the north is an agricultural preserve, and therefore, is not subject to restrictions of the MDEP Guideline, the record also includes DPA's noise estimates for two existing residential properties located beyond the abutting agricultural preserve, further to the north and northeast of the proposed site (Exhs. EFSB-1; HO-RR-36). DPA's analysis shows that operation of the proposed facility would result in nighttime L_{90} increases of 12 dBA at the southwest corner of the residential property identified as the Leonard parcel, and 11 dBA at the west property line of the Holton property (Exh. HO-RR-36). In regard to the Leonard parcel, DPA indicated that the southwest corner of the property is approximately 1000 feet away from the existing residence and from other adjacent residences along Route 138 (Exhs. EFSB-1; HO-RR-36). The Company also asserted that the parcel is zoned as open recreation and conservation land, and therefore, residential use of the property is a non-conforming use, which would preclude construction of additional residences (Exhs. EFSB-1; HO-RR-17).

The Company also stated that the resulting noise levels at neighboring residences would be substantially less than those allowed by the Siting Board in other generating facility cases, and well within the limits recommended by federal government agencies (Exhs. HO-E-1(C), App. M at 38; HO-RR-27; Tr. 4, at 7). Further, the Company noted that two Dighton municipal boards reviewing and approving the project, the Dighton ZBA and Dighton Planning Board, have both explicitly considered and accepted the expected effects of the project as proposed (Exhs. HO-E-36 (supp. 2); HO-RR-10).

Based on its studies, the Company indicated that the projected nighttime L_{90} levels at the nearest residences would range from 37 to 40 dBA and thus compare very well to the residential receptor levels ranging from 48 to 51 dBA presented in prior reviews of independent power projects by the Siting Board (Exh. HO-E-14 (supp. 2) (att.4)). Enron Decision, 22 DOMSC at 208; MASSPOWER, Inc., 20 DOMSC 301, 390 (1990); NEA Decision, 16 DOMSC at 401-402. DPA's analysis also indicates that operation of the facility would produce noise at a 24-hour L_{dn} level of 46 dBA at the most affected residential receptor point (RP-1), which would result in no change in the existing ambient L_{dn} level of 55 dBA at that point (Exhs. HO-E-14 (supp. 2) (att. 4); HO-RR-23). Thus, the Company's analyses conclude that the noise impacts of the facility would be sufficiently low to maintain an L_{dn} level within the limit of 55 dBA recommended by the USEPA as "requisite to protect the public health and welfare with an adequate margin of safety" at residential locations (Exh. HO-E-1(C), App. M at 38).

The analysis further shows that the highest facility noise level at any property line location would be a 24-hour L_{eq} level of 57 dBA at receptor CNL-2, on the northern property line of the site, which would be 18 dBA less than the 75 dBA limit recommended by the USEPA to protect hearing, and 28 dBA less than the threshold of the Occupational Safety and Health Administration Employee Noise Exposure Regulation for a worker with an eight-hour work day on the opposite side of the property line (id.; Exh. HO-E-60).

The Company further indicated that the proposed facility at the primary site has been designed with careful consideration of measures to minimize noise impacts to the surrounding community (Exh. DPA-1(A) at 6-38). Additions to the facility designed specifically for noise control purposes include: (1) muffling in the combustion turbine exhaust stream;

(2) muffling of air inlet for the combustion turbine; (3) extensive quieting of the air-cooled condenser; (4) enclosure hoods for turbines and generator; and (5) careful control of size and location of ventilation air inlets for the turbine building or acoustical treatment of the inlets to meet outdoor noise requirements (Exhs. HO-E-1(C), App. M. at 39; HO-E-142).

DPA also offered evidence that projected noise levels based upon the proposed facility design are overestimated due to the inherent conservatism of the noise studies, including:

(1) DPA's use of the lowest ambient noise levels from six measurements; (2) DPA's omission of allowances for additional residential area noise attenuation due to time varying atmospheric factors; (3) and DPA's use of preliminary and worst-case assumptions on plant noise sources (Exh. HO-RR-27; Tr. 7, at 23-32). Mr. Keast testified that such conservatism would likely overstate the actual incremental L_{90} noise increase at the nearest residences by an amount between two and five dBA (Tr. 7, at 46-47). Further, Mr. Fagan explained that the project contractor would also provide for a conservative allowance in satisfying its contractual requirement to meet the design noise criteria, which he estimated to be in the range of an additional one to two dBA (id. at 29-32, 48).

With respect to construction noise, the Company noted that the work is temporary in nature and the record indicates that the following mitigation steps will be taken:

(1) compliance with all federal regulations limiting noise of trucks; (2) construction activities that generate significant noise will be limited to weekday common daytime hours; (3) appropriate silencing will be used, as required, for the preparation of the plant and boiler system operations; and (4) the construction equipment manufacturers' normal sound muffling devices will be used, and will be kept in good repair during the construction process (Exh. HO-E-1(C), App. M. at 15). The projected levels of construction noise at the nearest residence would range from 58 to 63 dBA during construction hours (id.). Further, with respect to noise at the schools, DPA stated that it will maintain an open line of communication throughout construction with school officials, including consultation as to the use of mutually-agreeable temporary noise barriers to mitigate noise impacts for the schools during construction (Exh. HO-E-59). The Company further indicated that the estimated level of construction noise at the schools during the noisiest construction phase would be about 60 dBA (Exh. HO-E-144). DPA asserted that building walls typically provide a 25 dBA noise

reduction, and added the resultant interior level of 35 dBA would be below the range of 38 to 47 dBA considered acceptable for classrooms (id.).

In response to requests of the Siting Board staff, the Company identified and considered the cost-effectiveness of various further measures for mitigation of the projected noise impacts of the proposed facility, including: additional inlet silencing on gas turbines; acoustic walls surrounding the transformers; a lower transformer noise design and testing; additional acoustic baffles over the condenser air inlet; additional HRSG silencing; shrouding around the base of the stacks; and increased sound insulation in the main building (Exh. HO-E-53 (supp.)). DPA analyzed three sets of additional noise mitigation at the primary site, including: (1) an option to reduce the maximum projected nighttime L_{90} increases to eight dBA at the residences (costing an additional \$3,439,601 for installation and \$640,000 in lost operating efficiency); (2) an option to reduce projected nighttime L_{90} increases to seven dBA at the residences (costing an additional \$4,627,336 for installation and \$694,566 in lost operating efficiency); and (3) an option to reduce projected nighttime L_{90} increases to ten dBA at the property lines of the site abutting residential land or undeveloped land which could be developed for residential use under the present bylaws (costing an additional \$7,000,000) (id.). DPA has also identified additional noise mitigation options of adding a noise-insulating shroud around the base of the stack at an estimated cost of \$175,000 and adding a sound wall along the northern side of the switchyard for approximately \$212,000 (Exh. HO-E-54 (supp. 2)).

DPA has not proposed to incorporate any of these measures into the pre-construction design of the proposed facility, citing both undue costs and limited effectiveness (id.). However, during the record conferences, DPA indicated that it hoped to purchase and raze the nearest residence²¹ to the facility footprint, at the receptor RP-1 location on Route 138 east of the site, with the site to be used for construction and by Advanced Looseleaf (Record Conference, April 10, 1997, Tr. at 69, 137-138). DPA also agreed as part of the record conferences to provide noise mitigation for six other residences where expected increases in

²¹ The Company stated that the residence nearest to the proposed facility is owned by the Bristol County Savings Bank (Exh. EFSB-1; Tr. 7, at 44).

nighttime L_{90} noise are eight dBA or greater, including the Holton residence east of the site, the Cartin, Clark and Kennedy residences north of the site (represented by receptor RP-4 in DPA's analysis), and the Elmasian residence and Travis parcel residence south of the site (represented by receptor RP-2 in DPA's analysis) (collectively, the "Residences") (Exh. EFSB-1; Record Conference, April 18, 1997, Tr. at 28-32). Specifically, DPA agreed, as part of the record conferences, to perform noise testing at the Residences within six months after the facility begins operation and, as may be determined from such testing and analysis of possible responses thereto, to install additional on-site mitigation at a cost of up to \$250,000, or provide residence-based mitigation for affected Residences at a cost of up to \$20,000 per residence, or in the case of the Cartin, the Clark and the Kennedy residences, at the owner's option, to purchase at current fair market value affected properties (id.). With respect to the possible provision of additional on-site mitigation, DPA would install as applicable under the agreement and as effective, up to the \$250,000 maximum cost, either a mitigation option identified in this record (the shroud around the base of the stack or the sound wall along the northern side of the switchyard) or such other on-site mitigation as DPA may determine effective (id.).

The Company further stated that, on balance, the alternative site is inferior to the primary site with respect to noise impacts (Exh. DPA-1(A) at 7-24). The record indicates that the facility, if constructed at the alternative site, would cause nighttime L_{90} noise increases of 18 dBA at the nearest residence to the west and of ten dBA at two other residences (Exh. DPA-1(A) at 7-24, Table 7.6-4). Notwithstanding the extensive mitigation already included in the projections of noise at the alternative site, substantial additional mitigation measures would be required even to comply with the MDEP Guideline at nearby residences (id. at 7-17; Exh. HO-E-61 (supp.)).

The record demonstrates that the expected noise levels with operation of the proposed facility would be less than those of previously approved projects. Additionally, noise levels at existing residences would be within the MDEP Guideline, and within the 55 dBA limit recommended by the USEPA as a "requisite to protect the public health and welfare with an adequate margin of safety." DPA has also shown that extensive noise mitigation efforts have already been incorporated into the proposed project design. In addition, due to conservative

studies and contracting practices, the actual residential noise impacts upon operation will likely not reach the pre-construction design projections thereof. See Silver City Decision, 3 DOMSB at 336, n.418; NEA Decision, 16 DOMSC at 403.

However, the Siting Board has not previously accepted residential noise increases of as much as ten dBA, as proposed by DPA at residential receptors RP-2 and RP-4. Further, although DPA cites instances in which MDEP has accepted noise increases at non-residential property lines that are significantly over ten dBA, it is unclear that MDEP would accept noise increases of the magnitude proposed by DPA, particularly given the inclusion of currently vacant residentially zoned land as part of the affected area south and northwest of the site. While DPA has presented evidence as to practical limitations upon additional residential development of the affected area south and northwest of the site due to lack of frontage, wetlands and topographical grade, such evidence does not include information as to Board of Assessor valuations or re-valuations, or any supporting wetlands determination by the Conservation Commission, or information as to any plans the owner may have.

The record also includes DPA's consideration of options that would further minimize noise impacts from operation of the proposed facility. Such options would reduce expected noise increases that: (1) would be well above the three-dBA threshold for noticeable noise; (2) would reach the ten-dBA MDEP Guideline at residential receptors and significantly exceed that guideline at property line receptors; and (3) would be larger than increases previously accepted by the Siting Board. Berkshire Power Decision, 4 DOMSB at 405. However, DPA has not proposed to implement as part of its pre-construction design identified options to further minimize noise impacts from operation of the proposed facility, citing cost and limited effectiveness.

Thus, based on the identification of options for additional noise mitigation in the record for this proceeding, there are noise issues which require the Siting Board to evaluate trade-offs between environmental impacts and cost. To complete its review, the Siting Board must address this issue in order to determine whether noise impacts would be minimized consistent with minimizing cost and other environmental impacts.

While the Siting Board has found in several prior cases that incremental mitigation to reduce projected L_{90} noise impacts at residences to eight dBA was cost-justified, the

balancing of environmental impacts with increased costs in such cases was markedly different from the balance presented in this case. For example, the cost of the incremental noise mitigation measures considered in two recent cases ranged from \$156,000 to \$812,000, and were thus of a far lesser magnitude than the incremental costs of \$3.5 million indicated in this case to limit L_{90} noise increases to eight dBA. Silver City Decision, 3 DOMSB at 357; NEA Decision, 16 DOMSB at 437. In addition, most of the Siting Board's prior decisions did not involve proposals for air-cooled technology, which, as the Siting Board has previously noted, limits cost-effective noise mitigation options, but improves environmental impacts relating to water consumption, visual impacts of plumes from water cooling towers and fogging and icing from such plumes. Berkshire Power Decision, 4 DOMSB at 345, 441.

On the basis of the foregoing, the Siting Board concludes that the incremental noise reductions that could be achieved through additional pre-construction mitigation measures in the project design are not consistent with minimizing costs. The Siting Board therefore concludes that requiring additional mitigation measures in the pre-construction project design would not result in cost-effective benefits to neighbors of the proposed facility. We also note that, consistent with the Siting Board's statutory mandate to minimize environmental impacts consistent with minimizing costs, it is appropriate to consider the overall environmental impact of the facility, and that the limited cost-effectiveness of further noise mitigation measures is in part attributable to the planned use of air-cooling technology, which the Siting Board has previously recognized to be of substantial and offsetting environmental benefit due to greatly diminished water consumption. Id.

Notwithstanding the foregoing acceptance of the proposed project design in respect to noise, the Siting Board also finds, as a precautionary measure, that if operation of the proposed facility results in actual increases of L_{90} noise of greater than eight dBA at any of the Residences,²² the following additional noise mitigation steps would then be implemented

²² The Siting Board notes that the Company intends to purchase and raze the residence nearest to the facility footprint ("nearest residence"). If the Company does not fulfill this intention, and if the nearest residence is occupied at the time of noise testing, it shall be included in the noise testing protocol. If off-site noise mitigation is
(continued...)

in order to minimize environmental impacts consistent with minimizing cost.¹ Specifically, DPA is directed to develop and implement a noise testing protocol covering a 12-month period beginning at commercial operation to determine, whether the actual L_{90} noise increase at the Residences is more than eight dBA above the L_{90} ambient level. Such protocol should be consistent with the type of protocol utilized for testing compliance with the MDEP Guideline, and should be conducted at four representative receptor points selected to indicate increased noise levels 50 feet from the various Residences in the direction of the proposed facility, or at the property lines of the various Residences nearest to the facility if such property lines are less than 50 feet from the respective Residences.

If such testing protocol demonstrates that operation of the facility is causing an actual L_{90} noise increase of greater than eight dBA at Residences in only one direction (*i.e.*, only the Residences to the north, south, or east), then DPA shall offer to undertake mutually agreeable structural or noise-masking mitigation measures at such Residences at a cost of up to \$20,000 per residence.² If such testing protocol demonstrates that the project is causing an actual L_{90} noise increase of greater than eight dBA at Residences in more than one direction (*i.e.*, to two or more of the north, south, or east), then DPA shall evaluate whether additional on-site noise mitigation measures at the facility (including the above-referenced

22(...continued)

implemented at some or all of the Residences, and if the nearest residence is still occupied at the time such mitigation is implemented, it shall be treated as one of the Residences for purposes of mitigation.

¹ Given the current status of acoustic science, it is to be expected that the actual noise impacts during operation could vary materially from the pre-construction design projections thereof (Exh. HO-E-1(C), App. M at 17), and it is thus reasonable to also consider the appropriateness of additional post-construction mitigation measures conditioned upon actual noise impacts at neighboring residences. Indeed, such an approach is consistent with the Siting Board's previously articulated policy objective of considering whether noise impacts will be "sufficiently small to avoid or minimize ... related complaints by residential or other abutters." NEA Decision, 16 DOMSC at 65.

² Such off-site mitigation could include measures such as improved windows, doors, insulation, or screening at the residences.

options of a noise-insulating shroud around the base of the stack and a sound wall along the northern side of the switchyard) at a cost of up to \$250,000 would reduce the L_{90} noise increase to a level no greater than eight dBA for the Residences in all affected directions. If such on-site measures would reduce the incremental L_{90} noise increase to the Residences in all affected directions, then DPA shall undertake such measures. If, however, such on-site mitigation measures would not reduce the L_{90} noise increase at the Residences to a level no greater than eight dBA in all affected directions, then DPA would have the option of (i) implementing such on-site mitigation or (ii) implementing mutually agreeable off-site mitigation measures at the affected Residences at a cost of up to \$20,000 per Residence, as discussed above. In light of the greater exposure of the Residences to the north (i.e., the Clark, Cartin, and Kennedy residences) as to both noise and visual impacts, however, the Siting Board further directs that, if DPA chooses in such case to implement the off-site noise mitigation at those residences, then the owners of the Cartin, Clark and Kennedy residences would have the option at any point between six and 18 months following commercial operation to require DPA to purchase the affected residence at today's fair market value, as determined by third-party appraisal. Such appraisals shall be conducted at DPA's expense within 90 days of the date of this decision. DPA is further directed to advise the Siting Board of the results of such testing and resulting mitigation efforts. Satisfaction of the foregoing conditions does not obviate the need to comply with the MDEP Guideline, and in particular DPA shall ensure that there will be no increases in nighttime L_{90} noise in violation of the MDEP Guideline as applied by MDEP, on any parcel where nighttime occupancy is present or reasonably likely, given existing zoning restrictions and physical limitations on the development of those parcels.

The Siting Board finds that, with the implementation of the above conditions and with the proposed mitigation set forth above, the environmental impacts of the proposed facility at the primary site would be minimized with respect to noise impacts consistent with minimizing cost. The Siting Board further finds that the primary site is preferable to the alternative site with respect to noise impacts.

e. Traffic

The Company maintains that the construction and operation of the proposed facility at the primary site will have a minimal impact on local traffic conditions, and that the record indicates that the scheduled routing of traffic will be planned to ensure minimal overlap with anticipated times and locations of non-project related traffic constraints (Exh. DPA-1(A) at 6-54). The Company's assertion was based upon an extensive traffic study of the affected local intersections, including the utilization of automatic traffic recorder counts and intersection turning movement counts, which indicated favorable existing conditions (*id.* at 6-56, 6-60). The Company's study further demonstrated that the potential impacts to traffic conditions from both construction and operation of the facility would have negligible impacts on traffic operations (*id.* at 6-76). DPA also indicated that the magnitude and scheduling of truck trips during the construction phase would be designed to minimize impact to the community, and that the design of the site driveway would incorporate measures intended to maximize safe access to and from the project site while maintaining safe operations on Somerset Avenue (*id.* at 6-70). Moreover, DPA's decision not to use oil as a backup fuel for the proposed facility will greatly reduce the truck traffic to the site (Exh. DPA-LF-1, at 2). Therefore, the Siting Board finds that the environmental impacts of the proposed facility at the primary site would be minimized with respect to traffic.

With respect to the alternative site, DPA conducted a comparable traffic impact study using similar methodologies (Exh. DPA-1(A) at 7-28, 7-29). As was the case for the primary site, the study indicated that construction and operation of the proposed facility at the alternative site would have a negligible impact on traffic operations in the affected area (*id.* at 7-47). However, the Company's analysis indicates that existing and projected traffic conditions are likely to be slightly more congested at the alternative site than at the primary site (*id.*). Therefore, the Siting Board finds the primary site is slightly preferable to the alternative site with respect to traffic impacts.

f. Safety

The Company asserted that the proposed facility would be designed, constructed and operated in a manner that ensures maximum safety for employees and the surrounding community and that all design, construction and operation activities would be in accordance

with GEP and regulatory codes (Exh. HO-E-1(A) at 2-29, 2-30).

With respect to use and on-site storage of aqueous ammonia and other chemicals, the Company stated that all such substances will be managed in accordance with applicable public and occupational safety and health standards, including strict compliance with delivery procedures applicable to aqueous ammonia delivery (*id.* at 2-29, App. I at § 3.0; Exh. HO-E-99; Tr. 3, at 102-104). The record demonstrates that the facility will be designed to prevent any spillage or release of aqueous ammonia from on-site storage facilities (Exh. HO-E-100). Aqueous ammonia will be stored in a coated steel storage tank with a liberal corrosion allowance to ensure tank integrity over the life of the facility and the tank will be tested to ensure absence of any leaks prior to filling (*id.*). The storage tank will be surrounded by a concrete dike, or catch basin, which will be designed to provide secondary containment for the entire tank contents (*id.*; Exh. HO-E-123). The dike will contain plastic baffles to significantly reduce the surface area of aqueous ammonia in the unlikely event of a release and will protect the tank from vehicle traffic (*id.*). The Company has committed to compliance with all coordination and communication requirements of local officials and to the preparation of a Spill Prevention, Control and Countermeasures Plan (Exhs. HO-E-1(C), App. J; HO-E-124). In addition, during the course of the proceedings, the Company agreed to develop a rapid response plan to be implemented in the case of an accidental release of aqueous ammonia (Tr. 3, at 102). The Company will also provide municipal safety officials and residents in the immediate vicinity of the facility with control room telephone numbers for direct access to the facility (Record Conference, April 10, 1997, Tr. at 18-19, 23-24).

The record shows that the aqueous ammonia and all other chemicals used and stored on site will be managed in accordance with all applicable public and occupational safety and health standards and that the Company will develop emergency procedures and response plans similar to those found acceptable in previous Siting Board reviews. Berkshire Power Decision, 4 DOMSB at 412-414, 416; 1993 BECo Decision, 1 DOMSB at 145. However, to ensure proper notification and coordination with local residents and institutions, the Siting Board directs the Company to consult school and municipal officials in developing all emergency procedures and response plans for the proposed facility. The Siting Board further directs the Company to consult school and municipal officials in developing measures to

prevent unauthorized persons from gaining access to the proposed facilities and site, particularly during construction. Accordingly, the Siting Board finds that, with the implementation of the aforementioned conditions and safety measures proposed by the Company, the environmental impacts of the proposed facility at the primary site would be minimized with respect to safety.

The record demonstrates that the aforementioned safety measures would also apply to the proposed facilities at the alternative site. Accordingly, the Siting Board finds that the primary site would be comparable to the alternative site with respect to safety.

g. Electric and Magnetic Fields

The Company provided both an interconnection study and a study of potential electric and magnetic fields ("EMF") impacts of the proposed facilities at the primary site (Exhs. HO-V-4; HO-E-1(C), App. P). The record shows that, at the primary site, the proposed facility would be interconnected to EUA transmission lines now traversing the site and that there would be some increase in magnetic field levels on the EUA lines to the south with operation of the proposed facilities at the primary site (Exh. HO-E-1(C), App. P at 1). However, even under a worst-case scenario, the EMF levels at the edge of the transmission right-of-way would be well below the 85 milligauss level previously accepted by the Siting Board and, in particular, EMF levels to the north of the site would be reduced due to the displacement of load flow under the current southerly load flow pattern (*id.*; Exh. HO-E-103; Tr. 8, at 5).

The record also shows that a substantial reduction of magnetic fields along the referenced transmission line corridor has already occurred due to EUA's recent rephasing of the U6 and V5 lines to reduce lightning strikes and outages (Exhs. HO-E-126; HO-RR-40; Tr. 8, at 19-21). The record further shows that a different rephasing of the U6 and V5 lines, while providing a small additional magnetic field reduction, would pose concerns because of the increased likelihood of lightning strikes and resulting outages (Exh. HO-E-126). Accordingly, the Siting Board finds that the environmental impacts of the proposed facility at the primary site would be minimized with respect to EMF.

The record shows the EMF levels related to power flows on the EUA lines would be

generally comparable with construction of the proposed facility at the alternative site versus the primary site. The record also shows that construction of the proposed facility at the alternative site would require a longer and largely off-site interconnect route, assuming a dedicated interconnect line to the EUA lines, with correspondingly greater areas of EMF impact (Exh. HO-E-127). However, DPA also indicated that, if the proposed facility were interconnected directly to Taunton Municipal Light Plant transmission lines passing along the western edge of the alternative site, which in turn connect to the EUA lines, the magnetic field impacts would be comparable to those at the primary site (Exhs. DPA-1(A) at 7-48; HO-E-128).

Accordingly, the Siting Board finds that the primary site is comparable to the alternative site with respect to EMF impacts.

h. Land Use

The record indicates that the primary site is zoned for industrial use and that the project is an allowed use under the zoning by-laws of Dighton (Exhs. DPA-1(A) at 6-32; HO-E-16 (att.)). The abutting uses are industrial to the east, agricultural to the north, and vacant and residential to the south and west (Exh. DPA-1(A) at 6-32). The area within a half mile radius of the primary site contains minimal industrial/commercial uses (2.5 percent and 1.25 percent, respectively) with open vacant land comprising the largest percentage of land use (Exh. HO-E-33). Further, with the exception of the site and the adjacent Advanced Loose Leaf parcel, there is no other industrially-zoned land within a half mile radius of the primary site (Exh. DPA-1(A) at Figure 6.5-2). The record indicates that the proposed power generation building and stack exceed the 65-foot limitation of the Dighton zoning by-laws, and the Siting Board notes that the proposed structures are considerably taller and of a different scale than the existing structures in the surrounding area (*id.* at 6-35). The record also indicates, however, that the Company's petition for a special permit to exceed the 65-foot height limitation has been granted unanimously by the Dighton ZBA and that the Company has received unanimous site plan approval from the Dighton Planning Board (Exhs. HO-E-36; HO-RR-10). Notably, in granting the special permit, the Dighton ZBA unanimously concluded that the project would be in harmony with the general purpose and

intent of the zoning by-laws and Dighton's intended uses of its industrially zoned property (Exh. HO-RR-10).²⁵

The Company indicated that it would complete a site examination survey of possible archeological attributes in an area near the proposed interconnect point, and would incorporate appropriate mitigation as part of proposed construction near this area, pursuant to the requirements of the Massachusetts Historical Commission (Exhs. HO-E-1(A) at 3-49 to 3-53; HO-E-1, App. D (supp.)). The Company also provided correspondence from the Massachusetts Department of Food and Agriculture and the Massachusetts Natural Heritage & Endangered Species Program, which indicates that the proposed facility would pose no concerns related to conversion of agricultural land or impacts on rare and endangered species (Exhs. HO-E-1(A), App. A; HO-E-1 (supp.), App. A, App. D).

The Siting Board has imposed conditions to limit visual and noise impacts of the proposed facility in Sections III.B.2.c and III.B.2.d above. The stated conditions address, to a substantial degree, the issue of consistency with land use objectives. Accordingly, the Siting Board finds that the environmental impacts of the proposed facility at the primary site would be minimized with respect to land use.

The record indicates that the alternative site is zoned for industrial use and that the facility is an allowed use under the zoning by-laws of the City of Taunton (Exhs. DPA-1(A) at 7-9; HO-E-17(att.)). The alternative site is part of a larger industrially zoned area, with a history of industrial use, including an abandoned power generating facility (Exh. DPA-1(A) at 7-10). The abutting uses are industrial to the north, south and east, and residential to the west (id.). However, the site is only eight acres in size, which is much smaller than the primary site, and the nearest residence is in very close proximity, approximately 300 feet, to the site (id. at 1-9; 7-10).

DPA has asserted that the land use impacts of the proposed facility at the primary and alternative sites are comparable. Unlike the primary site, the overall land use characteristic at the alternative site is overwhelmingly heavy industrial, such that additional industrial

²⁵ In addition, the Company submitted an executed Tax Increment Financing Agreement with Dighton (Exh. HO-V-27(b)).

development would be largely consistent with the present land use impacts. The Siting Board recognizes, however, that this advantage is tempered by the fact that the alternative site borders industrial land in only three directions, with residential land in the remaining direction -- a major disadvantage given that the site lacks on-site buffer. Nonetheless, in this instance the significant difference in overall land use character is the more compelling consideration with respect to land use impacts, and favors the alternative site. Accordingly, the Siting Board finds that the alternative site would be slightly preferable to the primary site with respect to land use.

3. Cost

In this Section, the Siting Board evaluates whether the Company has provided sufficient information on the cost of the proposed facility to allow the Siting Board to determine if an appropriate balance has been achieved between environmental impacts and cost. The Siting Board then compares the estimated costs of construction and operating the proposed facilities at the primary and alternative sites.

The Company provided a confidential construction cost estimate for the facility, both at the primary site and at the alternate site, which were based upon current, site-specific information regarding construction costs, electric and gas interconnect costs, contingency allowances, site costs, CO₂ offsets and various other project costs (Exhs. DPA-LF-11; DPA-LF-12). As discussed in Sections III.B.2.a, and III.B.2.d, above, DPA also identified the cost of several options to mitigate CO₂ emissions of the proposed project and to further reduce the noise impacts associated with operation of the proposed facility (Exhs. DPA-6; DPA-7; HO-E-53; HO-E-54 (supp. 2); HO-RR-31).

The record also contains estimates of the overall cost of the proposed facility at the primary and alternative sites, including components of capital and operational costs which are site-dependent, as well as cost information for measures to further minimize environmental impacts (Exhs. HO-C-2; HO-C-3; HO-C-5; HO-C-7). The Company's analysis shows a total capital cost advantage of approximately \$4,000,000 for the primary site over the alternative site (Exhs. DPA-LF-11; DPA-LF-12).

Accordingly, the Siting Board finds that the Company has provided sufficient

information on costs of the proposed facility to allow the Siting Board to determine which site is preferable with respect to cost and whether an appropriate balance would be achieved among environmental impacts and cost. The record demonstrates that the cost of constructing and operating the proposed facility at the primary site would be less than that of the alternative site. Accordingly, the Siting Board finds that the primary site is preferable to the alternative site with respect to cost.

4. Conclusions

In this section, the Siting Board reviews the consistency of the proposed facility with its overall review standard, which requires that the appropriate balance be achieved between environmental impacts and costs. Such balancing includes trade-offs among various environmental impacts as well as between these environmental impacts and costs.

a. Conclusion on the Proposed Facility at the Primary Site

The Siting Board has found that, with the implementation of the conditions specified in Section III.B.2 above, the environmental impacts of the proposed facility at the primary site would be minimized with respect to water-related impacts, visual impacts, traffic, safety, EMF, and land use. Further, in Section III.B.3, the Siting Board has found that DPA has provided sufficient information on the costs of the proposed facility to allow the Siting Board to determine whether an appropriate balance would be achieved between environmental impacts and cost.

As discussed in Sections III.B.2 and III.B.3, above, the Company has identified and considered the cost-effectiveness of various further measures for mitigation of the projected CO₂ emissions and estimated noise impacts of the proposed facility. In addition, as discussed in Section III.B.2.a, above, the Company considered the cost-effectiveness of increasing the facility's stack height and the relative trade-offs between air quality and increased visual impacts for that option.

The Siting Board finds that, with the implementation of proposed mitigation and conditions, the air quality impacts and the noise impacts of the proposed facility would be minimized, consistent with minimizing cost. Therefore, the Siting Board finds that, with the

implementation of the above conditions and with the conditions set forth in Sections III.B.2 above, the environmental impacts of the proposed facility at the primary site would be minimized consistent with minimizing cost.

b. Comparison of the Primary and Alternative Sites

In Section III.B.2 above, the Siting Board has found that:

- the primary site would be comparable to the alternative site with respect to air quality;
- the primary site would be preferable to the alternative site with respect to water-related impacts;
- the primary site would be preferable to the alternative site with respect to visual impacts;
- the primary site would be preferable to the alternative site with respect to noise;
- the primary site would be preferable to the alternative site with respect to traffic impacts;
- the primary site would be comparable to the alternative site with respect to safety;
- the primary site would be comparable to the alternative site with respect to EMF impacts; and
- the alternative site would be slightly preferable to the primary site with respect to land use.

Accordingly, on balance, the Siting Board finds that the environmental impacts of the proposed facility at the primary site are superior to those at the alternative site.

The Siting Board also has found, in Section III.B.3, above, that the primary site would be preferable to the alternative site with respect to cost. Accordingly, the Siting Board finds that the primary site is preferable to the alternative site with respect to minimizing environmental impacts consistent with minimizing 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-69Q to provide a necessary 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 the Siting Board to determine whether plans for expansion or construction of energy facilities are consistent with the 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 has found that the Company has established need for the proposed project. Further, in Sections II.B and II.C, above, the Siting Board has found that the proposed project is superior to all alternative technologies reviewed with respect to providing a necessary energy supply with a minimum impact on the environment at the lowest possible cost, and that DPA has established that its proposed project is reasonably likely to be a viable source of energy. In Sections III.A and III.B, above, the Siting Board has found that DPA has considered a reasonable range of practical facility siting alternatives, and that with implementation of the listed conditions relative to air quality, visual impacts and noise, the environmental impacts of the proposed facility at the primary site would be minimized consistent with minimizing cost. Finally, in Section III.B, above, the Siting Board has found that the construction and operation of the proposed facility at the primary site is preferable to construction and operation of the proposed facility at the alternative site.

Accordingly, the Siting Board finds that, upon compliance with the conditions set forth in Sections III.B, above, and listed below, the construction and operation of the proposed facility will provide a necessary energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost.

In Sections III.A and III.B, above, the Siting Board has reviewed various environmental impacts of the proposed facility in light of related regulatory or other programs of the Commonwealth, including programs relating to air quality, water supply, water-related discharges, wetlands protection, noise, rare and endangered species, agricultural land preservation, and historical preservation. As evidenced by the above discussions and analyses, the proposed facility will be generally consistent with identified

requirements under all such programs, although the facility as proposed by DPA would result in property line impacts in excess of the ten-dBA MDEP Guideline. However, the Siting Board agrees with the Company that, to the extent that there are limitations on residential development of the affected properties, and given the offsetting environmental and cost considerations discussed above, the Company has reasonably determined that further noise mitigation beyond that identified in this decision would not be warranted.

In its review and balancing of the overall environmental and cost considerations in Section III.B, above, the Siting Board has found that the environmental impacts of the proposed facility at the primary site would be minimized consistent with minimizing cost, with DPA's compliance with the conditions set forth in Section III.B relating to visual and noise impacts. The Siting Board therefore finds that the proposed project is likely to be consistent with various health, environmental protection and resource use and development policies of the Commonwealth which relate to the environmental impacts and cost of the Commonwealth's energy supply.

Accordingly, the Siting Board APPROVES the petition of Dighton Power Associates Limited Partnership to construct a 170 MW bulk generating facility and ancillary facilities in Dighton, Massachusetts subject to the following conditions during construction and operation of the proposed facility:

(A) In order to mitigate CO₂ emissions, the Siting Board requires DPA to provide CO₂ offsets through a donation of \$150,000, in 1999 dollars, to a cost-effective CO₂ offset program(s) to be selected in consultation with Siting Board Staff.

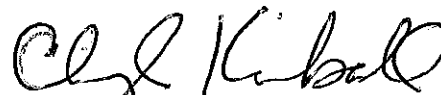
(B) In order to minimize visual impacts, the Siting Board directs the Company to develop and implement an off-site tree planting plan that includes, as agreeable to affected school officials and landowners, evergreen plantings of eight to ten feet in height spaced ten feet apart, or selectively placed trees of greater height, or other screening: (1) along the southern boundary of the Dighton school property beginning along the stone wall at the southeast corner of the Middle School extending easterly to the end of the school property; and (2) along the southern property line of the Cartin, Clarke and Kennedy properties consistent with the directives set forth in Section III.B.2.c, above. In addition, the Siting Board directs the Company to provide reasonable and mutually-agreeable off-site shrub and

tree plantings to help screen the proposed facility at locations other than those identified above that are within one mile of the proposed facility, where requested by property owners or appropriate municipal officials, consistent with the directives set forth in Section III.B.2.c, above.

(C) In order to minimize noise impacts consistent with minimizing cost, the Siting Board requires that, if the facility causes a L_{90} noise increase at the Residences of eight dBA or greater, DPA shall either (1) undertake additional on-site technical noise mitigation in amounts not exceeding \$250,000, (2) undertake mutually-agreeable off-site noise mitigation measures at the affected Residences not exceeding \$20,000 per residence, or (3) purchase the affected Residences to the north of the Site at today's fair market value consistent with the directives set forth in Section III.B.2.d, above.

Because issues addressed in this decision relative to this facility are subject to change over time, construction of the proposed generating facility and ancillary facilities must be commenced within three years of the date of this decision.

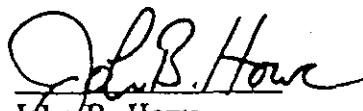
In addition, the Siting Board notes that the findings in this decision are based upon the record in this case. A project proponent has an absolute obligation to construct and operate its facility in conformance with all aspects of its proposal as presented to the Siting Board. Therefore, the Siting Board requires the Company to notify the Siting Board of changes other than minor variations to the proposal so that the Siting Board may decide whether to inquire further into a particular issue. The Company 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.



Cheryl Kimball
Hearing Officer

Dated this 8th day of July, 1997

Unanimously APPROVED by the Energy Facilities Siting Board at its meeting of July 8, 1997 by the members and designees present and voting. Voting for approval of the Tentative Decision as amended: John B. Howe (Chairman, EFSB/DPU); Janet Gail Besser, (Commissioner, DPU); Sonia Hamel (for Trudy Cox, Secretary, Executive Office of Environmental Affairs); David L. O'Connor (for David A. Tibbetts, Director, Department of Economic Development); and Joseph Faherty (Public Member).


John B. Howe
Chairman

Dated this 8th day of July, 1997

Table 1
RANGE OF REGIONAL NEED CASES (COMPANY ANALYSIS)

Summer
1999

| Demand Case | DSM | High Supply | Base Supply | Low Supply |
|-------------|------|-------------|-------------|------------|
| NEGC | High | (365) | (1,095) | (943) |
| NEGC | Base | (401) | (1,132) | (980) |
| NEGC | Low | (492) | (1,223) | (1,071) |
| 1996 CELT | High | (586) | (1,317) | (1,165) |
| 1996 CELT | Base | (623) | (1,354) | (1,202) |
| 1996 CELT | Low | (714) | (1,445) | (1,293) |

Winter
1998/1999

| Demand Case | DSM | High Supply | Base Supply | Low Supply |
|-------------|------|-------------|-------------|------------|
| NEGC | High | (2,510) | (3,249) | (3,094) |
| NEGC | Base | (2,545) | (3,284) | (3,129) |
| NEGC | Low | (2,629) | (3,368) | (3,213) |
| 1996 CELT | High | (216) | (955) | (800) |
| 1996 CELT | Base | (250) | (989) | (834) |
| 1996 CELT | Low | (334) | (1,073) | (918) |

Notes: The Company's base supply scenario is lower than the low supply scenario for the year 1996 due to the Company's assumptions regarding the Milstone replacements. In the base scenario, the Company included the retirement of Milstone 1 in 1997 and Milstone replacements totalling 160 MW for 1997 through 2011. In the low supply scenario, the Company included the retirement of Milstone 1 in 1997 and Milstone replacements totalling 312 MW for 1997 through 1999 and 160 MW for 2000 through 2011 (Exh. HO-RR-6).

Source: Exhs. HO-RR-6(c) to (h); HO-RR-37(a), (b).

Table 2
RANGE OF MASS NEED CASES (COMPANY ANALYSIS)

Summer
1999

| Demand Case | High Supply | Base Supply | Low Supply |
|-------------|-------------|-------------|------------|
| NEGC | (734) | (744) | (796) |
| 1996 CELT | (1,108) | (1,118) | (1,170) |

Winter
1998/1999

| Demand Case | High Supply | Base Supply | Low Supply |
|-------------|-------------|-------------|------------|
| NEGC | 121 | 111 | 58 |
| 1996 CELT | 900 | 889 | 837 |

1999/2000

| Demand Case | High Supply | Base Supply | Low Supply |
|-------------|-------------|-------------|------------|
| NEGC | (214) | (343) | (1,055) |
| 1996 CELT | 69 | (59) | (771) |

2000/2001

| Demand Case | High Supply | Base Supply | Low Supply |
|-------------|-------------|-------------|------------|
| NEGC | (280) | (440) | (1,282) |
| 1996 CELT | (110) | (271) | (1,113) |

2001/2002

| Demand Case | High Supply | Base Supply | Low Supply |
|-------------|-------------|-------------|------------|
| NEGC | (400) | (603) | (1,599) |
| 1996 CELT | (190) | (392) | (1,388) |

Notes: The Company did not include a high and low case DSM forecast in the Massachusetts need analysis.

Source: Exh. HO-RR-38(a),(b).

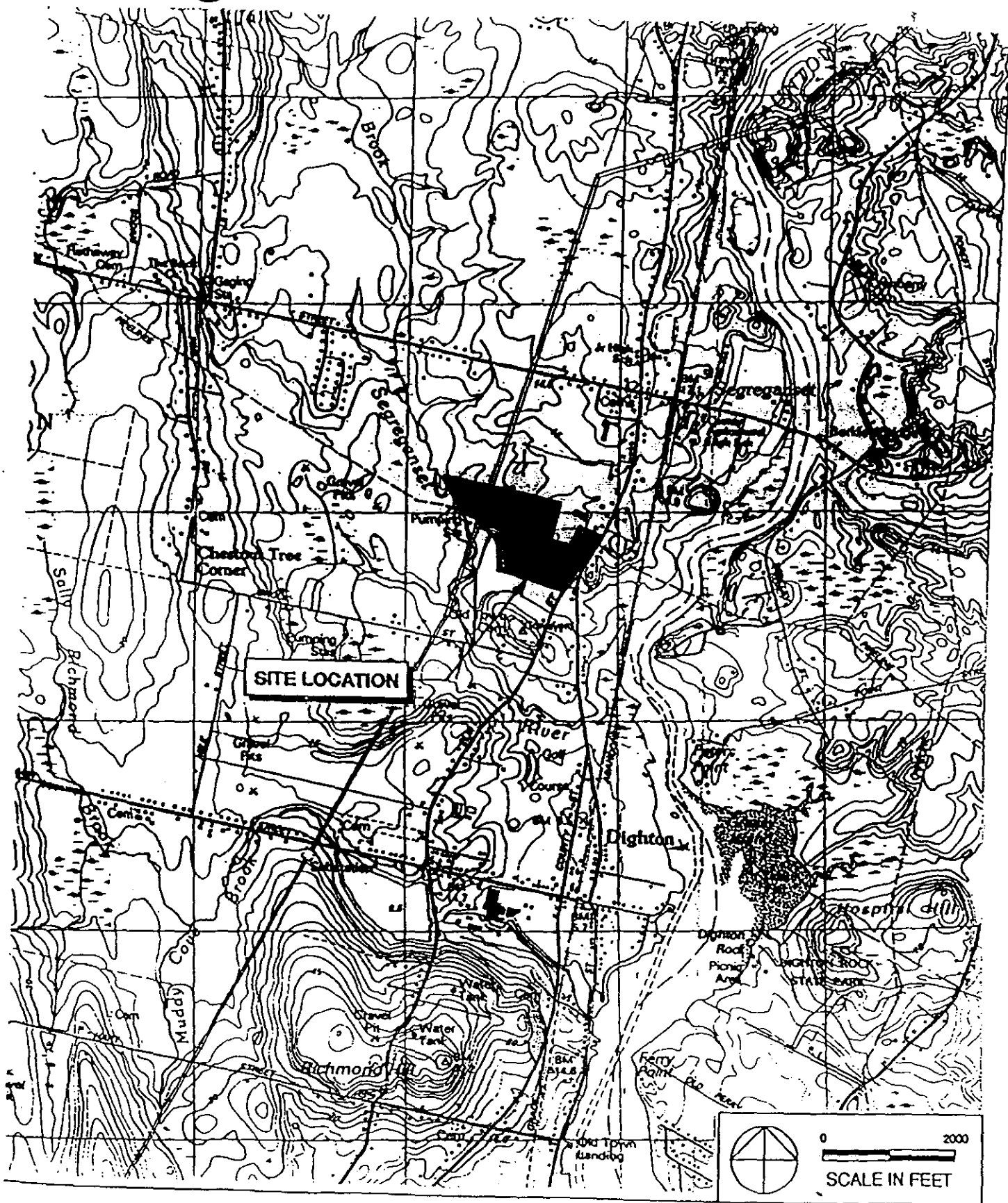
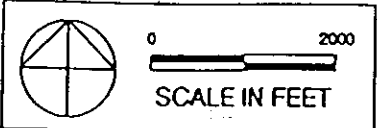


Figure 1.
Site Locus
Dighton Power Associates, Dighton Site



Dighton Power Associates, Taunton Site

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).

COMMONWEALTH OF MASSACHUSETTS
Energy Facilities Siting Board

In the Matter of the Petition of Commonwealth
Electric Company for Approval to Construct a
New, Underground 115 kV Transmission Line in
New Bedford, Massachusetts and
Acushnet, Massachusetts

EFSB 96-6

FINAL DECISION

Robert P. Rasmussen
Hearing Officer
September 16, 1997

On the Decision:
Peter Mills
William S. Febiger

APPEARANCES: James M. Avery, Esq.
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One Main Street - P.O. Box 9150
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FOR: Commonwealth Electric Company
Petitioner

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FIGURES:

FIGURE 1: PRIMARY AND ALTERNATIVE ROUTES

FIGURE 2: NOTICED ROUTE SEGMENTS

The Energy Facilities Siting Board hereby APPROVES the petition of Commonwealth Electric Company for approval to construct a new underground 115 kilovolt electric transmission line, using Commonwealth's proposed route in the City of New Bedford and the Town of Acushnet, Massachusetts.

I. INTRODUCTION

A. Summary of the Proposed Project

Commonwealth Electric Company ("Commonwealth" or "Company") is an investor-owned electric utility engaged in the generation, distribution and retail sale of electricity in forty communities in southeastern Massachusetts, including the City of New Bedford and the Town of Acushnet (Commonwealth Brief at 1). Commonwealth is a wholly-owned subsidiary of Commonwealth Energy System (*id.*).

Commonwealth has proposed to construct a new 115 kilovolt ("kV") underground transmission line, approximately 3.3 miles in length, that would extend from Commonwealth's Acushnet substation, located in Acushnet, Massachusetts, to its Pine Street substation, located in New Bedford, Massachusetts (Exh. C-1, at exhibit I-1). For its primary route, Commonwealth has proposed a transmission line that would exit the Acushnet substation, proceed westerly toward the Acushnet River, cross the Acushnet River into New Bedford, proceed to the intersection of Belleville Road and Belleville Avenue, and then follow city streets to the south and to the immediate west of the river, until reaching the Pine Street substation (*id.*) (see Figure 1). Commonwealth also identified a number of other route alternatives and route segments that could be employed in combination between the Acushnet substation and the Pine Street substation, as well as several points of interconnection between Commonwealth's primary route and the various noticed alternatives. A total of 20 specific route segments were identified in Commonwealth's petition (*id.* at V-5 to V-11, exhibit I-2) (see Figure 2).

In addition to the proposed 115 kV transmission line, Commonwealth has indicated that, depending upon the results of final engineering analyses, it also may install shunt reactors, circuit breakers, a 115 kV bus extension and related structures, relaying and control

equipment and switches at either the Acushnet substation or the Pine Street substation (Exh. HO-A-11) ("proposed project").

B. Procedural History

Commonwealth filed its petition for approval of the proposed project with the Energy Facilities Siting Board ("Siting Board") on October 31, 1996. The petition was docketed as EFSB 96-6. On January 8, 1997, the Siting Board conducted a public hearing on the petition in the City of New Bedford. In accordance with the direction of the Hearing Officer, Commonwealth provided notice of the public hearing and adjudication. No petitions to intervene or to participate as an interested person were submitted to the Siting Board.

The Siting Board conducted an adjudicatory hearing on April 14, 1997.

Commonwealth presented 6 witnesses: Harold W. Eklund, senior principal engineer of Commonwealth, who testified regarding the need for the project, the project alternative analysis and Commonwealth's route selection process; Keith L. Jones, a design engineer in Commonwealth's Transmission and Distribution Planning Group, who testified regarding the need for the project and the evaluation of project alternatives in terms of reliability and cost; Sara A. Brumbaugh, senior engineer-forecasting for Commonwealth, who testified regarding Commonwealth's long-range forecast and the continuing need for the project; Scott G. Hutchins, senior engineer and formerly Commonwealth's group leader of Demand Planning and Evaluation, who testified regarding Commonwealth's analysis of targeted demand-side management ("DSM") strategies that might be employed to address or defer the identified need for a new energy facility in the Pine Street Substation load center; Dennis M. Perry, an engineer in Commonwealth's System Engineering Department, who testified regarding the project alternative analysis, the route selection process and the cost comparison analysis of the various route segment alternatives analyzed by Commonwealth; and W. Stephen Collings, principal environmental engineer in Commonwealth's Environmental Programs Group, who testified regarding environmental aspects of Commonwealth's project alternative analysis and route selection process.

The Hearing Officer entered 81 exhibits into the record, consisting of

Commonwealth's responses to information and record requests. Commonwealth entered eight exhibits into the record. Commonwealth filed its brief on May 12, 1997.

C. Jurisdiction

Commonwealth's Petition is filed in accordance with G.L. c. 164, § 69H, which requires the Siting Board "to implement the energy policies ... to provide a necessary 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 electric companies to obtain Siting Board approval for construction of proposed "facilities" at a proposed site before a construction permit may be issued by another state agency.

Two definitions of "facility," both set forth in G.L. c. 164, § 69G, are relevant in determining which components of Commonwealth's proposed project are subject to Siting Board review and approval in this proceeding. Siting Board jurisdiction over Commonwealth's proposed transmission line is governed by the second definition of "facility" set forth in G.L. c. 164, § 69G. That section states, in part, that a facility is:

- (2) any new electric transmission line having a design rating of sixty-nine kilovolts or more and which is one mile or more in length except reconductoring or rebuilding of existing transmission lines at the same voltage.

The Company's proposal to construct a new 3.3 mile, 115 kV electric transmission line falls squarely within this definition. Accordingly, the Siting Board finds that the proposed transmission line is a jurisdictional facility within the meaning of G.L. c. 164, § 69G(2).

With respect to the shunt reactors, circuit breakers, 115 kV bus extension, relaying and control equipment and switches that may become components of the project, the third definition of facility set forth in G.L. c. 164, § 69G is the pertinent provision. This definition provides that a "facility" includes:

- (3) any ancillary structure including fuel storage facilities which is an integrated part of the operation of any electric generating unit or transmission line which is a facility.

The Siting Board has interpreted the term "ancillary structure" in its prior decisions, and has stated that such a structure is a "facility" within the meaning of G.L. c. 164, § 69G if

(1) the structure is subordinate or supplementary to a jurisdictional facility, and (2) the structure provides no benefit outside of its relationship to the jurisdictional facility. See New England Power Company, EFSB 95-2, at 5 (1996) ("1996 NEPCo Decision"); New England Power Company, 4 DOMSB 109, 117 (1995) ("1995 NEPCo Decision"); Commonwealth Electric Company, 17 DOMSC 249, 263 (1988) ("1988 ComElec Decision"). The reactors, circuit breakers, bus extension, relaying and control equipment and switches that may be installed at either the Acushnet Substation or the Pine Street Substation would be supplementary to the proposed transmission line, and would not provide a benefit outside of their relationship to it. Accordingly, the Siting Board finds that these project components constitute jurisdictional facilities within the meaning of G.L. c. 164, § 69G(3).

D. Scope of Review

In accordance with G.L. c. 164, § 69H, before approving an application to construct facilities, the Siting Board requires applicants to justify facility proposals 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 its project is superior to alternative approaches in terms of cost, environmental impact, reliability, and ability to address the previously identified need (see Section II.B, below). Finally, the Siting Board requires the applicant to show that its site selection process has not overlooked or eliminated clearly superior sites, 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.B and III.C, below).¹ Additionally, in the case of an electric

¹ When a facility proposal is submitted to the Siting Board, the petitioner is required to present: (1) its preferred facility site or route; and (2) at least one alternative facility site or route. These sites and routes often are described as the "noticed" alternatives because these are the only sites and routes described in the notice of adjudication published at the commencement of the Siting Board's review. In reaching a decision in a facility case, the Siting Board can approve a petitioner's preferred site or route, approve an alternative site or route, or reject all sites and routes. The Siting Board, however, may not approve any site, route, or portion of a route which was not included in the notice of adjudication published for purposes of the proceeding.

company which is required by G.L. c. 164, § 69I to file a long-range forecast with the Department of Public Utilities ("Department"), the applicant must show that the facility is consistent with the electric company's most recently approved long-range forecast. G.L. c. 164, § 69J. Commonwealth is an electric company required to make such a filing and to make such a showing.²

² The Department's most recent review of a long-range forecast for Commonwealth was in D.P.U. 95-95, in which, consistent with 220 C.M.R. §§ 10.00 et seq., the Department accepted the Company's forecast pursuant to a comprehensive Settlement Agreement. Cambridge Electric Light Company/Commonwealth Electric Company, D.P.U. 95-95 (Letter Order, December 15, 1995 at 2, 3).

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 to provide a necessary energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost. In carrying out this statutory mandate with respect to proposals to construct energy facilities in the Commonwealth, the Siting Board evaluates whether there is a need for additional energy resources³ to meet reliability, economic efficiency, or environmental objectives. The Siting Board must find that additional energy resources are needed as a prerequisite to approving proposed energy facilities.

2. Description of the Existing System

Commonwealth indicated that the Pine Street substation is currently served by two underground 115 kV transmission cables originating at the Acushnet substation (Exh. C-2, at 3). These cables are 250 kmil pipe-type transmission cables separated along their entire length by approximately 18 inches; Commonwealth refers to these cables as the #112 and #114 cables, and each is approximately four miles in length (Exh. C-1, at II-3). The cables exit the Acushnet substation running westerly and cross beneath the Acushnet River. The cables then proceed westerly on Belleville Road beneath City of New Bedford streets to the intersection of Ashley Boulevard, and then generally southerly continuing beneath the city streets including significant sections of Ashley Boulevard and County Street, and then generally easterly along Russell Street to the Pine Street substation (*id.*). Each of these cables has a rating of 60 megavolt amperes ("MVA"), providing a total of 120 MVA of

³ In this discussion, the term "additional energy resources" is used generically to encompass both energy and capacity additions, including, but not limited to, electric generating facilities, electric transmission lines, energy or capacity associated with power sales agreements, and energy or capacity associated with conservation and load management ("C&LM").

capacity at the Pine Street substation (id.). The #112 cable is high-pressure, nitrogen-filled, while the #114 cable is high-pressure, oil-filled. These cables are 48 and 46 years old, respectively (id.).

The Acushnet substation is served by two overhead 115 kV lines with nominal ratings of 386 MVA and 227 MVA, resulting in a normal supply capacity of 613 MVA and a firm capacity of 227 MVA (id. at II-3; Exhs. HO-N-1; HO-N-3). At the Acushnet substation, there are two bulk 115/13.2 kV transformers, each having a top nameplate rating of 62.5 MVA, providing a total of 125 MVA of capacity. The firm capacity of the Acushnet substation is therefore sufficient to serve the combined 1997 peak load of approximately 108.6 MW which consists of 73 MW at the Pine Street substation and 35.6 MW at the Acushnet substation (Exh. C-1, at II-3). The Acushnet substation serves twelve main 13.2 kV distribution feeder circuits, ten of which proceed beneath the Acushnet River to serve the north end of New Bedford. Of these ten circuits, five feeder circuits provide tie capability with the Pine Street substation, and can be used to transfer about 12.5 MW of load between these two substations (id.).

At the Pine Street substation there are three bulk 115/13.2 kV transformers, each having a 60 MVA top nameplate rating. The Pine Street substation serves thirty main underground 13.2 kV distribution feeder circuits. Five of these 13.2 kV circuits provide tie capability with the five Acushnet substation tie circuits previously mentioned.

Commonwealth also stated that the two overhead 115 kV line systems that serve the Acushnet substation area from the east, split to help form a multiple source of transmission supply that essentially surrounds the City of New Bedford on three sides. Commonwealth indicated that this design has provided the Company with the ability to transfer load to adjacent substations in the event of contingencies involving certain elements of the New Bedford district's bulk system.

Commonwealth indicated that it had maintained its existing limited capability to serve the Pine Street substation load area by "switching" certain of Commonwealth's 13.2 kV distribution circuits, so that a portion of the Pine Street load center could be served by other, adjacent bulk substations (id. at II-4 to II-6; Exh. C-2, at 4). Commonwealth indicated that

it has installed automated, remote-control switching on certain distribution "tie" circuits to decrease the amount of time necessary to effect switching between the Pine Street substation and the adjacent Acushnet substation, as well as between Commonwealth's Cross Road and Fisher Road substations, both of which are located in the Town of Dartmouth (Exh. C-1, at I-3, II-6).⁴ Commonwealth's seven tie circuits permit the transfer of approximately 20.1 megawatts of the forecasted 1997 summer peak load from the Pine Street substation (id. at II-6).

3. Reliability of Supply

Commonwealth asserted that the proposed facility is needed in order to provide a reliable supply of electricity to the Pine Street substation load area (id. at III-1 to III-2; Exh. C-2, at 5; Tr. at 47). In support of this assertion, Commonwealth identified its concerns with the existing 115 kV transmission system that serves its Pine Street substation which result in reduced system reliability. Commonwealth stated that the present demand at the Pine Street substation exceeds the capability of existing equipment in the event of a reasonably foreseeable, single contingency outage (Exh. C-1, at III-1). Commonwealth indicated that one of its primary measures of system reliability is its ability to respond to such an outage, i.e., where a single transmission element, bulk substation transformer, or autotransformer serving load in a particular area is forced out of service (id. at exhibit III-A).⁵

Commonwealth indicated that in the event of a single contingency outage during peak

⁴ Commonwealth stated that it had been able to defer the need for the proposed transmission line by automating the switching of its 13.2 kV tie circuits. Commonwealth asserted that this ability to transfer load, together with ongoing C&LM programs, enabled Commonwealth to defer the need for the proposed transmission line (Exhs. C-1, at I-3 - I-4; C-2, at 4, 9; C-3, at 7-8; Tr. at 23).

⁵ Commonwealth's reliability criteria further specify that system voltages, line loadings and equipment loadings shall be within normal limits for predisturbance conditions and within applicable "emergency" limits for a single contingency outage (Exh. C-1, at exhibit III-A).

conditions, the cable remaining in service would be exposed to potentially serious thermal overload until the 13.2 kV tie circuits linking Pine Street to surrounding substations could be transferred or switched to adjacent substations (id. at I-2; Exh. C-3, at 6). Commonwealth further explained that, due to the age of the existing underground cables serving the Pine Street substation load center, the Company typically would shed the Pine Street substation load in response to a single contingency outage during peak conditions so as to avoid a thermal overload and potential damage to the second or remaining cable. Commonwealth stated that at present, in the event of a single contingency involving one of the 115 kV lines serving the Pine Street substation, existing 13.2 kV distribution tie lines would be switched by the system operator and field crews so that a portion of the Pine Street load could be served by adjacent substations. The Company estimated that such switching would require two to four hours, during which time the Pine Street substation load center would be without service (Exhs. C-1, at III-4; C-3, at 6).

In this section, the Siting Board first examines the reasonableness of Commonwealth's system reliability criteria. The Siting Board then evaluates: (1) whether Commonwealth uses reviewable and appropriate methods for assessing system reliability based on load flow analyses; (2) whether existing and projected loads under certain contingencies exceed Commonwealth's reliability criteria, thereby requiring additional energy resources; and (3) whether acceleration of C&LM programs could eliminate the need for such additional energy resources.

a. Reliability Criteria

Commonwealth described several service reliability and system design criteria applicable to the existing transmission facilities that serve the Pine Street substation load center. In defining its reliability criteria, Commonwealth provided an excerpt of its Reliability Criteria for the Design of Transmission Lines and Bulk Power Substations (Exh. C-1, at exhibit III-A). First, Commonwealth's reliability standard requires that its transmission system be designed with sufficient capacity to serve area loads under certain reasonably foreseeable outage conditions, including the forced outage of certain transmission

circuits, transformers, or generators (id.; Exh. C-3, at 5). Commonwealth indicated that its design standard requires that its contingency studies assume power flow conditions that "reasonably" stress the system and that voltages, line loadings and equipment loadings should be within normal limits for "pre-disturbance" conditions, and within applicable emergency limits for the system conditions that exist following the established contingency (Exh. C-1, at exhibit III-A).

Commonwealth indicated that its reliability criteria had been developed in accordance with New England Power Pool and Northeast Power Coordinating Council reliability criteria to ensure that the reliability and efficiency of Commonwealth's bulk transmission facilities remain within acceptable guidelines (id. at III-1; Exh. C-3, at 4-5).

The Siting Board has consistently found that if the loss of any single major component of a supply system would cause significant customer outages, unacceptable voltage levels, or thermal overload on system components, then there is justification for additional energy resources to maintain system reliability. Norwood Municipal Light Department, EFSB 96-2, at 11 (1997) ("Norwood Decision"); 1996 NEPCo Decision, EFSB 95-2, at 10; Holyoke Gas & Electric Department, 3 DOMSC 1, 7 (1978). Consequently, the Siting Board finds that Commonwealth's reliability criteria regarding firm service in the event of a single contingency outage is reasonable.

In addition to the Company's single contingency criterion, Commonwealth introduced two additional factors for consideration in its assessment of need for new facilities, and discussed their relationship to overall system reliability. First, Commonwealth suggested that it is appropriate to consider the addition of new energy resources if emergency plans developed to address a reasonably conceivable double contingency would require extensive or substantial efforts, or necessitate undue or extended customer outages (Exh. C-1, at I-3, n.2, III-4). Second, Commonwealth suggested that the need for new energy facilities could be further established if such new facilities would support or enhance the ability of the Company to address future planned construction (id. at III-2).

With respect to Commonwealth's criteria regarding the potential for a double contingency involving both the #112 and #114 underground cables, the Siting Board has

noted that concern about such a loss is warranted if the need for a two line supply is clear, e.g., if the two lines provide needed firm capability or if the combined capacity of the lines is needed to meet peak load under normal operations. 1995 NEPCo Decision, 4 DOMSB at 124. The Siting Board has also found that it may be appropriate to consider this factor in conjunction with other reliability criteria that relate to the need for two lines. Id. Commonwealth's reliability criteria do not explicitly require that its bulk supply system maintain firm supply in the event of a double contingency outage, but do analyze its ability to restore service in the event of a reasonably conceivable double contingency outage. The Siting Board therefore finds that Commonwealth's analysis of a double contingency in this case is reasonable, but is not required based on its reliability criteria. Therefore, Commonwealth's double contingency criterion will not be explicitly considered in the Siting Board's determination of need for new energy facilities.

Upon reviewing Commonwealth's contention that requirements relating to future system expansion should be considered as a determinant in showing need for additional energy facilities, the Siting Board agrees that future expansion plans may be an appropriate reliability consideration in weighing alternatives for meeting the identified need. However, as Commonwealth has stated that it has no near term plans to reconductor either of the existing #112 or #114 lines, this factor will not be considered as a determinant in showing need for new energy facilities.⁶ Instead, the Siting Board will consider the extent to which the proposed project would facilitate future construction or upgrades of related system components as part of its review of the reliability of alternative approaches to meeting the identified need (see Section II.B.4, below).

Accordingly, the Siting Board finds that Commonwealth's single contingency reliability criterion is reasonable for purposes of determining need in this review. The Siting Board also finds that Commonwealth's double contingency and future construction criteria are reasonable in this case for purposes of comparing the reliability of the proposed project

⁶ Commonwealth indicated that for planning study purposes, it has identified years 2016 and 2017 as the likely date for reconductoring operations involving these lines (Exh. HO-A-5).

to alternative project approaches.

b. Load Forecast

i. Description

In connection with its analysis of the need for the proposed facility, Commonwealth presented its most recent load forecast for the Pine Street substation load center (Exh. C-1, App. A).

Commonwealth indicated that the Pine Street substation load center forecast was constructed using a "top down" approach, based on Commonwealth's most recent long-range forecast, which was reviewed and accepted by the Department in D.P.U. 95-95 (Exh. C-4, at 4). Commonwealth noted that this forecast reflected Commonwealth's total coincident peak load, *i.e.*, the coincidence of peak load in each of Commonwealth's three districts: Cape Cod; New Bedford; and Plymouth (*id.* at 5). Commonwealth then developed specific projections of each district's peak load, non-coincident with Commonwealth's total or system peak. These non-coincident peaks ("NCP") reflect the maximum demand that is expected to be placed on each district within the summer season (*id.*). Commonwealth explained that its allocation of its system-wide forecast to its three districts included analysis of the weather responsiveness of each district, and each district's sensitivity to economic conditions and seasonal load patterns (Exh. C-1, App. A, at 4). Commonwealth then developed allocated load forecasts for each substation within a district based upon the expected timing of that particular district's NCP. The Company stated that these forecasts are developed annually for 41 substations in each of Commonwealth's three districts (*id.* App. A, at 1).

Commonwealth indicated that it developed its Pine Street substation forecast in the context of its annual review using a six-step econometric modelling process. First, Commonwealth ascertained the continuing validity of its D.P.U. 95-95 forecast, by weather-normalizing the actual 1995 summer peak and observing that it was nearly identical to the forecasted 1995 summer peak (*id.* at App. A at 2-3, 6-8; Exh. C-4, at 5). Second, Commonwealth weather-normalized the actual individual district NCP loads using techniques similar to those applied to Commonwealth's system forecast (Exh. C-4, at 5; Exh. C-1, App.

A at 8). Through this process, Commonwealth established the particular patterns that, in isolation or in combination, drove Commonwealth's total load (Exh. C-4, at 7-8). Third, in order to account for forecast diversity between the weather-normalized system and district peak loads, normal peaking conditions were identified for each district, thus enabling the coincident peak forecast for the Commonwealth system as a whole to be transformed into the individual district NCP's (id. at 8-9; Exh. C-1, at App. A at 12-15). Fourth, loads for each substation in each district were modelled statistically, based on the pertinent district load, and on factors such as temperature, humidity, the day of the week, and the level of economic activity in the area as reflected, for example, by the level of manufacturing employment (Exhs. C-4, at 10; C-1, App. A at 15-16). Fifth, Commonwealth identified and reflected expected step loads, or incremental load increases of 0.5 MW or more, based upon an analysis of district-specific information.⁷ Step loads were then reduced by a factor of 0.6 to reflect the possibility that such loads might not completely materialize (Exhs. C-1, App. A at 17; C-4, at 11). Sixth, an "extreme weather" case was formulated in order to further test the reliability of Commonwealth's transmission system under "reasonably expected extreme weather." Commonwealth indicated that its extreme weather case assumed a one-in-five year probability of extreme conditions, based upon examination of the previous twenty-two years of available weather data (Exhs. C-1, App. A at 17-18; C-4, at 6, 11-12).

Commonwealth stated that its forecasted weather-normalized peak load at the Pine Street substation is expected to grow from 66 MW in 1995 to 75 MW in the year 2015, reflecting a compound annual growth rate ("CAGR") of 0.6% (Exh. C-4, at 13). In the extreme weather case, Pine Street substation load is expected to grow from 72 MW in 1995 to 81 MW in 2015, a CAGR of 0.6% (id. at 15).

⁷ In the case of the Pine Street load center, two expected step loads were identified and introduced into the model: 1.5 MW in year 1996 corresponding to the New Bedford wastewater treatment plant; and 0.66 MW in year 1997 corresponding to additional load for the wastewater treatment plant.

ii. Analysis

In support of its petition, Commonwealth has submitted a detailed substation level forecast which was derived from its system-wide forecast submitted in D.P.U. 95-95 and accepted by the Department pursuant to an approved settlement agreement. Commonwealth validated its D.P.U. 95-95 forecast with actual data, and Commonwealth's analysis demonstrated that the D.P.U. 95-95 forecast continues to be appropriate for planning purposes. In addition, Commonwealth analyzed its district and substation forecast to ascertain the consistency of these disaggregated forecasts with the system-wide forecast prepared and submitted in D.P.U. 95-95.

In forecasting load for the Pine Street substation, Commonwealth prepared a New Bedford district forecast and then derived the Pine Street substation forecast from the district forecast. In presenting its New Bedford district forecast, the Company adequately explained its derivation of historic trends in order to prorate its system-wide forecast into separate district forecasts. Commonwealth also has provided reasonable explanations of its estimation of load growth at the substation level, based upon both Commonwealth's forecasts of system and district load, as well as historical measurements of increasing substation load.

In previous transmission line reviews, the Siting Board has stated that, in facility reviews where a company projects load growth for a portion of its service territory, the Siting Board will require such company to use quantitative techniques, where sufficient data is available, or other systematic techniques, and to document all pertinent assumptions to support the allocation of system-wide growth to service areas and to individual substations within the service areas. 1995 NEPCo Decision, 4 DOMSB at 127; New England Power Company, 21 DOMSC 325, 344 (1991) ("1991 NEPCo Decision").

Here, the Siting Board finds that Commonwealth has relied on quantitative techniques with adjustments for forecasting load at the district level, and has provided a reasonable explanation for its estimation of load at the substation level, based on the district forecast. Accordingly, for purposes of this review, the Siting Board finds that Commonwealth's substation forecast is reasonable and acceptable.

c. Contingency Analysis

In this section, the Siting Board considers whether there is a need for additional energy resources based upon Commonwealth's reliability criteria.

Commonwealth stated that electrical facilities currently serving the Pine Street substation could not be operated at or above emergency capacity ratings in the event of a single contingency outage during peak periods (Exh. C-1, at III-4, exhibit III-B). In support of its assertion, Commonwealth provided the normal and emergency ratings of the existing #112 and #114 underground cables that serve the Pine Street substation load, which it indicated were based on manufacturers specifications and recommendations based on the manufacturers' industry experience, and on the age of these facilities (*id.* at II-3, n.1).⁸ Commonwealth stated that the established emergency rating for each of these cables is 60 MVA (*id.* at II-3; Tr. at 31). The Company thus established a load threshold of 60 MW, above which, Pine Street substation load would be at risk under a single contingency.

Commonwealth next provided load flow analyses showing power flows and voltage conditions on the facilities that currently serve the Pine Street substation (Exh. C-1, at exhibit III-B).⁹ Commonwealth's load flow analyses, based on a forecasted year 2000 summer peak load under extreme weather conditions of 74.5 MVA, indicated that in the event of a loss of one of the existing #112 or #114 underground cables that now run between the Acushnet substation and the Pine Street substation, the remaining line would be subject to a 25 percent overload prior to the switching of maximum transferable load to other adjacent

⁸ Commonwealth argued that any period of exposure of the existing #112 and #114 lines to load levels exceeding emergency ratings would not be prudent given the age of these cables and the prospect that subjecting either of these cables to overload conditions could lead to serious, permanent damage (Exh. C-1, at III-4 and III-8).

⁹ Commonwealth employed the Power System Simulator for Engineering ("PSS/E") model, an industry standard program to produce load flow analyses (Exh. C-3, at 5). Commonwealth explained that the PSS/E model used computerized mathematical models of Commonwealth's power system in order to quantify voltages and power flows under normal, peak, and contingency conditions (Exh. C-1, at III-3). Commonwealth applied the model to forecasted extreme weather peak load to analyze the adequacy of its system under normal and contingency conditions (*id.*).

substations (id. at III-4). Commonwealth stated that this condition constitutes a violation of the Company's single contingency reliability criterion (id. at III-4 and exhibit III-A). Additionally, Commonwealth indicated that by 2015 under extreme weather, a comparably timed contingency would result in an overload of the remaining cable by approximately 37 percent above that cable's 60 MVA emergency rating (id. at III-4).

Commonwealth stated that in order to restore reliability to the system under a single contingency outage of either the #112 or #114 line, it currently has to shift load to several 13.2 kV distribution level circuits which provide tie capability between the Pine Street substation and adjacent substations within Commonwealth's New Bedford district (id. at III-8) (see Section II.A.2, above). The Company argued that its reliance on distribution based capacity transfer capability is problematic for several reasons: (1) the transfer of load requires time for the Company's Supervisory Control and Data Acquisition ("SCADA") operators and line crews to complete; (2) physical interconnection of adjacent substations provides no guarantee that the requisite capacity will be available for load transfer purposes; and (3) transfer capacity will diminish as native load increases at those adjacent substations having distribution level interconnection with the Pine Street substation (id. at III-4).

Taking these considerations into account, Commonwealth explained that while 13.2 kV distribution level switching theoretically gives Commonwealth the ability to maintain loading on a single remaining line to within its rated capacity, the Pine Street substation load must be shed during the time that such switching is being pursued in order to avoid thermal overload of the remaining cable. Commonwealth stated that this necessary interruption of Pine Street substation service is in violation of the Company's single contingency reliability criterion (Exh. C-3, at 6).

Commonwealth also explained that its ability to transfer Pine Street substation load to other substations in the event of a single contingency involving one of the existing lines was becoming further constrained by load growth within the district as a whole, and that the number of hours and amount of load being placed at risk in the event of a single contingency would therefore increase during the period examined in the Company's load forecast (Exh. C-1, at III-4).

The Siting Board finds that Commonwealth used reviewable and appropriate methods for assessing the reliability of supply based on actual load measurements and load flow analyses. The Siting Board accepts the Company's analysis which indicates that 60 MW is the threshold of risk that applies to its existing facilities. The record indicates that in 1995, weather-normalized peak load at the Pine Street substation exceeded firm capacity by 6 MW, and that by 2015, peak load would exceed firm capacity by 15 MW. Under extreme weather assumptions, Pine Street substation load in 1995 exceeded firm capacity at the Pine Street substation by 12 MW, and would grow to exceed firm capacity by 21 MW in 2015. The Siting Board therefore finds that (1) Commonwealth's measurements and load flow analyses demonstrate that under a single contingency at both current and forecasted peak load conditions, transmission facilities supplying the Pine Street substation would be loaded above emergency capabilities in contravention of Commonwealth's reliability criteria, and (2) the ability of the current system to address a single contingency by effecting automated and manual switching of 13.2 kV distribution level circuits is not sufficient to maintain system reliability consistent with Commonwealth's stated reliability criteria. Consequently, the Siting Board finds that the current configuration of supply to the Pine Street substation does not meet Commonwealth's reliability criteria in the event of the single contingency loss of either the #112 or the #114 transmission cable.

Accordingly, the Siting Board finds that there is a need for additional energy resources based on Commonwealth's reliability criteria.

d. Accelerated Conservation and Load Management

G.L. c. 164, § 69J requires a petitioner to include a description of actions planned to be taken to meet future needs and requirements, including the possibility of reducing requirements through load management. Commonwealth asserted that, given the amount of load reduction necessary, accelerated C&LM¹⁰ efforts within the Pine Street substation load

¹⁰ Load management is a measure or action designed to modify the time pattern of customer electricity requirements, for the purpose of improving the efficiency of an
(continued...)

center would not address the identified need for additional energy resources (Exhs. C-1, at IV-14 to IV-15; C-5, at 9; Tr. at 174-175). The Company stated that it had been able to defer the construction of the proposed transmission line, in part, due to the implementation of its "Green Saver" programs and other DSM initiatives within the New Bedford load area. Commonwealth argued that such activities, in conjunction with the installation of additional distribution switching equipment, secured benefits for its customers, but that such actions could no longer be prudently implemented to further defer the construction of a new energy resource (Exh. C-2, at 9).

In support of its assertion, the Company provided a study, performed in conjunction with its consultant, XENERGY, Inc., of opportunities to address or defer the need for additional energy resources to serve the Pine Street substation area. The study considered whether a combination of targeted strategies including DSM, energy efficiency and load management, distributed generation ("DG"), and interruptible rates would be capable of supplying approximately 14 MW of load reduction in the area served by the Pine Street substation (Exh. C-1, App. B at 1).¹¹ As a result of this study, Commonwealth concluded that even extraordinary levels of achievement in these areas could only defer, and not avoid,

¹⁰(...continued)

electric company's operating system. 220 C.M.R. § 10.02. For example, a utility may reach an agreement with a manufacturer that uses electricity whereby that manufacturer will curtail its use during peak times when the utility's system, as a whole, is facing increased demand for electricity for cooling or heating purposes. During non-peak times the manufacturer may then resume its use of electricity. The utility providing electricity has, therefore, managed its load, thereby decreasing its need for additional peak capacity. Conservation, on the other hand, is a technology, measure, or action designed to decrease the kilowatt or kilowatt hour requirements of a particular electric end-use, thereby reducing the overall need for electricity (*id.*). Both conservation and load management are DSM measures.

¹¹ Commonwealth indicated that this figure was based upon forecasts of 1998 peak requirements at the Pine Street substation, which are expected to reach 73.6 MW under extreme weather, or approximately 14 MW over the 60 MW emergency threshold identified in Section II.A.3.c, above (Exh. C-1, App. A at 65, App. B at 15).

the need for a new energy resource to serve the Pine Street substation load area as Pine Street substation load is projected to reach 67.9 MW under base weather, and 73.6 MW under extreme weather, by 1998 (id. at III-6, n.4, App. A at 62, 65).

In performing its study, the Company conducted an analysis of Company data relating to technical potential, baseline energy and demand, and end-use measure impacts (id. at III-6). Commonwealth's staff also analyzed the particular characteristics of customers and customer classes within the Pine Street substation load center to determine whether any area-specific adjustments were required with respect to forecasting data and assumptions. The Company stated that Commonwealth's staff performed field investigations which served to further refine the Company's characterization of the Pine Street substation load area (id.). Commonwealth then developed particular demand and load characteristics for the Pine Street substation load center, disaggregated by customer class (id.). Customer class requirements were then analyzed and particular usage patterns for each class were developed (id.).

Next, Commonwealth examined a load duration curve for the Pine Street substation to determine the actual requirements for DSM applications in terms of both time and duration of use. Commonwealth then applied mathematical models commonly in use within the industry to assess potential DSM, and to rank DSM technologies by market segment (id.; see also Exh. C-1, App. B at 15). This resulted in the determination of the load center's technical potential by end-use in terms of energy and demand during the periods of peak load (id. at III-6, App. B at 16). The study identified 17.1 MW of Pine Street substation load that would be technically amenable to accelerated DSM initiatives. Commonwealth asserted that the level of technical potential identified by the study would be overstated to the extent that the analysis did not account for customers that have already participated in one or more of Commonwealth's established DSM programs, or customers who have already expressed a reluctance to accept interruptible service (id. at III-6 to III-7).¹² With respect to applications for DG, the Company stated that the study assumed two potential applications for a total of

¹² The Company indicated that 14 percent of the Pine Street substation load center's customer base has participated in ongoing Commonwealth DSM programs (Exh. C-1, at III-6).

4 MW of DG (fuel cells), but projected a cost of \$500 to \$4000 per kilowatt for such resources, leading the Company to conclude that DG would be uneconomical, and that it should therefore be rejected (*id.* at IV-15, and App. B at 4, 26). The Company also expressed concerns as to the reliability of this emerging technology as further grounds for the rejection of DG (*id.*).

Commonwealth next determined "economic potential" and "market or achievable potential," the level of DSM considered to be available and economically feasible in the Pine Street substation load area (Exh. C-5, at 7). The Company stated that, even using extremely optimistic assumptions,¹³ only 10.3 MW of DSM could be achieved by 1998 (Exh. C-1, at III-7). Commonwealth's load forecast for the Pine Street substation indicates that under the base weather case, 1998 peak load (adjusted for DSM) would be 67.9 MW and that extreme weather 1998 peak load would be 73.6 MW (Exh. C-1, App. A, at 62-65, App. B at 15). The Company identified a need threshold of 60 MW in relation to the Pine Street substation load area (see Section II.A.3.c, above). Consequently, based on its study and analysis, Commonwealth concluded that the application of accelerated and targeted DSM resources would not be sufficient to enable Commonwealth to avoid the need for a new energy facility (Exh. C-5, at 7).

Commonwealth has undertaken an extensive and comprehensive effort to determine the ability of a targeted load reduction program, including distributed generation, to meet the identified need by 1998. The Siting Board notes that Commonwealth would have to rely on the successful implementation of a highly aggressive targeted load reduction program in order to meet the identified need by 1998 under the base weather case. The Siting Board recognizes that achievement of 10.3 MW of load reduction would represent a reduction by approximately one-seventh of total load at the Pine Street substation, and agrees with Commonwealth's assessment that meeting this goal by 1998 likely is unrealistic given the aggressive assumptions included the Company's study, and the short time period available for

¹³ Commonwealth's assumptions included, for example, that all residential refrigerators within the City of New Bedford would be replaced with energy efficient refrigerators within a three year period (Tr. at 185-186).

implementation of such initiatives. Moreover, the record indicates that the Company would be unable to meet the identified need under extreme weather, even if the entire 10.3 MW of load reduction were to be achieved by 1998. In sum, the Company has reasonably demonstrated the likely inability of the Pine Street load area to achieve the magnitude of load reduction necessary to offset the present potential for thermal overload of existing transmission facilities.

Accordingly, the Siting Board finds that acceleration of C&LM programs, even when combined with other load reduction techniques, would not meet the identified need for additional energy resources based on Commonwealth's reliability criteria.

e. Conclusions on Reliability of Supply

The Siting Board has found that: Commonwealth's single contingency reliability criterion is reasonable for purposes of determining need in this review, and further that Commonwealth's double contingency and future construction criteria are reasonable in this case for purposes of comparing the reliability of the proposed project to alternative project approaches; Commonwealth has relied on quantitative techniques with adjustments for forecasting load at the district level, and has provided a reasonable explanation for its estimation of load at the substation level, based on the district forecast; and for purposes of this review, Commonwealth's substation forecast is reasonable and acceptable. In addition, the Siting Board has found that Commonwealth used reviewable and appropriate methods for assessing the reliability of supply based on actual load measurements and load flow analyses. The Siting Board has also found that: Commonwealth's measurements and load flow analyses demonstrate that under a single contingency at both current and forecasted peak load conditions, transmission facilities supplying the Pine Street substation would be loaded above emergency capabilities in contravention of Commonwealth's reliability criteria; the ability of the current system to address a single contingency by effecting automated and manual switching of 13.2 kV distribution level circuits is not sufficient to maintain system reliability consistent with Commonwealth's stated reliability criteria; and consequently the current configuration of supply to the Pine Street substation does not meet Commonwealth's

reliability criteria in the event of the single contingency loss of either the #112 or the #114 transmission cable. Accordingly, the Siting Board has found that there is a need for additional energy resources based on Commonwealth's reliability criteria. Finally, the Siting Board has found that acceleration of C&LM programs, even when combined with other load reduction techniques, would not meet the identified need for additional energy resources based on Commonwealth's reliability criteria.

Based on the foregoing, the Siting Board finds that Commonwealth has demonstrated that the existing supply system is inadequate to serve the Pine Street substation load center. Accordingly, the Siting Board finds that additional energy resources are needed for reliability purposes in the area served by the Pine Street substation.

B. Comparison of the 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 necessary energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost. In addition, G.L. c. 164, § 69J requires a project proponent to present "alternatives to planned action" which may include: (a) other methods of generating, manufacturing, or storing; (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 a petitioner to show that, on balance, its proposed project is superior to alternative approaches in terms of cost, environmental impact, and ability to meet the previously identified need. Norwood Decision, EFSB 96-2, at 20; 1996 NEPCo Decision, EFSB 95-2 at 18; Boston Edison Company, 13 DOMSC 63, 67-68, 73-74 (1985).

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.

¹⁴ G.L. c. 164, § 69J also requires a petitioner to provide a description of "other site locations." The Siting Board reviews Commonwealth's proposed route, as well as other routing alternatives, in Section III.B, below.

Norwood Decision, EFSB 96-2, at 21; 1996 NEPCo Decision, EFSB 95-2, at 19; Massachusetts Electric Company, 18 DOMSC 383, 404-405 (1989).

2. Project Approaches

In its initial filing, Commonwealth identified sixteen potential approaches to meeting the identified need: (i) the proposed project -- the construction of a new, underground, 115 kV transmission line between the Acushnet substation and the Pine Street substation, routed generally through the streets of the City of New Bedford (Exh. C-1, at exhibit I-1); (ii) an alternative involving the reconductoring of the existing #112 and #114 lines serving the Pine Street substation ("project alternative 2"); (iii) nine project alternatives involving the construction of additional transmission facilities that would provide another source of supply to the Pine Street substation from Commonwealth's bulk power system (project alternatives 3 through 11); (iv) three project alternatives involving the construction of additional distribution and substation facilities (project alternatives 12, 13 and 14); (v) a project alternative involving the repowering or resiting of Commonwealth's Cannon Street generating station, which is located adjacent to the Pine Street substation ("project alternative 15" or "generation alternative"); and (vi) an alternative involving a combination of DSM and DG resources (id. at exhibit IV-B, and App. B). Commonwealth maintained that it was necessary to identify and evaluate a comprehensive list of project alternatives so as to ensure "that no practical economic alternative to serve the identified need was omitted" (id. at IV-1). The Siting Board's examination of project approaches will include an analysis of the proposed project and each of the identified alternative project approaches.¹⁵

¹⁵ G.L. c. 164, §69J requires Commonwealth to consider the alternative of "no additional electrical power." Commonwealth indicated that project alternative 2 was akin to a no-build alternative, but stated that this alternative would seriously compromise system reliability during the reconductoring period (Exhs. C-1, at IV-3 to IV-4; C-3, at 5 to 6). The Siting Board considers project alternative 2 in Section II.B.3.b, below.

3. Ability to Meet the Identified Need

In its analysis of the ability of each of the sixteen project approaches to meet the identified need, the Siting Board evaluates whether each approach would provide a reliable supply to the Pine Street substation load center consistent with the Company's reliability criteria relating to unplanned single contingencies.

a. Proposed Project

Commonwealth asserted that the proposed facilities would fully address the identified need (id. at IV-3). In support thereof, Commonwealth provided load flow analyses showing equipment loadings under a contingency involving the loss of the existing #112 transmission line (id. at exhibit III-B).¹⁶ Commonwealth's load flow analyses demonstrate that, with the addition of the proposed facilities, Commonwealth's existing system components would be loaded well within emergency summer capabilities under the identified single contingency (id.).

The record demonstrates that the proposed facilities would provide a reliable supply to the Pine Street substation load center in the event of a loss of either the #112 or #114 underground cables. Accordingly, the Siting Board finds that the proposed project would meet the identified need.

b. Reconductoring Alternative

Commonwealth asserted that project alternative 2, which involves reconductoring of the existing #112 and #114 lines, would not meet the identified need (id. at IV-4 to IV-11). The Company provided load flow analyses which demonstrated that project alternative 2 would, once complete, be sufficient to address the identified need (id. at exhibits IV-C, and

¹⁶ The Siting Board notes that, from an operational standpoint, the effects on the system of a single contingency involving the #114 line would be essentially identical to those resulting under the single contingency involving the #112 line that is represented in Commonwealth's load flow analysis. This is the case because both existing cables perform the same function and have identical ratings.

IV-D). However, Commonwealth explained that, due to the substantial period of time required for the removal of the existing cable and subsequent reconductoring, system reliability would be substantially degraded during the construction period such that Commonwealth would be unable to satisfy its reliability standards given present load levels at the Pine Street substation (id. at IV-3 to IV-4; Exh. HO-A-3). Commonwealth stated that the construction of project alternative 2 would likely require two or more years to complete (Exh. HO-A-3). Therefore, Commonwealth indicated that it had rejected this alternative as being unable to meet the identified resource need consistent with its reliability standards (id.).

The Siting Board previously has found that Commonwealth has established that need exists under both current and forecasted load conditions (see Section II.A.3.c, above). While project alternative 2, once constructed, would meet the identified need, the process of constructing this alternative would further degrade already unacceptable reliability during a lengthy construction period. Accordingly, the Siting Board finds that the reconductoring alternative, project alternative 2, would not meet the identified need.

c. Alternative Transmission Facilities

Commonwealth asserted that nine new transmission line project alternatives, project alternatives 3 through 11, would meet the identified need (id. at IV-4 to IV-11).

In order to assess these alternatives, Commonwealth developed specific design criteria which considered the likely configuration and equipment requirements of each alternative, and presented schematic representations of each alternative (id. at IV-1, IV-4 to IV-11, exhibit IV-A). Commonwealth developed load flow analyses for each alternative showing equipment loadings under both normal conditions (id. at exhibit IV-C), and the single contingency loss of the #112 line (id. at exhibit IV-D). Commonwealth stated that load flow and equipment loadings would be maintained to within rated limits for each of the transmission alternatives (id. at IV-15, and exhibit IV-D).

The record demonstrates that project alternatives 3 through 11 would provide a reliable supply to the Pine Street substation load center under normal system conditions, and

in the event of a single contingency loss of either of the existing underground transmission cables. Accordingly, the Siting Board finds that the transmission level project alternatives, project alternatives 3 through 11, would meet the identified need.

d. Distribution and Substation Alternatives

Commonwealth stated that it analyzed three options for addressing the identified need by enhancing its distribution level "tie" capacity between the Pine Street substation and either the Acushnet substation or a new substation (project alternatives 12 through 14) (Exhs. C-1, at IV-11 to IV-14; C-3, at 7). Commonwealth indicated that, in concept, these alternatives would enable Commonwealth to switch an additional increment of load from the Pine Street substation in the event of a single contingency outage of either the #112 or #114 line (*id.*).

Project alternative 12 would involve the construction of six 13.2 kV express distribution feeders between the Acushnet and Pine Street substations (*id.* at IV-11). Commonwealth stated that these improvements would add about 60 MVA of capacity to the Pine Street substation load center (*id.* at IV-12). However, the Company noted that during normal operating conditions, these express feeders would be out-of-service, and that a complex series of switching operations would be required in order to provide support to the Pine Street substation in the event of a contingency (*id.*).¹⁷ The Company's load flow analyses indicated that in order to maintain operation of existing system elements within acceptable thermal ratings, this distribution level switching would need to be accompanied by the electrical disconnection, or islanding, of two of the Pine Street substation load busses from the remaining 115 kV line in order to prevent loop flow (Exh. HO-A-6).¹⁸ Commonwealth explained that this alternative would actually increase the number and extent

¹⁷ Commonwealth stated that the express tie circuits would normally be switched open in order to prevent loop flow that would leave the remaining 115 kV line subject to thermal overload in the event of a single contingency (Exh. HO-A-6).

¹⁸ Commonwealth indicated that loop flow would result once tie circuits between Pine Street substation and Acushnet substation are switched in, forming a closed loop, *i.e.*, a closed electrical path with the 115 kV bulk supply system (Exh. HO-A-6).

of switching operations that Commonwealth would have to accomplish in the event of a single contingency and therefore would exacerbate the Company's existing violation of its reliability standard (Exh. C-1, at IV-12).

Project alternatives 13 and 14 would involve tapping Commonwealth's existing #109 115 kV line at a point between the Cross Road and Fisher Road substations located in the Town of Dartmouth. A new overhead (alternative 13) or underground (alternative 14) 115 kV line would run from the tap point to feed a new substation to be located at the intersection of Hawthorne Street and Slocum Road in Dartmouth ("Hawthorne Street substation"). The new substation would feed the Pine Street substation by means of six new 13.2 kV underground feeder circuits (id. at IV-13). The Company provided load flow analyses which demonstrate that, in the event of a single contingency involving the #112 or #114 cable, load on the remaining cable would be 54.2 MW, or 90 percent of its 60 MVA rating (id. at exhibit IV-D). The Company stated that project alternatives 13 and 14 would perform identically with respect to load flow and reliability (id. at IV-12 to IV-14).

The Company stated that in order to maintain the ability of project alternatives 13 and 14 to support the Pine Street substation over the longer term, additional 13.2 kV express distribution feeders would be required, as would the addition of a new transformer bank at the Hawthorne Street substation (id. at IV-13). Commonwealth also noted that from an operational standpoint, project alternatives 13 and 14 would require the completion of switching operations before the Pine Street substation load could be effectively supported following a single contingency (id.). The Company stated that, as with alternative 12, Pine Street substation load would be interrupted until such time as switching could be completed, thus contravening Commonwealth's reliability standard (id.).

The record demonstrates that project alternative 12 would require that Commonwealth rely on distribution level switching to address capacity constraints at the Pine Street substation in the event of a single contingency. The record also demonstrates that service outages to the Pine Street substation load area would result, thus placing the Company in

contravention of its system reliability criteria.¹⁹ Accordingly, the Siting Board finds that the distribution level project alternative, project alternative 12, would not meet the identified need.

Similarly, project alternatives 13 and 14 would require outages pending the completion of switching of distribution level components in the event of a single contingency, thus subjecting the Pine Street substation load area to interruption of service during the period required to complete such switching. Accordingly, the Siting Board finds that the distribution level project alternatives, project alternatives 13 and 14, would not meet the identified need.

e. Generation Alternative

Project alternative 15 considered additional power generation as an alternative to meet the identified need. Commonwealth provided a load flow analysis assuming a 135 MW combined cycle facility located at its Cannon Street station, which demonstrated that equipment loadings would be maintained to well within acceptable levels both under normal conditions, and in the event of a single contingency involving the #112 cable (Exh. C-1, at exhibit IV-D).

The record demonstrates that the repowering or resiting of a generation facility at Cannon Street station would address the identified need in a manner consistent with Commonwealth's reliability criteria. Accordingly, the Siting Board finds that the repowering or resiting of a generation facility at the Cannon Street station, project alternative 15, would meet the identified need.

¹⁹ In its treatment of need for the proposed project under Section II.A.3.c, the Siting Board has found that the Company's ability to address a single contingency by means of automated and manual switching of 13.2 kV distribution level circuits is not sufficient to maintain system reliability consistent with Commonwealth's reliability criteria. To the extent that reliability concerns associated with distribution level switching operations required under certain project alternatives are similar to, or in some instances more pronounced than, those options currently available to the Company, the Siting Board notes that those project alternatives would not meet the identified need.

f. Distributed Generation

Commonwealth provided an analysis of the ability of DG to meet the identified need by including DG as one element of a comprehensive strategy of load reduction that would combine DSM, energy efficiency and load management, DG and interruptible rates (see Section II.A.3.d, above). Commonwealth stated that it identified several waterfront and industrial locations in the New Bedford area that potentially would be suitable for the siting of DG resources (Exh. C-1, at IV-15). The Company stated that its load reduction alternative assumed the siting of four MW of DG (fuel cells) within the Pine Street substation load center (id.).

The Company identified two concerns as to the viability of DG as part of a strategy for meeting the identified need. First, Commonwealth stated that based on its analysis, DG resources would cost \$500 to \$4000 per kilowatt, and as such would not be competitive with its proposed transmission project (id. at n.3). Second, the Company stated concerns as to the reliability of emerging fuel cell technology (id.). The Company indicated that it did recognize the potential for securing environmental benefits with the use of DG, and stated that it would continue to monitor developments in DG technology as an option for addressing future transmission and distribution needs (id.).

In Section II.A.3.d above, the Siting Board has reviewed the Company's study of a targeted load reduction strategy, and has found that acceleration of C&LM programs, even when combined with other load reduction techniques, would not meet the identified need. The Siting Board notes that the study assumed a range of load reduction initiatives, an integral component of which was four MW of DG resources. Based on the Siting Board's finding that such a strategy would not meet the identified need, the Siting Board finds that four MW of DG resources alone would not be sufficient to meet the identified need. Accordingly, the Siting Board finds that distributed generation would not meet the identified need.

g. Conclusions on Ability to Meet Identified Need

The Siting Board has found that Commonwealth has demonstrated that the proposed

project, the construction of a new 115 kV transmission line between the Acushnet substation and the Pine Street substation, would satisfy Commonwealth's reliability criteria and would meet the identified need. In addition, the Siting Board has found that: (1) the reconductoring alternative, project alternative 2, would not meet the identified need; (2) the transmission level project alternatives, project alternatives 3 through 11, would meet the identified need; (3) the distribution level project alternatives, project alternatives 12, 13, and 14, would not meet the identified need; (4) the repowering or resiting of a generation facility at the Cannon Street station, project alternative 15, would meet the identified need; and (5) distributed generation would not meet the identified need.

Accordingly, the Siting Board next evaluates the reliability, environmental impacts and cost of the proposed project and those alternatives to the proposed project that have been found to meet the identified resource need.

4. Reliability

In this section, the Siting Board compares the proposed project with project alternatives 3 through 11 with respect to providing a reliable supply of electricity to the Pine Street substation. In so doing, the Siting Board addresses the two reliability criteria identified in Section II.A.3.a, above, namely the double-contingency and future construction criteria, and any other reliability arguments raised by the Company for specific project alternatives.

a. Transmission Alternatives

Commonwealth argued that the proposed project would be more reliable than the transmission level project alternatives (Brief at 27). In support of its statement, Commonwealth identified a series of reliability issues for which the proposed project would provide reliability advantages as compared to the transmission level project alternatives. Specifically, the Company argued that: (1) the double source of bulk 115 kV supply to the Acushnet substation rendered the proposed project more reliable than those project alternatives that would tie into the existing bulk system at a points with only a single source

of supply; (2) the proposed project would consist of a simple electrical connection between the Acushnet substation and the Pine Street substation and require no series reactive compensation or phase angle regulating equipment; (3) the proposed project would involve no construction of overhead lines and only a short submarine section; and (4) the proposed project generally follows a shorter and more direct route than many of the project alternatives (Exh. C-1, at IV-15 to IV-18).²⁰

With respect to Commonwealth's argument regarding the double source of 115 kV supply, the Company explained that the Acushnet substation is supplied by two separate sources, each of which is able to satisfy the requirements of both the Acushnet substation and the Pine Street substation. The Company noted that alternative transmission configurations generally were inferior to the proposed facilities in this regard (*id.* at IV-15 to IV-16; Exh. C-3, at 10; Tr. at 14-15, 27-28, 39-41, 70-72). However, Commonwealth also recognized that project alternatives 3 through 10 would provide a source of 115 kV supply to the Pine Street substation independent of the Acushnet substation, an advantage which would partially offset the advantage of a two source supply for the proposed project. (Exh. C-1, at IV-4 to IV-11, IV-15).

With respect to the reliability of the identified project configurations and the associated system components, Commonwealth indicated that project alternatives 3, 4, 6, and 9 would require the application of load compensating equipment such as series reactive components, and that project alternatives 5, 7 and 10 would require mechanical equipment such as phase angle regulators in order to improve the balance of power flows between the new facilities and the existing cables (*id.* at IV-4). Commonwealth stated that, at a minimum, such equipment represents a complicating factor. The Company also asserted that there is little operational experience with phase angle regulating equipment in New England, and that such mechanical components have a higher probability of failure than do simple electrical connections (*id.* at IV-7; Exh. HO-A-7; Tr. at 39-41).

²⁰ In response to an information request, Commonwealth stated that there were no areas within its New Bedford district that would gain reliability benefits from construction of one of the identified project alternatives (Exh. HO-A-1).

Commonwealth stated that project alternatives 4 through 10 each would involve some measure of overhead construction, and argued that those alternatives would be less reliable than the proposed project in that they would be subject to greater risk of outages resulting from storm damage or lightning strikes. In support of its assertion, Commonwealth provided data on unplanned transmission system outages occurring during the most recent ten year period in the New Bedford district. The data indicate that several recent transmission system incidents resulting in customer outages in the New Bedford district were attributed to lightning or tree damage (Exh. HO-N-4).

With respect to the overall length, Commonwealth stated that the proposed facility would be approximately 3.3 miles, all underground, with a 0.25 mile river crossing (Exh. C-1, at IV-2). Project alternatives 4 through 10 are significantly longer than the proposed project. Commonwealth noted that alternative 3, although shorter than the proposed project, would involve a nearly 1.0 mile submarine crossing of the Acushnet River (id. at IV-4). The Company asserted that project alternative 11, which follows the same route as the proposed project, possesses neither advantages nor disadvantages as compared to the proposed project with respect to overall length.

Finally, Commonwealth indicated that it expected that project alternatives 3 through 11 would enhance Commonwealth's ability to respond to a double contingency (id. at IV-4; Brief at 24). With respect to the future construction criterion, Commonwealth stated that project alternatives 3, 4, and 5 would provide benefits in terms of the future planned reconductoring of the existing #112 and #114 lines, and implied that the remaining transmission level alternatives would provide similar benefits to the extent that they, like the proposed project, introduced a third source of 115 kV supply to the Pine Street substation which would facilitate such construction (Exh. C-1, at IV-4 to IV-11).

The record demonstrates that the proposed project provides reliability benefits above those offered by the other transmission level project approaches with respect to: (i) the relative simplicity of the proposed project's design and electrical functioning; (ii) the proposed project's lack of reliance on either overhead construction or long submarine sections; and (iii) the comparatively short overall length and directness of the proposed route.

The record is unclear as to whether the reliability advantage of a double source of bulk supply exceeds the reliability advantage provided by a source of transmission to the Pine Street substation that is independent of the Acushnet substation. Therefore, the Siting Board is unable to adequately compare the proposed project to the transmission level project alternatives with respect to this particular aspect of reliability.

Finally, the Siting Board finds no evidence to suggest that project alternatives 3 through 11 would differ significantly from the proposed project in providing benefits with respect to Commonwealth's double-contingency and future construction criteria.

Accordingly, the Siting Board finds that the proposed project would be preferable to project alternatives 3 through 11 with respect to reliability.

b. Generation Alternative

Commonwealth asserted that the repowering or resiting of the Cannon Street station would provide generally acceptable loadflow and performance under normal plant conditions, but would also maintain the Company's reliance on its two existing cables (Exh. C-1, at IV-16). Commonwealth explained that any such generating station would be subject to planned and unscheduled outages for maintenance and repair, during which time a single contingency involving the #112 or #114 lines would place Commonwealth in contravention of its reliability criteria (*id.* at IV-14). In addition, Commonwealth argued that the permitting and construction associated with the generation alternative could not be completed on a timely basis (*id.* at IV-14). Commonwealth therefore asserted that the proposed project was superior to the repowering or resiting of generating facilities at the Cannon Street station with respect to reliability (*id.*).

With respect to Commonwealth's future construction criterion, the Company indicated that, in the absence of an extended planned or forced outage, the generation alternative would facilitate the reconductoring of Commonwealth's existing #112 and #114 lines (*id.*). The Company did not discuss the reliability of the generation alternative in the event of the double-contingency loss of the existing lines.

The Siting Board notes that generating facilities, by their nature, are subject to

planned and forced outages of considerably greater frequency and duration than the unplanned outages to which an underground transmission line is subject. During such outages, the Company would be reliant on its existing 115 kV cables to serve the Pine Street substation load, and would experience the same reliability concerns that led the Company initially to propose this project. While Commonwealth likely could schedule any future construction around the timing of its planned outages, it cannot similarly schedule double contingencies. Therefore, the Siting Board finds that the proposed project would be slightly preferable to project alternative 15 with respect to Commonwealth's future construction criteria, and preferable with respect to the Company's double-contingency criteria.

Accordingly, the Siting Board finds that the proposed project would be preferable to project alternative 15 with respect to reliability.

5. Environmental Impacts

In this section, the Siting Board compares the proposed project to those project alternatives that were found to meet the identified need with respect to the environmental impacts resulting from: (1) facility construction; (2) permanent land use; and (3) magnetic field levels.

a. Facility Construction Impacts

Commonwealth stated that it analyzed the facility construction impacts of the proposed project and the various project alternatives that would meet the identified need (Exhs. HO-RR-4; C-1, at IV-17). Commonwealth asserted that facility construction impacts of the proposed project would be significantly less than those of the project alternatives (Exh. HO-RR-4, at 6; Brief at 32). In support of its statement, Commonwealth provided a comparative analysis which was developed by its Environmental Programs Department (Exh. HO-RR-4).

Commonwealth explained that, because the various project alternatives would involve differing types of construction activity and would result in construction related impacts on various types of land resources, it developed a general set of preferences for specified

comparative factors. For example, Commonwealth explained that, to the extent possible, construction of roughly linear facilities within established right-of-ways ("ROW"s) was preferable to construction in pristine areas (Exhs. C-7, at 4; HO-RR-4, at 1). The Company also assumed that shorter, more direct route alternatives would be preferable as a means to reduce the total amount of construction activity associated with the proposed project as well as with each of the identified project alternatives.

Commonwealth indicated that it performed field work to further define the construction impacts of the various project alternatives (Exh. HO-RR-4, at 2; Tr. at 58). Commonwealth explained that a project team, the Environmental Programs Group, visited proposed sites for the various project alternatives, consulted with Commonwealth's engineers to ascertain construction requirements, and elicited comment from relevant public officials in order to identify permitting issues and any exogenously identified preferences (Exhs. C-1, at I-5; C-2, at 6-8).

Commonwealth asserted that project alternative 3, consisting of a 115 kV transmission line running from Commonwealth's Arsene Street substation in Fairhaven, would require a mile-long directional drill to cross the Acushnet River and therefore would involve significantly greater impacts than the proposed project relating to the handling and disposal of drilling slurry and mud generated during the drilling process.²¹ Such construction would also require a larger operations staging area in the vicinity of the Acushnet River and associated wetlands, due both to the length of the bore and more elaborate requirements associated with installation of the project's electrical components (Exh. HO-RR-4).

Commonwealth also indicated that construction of project alternative 3 would require the clearing of a new ROW and the excavation of pole foundations in an area that may contain hazardous waste (id. at 2; Exh. C-1, at IV-4 to IV-5; Tr. at 69-73). Commonwealth

²¹ Commonwealth indicated that installation of the cable on the river bottom would not be permitted in this location as the lower portion of the Acushnet River is navigable water that is within the "Designated Port Area" as delineated by the Massachusetts Department of Environmental Protection ("MDEP") and the Division of Coastal Zone Management (Exh. HO-A-8). A cable lying on the bottom in this vicinity would be subject to damage from anchors, and would impede future dredging operations (id.).

explained that such activities potentially would involve special handling and disposal requirements for contaminated soils as well as worker safety and exposure issues (Exh. HO-RR-4, at 3). In sum, Commonwealth concluded that the construction impact of project alternative 3 would be significantly greater than that of the proposed project (*id.*).

The record demonstrates that the extent of facility construction required for project alternative 3 would be greater than that required for the proposed project. Accordingly, the Siting Board finds that the proposed project would be preferable to project alternative 3 with respect to facility construction impacts.

Commonwealth asserted that construction of project alternatives 4 and 5 would involve significant operations adjacent to a railroad ROW, in addition to temporary impacts associated with underground construction comparable to those anticipated for the proposed project (Exh. C-1, at IV-5 to IV-7). Commonwealth stated that construction of these project alternatives also would necessitate the clearing of a 5.0-mile section of new easement through areas including a number of wetlands and a stream (Exh. C-1, at IV-6). Commonwealth asserted that construction activities conducted in the vicinity of active railroads, or within wetlands, would be more complex, and progress more slowly, and that such construction therefore would result in greater facility construction impacts (Exh. HO-RR-4, at 3). Commonwealth further argued that the greater length of project alternatives 4 and 5 -- 4.2 miles of underground construction and 5.0 miles of overhead construction -- would involve a more significant total construction impact than the proposed project (*id.* at 3-4; Exh. C-1, at IV-5).

The record demonstrates that the extent of facility construction for project alternatives 4 and 5 would be greater than that required for the proposed project. Accordingly, the Siting Board finds that the proposed project would be preferable to project alternatives 4 and 5 with respect to facility construction impacts.

The Company indicated that project alternatives 6, 7, 9 and 10, would follow a common route for significant portions of their length, and include an approximately 4.0-mile segment of underground cable, as well as overhead segments of various lengths. In the case of alternatives 6 and 7, the overhead portion would be 4.3 miles long, and in the case of

alternatives 9 and 10, the overhead portion would be 9.3 miles long (Exh. C-1, at IV-8 to IV-10). All four of these project alternatives also would involve the construction of a new overhead-underground transition station at the intersection of Allen Street and Tucker Road in the Town of Dartmouth (id.). Commonwealth asserted that each of these project alternatives would involve more significant environmental impacts than the proposed project (id. at IV-7 to IV-9, IV-10 to IV-11; Exh. HO-RR-4, at 4-5). Commonwealth explained that facility construction would require the permanent clearing of wetland vegetation along portions of a new overhead right-of-way, as well as clearing and sideline trimming of vegetation along an existing ROW (Exh. HO-RR-4, at 4-5).²² Commonwealth also asserted that, while the underground portion of these project alternatives would involve short-term construction impacts generally comparable to those anticipated for the proposed project, the length of these facility alternatives would be greater than that for the proposed project and, therefore, would affect a larger total area (id.).

The record demonstrates that the extent of facility construction for project alternatives 6, 7, 9 and 10 would be greater than that required for the proposed project, and would impact additional wetlands. Accordingly, the Siting Board finds that the proposed project would be preferable to project alternatives 6, 7, 9 and 10 with respect to facility construction impacts.

Project alternative 8 consists of a new underground cable that would follow the primary route between the Pine Street substation and the Acushnet substation, but would extend beyond the Acushnet substation and proceed overhead, parallel to the Company's existing #112 and #114 transmission lines' right-of-way, to tap the #112 line at Commonwealth's Industrial Park Tap, for a total length of 6.2 miles (id.; Exh. C-1, at

²² Commonwealth explained that project alternative 9 would involve sideline trimming and possible clearing of vegetation along an 8.0-mile section of existing transmission line that would require reconductoring under this project alternative (Exh. HO-RR-4, at 4). The existing #109 line runs generally southerly from Commonwealth's High Hill switching station to its Cross Road substation, continuing southerly to a point between the Cross Road and Fisher Road substations in the Town of Dartmouth where the new line would tap the #109 line (id.).

IV-9). Commonwealth explained that project alternative 8 would require extensive construction activity in wetland areas between the Acushnet substation and the Industrial Park Tap (Exh. HO-RR-4, at 4). Commonwealth also asserted that the construction impacts of project alternative 8 would be significantly greater than the proposed project, due primarily to the greater length of the facility (id.).

The record demonstrates that the extent of facility construction required for project alternative 8 would be greater than that required for the proposed project, and would impact additional wetlands. Accordingly, the Siting Board finds that the proposed project would be preferable to project alternative 8 with respect to facility construction impacts.

The Company stated that project alternative 11, consisting of two new 115 kV cables along the Company's primary route for its proposed project, would involve marginally greater facility construction impacts than would the proposed project (id. at 5).

Commonwealth asserted that construction of two lines would involve greater impacts in terms of street construction as well as at the river crossing (id.).

The record demonstrates that the extent of facility construction required for project alternative 11 would be slightly greater than that required for the proposed project. Accordingly, the Siting Board finds that the proposed project would be preferable to project alternative 11 with respect to facility construction impacts.

Finally, Commonwealth asserted that project alternative 15, the generation alternative, would involve major air quality and siting issues that would affect land-use policies in the City of New Bedford (Exhs. C-1, at IV-14; HO-RR-4). Commonwealth explained that it believed that the construction impacts associated with project alternative 15 would be dramatically greater than those projected for Commonwealth's proposed project and that, as such, the generation alternative represented the least advantageous alternative with respect to environmental impacts (id. at 6; Exh. C-1, at IV-14).

The Siting Board acknowledges that the impacts of facility construction with respect to project alternative 15 would be considerably greater than for the proposed project. Accordingly, the Siting Board finds that the proposed project would be preferable to project alternative 15 with respect to facility construction impacts.

Thus, the Siting Board has found, above, that the proposed project would be preferable to project alternatives 3 through 11 and 15 with respect to construction impacts.

b. Permanent Land Use Impacts

Commonwealth asserted that the proposed project would involve "essentially no long-term impacts" (Exh. HO-RR-4, at 2; see also Exh. C-1, at IV-17). In support of this assertion, Commonwealth explained that the proposed use of roadway construction would mean that "the new cable would be installed in existing utility corridors with no change in terms of visibility or land-use considerations" (Exh. HO-RR-4, at 2).

Commonwealth also provided a comparison of the proposed project to project alternatives with respect to permanent land use impacts (Exh. HO-RR-4). It assumed that the use of underground construction, particularly in the vicinity of existing utility facilities, tends to involve the least long-term environmental impact (Exh. C-7, at 4). Commonwealth also stated that the construction of permanent facilities that could affect the character or land use of a particular area following construction was disfavored (id. at 5). For example, construction of visible structures, such as overhead poles and supports or transition stations, particularly in proximity to residential areas, were met with reservation by the Company, as were requirements to place these or other structures within wetlands or pristine areas (Exh. HO-RR-4, at 1-2).

Commonwealth explained that it considered alternatives 3, 4, 5, 6, 7, 9 and 10 to be inferior to the proposed project with respect to land use impacts because they each would require the establishment of new, permanent ROWs and, in some instances, would require the construction of permanent ancillary facilities such as transition stations and overhead structures (id. at 3-6; Exhs. C-1, at IV-17; C-7, at 4). Commonwealth considered project alternative 8 to be inferior to the proposed project because, while it would use an existing ROW, overhead construction would be required for a portion of the project's length and the project would result in significant land use impacts in wetland areas between the Acushnet substation and the Industrial Park tap (Exh. HO-RR-4, at 4). Commonwealth asserted that project alternative 11, which would involve the construction of two new 115 kV lines along

the primary route for the proposed project, would involve permanent land use impacts comparable to those of the proposed project (*id.* at 5). Finally, Commonwealth noted that project alternative 15, the generation alternative, would involve significant, permanent land use impacts at a site that, according to the Company, has been targeted as a central parcel for redevelopment within the City of New Bedford (Exh. C-1, at IV-14).

The Siting Board has previously found that "in many cases, the use of an existing [ROW] as the site of new lines is the most appropriate way to achieve the proper statutory balance [among need, environmental impacts and cost]" and that the environmental impact of such use is "prima facie minimal." See 1996 NEPCo Decision, EFSB 95-2, at 30; 1988 ComElec Decision, 17 DOMSC 249 at 327; Boston Edison Company, 3 DOMSC 44, 53-54, 61 (1978). Because the proposed project would be located primarily beneath existing roadbeds and within an existing ROW, the Siting Board expects that incremental permanent land use impacts would be minimal. 1996 NEPCo Decision, EFSB 95-2 at 30. The record demonstrates that the long-term environmental impacts associated with project alternatives 3 through 10 would involve the permanent clearing of new ROWs and/or the construction of ancillary structures such as towers and transition stations, and therefore would involve greater permanent land use impacts than the proposed project. With respect to the generation alternative, the Siting Board agrees that the permanent land use impacts associated with the repowering or resiting of generation facilities in New Bedford would be significantly greater than those associated with the proposed project.

Accordingly, the Siting Board finds that the proposed project would be comparable to project alternative 11 and preferable to project alternatives 3 through 10 and project alternative 15 with respect to permanent land use impacts.

c. Magnetic Field Levels²³

Commonwealth stated that it expected that only minor increases to ambient magnetic field levels would result from construction and operation of the proposed project, and that such increases would not constitute a significant environmental impact (Exh. HO-E-19). In support of its statement, Commonwealth provided a report produced by its consultant, Enertech Consultants of Santa Clara, Inc. ("Enertech"), entitled "Calculated EMF Levels of 115 kV Cables and Existing Levels Along Two Proposed Alternative Routes" ("Enertech report") (*id.* Att.). In the Enertech report, calculations estimating magnetic field levels for the proposed project were compared to existing magnetic field levels as measured along Commonwealth's primary route, and along a noticed alternative route which is the route followed by the existing #112 and #114 cables (Exh. C-1, at IV-2) (see Section III.C.2.a.iii, below).

In comparing the magnetic field impacts of the proposed project to those associated with the various project approaches identified by Commonwealth, the Company first explained that all transmission level alternatives would involve relatively low impacts that would be consistent with magnetic field levels that have been found to be acceptable in previous decisions of the Siting Board (Exh. HO-RR-4, at 1). 1995 NEPCo Decision, 4 DOMSB at 152; Massachusetts Electric Company/New England Power Company, 13 DOMSB 119, 228-242 (1985) ("1985 MECo/NEPCo Decision").

In lieu of presenting EMF measurement data for each of its project alternatives, Commonwealth presented a set of criteria relating to magnetic field impacts, which it used to compare the various project alternatives. Commonwealth asserted that underground construction, particularly within established ROWs, such as streets, and along shorter routes likely would result in lower magnetic field impacts (Exh. HO-RR-4, at 1). Commonwealth also stated that project alternatives that could be routed through primarily industrial areas

²³ The Siting Board focuses on magnetic field levels rather than electric field levels because perceived health impacts generally relate to magnetic field levels. see 1996 NEPCo Decision, EFSB 95-2 at 26, n.22; 1995 NEPCo Decision, 4 DOMSB at 32, n.51.

should be considered preferable with respect to magnetic field impacts (id.).

Based on these criteria, Commonwealth argued that the proposed project was preferable to other project alternatives in terms of magnetic field levels (Exh. HO-RR-4, at 2). Commonwealth explained that the proposed project would involve underground construction along a short and relatively direct route. Commonwealth asserted that project alternatives 3 through 10 would either: (1) involve longer route segments including construction beneath city streets traversing greater numbers of residential areas within New Bedford, and that such alternatives would involve the siting of facilities in proximity to greater numbers of sensitive receptors such as schools and churches; or (2) include overhead lines, leading to more significant increases in magnetic field levels in those areas (id. at 5-6; C-1 at Section 5.C) (see Section II.B.5.b, above). The Company asserted that magnetic field impacts from project alternative 11 likely would be marginally inferior to the proposed project depending upon the disposition of the Company's existing cables (Exh. HO-RR-4, at 5).²⁴

With respect to ambient magnetic field levels along the primary route, Commonwealth stated that assuming peak load, existing average magnetic fields along the primary route would be 5.2 mG (Exh. HO-E-19). The Company stated that, with the proposed facility, average magnetic field along the primary route under peak load would be between 5.22 mG and 7.35 mG (id.). The Company noted that existing magnetic fields along the primary route likely would be dominated by distribution circuits that serve the industrial and commercial loads in this area (Tr. at 119-120). With respect to the residential portions of the primary route, Commonwealth stated that magnetic field levels tend to be dominated by appliances and other electrical equipment already in use in homes and buildings along the route (Tr. at 119; Brief at 34).

The record demonstrates that under the proposed project, magnetic field levels within the ROW for the construction of the proposed transmission facilities would be at low levels,

²⁴ The Company noted that, under project alternative 11, its existing 115 kV lines could either be abandoned, or relegated to 13.2 kV distribution service.

comparable to ambient conditions existing within the relevant New Bedford streets. While Commonwealth did not provide magnetic field measurement data relative to each of the alternatives to the proposed project, the Company's use of magnetic field criteria to compare project alternatives with respect to magnetic field levels demonstrates that the effect of magnetic fields would be somewhat greater along other project alternatives due to alternative configurations and the greater length of several alternatives to the proposed project. Accordingly, the Siting Board finds that the proposed project would be preferable to project alternatives 3 through 11 with respect to magnetic field impacts.

The Company has not provided criteria and data on magnetic fields that is suitable for an assessment of the performance of the generation alternative in terms of magnetic field impacts. Therefore, the Siting Board makes no finding on the preferability of the proposed project relative to the generation alternative, project alternative 15, with respect to magnetic field impacts. Below, the Siting Board balances overall environmental impacts for the generation alternative with those for the proposed project.

d. Conclusions on Environmental Impacts

In Sections II.B.5.a, b, and c, above the Siting Board has found that the proposed project would be preferable to project alternatives 3 through 11 and 15 with respect to facility construction impacts, comparable to project alternative 11 and preferable to project alternatives 3 through 10 and project alternative 15 with respect to permanent land use impacts, and preferable to project alternatives 3 through 11 with respect to magnetic field impacts. The Siting Board made no finding with respect to the magnetic field impacts of project alternative 15; however the Siting Board concludes that, on balance, the construction and long term impacts of siting a generating facility would significantly outweigh the impacts of the proposed project, and therefore finds that the proposed project would be preferable to project alternative 15 with respect to environmental impacts.

Accordingly, the Siting Board finds that the proposed project would be preferable to project alternatives 3 through 11 and 15 with respect to environmental impacts.

6. Cost

Commonwealth stated that the proposed project represents the least cost project alternative that meets the identified need (Exh. C-1, at IV-16). Commonwealth provided cost data showing that, for the proposed project, total project costs as derived from "as-installed" non-binding price quotations from vendors and calculation of the Company's internal and overhead costs would be \$7,167,000 (id. at V-11, and exhibit V-A). Commonwealth stated that for the purpose of comparing the various project alternatives with respect to cost, it developed direct capital cost estimates for each of the project alternatives based upon detailed information provided by its Engineering Services Department (id. at V-16).²⁵ Commonwealth estimated that the direct capital cost for the proposed project would be \$5,989,000 (id., at exhibit IV-E). Estimates of capital costs for the transmission level project alternatives ranged from \$6,561,000 to \$15,878,000 (id.). Commonwealth estimated the direct capital cost for repowering or resiting generation resources at Cannon Street station at \$85,761,000 and \$102,375,000 respectively (id.). For each alternative, Commonwealth assumed that construction would begin in 1997 and would be completed at the end of year 1999, with capital expenditures occurring over a three year period (id. at IV-16).

In order to fully compare the cost of the proposed project to the alternative projects, Commonwealth provided the 1997 present value of revenue requirements ("PVRR") over a forty-year project life for each project alternative (id.; Exh. C-2, at 9). The Company's PVRR cost analysis included the present value of differential transmission line losses (again over a forty-year project life) resulting from the various project alternatives (id.). Commonwealth stated that it estimated a 1997 PVRR of \$9,171,000 for the proposed project, and provided projected costs of the remaining transmission level project alternatives ranging from \$10,295,000 to \$24,425,000 (Exh. C-1, at exhibit IV-E). Commonwealth stated that

²⁵ The Company's direct capital cost estimates presented in Exh. C-1, at exhibit V-E include capital (equipment) costs only. The Company stated that overhead and administrative costs were excluded from the analysis because such costs would be applied to the various project alternatives at comparable rates, and would not add information useful to the cost comparison (Exh. C-1, at V-16, n.4).

project alternative 15, the repowering or resiting of the Cannon Street generating station had a projected 1997 PVRR (including line loss savings) of \$345,414,000 and \$412,875,000 respectively (*id.* at V-17, exhibit IV-E).

Commonwealth noted that transmission alternatives were clearly more cost-effective than the generation alternative (*id.* at IV-17; Exh. C-3, at 10). The Company also noted that the proposed project represented the least cost transmission option (Exh. C-1, at IV-17). Commonwealth explained that it believed that the proposed project was the least cost transmission alternative because it involved a shorter distance, included the most advantageous option for crossing the Acushnet River, and avoided the need for expensive ancillary facilities and equipment such as series reactive components or phase angle regulators (*id.* at IV-18).

The record demonstrates that the proposed project would provide a significant long-term cost advantage relative to other project alternatives. Accordingly, the Siting Board finds that the proposed project would be preferable to project alternatives 3 through 11 and 15 with respect to cost.

7. Conclusions: Weighing Need, Cost, Environmental Impacts and Reliability

In comparing the proposed project to the transmission, distribution and generation project alternatives identified by Commonwealth, the Siting Board has found that: (1) the proposed project would meet the identified need; (2) the reconductoring alternative, project alternative 2, would not meet the identified need; (3) the transmission level project alternatives, project alternatives 3 through 11, would meet the identified need; (4) the distribution level project alternatives, project alternatives 12, 13, and 14, would not meet the identified need; (5) the repowering or resiting of a generation facility at the Cannon Street station, project alternative 15, would meet the identified need; and (6) distributed generation would not meet the identified need.

With respect to environmental impacts, cost and reliability of the proposed project and alternatives to the proposed project, the Siting Board has found that: (1) the proposed

project would be preferable to project alternatives 3 through 11 with respect to reliability; (2) the proposed project is preferable to project alternative 15 with respect to reliability; (3) the proposed project would be preferable to project alternatives 3 through 11 and 15 with respect to environmental impacts; and (4) the proposed project would be preferable to project alternatives 3 through 11 and 15 with respect to cost.

Accordingly, the Siting Board finds that the proposed project is preferable to all other project alternatives identified by Commonwealth.

III. ANALYSIS OF THE PROPOSED AND ALTERNATIVE FACILITIES

The Siting Board has a statutory mandate to implement the policies of G.L. c. 164, §§ 69H-69Q to provide a necessary energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost. G.L. c. 164, §§ 69H and J. Further, G.L. c. 164, § 69J requires the Siting Board to review alternatives to planned projects, including "other site locations." In its review of other site locations, the Siting Board requires a petitioner to show that its proposed facilities' siting plans are superior to alternatives and that its proposed facilities are sited at locations that minimize costs and environmental impacts while ensuring supply reliability. Norwood Decision, EFSB 96-2, at 33; 1996 NEPCo Decision, EFSB 95-2, at 35; 1991 NEPCo Decision, 21 DOMSC at 376.

A. Description of the Proposed Facilities and Alternative Facilities

1. Proposed Facilities

Commonwealth proposes to construct a new, underground 115 kV transmission line in the Town of Acushnet and the City of New Bedford that will connect Commonwealth's Acushnet substation to its Pine Street substation. The Company noticed twenty individual segments (numbered 1 through 20) that may be used in different combinations to form a series of possible route configurations (see Figure 1). The primary route is identified as alternative 1A, and consists of segments 3, 7, 9, 11, 15, 16, 18 and 19 (Exh. C-1, at I-B, V-17) (see Figure 2).

The proposed transmission line would proceed westerly, underground, from the Acushnet substation, crossing beneath the Acushnet River and into the City of New Bedford in the vicinity of Belleville Road. The proposed line would then proceed further westerly, beneath New Bedford streets, following Belleville Road to Front Street, then southerly on Front Street, Herman Melville Boulevard, and MacArthur Drive to the Pine Street substation ("primary route") (*id.* at I-1, exhibit I-A).

The proposed transmission line along the primary route would be constructed within public ROWs in New Bedford for most of its length (*id.* at exhibit I-A). Commonwealth proposes to excavate a trench, and construct a concrete encased duct bank approximately four

to five and one half feet deep, in order to emplace a steel pipe or PVC conduit through which the cable will run (Exhs. HO-E-6; HO-E-19(att.) at Sec. 3; Tr. at 129).²⁶ Commonwealth stated that at a depth of between four and six feet, the proposed facility would generally be above other existing utility facilities located within the street bed, but that engineering design would be such that existing facilities at shallower depths can be adequately avoided (*id.*). The Company indicated that manhole locations would be determined as part of the detailed engineering and design work following the approval of a final route (Exh. C-1, at V-2, V-12).

With regard to the portion of the proposed transmission line that would cross the Acushnet River, Commonwealth stated that it would prefer to place the new cable on the bottom of the Acushnet River. However, the Company indicated that, depending upon final engineering analyses and the status of ongoing clean-up activities being conducted by the United States Environmental Protection Agency ("USEPA") in the Acushnet River, directional drilling techniques might be employed in order to place the facility beneath the river bed in a subsurface duct system (Exh. HO-E-13; Tr. at 49, 87).

Commonwealth also stated that certain ancillary components including relaying and control equipment, bus extensions, shunt reactors, and related equipment may be required at either the Pine Street substation or Acushnet substation to support the operation of the proposed transmission line. The Company stated that the need for, and exact location of, any such equipment would remain undetermined until completion of final engineering design work (Exh. HO-A-11).

²⁶ Commonwealth noted that the depth of the trench may be dependent on the cable configuration selected by the Company for the proposed facility. Commonwealth stated that while a pipe type cable would be installed within a four foot deep trench, a solid dielectric cable would likely be constructed within a slightly deeper trench (on the order of five and one half feet) so as to minimize magnetic fields (Tr. at 129; see also Exh. HO-E-19(att.) at Sec. 3).

2. Alternative Facilities

Commonwealth developed combinations of route segment alternatives between the Acushnet substation and the Pine Street substation consistent with its segment-based route selection approach (see Section III.B.2, below). Commonwealth presented a total of 48 routing alternatives that employed various combinations of the twenty identified route segments (Exh. C-1, at exhibit I-B, exhibit V-D). For comparative purposes, Commonwealth presented an analysis of two route alternatives, one of which includes an alternative river crossing. Commonwealth asserted that the identified alternative routes reflected a measure of geographic diversity from the primary route (*id.* at V-19).

Commonwealth's first route alternative generally follows the route of the existing #112 and #114 cables to the west of the Central New Bedford Historic District ("westerly alternative")²⁷ (see Figure 2). Commonwealth noted that the westerly alternative would traverse predominantly residential and commercial areas along County Street, in contrast to the primary route which would traverse the primarily industrial areas of Herman Melville Boulevard, Front Street, and MacArthur Drive (*id.* at V-18). The westerly alternative would overlap the primary route in the vicinity of the Acushnet River crossing.

As its second alternative, Commonwealth presented a variation of the westerly alternative with a different approach to the river crossing ("Acushnet alternative")²⁸ (see Figure 2.). The Acushnet alternative would extend, underground, northeasterly from the Acushnet substation along Commonwealth's existing transmission ROW, and continue northerly, then westerly, beneath portions of South Main Street and Slocum Street in

²⁷ The westerly alternative consists of route segments 1, 4, 5, 8, 10, 17, 18 and 19 (Exh. C-1, Sec. V.E.). The Siting Board notes that Commonwealth's identification of the composition of the westerly alternative in its description presented in Section V.E. of its Petition (Exh. C-1, at V-17) and in Exh. HO-C-5(att.), is different from that presented in its Petition (Exh. C-1, exhibit V-D). The Siting Board has relied on the route designations presented in the Petition at Section V.E. to identify the route alternatives.

²⁸ The Acushnet alternative consists of route segments 1, 2, 5, 8, 10, 17, 18 and 20 (Exh. C-1, at V-17).

Acushnet, and across the Acushnet River on the Wood Street Bridge (id. at V-10, and exhibit I-B). It would then proceed westerly and southerly beneath portions of River Street, Sylvia Street, and Belleville Avenue in New Bedford, rejoining the westerly alternative at the western end of the 0.3-mile segment which defines the preferred river crossing (id. at V-10 to V-11). The Company indicated that its alternative river crossing ("segment 20") would cover approximately 2.0 miles and, as such, would be nearly six times the length of its preferred river crossing (id. at exhibit I-B).

Commonwealth indicated that ancillary facilities comparable to those identified in connection with the proposed facility may be needed at the Pine Street substation or Acushnet substation to support a transmission facility involving any of the identified alternative route segment combinations (Exh. HO-A-11).

B. Site Selection Process

1. Standard of Review

In order to determine whether a facility proponent has shown that its proposed facilities' siting plans are superior to alternatives, the Siting Board requires a facility proponent to demonstrate that it examined a reasonable range of practical facility siting alternatives. Norwood Decision, EFSB 96-2, at 36; 1996 NEPCo Decision, EFSB 95-2, at 37; Northeast Energy Associates, 16 DOMSC 335, 381, 409 (1987) ("NEA Decision"). In order to determine that a facility proponent has considered a reasonable range of practical alternatives, the Siting Board requires the proponent to meet a two-pronged test. First, the facility proponent must establish that it developed and applied a reasonable set of criteria for identifying and evaluating alternatives in a manner which ensures that it has not overlooked or eliminated any alternatives which are clearly superior to the proposal. Norwood Decision, EFSB 96-2, at 38; 1996 NEPCo Decision, EFSB 95-2 at 37-38; Berkshire Gas Company (Phase II), 20 DOMSC 109, 148-149, 151-156 (1990). Second, the facility proponent must establish that it identified at least two noticed sites or routes with some measure of geographic diversity. Norwood Decision, EFSB 96-2, at 37; 1996 NEPCo Decision, EFSB 95-2, at 38; NEA Decision, 16 DOMSC at 381-409.

In the sections below, the Siting Board reviews Commonwealth's site selection process, including Commonwealth's development and application of its siting criteria as part of its site selection process.

2. Development of Siting Criteria

a. Description

Commonwealth stated that it developed siting criteria and implemented an extensive analytical process to identify and evaluate route alternatives for the proposed transmission line (Exhs. C-1, at V-1; C-2, at 10-11; C-6, at 2-3; C-7, at 5). Commonwealth indicated that its analytical process and related siting criteria sought to reflect engineering and construction requirements and costs associated with the proposed facilities, as well as existing land uses, land and water resources, relevant environmental policy, and regulatory precedent (Exh. C-2, at 10-14).

Commonwealth stated that, in order to investigate the potential routing options for the proposed transmission line, it first determined a facility site study area (Exh. C-6, at 2-3). Based upon the outcome of its analysis of project alternatives (see Section II.B, above), Commonwealth determined that the facility site study area should encompass an area defined as the western side of the Acushnet River in the City of New Bedford, generally between the Acushnet substation and the Pine Street substation (Exhs. C-1, at V-1; C-6, at 2-3; C-7, at 5; Tr. at 47). Commonwealth indicated that it attempted not to impose strict limits on the study area until it had further developed its analysis of practicable route alternatives (Exhs. C-2, at 10; C-6 at 3).

Commonwealth identified three general categories of siting criteria to apply in its evaluation of routes within the study area: cost criteria; environmental criteria; and engineering and reliability criteria (Exh C-1, at exhibit V-B). Commonwealth indicated that, in defining its site selection criteria, it sought to identify particular constraints or impediments to the development of the proposed facility in terms of engineering, construction, economic, and environmental factors (*id.* at V-1; Exh. C-2, at 8, 11).

Commonwealth presented its analysis of cost criteria in the form of a matrix model

designed to quantify costs associated with each of the identified route alternatives. Initially, Commonwealth used cost information provided by contractors in the form of turnkey cost estimates for installation of the proposed project along the primary route, and Commonwealth's estimated internal and overhead costs derived from the Company's internal budget procedures (Exhs. C-1, at V-11; C-6, at 5). From this information, Commonwealth derived an installed cost per linear foot which it then used to estimate the baseline installed cost for each route alternative.²⁹ Commonwealth next identified factors relating to specific engineering or construction requirements that would increase the cost of construction along various route segments (id. at V-14; Exh. HO-C-5(att.)). Construction cost multipliers were thus assigned to the relevant route alternatives, allowing the Company to define a comparative cost analysis matrix which incorporated information relating to both cost and engineering requirements (Exh. C-1, at exhibit V-A).

Commonwealth presented its environmental criteria in the form of a matrix model consisting of thirty-two environmental factors which were divided into three broad categories: natural resource factors; land use factors; and human environmental factors (id. at exhibit V-B). Natural resource factors included impacts to wetlands, surface water, rare or endangered species and their habitats, trees, vegetation, fisheries and scenic views (id.). Land use factors included impacts to residential dwellings, commercial and industrial structures, historic dwellings or structures, historic districts, recreational land, railroad crossings and traffic flow (id.). Human environmental factors included impacts to sensitive receptors such as hospitals, schools, churches and nursing homes, and factors such as noise, electric and magnetic fields ("EMF"), marine navigational requirements, and community acceptance (id.).

Commonwealth stated that, for each proposed route segment, it assigned a score of from zero to five for each of the identified environmental factors (id. at V-13).

²⁹ Commonwealth stated that its estimate of installed cost per linear foot for the primary route was derived by dividing a projected cost of \$7,167,000 by the total length of the proposed project, 19,218 feet. The resulting installed cost per linear foot is \$373.00 (Exh. C-1, at exhibit V-A).

Commonwealth stated that it defined and applied scoring threshold characteristics that reflected quantitatively based information, while minimizing any potential for individual bias in assigning a score (id. and exhibit V-C). The relevant segment scores were summed to form an aggregate score for each route alternative. The route alternatives were then ranked by total score with a lower score being preferable to a higher one (id. at exhibit V-D).

Finally, Commonwealth indicated that it assessed the reliability of the proposed alternatives based on two criteria: overall length, and the ability to construct significant portions of the facility over continuous, straight segments (id. at V-2). The Company explained that straight segments would allow it to maximize the length of cable that could be installed without splicing, and noted that splice points are often identified as the origin of cable failure (id. at V-2, and V-18).

b. Analysis

Commonwealth has developed a set of criteria for evaluating alternative routes that include natural resource factors, land use factors, human environmental factors, cost and reliability -- types of criteria that the Siting Board has found to be appropriate for the siting of transmission lines. See Norwood Decision, EFSB 96-2, at 38; 1996 NEPCo Decision, EFSB 95-2, at 41; 1995 NEPCo Decision, 4 DOMSB at 167. After defining a facility site study area that would encompass all viable route options, Commonwealth identified a comprehensive list of environmental features that might be present within the study area in order to aid in identification and evaluation of potential routes. Commonwealth also assigned scores for each of the criteria which considered the relative impacts of various types of facility construction.

Commonwealth provided a separate analysis of the cost and reliability of each identified route segment and adequately explained the factors that were considered in preparing the cost and reliability analyses. Commonwealth's weighting method provides for a quantitative comparison among environmental criteria; however, Commonwealth did not provide overall weights that could be used to conduct a balancing of the cost, environmental impact, and reliability categories.

In previous cases, the Siting Board has emphasized the need for project proponents to explain fully how they balance cost, reliability and environmental impacts when analyzing siting alternatives. Here, Commonwealth has indicated that the reliability of all identified route segments, taken individually, is essentially the same, and further that the combination of route segments constituting the primary route are comparable or preferable to other route alternatives in terms of reliability. Commonwealth's environmental and cost matrix analyses show that the primary route has both the lowest environmental impact and lowest cost. The record demonstrates that the primary route is comparable or preferable to all other routing alternatives with respect to cost, environmental impacts, and reliability, so an extensive justification of weights is therefore unnecessary.

Consequently, the Siting Board finds that Commonwealth has developed a reasonable set of criteria for identifying and evaluating route alternatives. The Siting Board notes, however, that in future reviews where such balancing is necessary, applicants should provide clear justification for the weighting of these factors in order to fully explain how environmental impacts, cost and reliability are balanced.

3. Application of Siting Criteria

a. Description

Commonwealth evaluated and compared environmental impacts, cost and reliability for twenty specific route segments, which could be combined to form 48 route alternatives (Exh. C-1, at V-11 to V-19). Commonwealth selected three routes for more detailed evaluation, including the primary route, the westerly alternative and the Acushnet alternative. The Company stated that it based its choice of alternatives on the results of its initial route comparison and in order to present for consideration, geographically diverse alternatives to the primary route (id. at V-3 to V-4). Commonwealth personnel, and its consultants in the fields of wetlands and vegetation, engineering, historic and cultural resources, and magnetic fields, participated in this phase of the review (Exhs. HO-E-12; C-2, at 1-2; C-6, at 1). Commonwealth indicated that it continued to discuss the various siting options with City of New Bedford officials and, as the siting analysis progressed, Commonwealth conducted a

noticed public informational meeting with New Bedford residents and officials to identify and assess concerns of New Bedford residents and businesses relative to the construction and operation of the proposed facility (Exh. C-1, at V-14, exhibit V-E; Exh. C-2, at 12, App. A, App. B).

Commonwealth indicated that it collected and considered data relating to relevant engineering and environmental concerns (Exh. C-1, at I-6, exhibit V-I, exhibit V-J, exhibit V-K, App. C, App. D). With regard to environmental factors, the Company conducted surveys of historic structures and properties, trees, wetlands, archaeological resources, traffic patterns and magnetic fields (id.; Exhs. HO-E-16; HO-E-19(att.); HO-E-20). The Company stated that it also assembled and evaluated engineering and cost data relating to such factors as the need to incorporate railroad crossings or to do directional drilling beneath the Acushnet River (Exh. C-7, at 5). The Company explained that it studied specific factors affecting construction cost for particular route segments and applied, within the cost matrix, multipliers for segments involving cost-sensitive construction operations (Exhs. C-1, at exhibit V-A; C-6, at 5; HO-C-5(att.)).

Commonwealth indicated that its environmental experts performed individual inspections and investigations of each route segment for each of the thirty-two environmental factors and assigned an independently derived score for each factor (Exh. C-1, at I-6, V-13). Commonwealth explained that the scores assigned to comparable alternative segments were often similar or identical and, as such, reflected the relatively minimal impacts expected to accompany the construction of the proposed facilities (id. at V-18).

Commonwealth stated that the aggregate environmental score for its primary route was 65, the lowest of all alternatives (Exh. C-1, at V-17 to V-18). The score for the westerly alternative was 104, and the score for the Acushnet alternative was 115 (id. at exhibit V-D). Routes consisting of alternative configurations of noticed segments were also scored. A route using the alternative Acushnet River crossing (segment 20) and following the primary route for the remainder of its length received a score of 77. Two other routes using variations of segments in northern New Bedford that are contained within the primary or alternative routes were scored at 73 and 96 respectively (id.). The majority of the routes

scored between 90 and 120 pursuant to Commonwealth's environmental matrix model (id.). Commonwealth stated that its main objective in selecting segments for public notice, and hence for further study, was to identify and present route alternatives that would provide an appropriate measure of geographic diversity from the primary route (id. at V-1).

Commonwealth indicated that one alternative route received the same aggregate score as its primary route. This route involved two slightly different segments in the residential portion of northern New Bedford (see Exh. C-1, at exhibit V-D). The Company indicated that in the event of a "tie" resulting from its environmental scoring procedure, it deferred to the community acceptance score to determine the preferred route (id. at V-17, n.4; Tr. at 112-115).³⁰

Commonwealth explained that its primary route would generally follow roads that have low to moderate traffic flow, and that are of sufficient width for normal cable construction (Exh. C-1, at V-18). In addition, its primary route would be located within industrial areas for substantial portions of its length (id.; Exh. HO-E-11(att. 1)). Commonwealth explained that industrial locations are generally preferable to residential or commercial areas where impacts of construction would be more significant given the greater number and proximity of sensitive receptors such as churches, schools, nursing homes or parks (id.).

Commonwealth next compared the identified route segments on the basis of as-installed cost. Commonwealth indicated that the primary route was the least-cost alternative with a total construction cost of approximately \$7,167,000 (Exh. HO-C-5(att.)).³¹

³⁰ The combined length of the segment pairs 11 and 15, and 12 and 14, is approximately 1,300 feet, and both of these pairs proceed through substantially similar areas (Exh. C-1, at exhibit I-B, V-9). In connection with its community acceptance criteria, the Company also noted the expressed preference of the New Bedford Department of Public Works ("DPW") for Commonwealth's primary route (id. at exhibit V-G).

³¹ Commonwealth also provided a cost calculation of the total cost for the primary route pursuant to Commonwealth's internal construction cost model. This model reflects internal costs, and overheads (see Exh. HO-C-1).

Commonwealth asserted that the cost advantage for the primary route was due to the shorter overall distance covered, the need for fewer manholes and cable splices, reduced restoration and paving costs given a projected degree of coordination with construction and road resurfacing projects being anticipated by the New Bedford DPW, and the anticipated avoidance of significant environmental mitigation costs (Exhs. C-1 at exhibit V-G; C-6, at 5).

Commonwealth also compared the various route segment combinations with respect to reliability. Commonwealth concluded that the primary route would provide reliability benefits as compared to alternative routes due to its generally straight layout, relatively short overall length, and the fact that it would be geographically distinct from Commonwealth's existing 115 kV cables (Exh. C-1, at V-18; Tr. at 130-140).

Commonwealth stated that its route segment analysis demonstrated that an appropriate set of criteria was applied consistently in the route evaluation process and that, based upon the results of its environmental, cost and reliability analyses, the primary route was preferable to available alternative routes in terms of both cost and environmental impact and was comparable or preferable with respect to reliability (Exh. C-1, at V-18).

b. Analysis

The record demonstrates that Commonwealth identified and evaluated twenty potential route segments that could be combined to form forty-eight route alternatives within a specified facility site study area. Commonwealth provided separate analyses of the environmental impacts, reliability and cost of each identified route segment combination and adequately explained the factors that were considered in preparing its environmental impact, reliability and cost analyses. The Siting Board notes that Commonwealth's evaluation of forty-eight route alternatives represents an initial examination of a broadly inclusive range of siting alternatives.

As a result of its initial siting analysis, Commonwealth identified two distinct alternatives to its primary route: the westerly alternative, and the Acushnet alternative. The record indicates that the Company's noticed alternative routes do not represent the next most

advantageous alternatives to the primary route in terms of environmental impacts. However, Commonwealth presented aggregate scores for all possible route alternatives, and has demonstrated that its primary route received the lowest aggregate score, and that its noticed alternative routes meet the objective of providing geographic diversity relative to the primary route. Therefore, the Siting Board finds that Commonwealth's selection of the primary route, the westerly alternative, and the Acushnet alternative for further evaluation is appropriate. The Siting Board further considers the environmental impacts and cost of the proposed facilities in Section III.C, below.

Based on the foregoing, the Siting Board finds that Commonwealth has applied its site selection criteria consistently and appropriately, and in a manner which ensures that it has not overlooked or eliminated any siting options which are clearly superior to the proposed project.

The Siting Board has found, above, that Commonwealth has developed a reasonable set of criteria for identifying and evaluating alternative routes. Accordingly, the Siting Board finds that Commonwealth has developed and applied a reasonable set of criteria for identifying and evaluating alternatives to the proposed project in a manner in which ensures that it has not overlooked or eliminated any siting options which are clearly superior to the proposed project.

4. Geographic Diversity

Commonwealth considered combinations of twenty different route segments for its proposed transmission line. The combinations of available route segments originate at the Acushnet substation and proceed across the Acushnet River and through New Bedford city streets to the Pine Street substation. Commonwealth's primary route proceeds generally to the immediate west of the Acushnet River through an industrial portion of New Bedford, covering a distance of approximately 3.3 miles.

Commonwealth presented two alternative routes that differ from the primary route

over most or all of their length.³² The westerly alternative proceeds for a total length of 4.0 miles approximately 1,500 to 2,000 feet further to the west of the primary route, generally following the route of Commonwealth's existing underground cables that serve the Pine Street substation (Exh. C-1, at exhibit I-B). The Acushnet alternative generally follows the westerly route for most of its distance but is distinct from the westerly route in that it involves a surface level crossing of the Acushnet River to the north of the primary river crossing, using the Wood Street Bridge and street beds in the Town of Acushnet. The Acushnet alternative results in an additional facility length of nearly two miles (*id.*).

Route segments were identified that provide alternative means through a given area, and several points of potential interconnection were identified. In considering the various routes, Commonwealth identified segments, and routes, having appropriately distinct characteristics.

Based on the foregoing, the Siting Board finds that Commonwealth has identified a range of practical transmission line route alternatives with some measure of geographic diversity.

5. Conclusions on the Site Selection Process

The Siting Board has found that Commonwealth developed and applied a reasonable set of criteria for identifying and evaluating alternatives in a manner which ensures that it has not overlooked or eliminated any alternatives which are clearly superior to the proposed project. In addition, the Siting Board has found that Commonwealth has identified a practical range of transmission line routes with some measure of geographic diversity.

Accordingly, the Siting Board finds that Commonwealth has considered a reasonable range of practical siting alternatives.

³² Commonwealth's westerly alternative differs from the primary route over 87 percent of its length, and has only segments 18 and 19 in common with the primary route. The Company's Acushnet alternative is 100 percent distinct from its primary route (Exh. C-1, at exhibit I-B).

C. Environmental Impacts, Cost and Reliability of the Proposed and Alternative Facilities

1. Standard of Review

In implementing its statutory mandate to ensure a necessary energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost, the Siting Board requires project proponents to show that proposed facilities are sited at locations that minimize costs and environmental impacts, while ensuring a reliable energy supply. In order to determine whether such a showing is made, the Siting Board requires project proponents to demonstrate that the proposed project site for the facility is superior to the noticed alternatives on the basis of balancing cost, environmental impact, and reliability of supply. Norwood Decision, EFSB 96-2, at 43; 1996 NEPCo Decision, EFSB 95-2, at 46; Berkshire Gas Company, 23 DOMSC 294, 324 (1991).

An assessment of all impacts of a 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. Norwood Decision, EFSB 96-2, at 43; 1996 NEPCo Decision, EFSB 95-2, at 46; Eastern Energy Corporation, 22 DOMSC 188, 334, 336 (1991) ("EEC Decision"). A facility which achieves that appropriate balance thereby meets the Siting Board's statutory requirement to minimize environmental impacts at the lowest possible cost. Norwood Decision, EFSB 96-2, at 43; 1996 NEPCo Decision, EFSB 95-2, at 46-47; EEC Decision, 22 DOMSC at 334, 336.

An overall assessment of the impacts of a facility on the environment, rather than a mere checklist of a facility's compliance with regulatory standards of other government agencies, is consistent with the statutory mandate to ensure a necessary energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost. Norwood Decision, EFSB 96-2, at 43-44; 1996 NEPCo Decision, EFSB 95-2, at 47; EEC Decision, 22 DOMSC at 334, 336. The Siting Board previously has found that compliance with other agencies' standards clearly does not establish that a proposed facility's environmental impacts have been minimized. Id. Furthermore, the levels of environmental control that the project proponent must achieve cannot be set forth in advance in terms of

quantitative or other specific criteria, but instead, must depend on the particular environmental, cost and reliability trade-offs that arise in respective facility proposals. Norwood Decision, EFSB 96-2, at 44; 1996 NEPCo Decision, EFSB 95-2, at 47; EEC Decision, 22 DOMSC at 334-335.

The Siting Board recognizes that an evaluation of the environmental, cost and reliability trade-offs associated with a particular review must be clearly described and consistently applied from one case to the next. Therefore, in order to determine if a project proponent has achieved the appropriate balance among 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 in order to make such a determination. Norwood Decision, EFSB 96-2, at 44; 1996 NEPCo Decision, EFSB 95-2, at 47; Boston Edison Company (Phase II), 1 DOMSB 1, 39-40 (1993) ("1993 BECo Decision"). The Siting Board can then determine whether environmental impacts would be minimized. Similarly, the Siting Board must find that the project proponent has provided sufficient cost information in order to determine if the appropriate balance among environmental impacts, costs, and reliability would be achieved. Norwood Decision, EFSB 96-2, at 44; 1996 NEPCo Decision, EFSB 95-2, at 47; 1993 BECo Decision, 1 DOMSB at 40.

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

2. Analysis of the Proposed Facilities Along the Primary Route

a. Environmental Impacts of the Proposed Facilities Along the Primary Route

In this section, the Siting Board evaluates the environmental impacts of the proposed facilities along the primary route and the proposed mitigation for such impacts, and any options for additional mitigation. As part of its evaluation, the Siting Board first addresses whether the petitioner has provided sufficient information for the Siting Board to determine: (1) whether environmental impacts of the proposed facilities would be minimized; and (2) whether the proposed facilities achieve the appropriate balance among environmental impacts and among environmental impacts, cost and reliability. The Siting Board then addresses whether the environmental impacts of the proposed facilities along the primary route would be minimized.

i. River Crossing Impacts

In order to connect the Pine Street substation with the Acushnet substation, the proposed facilities must cross the Acushnet River. In this section, the Siting Board reviews the impact on natural resources of the construction of the proposed facilities using the Company's preferred river crossing. The Siting Board also reviews the impact of the proposed river crossing on the USEPA's ongoing cleanup of hazardous material contained in the sediments of the Acushnet River.

Commonwealth's preferred river crossing alternative, identified as segment 19 in the Company's petition, would proceed westerly from the Acushnet substation, cross on or beneath the bed of the Acushnet River and extend to the intersection of Belleville Avenue and Belleville Road in New Bedford. The Company proposes to complete the river crossing by one of two methods: direct laying of the cable on the river bottom, or directional drilling beneath the river bed (Exh. C-1, at V-3). Commonwealth asserts that overall impacts associated with installation of the cable across the river would be minimized pursuant to either river crossing technique (Exhs. HO-E-13; HO-E-14; Tr. at 88, 104-105). Commonwealth explained that no excavation, filling, or other permanent impacts would be

associated with the river crossing regardless of whether the cable is laid on the river bottom or installed using directional drilling beneath the river bottom (Exh. HO-E-13).

Commonwealth indicated that construction operations would include vehicle traffic between the Acushnet substation and the high water mark on the eastern shore of the Acushnet River which could impact trees and vegetation in that area (Tr. at 104-105). Mr. Collings and Mr. Perry of Commonwealth testified that when possible, the Company would minimize impacts to vegetation by using an existing roadbed in the area between its Acushnet substation and the proposed river crossing (id. at 107). They noted that some clearing of overgrowth would be necessary in order to make use of the existing roadbed, but stated that upon completion of construction operations in this area, vegetated areas would be allowed to revert to their prior condition (id. at 111). Commonwealth also indicated that should any clearing of trees become necessary during reconditioning of the roadbed, the Company expected to leave tree root masses intact to prevent erosion and to promote subsequent regrowth (id. at 110).

Commonwealth stated that its preferred river crossing would result in temporary impacts to wetlands, flowing surface water, and fisheries (Exh. C-1, at exhibit V-B). In terms of impacts to wetlands, the Company indicated that construction activity would be required in wetland areas, but that no temporary or permanent filling of such areas would be necessary (id. at exhibit V-C).³³ The Company stated that construction equipment would need to travel over the uplands and wetlands between the Acushnet substation and the eastern shore of the Acushnet River in the course of installing the duct bank and other facility components (Tr. at 104-105). The Company stated that it planned to use a combination of interlocking oak matting and a "geo-tech style" fabric matting to minimize the impacts of

³³ Commonwealth indicated that the proposed facility would include the installation of manhole access to the duct bank on the Acushnet side of the river, but stated that such manhole would likely be sited within the upland area adjacent to the Acushnet substation, roughly 200 to 300 feet from the river bank (Tr. at 111, 142). The Company noted that it would not typically choose to locate a manhole in a wetland area because access to facility components at such locations would be compromised by flooding (id.).

necessary construction traffic (id.; Exh. HO-E-14).

Commonwealth also stated that it would develop a comprehensive, site-specific mitigation plan that would be reviewed by the Conservation Commissions of the Town of Acushnet and the City of New Bedford to mitigate wetland impacts (Exh. HO-E-14; Tr. at 104-105, 109-110). The Company stated that, as necessary, it would segregate wetland plant root masses for replanting, or plant wetland vegetation in disturbed areas (Exh. HO-E-14; Tr. at 88-89). The Company stated that it had previously used similar techniques in constructing transmission lines through wetland areas, and that it would bring such experience to bear in formulating and executing construction operations for the proposed project (id.). Commonwealth also noted that it had successfully installed, and currently maintains, other transmission and distribution facilities in the immediate vicinity of the proposed river crossing (Exh. HO-C-3(att. a); Tr. at 105-110).

Commonwealth stated that it explored the possibility that protected eel grass beds may be located in the vicinity of route segment 19, and concluded, based on the results of its own investigation and consultation with officials at the MDEP Wetlands Conservancy Program, that the proposed river crossing would not impact eel grass beds (Exhs. C-1, at V-15, App. D at 1; HO-E-15(att.)).

Commonwealth also assessed potential impacts of the proposed river crossing on fisheries (Exh. C-1, at V-14, App. D at 1). The Company noted that a herring run is present in the vicinity of the proposed crossing but asserted that its proposed facility would not impact the herring run (id. at exhibit V-C; Exh. HO-E-20). The Company noted that if directional drilling techniques are employed for the river crossing, there would be no physical disturbance to the river and hence no disturbance to the herring run (id.). Alternatively, Commonwealth stated that installation of the proposed cable on the river bottom could be completed in a relatively short time frame and would therefore have little or no impact on migrating fish populations (Exh. HO-E-20). Commonwealth confirmed this conclusion based upon consultations with the Massachusetts Division of Marine Fisheries

(id.; Exh. C-1, at App. D).³⁴

With respect to impacts involving hazardous materials or hazardous waste, Commonwealth stated that it intends to coordinate construction activity associated with its proposed project with USEPA's ongoing cleanup of hazardous materials in the sediments of the Acushnet River (id.; Exh. C-7, at 7). Commonwealth noted that construction of the river crossing would take place within, but would not materially impact, the hazardous waste area (Exh. C-1, at exhibit V-B, exhibit V-C). Commonwealth provided evidence that it has engaged in discussions with the USEPA regarding the development of a final cleanup plan to address hazardous wastes contained in the sediments of the Acushnet River (Exhs. HO-C-3, HO-C-3(att.); HO-E-13(supp.)).

Commonwealth stated that its preferred installation method is to lay the cable directly on the river bottom, thereby adding a new line in a river crossing corridor where there already are existing transmission and distribution lines (Exh. C-1, at V-17). Commonwealth asserted that its new and existing cables could be relocated later to a new dredged area within the cleanup area, but outside of any USEPA designated confined sediment disposal facilities ("CDFs") (Exh. HO-C-3(att. a) at 3-5). Such a solution would allow the USEPA to complete dredging of contaminated areas while allowing the Company to maintain its supply lines (id.). The Company stated that the alternative of directional drilling of the river crossing segment would add \$250,000 to \$500,000 to the cost of the project (id.).

While laying the cable on the river bottom is Commonwealth's preferred option, the USEPA, in written correspondence with the Company, has noted that its proposed cleanup plan is not complete with respect to the final disposition of Commonwealth's existing and proposed cables (id. at 1). Moreover, in comments submitted subsequent to its review of Commonwealth's Environmental Notification Form ("ENF") for the project, the MDEP stated that it did not concur with Commonwealth's preferred option of placing the proposed

³⁴ Commonwealth indicated that, depending upon the construction technique employed, it would investigate the prospect of scheduling construction of the river crossing portion of the proposed facility so as to avoid construction activity during the spawning season (Exh. HO-E-20).

cable on the river bottom as the installation would make the planned remediation more difficult (Exh. HO-RR-3). However, MDEP did not indicate a preference either for directional drilling or for the use of the Wood Street Bridge crossing proposed in the Company's Acushnet alternative (see Section III.A.2, below) (Exhs. HO-RR-3(att.); HO-RR-3(supp.)). The Siting Board also notes that the proposed project would be subject to MDEP review and licensing under the Waterways Act (G.L. c. 91), and through the issuance of a Water Quality Certificate (*id.*).³⁵

The record demonstrates that construction of the proposed facilities using the preferred river crossing would result in temporary impacts to vegetation and trees, temporary impacts within wetland areas, and minimal or no impact to fisheries resources. The Siting Board finds that, with implementation of the proposed mitigation measures, each of the identified impacts would be sufficiently mitigated.

With respect to hazardous materials, the record indicates that coordination of the USEPA's dredging program is ongoing, and that Commonwealth may be required to move some or all of its existing lines to accommodate the cleanup. The Siting Board notes that either of Commonwealth's proposed river crossing techniques has the potential to minimize the impacts of the river crossing on the dredging and remediation program, depending on the needs of the program. Further, the Siting Board finds that both the directional drilling and the direct lay options present acceptable balances between environmental impacts and costs.³⁶ In the absence of additional information as to the timing and requirements of the USEPA dredging operations and the costs of moving the proposed facility if it interferes with the dredging operations, the Siting Board can make no finding with respect to which of

³⁵ The Siting Board notes that the Executive Office of Environmental Affairs stated in its Certificate on Commonwealth's ENF that the proposed project shall not require the preparation of an Environmental Impact Report (Exh. HO-RR-3(supp.)(att.)).

³⁶ In making this finding, the Siting Board acknowledges that: (1) the directional drilling option would initially be more costly but have fewer potential environmental impacts; and (2) the direct lay option, with its greater potential for environmental impacts, although less costly initially, may have additional costs associated with later cable moves to accommodate the USEPA's operations.

Commonwealth's proposed river crossing techniques would represent the optimal solution to all concerns. The Siting Board therefore directs Commonwealth to work with the USEPA to develop a mutually agreeable solution to this issue, to inform the Siting Board as to the final configuration of the proposed facilities in the vicinity of the Acushnet River, and to report any significant changes in cost or design that justify the choice of configuration.

Accordingly, the Siting Board finds that, with the implementation of the proposed mitigation measures and continued coordination with the USEPA concerning the configuration of the river crossing, the environmental impacts of the proposed facilities along the primary route would be minimized with respect to impacts upon natural resources in the vicinity of the proposed river crossing.

ii. Impacts Outside the River Crossing

In this section, the Siting Board reviews the impact of the proposed facilities along the streetbed segments of the primary route with respect to existing land uses, natural resources, traffic, and construction noise and dust.

Commonwealth stated that it assessed land use impacts by considering impacts on the following: residential dwellings, historic residential dwellings and historic districts, commercial uses, industrial uses, archaeological resources, and agricultural and recreational land (Exh. C-1, at exhibit V-B). The Company asserted that the construction of the proposed project along the primary route would have essentially no impact on the adjacent existing land uses, except for short-term impacts during construction, because construction would take place entirely within existing easements and ROWs (*id.* at V-18, and exhibit V-B; Exh. HO-E-3).

Commonwealth indicated that it preferred to minimize impacts to residential areas and determined that construction through commercial and industrial areas was therefore favored (Exh. C-1, at V-15). Commonwealth stated that the primary route would proceed mainly through commercial and industrial areas in the City of New Bedford and that, consequently, the primary route would minimize impacts to residentially zoned portions of the City of New Bedford (Exh. C-7, at 7). Commonwealth stated that its primary route would also minimize

impacts to sensitive receptors such as churches, schools and nursing homes, and that these considerations favored routes, such as the primary route, that incorporated segment 3 (Exh. C-1, at V-15). The Company stated that construction of the proposed facility would involve temporary impacts to residential and commercial areas, resulting from the excavation of a trench and installation of a concrete duct bank, and other related activities that would be conducted within the public ROW (*id.* at V-12, n.3, and V-18). Commonwealth indicated that it would mitigate the impacts of construction through timely backfilling and patching of road surfaces and the use of steel plates to maintain access to residences and businesses across any open sections of trench (Exhs. C-6 at 5; C-7 at 8). The Company noted that construction along the primary route could be expected to progress at a rate of 150 to 200 feet per day, suggesting that construction-related inconvenience to individual residences or businesses would be of relatively short duration (Exh. HO-E-4).

With respect to impacts to historic districts and residences, Commonwealth explained that the primary route passes by the edge of the Merrill's Wharf Historic District along the New Bedford waterfront where historic ships and waterfront structures are located (Exh. C-1, at V-6). The Company stated that no part of the historic district would be impacted by the proposed facility (*id.*) The Company noted that its primary route also passes through a National Register district and that four structures along the route are identified as National Register properties (*id.* at exhibit V-K, App. C at 11). Commonwealth stated that construction of the proposed facilities would have no impact on these structures (*id.*).

With respect to impacts on agricultural or recreational land, the Company stated that no agricultural lands would be impacted and that a small park located adjacent to segment 7 at Earle Street would be temporarily impacted by construction activity (*id.* at V-8, exhibit V-B).

With respect to impacts on archaeological resources, Commonwealth indicated that construction along the primary route may impact the Lawson Cultural Site, which is located on the east bank of the Acushnet River in the Town of Acushnet (*id.* at V-10, App. C). Commonwealth explained that the Lawson Cultural Site has been identified as a potential location of prehistoric resources; however, it argued that extensive disturbance to this area

from prior construction and river dredging activities "make it unlikely that any materials recovered from such area would be in good physical condition or appropriate context" (*id.*). Commonwealth's archaeological consultant supported this conclusion (*id.* App. C at 10).

Commonwealth stated that the construction of the proposed facilities along the primary route would result in limited and temporary impacts to existing natural resources, primarily trees (*id.* at V-15, exhibit V-B, and App. D; Exh. C-7, at 7-8). Commonwealth indicated that it conducted a comprehensive inventory of the various trees located along each of the identified route segments.³⁷ The primary route includes two roadbed segments with existing trees (Exh. C-1, at V-13, exhibit V-C). Commonwealth stated that it did not expect construction of the proposed transmission line to significantly affect any trees along city streets, since construction would be completely within existing roadways and, therefore, would be unlikely to encounter significant numbers of tree roots (*id.* at V-15; Exhs. C-7, at 8; HO-E-21). The Company explained that the majority of city streets previously have been disturbed in the course of installation of other utility facilities including telephone, gas, and electric facilities, as well as sewer and street drain systems, thereby reducing the likelihood of encountering tree roots in the course of constructing the proposed facility (Exh. HO-E-21). The Company indicated that should street-side trees be encountered in the course of construction, Commonwealth would consult with the Tree Warden of the City of New Bedford in order to mitigate the impacts of construction activity (*id.*). The Company stated that mitigation of impacts to trees, if necessary, would include hand excavating around root structures, treatment of damaged roots, and fertilizing and watering following construction (*id.*).

With respect to traffic impacts, Commonwealth stated that traffic flow along the primary route was primarily light to moderate (Exh. C-1, at exhibit V-B). The Company stated that it would use police details to promote efficient traffic flow around construction activities, and provide temporary pedestrian walkways, as necessary, to maintain access to

³⁷ Commonwealth retained the BSC Group, Inc. of Worcester and Norwell, Massachusetts to perform a wetlands inventory and a tree enumeration and identification (Exh. C-1, at V-15, exhibit V-I, App. D).

public transportation and ensure public safety (Exh. HO-E-16). Commonwealth indicated that steel plates would be used to maintain access to property located along the proposed route, and that representatives of the Company would consult with residents and businesses prior to construction so as to identify and resolve concerns regarding access (Exh. C-2, at App. C). The Company added that, to minimize inconvenience to area residences and businesses, it would backfill and patch road surfaces as construction progressed, and provide permanent resurfacing of roadways, consistent with New Bedford DPW standards, within approximately thirty days (Exh. C-6, at 5-6).

Commonwealth indicated that temporary noise impacts associated with construction would derive primarily from asphalt cutting, trenching, and backfilling operations (Exh. HO-E-9). Commonwealth stated that noise impacts would be mitigated by conducting construction activity during normal business hours when ambient noise levels are highest (*id.*). Commonwealth noted that noise impacts to residential receptors also would be minimized as a result of the choice of a route that traverses areas having industrial and commercial uses along significant portions of its length (Exh. C-1, at V-15).

Commonwealth stated that it would control airborne dust by sweeping or watering if necessary and noted that the relatively rapid backfilling of trenches would tend to minimize dust formation (Exhs. HO-E-9; C-7, at 8). Commonwealth also stated that it would remove excavated soil from the site of construction activity (Exh. HO-E-16).

The record indicates that the principal environmental impacts resulting from the construction of the proposed project along the primary route would occur during facility construction. The proposed project would have no impact on historic resources or agricultural land, and only temporary construction impacts on residential, commercial and industrial areas. Moreover, impacts on residential land uses have been minimized by routing the proposed project primarily through commercial and industrial areas.

With regard to natural resources, the construction of the proposed facility along the primary route would involve minimal impact to trees, and Commonwealth has identified appropriate mitigation techniques with respect to tree impacts for the construction of the proposed facilities. With regard to traffic, the primary route would be constructed entirely

within existing easements and ROWs, and Commonwealth would repair all street surfaces affected by construction in accordance with New Bedford DPW standards. Finally, Commonwealth has identified, and would implement, appropriate mitigation for temporary impacts relating to construction noise and dust. In summary, the record demonstrates that Commonwealth has proposed appropriate steps to mitigate the identified impacts of construction activity along the primary route.

Accordingly, the Siting Board finds that, with the implementation of Commonwealth's proposed mitigation measures, the environmental impacts of the proposed facilities along the street portions of the primary route would be minimized with respect to land use, natural resources, traffic and safety, and construction noise and dust.

iii. Magnetic Field Levels

Commonwealth asserted that the construction of the proposed facilities along the primary route would result in minimal impact in terms of magnetic fields (Exh. C-1, at exhibit V-B). In support of its assertion, Commonwealth provided data on magnetic field levels for the existing electric facilities and the proposed transmission line along the primary route.³⁸ Measurements of existing magnetic fields were conducted along transects within existing roadways by Commonwealth's consultant, Enertech Consultants, Inc. The Company stated that existing magnetic fields ranged from 0.3 mG to 19.7 mG along the primary route (Exh. HO-E-19(att.) Sec. 1, at 4).

The Company modelled magnetic field levels for the proposed transmission line along the primary route under three load conditions: average load (110 amperes), peak load (180 amperes), and emergency load (450 amperes); and two possible cable configurations: pipe type and solid dielectric (Exh. HO-E-19(att.) Sec. 3, at 2, and Sec. 1, at 5). The model indicates that the maximum magnetic field for a pipe type cable, measured at one meter above the road surface on the cable axis, would be 0.75 mG under average load, 1.15 mG

³⁸ The Company indicated that, as a result of subsurface construction, there would be no significant impacts from electric fields (Exhs. HO-E-19, HO-E-19(att.)).

under peak load, and 2.55 mG under emergency load (*id.* Sec. 1, at 5). For a solid dielectric cable, projected maximum magnetic field would be 9.0 mG under average load, 15.0 mG under peak load, and 37.5 mG under emergency load (*id.*).

The Company also presented what it termed "street averages" for the proposed facility, which are spatially averaged magnetic fields within a seventy foot wide corridor bisected by the proposed cable. The Company asserted that street average magnetic field levels from the facility would range from 0.3 mG under average load to 0.9 mG under emergency load for the pipe type cable, and would range from 3.1 mG under average load to 13.0 mG under emergency load for the solid dielectric cable (*id.*).

Commonwealth noted that its estimates of magnetic fields attributable to the proposed facility did not account for pre-existing magnetic fields from distribution lines present along the primary route, and provided additional calculations of averaged magnetic fields, with and without the proposed facilities.³⁹ Commonwealth indicated that along the primary route, the existing average magnetic field is 3.2 mG under average load and 5.2 mG under peak load (*id.*). The Company calculated that the combined average magnetic field under average load conditions would be 3.21 mG for a pipe type cable, and 4.46 mG for a solid dielectric cable, and that the combined average magnetic field levels under peak load would be 5.22 mG for a pipe type cable and 7.35 mG for a solid dielectric cable (Exh. HO-E-19).⁴⁰

³⁹ The Company derived these field levels by calculating the square root of the sum of the squares for the existing and projected magnetic field levels (Exh. HO-E-19). The field levels used in the calculation were themselves averaged in two dimensions: (1) longitudinally, *i.e.*, along the path of the proposed line; and (2), laterally, *i.e.*, perpendicular to the proposed line within a seventy foot corridor for the projected fields, and within an actual corridor, bounded by existing street curbs, for the existing fields (Exh. HO-E-19(att.) at Sec.1, n.4). The Siting Board notes that while this method allows for a simplified comparison of the two proposed cable types with respect to magnetic field impacts, it ignores the variations in magnetic fields levels that are frequently observed along electric utility corridors, and thus may not reflect actual worst-case impacts.

⁴⁰ Commonwealth did not provide estimates of magnetic fields in future years. The Company stated that it forecasted that average load levels in the Pine Street load area
(continued...)

Commonwealth concluded that existing magnetic field levels would not be significantly affected by the construction of the proposed transmission line due to its underground construction and its location within an established ROW (Exhs. C-1, at V-16 to V-17; HO-RR-4, at 1; HO-E-19, HO-E-19(att.)). Commonwealth indicated that no special design configurations would be necessary to achieve acceptable magnetic field levels (*id.*). Commonwealth further asserted that its analysis showed no significant differences with respect to overall field levels regardless of whether a solid dielectric cable or a pipe type cable was selected for the proposed project (Exh. HO-E-19; Tr. at 124).

In a past review of proposed transmission line facilities which included 345 kV transmission lines, the Siting Board accepted edge-of-ROW levels of 85 mG for magnetic fields. 1985 MECo/NEPCo Decision, 13 DOMSC at 228-242. The Siting Board has also applied these edge-of-ROW levels in subsequent reviews of facilities which included 115 kV transmission lines. See Enron Power Enterprise Corporation, 23 DOMSC 1, 227 (1991); MASSPOWER, Inc., 20 DOMSC 301, 401-403 (1990). Here, Commonwealth's calculations suggest increases in average magnetic field levels due to the proposed transmission line would be minimal regardless of the type of construction used -- less than 1.5 mG under average load and less than 2.5 mG under peak load. Moreover, even the projected maximum magnetic field level directly above the cable is well below levels previously accepted by the Siting Board for edge-of-ROW locations.

Accordingly, despite its concerns regarding the Company's use of "average" magnetic field levels, the Siting Board finds that the impacts of the proposed facilities along the primary route would be minimized with respect to magnetic fields.

⁴⁰(...continued)

would grow at a compound annual growth rate of 0.6 percent (Exh. C-1, at App. A). The Company's witness, Mr. Eklund, stated that average load would not reach the present level of peak load during Commonwealth's twenty year forecast period (Tr. at 134-135).

iv. Conclusions on Environmental Impacts

In Section III.C.2.a, above, the Siting Board has reviewed the information provided by Commonwealth regarding environmental impacts of the proposed facilities along the primary route and the potential mitigation measures. The Siting Board finds that Commonwealth has provided sufficient information regarding environmental impacts of the proposed facilities along the primary route and potential mitigation measures for the Siting Board to determine whether environmental impacts would be minimized and whether the appropriate balance among environmental impacts and between environmental impacts and cost would be achieved.

In Section III.C.2.a, above, the Siting Board has found that: (1) with the implementation of the proposed mitigation measures and continued coordination with the USEPA concerning the configuration of the river crossing, the environmental impacts of the proposed facilities along the primary route would be minimized with respect to impacts upon natural resources in the vicinity of the proposed river crossing; (2) with the implementation of Commonwealth's proposed mitigation measures, the environmental impacts of the proposed facilities along the street portions of the primary route would be minimized with respect to land use, natural resources, traffic and safety, and construction noise and dust; and (3) the impacts of the proposed facilities along the primary route would be minimized with respect to magnetic fields.

Accordingly, the Siting Board finds that, with the implementation of proposed mitigation measures and the continued coordination with the USEPA concerning the configuration of the river crossing, the environmental impacts of the proposed facilities along the primary route would be minimized.

b. Cost of the Proposed Facilities Along the Primary Route

Commonwealth asserted that the construction of the proposed transmission line along the primary route is the least cost alternative based on its analysis of construction costs (Exhs. C-1, at V-17; HO-C-5(att.)). Commonwealth estimated that construction costs, including material, labor, permitting, and substation costs, would total approximately

\$7,167,000 (Exh. HO-C-5(att.)). Commonwealth estimated the 1997-2037 PVRR for the proposed project would be \$9,171,000, including adjustment for line loss savings of \$503,000 (Exh. C-1, at exhibit IV-E). Commonwealth stated that its analysis reflected annual operations and maintenance ("O&M") costs of approximately \$8,000 for the primary route (Exh. HO-C-2).

The Siting Board finds that Commonwealth has provided sufficient cost information for the Siting Board to determine whether an appropriate balance would be achieved between environmental impacts and cost.

c. Reliability of the Proposed Facilities Along the Primary Route

Commonwealth asserted that the construction of the proposed transmission line along the primary route is the most reliable alternative (Exh. C-1, at V-18) (see Section II.B.4, above). Commonwealth stated that the primary route is most reliable because it was geographically distinct from Commonwealth's existing transmission cables, and because it followed a generally shorter and straighter route than the identified alternative routes (*id.*).

The Siting Board finds that Commonwealth has provided sufficient reliability information for the Siting Board to determine whether an appropriate balance would be achieved between environmental impacts, cost and reliability.

d. Conclusions

The Siting Board has found that Commonwealth has provided sufficient information regarding the environmental impacts of the proposed facilities along the primary route and potential mitigation measures for the Siting Board to determine whether environmental impacts would be minimized and whether the appropriate balance among environmental impacts and between environmental impacts, cost and reliability would be achieved. The Siting Board has also found that Commonwealth has provided sufficient cost and reliability information for the Siting Board to determine whether an appropriate balance would be achieved among environmental impacts, cost and reliability. In Section III.C.2.a, above, the Siting Board has found that, with the implementation of proposed mitigation measures and

the continued coordination with the USEPA concerning the configuration of the river crossing, the environmental impacts of the proposed facilities along the primary route would be minimized.

Accordingly, the Siting Board finds that the proposed facilities along the primary route would achieve an appropriate balance among conflicting environmental concerns as well as among environmental impacts, cost and reliability.

3. Analysis of the Proposed Facilities Along the Alternative Route Segment Combinations and Comparison

a. Environmental Impacts of the Proposed Facilities Along the Alternative Routes and Comparison

In this Section, the Siting Board evaluates the environmental impacts of the proposed facilities along the alternative routes identified by Commonwealth, and potential mitigation for such impacts, and compares the primary and alternative routes. First, as part of its evaluation, the Siting Board addresses whether the petitioner has provided sufficient information regarding alternative routes for the Siting Board to determine whether the environmental impacts of the proposed facilities would be minimized, and whether the proposed facilities would achieve the appropriate balance among environmental impacts and among environmental impacts, cost and reliability. If necessary for its review, the Siting Board separately addresses whether the environmental impacts of the proposed facilities along the alternative routes would be minimized, with potential mitigation. Finally, the Siting Board compares the environmental impacts of the primary route to the environmental impacts of each of the alternative routes.

For purposes of this analysis, Commonwealth identified two route alternatives: the westerly alternative and the Acushnet alternative (see Section III.A.2, above).

i. River Crossing

In this section, the Siting Board reviews the impacts of the construction of the proposed facilities on natural resources in the vicinity of the river crossings for the alternative routes, and on the USEPA's on-going cleanup of hazardous materials contained in

the sediments of the Acushnet River, and compares the primary and alternative routes.

(a) Westerly Alternative

The Company's westerly alternative would use the same river crossing as the Company's primary route. The Siting Board notes that, in its detailed specification and estimation of cost of the various route alternatives, Commonwealth assumed directional drilling beneath the Acushnet River for its westerly alternative, and assumed a river bottom installation for its primary route. In Section III.A.2, above, the Siting Board considered the choice of river crossing technique as a design alternative.⁴¹ For purposes of comparison, here the Siting Board places the route alternatives on an equal footing with respect to the choice of river crossing technique, and assumes the same technique would be used for the westerly alternative as for the primary route.

The record therefore indicates that the westerly alternative would be identical to the primary route in the river crossing segment. Accordingly, the Siting Board finds that the primary route and the westerly route would be comparable with respect to natural resource impacts in the vicinity of the river crossing.

(b) Acushnet Alternative

Commonwealth asserted that construction of the Acushnet alternative's river crossing, segment 20, would involve incremental impacts to natural resources, primarily in the area between South Main Street in the Town of Acushnet and Commonwealth's Acushnet

⁴¹ The Siting Board has found that, with the implementation of the proposed mitigation measures, and continued coordination with the USEPA concerning the configuration of the river crossing, the environmental impacts of the proposed facilities along the primary route would be minimized with respect to impacts upon natural resources in the vicinity of the proposed river crossing (see Section III.C.2.a.i, above). Furthermore, Commonwealth indicated that its choice of a river crossing technique with respect to segment 19 is not contingent upon the Siting Board's approval of a particular route, but rather that it more likely would be influenced by the needs and requirements of the USEPA and/or the Army Corps of Engineers (Exh. C-1, at V-3 to V-4, V-10) (see Section III.C.2.a.i, above).

substation. The Company stated that in this area, its alternative route would follow the Company's existing transmission ROW across approximately 2500 feet of land and water resources, including a mix of uplands and bordering vegetated wetlands, a salt marsh and a tidal creek (Exh. C-1, at V-10 to V-11, App. D, at 4). The proposed facility would then be routed beneath streets in the Town of Acushnet, and would cross the Acushnet River in a conduit that would be attached to the Wood Street bridge (id. at V-11). The Company stated that overall, the Acushnet alternative river crossing would be approximately 1.7 miles longer than the preferred crossing (Exh. HO-C-5(att.)).

Commonwealth argued that, in addition to environmental impacts similar to those identified for the primary river crossing, the Acushnet alternative would result in additional impacts to water resources, and increased impacts to trees and vegetation (Exh. C-1, at exhibit V-B). The Company indicated that the primary benefit of this alternative river crossing would be the avoidance of disturbance to the bottom of the Acushnet River (id. at V-4).

With respect to water resources, the Company indicated that the Acushnet alternative would involve temporary facility construction impacts across salt marsh and tidal creek areas (id. at App. D). The Company stated that the impacts of construction in other wetland areas under the Acushnet alternative would be similar to those under the primary route, and that such impacts would be mitigated by the use of interlocking oak matting to minimize the impact of vehicle traffic, and the preservation and replanting of affected wetland plants (Exh. HO-E-14; Tr. at 104-105). With respect to impacts to trees and vegetation, the Company stated that construction along the existing transmission ROW between the Acushnet substation and South Main Street would require the removal of up to twenty-five mature trees which currently screen views of the ROW from South Main Street (Exhs. C-1, at V-11; HO-E-1(supp.)). Commonwealth indicated that it would mitigate tree and vegetation impacts by tying back overhanging branches, hand excavating around root structures, treating damaged roots, and replacing plantings that would be unavoidably damaged or removed in the course of facility construction (Exhs. HO-E-14, HO-E-21; Tr. at 88-89, 110).

The record indicates that impacts to trees and vegetation associated with the Acushnet

alternative river crossing would be minimized with the appropriate mitigation measures. However, these impacts would be greater than those for the primary route due to the greater distance covered by the Acushnet alternative, and the need to clear trees and vegetation along the buffer between Commonwealth's ROW and South Main Street in Acushnet. The record indicates that with respect to water resources, use of the Acushnet alternative would involve impacts similar to those along the primary route, but that the greater distance of the alternative route would result in greater impacts to wetlands, including a salt marsh and a tidal creek.

The record indicates that the Acushnet alternative would avoid impacts to the Acushnet River bottom and would not affect the USEPA's on-going dredging and remediation program. The Siting Board notes that the benefits of avoiding adverse impacts to the dredging and remediation program deserve significant weight in light of evidence which suggests difficulty in coordinating the dredging program with the construction of the proposed facilities along the primary route (see Section III.C.2.a.i, above). However, such impacts could be completely avoided along the primary route by using directional drilling to cross under the Acushnet River, rather than laying cable along the bottom of the river. This approach both would eliminate impacts to natural resources in the Town of Acushnet, with the exception of the relatively short distance between the Acushnet substation and the Acushnet River, and would involve lower incremental costs than the use of the alternative river crossing.⁴²

Accordingly, the Siting Board finds that the preferred river crossing, using directional drilling if necessary, would be preferable to the Acushnet alternative with respect to natural resource impacts in the vicinity of the river crossing.

⁴² The Siting Board recognizes that the Acushnet alternative, in minimizing impacts at the river crossing by using a bridge, results in impacts in the Town of Acushnet relating to land use, archaeological resources, traffic, construction noise and dust, and magnetic fields. The Siting Board examines these categories of impacts under Sections III.C.3.a.ii, and iii, below, and gives weight to these impacts in determining overall preferability among the Company's river crossing alternatives.

ii. Impacts Outside the River Crossing

In this section, the Siting Board reviews the impact of construction of the proposed facilities along the remaining streetbed segments of the alternative routes with respect to existing land uses, natural resources, traffic and safety, and construction noise and dust, and the potential mitigation for such impacts, and compares the primary and alternative routes.

(a) Westerly Alternative

Commonwealth stated that the westerly alternative would involve greater construction impacts than the primary route with respect to land use (Exh. C-1, at exhibit V-B). Specifically, Commonwealth indicated that the westerly alternative would traverse more residential and commercial areas than would the primary route, and argued that construction through industrial areas was preferred in order to minimize impacts to sensitive receptors such as churches, schools, nursing homes and parks (*id.* at V-18). With respect to impacts to residential areas and historic districts, Commonwealth stated that the westerly alternative would proceed to the immediate west of the Central New Bedford Historic District, continuing through the County Street National Register Historic District, the North New Bedford National Register Historic District and the Acushnet Heights National Register Historic District, and past numerous historic residences (*id.* at V-7, App. D). Commonwealth stated that the westerly alternative would proceed past 188 National Historic Register Properties while the primary route would proceed past four such properties (*id.* at exhibit V-K). The Company indicated that the westerly alternative would also pass through a park and would impact residentially-zoned areas for substantial portions of its length (*id.* at V-6 to V-8, V-16, exhibit V-K, App. C, at 8; Exh. HO-E-11(a)(att.)).

The record indicates that the westerly alternative would traverse a greater portion of land that is zoned for residential and commercial use and would require construction in close proximity to historic districts and properties. The Siting Board therefore finds that the primary route would be preferable to the westerly alternative with respect to land use impacts.

Commonwealth asserted that the construction of the proposed facilities along the

westerly alternative would involve greater impacts to natural resources than would the primary route (Exh. C-1, at V-17, and exhibit V-B). In particular, Commonwealth stated that the westerly alternative would include more route segments with street trees, resulting in a slightly higher probability that tree roots would be encountered in the course of construction, although Commonwealth noted that, as with the primary route, no impacts to street trees were expected (id. at exhibit V-B, exhibit V-I, and App. D; Exh. C-7, at 8). Commonwealth indicated that mitigation of impacts to trees would be identical to that proposed for the primary route (see Section III.C.2.a.ii, above). Commonwealth also stated that route segment 5, a long segment of the westerly alternative that proceeds southerly approximately 1,500 to 2,000 feet to the west of the primary route, passes through an area noted for its scenic views and other aesthetic characteristics, but indicated that no permanent impacts to such scenic areas would result from facility construction (Exh. C-1, at exhibit V-B).

The record indicates that the impacts of facility construction along the westerly alternative with respect to natural resources would be temporary, and that, with the appropriate mitigation measures, impacts to trees and scenic areas along the westerly alternative would be minimized. The Siting Board therefore finds that the primary route would be slightly preferable to the westerly alternative with respect to impacts to natural resources.

The Company stated that traffic impacts would be significant for the westerly alternative since the westerly alternative runs along roads in commercial and residential portions of New Bedford where traffic flow is moderate to heavy (id.). The Company also noted that significant portions of segments 5 and 8 are used as bus routes by schools and other public carriers (id.; Exh. HO-E-16(atts. 1, 2, 3, 4)). Commonwealth stated that it would use the same measures developed to address traffic and safety impacts along the westerly alternative as were proposed for the primary route (see Section III.C.2.a.ii, above).

The record indicates that, as compared to the primary route, the westerly alternative would traverse areas where the impacts of facility construction would be greater with respect to traffic flow. The record demonstrates that, with the appropriate mitigation measures,

traffic impacts along the westerly alternative would be minimized, but that such impacts would be greater along the westerly alternative than along the primary route. The Siting Board therefore finds that the primary route would be preferable to the westerly alternative with respect to traffic impacts.

Commonwealth stated that the impacts of construction noise and dust along the westerly alternative would be comparable to those along the primary route, but noted that, due to differences in zoning between the two routes, a greater number of sensitive receptors such as churches, schools, and parks would be affected by these impacts along the westerly alternative (Exh. C-1, at V-5 to V-11). Commonwealth indicated that its proposed mitigation for construction noise and dust would be identical to that proposed for the primary route (Exh. HO-E-9) (see Section III.C.2.a.ii, above).

The record indicates that, with the appropriate mitigation measures, impacts from construction noise and dust along the westerly alternative would be minimized. The record demonstrates that because there are fewer sensitive receptors located along the primary route, the primary route would be preferable to the westerly route with respect to construction noise and dust impacts.

Based on the foregoing, the Siting Board finds that the primary route would be preferable to the westerly alternative with respect to land use impacts, traffic and safety impacts, and noise and dust impacts, and would be slightly preferable to the westerly alternative with respect to natural resource impacts.

Accordingly, the Siting Board finds that the primary route would be preferable to the westerly alternative with respect to land use, natural resources, traffic and safety, and construction noise and dust impacts along street portions of the primary route.

(b) Acushnet Alternative

Commonwealth asserted that, because the Acushnet alternative would follow a route comparable to that proposed for the westerly alternative for most of its length, the impacts of the Acushnet alternative would be essentially equivalent to those of the westerly alternative, except in the vicinity of segment 20, the Acushnet River crossing (Exh. C-1, at exhibit V-B).

However, Commonwealth identified additional land use and traffic impacts associated with segment 20.

With respect to land use impacts, Commonwealth indicated that the Acushnet alternative would involve temporary impacts to residential and commercial land uses in the Town of Acushnet (id.). The Company stated that segment 20 would be located within portions of Slocum Road and South Main Street in Acushnet, and that these streets are characterized by a mix of residential and small commercial uses (id. at V-11). The Company noted that the Town of Acushnet Selectmen have expressed a strong preference for the Company's preferred river crossing (id. at V-14 to V-15, V-18, exhibit V-G). The Company also stated that the Acushnet alternative could involve impacts to archaeological resources in the vicinity of the Acushnet substation. In particular, the Company indicated that the proposed route would pass between the Swift and Lawson cultural sites, which are potential locations of prehistoric resources (id. at V-11). While the Company acknowledged that these sites likely would not be directly impacted, it stated that the use of segment 20 is such that there would be an increased potential to impact archaeological resources as compared to the preferred river crossing (id. at exhibit V-B).

Commonwealth stated that route segment 20 would involve significant traffic impacts because it would involve construction activity within high volume roadways in the Town of Acushnet (id. at V-11, exhibit V-B). The Company indicated that portions of Slocum Road and South Main Street are characterized by heavy traffic volume (id.).

The Siting Board notes that with the exception of impacts associated with segment 20, the environmental impacts associated with the construction of the Acushnet alternative are, in all respects, comparable to those of the westerly alternative (see Section III.C.3.ii.a, above). However, the use of segment 20 would result in construction impacts on residential and commercial land uses in Acushnet as well as increased traffic impacts along Slocum Road and South Main Street in Acushnet. Neither the primary route nor the westerly route would create these impacts. The Company has also asserted that the use of segment 20 would increase potential impacts on archaeological resources; however, given that the sites in question have been disturbed by previous construction and river dredging activities, the Siting

Board concludes that impacts of facility construction on archaeological resources would be minor and indirect, and comparable in nature and extent to those identified in connection with the primary route.

Based on the foregoing, the Siting Board finds that the primary route would be preferable to the Acushnet alternative with respect to land use and traffic impacts in the Town of Acushnet. Additionally, because construction impacts within the City of New Bedford relating to land use, traffic and safety, and noise and dust impacts for the Acushnet alternative would be comparable to those identified for the westerly alternative, the Siting Board finds that the primary route would be preferable to the Acushnet alternative with respect to these same categories of environmental impacts.

Accordingly, the Siting Board finds that the primary route would be preferable to the Acushnet alternative with respect to land use, natural resources, traffic and safety, and construction noise and dust impacts along street portions of the primary route.

iii. Magnetic Field Levels

In this section, the Siting Board reviews the impacts of magnetic fields for the proposed facilities along the alternative routes and potential mitigation for such impacts, and compares the primary and alternative routes.

(a) Westerly Alternative

Commonwealth provided measurements of existing magnetic fields along the westerly alternative at thirty-six locations along transects running perpendicular to existing roadways (Exh. HO-E-19(att.)). Commonwealth stated that these measurements ranged from a minimum of 0.2 mG to a maximum of 33.5 mG, with an average magnetic field value of 3.6 mG (*id.* Sec. 1, at 4).⁴³ The Company indicated that it applied a correcting factor to its field measurements to calculate the existing magnetic fields for average and peak Pine Street area

⁴³ The data indicate magnetic field levels of less than or equal to 10 mG for approximately 83 percent of the individual data points.

load conditions (see Section III.B.5.b, above). The calculations indicated that the maximum existing magnetic field would be 23.5 mG under average load, and 38.5 mG under peak load (id. at 5). Average values, calculated within a corridor defined by the actual width of the existing streets, were 2.5 mG under average load and 4.1 mG under peak load (id.).

Commonwealth noted that, while the maximum magnetic field level identified along the westerly alternative is greater than the maximum field level along the primary route, average magnetic field levels along the westerly alternative are slightly less than those along the primary route. Commonwealth explained that the higher average magnetic field levels along the primary route are due to the presence of a greater number of distribution circuits in the vicinity of the primary route (Tr. at 119-120).

The Company also provided estimates of magnetic field impacts of the proposed facility along the westerly alternative under three load conditions, average load, peak load, and emergency load (see Section III.C.2.a.iii, above). The Company explained that such estimates are indicative of expected fields along all segments and routes because they reflect the performance of the proposed facilities with respect to magnetic field impacts, independent of ambient conditions (Exhs. HO-E-19; HO-E-19(app. 1); HO-E-19(app. 2)).

Commonwealth also provided an estimate of magnetic fields which combined existing levels with levels predicted for the proposed facility along the westerly alternative for two possible cable configurations -- solid dielectric and pipe type -- and two load conditions, average load and peak load (Exh. HO-E-19). The Company stated that average magnetic fields along the westerly alternative under average load would be 2.52 mG for the pipe type cable and 3.98 mG for the solid dielectric cable (id.). Under peak load, magnetic fields would average 4.12 mG for the pipe type cable and 6.62 mG for the solid dielectric cable (id.).

The record indicates that increases in average magnetic field level along the westerly alternative and the primary route due to the proposed facilities would be comparable, and would be well below levels that previously have been accepted by the Siting Board. The record also demonstrates that the environmental impacts of the westerly alternative would be minimized with respect to magnetic fields. However, the westerly alternative would be

longer, and would proceed through residential and commercial areas of New Bedford for greater portions of its length, thereby increasing potential exposure to magnetic fields from the proposed facility.

Accordingly, the Siting Board finds that the primary route would be slightly preferable to the westerly alternative with respect to magnetic field levels.

(b) Acushnet Alternative

The Company asserted that the magnetic field impacts of the proposed facilities along the Acushnet alternative would be comparable to those of both the primary route and the westerly alternative (Exh. C-1, at exhibit V-B). The Company stated that the magnetic field levels of the proposed facilities along segment 20 would be comparable to those along other segments of the route (Exhs. C-1, at exhibit V-B; HO-E-19(att.)). The Company did not provide measurements showing existing magnetic fields along segment 20 of the Acushnet alternative, that segment of the Acushnet alternative route which differs significantly from the primary route and the westerly alternative. However, the Company did provide information indicating segment 20 would extend through portions of Acushnet including both on-street and transmission ROW locations, with predominantly residential and small commercial abutting land uses (Exhs. C-1, at V-10; HO-E-11(a) at 2).

The Siting Board notes that, with the exception of impacts along segment 20, magnetic field impacts along the Acushnet alternative would be comparable to those along the westerly alternative in that these two alternatives would follow a common route for the majority of their length.

The record indicates that where it deviates from the primary route river crossing, the Acushnet alternative would proceed through portions of the Town of Acushnet that are dominated by residential and small commercial uses. Although Commonwealth has asserted that the magnetic fields from the proposed facilities would be below levels that previously have been accepted by the Siting Board, the greater length of the Acushnet alternative, and associated differences in abutting land use, would result in greater potential for exposure to magnetic fields from the proposed facilities than with the primary route.

Accordingly, the Siting Board finds that the primary route would be preferable to the Acushnet alternative with respect to magnetic field levels.

iv. Conclusions on Environmental Impacts

In Sections III.C.3.a.i to iii, above, the Siting Board has found that the primary route would be comparable to the westerly alternative and preferable to the Acushnet alternative with respect to impacts to natural resources in the vicinity of the river crossing, and preferable to both the westerly alternative and the Acushnet alternative with respect to land use, natural resources, traffic and safety, and construction noise and dust impacts along street portions of the primary route, and slightly preferable to the westerly alternative and preferable to the Acushnet alternative with respect to magnetic field levels.

The Siting Board notes that Commonwealth's effort to solicit input from a wide variety of sources during the early stages of its planning process and its subsequent segment-based analysis of route alternatives has produced a primary route and alternative routes, each of which would involve temporary, relatively minor and readily mitigated impacts. Nonetheless, Commonwealth's primary route clearly offers certain advantages over the two alternatives. These advantages are primarily due to: (1) the shorter overall length of the primary route, which would result in fewer environmental impacts during the construction period; (2) the fact that a substantial portion of the primary route would be constructed in streets within industrial areas rather than in areas that are mainly residential in character; (3) the primary route's use of streets with lower traffic volume and its avoidance of established historic districts; and (4) the fact that the primary route would employ a more direct crossing of the Acushnet River.

Accordingly, the Siting Board finds that the primary route would be preferable to the westerly alternative and the Acushnet alternative with respect to environmental impacts.

b. Cost of the Proposed Facilities Along the Alternative Routes and Comparison

Commonwealth asserted that the construction of the proposed facilities along the primary route is the least-cost alternative based on its analysis of construction and other costs (Exh. HO-C-5(att.)).

Commonwealth provided a comparison of construction costs as follows:

| <u>Primary Route</u> | <u>Westerly Alternative</u> | <u>Acushnet Alternative</u> |
|-------------------------------|---------------------------------|-----------------------------|
| \$7,167,000 to \$7,501,334 | \$10,347,080 to \$10,681,414 | \$14,873,651 |

(Exh. HO-C-5(att.)).⁴⁴

Commonwealth indicated that construction cost estimates were based upon pricing information obtained as "non-binding" price quotations from representative vendors and Commonwealth's calculation of the Company's internal and overhead costs (Exhs. C-1, at V-11; C-6, at 5).⁴⁵

Commonwealth indicated that the O&M costs and line losses associated with the primary and alternative routes would be comparable (Exhs. C-1, at exhibit IV-E; HO-C-2; HO-C-6).⁴⁶

⁴⁴ The Siting Board notes that in its estimation of cost for the westerly alternative presented in Exhibit HO-C-5(att.), the Company assumed a more costly directional drill (*i.e.*, segment 19B) for the river crossing. In order to accurately compare the construction costs of the three route alternatives, this cost comparison shows a range of costs for the primary route and the westerly alternative. In each case, the lower cost figure assumes the "direct lay" river crossing, while the higher cost figure assumes directional drilling.

⁴⁵ Commonwealth noted that construction cost estimates included separate contingency adjustment factors based on construction characteristics for particular route segments (Exh. C-1, at V-11 to V-12, and n.2).

⁴⁶ Commonwealth estimated that O&M costs for the primary route would be approximately \$8000.00 per year (Exh. HO-C-2). The Company explained that the majority of O&M costs would be associated with the cable system terminal ends

(continued...)

The record demonstrates that Commonwealth has provided sufficient information regarding the construction costs and O&M costs of the proposed facilities along the alternative route segment combinations for the Siting Board to compare such costs with the cost of the proposed facilities along the primary route. In comparing the cost of the primary route to the westerly alternative and the Acushnet alternative, the record indicates that: (1) the construction costs of the westerly alternative would be 44 percent greater than for the primary route, and the construction cost of the Acushnet alternative would be 108 percent greater than for the primary route; and (2) O&M costs and line loss savings would be comparable for all route alternatives.

Accordingly, the Siting Board finds that the proposed facilities along the primary route would be preferable to the proposed facilities along the westerly alternative or the Acushnet alternative with respect to cost.

c. Reliability of the Proposed Facilities Along the Alternative Route Segment Combinations and Comparison

i. Description

Commonwealth stated that the construction of the proposed transmission line along the primary route is more reliable than along the two alternative routes because construction along the primary route would result in a shorter and straighter facility configuration with fewer cable splices (Exh. C-1, at V-18). Commonwealth also noted the reliability advantage of constructing the proposed facility along a route that is geographically distinct from that of its existing #112 and #114 underground cables, thereby reducing the risk of third party damage to more than one necessary supply facility (*id.* at V-18).

⁴⁶(...continued)

which would be located at the Acushnet substation and the Pine Street substation for all route alternatives, and that therefore, O&M costs identified for the primary route would be comparable to those for the alternative routes (Exh. HO-C-6).

ii. Analysis

The record demonstrates that Commonwealth has provided sufficient information regarding the reliability of the proposed facilities along the alternative route segment combinations for the Siting Board to compare the reliability of such facilities with the reliability of the facilities along the primary route.

In comparing the reliability of alternative routes to the reliability of the primary route, the record indicates that the primary route is shorter, more direct and is geographically distinct from Commonwealth's existing transmission facilities that serve the Pine Street substation. These factors would provide a slightly higher degree of reliability as compared to the westerly alternative and the Acushnet alternative. Accordingly, the Siting Board finds that the proposed facilities along the primary route would be slightly preferable to the proposed facilities along the westerly alternative and the Acushnet alternative with respect to reliability.

d. Conclusions

In comparing the primary route to the westerly alternative and the Acushnet alternative, the Siting Board has found that the proposed facilities along the primary route would be preferable to both the westerly alternative and the Acushnet alternative with respect to environmental impacts and cost, and slightly preferable with respect to reliability.

Accordingly, the Siting Board finds that the primary route would be preferable to the westerly alternative and the Acushnet alternative with respect to providing a necessary energy supply for the Commonwealth with a minimum impact upon the environment at the lowest possible cost.

IV. DECISION

The Siting Board has found that Commonwealth has demonstrated that the existing supply system is inadequate to satisfy the Pine Street substation load center, and therefore that additional energy resources are needed for reliability purposes in the area served by the Pine Street substation.

The Siting Board also has found that the proposed project is preferable to all other project alternatives identified by Commonwealth.

The Siting Board further has found that Commonwealth has considered a reasonable range of practical siting alternatives.

The Siting Board further has found that, with the implementation of proposed mitigation measures and the continued coordination with the USEPA concerning the configuration of the river crossing, the environmental impacts of the proposed facilities along the primary route would be minimized.

The Siting Board further has found that the proposed facilities along the primary route would achieve an appropriate balance among conflicting environmental concerns as well as among environmental impacts, cost and reliability.

Finally, the Siting Board has found that the primary route would be preferable to the westerly alternative and the Acushnet alternative with respect to providing a necessary energy supply for the Commonwealth with a minimum impact upon the environment at the lowest possible cost.

In addition, the Siting Board finds that the proposed project is consistent with the most recently approved long-range forecast of Commonwealth.

The Siting Board's enabling statute requires the Siting Board to determine whether plans for expansion or construction of energy facilities are consistent with the current health, environmental protection, and resource use and development policies as adopted by the Commonwealth. G.L. c. 164, § 69J. In its review and balancing of overall environmental, cost and reliability considerations above, the Siting Board has found that the environmental impacts of the proposed facilities along the primary route would achieve an appropriate balance among conflicting environmental concerns as well as among environmental impacts,

cost and reliability. The Siting Board therefore finds that the proposed project is likely to be consistent with various health, environmental protection and resource use and development policies of the Commonwealth which relate to the environmental impacts and cost of the Commonwealth's energy supply.

Accordingly, the Siting Board APPROVES Commonwealth's petition to construct a new 115-kV underground electric transmission line, using Commonwealth's proposed route in the City of New Bedford and the Town of Achushnet.

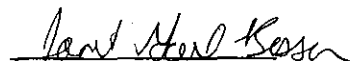
The Siting Board notes that the findings in this Decision are based on the record in this case. A project proponent has an absolute obligation to construct and operate its facility in conformance with all aspects of its project proposal as presented to the Siting Board. Therefore the Siting Board requires Commonwealth to notify the Siting Board of any changes other than minor variations to the project proposal so that the Siting Board may decide whether to inquire further into a particular issue. Commonwealth 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.



Robert P. Rasmussen
Hearing Officer

Dated this 16th day of September, 1997.

Unanimously APPROVED by the Energy Facilities Siting Board at its meeting of September 16, 1997 by the members and designees present and voting. Voting for approval of the Tentative Decision as amended: Janet Gail Besser (Acting Chair, EFSB/DPU); John D. Patrone (Commissioner, DPU); Sonia Hamel (for Trudy Cox, Secretary, Executive Office of Environmental Affairs); David L. O'Connor (for David A. Tibbetts, Director, Department of Economic Development); and Joseph Faherty (Public Member).


Janet Gail Besser
Acting Chair

Dated this 16th day of September, 1997

Figure 1.

Primary and Alternative Routes

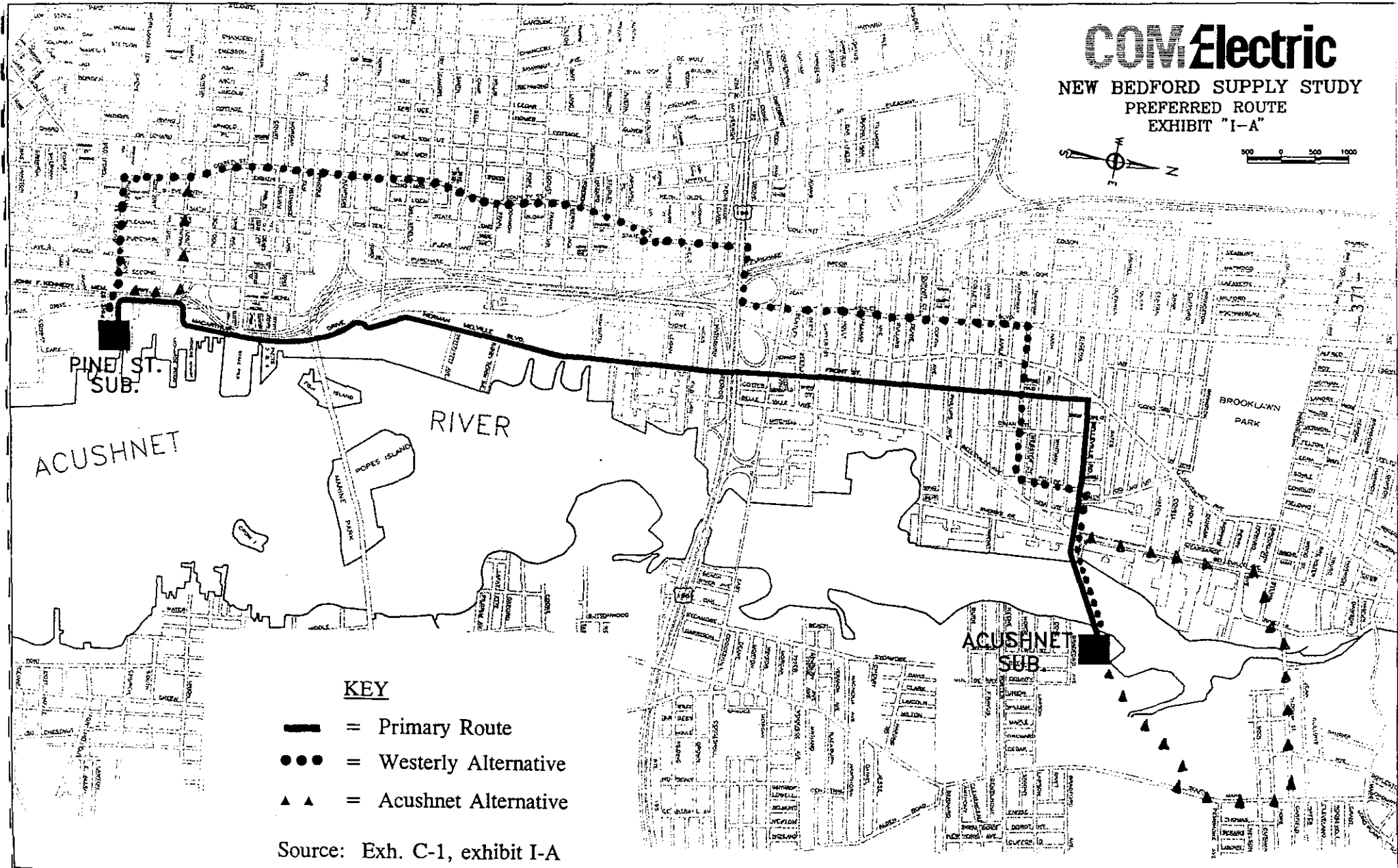
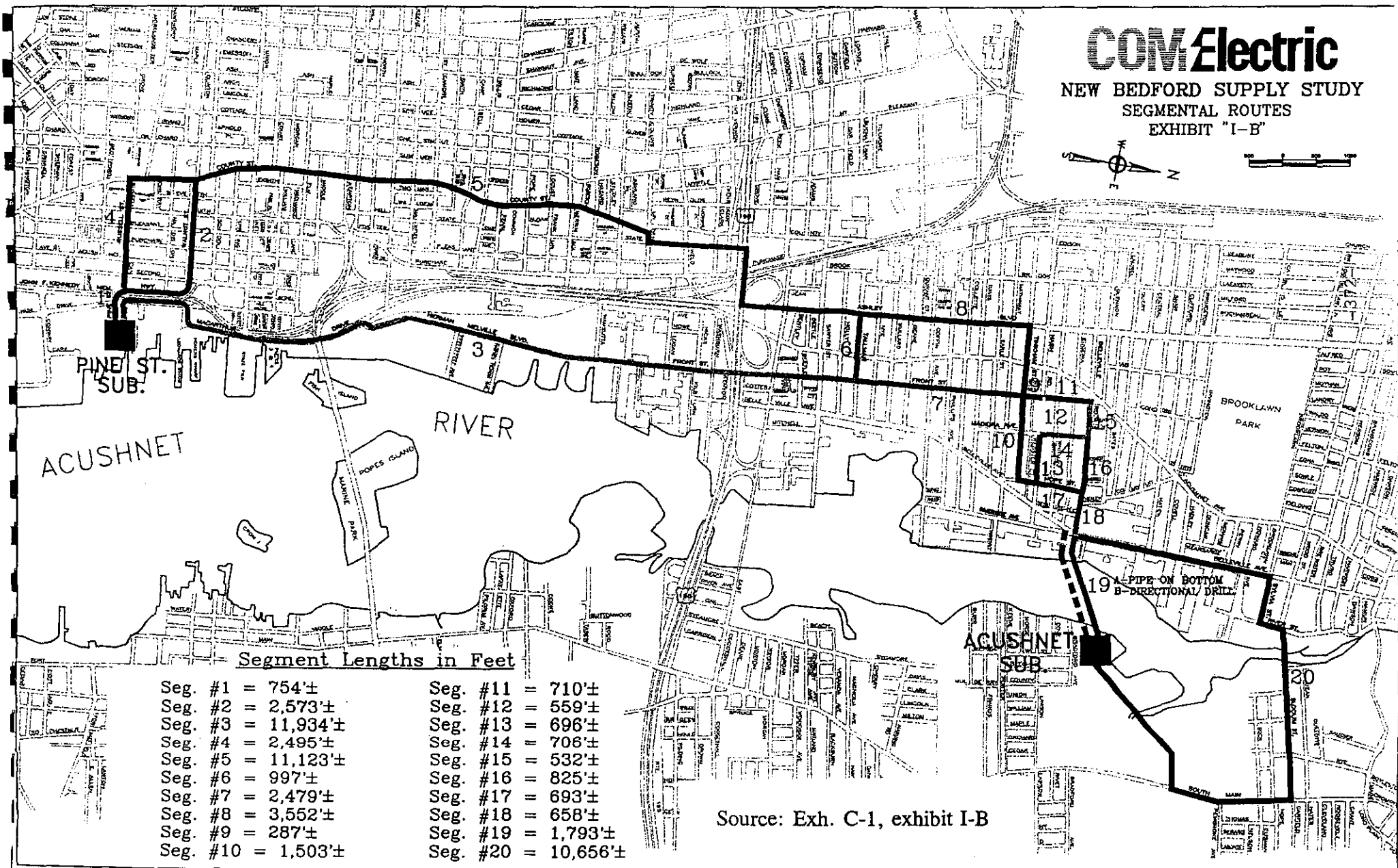


Figure 2.
Noticed Route Segments



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).

COMMONWEALTH OF MASSACHUSETTS
Energy Facilities Siting Board

| | |
|---|---|
| Request of Infrastructure Development |) |
| Corporation for an Advisory Ruling pursuant |) |
| to 980 C.M.R. § 3.02(7), Regarding the |) |
| Noticing of Alternative Sites for Proposed |) |
| Generating Facilities |) |

FINAL ADVISORY RULING

I. REQUEST FOR ADVISORY RULING

By letter dated August 15, 1997 ("Request"), John A. DeTore petitioned the Energy Facilities Siting Board ("Siting Board") on behalf of Infrastructure Development Corporation ("IDC") for an Advisory Ruling pursuant to the provisions of 980 C.M.R. § 3.02(7), with respect to the applicability of the Siting Board's current practice of requiring proponents of proposed energy facilities to publish notice of both a preferred and an alternative route or site for such facilities. IDC intends to file with the Siting Board an application to construct a generating facility at a site in Bellingham, Massachusetts.

In the Request, Mr. DeTore argues that neither the Siting Board's statute (G.L. c. 164, § 69J) nor its regulations (980 C.M.R. § 7.04(e)) require notice of both a primary and an alternative site or route (Request at 2-3). He also asserts that the Siting Board's predecessor agency, the Energy Facilities Siting Council ("Siting Council"), previously has waived the practice of requiring two noticed alternative sites with some measure of geographical diversity for certain cogeneration projects, where the petitioner could demonstrate that practical facility site alternatives did not exist (id. at 4, citing, Altresco Pittsfield, Inc., 17 DOMSC 351, 394 (1988)).

Mr. DeTore also asserts that there is no policy rationale for requiring IDC to notice two sites, and that there are significant advantages associated with noticing only the preferred site (id. at 5). In particular, he argues that noticing only a single site for the IDC facility would eliminate the public confusion created by noticing two sites, would avoid disputes regarding the alternative site, and would allow the Siting Board to streamline its review of the proposed facility by focussing on the preferred site (id.). He states that IDC is confident that it can demonstrate that its preferred site is superior to the alternatives based on IDC's site selection process, without noticing an alternative site (id. at 4).

II. ANALYSIS

IDC's Request raises two separate but related issues: (1) whether the formal noticing of two sites (that is, the description of two sites in the notice of adjudication published at the commencement of the Siting Board's review) for a proposed generating facility such as IDC is required as a matter of law or Siting Board regulation, or is necessary as a matter of policy; and (2) whether an analysis of two or more potential sites for IDC's proposed generating facility is necessary to demonstrate that the proposed facility meets the requirements for approval set forth in G.L. c. 164, § 69J.

With regard to the first issue, the Siting Board can find nothing in its statute or its regulations that requires the noticing of more than one site for a generating facility. In fact, the Siting Board has an established practice of requiring only a single noticed site for proposed cogeneration facilities if the proponent: (1) has a steam sales agreement with existing steam purchaser(s) sufficient to qualify it for qualifying facility ("QF") status; and (2) has a proposed site fully within the property boundaries of the principal steam host. MASSPOWER, Inc., 20 DOMSC 301, 382 (1990); see also Cabot Power Corporation, 2 DOMSB 241 (1994), Altresco Lynn, Inc., 2 DOMSB 1 (1993), Eastern Energy Corporation, 22 DOMSC 188 (1991), West Lynn Cogeneration, 22 DOMSC 1 (1991). The Siting Board therefore concludes that the formal noticing of two alternative sites for a proposed generating facility is not required as a matter of law or Siting Board regulation.

The Siting Board notes that it can only approve sites or routes that have been formally noticed. Consequently, the Siting Board typically notices multiple sites or routes for a proposed facility so that it may approve the proposed facility on an alternative site or route if the preferred site or route fails to meet the Siting Board's standards for approval. However, as a practical matter, the developer of an independent power project ("IPP") may have no intention of building the proposed facility at its noticed alternative site if the primary site is rejected. In such cases, the noticing of an alternative site may serve little practical purpose. Moreover, it may create unnecessary concern for people living near the noticed alternative site, who are led to believe that the developer may have plans to construct a power plant in their neighborhood. The Siting Board therefore concludes that the formal noticing of two alternative sites for a proposed generating facility is not necessary as a matter of policy, unless a developer needs or wishes to submit two or more potential sites for Siting Board approval.

To address the second issue, the Siting Board must look to the purpose of its review. The Siting Board has a statutory mandate to implement the energy policies in G.L. c. 164, §§ 69H-69Q to provide a necessary 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 and requirement, the Siting Board requires a petitioner to show that its proposed facilities' siting plans are superior to alternatives, and that its proposed facilities are sited at locations that

minimize costs and environmental impacts while ensuring supply reliability. Berkshire Power Development, Inc., 4 DOMSB 221, 347 (1996).

Typically, the Siting Board has required petitioners to make this showing in two ways, both of which involve the analysis of a noticed alternative site or route. First, the petitioner must demonstrate that it has examined a reasonable range of practical facility siting alternatives by meeting a two-pronged test: it must establish that it (1) developed and applied a reasonable set of criteria for identifying and evaluating alternatives in a manner which ensures that it has not overlooked or eliminated any alternatives which are clearly superior to the proposal, and (2) identified at least two noticed sites or routes with some measure of geographic diversity. Id. at 347-348. Additionally, the petitioner must show that proposed facilities are sited at locations that minimize costs and environmental impacts by demonstrating that the proposed site for the facility is superior to the noticed alternative on the basis of balancing cost, environmental impact and reliability of supply. Id. at 358.

However, the Siting Board has long recognized that these showings can be made without reference to a noticed alternative site. In Altresco Pittsfield, the Siting Council stated that in cases involving proposed cogeneration facilities, "if the facility proponent can establish that a second practical facility site does not exist, the Siting Council does not require the identification of two geographically diverse sites". In MASSPOWER, the Siting Council clarified this exemption, stating that a noticed alternative site would not be required if a cogeneration proponent: (1) had a steam sales agreement with existing steam purchaser(s) sufficient to qualify it for QF status; and (2) had a proposed site fully within the property boundaries of the principal steam host. MASSPOWER, 20 DOMSC at 382. The Siting Council emphasized that, whether or not a noticed alternative site is required, it would review the petitioner's site selection process to ensure that clearly superior sites have not been overlooked or eliminated.¹ Id. The Siting Council also stated that even where there are no practical alternatives to a proposed site, the Siting Council must nevertheless determine whether the proposed facilities are consistent with ensuring a necessary energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost. Id. at 384. The Siting Board expanded on this requirement in Altresco Lynn, stating that in cases where noticed alternative(s) are not required, the facility proponent must still demonstrate that the proposed site for the facility will minimize environmental impacts, and that an appropriate balance will be achieved among conflicting environmental concerns as well as among environmental impacts, cost and reliability. Altresco Lynn, 2 DOMSB at 176.

IDC's Request essentially asks the Siting Board to expand its current exemption from the noticed alternative site requirement to include a generating facility that is an IPP rather than a cogenerator. The Siting Board notes that its modified review standards for

¹ The scope of the site selection review included the petitioner's selection of a steam host, as well as the selection of a site in the vicinity of the chosen steam host.

cogenerators are based on the assumption that cogeneration projects closely tied to an existing steam host do not have practical facility siting options, and therefore do not have the ability to minimize their cost and environmental impacts through selection of the best possible site. IDC is in a qualitatively different position; because it is not proposing a cogeneration project, it may select from a broad range of potential sites with widely varying costs and environmental impacts. Thus, a more extensive analysis of siting alternatives may be required in order to demonstrate that IDC's siting plans are superior to alternatives, and that its proposed facility is sited at a location that minimizes cost and environmental impacts while ensuring supply reliability.

In particular, in the absence of a noticed alternative, the Siting Board's review of the site selection process would need to be expanded to include a qualitative comparison of the cost, reliability, and environmental impacts of the small number of best-ranked sites that remain in the final stage of IDC's site selection process. Such a comparison would be considerably less extensive than the current review of the noticed alternative site, since there would be no need to develop a record to support the approval of the proposed facility at the alternative site. However, it would need to be detailed enough to make clear the cost, environmental, and reliability advantages and disadvantages of each site that remained in the final stage of the site selection process, and to provide a basis for an evaluation of whether IDC, through site selection, design, and mitigation, has minimized the cost and environmental impacts of its proposed project.

III. ADVISORY RULING

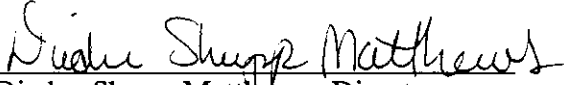
Accordingly, after due consideration of the stated facts and the foregoing analysis, the Siting Board hereby rules as follows:


- (1) The formal noticing of two sites for a proposed generating facility such as IDC is not required as a matter of law or Siting Board regulation, and is not necessary as a matter of policy. Consequently, the Siting Board will permit IDC to notice only its preferred site.
- (2) In order to demonstrate that its proposed facility meets the requirements for approval set forth in G.L. c. 164, § 69J, IDC must demonstrate that its proposed facilities' siting plans are superior to alternatives, and that its proposed facility is sited at a location that minimizes costs and environmental impacts while ensuring supply reliability. Specifically, IDC must make the following showings:
 - (a) that it has examined a reasonable range of practical facility siting alternatives by meeting a two-pronged test: it must establish that it (1) developed and applied a reasonable set of criteria for identifying and evaluating alternatives in a manner which ensures that it has not overlooked or eliminated any alternatives which are clearly superior to the proposal, and (2) identified at least two potential facility sites with some measure of geographic diversity;

- (b) that its proposed facility is sited, designed, and mitigated in a manner that will minimize cost and environmental impacts; and
 - (c) that an appropriate balance will be achieved among conflicting environmental concerns as well as among environmental impacts, cost and reliability.
- (3) In order to facilitate the Siting Board's review of the site selection process, IDC's filing should include a description of each site that remained in the final stage of IDC's site selection process. Such description should include sufficient information on environmental impacts and costs to compare the best-ranked alternative sites to the preferred site. The scope of the environmental and cost information to be provided may vary, depending on the merits of each site relative to the preferred site; however, the filing should include site specific information regarding at a minimum the most important physical, natural resource, community and land use characteristics and cost factors related to each site. Where a comparison involves conflicting advantages for two sites, the filing should include site-specific information about the advantages of each of the sites, not just the issues favoring the preferred site. Finally, the filing should indicate for each site which major disadvantages could be minimized through appropriate design and mitigation measures, and which are inherent to the site.

The Siting Board notes that, in choosing to notice a single preferred site, IDC accepts two sets of risk. First, since the Siting Board can approve only a noticed site, IDC risks having its project rejected entirely if it cannot demonstrate that its proposed project at the preferred site is consistent with the Siting Board's mandate to provide a necessary energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost. Second, since IDC would be the first IPP to be reviewed without reference to a noticed alternative site, it faces the burden of meeting a standard of review that has not been tested on other similar projects. Should IDC wish to avoid these risks, it may choose to notice and analyze an alternative site.

Signed:


Diedre Shupp Matthews, Director


Robert P. Rasmussen, General Counsel

This ruling was approved by a majority vote of the Energy Facilities Siting Board at its September 16, 1997 meeting.