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ABBREVIATIONS

<u>BECo/Hopkinton</u>	<u>Boston Edison Company</u> , 6 DOMSB 208 (1997)
<u>Berkshire Power</u>	<u>Berkshire Power Development, Inc.</u> , D.P.U. 96-104 (1997)
<u>Boston Gas Decision</u>	<u>Boston Gas Company</u> , D.T.E. 00-24 (2001)
<u>Cape Wind</u>	<u>Cape Wind Associates LLC</u> , 15 DOMSB 1 (2005)
<u>CELCo/Kendall</u>	<u>Cambridge Electric Light Company</u> , 12 DOMSB 305 (2001)
<u>GSRP</u>	<u>Western Massachusetts Electric Company</u> , EFSB 08-2/D.P.U. 08-105/08-106 (2010)
<u>Hydro-Quebec</u>	<u>Massachusetts Electric Company/New England Power Company</u> , 13 DOMSB 119 (1985)
<u>MECo/Westford</u>	<u>Massachusetts Electric Company</u> , D.T.E. 01-77 (2002)
<u>NSTAR/Stoughton</u>	<u>NSTAR Electric</u> , 14 DOMSB 233 (2005)
<u>NY Central Railroad</u>	<u>New York Central Railroad v. Department of Public Utilities</u> , 347 Mass. 586 (1964)
<u>Russell</u>	<u>Russell Biomass</u> , 17 DOMSB 1 (2009)
<u>Save the Bay</u>	<u>Save the Bay v. Department of Public Utilities</u> , 366 Mass. 667 (1975)
<u>Tennessee/Agawam</u>	<u>Tennessee Gas Pipeline Company</u> , D.T.E. 01-57 (2002)
<u>Town of Truro</u>	<u>Town of Truro v. Department of Public Utilities</u> , 365 Mass. 407 (1974)
<u>Worcester Decision</u>	<u>New England Power Company</u> , EFSB09-1/D.P.U. 9-52/9-53 (2011)
BMPs	Best Management Practices
BVW	Bordering vegetated wetlands
CELT	Capacity, Energy, Loads, and Transmission (forecast)
CHP	combined heat and power
CO	Carbon monoxide
CO ₂	carbon dioxide

Company	New England Power LLC
Companies	New England Power LLC and Western Mass Electric Co
CL&P	Connecticut Light & Power
dBA	A-weighted decibels
DCR	Massachusetts Department of Conservation and Recreation
DCT	double circuit tower
DG	distributed generation
DOMSB	Decisions and Orders of Massachusetts Energy Facilities Siting Board
DOMSC	Decisions and Orders of Massachusetts Energy Facilities Siting Council
draft ISO Guidelines	ISO-NE's proposed Transmission System Planning Load Interruption Guidelines (November 2010)
DSM	demand-side management
EFSB	Energy Facilities Siting Board
GHG	Greenhouse Gas
GIS	Geographic Information System
G.L. c.	Massachusetts General Laws chapter
GSRP	Greater Springfield Reliability Project
HCRP	Hampden County Reliability Project
HVAC	Heating, Ventilating and Air Conditioning
IRP	Interstate Reliability Project
ISO-NE	Independent System Operator of New England
kV	kilovolts
LSP	Licensed Site Professional

MassDEP	Massachusetts Department of Environmental Protection
MDRP	Massachusetts Diesel Retrofit Program
MECo	Massachusetts Electric Company
MEPA	Massachusetts Environmental Protection Act
mG	milligauss
MHC	Massachusetts Historical Commission
MOU	Memorandum of Understanding
MVA	megavolt-amperes
MVAR	megavolt-amperes, reactive
MW	megawatts
MWh	megawatt-hours
NEEWS	New England East – West Solution
NEP	New England Power Company
NERC	North American Electric Reliability Corporation
NHESP	National Heritage and Endangered Species Program
NPCC	Northeast Power Coordinating Council
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
NU	Northeast Utilities
PP-3	ISO-NE Planning Procedure No. 3
PM	particulate matter
ppm	parts per million
PREP	Palmer Renewable Energy Project
Project	Hampden County Reliability Project

PSA Forecast	Power Supply Area
PSC	Public Service Corporation
ROW	right-of-way
Siting Board	Energy Facilities Siting Board
SF ₆	sulfur hexafluoride
SPCC	Spill Protection, Control, and Countermeasure Plan
Study Area	Towns of Palmer, Monson, Wilbraham, Hampden, and East Longmeadow
SVC	static VAR compensator
Three Towns Area	East Longmeadow, Hampden, and Wilbraham
TMP	Traffic Management Plan
USEPA	United States Environmental Protection Agency
VOC	Volatile Organic Compounds
WHO	World Health Organization
WMECo	Western Massachusetts Electric Company

Pursuant to G.L. c. 164, § 69J, the Massachusetts Energy Facilities Siting Board (“Siting Board”) hereby approves, subject to the conditions set forth below, the petition of New England Power Company d/b/a National Grid (“NEP” or the “Company”) and Western Massachusetts Electric Company (“WMECo,” together with NEP, the “Companies”) to construct a new 115 kilovolt (“kV”) overhead transmission line between Palmer Substation and a new West Hampden Substation. Pursuant to G.L. c. 164, § 72, the Siting Board hereby approves, subject to the conditions set forth below, the petition of NEP and WMECo for a determination that the proposed 115 kV transmission line is necessary, serves the public convenience and is consistent with the public interest. Pursuant to G.L. c. 40A, § 3, the Siting Board hereby approves, subject to the conditions set forth below, the petition of NEP and WMECo for individual and comprehensive exemptions from the zoning ordinance of the Town of Palmer, and the zoning bylaws of the Towns of Hampden and Monson in connection with the proposed transmission facilities, as described herein.

I. INTRODUCTION

A. Summary of the Proposed Transmission Project

According to the Company, the proposed transmission project, known as the Hampden County Reliability Project (“HCRP” or the “Project”) is designed to address reliability needs in Palmer, Monson, Hampden, Wilbraham and East Longmeadow (the “Study Area”) (Exh. NEP-1, at 1-1). The Study Area is currently served radially by a limited number of transmission lines that emanate from Palmer Substation. If one or more of these “feeder” lines were to experience an unplanned outage, the remaining lines would experience insufficient voltages, particularly at the end of the radial service to the Study Area (*id.* at Figure 3.2.2-1).

The Project consists of the following: (1) replacing approximately ten miles of NEP’s existing 69 kV transmission line designated as O-15S with a new 115 kV line to be designated as the R-170 line (running in the existing O-15S right-of-way (“ROW”) between the Palmer Substation and the proposed West Hampden Substation); (2) constructing a new 2.7-acre 115/69 kV substation in the town of Hampden (“West Hampden Substation”); (3) constructing a new 750-foot loop line connecting WMECo’s existing 115 kV 1515 transmission line with the proposed West Hampden Substation; and (4) retiring and removing the existing Hampden

Substation. In addition, NEP would also refurbish the remaining 4.4-mile portion of the existing O-15S line (which would remain 69 kV) from the new West Hampden Substation to the East Longmeadow Substation and the Shaker Road Substation (*id.* at 1-1 to 1-2).¹ Construction of the HCRP is estimated to take two years beginning in spring 2012. The estimated cost of constructing the HCRP is \$35.25 million (Exh. EFSB-8).

The Company is required by G.L. c. 164, § 69J to present both a Primary Route and an Alternative Route for its Project. A description of the Alternative Route and its comparison to the Primary Route can be found in Section V.B.

B. Procedural History

On August 31, 2010, NEP and WMECo filed three petitions with the Siting Board and the Massachusetts Department of Public Utilities (“Department”) relating to the HCRP. In the first petition, the Companies request approval of the Project, pursuant to G.L. c. 164, § 69J (“Siting Board Petition”). A second petition seeks specific and comprehensive exemptions from the zoning bylaws or ordinances in the towns along the preferred route for the HCRP pursuant to G.L. c. 40A, § 3 (“Zoning Petition”). The third petition requests approval for the HCRP pursuant to G.L. c. 164, § 72 (“Section 72 Petition”).

The Siting Board Petition was docketed as EFSB 10-1, the Zoning Petition as D.P.U. 10-107, and the Section 72 Petition as D.P.U. 10-108. Pursuant to the Petitioners’ motion, on September 17, 2010 the Chairman of the Department issued a Consolidation Order, referring the Section 72 and Zoning Petitions for review and approval or rejection to the Siting Board pursuant to G.L. c. 164, § 69H(2). The consolidated proceeding was docketed as EFSB 10-1/D.P.U. 10-107/10-108. Accordingly, the Siting Board conducted a single adjudicatory proceeding and developed a single evidentiary record for the consolidated petitions (“Petitions”).

A public hearing was held for the purpose of taking public comment on the HCRP on October 27, 2010 in Hampden. By Hearing Officer ruling dated December 7, 2010, intervenor status was granted to Theresa Corey Dzierwinski and Richard J. Dzierwinski of Wilbraham.

¹ The refurbishment entails replacing 22 wooden transmission poles and modifying 13 others and is estimated to take five to six weeks.

The Petitioners presented the testimony of the following twelve witnesses in support of the Petitions: Bradley Bentley, Jeffrey Brandt, Dena M. Champy, James M. Clark, Andrea M. Desilets, Colin P. Duncan, Dean M. Latulipe, Alfred Morrissey, Jessica Farrell, Paul E. Robinson, Timothy R. Roughan, and Dr. Peter Valberg.

The Siting Board held five days of evidentiary hearings beginning on May 17, 2011 and ending on June 15, 2011. The Company filed its Brief on July 27, 2011. On October 27, 2011, Staff issued its original Issues Memorandum for the case in preparation for discussion at the Siting Board's November 10, 2011 meeting. On November 1, 2011, NEP requested that the Issues Memorandum be taken off the Siting Board's meeting agenda so that it could file a motion for leave to submit additional evidence in the case before the Siting Board began its deliberations. The Siting Board removed the Issues Memorandum from its November agenda. On November 4, 2011, the Company filed a Motion for Leave to Submit Additional Evidence, which was granted by the Presiding Officer on November 21, 2011.

NEP's request to supplement the record related to the discussion of project alternatives. NEP submitted supplemental prefiled testimony on December 15, 2011. The Siting Board conducted an additional evidentiary hearing on January 10, 2012, and the Company submitted a Supplemental Brief on February 1, 2012. On February 27, 2012, Staff issued its second Issues Memorandum for the case. NEP filed comments on March 5, 2012, and the Siting Board held a public meeting on March 10, 2012 to discuss the Issues Memorandum. On March 10, 2012, the Siting Board voted unanimously to direct the Staff to write a tentative decision approving the Company's Project and the Company's request for individual and comprehensive zoning exemptions.

II. JURISDICTION AND STANDARD OF REVIEW UNDER G.L. c. 164, § 69J

The Company filed the Siting Board Petition pursuant to G.L. c. 164, § 69J, which requires a project applicant to obtain Siting Board approval for the construction of a proposed energy "facility" before a construction permit may be issued by another state agency.

G.L. c. 164, § 69G defines a “facility” to include:

a new electric transmission line having a design rating of 115 kilovolts or more which is ten miles or more in length on an existing transmission corridor, except [for] reconductoring or rebuilding of transmission lines at the same voltage.

The proposed 115 kV transmission line is clearly a “facility” with respect to Section 69J. The Company asserts that the 4.4 mile-long refurbishment of the O-15S line between West Hampden Substation and Shaker Hill Road Substation is maintenance-related and does not require Department or Siting Board review. However, the Company presented and analyzed all aspects of the Project, including the refurbishment of the 4.4-mile portion of the existing O-15S line from the new West Hampden Substation to the East Longmeadow Substation and the Shaker Road Tap, on an integrated and consolidated basis. Accordingly, the Siting Board reviews the refurbishment of the 4.4-mile portion of the existing O-15S line on a consolidated basis with the proposed R-170 115 kV line. See Western Massachusetts Electric Company, EFSB 08-2/ D.P.U. 08-105/08-106, at 6-7 (2010).

In accordance with G.L. c. 164, §§ 69H and 69J, before approving a petition to construct, the Siting Board requires an applicant to justify its proposal in four phases. First, the Siting Board requires the applicant to show that additional energy resources are needed (see Section III, below). Second, the Siting Board requires the applicant to establish that, on balance, its proposed project is superior to alternative approaches in terms of reliability, cost, and environmental impact, and in its ability to address the identified need (see Section IV, below). Third, the Siting Board requires the applicant to show that it has considered a reasonable range of practical siting alternatives and that the proposed site for the project is superior to a noticed alternative site in terms of cost, environmental impact, and reliability of supply (see Section V, below). Finally, the applicant must show that its plans for construction of its new facilities are consistent with the current health, environmental protection and resource use and development policies as developed by the Commonwealth (see Section V.C., below).

III. NEED FOR THE PROPOSED FACILITIES

A. Standard of Review

G.L. c. 164, § 69J provides that the Siting Board should approve a petition to construct if the Board determines that the petition meets certain requirements, including that the plans for the

construction of the applicant's facilities are consistent with the policies stated in G.L. c. 164, § 69H to provide a reliable energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost. To accomplish this, the Siting Board must, among other matters, review the "need for" the facilities to meet reliability, economic efficiency, or environmental objectives. G.L. c. 164, § 69H. Consistent therewith, G.L. c. 164, § 69J requires applicants to include in their petitions an analysis of need for the facility. Here, the Petitioners assert that the HCRP is needed for reliability purposes (Exh. NEP-1, at 2-12).²

To ensure reliability, each transmission and distribution company establishes planning criteria for construction, operation, and maintenance of its transmission and distribution system. Compliance with the applicable planning criteria can demonstrate a "reliable" system. See e.g., New England Power Company, 7 DOMSB 333, at 346-348 (1998); Boston Edison Company, 6 DOMSB 208, at 243-245 (1997) ("BECo/Hopkinton").

To determine whether system improvements are needed, the Siting Board takes the following steps: (1) examines the reasonableness of the petitioner's system reliability planning criteria; (2) determines whether the petitioner uses reviewable and appropriate methods for assessing system reliability over time based on system modeling analyses or other valid reliability indicators; and (3) determines whether the relevant transmission and distribution system meets these reliability criteria over time under normal conditions and under certain contingencies, given existing and projected loads.

When a petitioner's assessment of system reliability and facility requirements are, in whole or in part, driven by load projections, the Siting Board reviews the underlying load forecast. The Siting Board requires that forecasts be based on substantially accurate historical

² The Siting Board's review of proposed transmission facilities is conducted pursuant to G.L. c. 164, § 69J. This section states, in part, that "[n]o applicant shall commence construction of a facility at a site unless . . . in the case of an electric or gas company which is required to file a long-range forecast pursuant to section sixty-nine I, that facility is consistent with the most recently approved long-range forecast for that company." The Siting Board notes that, pursuant to the Department's Order in D.T.E. 98-84A, Massachusetts electric companies, including NEP and WMECo, are now exempt from the requirements of G.L. c. 164, § 69I. Thus, the Siting Board need not consider whether the proposed transmission facilities are consistent with a recently approved long-range forecast.

information and reasonable statistical projection methods that include an adequate consideration of conservation and load management. G.L. c. 164, § 69J. To ensure that this standard has been met, the Siting Board requires that forecasts be reviewable, appropriate and reliable.

NSTAR Electric, 14 DOMSB 233, at 252-253 (2005) (“NSTAR/Stoughton”); BECo/Hopkinton at 232 (1997). A forecast is reviewable if it contains enough information to allow a full understanding of the forecast method. A forecast is appropriate if the method used to produce the forecast is technically suitable to the size and nature of the company that produced it. A forecast is considered reliable if its data, assumptions and judgments provide a measure of confidence in what is most likely to occur. NSTAR/Stoughton at 253.

B. Understanding the Existing Transmission System in the Area

A transmission system map of the area is attached as Figure 1. Four substations (East Longmeadow, Shaker Road, Hampden, and Wilbraham Substations) serve load in the area of East Longmeadow, Hampden, and Wilbraham (“Three Towns Area”), south and east of Springfield. The four substations are served exclusively by the N-14 and the O-15S lines, which are 69 kV feeders from Palmer Substation.³ The N-14 and O15S lines effectively form an open loop because both travel to Kibbe Road Switching Station; however, the N-14 line is typically operated in the “open” position (*i.e.*, the circuit is not feeding electricity to the Kibbe Switching Station) (Exh. NEP-1, at Figure 2.2-2). There is no utility-scale generation in the Three Towns Area.

Palmer Substation provides power to the N-14 and O-15S lines and also serves local load in the Palmer and Monson area. Palmer Substation receives power from two 115 kV lines: the X-176 line, which is nine miles long and connects to Ludlow Substation (which is operated by WMECo); and the W-175 line, which is 18 miles long and connects to Carpenter Hill Substation in Charlton. Palmer Substation is also linked to the O-15N line, a 69 kV line that connects at Ware to 66-mile-long 69-kV lines (lines E5 and F6) extending to Deerfield 3 Substation and Millbury 3 Substation (RR-EFSB-63). The O-15 line is known as O-15S line from Palmer Substation south, and as the O-15N line from Palmer Substation north.

³ According to NEP, the O15-S line requires rehabilitation because of deteriorating structures, should they remain in operation (Exh. NEP-1, at 3-3).

Ludlow Substation and Carpenter Hill Substation are connected by the 345 kV 301 line, which connects at Carpenter Hill to the 345 kV 302 line. The 302 line then travels further east to Millbury Substation 3, where it terminates. The N-14 and O-15S lines, which are the only sources of power serving load in the Three Towns Area, are crossed by, but do not interconnect with, WMECo's 345 kV 3419 line and the 115 kV 1515 line extending from Ludlow Substation south towards Connecticut (Exh. NEP-1, at Figure 2.2-1).

An unusual number of severe weather events has affected the Study Area in 2011 including: (1) a tornado on June 1, 2011; (2) a severe wind storm on July 26, 2011; (3) Tropical Storm Irene on August 28, 2011; (4) an extremely early substantial snow storm on October 29, 2011; and (5) a severe wind storm on December 27, 2011 (Exh. DM-PFT-Supp, Attachment DML (Supp) H – Revised). During each of these storms, the Company reported losing its transmission supply to one or more substations in the Study Area. The Company maintains that had the Project been in place during these weather events, the Company would not have experienced a loss of transmission supply because the West Hampden Substation would have been supplied by WMECo's 1515 line, which remained in service (Exhs. DML-PFT-Supp at 13-14; EFSB-PA-25 Supp at 2).⁴

C. Description of Company's Demonstration of Need

1. Regional/National Context for Company Reliability Planning

The Company described key aspects of the regional and national reliability-planning regime and the resulting standards and procedures applicable to the Company's transmission system (Exh. NEP-1, at 2-1 to 2-5). As a transmission provider, NEP must maintain its system consistent with the reliability standards and criteria developed by the Northeast Power Coordinating Council ("NPCC"), and Independent System Operator of New England ("ISO-NE") (*id.* at 2-2). These criteria are established under the purview of the North American Electric Reliability Council ("NERC"), which sets the standards for electric power transmission for all of North America. The criteria established by these entities require transmission

⁴ The Company also noted that transmission lines are not designed to withstand tornadoes, and, therefore, it is not certain that the steel structures proposed for the Project would have sustained less damage than experienced by the O-15S line and N-14 line during the June 1, 2011 tornado (Exh. EFSB-PA-25 Supp at 4).

operators, such as NEP, to design, test, and operate their systems to maintain adequate voltage and thermal requirements for their transmission lines under various identified contingencies. The Company is generally required to plan for system upgrades that would bring the transmission system into compliance with the applicable criteria (id., at 2-2).

A single contingency, known as an “N-1” contingency, includes the outage of any 115 kV or 345 kV transmission system element (e.g., circuit, underground cable, breaker-failure, or 345/115 kV transformer). A single contingency also includes the simultaneous outage of double-circuit tower (“DCT”) facilities, i.e., two transmission circuits sharing a common transmission line tower (id. at 2-3). After the first contingency has occurred, if a second non-related transmission or generation outage follows at least 30 minutes after the first contingency, the two contingencies together are known as an “N-1-1” contingency condition (see Exh. NEP-1, at 2-8). The reliability of the Bulk Power System portion of the transmission system must also be tested and be capable of serving load without violating any thermal or voltage standards under both N-1 and N-1-1 contingencies (see Exh. NEP-1, at 2-7 to 2-9).⁵

To test the system under contingencies, transmission planners study the thermal performance of the local transmission facilities and voltage levels on the system to determine whether the loss of certain transmission elements would either cause the remaining elements to become loaded beyond their temperature-based capability ratings or system voltages to fall below acceptable limits (see Exh. NEP-1, at 2-8).

2. Description of the Company’s Reliability and Need Analysis

a. Load Forecasting Methodology

The Company’s petition relied upon ISO-NE’s 2010 Capacity, Energy, Loads, and Transmission (“CELT”) Report for its peak-load forecast of New England as a whole, and on a Company-developed local power supply area forecast (“2010 PSA Forecast”) to establish load conditions for the Study Area (Exh. NEP-1, at 2-6). The load-flow analyses, described below,

⁵ The Bulk Power System is defined in NPCC’s Document A-10, Classification of Bulk Power System Elements. The NPCC definition of Bulk Power System does not include NEP’s lines O-15S and N-14, which are 69 kV lines. As a result, NPCC does not require that the transmission system be studied to consider the effects on the larger Bulk Power System of losing either of these lines as a first contingency event.

that rely on the 2010 PSA Forecast are based on the forecasted loads for 2011, 2014, and 2019 (id.). One week prior to the last day of evidentiary hearings, the Company submitted a new 2011 Forecast, dated March 31, 2011, which relied, in part, on the 2011 CELT Report (RR-EFSB-25). The Company used its 2011 PSA Forecast to re-run the transmission model with forecasted loads for 2012, 2015, and 2020 (id.).

The Company developed its demand forecast using econometric models which relate the historic peak load demand for electricity to historic levels of econometric/demographic activity, such as local employment, the number of households, and peak-day weather conditions (Exhs. NEP-1, at 2-7; EFSB-N-14). The models predict future load growth based on forecasts of employment and households, provided by Moody's Economy (Exh. EFSB-N-14). The Company's initial load forecast relied on summer peak load conditions with extreme weather that would occur with a frequency of once in 20 years ("95/5 weather") (Exh. NEP-1, at Appendix 2-6, at 3). Using 95/5 weather, the Company forecasted approximately 224 MW of load in 2020 for the Study Area (RR-EFSB-58). In response to a Siting Board record request, the Company adjusted its forecast to reflect 90/10 weather (that would occur with a frequency of once in ten years), resulting in a forecasted load of approximately 222 MW for the Study Area (id.). The results of the analysis using 90/10 weather indicate a reduction of forecasted peak load for the Palmer PSA of approximately two MW, which the Company reported had no effect on the scope of the Company's Project or any of the studied alternatives (id.).

In its 2010 PSA Forecast, the Company reflected demand-side management ("DSM") savings in Massachusetts associated with existing programs, as approved through 2012 only (Exh. EFSB-N-15). However, the Company acknowledged that it is likely that Massachusetts Electric Company ("MECo") would either add new programs or continue existing programs beyond 2012 to offset the impact of reductions in savings from programs whose product lifetimes expire, preventing a decline in cumulative DSM savings, and potentially increasing rather than decreasing estimated savings beyond 2012 (id.). In its 2011 PSA Forecast, the Company modified the way it reflected DSM savings in Massachusetts by including both the effects of historic DSM savings (embedded in the metered load data), and a DSM component that continues existing programs beyond 2012, thereby preventing a decline in forecasted DSM savings (RR-EFSB-25, at 19).

In both its 2010 and 2011 PSA Forecasts, the Company included 100 percent of the passive demand response associated with its energy efficiency programs, but no active demand response (RR-EFSB-25, at 10, 19).⁶ According to the Company, there are no active demand response (“DR”) program participants currently in place in the Study Area (Tr. 1, at 82-84). The Company surveyed large industrial customers served by the Shaker Road and East Longmeadow Substations to identify any potential larger net-metered generation projects or possible DR customer interest (Exh. NEP-1, at Appendix 3-2, at 3). The results indicated that one customer was contemplating a 1 MW solar photovoltaic system, but that there were no other reported project intentions (*id.*).

The Company reports that its forecast does not include savings from interruptible programs, direct load control, various non-wires alternatives, “smart grid” or other active programs, but that “forecast scenarios for these can be used to adjust the baseline forecasts . . .” (RR-EFSB-25, at 19).

b. The Company’s Generation and Load Flow Assumptions

The Company used software developed by Siemens Power Technologies International, known as PSS/E, to simulate load flows on its transmission system over a ten-year forecast period (Exh. NEP-1, at 2-5). The Company updated the load flow model to reflect changes in the electrical configuration of its system, substation load requirements, and power supply statistics at the substation level (*id.*). The Company then modeled the thermal and voltage characteristics of each transmission element, including normal, long-term emergency, and short-term emergency ratings, and the resulting voltages at various locations within the system under single contingency and double contingency outage assumptions (*id.* at 2-6).

The Company modeled its system under stressed conditions by incorporating significant electric power transfers from eastern New England to western New England at peak system conditions (Exh. NEP-1, at 2-7). In particular, the Company modeled generation in western New England to be sufficiently unavailable so that 3,500 MW of power would flow from east to west,

⁶ In general, active demand response systems are dispatchable in a manner similar to generation units, whereas passive demand response systems are continuously in effect and require no special action to be activated. GSRP at 31.

as served by available generation in eastern New England.⁷ The Company also modeled the 360 MW Millennium generating facility in Charlton as off line to further stress the local transmission system (Exh. NEP-1, at 2-8).

According to the Company, ISO-NE did not comment as to whether Millennium should be assumed off line for the purposes of the Company's analysis (Exh. EFSB-N-52). The Company states that "[t]here are no formalized rules or guidance at this time that outline whether and under what circumstances a single large generating unit should be assumed off line for purposes of conducting a transmission planning study relative to the size of the study area" (*id.*). Nevertheless, the Company assumed Millennium out of service for purposes of modeling the transmission system from a reliability perspective because "the transmission system should not be designed such that a [particular] generator must run in order to meet reliability criteria" (Exh. EFSB-N-51). The Company maintains that a generator may experience an unplanned outage that keeps the unit off line for weeks or months for repair (*id.*). Accordingly, the Company stated that "dispatches in planning studies are constructed so as not to assume dependence on any single large generating unit or any other specific local generation" (Exh. EFSB-N-52).

c. Company's Voltage Criteria

Voltage standards are established to protect customer equipment (particularly motors) from voltage drops above or below acceptable levels (Exh. NEP-1, at 2-3). Low voltages can damage customer equipment (particularly motors), while collapsing voltages result in loss of load throughout the affected area (*id.*). Table 1, below, reflects NEP's voltage criteria:

⁷ The existing east-to-west interface is currently 2,400 MW, but is expected to increase to 3,500 MW after construction of the proposed Interstate Reliability Project ("IRP") (Exh. EFSB-N-7). The IRP is a 75-mile 345 kV overhead transmission line that would run from Millbury, MA to North Smithfield, Rhode Island, and then to Connecticut where it would terminate in Lebanon, Connecticut.

Table 1: NEP’s Voltage Criteria

NEP Allowable Voltage Ranges for Critical and Non-Critical Buses (as a percentage of nominal voltage)		
Condition	Critical Buses (345 kV, 230 kV, bulk power system buses and selected other buses)	Non-Critical Buses (115 kV buses outside of bulk power system and not otherwise selected)
Normal Operating	98% to 105%	95% to 105%
Post-Contingency and Automatic Actions	95% to 105%	90% to 105%

Source: Exh. NEP-1, at 2-9

d. Results of the Company’s Contingency Analysis

The Company’s modeling indicates that two different combinations of transmission line losses (*i.e.*, N-1-1 contingencies) could cause voltage violations (Exh. NEP-1, at 2-9 to 2-11). Depending on the load levels at the time of an N-1-1 contingency, and upon certain system operator actions taken after the first contingency in anticipation of the second contingency, customer loads served by certain substations in the Study Area could be interrupted as a result of the second contingency of an N-1-1 event (Exh. EFSB-N-50).

One adverse contingency combination is the loss of the 301/302 345 kV lines that run between Ludlow Substation, Carpenter Hill Substation, and Millbury 3 Substation, followed by the loss of the X-176 115 kV line that runs between the Ludlow Substation and the Palmer Substation (the “301/176 contingency”).⁸ According to the Company, this contingency combination potentially results in voltage violations as early as 2011, and voltage collapse beginning in 2015 resulting in 328 MW of lost customer load. By 2019, the Company forecasts this load loss would grow to approximately 350 MW (Exhs. EFSB-N-50; NEP-1, at 2-10).⁹

⁸ The loss of the 301 line and the 302 line is considered a single contingency because there is not an existing breaker between the two lines. As a result, a fault on either line results in the loss of both lines. The sequence of the pairs of contingencies does not matter in this instance.

⁹ The 350 MW is combined load served from the following substations: Palmer, East Longmeadow, Hampden, Wilbraham, Shaker Road, East Webster, West Charlton, Little Rest Road and North Oxford (Exh. EFSB-N-50).

The second adverse contingency combination is the loss of the W-175 line that runs between Palmer Substation and Carpenter Hill Substation, followed by the loss of the X-176 line that runs between Palmer Substation and Ludlow Substation (the “175/176 contingency”). If these two lines are lost, all of the load served through Palmer would be served by a lower-voltage line from Ware Substation. According to the Company, this contingency combination would potentially result in voltage collapse in the East Longmeadow area (Shaker Road, East Longmeadow, Hampden, Wilbraham, and Palmer Substations) beginning in 2011. Such a voltage collapse would cause the interruption of service equal to approximately 131 MW in 2015, and 192 MW in 2019, as load is predicted to grow (Exhs. NEP-1, at Attachment 2.1; EFSB-N-50; RR-EFSB-57). Based on this information, the Company maintains that the consequences of either of the two contingencies, the 301/176 contingency or the 175/176 contingency, demonstrate a need for additional energy resources.

Although not described by the Company in its Petition, it should be noted that the loss of the X-176 line, as an N-1 event, would automatically cause the loss of loads served by the Thorndike Substation (16 MW), which is served exclusively by the X-176 line (RR-EFSB-62). Similarly, the loss of the W-175 line, as an N-1 event, would automatically cause the loss of loads served by the Little Rest Road Substation (16 MW) and West Charlton Substation (28 MW), which are served exclusively by the W-175 line (RR-EFSB-57). Thus, the two contingencies identified by the Company above result in the immediate interruption of loads as a result of an N-1 event, separate and apart from the additional resulting voltage issues. The Company’s modeling for the 175/176 contingency indicates that there would be a potential voltage collapse in portions of the Palmer/East Longmeadow area in 2011 and in the entire area in the 2019 forecast period (Exh. NEP-1, at 2-11). Table 2, below, summarizes the results of the Company’s voltage modeling for the 301/176 contingency.

Table 2: NEP's Voltage Modeling for the 301/176 Contingency

301/176 Post-Contingency (N-1-1) Voltage Levels				
Substation	Low Limit	2011 Level	2014 Level	2019 Level
Shaker Road	90%	88%	85%	**
East Longmeadow	90%	88%	85%	**
Hampden	90%	90%	88%	**
Wilbraham	90%	89%	86%	**
Palmer (69 kV bus)	90%	91%	89%	**
Palmer (115 kV bus)	90%	91%	90%	**
Little Rest Road	90%	92%	91%	**
Carpenter Hill (115 kV bus)	95%	93%	92%	**
** Indicates voltage collapse of the entire Palmer/E. Longmeadow area.				

Sources: Exhs. NEP-1, at 2-10; EFSB-N-61

Note: Under this contingency, the load at Thorndike Substation would be interrupted as a direct consequence of the identified contingency.

The Company reports no thermal or voltage violations for any transmission facility in the Study Area under N-0 or N-1 conditions for forecasted peak load conditions through 2019 (Exh. NEP-1, at 2-9).¹⁰ According to the Company, the construction of the HCRP would allow the local transmission system to continue to operate within normal allowed thermal and voltage ratings under N-1-1 contingencies.

D. Analysis and Findings on Need

With regard to the forecast, the Company's 2011 PSA Forecast represents an improvement over its 2010 PSA Forecast concerning the inclusion of existing DSM programs going forward into the forecast period. However, the Siting Board is concerned that the Company is not also including savings from interruptible programs, direct load control, net-metered generation, smart grid, or other active programs. At a minimum, such savings

¹⁰ N-0 represents the modeled condition of the transmission system with no unexpected generation or transmission contingencies.

should be reflected in the Company's forecast as a sensitivity case for inclusion in the Company's forecast. Where reasonable savings estimates can be calculated, they should be included as a reduction to the Company's peak load forecast for greater forecast accuracy.

The Company used both a 95/5 and 90/10 weather forecast to run its transmission model in this case. Neither the identified need nor the potential alternatives to meet that need were affected by the difference between 90/10 weather and 95/5 weather. We note that ISO-NE as well as transmission-owning utilities in Massachusetts place primary reliance on 90/10 weather when analyzing the potential need for additional transmission resources. We believe that the use of a 90/10 weather assumption is sufficiently conservative for transmission planning purposes, although it may be useful to also evaluate more extreme weather conditions in a sensitivity analysis.

Overall, the Company has provided sufficient information to permit a general understanding of its forecasting method and has provided evidence that it generally uses substantially accurate historical data, independent variables, and quantitative methods.

We are somewhat concerned over what the Company itself has identified as the absence of formalized rules or guidance at this time concerning substantial transmission planning assumptions to be used in modeling the system (Exh. EFSB-N-52). We note, as we did in GSRP, that ISO-NE is in the process of developing a new draft Planning Procedure No. 2, which should address many of the underlying planning assumptions to be used in formulating a need determination for substantial new transmission within ISO-NE. GSRP at 30, fn. 24. The Siting Board encourages all stakeholders to participate actively in this process, and hopes that such participation would lead to greater consensus regarding the numerous critical issues that affect transmission planning analysis. Id.

The Company's initial transmission modeling relied exclusively on the top of the expected range for the East-To-West Interface, assuming the construction of the Interstate Reliability Project ("IRP"), namely 3,500 MW. Upon further study, however, the Company was able to demonstrate that significantly lower East-To-West transfers (e.g., 2,000 MW and 0 MW) produce the same identified voltage violations, and that such voltage violations are therefore primarily driven by local issues (and not modeled transfers of power across a major interface) (Exh. EFSB-N-63). The results demonstrated that the need for additional energy resources was

not dependent solely upon the initially assumed maximum transfer level for the East-To-West Interface (id.).

Based on the foregoing, the Siting Board finds that the existing electric transmission system is inadequate under certain contingencies to reliably serve both existing and projected loads in the Study Area. Accordingly, the Siting Board finds that additional energy resources are needed for reliability of supply in the towns of Palmer, Monson, Hampden, Wilbraham, and East Longmeadow.

IV. ALTERNATIVE APPROACH FOR MEETING IDENTIFIED NEED

A. Standard of Review

G.L. c. 164, § 69J requires a project proponent to present alternatives to the proposed facility which may include: (a) other methods of transmitting or storing energy; (b) other sources of electrical power; or (c) a reduction of requirements through load management.¹¹ In implementing its statutory mandate, the Siting Board requires a petitioner to show that, on balance, its proposed project is superior to such alternative approaches in terms of cost, environmental impact, and ability to meet the identified need. 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. NSTAR Electric Company, EFSB 10-2/D.P.U. 10-131/10-132, at 53 (2012) (“Lower SEMA”); New England Power Company, EFSB 09-1/D.P.U. 9-52/9-53, at 19, (March 14, 2011) (“Worcester Decision”); Western Massachusetts Electric Company, EFSB 08-2/D.P.U. 08-105/106, at 41 (September 28, 2010) (“GSRP”).

B. Identification of Project Approaches for Analysis

The Company considered eight approaches for supporting voltages in the Study Area including: (1) a 115 kV transmission line between the Palmer Substation and a new substation, interconnecting to the 1515 line (the Project); (2) a 115 kV transmission line from the Palmer to East Longmeadow and Shaker Road Substations, interconnecting to the 1515 line

¹¹ G.L. c. 164, § 69J also requires an applicant to present “other site locations.” This requirement is discussed in Section V.A, below.

(Alternative 2); (3) a 115 kV transmission line from the Palmer to East Longmeadow/Shaker Road Substations, interconnecting to Franconia Substation (Alternative 3); (4) the Carpenter Hill Autotransformer (Alternative 4); (5) a step-down substation in West Hamden (Alternative 5); (6) a static VAR compensator (“SVC”) at Kibbe Road (Alternative 6); (7) an underground 115 kV line (Alternative 7); and (8) demand-side management (Alternative 8) (Exh. NEP-1, at 3-2 to 3-7).¹²

1. New 115 KV Line

Four of the Company’s alternatives and one additional alternative suggested by Siting Board staff consist of construction of a new 115 kV line starting at the Palmer Substation (Exh. NEP-1, at 3-2 to 3-4). The Company stated that these five alternatives (the Project, Alternative 2, Alternative 3, Alternative 3A – the staff suggested alternative, described below – and Alternative 7) all meet the identified need (Exh. NEP-1, at 3-2 to 3-7; RR-EFSB-20).

a. The Project

The Project consists of a new, approximately ten-mile 115 kV transmission line between the Palmer Substation and the a new substation in western Hampden (“West Hampden Substation”) interconnecting with WMECo’s 115 kV 1515 line, along the existing 69 kV O-15S ROW (Exh. NEP-1, at 3-2).¹³ The existing Hampden Substation would be retired (Exh. EFSB-G-6). In addition, NEP would refurbish the 4.4-mile portion of the existing O-15S line that is not removed as part of the Project. The cost of the Project is \$35.25 million (Exh. EFSB-8).

¹² The Company also considered a No-build Alternative. However, as discussed in Section III. D, above, the Company determined that additional energy resources were needed to meet reliability standards in the Study Area. Therefore, the Company did not evaluate this option further (Exh. NEP-1, at 3-2).

¹³ If the Alternative Route is selected, this project alternative would consist of a 115 kV transmission line between the Palmer Substation and a new substation in western Wilbraham, along the existing N-14 69 kV ROW. The entire 14.4-mile existing O-15S line would then need to be refurbished (Exh. NEP-1, at 5-4).

b. Alternative 2

This Alternative consists of a new, approximately 14.4-mile 115 kV transmission line between the Palmer Substation and the East Longmeadow and Shaker Road Substations, along the existing O-15S ROW (Exh. NEP-1, at 3-3). The new West Hampden Substation interconnecting with WMECo's 1515 line would be constructed, and the existing Hampden Substation would be retired. The cost of Alternative 2 is approximately \$45 million (id. at 3-8).

c. Alternative 3

This Alternative includes a new, approximately 14.4-mile 115 kV transmission line between the Palmer Substation and the East Longmeadow and Shaker Road Substations, along the existing O-15S ROW (Exh. NEP-1, at 3-4). Instead of a new West Hampden Substation connecting to the 1515 line, Alternative 3 includes a new 1.2-mile 115 kV line between the Franconia Substation and the Shaker Road Substation on a new ROW (id.). The existing Hampden Substation would not be retired and would require a new 115/13 kV transformer (id.). The cost of Alternative 3 is approximately \$41.4 million (id. at 3-8).

d. Alternative 3A

During the course of the proceeding, Staff requested a revision to Alternative 3, known as Alternative 3A. Specifically, unlike Alternative 3, Alternative 3A does not require the construction of the 14.4 miles of 115 kV line from western Hampden to the East Longmeadow Substation (Exh. EFSB-N-56; RR-EFSB-19; Tr. 2, at 233-234). Alternative 3A includes: the construction of a new approximately 1.35-mile 115 kV line between WMECo's Franconia Substation and the Company's Shaker Road Substation; three new 115/69 kV transformers at the Shaker Road Substation; two 115 kV circuit breakers at the Franconia Substation, one 115 kV, 14.4 MVAR capacitor bank at both the Franconia and Scitico Substations; a 115 kV capacitor bank at Carpenter Hill Substation; one 13 kV capacitor bank at both Shaker Road Substation and Hampden Substation; and refurbishment of the 14.4 mile O-15S line (Exh. EFSB-8; RR-EFSB-19). The cost of Alternative 3A is estimated to be \$37.33 million (Exh. EFSB-8).

e. Underground Line (Alternative 7)

Alternative 7 has the same components as the Project, with the exception that the 115 kV line would be located underground (Exh. NEP-1, at 3-7). The Company asserted that construction of the underground line along the O-15S ROW would not be feasible due to property rights issues along the existing ROW and that obtaining such rights would be costly and add significant time to the Project (Exh. NEP-1, at App. 3-1, at 2). Further, the presence of wetlands, and the necessary construction of a new access road would add to the environmental impacts (id.). NEP therefore based its underground alternative on the use of public roads and developed a 14.2-mile conceptual route (id. at 3). A study-grade estimate of approximately \$99.8 million was developed, which did not include the cost of the substation, land acquisition or easement costs, and associated overhead line work or dead end structures (id. at 7).

2. Carpenter Hill Auto Transformer (Alternative 4)

Alternative 4 consists of the installation of a second 345/115 kV autotransformer and three new circuit breakers at the existing Carpenter Hill Substation in Charlton; and the refurbishment of the 14.4-mile O-15S line (Exh. NEP-1, at 3-5).¹⁴ The installation would require the addition of a new 345 kV bay and the subsequent expansion of the existing fence line (id.). As initially presented in the Company's project alternative analysis, Alternative 4 would address the 301/176 contingency, but would not address the 175/176 contingency (Exh. NEP-1, at 3-5). However, as discussed below, Alternative 4 could potentially be a viable option were the Company able to address the 175/176 contingency by means of dropping load in a controlled manner.

a. Load Shedding

Both NERC and ISO-NE reliability standards allow certain loads to be temporarily dropped in response to certain N-1-1 scenarios (Exh. EFSB-N-48). According to the Company, NERC allows controlled load shedding after the second contingency (id.). ISO-NE is in the process of developing draft guidelines on load interruption – the ISO-NE's 2010 proposed

¹⁴ Alternative 4 would provide an operational benefit to the Millennium power plant, since the output restriction currently in place when the Carpenter Hill autotransformer is out of service would then be unnecessary (Exh. EFSB-PA-37).

Transmission System Planning Load Interruption Guidelines (“draft ISO Guidelines”) (*id.*). Similarly, the Company’s Transmission Planning Guide also permits customer load to be interrupted in response to N-1-1 contingencies (Exh. NEP-1, at Appendix 2-4, Section 4.2.4; Tr. 5, at 606).

The draft ISO Guidelines propose an ISO-NE policy for when it could be acceptable to rely on planned or controlled load interruption to address an N-1-1 contingency. According to the draft ISO Guidelines, the acceptability of interrupting load depends on “the amount of load at risk, the duration of the interruptions, the frequency of interruptions, the customers affected and the impacts of geography” (Exh. EFSB-N-48(a) at 4).

The draft ISO Guidelines state that load interruption for N-1-1 contingencies is allowed from 0-100 MW, and is “potentially allowable” from 100-300 MW (Exh. EFSB-N-48(a) at 7). With interruptions up to 100 MW, the draft ISO Guidelines state that transmission solutions “would generally not be undertaken and the cost of [the] transmission solution would not generally be approved as a regional cost” (*id.*). By contrast, transmission solutions may be approved as a regional cost for situations involving the loss of between 100 and 300 MW, depending on the level of the load interruptions, the characteristics of the load being interrupted, restoration time, hours of exposure and the cost of mitigation (*id.*). According to the draft ISO Guidelines, loads exceeding 300 MW should not be interrupted as a result of N-1-1 contingencies.

b. Alternative 4 with Load Shedding

As noted above, the Company explained initially that Alternative 4 would meet the 301/176 contingency but not the 175/176 contingency, as voltage collapse would result from the loss of the 175/176 lines (Exhs. NEP-1, at 3-5, 3-6; EFSB-N-57).¹⁵ Specifically, under this

¹⁵ With regard to Alternative 4, the Carpenter Hill Substation transformer, the Company initially reported in the Petition that based on current reliability standards it would only have to meet the 301/176 contingency, not the 175/176 contingency (Exh. NEP-1, at 3-5 to 3-6). In the course of reviewing the requirements, NEP determined that under the existing NPCC standards the 175/176 lines do meet the definition of a Bulk Power system element; therefore, the system must be designed to meet the second N-1-1 contingency, and Alternative 4 would not meet the identified need (Exh. EFSB-N-2 (S); Tr. 6, at 724-725).

contingency, the remaining 69 kV supply from the Ware Substation would be unable to support the entire 69 kV load served from the Palmer Substation (Exh. EFSB-PA-30). The Company asserted that Alternative 4 would not address the identified voltage violations, and therefore it did not provide any further substantive analysis of the costs and environmental impacts of Alternative 4.

However, following further analysis at the request of Staff, the Company determined that Alternative 4 could prevent voltage violations by “posturing” the transmission system to drop loads if the solution relied, in part, on the interruption of customer loads in the Study Area to solve the 175/176 contingency (RR-EFSB-57; Exh. DML-PFT-Supp at 6).¹⁶ The evidentiary record in the case indicated that such an approach is consistent with draft ISO-NE guidelines for the interruption of customer loads (Exh. EFSB-N-48). Given the conclusions identified by the additional analysis, Alternative 4 then underwent an in-depth analysis of environmental impacts, costs, and reliability.

As described above in Section I.B, the Company supplemented the record related to the discussion of Alternative 4. Specifically, the Company requested that it supplement the record after Staff concluded in the first Issues Memorandum that Alternative 4, in conjunction with controlled load shedding, could meet the reliability needs of the area. The Company maintained in the supplemental evidence that while Alternative 4 addresses the 301/176 and 175/176 contingencies, it does not safely address the reliability need because it might lead to a voltage collapse on two 69 kV lines (E-5/F-6 lines) (Exh. DML-PFT-Supp at 6). Specifically, in order to rely on the interruption of customer load, operator action would need to be taken to open the 69 kV O-15N line at the Ware Substation (*id.*). The Company’s updated load flow simulations demonstrated that, under 2019 peak load conditions, with the O-15N line open, a contingency on the E-5/F-6 69 kV transmission lines could result in voltage collapse at substations served by the

¹⁶ Following the loss of one 115 kV line, the Company can “posture” the system to drop load in the event of a second contingency by opening switches between an area served by the 69 kV line from Ware; this posturing is also known as post-first-contingency switching.

E-5 and F-6 lines (*id.*).¹⁷ The Company asserted that this additional evidence indicates that Alternative 4 with load shedding is no longer a viable alternative, as it does not solve the modeled second contingency voltage violations.

3. Step-Down Substation (Alternative 5/5A)

Alternative 5 includes the installation of a new substation (that would be constructed at the same location as the proposed West Hampden Substation) consisting of a 115-to-69 kV autotransformer that would connect WMECo's 115 kV system with NEP's 69 kV system via a 750-foot loop line (Exh. NEP-1, at 3-6). With this alternative, the entire 14.4 miles of O-15S 69 kV line would be refurbished for continued use at 69 kV (*id.*). The existing Hampden Substation on Allen Road would not be retired (Exh. EFSB-PA-32).

In its Petition, NEP rejected Alternative 5 as a viable alternative because WMECo reportedly informed the Company that WMECo's area transmission system could not support NEP's load following the loss of WMECo's 1515N 115 kV line without incurring serious voltage violations (Exhs. NEP-1, at 3-6; EFSB-PA-24; Tr. 2, at 182). However, in response to a Staff information request to re-examine the accuracy of WMECo's concern in light of the recently approved Greater Springfield Reliability Project, the Company asserted that Alternative 5 could address the Company's identified need with certain upgrades to the WMECo system (Exhs. EFSB-PA-24; EFSB-PA-50). To address voltage violations on WMECo's system under certain contingencies, WMECo would need to construct one of the following options on its system: (1) install one 115 kV 14.4 MVAR capacitor bank at both the WMECo Franconia and Scitico Substations, or (2) install one 115 kV 14.4 MVAR capacitor bank at the Franconia Substation and pursue modifications at the WMECo Ludlow Substation (Exh. EFSB-PA-50). With the addition of these additional WMECo elements, Alternative 5 became Alternative 5A.

The Company estimated that installing these upgrades to the WMECo system would cost approximately \$8 million for either one of WMECo's two options (Exhs. EFSB-8; EFSB-PA-

¹⁷ The E-5 and F-6 lines run between the Millbury and Deerfield Substations, where they share double-circuit towers for the entire length, and therefore would be treated as a single design contingency (Tr. 6, at 739-740). Voltage collapse would occur at the following substations: Meadow Street, Lashaway, Ware, Belchertown, and Shutesbury (Exh. DML-PFT-Supp at 6, 7).

50).¹⁸ WMECo explained that it, rather than NEP, would be responsible for paying for the upgrades at the WMECo substations (Tr. 3, at 165). WMECo asserted that it would prefer the Project over Alternative 5A, but that it would install such upgrades if Alternative 5A were selected as the preferred alternative (Tr. 2, at 226-227).

The cost of Alternative 5A is estimated to be \$36.2 million (Exh. EFSB-8). The Company stated that Alternative 5A, as revised to include the upgrades to WMECo's system, meets the identified need (Exh. EFSB-PA-50; Tr.5, at 594-597).

4. Kibbe Road Static VAR Compensator (Alternative 6)

Alternative 6 consists of the construction of a 90 MVAR SVC, located in the vicinity of the existing Kibbe Road switch structures in East Longmeadow; and the refurbishment of the 14.4 mile O-15S line (Exh. NEP-1, at 3-6; Tr. 4, at 544). An SVC is a shunt-connected, static VAR generator or absorber whose output adjusts to exchange capacitive or inductive current so as to maintain adequate bus voltages in an electrical power system (Exh. NEP-1, at 3-6). The 90 MVAR SVC is estimated to require a 200 feet by 200 feet area (Tr. 4, at 497). The location identified by the Company as the potential location for the SVC is not owned by the Company, nor is there any available Company-owned land in the vicinity (RR-EFSB-1; Tr. 4, at 499).

The cost of Alternative 6 is \$46.46 million, of which approximately \$23 million is for the installation of the SVC, \$5.65 million is for refurbishment of the O-15S line, and approximately \$15 million is for retension, reconductoring, and upgrades from area 69 kV lines and substations (Exh. EFSB-8).

¹⁸ In order to formulate the \$8 million estimates, the Companies indicated that it based the estimates on recent installations of two capacitor bank projects (Exh. EFSB-PA-50; RR-EFSB-10). Both projects were completed in 2006 and consisted of two 14.4 MVAR capacitor banks, two circuit switchers, two current limiting reactors and one circuit breaker, which is similar to the proposed capacitor bank installations (RR-EFSB-10). Both projects also included substation yard expansion and associated site work (*id.*). The cost of the Woodland Substation project was \$2.1 million and the Pleasant Substation was \$2.6 million (*id.*). The Company calculated that using a 3.5 percent escalation rate for five years and a 30 percent contingency allowance, the current costs for Woodland and Pleasant Substations would be \$3.2 million and \$4.0 million, respectively (*id.*).

The Company maintained that Alternative 6 would not address the identified need because there would be low voltage impacts at the Carpenter Hill, East Webster, and West Charlton Substations (Exh. NEP-1, at 3-6; Tr. 1, at 55). Further, the Company initially asserted that increasing the size of the SVC above 90 MVAR was not a viable option because it would result in high voltage violations in the Kibbe Road area and the Carpenter Hill and East Webster Substations (Exhs. EFSB-PA-21; EFSB-PA-22; Tr. 1, at 57). Although NEP asserted that Alternative 6 could not meet the identified need, there is the possibility of using a larger SVC, as well as other upgrades or enhancements to other facilities. Subsequently, the Company analyzed the ability of a 150 MVAR SVC to meet the identified need, and concluded that even with the increase in size, Alternative 6 would be inadequate (RR-EFSB-8; Exh. EFSB-PA-34).

The nearest residence to the potential site is approximately 360 feet from the proposed SVC, and modeled nighttime noise increases at this residence is calculated to be 13 A-weighted decibels (“dBA”), without additional noise mitigation (RR-EFSB-41; Tr. 5, at 561). Further, there is one residence within 100 feet of the proposed property line of the Kibbe Road site, and seven residences within 300 feet (RR-EFSB-46). Based on the location and size of the Kibbe Road SVC, the Company maintains that there would be significant noise impacts from the operation of the SVC (RR-EFSB-41; Tr. 5, at 561-563). According to the Company, the noise impact would not comply with the Massachusetts Department of Environmental Protection (“MassDEP”) Noise Pollution Policy limit of 10 dBA increase over ambient levels (RR-EFSB-41).

5. Demand Side Management

The Company evaluated the potential for DSM measures, including demand response, energy efficiency and distributed generation, to reduce demand sufficiently at substations in the area to address the identified need (Exh. NG-1, App 3-2, at 1). The Company stated that the peak load reductions required to eliminate N-1-1 voltage violations at Shaker Road and East Longmeadow for 2014 are 36 and 28 percent, respectively, and for 2019 are 48 and 51 percent, respectively (Exh. EFSB-PA-44).¹⁹ The Company asserted that these levels of load reduction

¹⁹ The Company explained that it chose the two substations to model DSM since they are the furthest from the supply at Palmer Substation and are near the end of the radial line,

are not available through existing and planned energy efficiency programs, distributed generation, or from customers that could provide demand response (Exhs. EFSB-PA-44; EFSB-PA-46; NG-1, App 3-2, at 1-2). According to the Company, the average peak load savings that it can reasonably expect to achieve from a targeted DSM program is in the range of five percent of peak load (RR-EFSB-5; Tr. 1, at 91). The Company concluded that even if the rate of peak load reduction were doubled and extended into 2014, the voltage violations at the Shaker Road and Longmeadow Substations would still occur (Exh. EFSB-PA-39). Therefore, violations of the two N-1-1 contingencies would continue to occur even with additional DSM (Tr. 1, at 87).

The Company analyzed DSM as a stand-alone (“targeted DSM”) solution (Exh. NEP-1, at 3-7 and App. 3-2). Upon request by Staff, the Company also analyzed DSM in combination with the transmission alternatives (Exhs. EFSB-PA-43; EFSB-PA-44; EFSB-PA-45; EFSB-PA-46). According to NEP, supplementing a wires-based solution with a targeted DSM program only makes sense if the target DSM program could either: (1) reduce the scope of an effective wires solution; or (2) enhance a wires solution that is not fully capable of meeting the identified need (Exh. EFSB-PA-25).

The Company asserted that using DSM in conjunction with Alternative 4 would not result in meeting the identified need for the 176/175 contingency because there would be insufficient DSM available (Tr. 1, at 95). With regard to DSM and Alternative 6, the Company modeled a decrease in 50 percent of the East Longmeadow load (14.3 MW), and concluded that the 2019 load flow analysis indicated that the 301/176 contingency would still show voltage violations (Exh. EFSB-PA-25; Tr. 1, at 96). Finally, WMECo testified that it did not consider any DSM or any other non-traditional alternatives for the area associated with Alternative 5 (Tr. 2, at 163).

The Company surveyed industrial customers in the Study Area about their future plans for distributed generation. One customer is considering a one MW photovoltaic array, but there are no final plans, and there were no other indications of pending distributed generation interest

which would have the higher impedance and therefore a greater voltage drop (Tr. 1, at 89). The Company suggested that it is more effective to install DSM where it can provide the greatest amount of voltage increase (id.).

(Exh. NG-1, App. 3-2, at 1). The Company concluded that distributed generation was insufficient to meet the identified need (Exh. EFSB-PA-45).

6. Alternative Refinement and Analysis

Based on the Company's need analysis, the Company initially stated in its Petition that Alternatives 1, 2, 3 and 4 would go forward for a comparative analysis of reliability, cost and environmental impacts and based the project alternative analysis on these four alternatives. The Company eliminated Alternative 5 since it determined that the WMECo area transmission system could not support NEP's load following the loss of WMECo's 1515 line without voltage violations. The Company eliminated Alternative 6 due to some voltage problems resulting from the 301/176 contingency. Alternative 7, the underground alternative, was not analyzed further due to high costs. There were no variations presented by the Company to any of the above Alternatives. In addition, based on the bulk electric power system designation, the Company asserted that Alternative 4 could meet only the 301/176 contingency, and therefore NEP did not initially provide substantive physical and environmental details on Alternative 4.

Given the above, the bulk of the initial project approach analysis presented in the Petition consisted of three alternatives using basically the same approach – at least ten miles of a new 115 kV transmission line, all in the same location – and the new Carpenter Hill transformer, which the Company concluded did not meet the identified need. Therefore, the initial comparative analysis presented by the Company was limited. As discussed above, the project approach analysis was expanded throughout the course of the proceeding, at the initiative of Staff. The Siting Board identifies the following three principal issues with the Company's approach.

First, as discussed in Section IV.B.2.a above, load shedding is a viable and allowable action within certain parameters, to address voltage and thermal violations. Both NEP and WMECo accept load shedding as an element of their proposed Project. For example, the Company's proposal in this case allows approximately 60 MW of load to be interrupted under the 175/176 contingency. Were the Company's proposed R-170 line to go out of service after it is constructed, together with the loss of WMECo's 1515N line, the Company testified that it would have to interrupt approximately 42 MW of load served by the East Longmeadow, Shaker Road and Hampden Substation. Further, as discussed above, the draft ISO Guidelines set forth

ISO-NE's proposed policy of when it is acceptable to rely on planned or controlled load interruption to address an N-1-1 contingency. However, in evaluating project alternatives, the Company failed to explore the full range of options contemplated by the draft ISO Guidelines in analyzing potential project approaches that could possibly have lower costs and fewer environmental impacts.

Second, the Company initially rejected Alternative 5 as a viable alternative based on its conclusion that the WMECo area transmission system would experience voltage violations if this alternative were installed and WMECo lost its 1515N line. NEP did not attempt to develop a solution or question whether upgrades could be implemented on WMECo's system in order to generate a viable project for Alternative 5. In addition, WMECo, a co-petitioner in this case, did not put forth suggested upgrades to its system required by Alternative 5 to enable its full evaluation. Therefore, NEP and WMECo overlooked analyzing potential project approaches that possibly could have yielded lower costs and fewer environmental impacts. The Siting Board reminds the Company, as well as future applicants, that given the integrated nature of the transmission system in Massachusetts and the region, a Company should not dismiss an alternative because the alternative may also require additional transmission investment on another utility's system.

Finally, in light of the mandate in the Green Communities Act that "electric and gas resource needs shall first be met through all available energy efficiency and demand reduction resources that are cost effective or less expensive than supply," and the focus on non-transmission alternatives, the practice by NEP of looking at DSM only as a stand-alone alternative is inadequate. See Green Communities Act at Section 21(a). The Siting Board notes that this issue is not confined to the Company, as other utilities have also been hesitant to expand their view of DSM combined with other project alternatives.

The Siting Board recognizes that electric distribution companies are required to prepare energy efficiency plans every three years for approval by the Department, and that the plan submitted by MECo and Nantucket Electric was approved by the Department on January 28, 2010. Here, in addition to the approved plan, the Company analyzed the availability of targeted DSM as a project approach. However, the nature of DSM as a potential complement to a wires approach must be recognized as an important component of a project approach analysis in Siting

Board reviews of transmission lines. Therefore, the Company, as well as future applicants, are reminded that when developing and analyzing project alternatives, DSM should be considered as both a stand-alone alternative and in conjunction with other identified alternatives.

Of the ten alternatives (eight original plus Alternative 3A and Alternative 5A), the Project, Alternative 2, Alternative 3, Alternative 3A, Alternative 5A, and Alternative 7 meet the identified need. The proposed Project, Alternative 2, Alternative 3, Alternative 3A and Alternative 7 all consist of replacing the existing 69 kV O-15S line with a new 115 kV line, the R-170. The Project, Alternative 2, Alternative 7, and Alternative 5A would require the construction of a new substation, while Alternative 3 would rely on a new 1.2-mile 115 kV line from WMECo's Franconia Substation to the Shaker Road Substation instead of a new substation, as well as an extension of the R-170 line to East Longmeadow. The five new 115 kV transmission line alternatives all would meet the identified need using the same type of source, and therefore are all comparable with regard to reliability. The majority of the Project, Alternative 2, and Alternative 3 are basically the same, only varying in terms of whether the final 4.4 miles are either new 115 kV or refurbished lines, and whether to construct a new substation or a new 1.2-mile 115 kV line on a new ROW. Therefore, the environmental impacts are similar. However, the cost of the Project is less than the two overhead alternatives. Alternative 7, the underground transmission line, would need to be constructed along public ways, with attendant traffic impacts. Further, the cost of Alternative 7 is at least three times the cost of the Project, with the same reliability. Given that Alternative 2 and Alternative 3 are similar to the Project, have no environmental or reliability advantages over the Project, and are more costly, the Project is the preferred 115 kV transmission line alternative.

Alternative 3A is comparable in cost to the Project, varies in configuration from the Project in that it does not require the construction of the new 115 kV line or a new substation, and also addresses the voltage violations. Similarly, Alternative 5A is also comparable in cost to the Project and addresses the voltage violations.

Finally, the installation of a new Carpenter Hill transformer (Alternative 4), installation of the Kibbe Road SVC (Alternative 6), and DSM (Alternative 8) do not meet the identified need and are not analyzed further.

Therefore, in the following sections, the Siting Board compares the Project, Alternative 3A and Alternative 5A in depth as the most feasible alternatives with respect to reliability, environmental impacts, and cost.

C. Reliability

Alternative 1 (the Project), Alternative 3A, and Alternative 5A each meets the reliability criteria applied to the study of the transmission system over the ten-year forecast period (Exhs. NEP-1, at 3-2 to 3-4; EFSB-PA-50). The Project, Alternative 3A and Alternative 5A provide system protection without loss of customer load in the 301/176 contingency. In the case of the 175/176 contingency, the Project, Alternative 3A and Alternative 5A solve the voltage violations that occur in the Study Area under the existing 69 kV system (RR-EFSB-57). However, the Project, Alternative 3A and Alternative 5A require approximately 60 MW of load interruption under the 175/176 contingency (RR EFSB-62). Even after construction of a new 115 kV line into the Study Area, when the X-176 line contingency occurs, the load served out of the Thorndike Substation is interrupted, and when the W-175 line contingency occurs, service at the Little Rest Road and West Charlton Substations is interrupted.²⁰ The Company stated that it has no plans to address this load loss because the amount of load that would be interrupted is not a violation of the Company's transmission planning standards (id.). None of the alternatives offers a solution to avoid interrupting load completely in the event that the W-175 or X-176 line goes out of service.

In addition, were the Company's proposed R-170 line to go out of service, together with the loss of WMECo's 1515 line, approximately 66 MW of load served by the East Longmeadow, Shaker Road and West Hampden Substations would be dropped (RR-EFSB-56; RR-EFSB-57). Subsequently, the Company identified a design modification to the planned configuration of the

²⁰ It should be noted that none of the relevant load flow diagrams produced by the Company accurately represented the loss of these three substations, but instead showed that the three substations continued to function within the Company's acceptable voltage range (see Tr. 6, at 762-765; Exh. EFSB-N-53). According to the Company's witness, Mr. Latulipe, the Company "did not take those substations out when [it] was running the simulation because it just makes the simulation a little harder to run" (Tr. 6, at 763). In the future, if the Company has made simplifying assumptions, then it should clearly note the inaccuracies that appear in the diagram.

West Hampden Substation that would prevent the loss of load at the West Hampden Substation, thereby limiting interruption of load to the East Longmeadow and Shaker Road Substations (RR-EFSB-57). The Company stated that it could restore this 42 MW of interrupted load in approximately five minutes by remote operator action (RR-EFSB-57). Therefore, the net effect of the Project is to reduce, but not eliminate, loss of load in the event that the 175/176 contingency were to occur.²¹ The Project would reduce the amount of interrupted load from 192 MW to 60 MW in 2019 (RR-EFSB-57). In addition, under the N-1-1 contingency where the R-170 line itself were to go out of service together with the loss of WMECo's 1515N line, approximately 42 MW of load would be interrupted (*id.*).

The Company asserts that its Project is more reliable than Alternatives 3A or 5A because the use of a 115 kV line provides better voltage performance than a 69 kV line, due to its lower impedance (Exh. EFSB-PA-50). Importantly, the Project provides 115 kV from two sources, the 115 kV from Palmer Substation and the new interconnection with WMECo's 1515 line (Exhs. NEP-1, at Fig. 3.2.2-1; DML-PFT (Supp) at 15). Further, the Company asserts that a 115 kV line has a higher thermal rating than a 69 kV line, and is easier to expand and integrate with the system (Exh. EFSB-PA-50).

D. Environmental

The Company asserts that its Project has less environmental impact than Alternative 5A since there are slightly more temporary wetland impacts associated with refurbishment than with new construction (Exh. DML-PFT (Supp), Att. 1; Tr. 5, at 571). The Company points to its typical practice of using swamp mats for every structure located in a wetland to be replaced as part of a refurbishment (Tr. 5, at 571). For the new transmission line, the Company asserts it can remove the existing structures and/or avoid locating the monopoles in wetlands; therefore, each structure now located in a wetland may not need a swamp mat (*id.* at 570, 573).

The existing O-15S line consists of wooden pole structures approximately 45 to 50 feet tall (Tr. 5, at 575). The Project would consist of new steel monopoles approximately 80 feet high, and the refurbishment would consist of using new wood monopoles at the existing height

²¹ As noted above, Alternatives 3A and 5A do not include the proposed R-170 line. Accordingly, the loss of the proposed R-170 line is not relevant to these two alternatives.

or approximately five to ten feet higher (id. at 575-576). The approximate 30-foot height increase with the 115 kV steel monopoles would impose additional visual impacts on area residents, 102 of whom live within 300 feet of the edge of the ROW (Exh. NEP-2, at 5-12 to 5-13).²²

The West Hampden Substation would be situated in a protected habitat area and would require five acres of clearing within a large parcel with treed buffer (Exh. NEP-1, at 5-4). The Alternative 5A step-down substation would be located in the same area but would be approximately one-half acre larger than the West Hampden Substation, as the step-down substation would require three transformers and the West Hampden Substation would have two transformers (Exh. EFSB-PA-32; Tr. 6, at 713). The increase in size would be to the north, requiring incorporation of additional mitigation into the plans being prepared with the National Heritage and Endangered Species Program (“NHESP”) (Tr. 6, at 715). Both the West Hampden and Alternative 5A step-down substation would be situated outside of wetlands, the 100-foot buffer zone, and the 200-foot Riverfront Area, and the location of the driveway would avoid new wetland and stream crossing (Exh. EFSB-PA-32; Tr. 6, at 718).

For Alternative 3A, the 1.35-mile 115 kV line from the Franconia Substation to the Shaker Hill Substation would be situated in close proximity to a new housing development to the east and an elder care facility to the west (Exh. NEP-1, at 3-10, 3-11; RR-EFSB-48). Specifically, the centerline of the new 115 kV line would be approximately 58 feet to the nearest residential structure and 58 feet to the driveway of the elder care facility (RR-EFSB-48). The new 115 kV line would cross four wetlands, and have direct wetland impacts, although there are no wetlands, streams or vernal pools in the vicinity of the Shaker Road Substation (Exh. NEP-1, at 3-10; Tr. 4, at 513, 533). The total newly disturbed area would be 11.6 acres (Exh. NEP-1, at 3-10). The Shaker Road Substation would be expanded outside of its existing fence line, for approximately 250 feet, in an industrial area (RR-EFSB-18). The Franconia Substation fence line would also have to be expanded to include additional breakers (RR-EFSB-51). In addition,

²² There are nine residences within 25 feet, 21 residences within 50 feet, and 41 residences within 100 feet of the edge of the ROW (Exh. EFSB-LU-8).

the Company indicated that the property rights for this new ROW could be costly and difficult to obtain (Exh. NEP-1, at 3-11).

E. Cost

The Project is estimated to cost \$35.25 million, compared to an estimated cost of \$37.3 million for Alternative 3A and \$36.2 million for Alternative 5A.²³ Both WMECo substation upgrade options to Alternative 5A are estimated to cost \$8 million based on a -50/+200 percent estimate prepared by WMECo (Exh. EFSB-PA-50). However, similar equipment installations in the region were identified with costs at least 50 percent less than the WMECo estimates (Exh. EFSB-5; RR-EFSB-10).

As noted above, the O-15S line requires refurbishment in those sections that are not being replaced by the new 115 kV line. The Project includes the refurbishment of 4.4 miles of the O-15S line that is not converted to 115 kV, which runs from the new West Hampden Substation to the East Longmeadow and Shaker Road Substations, at a total cost of \$1.25 million (Exhs. NEP-1, at 3-3; EFSB-8). Alternative 3A and 5A include the refurbishment of the entire 14.4-mile O-15S 69 kV line from the Palmer Substation to the East Longmeadow Substation and the Shaker Road Substation, at a total cost of \$5.65 million (Exhs. NEP-1, Att 3-2; EFSB-8).

Based on ISO-NE cost allocation principles, Staff calculated that Massachusetts customers would be responsible for approximately \$18.4 million for the Project, \$22 million for Alternative 3A, and \$20.7 million for Alternative 5A (see Exh. EFSB-8; RR-EFSB-61).²⁴

²³ Based on the 2011 Forecast, Alternative 5 showed low voltage violations in 2016, where under the 2010 Forecast, voltage violations did not appear during the forecast period (Tr. 6, at 374-378). To address these forecasted voltage violations, the Company modeled the addition of capacitors to Carpenter Hill and Hampden Substations (Exh. EFSB-PA-50(S)). The Company revised its estimate from \$33.2 million to \$36.2 million because more capacitors are required based on the 2011 Forecast (Exh. EFSB-8).

²⁴ The calculation is based on Company estimates of the cost of each alternative, divided into pooled transmission facility (“PTF”) costs and non-PTF costs (see Exh. EFSB-8; RR-EFSB-61). Massachusetts customers typically pay about 46 percent of the costs of pooled transmission facilities. NEP stated that load share ratio for Massachusetts under NEP’s tariff is 72 percent (RR-EFSB-61). Staff added together 46 percent of the PTF amount and 72 percent of the non-PTF amount, to arrive at the cost for Massachusetts customers.

Table 3: Summary of the Feasible Project Alternatives

DESCRIPTION	THE COMPANY'S PROJECT	ALT. 3A	ALT. 5A
Major Facility Components	New 10-mile 115 kV line in existing ROW; new West Hampden Sub connecting to 1515 line; retire existing Hampden Sub	New 1.35-mile 115 kV line in new ROW or underground; new transformers at Shaker Road; new capacitor banks at Franconia, Scitico, Carpenter Hill, Shaker Road and Hampden Subs	New West Hampden step-down substation with 115 kV/69 kV autotransformer; either one or two new capacitor banks at Franconia and/or Scitico Subs
General Layout for the existing O-15S right-of-way	New 10-mile 115 kV line; 21 fewer poles than with 69 kV line (originally 177, now 156); 4.4 miles 69 kV refurbished, replace 22 poles and convert 13 poles to present standards	14.4 miles 69 kV refurbished, replace 123 poles and convert 46 poles to present standards	14.4 miles 69 kV refurbished, replace 123 poles and convert 46 poles to present standards
ENVIRONMENTAL			
Visual	Current poles approx. average height is 38 ft.; new poles approx. average height is 71 ft. (27 poles over 80 ft.); 48 homes now have direct views of poles, additional 16 would have direct views of the 115 kV poles after clearing, others would see above the existing treed buffer; West Hampden Sub on a large parcel, with a large treed buffer in all directions	New 1.35 mile overhead line with new ROW, possible overland route very close to large subdivision and elder care facility; O-15S poles stay the same height or 5 to 10 feet taller; no new substation; expansion of Shaker Road Substation outside of fence line, approx. 250 ft. in industrial area	O-15S poles remain the same height or 5 to 10 feet taller; West Hampden Sub on a large parcel, with a large treed buffer in all directions
Noise	Transformer at West Hampden Sub would increase ambient sound by 2 dBA at nearest residence 825 ft away; construction noise along route	5 dBA increase at nearest residence (w/3 transformers) from Shaker Road Sub; shorter construction schedule for refurbishment vs. new line, less construction noise; construction noise close to residents for 1.35 mile route	Transformer would increase ambient sound by 2 dBA at nearest residence to West Hampden Sub; shorter construction schedule for refurbishment vs. new line, less construction noise along route
Wetlands	Would not have to use swamp mats at all existing pole locations in wetlands, have flexibility in placing new poles outside of wetlands; NEP anticipates lower temporary wetland impacts; minimal wetland impacts at substation site for driveway	No wetlands, streams or vernal pools in the vicinity of the Shaker Road Substation, but wetlands on new ROW. For refurbishment, would have to swamp mat at all pole locations and poles stay in same location; however, only replacing 123 poles in total vs. 178 for the Project	For refurbishment, would have to swamp mat at all existing pole locations and poles stay in same location; however only replacing 123 poles in total vs. 178 for the Project; minimal wetland impacts at substation site for driveway
Habitat	West Hampden Sub is within NHESP habitat area	No new West Hampden Substation	West Hampden Sub is within NHESP habitat area – NEP states that more mitigation may be required since the step-down station is approximately ½ acre larger than for the Project
Magnetic Fields	Slight decrease for 40% of route at edge of ROW, slight increase for 60% of route	Magnetic field levels stay the same with refurbishment	Magnetic field levels stay the same with refurbishment
Clearing	5 acres of forest cleared for sub	Expansion of Shaker Road Sub outside of fence line, approx. 250 ft.	5 acres of forest cleared for sub
TOTAL COST (using 2011 Forecast)	\$35.25 million	\$37.33 million	\$36.2 million
Cost to MA Ratepayers	\$18.4 million	\$21.1 million	\$20.9 million
RELIABILITY	Resolves the 301/176 contingency; load loss for 176/175 contingency is 60 MW (for loss of just W-175 is 44 MW); new 115 kV line would have higher capacity and higher thermal rating due to lower impedance than 69 kV	Resolves the 301/176 contingency; load loss for 176/175 contingency is 60 MW (for loss of just W-175 is 44 MW)	Resolves the 301/176 contingency; load loss for 176/175 contingency is 60 MW (for loss of just W-175 is 44 MW); system losses are 0.1 MW higher than the Project

F. Conclusion on Project Approach

The Project, Alternative 3A, and Alternative 5A all meet the reliability criteria applied to the study of the transmission system over the ten-year forecast period. The Project, Alternative 3A and Alternative 5A all have comparable costs. However, as discussed below, Alternative 3A has greater environmental impact than both the Project and Alternative 5A, whereas Alternative 5A has slightly less environmental impact than the Project.

For both Alternative 3A and 5A, the entire O-15S 69 kV line would be refurbished, retaining existing pole heights, and visual impacts would be less significant than those associated with the Project's approximate 30-foot pole height increase for the new 115 kV line. Alternative 3A would not include a new substation; however, the 1.35-mile 115 kV transmission line from Franconia to the Shaker Substation would be located in a new ROW. The new line would itself be in very close proximity, within 58 feet, to residences and an elder care facility. The Shaker Road Substation would require three new transformers with a five dBA noise increase at the nearest residence. Finally, the new 115 kV 1.35 mile line would cross four wetlands. On balance, Alternative 3A has greater environmental impact than the Project or Alternative 5A.

The Company has asserted that the Project would have fewer wetland impacts than Alternative 5A; however, the location of the new structures has not yet been determined. In addition, the Project consists of 156 new structures and the replacement of 22 structures, while Alternative 5A consists of the replacement of only 123 wooden poles.²⁵ Therefore, the record does not support the Company's assertion that there are slightly more temporary wetland impacts associated with refurbishment than with new construction.

Based on the above, the choice is then narrowed down to the Project and Alternative 5A. As noted, the costs are comparable and the environmental impacts of Alternative 5A are somewhat less than the Project, primarily due to the visual impacts of the new 115 kV versus the refurbished 69 kV line. The new line travels through a rural area, and the residential areas are low density, therefore generally the visual impacts from installation of the new 115 kV line are

²⁵ Alternative 5A involves the replacement of 123 wood monopoles and conversion of 46 wood monopoles along the entire 14.4 miles of the O-15S line. The O-15S replacement monopoles would be of similar design and remain the same height or be five to ten feet taller in some instances, and in the same general location as the existing poles. As with the Project, the converted monopoles would include new insulators and the replacement of single cross arms with double cross arms.

modest. Further, the visual impacts can be mitigated with off-site landscaping to help screen residences along the ROW.

While Alternative 5A meets the reliability criteria, the Project relies on a new 115 kV line which provides a more robust solution with both higher capacity and greater thermal rating than the refurbished O-15S line, with additional flexibility to accommodate future system growth. The Project would allow the area to be served by two 115 kV sources, the new 115 kV line from the Palmer Substation and a new interconnection with WMECo's 1515 line. Given the comparable costs, and the enhanced reliability and capacity benefits of the Project over Alternative 5A, the overall benefits of the Project outweigh the slight environmental advantage of Alternative 5A. Accordingly, the Siting Board finds that the construction of the Project is preferable to the identified project alternatives with respect to providing a reliable energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost.

V. ROUTE ALTERNATIVES

A. Route Selection

1. Standard of Review

G. L. c. 164, § 69J requires a petition to construct to include a description of alternatives to the facility including "other site locations." Thus, the Siting Board requires an applicant to demonstrate that it has considered a reasonable range of practical siting alternatives and that its proposed facilities are sited in locations that minimize cost and environmental impacts. To do so, an applicant must meet a two-pronged test. First, the applicant must establish that it developed and applied a reasonable set of criteria for identifying and evaluating alternative routes in a manner that ensures that it has not overlooked or eliminated any routes that, on balance, are clearly superior to the proposed route. Second, the applicant must establish that it identified at least two noticed sites or routes with some measure of geographic diversity. Worcester Decision, EFSB 09-1/D.P.U. 09-52/09-53, at 19-20 (2011); GSRP, EFSB 08-2/D.P.U. 08-105/08-106, at 42 (2010); Massachusetts Municipal Wholesale Electric Company, 12 DOMSB 18, at 92 (2001).

2. The Company's Route Selection Process

The Company began the route selection process by establishing a route selection study area that would encompass reasonable routes for a 115 kV transmission line between Palmer Substation and an interconnection with WMECo's 1515 line in either western Hampden or western Wilbraham (Exh. NEP-1, at 4-1). The resulting study area was bordered by Palmer Substation to the east, WMECo's 1515 line to the west, the Company's X-176 line ROW to the north, and a Tennessee Gas Pipeline ROW to the south (*id.*).

The Company identified two possible endpoints for the Project: (1) an interconnection to the 1515 line at a potential new substation in western Hampden (to be called the West Hampden Substation); or (2) an interconnection to the 1515 line at a potential new substation in western Wilbraham (*id.* at 4-4). The Company identified six potential route corridors within the study area, five of which were in existing ROWs (*id.* at 4-2). Route 1 is the Company's Project and Route 2 is the Company's noticed alternative route. As shown in Table 4, below, the Company also developed variations within Route 3 and Route 5.

Table 4: Description of Six Route Alternatives

Alternative	Description
Route 1	Route 1 is approximately ten miles long and is located within the existing O-15S ROW for the entire length between Palmer Substation and the proposed West Hampden Substation.
Route 2	Route 2 is approximately 9.6 miles long and is located entirely within the existing N-14 ROW. For its first 4 miles the route is in the same corridor as the O-15S ROW. Route 2 would terminate at a proposed new substation in western Wilbraham.
Route 3	Routes 3A and 3B are approximately 15.5 and 15.3 miles long, respectively, and are the most southern of the route alternatives considered. The routes rely on existing transmission line, distribution line, and natural gas pipeline ROWs. The final 1.6 mile portion of the routes would require expansion of WMECo's existing 1515 line ROW.
Route 4	Route 4 is an approximately 12.7 mile-long alternative that does not, for the most part, rely on existing ROWs. It primarily crosses undisturbed forest areas in the towns of Monson and Hampden and would terminate at the proposed West Hampden Substation.
Route 5	Routes 5A, 5B, and 5C are approximately 12.1, 15.7, and 13.5 miles long, respectively. The routes use existing road, rail, and transmission line ROWs. The three routes are in the northern portion of the route selection study area. Route 5C would require 5.2 miles of new ROW.
Route 6	Route 6, the longest of the alternatives, is approximately 18.5 miles long. It would be located primarily within existing electric ROWs, but would require 6.1 miles of new ROW adjacent to WMECo's 1515 line ROW.

Source: Exh. NEP-1, at 4-2 to 4-5

The Company compared the alternative routes based on environmental criteria, cost and reliability (Exh. NEP-1, at 4-1 to 4-11). In examining the environmental impacts of the alternatives, the Company applied nine environmental route-selection criteria to each route including: constructability, directness of the route, availability of existing ROWs, traffic interference, avoidance of conservation land, impact to wetlands and water resources, protection of species habitat, land use impacts, and avoidance of contaminated areas (Exh. NEP-1, at 4-5 to 4-6). Based on field studies and Geographic Information System (“GIS”) information, the Company assigned scores to each of the potential routes. The Company developed weighting of one, two, or three for each criterion that represent its judged importance in assessing environmental impacts, community impacts, and constructability (*id.* at 4-6). Route 1 and Route 2 had the lowest (best) scores (*id.* at 4-11).

The Company also calculated an estimate of the cost to build each alternative and identified several factors responsible for cost differentials among routes (Exh. NEP-1, at 4-6). Key among the factors affecting route cost are: (1) route length; (2) the need to remove or refurbish the existing O-15S line; (3) the need to upgrade the existing Wilbraham Substation (if the Alternative Route is selected); and (4) the need to acquire additional land rights for ROWs. Route 1 had the lowest cost, and Route 2 and Route 5A (which were virtually the same costs) had the second lowest costs (*id.* at 4-11). With respect to the element of reliability, the Company concluded that all routes would provide comparable levels of reliability because they would involve similar construction and are comparable in length (*id.*). Based on the scores and costs, the Company selected Route 1 as the Primary Route and Route 2 as the Alternative Route (*id.* at 4-12).

In past decisions, the Siting Board has found various types of criteria to be appropriate for identifying and evaluating route options for transmission lines and related facilities. These types of criteria include natural resource issues, land use issues, community impact issues, cost and reliability. Lower SEMA at 55; GSRP at 46-47; New England Power Company, 4 DOMSB 109, at 167 (1995). The Siting Board has also found the specific design of scoring and weighting methods for chosen criteria to be an important part of an appropriate site selection process. Boston Edison Company, 19 DOMSC 1, at 38-42 (1989).

Here, the Company developed numerous screening criteria, which it used to evaluate the routing options. These criteria generally encompass the types of criteria that the Siting Board previously has found to be acceptable. The Company also developed a quantitative system for ranking routes based on compilation of weighted scores across all criteria. This is a type of evaluation approach the Siting Board previously has found to be acceptable. Further, the Company identified and compared a large number of potential routes, nine in total.

The Siting Board finds that the Company has developed and applied a reasonable set of criteria for identifying and evaluating alternative routes in a manner that ensures the Company has not overlooked or eliminated any routes that are clearly superior to the Project.

3. Geographic Diversity

The two routes are in separate ROW for approximately six of the ten miles needed for the proposed interconnection of Palmer Substation with the WMECo 1515 line. Given the limitations imposed by an interconnection between Palmer Substation and WMECo's 1515 line, the Company identified a study area that would encompass all viable siting options. Although the two routes share approximately four of the ten total miles, given the relatively short distance between the substations, each route offers a unique set of environmental and cost advantages and disadvantages within the Study Area. The Siting Board finds that the Company established two routes (the Primary and the Alternative Route) for the Project with some measure of geographic diversity.

4. Conclusion on Route Selection

The Company has: (a) developed and applied a reasonable set of criteria for identifying and evaluating alternative routes in a manner that ensures that it has not overlooked or eliminated any routes that are clearly superior to the proposed project; and (b) identified a range of practical transmission line routes with some measure of geographic diversity. Therefore, the Siting Board finds that the Company has demonstrated that it examined a reasonable range of practical siting alternatives.

B. Analysis of Primary and Alternative Routes

1. Standard of Review

In implementing its statutory mandate under G.L. c. 164, § 69H, the Siting Board requires a petitioner to show that its proposed facility is sited at a location that minimizes costs and environmental impacts while ensuring a reliable energy supply. To determine whether such a showing is made, the Siting Board requires a petitioner to demonstrate that the proposed route for the facility is superior to the alternative route on the basis of balancing cost, environmental impact, and reliability of supply. Lower SEMA at 92; Worcester Decision, at 65; GSRP at 84.

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

2. Description of the Primary Route and Alternative Route

a. Primary Route

i. Transmission Line and Refurbishment of the O-15S Line

The Primary Route is ten miles long and is located within the existing O-15S line ROW for its entire length from the Palmer Substation to the proposed West Hampden Substation (Exh. NEP-1, at 5-2). Within the existing ROW, the Primary Route travels through the towns of Palmer (0.06 miles), Monson (5.1 miles), and Hampden (4.8 miles) (*id.* at App. 6-1, at 4). The width of the existing O-15S line ROW varies from 60 feet (where it contains only the O-15S line) to 110 feet (where it also contains the N-14 line) (*id.* at 5-2).

The Primary Route also entails refurbishing the remainder of the O-15S line for 2.7 miles between the West Hampden Substation and the East Longmeadow Substation along with 1.7 miles that make up the Shaker Road Tap, for a total of 4.4 miles (Exh. NEP-1, at 5-3; RR-EFSB-

55). This refurbishment of the O-15S line would require the replacement of approximately 22 structures and modifying 13 structures (RR-EFSB-55).

ii. Substations

The Primary Route includes construction of a new substation in West Hampden on 2.7 acres of a 97-acre parcel of land off Allen Street on the north side of the O-15S line ROW, and east of the WMECo 1515 line ROW (Exh. NEP-1, at 5-2). The West Hampden Substation would consist of an open-air 115 kV ring bus, a 115-to-69 kV autotransformer, a 115-to-13 kV autotransformer, 115 kV and 69 kV substation yards, a 13 kV metal clad substation, a 40 feet by 100 feet control house, a 14 feet by 45 feet metal clad 13 kV switch gear enclosure, and related equipment and controls (Exh. NEP-2, at 1-2).

The West Hampden Substation would supply the remainder of the O-15S line extending west to East Longmeadow and Shaker Road Substations, and would also supply local 13 kV feeders currently fed by the existing Hampden Substation. The new West Hampden Substation would interconnect the new R-170 line and WMECo's 1515 line via a new 115 kV loop line (750 feet in length) (Exh. NEP-1, at 5-2; 5-3). To accommodate the loop line, WMECo would construct a single structure to raise the conductor on WMECo's existing overhead 345 kV transmission line located on the same ROW so the loop line could proceed underneath and to the West Hampden Substation (id. at 5-2). NEP would consolidate its distribution and transmission equipment at the West Hampden Substation and retire the existing Hampden Substation (also along the O-15S line ROW) located approximately 0.4 miles east of the proposed West Hampden Substation (id.). Once NEP retires the Hampden Substation, the site would be restored to a vegetated state (id.).

Regardless of the route selected for the Project, upgrades would be required at the Palmer, Scitico and Ludlow Substations (Exh. NEP-1, at 5-3). As part of the Project, NEP would install a new 115 kV, 2000 ampere, circuit breaker and replace an existing 69 kV breaker at the Palmer Substation within the existing fenceline (id.). In addition, relay and protection scheme upgrades are required at both WMECo's Ludlow Substation and CL&P's Scitico Substation in Enfield, Connecticut (id.).

b. Alternative Route

i. Transmission Line and Refurbishment of the O-15S Line

The Alternative Route extends for approximately 9.6 miles within the existing N-14 ROW from the Palmer Substation to the West Wilbraham Substation (Exh. NEP-1, at 5-4). The N-14 line ROW ranges in width from approximately 50 to 60 feet (where it contains only the N-14 line) to approximately 110 feet (where it contains both the N-14 line and the O-15S line) (id.). It should be noted that the N-14 line was refurbished in 2007 (Exh. NEP-1, at 2-1).

Construction of the Project along the Alternative Route would require the refurbishment of the existing O-15S line along its entire 12.7 mile length between the Palmer and East Longmeadow Substations along with the 1.7 miles that make up the Shaker Road Tap, for a total distance of 14.4 miles (Exh. NEP-2, at 5-4; RR-EFSB-55). The refurbishment of the O-15S line would require the replacement of approximately 123 structures and the modification of an additional 46 structures (RR-EFSB-55).

ii. Substations

Construction of the Project along the Alternative Route would require the construction of a new substation to interconnect the new R-170 line with WMECo's 1515 line (Exh. NEP-2, at 5-4). This substation would be located between the N-14 line ROW and the 1515 line ROW identified by the Company as the West Wilbraham Substation (id.). The new substation would be a similar configuration to that of the proposed West Hampden Substation (id.). In addition, the existing Wilbraham Substation, which is currently served from the N-14 line at 69 kV, would need to be upgraded to accommodate 115 kV service (id.).

3. Company's Community Outreach

In 2009, NEP communicated with Palmer, Monson, and Hampden officials, beginning with a series of preliminary meetings with various municipal officials including representatives from each town's Board of Selectmen (Exh. NEP-2, at 1-9). NEP mailed informational materials to Project abutters and established a Project website (id.). NEP conducted open houses in Monson on May 24, 2010 and in Hampden on May 26, 2010, where NEP responded to a range of inquiries including questions concerning vegetative clearing, construction procedures and electromagnetic fields (id.).

The Company stated that prior to construction, NEP would mail fact sheets to abutting property owners and other stakeholders, including municipal officials, departments of public works, police departments, and fire chiefs (Exh. EFSB-G-17). The fact sheets would provide details about the construction phases of the Project, including the locations of the work, how the work would proceed, how long crews would be in each area, what time of day the crews would be working, what abutters can expect to see and hear, staging areas, road closures, and Company contact information (id.). NEP would also provide e-mail updates to stakeholders who provided their contact information during previous outreach activities (id.).

4. Environmental Impacts

a. Construction Methodologies and Sequencing of the Substation and Transmission Line

The Companies would construct, and place in service, the new West Hampden Substation and the loop line to WMECo's 1515 line prior to dismantling the O-15S line east of the West Hampden Substation and constructing the new R-170 line (Exh. EFSB-G-16). The Company estimates that construction of the West Hampden Substation would occur between the fall of 2012 and the spring of 2014, taking twelve to 16 months to complete (Exh. NEP-4, at 2-28). With the West Hampden Substation in service, the East Longmeadow 69 kV load pocket can be supplied during typical construction conditions (i.e., light load and shoulder peak load conditions) (Exh. EFSB-G-16). The West Hampden Substation would provide a 69 kV source with the O-15S line taken out of service during construction (id.).

The installation of the R-170 line would occur from the fall of 2014 to the spring of 2015, taking between six to nine months to complete (id. at 2-28 to 2-29). The construction includes the following sequencing with associated estimated duration: (1) two months for ROW preparation, including tree trimming, removing vegetation from access ways and structure locations, and removing danger trees; (2) one month for contractor mobilization, including onsite worker safety and environmental training and delivery of trailers, fencing, equipment and materials; (3) two and a half months for installation of concrete and embedded foundations for transmission structures; (4) ten to twelve weeks for conductor and shield wire installation; and (5) restoration of the ROW in compliance with applicable environmental permits, which would vary in duration (Exhs. NEP-1, at 1-8; EFSB-G-10).

b. Land Use and Historic Resources Impacts

i. Primary Route

The Primary Route follows the existing O-15S line ROW with the land use directly adjacent to the ROW comprised predominately of forested open space,²⁶ agricultural lands, and wetlands (Exh. NEP-1, at 5-12). Within 300 feet from the edge of the ROW, there are 102 residences on lots ranging from one half acre to greater than an acre (Exh. NEP-1, at 5-12, 5-13, 5-21). The Primary Route crosses the Laughing Brook Wildlife Refuge which has four miles of hiking trails on 356 acres of woodlands, meadows, and streams (Exh. NEP-1, at 5-13). The Company stated that it would discourage unauthorized road vehicle and all-terrain vehicle users from accessing the ROW by installing gates and road blocks at key locations (Exh. EFSB-LU-4).

The land use impacts of the Project would include construction-related tree clearing (Exh. NEP-1, at 5-14). The Company would clear 5,280 square feet of uplands along the ROW (Exh. NEP-4, Table EOEEA-1, at 2-2). NEP is currently seeking to secure additional vegetation management rights to perform limited pruning or remove hazardous trees ten feet beyond both sides of the existing ROW (Exh. NEP-1, at 5-14). NEP has secured only 25 percent of the easements (23 of 92 easements have been duly executed by the Company and abutters) for the additional vegetation management rights (Tr. 3, at 351). On properties for which NEP has secured easements, an arborist would conduct selective tree and limb removal depending on the tree species (*i.e.*, whether the species is tall, fast-growing trees such as white pine), condition, lean (into the ROW); NEP estimates that up to 1.1 acres of forest canopy cover could be removed from the both edges of the ROW (Exh. NEP-1, at 5-14). For those instances where easements are not obtained, the Company would approach landowners on a case-by-case basis to request permission to remove trees that could potentially impact the Company's infrastructure (Tr. 3, at 352).

In terms of historic resources, there are no structures or historic districts listed in the State or National Register of Historic Places ("NRHP"), either within the Project ROW or at the West Hampden Substation site (Exh. EFSB-HA-2). Within 0.25 miles of the ROW, there are

²⁶ The Company classifies the upland forested areas generally as oak, hickory, white pine, and hemlock with pockets of maple, beech and birch trees (Exh. EFSB-LU-3).

eight properties recorded in the Massachusetts Historic Commission (“MHC”) Inventory, and one newly identified property that is potentially eligible for listing in the NRHP (*id.*). NEP’s consultant concluded that the Project should have no direct impacts or significant visual impacts on these properties due primarily to the distance between the area of potential effect and the existing visual impacts of the O-15S line (*id.*; Exh. NEP-1, at 5-46).

With respect to archaeological resources, there are six pre-contact sites along the Primary Route (Exh. EFSB-HA-1(a)).²⁷ In October of 2009, NEP’s archaeological consultant conducted sensitivity assessments of the major components of the Project to identify cultural resources, evaluate their significance and develop mitigation measures (Exh. NEP-4, at 3-6). NEP’s cultural resource consultant determined that within the ROW for the Primary Route, there are two archaeological sites considered eligible for listing in the NRHP (*id.*). NEP indicated that it would relocate the two structures to avoid the two NRHP-eligible sites (*id.*). Pursuant to NEP’s consultant’s report dated October 2010, there are also 14 stone walls within the ROW (Exh. EFSB-HA-1(a)). NEP indicated that should the Project affect any stone walls, it would rebuild the walls in their original configuration and alignment (Exh. EFSB-LU-17).

The 2.7-acre footprint of the West Hampden Substation would occupy a portion of a 97-acre parcel currently containing a residence, barns, outbuildings, fields and wooded areas (Exh. NEP-1, at 5-14). The West Hampden Substation site is bordered by a NEP transmission ROW to the south, a WMECo transmission ROW to the west, Allen Street to the east, and forested land to the north (*id.*). The land use impacts that would result from the development of the West Hampden Substation site would include conversion of a portion of the site from a residential use to a substation (*id.*). NEP would clear approximately five acres of forest for the new West Hampden Substation (*id.*). There are no known archaeological sites near the West Hampden Substation site (Exh. NEP-1, at 5-48).

²⁷ The pre-contact period is documented by archaeologists as the 12,000-year period of Native American occupation of the New England region prior to the 1500s (Exh. EFSB-HA-1(a) at 9). The post contact period begins roughly in 1650 in the New England region (*id.* at 17-18).

ii. Alternative Route

The Alternative Route would traverse essentially the same type of land use settings as the Primary Route – sharing the ROW with the Primary Route for the first four miles but then diverging west for the remaining 5.6 miles (Exh. NEP-1, App. 5-3, at 4). As with the Primary Route, the Alternative Route would be located entirely within an existing NEP transmission ROW with the land use directly adjacent to the ROW primarily (approximately 61 percent) forested open space (id. at 5-15). Agricultural land and wetlands comprise an additional 9.8 percent and 12.2 percent respectively of the Alternative Route (id.). Approximately nine-tenths of a mile of the Alternative Route passes through low density residential areas (id.). There are 116 residences within 300 feet of the edge of the ROW and two schools, the Minnechaug Regional High School and Mile Tree School within 25 feet of the ROW (Exhs. NEP-1, at 5-15; NEP-2, at 5-24). The land use impacts of the Project along the Alternative Route would include construction-related tree clearing to meet clearance codes (Exh. NEP-1, at 5-16). As with the Primary Route, NEP would pursue an additional ten feet of vegetation management rights on both sides of the ROW (id.).

The Alternative Route includes two properties, the Adams Cemetery and the Glendale Cemetery, eligible for the NRHP (Exh. NEP-1, at 5-46). There are 19 architectural properties recorded in the MHC Inventory located in the study area, but they have not been evaluated for listing in the NRHP (id.). Archeological sites within the study area along the Alternative Route include ten pre-contact sites and one post-contact site (id.).

The Company's identified site for the West Wilbraham Substation is wooded and owned by the Wilbraham Nature and Cultural Center (Exh. NEP-1, at 5-16). This land is designated for conservation purposes with an Article 97 land use restriction (id.). Construction of the West Wilbraham Substation at the Wilbraham Nature and Cultural Center site would conflict with existing land use restrictions and would require an Article 97 approval by the Massachusetts Legislature (id.). There are no known archaeological sites near the West Wilbraham Substation site (Exh. NEP-1, at 5-48).

iii. Conclusion on Land Use and Historic Resources Impacts

With regard to land use impacts resulting from construction activities, the Primary and Alternative Routes are similar. However, the Alternative Route would also include the refurbishment of the entire O-15S line (i.e., 14.4 miles versus 4.4 miles with the Primary Route) and the associated land use impacts. Therefore, land use impacts would occur along both routes if the Project is constructed along the Alternative Route. Additionally, the West Hampden Substation site is preferable to the West Wilbraham Substation site due to the Article 97 Land Use Restriction which would necessitate approval by the Massachusetts Legislature.

During the public hearing for the Project, several residents indicated that when NEP removed vegetation from the ROW in the past, the Company left woody debris on residents' property along the ROW (Public Hearing, Hampden, October 27, 2010, Tr. at 29, 36, 39, 40, 47, 48). The abutters further alleged that requests to the Company to remove the discarded vegetation were unsuccessful (id. at 40). Several abutters stated that they made arrangements to have the discarded vegetation removed at their expense (id. at 36). Therefore, to facilitate site restoration related to this Project, the Siting Board directs NEP to notify affected property owners in writing of the description of the area of tree removal, the timely manner in which the woody debris would be removed or handled in accordance with the affected property owner preference, and/or relevant regulatory requirements, and include Company contact information.

Both the Primary and Alternative Routes are located away from historic structures and mostly likely would not have a direct impact on historic resources. While both routes are near archaeological sites, the Alternative Route may have a slightly greater chance of impacts due to the greater number of pre-contact sites in proximity to the ROW compared to the Primary Route. However, the Alternative Route would also include the refurbishment of the entire O-15S line along the Primary Route, with associated potential impacts to archaeological sites. Therefore, impacts to archaeological resources have the potential to occur along both routes if the Project is constructed along the Alternative Route. Accordingly, the Siting Board finds that the Primary Route is preferable to the Alternative Route with respect to land use and historic resources impacts.

Because construction of the transmission line on the Primary Route would occur primarily within an existing ROW and the footprint for the substation would be located on 2.7

acres of a 97-acre parcel, with a significant vegetative buffer, impacts on land use would be minimal. Further, there are minimal historical resources in proximity to the Project and NEP would relocate two structures to avoid the two NRHP-eligible sites. Therefore, the Siting Board finds that, subject to compliance with the above condition concerning site restoration, the impacts on land use, historic resources, and archaeological resources along the Primary Route would be minimized.

c. Water Resource and Wetland Impacts

i. Primary Route

In terms of water resource impacts, the Primary Route crosses 19 waterways within the Chicopee and Connecticut River Basins (Exh. NEP-1, at 5-49). In addition, the Primary Route crosses or is adjacent to three small ponds (*id.*). Impacts would be limited to temporary placement of swamp mats across some streams for construction vehicle access (Exh. NEP-1, at 5-52). Swamp mat placement may result in some minor and localized disturbance to vegetation on either side of the stream bank; however, NEP stated that the use of swamp mats does not destroy the root mass of the plants, allowing them to survive and re-grow when the swamp mats are removed (*id.*).

The Primary Route crosses less than 0.5 miles of two Zone II Wellhead Protection Areas (Exh. NEP-1, at 5-28).²⁸ The Company would work with its contractor to ensure best management practices (“BMPs”) are followed with respect to handling and storing hazardous substances and that no re-fueling of construction equipment would take place within Wellhead Protection Areas (*id.*). Furthermore, the Company would require its contractors to adhere either to its standard emergency response plan or to a Project-specific spill prevention, containment, and response plan (*id.* at 5-29).

The Project would result in both temporary and permanent impacts to wetlands (Exh. NEP-2, at 5-33). The Primary Route crosses 32 wetlands with a total crossing distance of

²⁸ Wellhead Protection Areas protect the recharge area around public supply groundwater sources (Exh. NEP-2, at 5-27). A Zone II Wellhead Protection Area is a location determined by hydrogeologic modeling and regulated by MassDEP’s Drinking Water Program (*id.*).

1.9 miles (id. at 5-30). Temporary impacts occurring during construction would include vegetation mowing, placement of swamp mats for wetland crossings, equipment staging pads, and access road improvement (id.). NEP anticipates that approximately 5.1 acres of wetlands would be temporarily affected by swamp mats during Project construction (Exh. NEP-4, at 3-9). Almost all of these temporary wetland impacts would occur within state jurisdictional Bordering Vegetated Wetlands (“BVW”); however, 400 square feet of impacts are within isolated wetlands that may be solely under federal jurisdiction (id.). Wetland impacts would also include increased turbidity during swamp mat installation and removal (Exh. EFSB-W-3). With regard to potential impacts to vernal pool habitat, four vernal pools were verified in the field along the Primary Route (Exh. NEP-2, at 5-35).²⁹

Permanent wetland alterations of approximately 0.08 acres (3,480 square feet) of wetlands would occur due to placement of new transmission structures along the Primary Route (Exh. NEP-4, at 3-9). In addition, permanent wetland alterations totaling 0.06 acres (2,450 square feet) would occur at the West Hampden Substation site due to upgrading two existing culverts and upgrading an existing farm access road to Town of Hampden zoning standards (id. at 3-11).

To mitigate permanent wetland impacts resulting from the Project, a 10,000 square foot wetland restoration area would be created adjacent to the Hampden Substation, achieving a mitigation ratio of 3:1 for the forested wetlands impacted by the substation driveway and a mitigation ratio of 2.5:1 for the wetlands impacted by installing structures in Hampden along the ROW (Exh. NEP-4, at 3-12 to 3-13). Approximately 785 square feet of permanent wetland impacts would occur due to installation of the transmission structures along the ROW in Monson (id. at 3-13). NEP is presently finalizing mitigation details and commitments with the Monson Conservation Commission regarding two potential areas where mitigation would be beneficial (id.).

To further mitigate wetland impacts along the Primary Route, NEP would clearly mark boundaries of wetlands to prevent unauthorized vehicular encroachment (Exh. NEP-1, at 5-6).

²⁹ The four vernal pools are along the part of the ROW that is also followed by the Alternative Route (Exh. NEP-2, at 5-35).

Pursuant to the request of the U.S. Army Corps of Engineers, to minimize ground disturbance the Company would cut tall trees within wetland areas impacted by the Project close to ground level, leaving the stumps and roots in place except where grading is required for access road construction or at structure sites (id.). NEP would install erosion control devices such as hay bales and siltation fencing in accordance with approved plans and Orders of Conditions from the local conservation commissions (id.). NEP would perform weekly inspections to evaluate potential erosion and sedimentation issues and inspection reports would be submitted until final stabilization has been achieved (i.e., 75 percent vegetative cover for disturbed areas) (id.). Should unforeseen damage occur to the banks associated with the stream crossings, or should rutting occur to vegetated wetlands, the Company would re-grade the affected area to the original topography (Exh. EFSB-W-8).

ii. Alternative Route

The Alternative Route would cross 14 waterways in total in the Chicopee and Connecticut watersheds (Exh. NEP-2, at 5-53). The Primary and Alternative Routes cross the same two Zone II Wellhead Protection Areas (Exh. NEP-1, at 5-29). The Alternative Route would cross within one mile of the outer boundary limit of one other Zone II Wellhead Protection Area and 18 designated groundwater protection areas (Exh. NEP-1, at 5-28).

The Alternative Route crosses 24 wetlands for a total of 1.3 miles (Exh. NEP-1, at 5-33).³⁰ From the point where the Primary and Alternative Routes diverge to the West Hampden Substation, there are 5,330 feet of wetlands crossed for the Primary Route and 4,260 feet of wetlands crossed for the Alternative Route (Exh. EFSB-W-2). In terms of potential impacts to vernal pool habitat, based on NHESP mapping, a total of seven potential vernal pools are located along the Alternative Route; however, field verification would have to be performed for confirmation (Exh. NEP-2, at 5-35).

³⁰ Wetland impacts along the Alternative Route were estimated based on available GIS mapping rather than field delineations (Exh. NEP-1, at 5-33).

iii. Conclusion on Water Resource and Wetland Impacts

There are slightly more wetland crossings for the Primary Route. However, with advanced engineering design and collaboration with local, state and federal wetlands agencies, the Company has determined that impacts would be limited to 5.1 acres of temporary wetland impacts from swamp mat placement, 0.08 acres of permanent wetland impacts from structure placement, and 0.06 acres of permanent impacts at the West Hampden Substation. The most significant difference for potential water resource and wetland impacts between the Primary and Alternative Routes results from the fact that if the Alternative Route were selected, wetland impacts would occur along both routes. In contrast, if the Primary Route were chosen, only 4.4 miles of the O-15S line would need to be refurbished, thus minimizing potential impacts to water resources and wetlands. Accordingly, the Siting Board finds that the Primary Route is preferable to the Alternative Route with respect to water resource and wetland impacts.

The Siting Board finds that with mitigation proposed by the Company including creating a wetland restoration area in consultation with the U.S. Army Corps of Engineers and affected communities as well as marking wetland boundaries, and installing erosion control devices, impacts to water resources and wetlands along the Primary Route would be minimized.

d. Protected Species

i. Primary Route

Both the Primary Route and the West Hampden Substation site cross Estimated and/or Priority Habitats of three state-listed protected reptile species and one protected plant species, as identified by the NHESP (Exh. NEP-1, at 5-36).³¹ The Primary Route currently crosses approximately 2.7 miles of Priority Habitat and 2.6 miles of Estimated Habitat (*id.* at 5-37). NEP and its consultants have been coordinating with NHESP staff since the fall of 2008 to better

³¹ NHESP restricts the release of information about these species because they are highly susceptible to collection (Exh. NEP-1, at 5-36). See Massachusetts Public Records Law, M.G.L. c. 66, § 17D.

understand the nature and extent of rare species habitats within the mapped areas (Exh. NEP-4, at 2-30; Tr. 3, at 360).³²

Due to the location of the West Hampden Substation relative to documented habitat for the recently discovered reptile species at the West Hampden Substation, NHESP determined that the Project would result in a “take” and requires that NEP prepare a Rare Species Protection Plan for the specific plant and reptile species (Exh. NEP-4, at 2-30).³³ Concerning the operational impacts of the Project, maintenance of the Company’s transmission facilities within mapped NHESP estimated and priority habitats is subject to a ROW maintenance permit issued by NHESP (Exh. NEP-1, at 5-38). This type of permit is renewed yearly and includes conditions such as time-of-year restrictions, vehicle and equipment limitations, pre-cutting survey requirements where applicable, and training of maintenance crews with respect to specific species present on the ROW (id.).

ii. Alternative Route

The potential impacts to Protected Species would be similar for the Primary and Alternative Routes. However, in addition to the three protected reptile species and one protected plant species along the Primary Route there is also an additional amphibian species mapped by NHESP along the Alternative Route (Exh. NEP-1, at 5-39). The Alternative Route crosses approximately 3.1 miles of Priority Habitat and 2.5 miles of Estimated Habitat (id.). The identified West Wilbraham Substation site is land designated for conservation purposes and owned by the Wilbraham Nature and Cultural Center (Exh. NEP-1, at 5-16).

iii. Conclusion on Protected Species

Based on NEP’s analysis of the data and field surveys, the Primary Route crosses slightly less Priority Habitat than the Alternative Route (i.e., 2.7 miles versus 3.1 miles), but slightly

³² The Company stated that in addition to the three stated-listed reptile species, there is a reptile species present at the West Hampden Substation site that NHESP did not map (Tr. 3, at 361). NHESP was not aware of the presence of this reptile species at the West Hampden Substation site until the Company submitted the results of its surveys (id.).

³³ The plan would include reptile surveys by a biologist, radio-telemetry, use of silt and construction fencing, assignment of a Construction Environmental Compliance Monitor, and establishment of a nine acre conservation restriction area (Exh. NEP-4, at 2-30).

more Estimated Habitat (2.6 miles versus 2.5 miles). If the Alternative Route is selected, habitat on both routes would be affected since line O-15S would also need to be refurbished. Therefore, the Siting Board finds that the Primary Route is preferable to the Alternative Route with respect to potential impacts to protected species.

NEP would be implementing a Rare Species Protection Plan approved by NHESP with specified mitigation including reptile surveys performed by a qualified reptile biologist, reptiles fitted with radio transmitters, installation and maintenance of fencing around the work area and plant communities, and establishment of a Conservation Restriction within existing known habitat. These measures would mitigate impacts to rare species. Therefore, the Siting Board finds that the environmental impacts related to protected species and their habitat along the Primary Route would be minimized.

e. Visual Impacts

i. Primary Route

There would be permanent visual impacts resulting from NEP's installation of taller transmission structures as well as the clearing of vegetation from the ROW (Exh. NEP-1, at 5-56). The existing O-15S structures are wood poles ranging in height from 39 to 49 feet above grade level (*id.* at 5-2). The wood monopoles would be replaced with steel monopoles ranging in height from 59 to 103 feet above grade level, which results in an average of approximately 70 percent increase in the height of the structures (RR-EFSB-39(a)). The majority of the R-170 structures would be taller than the average existing height of vegetation, which ranges from 35 to 60 feet (*id.*). However, the number of transmission structures along the ten-mile ROW would be reduced from 177 to 156 (RR-EFSB-39).

NEP would conduct selective tree and limb removal from the edge of the ROW, estimated to affect approximately 1.1 acres of forest canopy cover (Exh. NEP-1, at 5-14). NEP stated that there are a total of 48 residences that currently have a direct view of the structures and wires in the ROW, with no vegetative buffer between the residences and the ROW (Exh. DPU-V-4). In addition to the 48 residences that currently have a direct view of the structures and wires in the ROW, with construction of the Project an additional 16 residences would also have direct views (*id.*).

At the West Hampden Substation, the height of substation equipment includes transformers (26 feet tall), a control house (approximately 17 feet high) and transmission structures (not greater than 55 feet) (Exh. EFSB-V-7). NEP would clear approximately five acres of forest to construct the proposed West Hampden Substation (Exh. NEP-1, at 5-14). Visual impacts of the West Hampden Substation would be minimal due to (1) the large parcel of land, (2) setback of the substation (the nearest fence line of the substation is more than 1,700 feet away from Allen Street), and (3) the vegetative buffer between the substation and abutting properties (i.e., approximately 40 foot tall trees within a 500-foot buffer) between the substation and closest residences (id.; Exh. EFSB-V-7).

In terms of mitigation for the visual impacts of the R-170 line along the Primary Route, NEP has been collaborating with several abutters concerning transmission structure placement and height of the structures (Exh. EFSB-V-11). Several abutters have contacted NEP regarding changing the proposed location of transmission structures so that the structures are further from homes and/or closer to the edges of yards (id.). Additionally, a property owner on North Road in Hampden raised concerns with NEP about the height of a transmission structure relative to a steep grade (id.). Based on site visits and collaborations with property owners on North Road, NEP asserts it is in the process of reaching agreement about transmission structure placement and height to strike a balance between the optimum transmission line design and the abutters' concerns (Tr. 3, at 354-355).

ii. Alternative Route

As with the Primary Route, there would be permanent visual impacts resulting from NEP's installation of taller transmission structures as well as from clearing vegetation from the ROW (Exh. NEP-1, at 5-57). The existing N-14 transmission wood monopole structures are similar to the existing O-15S structures ranging in height, from 39 to 49 feet above grade level (Exh. NEP-1, at 5-4). As with the Primary Route, installation of the new steel monopoles would result in an average of approximately 70 percent increase in the height of the structures (RR-EFSB-39(a)).

Visual impacts of the West Wilbraham Substation would be similar to those of the West Hampden Substation due to the proposed equipment height relative to the setback from the road and existing vegetative buffer between the facility and abutting properties (Exh. NEP-1, at 5-57).

iii. Conclusion on Visual Impacts

In addition to the Primary and Alternative Routes sharing the ROW for approximately four miles, the Primary and Alternative Route share similar settings, existing transmission structures, and proposed substation equipment and substation sites. As such, the Siting Board finds that the Primary and Alternative Routes are comparable with respect to visual impacts.

The Company indicated that it would evaluate requests for visual mitigation on a case-by-case basis and that it has already met with some landowners to discuss the potential tree work and the abutters' requests for mitigation (Exh. EFSB-V-6). However, as discussed above, loss of the existing vegetative buffer coupled with the increased heights of the R-170 transmission structures and lines would create greater visual impacts on abutting residential properties. Given the restrictions on planting new vegetation near the transmission lines, a feasible alternative would be to enhance the vegetative buffer using taller plantings on the residential properties abutting the ROW ("off-site screening"). In several recent transmission line cases, the Siting Board directed the Petitioners to offer vegetative plantings in edge-of-ROW or off-ROW locations to abutting residential properties. Lower SEMA at 71; GSRP at 104-106; Russell T-Line at 46. Therefore, due to the significant visual impacts on residences in close proximity to the ROW, the Siting Board finds that mitigation of the visual impacts of the Project along the Primary Route requires an off-site mitigation plan.

Accordingly, in order to minimize visual impacts, the Siting Board directs NEP to implement an off-site screening program to include the following requirements:

- (a) upon completion of construction, notify in writing by first class mail with delivery confirmation all owners of property located on or abutting the ROW of the option to request that the Company provide off-site screening. The Company would follow up with a phone call to non-responding property owners for whom a phone number is accessible. The off-site screening may include, but is not limited to,

- shrubs, trees, window awnings and fences, provided that the Company's operating and maintenance requirements for its ROW facilities are met;
- (b) provide property owners with a selection of generic renderings of possible mitigation approaches. Such renderings shall be for guidance purposes only, and shall not limit a property owner's ability to request different mitigation;
 - (c) meet with each property owner who requests mitigation to determine the type of mitigation package the Company would provide, provided that the Company has received a response from the property owner within three months of receipt of the Company's written notification;
 - (d) honor all property owners' requests for reasonable and feasible mitigation that are submitted within six months of a meeting with the Company and/or its consultants;
 - (e) issue a warranty to property owners to ensure that all plantings are established and replaced if needed at the end of one year from the date of planting, provided that the property owners reasonably maintain the plantings;
 - (f) submit to the Siting Board for its approval, at least three months before the conclusion of construction, a draft of the notification letter to property owners prior to mailing; and
 - (g) submit a compliance filing within 18 months of completion of construction detailing: (i) a list of all properties that were notified of the available off-site landscaping; (ii) the number of property owners that responded to the offer for off-site mitigation; (iii) a list of any property owners whose requests were not honored, and the rationale therefore; (iv) a general description of the types of off-site landscaping provided; and (v) the average cost of landscaping per property, broken down by installation, material, and design costs.

In addition to constructing the transmission line and substation, the Primary Route entails retiring the existing Hampden Substation. NEP would remove the electrical structures and components as well as the perimeter fence (Exh. EFSB-V-8). Site restoration would include importing topsoil to establish a finished grade that blends with existing contours and re-

vegetating the site with a grass seed mix (id.). Pursuant to the request of an abutter to the existing Hampden Substation slated to be dismantled, NEP has agreed not to remove the existing arborvitae screening along the northern and western substation fence line (id.). In addition to importing topsoil, re-grading and re-vegetating the Hampden Substation site, the Siting Board directs NEP not to remove the existing screening of arborvitae shrubs along the northern and western fence line after the Hampden Substation is retired.

With NEP's collaboration with abutters regarding transmission structure height and placement as well as implementation of the above conditions, including implementation of an off-site screening program and maintaining the existing arborvitae screening along the northern and western fence line at the Hampden Substation, the Siting Board finds that the visual impacts along the Primary Route would be minimized.

f. Noise Impacts

i. Primary Route

(A) Transmission Line

For the Primary Route, there are nine homes within 25 feet of the edge of the ROW, 21 homes within 50 feet of the edge of the ROW, and 41 homes within 100 feet of the ROW (Exh. EFSB-LU-8). Regardless of which route is selected, there would be noise generated during all stages of the construction of the overhead transmission line (Exh. NEP-1, at 5-5). Noise levels of construction equipment associated with the transmission line installation along either route would range from approximately 60 dBA (for pickup trucks) to 90 dBA (for dump trucks and heavy duty mowers) measured at 50 feet (Exh. NEP-1, at 5-25). NEP expects construction noise levels to be greater than ambient conditions at the closest residences (Exh. NEP-1, at 5-21).

Another potential source of noise is the use of helicopters for wire stringing operations and NEP is still in the process of determining whether traditional ground line pulling methods or aerial construction techniques would be used for wire stringing operations (id.; Exhs. EFSB-G-12; EFSB-G-18). NEP indicated that noise levels associated with helicopter work vary based upon distance and type of helicopter used to perform the work (RR-EFSB-32). Should NEP

pursue the use of helicopters for wire stringing operations, it would notify municipal officials, abutters, and local airports prior to the commencement of wire stringing operations (*id.*).³⁴

The Company proposes that construction take place Monday through Saturday 7:00 a.m. to 5:00 p.m. (Exh. EFSB-NO-11). In addition, NEP indicates that in certain limited instances, such as wire stringing that requires additional time for safety or efficiency, work may extend to 7:00 p.m. (*id.*). NEP estimates that the extended work hours from 5:00 p.m. to 7:00 p.m. would occur infrequently and only when necessary (Tr. 3, at 375).

In terms of the noise requirements for each of the affected communities, Section 5.1.3 of the Monson Zoning Bylaw includes limitations on “continuous, regular or frequent sources of sound” (Exh. EFSB-Z-4). The Monson Zoning Bylaw includes an exception for construction activity, as long as “very loud” construction activities are not conducted on a site adjacent to a residential use between 10:00 p.m. and 7:00 a.m. (*id.*). The Company anticipates that it would be able to comply with Monson’s noise standard (*id.*). The Town of Hampden Zoning Bylaw limits noise levels with an exception for construction activities; however, no loud construction activities are permitted between the hours of 9:00 p.m. to 7:00 a.m. if the construction site abuts residential areas (Exhs. NG-LPM-7, at 86). The Company anticipates it would be able to comply with the noise standards set forth in Hampden’s Zoning Bylaw (Exh. EFSB-Z-11). The Town of Palmer does not have a noise ordinance.

(B) Substation

NEP conducted 21 hours of noise monitoring at five locations around the identified West Hampden Substation site on May 10-11, 2010 (Exh. NEP-1, App. 5-3, at 1). Ambient sound levels during the day ranged from 35 to 42 dBA and nighttime ambient levels ranged from 24 to 26 dBA (Exh. NG-1, App. 5-3, at 4). Ambient noise levels are influenced by road and aircraft traffic as well as natural sounds such as wind and birds (*id.*). The Company stated that existing noise levels in the area are typical of lightly developed residential uses with somewhat higher

³⁴ NEP would also coordinate with abutters and local residents with special requirements such as operators of equestrian facilities (Exh. EFSB-G-18). According to NEP, helicopters tend to disturb horses; therefore, NEP would coordinate flight paths to avoid equestrian operations (*id.*; Tr. 3, at 345). Where flight paths cannot be altered, NEP would work closely with equestrian owners to address their concerns (*id.*).

ambient noise levels near more heavily travelled roadways such as Routes 20 and 32 in Monson and Route 83 in Hampden (id.).

The Company indicated that construction of the West Hampden Substation would have similar sound levels to that of the construction of the transmission line (Exh. NG-1, at 5-21; 5-25). The closest four residences to the West Hampden Substation range from 825 feet to 1,175 feet away (Exh. EFSB-G-8). Permanent sources of noise at the West Hampden Substation would include two transformers and a heating, ventilation and air conditioning (“HVAC”) unit mounted on the outside of the control building³⁵ (Exhs. NEP-1, at 5-21; EFSB-NO-9). To mitigate permanent noise levels at the substation, NEP would use low noise transformers with more sound reducing insulation built into the transformer walls compared with a typical transformer (Exh. EFSB-NO-5). According to NEP, the modeled contributions of noise from the substation would be limited to a seven dBA increase over ambient at the closest substation property line and limited to two dBA or less over ambient at any residence (Exh. NEP-1, App. 5-3, at 4).

ii. Alternative Route

Construction activities, sequencing, and work hours would be the same for both the Primary and Alternative Routes. Ambient sound levels along both the Primary and Alternative Routes are generally the same, typical of low density residential uses with somewhat higher noise levels near more heavily travelled roadways (Exh. NEP-1, App. 5-3, at 5). However, if the Alternative Route is chosen, the existing O-15S line would still need to be refurbished, which would entail (1) clearing the ROW; (2) constructing access roads; and (3) removing and replacing certain transmission structures resulting in additional construction noise for a longer duration (Exh. NG-1, at 5-25).

The West Wilbraham Substation equipment would be similar to that of the West Hampden Substation and also would be located on a large parcel set back from roads and residential areas by existing utility line ROWs and forested open space (Exh. NEP-1, at 5-25). NEP assumed that existing ambient noise conditions would be similar at the West Wilbraham

³⁵ The Company has not determined the exact location of the HVAC unit but to be conservative, the noise modeling analysis assumed the HVAC unit would be installed on the western side of the control building, facing the closest residence (Exh. EFSB-NO-9).

Substation compared to the proposed West Hampden Substation (id.). The closest four residences range from 550 feet to 1,370 feet from the proposed West Wilbraham Substation (Exh. EFSB-G-8).

iii. Conclusion on Noise Impacts

With regard to noise impacts, ambient sound levels and the number of residences within 300 feet of the ROW along the Primary and Alternative Routes are similar. Construction activities, sequencing and associated noise levels would be similar for either the Primary or Alternative Route. However, the Alternative Route also includes the refurbishment of 14.4 miles of the O-15S line, and the associated construction noise impacts with the Primary Route include only 4.4 miles of refurbishment. Therefore, construction noise would occur along both routes if the Project is constructed along the Alternative Route. With respect to substations, the West Wilbraham site is located somewhat closer to residences than the West Hampden site (i.e., 825 feet compared with 550 feet). Existing noise levels appear to be similar at both the West Hampden and West Wilbraham Substation sites; consequently, noise impacts associated with the operation of substation equipment would be slightly greater at the West Wilbraham site. Accordingly, the Siting Board finds that the Primary Route is preferable to the Alternative Route with respect to noise impacts.

To mitigate noise levels generated during construction of the Project along the Primary Route, the Companies would provide functional mufflers on all equipment (id.). In addition, the Companies and its contractors would comply with M.G.L. c. 90, § 16A and MassDEP regulations (310 C.M.R. 7.11 (1)(b)), which limit vehicle idling to no more than five minutes in most cases (Exh. EFSB-AIR-1).³⁶ Further, the Siting Board directs the Company to conduct all construction between the hours of 7:00 a.m. to 5:00 p.m. Monday through Saturday, excluding holidays. Where there are residences within 300 feet of the ROW, Saturday construction hours would be limited to 9:00 a.m. to 5:00 p.m. To the extent the Company finds that construction is necessary outside of these hours or on Sundays or holidays, the Company shall seek written

³⁶ There are exceptions for vehicles being serviced, vehicles making deliveries that need to keep their engines running and vehicles that need to run their engines to operate accessories (Exh. EFSB-AIR-1).

permission from the relevant municipal authority prior to the commencement of such work, and provide the Siting Board with a copy of such permission. If the Company and municipal officials are not able to agree on any Company request to perform Sunday, holiday, or extended weekday construction, the Company may file a written request for authorization from the Siting Board prior to performing such construction, provided that it also notifies the relevant municipal authorities in writing of such request.

Although the Company has engaged in community outreach as discussed in Section II.E.3, above, a specific plan has not been developed. Therefore, the Siting Board directs the Company in consultation with the Towns of Palmer, Monson, and Hampden to develop a community outreach plan for construction of the Project. The outreach plan should, at a minimum, set forth procedures for providing prior notification to affected residents of: (a) the scheduled start, duration, and hours of construction; (b) any construction the Company intends to conduct that, due to unusual circumstances, must take place outside of the hours detailed above; (c) the availability of web-based Project information; and (d) complaint and response procedures including the Companies' contact information.

The Siting Board finds that, with the implementation of the Company's proposed mitigation including the installation of low noise transformers at the West Hampden Substation, use of mufflers for construction equipment, and implementation of idling restrictions, in addition to implementation of the conditions limiting construction hours near residential areas and development of a community outreach plan, noise impacts resulting from the construction of the Project along the Primary Route would be minimized.

g. Traffic Impacts

i. Primary Route

NEP asserts that construction, operation and maintenance of the transmission line would not significantly affect traffic flow on local roadways (Exh. NEP-1, at 5-17 to 5-18). As construction progresses, the location of worksites would progress along the transmission line ROW (id.). The Primary Route would cross 19 state, local, and private roads (Exh. NEP-1, at Table 5.4.2-1). Existing roads would provide access to the ROW (Exh. NEP-1, at 5-17). Construction of the transmission line along the Primary Route would result in temporary minor

traffic disruptions that would be short-term and localized due to the arrival and departure of construction workers as well as delivery of equipment and materials (id.). Pulling the transmission line over roadways may require temporary lane closures (Exh. NEP-1, at 5-17 to 5-18).

The Company would use a parcel off Fenton Road in Monson and a field adjacent to the proposed West Hampden Substation, both owned by NEP, for temporary lay-down areas, staging activities and parking for construction workers (Exh. EFSB-G-13). The Fenton Road site is located more than 300 feet from the nearest residence (Exh. EFSB-G-13(a)). As for the Hampden Substation site, there is a 500-foot buffer of trees between the site and the closest residences to the north, south, east, and west (Exh. NEP-1, at 5-56). There would be five crews of construction workers ranging from four to eight workers and one crew ranging from 14 to 18 workers (Exh. EFSB-G-15). On a daily basis, roughly 25 to 30 personal construction workers' vehicles and between four to eight contractor pick-up trucks would enter and exit the lay-down areas (Exh. EFSB-T-1). Delivery of transmission line construction materials to the lay-down areas would occur during normal work hours (id.).

The construction of West Hampden Substation would likewise have temporary minor disruptions due to the delivery of construction equipment, materials and workers to the site (Exh. NEP-1, at 5-18). Long-term traffic impacts would be limited to periodic maintenance and inspections of the substation (id.).

In terms of mitigation of traffic impacts along the Primary Route, NEP would prepare a Traffic Management Plan ("TMP") in consultation with local officials from the towns of Palmer, Monson, and Hampden (Exh. NEP-1, at 5-19). The TMP would detail access routes, time restrictions, signage identifying construction work zones, travel routes to transport materials, police details for road crossings during wire pulling operations, and a notification process for residents and businesses concerning construction activities (id. at 5-19 to 5-20). NEP would also schedule wire pulling operations during weekday off-peak hours, evenings or weekends to minimize traffic impacts (id. at 5-20).

ii. Alternative Route

NEP stated that traffic impacts associated with the construction and operation of the Project along the Primary and Alternative Routes are similar (Exh. NEP-1, at 5-20). The Primary and Alternative Routes cross almost the same number of roadways (19 and 20 respectively), resulting in similar traffic impacts (id.). For the Alternative Route, NEP proposed access to the West Wilbraham Substation via Soule Road and the WMECo ROW to avoid traffic disruption in the neighboring residential neighborhood (id.). Post-construction, there should be no discernable impact on the flow of traffic, regardless of whether the Primary or Alternative Route is selected (id.).

iii. Conclusion on Traffic Impacts

For either route, there would be short-term localized impacts due to transportation of workers, materials, and equipment for transmission line and substation construction. However, the Alternative Route would also include refurbishing the entire O-15S line and as such, construction would occur along both routes, increasing the possibility of traffic impacts, extending the duration of construction, and expanding the geographical area of potential traffic impacts. Accordingly, the Siting Board finds that the Primary Route is preferable to the Alternative Route with respect to traffic impacts associated with construction of the Project.

NEP would prepare a TMP in coordination with local officials, and schedule wire pulling for off-peak hours to mitigate traffic impacts. The Siting Board finds that traffic impacts associated with the Project along the Primary Route would be minimized.

h. Air Impacts

i. Construction Equipment Air Impacts

(A) Primary Route

According to MassDEP's Diesel Retrofit Guide, diesel engines produce significant amounts of particulate matter ("PM"), which are small solid and liquid particles composed primarily of carbon which can be easily inhaled and which pose a significant health risk to humans (Exh. EFSB-9, at 1). MassDEP indicates that reducing PM pollution from all sources, including construction equipment, is important for the health of workers and communities (id.). MassDEP has established a Massachusetts Diesel Retrofit Program ("MDRP") (id. at 4). The

MDRP involves using contract specifications to require contractors working on state-funded projects to install retrofit pollution controls on their construction equipment engines to reduce PM, volatile organic compounds (“VOCs”), and carbon monoxide (“CO”) (*id.*). In three recent cases, the Siting Board imposed conditions requiring the applicant to retrofit certain diesel-powered construction equipment. See Lower SEMA at 78; GSRP at 80, 145; Worcester Decision at 41-43, 85.

The Companies have not yet selected a contractor for this Project and as such cannot state with certainty the exact equipment to be used for the Project (Exh. EFSB-AIR-2). However, the Companies have committed to retrofitting all diesel-powered non-road construction equipment rated 50 horsepower or above to be used for 30 or more days over the course of the project with USEPA-verified (or equivalent) emission control devices (*e.g.*, oxidation catalysts or other comparable technologies) (Exh. EFSB-AIR-4). In addition, the Company has committed to using ultra-low sulfur diesel fuel in its diesel-powered construction equipment and limiting vehicle idling to five minutes pursuant to state regulations (Exh. EFSB-AIR-4).

(B) Alternative Route

Air impacts from construction equipment associated with construction of the Project along either the Primary or Alternative Routes would be similar in scope and duration. However, the Alternative Route also includes the refurbishment of the entire O-15S line, and the associated construction equipment air impacts with extended construction duration.

ii. SF₆ Impacts

Sulfur hexafluoride (“SF₆”) gas has been identified as a non-toxic but highly potent greenhouse gas (“GHG”).³⁷ The Massachusetts Clean Energy’s Energy and Climate Plan³⁸ adopts a 2020 statewide GHG emissions limit of 25 percent below 1990 emissions levels and sets forth an integrated portfolio of policies to reach the Commonwealth’s clean energy and

³⁷ One pound of SF₆ is considered to have the same global warming impact as eleven tons of CO₂. Massachusetts Clean Energy and Climate Plan for 2020, at 77.

³⁸ On December 29, 2010, the Secretary of Energy and Environmental Affairs issued the Massachusetts Clean Energy and Climate Plan for 2020. See G.L. c. 21N.

climate goals. One of the policies set forth in the Plan is reducing SF₆ emissions by 2020 equivalent to a reduction of 0.2 million metric tons of carbon dioxide (“CO₂”) from 1990 levels.

As part of the Siting Board’s mandate to ensure that new energy facilities are consistent with the Commonwealth’s current health, environmental protection, and resource use and development policies, the Siting Board has reviewed the Company’s proposed use of SF₆ to ensure that SF₆ emissions are being reduced to the maximum extent possible. NEP’s Massachusetts nameplate capacity is approximately 101,220 pounds of SF₆ (Exh. EFSB-T-5). For 2010, NEP reported 4,194 pounds of emissions for a leakage rate of 4.4 percent (Exh. EFSB-T-5; RR-EFSB-34).

NEP entered into an SF₆ Emissions Reductions Partnership MOU with the USEPA in December 2003 (Exh. EFSB-T-5). NEP’s SF₆ reduction program consists of monitoring, prioritizing, and repairing leaking SF₆ equipment (*id.*). NEP uses an infrared camera specifically designed to detect SF₆, halogen leak detectors, and bubble mix to determine the locations of SF₆ leaks (*id.*). NEP is not able to specify an annual cost for its SF₆ leak detection program as these activities are incorporated into the Company’s overall facility operation and maintenance program (*id.*).³⁹

The Primary Route entails consolidating transmission and distribution equipment by retiring the existing Hampden Substation and installing the 115-to-13 kV transformer and equipment at the West Hampden Substation (Exh. EFSB-G-6). The Project requires the long-term use of SF₆ gas as an insulating and electrical arc quenching medium for the circuit breakers and circuit switcher at the West Hampden Substation (Exh. EFSB-T-5). There would be six circuit breakers and one circuit switcher installed, for a total of 358 pounds of SF₆ gas at the

³⁹ For 2010, WMECo reported 14 pounds of emissions for a leakage rate of 0.1 percent (Exh. EFSB-T-5). WMECo has been a participant in the SF₆ Emission Reduction Partnership since 1999 (*id.*). WMECo’s SF₆ emission reduction program consists of leak monitoring, detection and maintenance (*id.*). WMECo’s program includes the use of integrated SF₆ leak detection and monitoring systems with all SF₆ equipment purchases as well as periodic evaluation and prescribed maintenance (*id.*). WMECo estimated that its emission reduction program costs \$50,000 annually (*id.*).

West Hampden Substation (id.).⁴⁰ NEP expects that the emission rate would be less than 0.5 percent per year at the West Hampden Substation, (id.).

The Alternative Route assumes the construction of a 115 kV-to-69 kV transformer at the West Wilbraham Substation and the continued utilization of the existing Wilbraham Substation for distribution purposes (RR-EFSB-53). In terms of SF₆ air impacts, the West Wilbraham Substation associated with the Alternative Route scenario would have one less 115 kV breaker compared to the proposed West Hampden Substation, resulting in a total of approximately 300 pounds of SF₆ (id.). There is one 69 kV circuit switcher at the existing Wilbraham Substation that contains approximately five pounds of SF₆, which would remain in service for both the Primary and Alternative Routes (id.).

Mitigation measures to be implemented by NEP at the West Hampden Substation associated with the Primary Route include installing circuit breakers that have a leak rate of less than 0.1 percent per year; installing pressure switches that send an alarm to the Company's central transmission control center upon loss of approximately ten percent of SF₆; and using an infrared camera specifically designed to detect SF₆ leaks (RR-EFSB-52). Furthermore, NEP would track SF₆ emissions as required by the USEPA Mandatory Greenhouse Gas Reporting Rule (id.).

iii. Conclusion on Air Impacts

Construction equipment air impacts would occur along both routes. If the Project is constructed along the Alternative Route, it would entail a longer construction period resulting in more construction equipment air impacts. Accordingly, since the Alternative Route entails construction along both routes, the Alternative Route would have greater air impacts from construction equipment. However, even though there would be similar SF₆ emission rates at both substations, there would be less SF₆ gas at the West Wilbraham Substation and, due to SF₆

⁴⁰ At the West Hampden Substation there would be six 115 kV circuit breakers installed, each containing 58 pounds of SF₆ (RR-EFSB-53). There would also be one circuit switcher which would contain approximately ten pounds of SF₆, for a total of 358 pounds of SF₆ at the West Hampden Substation (id.).

being more potent than CO₂, the Siting Board finds that the Alternative Route is slightly preferable to the Primary Route with respect to potential air impacts.

The Companies have specified mitigation for construction equipment air emissions including using ultra-low sulfur diesel fuel in diesel-powered construction equipment, limiting vehicle idling to five minutes, and retrofitting all diesel-powered non-road construction equipment prior to construction.

The Siting Board directs the Company, as the Company has agreed, that all diesel-powered non-road construction equipment with engine horsepower ratings of 50 and above to be used for 30 or more days over the course of Project construction must have USEPA-verified (or equivalent) emission control devices, such as oxidation catalysts or other comparable technologies (to the extent that they are commercially available) installed on the exhaust system side of the diesel combustion engine. Prior to the commencement of construction, the Company shall submit to the Siting Board certification of compliance with this condition and a list of retrofitted equipment, including type of equipment, make/model, model year, engine horsepower, and the type of emission control technology installed.

Further, in terms of SF₆ air impacts, NEP would be installing circuit breakers with a less than 0.1 percent annual leakage rate, along with pressure switches with alarms and leak detection equipment at the West Hampden Substation. The Company would also comply with USEPA SF₆ reporting requirements. Due to the Siting Board's longstanding concerns about GHG emissions and the Company's reliance on new equipment to help minimize future SF₆ leakage rates, the Siting Board directs the Company, within one year of operation of the West Hampden Substation, to provide a compliance filing detailing the actual leakage rate of SF₆ at the West Hampden Substation. If the Siting Board determines that the SF₆ leakage rate is greater than anticipated, the Siting Board may require operating changes or additional measures to address such SF₆ emissions rate deviations.

The Siting Board finds that with the implementation of the above conditions potential air impacts from the Project's construction along the Primary Route would be minimized.

i. Potentially Hazardous Materials

The Primary Route would entail the construction of the West Hampden Substation, which would include two transformers: a 115-to-69 kV autotransformer and a 115-to-13.2 kV autotransformer (Exh. NEP-2, at 1-2). With respect to handling and storage of any hazardous substances during construction of the Project, the Company would ensure that its contractors follow BMPs, adhere to regulatory requirements, and follow a Project-specific spill prevention, containment, and response plan (Exh. NEP-2, at 5-28; 5-29). The Company proposes the following mitigation measures: (1) specific oil handling procedures for the filling the transformers upon delivery; (2) compliance with NEP's Spill Response Plan, which requires immediate control, containment, clean-up and reporting of any spills; and (3) no storage of hazardous materials at the substation (Exh. EFSB-3, at 2). In addition, NEP would develop a Spill Prevention, Control, and Countermeasure ("SPCC") Plan, which would include measures such as constructing a berm around the substation perimeter fence, low volume alarms connected to NEP Dispatch, spill containment basins (110 percent volume) for transformers and routine inspection of the substation by NEP personnel (id. at 2, 3).

For the Alternative Route, the West Wilbraham Substation would be similar to the proposed West Hampden Substation, resulting in similar potential impacts from hazardous materials (Exh. NEP-2, at 5-4). The mitigation measures would also be similar for both the Primary and Alternative Routes. The Siting Board finds that the Primary and Alternative Routes are comparable with respect to potential hazardous materials impacts.

The Siting Board further finds that with the Company's implementation of its SPCC Plan, implementation of the Company's oil handling procedures, and compliance with the Company's Spill Response Plans, impacts from potentially hazardous materials would be minimized along the Primary Route.

j. Solid Waste Impacts

The Primary Route would generate solid waste from removing the existing O-15S line components and the retirement of the Allen Street Substation (Exh. EFSB-LU-5). The removal of the O-15S line would generate approximately 183 wood poles, 225 cross-arms, 1,040 insulators, and 107,000 pounds of conductors (id.).

The Alternative Route would generate a greater amount of solid waste compared to the Primary Route (Exh. EFSB-LU-6). While the Alternative Route is slightly shorter (9.6 miles) than the Primary Route (ten miles), and would eliminate the retirement of the existing Hampden Substation, it would not only require the removal of the N-14 line for the installation of the new 115 kV line but would necessitate the refurbishment of the O-15S line as a separate project (*id.*). Please see the comparison of solid waste between the Primary and Alternative Routes in Table 5, below:

Table 5: Comparison of Solid Waste Generated from the Project Along the Primary and Alternative Routes

Component	Primary Route	Alternative Route
Line conversation	ten miles (O-15S line)	9.6 miles (N-14 line)
Substation Retirement	Yes, Hampden Substation	No
Refurbishment	4.4 miles of O-15S line	14.4 miles of O-15S line
Wood poles	183	360
Cross-arms	225	440
Insulators	1,040	2,040
Conductor (pounds)	107,000	209,700

Source: Exh. EFSB-LU-6; EFSB-RR-55

As shown in the table, the Alternative Route would generate almost twice as much solid waste compared to the Primary Route. Accordingly, the Siting Board finds that the Primary Route is preferable to the Alternative Route with respect to solid waste impacts. In terms of mitigation of solid waste impacts for the Primary Route, it is NEP's policy to recycle treated wood poles for energy recovery or be reused as commercial products (Exh. EFSB-LU-7). Two examples of NEP's recycling plan include transporting obsolete treated wood poles to a facility in Quebec that reuses poles as guard rail posts (*id.*). Poles unsuitable for guard rails are chipped and used as a fuel source in the production of Portland cement in Quebec (*id.*).

The Company would be implementing the above-referenced solid waste reduction plan incorporating recovery and recycling of equipment, materials, and poles. The Siting Board seeks to be informed regarding the plans and effectiveness of recycling efforts associated with the construction of the Project. Therefore, in order to minimize solid waste impacts, the Siting Board directs the Company, prior to the commencement of construction, to provide to the Siting Board a construction recycling plan, and at the end of construction to report on the Company's

percentage of waste materials by waste type that were recycled. The Siting Board finds that, with implementation of the above condition, the solid waste impacts of the Project along the Primary Route would be minimized.

k. Magnetic Field Impacts

i. Primary Route

(A) Transmission Line

NEP is proposing a delta configuration of the conductors along the ROW (Exh. NEP-1, App. 5-4, at 21).⁴¹ To calculate the magnetic field levels as a result of the Project, NEP ascertained current and voltage information for both existing normal and peak loading conditions and proposed future configurations at both normal and peak loading (Exh. NEP-1, App. 5-4, at 12-13; RR-EFSB-28). In addition, NEP determined the loads for the circuits at the proposed West Hampden Substation and the Palmer Substation (Exh. NEP-1, App. 5-4, at 12-13). NEP then calculated magnetic field levels for both normal and peak loads for the present day configuration, which consists of both the O-15S line with and without the N-14 line, and for the proposed configuration, which consists of the proposed R-170 line with and without the N-14 line (*id.* at 29). Table 6, below, shows the magnetic field impacts comparison for the existing conditions and modeled magnetic field impacts post-Project.

⁴¹ The delta configuration means that the davits holding the conductor on the top and bottom positions are on one side of the monopole and the conductor on the middle davit is on the opposite side of the monopole (Exh. NEP-1, App. 5-4, at 21).

Table 6: Magnetic Fields within and at Edges of ROW for Existing and Proposed Configurations

Magnetic Fields	Location	Single Line		Co-located with N-14 Line	
		Configuration		Configuration	
		Existing, Present Day Normal/Peak	Proposed Configuration Normal/Peak	Existing, Present Day Normal/Peak	Proposed Configuration Normal/Peak
Magnetic Field milligauss (“mG”)	Southeast edge of ROW (0 ft)	3.1/2.8	4.5/4.6	10.2/17.4	5.1/6.3
	Northwest edge of ROW (80 ft)	8.9/7.9	11.4/11.9	11.6/13.5	10.3/10.2
	At point of peak field within ROW	23.8/21.1	23.2/24.0	24.5/43.6	19.2/18.5

Source: RR-EFSB-28

When comparing the existing conditions of the O-15S line with the replacement of the R-170 line, in areas where only the R-170 line is in the ROW, the magnetic field levels would slightly increase for both normal and peak loads at both the southeast and northwest edges of the ROW (RR-EFSB-28). At the point of peak field the magnetic field levels would decrease slightly for normal loads but would minimally increase for peak loads (*id.*). In sections of the ROW where the R-170 line would be co-located with the N-14 line, magnetic field levels would generally decrease (*id.*).

Magnetic field levels drop to lower values as the distance increases from the circuit center line (Exh. NEP-1, App. 5-4, at 25). For the Primary Route, where the R-170 line is solely within the ROW, the magnetic field levels decrease to 2.3 mG at 25 feet and 1.4 mG at 50 feet beyond the southeast edge of the ROW (RR-EFSB-29). In sections of the ROW where the R-170 line would be co-located with the N-14 line, magnetic field levels would decrease to 2.7 mG at 25 feet and 1.6 mG at 50 feet beyond the southeast edge of the ROW (*id.*).

As for the proposed West Hampden Substation, modeling shows that magnetic fields would be below five mG along most of the fence line (Exh. NEP-1, at 5-43). At locations where the transmission lines enter the substation magnetic fields would generally be below 50 mG with some areas modeled to be approximately 20 mG (*id.*). The highest magnetic field levels would occur where the 1515 line enters and exits the substation but would not exceed 50 mG (*id.*). The closest residence to the West Hampden Substation would be 825 feet away (Exh. EFSB-G-8).

ii. Alternative Route

The Alternative Route entails replacing the existing N-14 line with the R-170 line, which shares the O-15S line ROW for four miles (Exhs. NEP-1, at 5-4; NEP-1, App. 5-3, at 4).

Table 7, below, summarizes magnetic field impacts of the Primary Route, in comparison to the Alternative Route.

Table 7: Magnetic Fields within and at Edges of ROW for Primary and Alternative Route Configurations

Electromagnetic Fields	Location	Primary Route		Alternative Route	
		Single Line Normal/Peak	Co-located with N-14 Line Normal/Peak	Single Line Normal/Peak	Co-located with O-15S Line Normal/Peak
Magnetic Field milligauss (“mG”)	Southeast edge of ROW (0 ft)	4.5/4.6	5.1/6.3	4.5/4.6	11.3/10.4
	Northwest edge of ROW (80 ft)	11.4/11.9	10.3/10.2	11.4/11.9	7.5/12.1
	At point of peak field within ROW	23.2/24	19.2/18.5	23.2/24	29.8/37.7

Source: Exh. NEP-1, App. 5-4, at 29; RR-EFSB-28

iii. Conclusion on Magnetic Field Impacts

As shown in the tables above, the Primary and Alternative Routes would have the same magnetic field levels in areas where only the R-170 line occupies the ROW. In sections of the ROW where the R-170 line would be co-located with a 69 kV line, the magnetic field levels would be lower for the southeast edge of the ROW and point of peak field for the Primary Route, while the magnetic field levels would be slightly higher on the northwest edge of the ROW for the Primary Route. Accordingly, the Siting Board finds that the Primary and Alternative Routes are similar with respect to magnetic field impacts. Further, the increases in magnetic field levels are minimal along the ROW where the R-170 line would solely occupy the ROW, and the levels would generally decrease where the R-170 line would be co-located with the N-14 line in comparison to existing conditions. Accordingly, the Siting Board finds that electric magnetic field levels would be minimized along the Primary Route.

5. Conclusion on Analysis of the Primary and Alternative Routes

The Siting Board finds that the information provided by the Companies regarding the Project's environmental impacts is substantially accurate and complete. In comparing the environmental impacts along the two routes, the Siting Board finds that the Primary Route would have lower land use and historic resources, water resources and wetlands, protected species, noise, traffic, and solid waste impacts than the Alternative Route due to the fact that selecting the Primary Route obviates the requirement to refurbish the entire length of the O-15S line. Whereas, if the Alternative Route is chosen, the entire 14.4 miles of the O-15S line would have to be refurbished. The Siting Board finds that the Alternative Route would have lower air impacts. The Siting Board further finds that there would be comparable visual, potential hazardous material, and electric magnetic field impacts for the Primary and Alternative Routes. On balance, the Siting Board finds that the Primary Route is preferable to the Alternative Route with respect to environmental impacts.

The Siting Board also finds that with the implementation of the specified conditions and mitigation presented in Section V.B.4 above, and compliance with all local, state, and federal requirements, the environmental impacts of the Project along the Primary Route would be minimized.

6. Cost

The Companies developed refined estimates based on costs associated with recently completed and ongoing projects for both the Primary and Alternative Routes (Exh. EFSB-C-1; Tr. 5, at 689). The cost estimates for the routes are summarized in the Table 8, below:

Table 8: Route Cost Comparison

Project Component	Primary Route	Alternative Route
Transmission Line	\$16,000,000	\$17,400,000
O-15S Refurbishment	\$1,250,000	\$5,650,000
New Substation	\$14,500,000	\$11,000,000
Substation Retirement	\$500,000	0
Wilbraham Substation Upgrades	0	3,550,000
Palmer Substation Upgrades	\$1,600,000	\$1,600,000
WMECo Upgrades	\$1,400,000	\$1,400,000
Total Estimated Cost	\$35,250,000	\$40,600,000

Source: Exh. EFSB-C-1

The difference in cost between the Primary and Alternative Route is \$5.35 million (Exh. EFSB-C-1). The cost differential is attributable primarily to lower O-15S refurbishment costs for the Primary Route (*id.*). NEP stated that it has more information on the Primary Route with regard to adaption of structure type and locations to accommodate environmental and engineering concerns, ROW restrictions, and abutter concerns (*id.*). NEP would bear most of the estimated cost associated with the Project; however, WMECo would be responsible for \$1.4 million associated with constructing a 115 kV loop line into and out of the West Hampden Substation to connect the 1515 line as well as upgrades to the Scitico and Ludlow Substations (Exh. EFSB-C-3). The Company states most of the Project would be considered Pool Transmission Facilities and would be eligible for regional cost support (*id.*; RR-EFSB-61).⁴²

Although the Siting Board does not have jurisdiction over regulatory cost recovery, the Siting Board's statutory mandate is to review the need for, cost of, and environmental impacts of transmission lines. G.L. c 164, § 69H. In order to review the costs of the Project, and in an effort to identify the factors that may lead to cost overruns and delays in construction of approved facilities, the Siting Board directs the Company to submit to the Board an updated and certified cost estimate for the Project prior to the commencement of construction. Additionally,

⁴² Non-Pool Transmission Facilities include the refurbishment of the O-15S line from the West Hampden Substation to the East Longmeadow Substation, the cost of all 69kV equipment (including the 115-to-69 kV autotransformers), and the retirement of the Hampden Substation (RR-EFSB-61).

the Siting Board directs NEP to file semi-annual compliance reports with the Siting Board starting within 60 days of the commencement of construction, that include projected and actual construction costs and explanations for any discrepancies between projected and actual costs and completion dates, and an explanation of the Company's internal capital authorization approval process.

Given the likely lower costs of the Primary Route, the Siting Board finds that the Primary Route is preferable to the Alternative Route with respect to cost.

7. Reliability

In terms of assessing reliability of transmission projects, the Company typically assesses total exposure (length) of the transmission line, location of the facilities, types of construction methodology, and access to the line for repairs (Exh. NEP-1, at 5-59). Both the Primary and Alternative Routes are reliable means for enhancing electrical service to the towns of Hampden, East Longmeadow, Wilbraham, Monson, and Palmer (id.). The Primary and Alternative Routes would be of similar length, be constructed in similar geographical locations, and involve similar construction techniques (id.).

The Company asserts that while the Primary Route is slightly longer than the Alternative Route, less time would be required to construct the line along the Primary Route as compared to the Alternative Route (Exh. EFSB-R-1). The Company bases its argument on the increased construction time required along the Alternative Route to remove a greater number of N-14 structures and greater number of dead end structures for the R-170 line to address angles in the ROW (id.). It should be noted that the Primary Route also entails refurbishment of 4.4 miles of the O-15S line compared with refurbishment of 14.4 miles of the O-15S line for the Alternative Route, which also increases the duration of construction for the Alternative Route (id.).

The Company points out that due to the shorter construction duration for the Primary Route, the transmission line would be out of service for a shorter time than for the Alternative Route (id.). However, the Company could not provide an estimate on the actual construction time difference due to not having firm engineering information regarding the transmission structure design and soil conditions for the Alternative Route (Exh. EFSB-R-2).

Given the fact that Company could not provide sufficient information to support its assertion that reliability would be better during construction of the Project along the Primary Route versus the Alternative Route and that reliability would be comparable for both routes once the Project was operational, the Siting Board finds that reliability is comparable for the Primary and Alternative Routes.

8. Conclusions on Route Comparison

Table 9, below, summarizes the comparison between the Primary and Alternative Routes in terms of environmental impacts, cost and reliability.

Table 9: Comparison of the Primary and Alternative Routes

Type of Impact	Primary Route	Alternative Route	Least Impact Primary(P), Alternative (A) Comparable (C)
Land Use and Historic Resources Impacts	102 residences w/in 300' of ROW; 8 MHC Inventory properties w/in 0.25 miles of ROW; 4.4 miles of the O-15S line would be refurbished	116 residences w/in 300' of ROW; 19 MHC Inventory properties w/in 0.25 miles of ROW; 14.4 miles of the O-15S line would be refurbished; substation site has Article 97 land use restriction	P
Water Resources and Wetland Impacts	Crosses 19 waterways, 32 wetlands, and 0.5 miles of two Zone II Wellhead Protection Areas; transmission line would permanently impact 0.08 acres of wetlands and West Hampden Sub would impact 0.06 acres of wetlands	Crosses 14 waterways, 24 wetlands and the same 2 Wellhead Protection Areas	P
Protected Species Impacts	2.7 miles of Priority Habitat, 2.6 miles of Estimated Habitat, 4 protected reptile and 1 protected plant species	3.1 miles of Priority Habitat, 2.5 miles of Estimated Habitat, 3 protected reptile, 1 protected plant, and 1 protected amphibian species	P
Visual Impacts	Avg height of existing poles – 38', avg height of new poles is 71' (70% increase), # of structures would be reduced from 177 to 156; 48 homes now have direct views of structures and wires, additional 16 would have direct views post Project	Similar visual impacts resulting from transmission line and substation; Same substation equipment and similar type of site as the Primary Route	C
Noise Impacts	Construction noise 60-90 dBA; Transformer and HVAC at Hampden Sub. would increase ambient sound by 2 dBA at nearest residence 825' away	Similar construction, transformer and HVAC noise; Construction noise would occur along both routes due to O-15S refurbishment	P
Traffic Impacts	Minor disruptions due to workers and delivery of equipment + materials	Similar impacts, but impacts would occur along both routes for a longer duration and larger geographical area	P
Air Impacts	Construction equipment air emissions for 12-16 months for substation and 6-9 months each for R-170 line and Palmer Sub. upgrades; 6 circuit breakers + 1 circuit switcher = 358 lbs of SF ₆ gas	Similar construction equipment air emissions however the duration would be longer for construction along both routes; 5 circuit breakers + 1 circuit switcher = 300 lbs of SF ₆	A
Hazardous Materials Impacts	Transformers at the West Hampden Sub include use of oil	Similar potential impacts	C
Solid Waste Impacts	Generate ½ the waste of Alternative	Generate twice the waste as Primary	P
Magnetic Field Impacts	In sections of the ROW where the R-170 line would be co-located with a 69 kV line, the magnetic field levels would be lower for the southeast edge of the ROW and point of peak	Primary and Alternative Routes would have same magnetic field levels where the R-170 line would solely occupy the ROW. The magnetic fields would be lower on the northwest edge of the ROW	C
Cost	\$35.25 million	\$40.6 million	P
Reliability	New 115 kV line would have higher capacity and higher thermal rating due to lower impedance of 69 kV line	Similar reliability benefits	C

Based on review of the record, the Siting Board finds that the Company provided sufficient information regarding cost, reliability, and environmental impacts to allow the Siting Board to determine whether the Project has achieved a proper balance among cost, reliability and environmental impacts. The Siting Board finds that the Project along the Primary Route would achieve an appropriate balance among conflicting environmental concerns as well as among environmental impacts, reliability, and cost. The Siting Board therefore finds that the Primary Route is preferable to the Alternative Route with respect to providing a reliable energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost.

C. Consistency with the Policies of the Commonwealth

1. Standard of Review

G.L. c. 164, § 69J requires the Siting Board to determine whether plans for construction of the applicant's new facilities are consistent with current health, environmental protection, and resource use and development policies as adopted by the Commonwealth.

2. Analysis and Conclusions

a. Health Policies

In Section 1 of the Electric Utility Restructuring Act of 1997, the Legislature declared that "electricity service is essential to the health and well-being of all residents of the Commonwealth . . ." and that "reliable electric service is of utmost importance to the safety, health, and welfare of the Commonwealth's citizens . . ." See c. 164 of the Acts of 1997, Section 1(a) and (h). In Section III.D, above, the Siting Board finds that the Project would improve the reliability of electric service in the towns of Hampden, East Longmeadow, Wilbraham, Monson, and Palmer. In addition, in Section V.B.4, the Siting Board requires the Company to use only retrofitted off-road construction equipment to limit emissions of PM during Project construction. This condition is consistent with MassDEP's Diesel Retrofit Program designed to address health concerns related to diesel emissions. In Section V.B.5, the Siting Board finds that the Project's magnetic field, traffic, hazardous materials, and air impacts have been minimized. Accordingly, subject to the Companies' specified mitigation and the Siting Board's conditions set forth in Section IX below, the Siting Board finds that the Company's

plans for construction of the Project are consistent with the current health policies of the Commonwealth.

b. Environmental Protection Policies

In Section V.B, above, the Siting Board reviewed how the Project would meet various state environmental protection requirements. The Siting Board also: (1) considered the Project's environmental impacts, including those related to water resources, wetlands, endangered species, land use, historical resources, air emissions, noise, and visual impacts; and (2) concluded that subject to the specified mitigation and conditions set forth below, the Project's environmental impacts have been minimized. See Section VIII.A, below, for a discussion on the Massachusetts Environmental Policy Act ("MEPA") Greenhouse Gas Emission Policy and Protocol.

Subject to the specified mitigation and conditions set forth in this Decision, the Siting Board finds that the Company's plans for construction of the Project are consistent with the current environmental policies of the Commonwealth.

c. Resource Use and Development Policies

In 2007, pursuant to the Commonwealth's Smart Growth/Smart Energy policy produced by the Executive Office of Energy and Environmental Affairs, Governor Patrick established Sustainable Development Principles. Among the principles are: (1) supporting the revitalization of city centers and neighborhoods by promoting development that is compact, conserves land, protects historic resources, and integrates uses; (2) encouraging reuse of existing sites, structures and infrastructure; and (3) protecting environmentally sensitive lands, natural resources, critical habitats, wetlands and water resources and cultural and historic landscapes. The Siting Board notes that the Project is designed to enhance the reliability of electricity delivery in the towns of Hampden, East Longmeadow, Wilbraham, Monson, and Palmer. The Project replaces an existing 69 kV line and is located within an existing ROW. In addition, local officials and community groups have provided input concerning mitigation plans. In Section V.A, above, the Siting Board reviewed the process by which the Company sited the Project. Finally, the Siting Board found in Section V.B.4, above, that the Project is unlikely to impact water, protected species or historic resources.

Subject to the specified mitigation and the conditions set forth in this Decision, the Siting Board finds that the Company's plans for construction of the Project are consistent with the current resource use and development policies of the Commonwealth.

VI. ANALYSIS UNDER G.L. C. 40A, § 3 - ZONING EXEMPTIONS

Pursuant to G.L. c. 40A, § 3, the Company requests individual zoning exemptions from the Town of Palmer Zoning Ordinance ("Palmer Zoning Ordinance"), the Town of Monson Zoning Bylaw ("Monson Zoning Bylaw"), and the Town of Hampden Zoning Bylaw ("Hampden Zoning Bylaw") for the proposed transmission line and related substation improvements. The Company also seeks a comprehensive zoning exemption from each municipality's zoning bylaw or ordinance.

A. Individual Zoning Exemptions

1. Standard of Review

G.L. c. 40A, § 3 provides, in relevant part, that:

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 [Department] 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 . . .

Thus, a petitioner seeking exemption from a local zoning by-law under G.L. c. 40A, § 3 must meet three criteria.⁴³ First, the petitioner must qualify as a public service corporation.

⁴³ G.L. c. 40A, § 3 applies to the Department. The Department refers zoning exemption cases to the Siting Board for hearing and decision pursuant to G.L. c. 25, § 4. When deciding cases under a Department statute, the Siting Board has the power and the duty:

to accept for review and approval or rejection any application, petition or matter related to the need for, construction of, or siting of facilities referred by the chairman of the department . . . provided, however, that in reviewing such application, petition or matter, the board shall apply department and board standards in a consistent manner.

G.L. c. 164, § 69H.

Save the Bay, Inc. v. Department of Public Utilities, 366 Mass. 667 (1975) (“Save the Bay”). Second, the petitioner must establish that it requires exemption from the zoning ordinance or by-law. Boston Gas Company, D.T.E. 00-24, at 3 (2001) (“Boston Gas Decision”). Finally, the petitioner must demonstrate that its present or proposed use of the land or structure is reasonably necessary for the public convenience or welfare. Massachusetts Electric Company, D.T.E. 01-77, at 4 (2002) (“MECo/Westford”; Tennessee Gas Pipeline Company, D.T.E. 01-57, at 3-4 (2002) (“Tennessee/Agawam”).

2. Public Service Corporation

a. Standard of Review

In determining whether a petitioner qualifies as a “public service corporation” (“PSC”) for the purposes of G.L. c. 40A, § 3, the Massachusetts 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 at 680. See also, Boston Gas Decision, D.T.E. 00-24, at 3-4; Berkshire Power Development, Inc., D.P.U. 96-104, at 26-36 (1997) (“Berkshire Power”).⁴⁴

⁴⁴ The Department interprets this list not as a test, but rather as guidance to ensure that the intent of G.L. c. 40A, § 3 would be realized, i.e., that a present or proposed use of land or structure that is determined by the Department to be “reasonably necessary for the convenience or welfare of the public” not be foreclosed due to local opposition. See Berkshire Power, D.P.U. 96-104, at 30; Save the Bay at 685-686; Town of Truro v. Department of Public Utilities, 365 Mass. 407 (1974) (“Town of Truro”). The Department has interpreted the “pertinent considerations” as a “flexible set of criteria which allow the Department to respond to changes in the environment in which the industries it regulates operate and still provide for the public welfare.” Berkshire Power, D.P.U. 96-104, at 30; see also Dispatch Communications of New England d/b/a Nextel Communications, Inc., D.P.U./D.T.E. 95-59-B/95-80/95-112/96-113, at 6 (1998). The Department has determined that it is not necessary for a petitioner to demonstrate the existence of “an appropriate franchise” in order to establish PSC status. See Berkshire Power, D.P.U. 96-104, at 31.

b. Analysis and Conclusion

The Company is an electric company as defined by G.L. c. 164, § 1 and, as such, qualifies as a public service corporation. Worcester Decision at 7. Accordingly, the Siting Board finds that the Company is a public service corporation for the purposes of G.L. c. 40A, § 3.

3. Public Convenience or Welfare

a. Standard of Review

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. Save the Bay at 680; Town of Truro at 407. 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) (“New York Central Railroad”). 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 at 685; New York Central Railroad at 592.

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 need for, or public benefits of, the present or proposed use; (2) the present or proposed use and any alternatives or alternative sites identified;⁴⁵ and (3) the environmental impacts or

⁴⁵ With respect to the particular site chosen by a petitioner, G.L. c. 40A, § 3 does not require the petitioner to demonstrate that its primary site is the best possible alternative, nor does the statute require the Department to consider and reject every possible alternative site presented. 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 primary site is reasonably necessary for the convenience or welfare of the public. Martarano v. Department of Public Utilities, 401 Mass. 257, 265 (1987); New York Central Railroad at 591.

any other impacts of the present or proposed use. The Department then balances the interests of the general public against the local interest and determines whether the present or proposed use of the land or structures is reasonably necessary for the convenience or welfare of the public. Boston Gas Decision, D.T.E. 00-24, at 2-6; MECo/Westford at 5-6; Tennessee/Agawam at 5-6; Tennessee Gas Company, D.T.E. 98-33, at 4-5 (1998).

b. Analysis

With respect to need for, or public benefits of, the Project, the Siting Board found in Section III, above, that (1) additional energy resources are needed for reliability; and (2) the Project would address these reliability issues.

Regarding alternatives, in Section IV, the Siting Board analyzed a number of different project approaches other than the Company's proposed 115 kV transmission line alternative that the Company might use to meet the reliability need (such as step-down substation, 345 kV transformer, SVC, and DSM) and concludes that the proposed approach is preferable to other approaches. The Siting Board also reviewed the Company's route selection process in Section V.A, and determined that the Company applied a reasonable set of criteria for identifying and evaluating routes to ensure that no clearly superior route was missed. The Siting Board also compared the benefits of the Primary and Alternative Routes and concluded that the Primary Route is preferable to the Alternative Route in providing a reliable energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost.

Finally, regarding Project impacts, in Section V.B, the Siting Board reviewed the environmental impacts of the Project and found that, while the Project may result in some local adverse impacts, generally, with the implementation of certain mitigation and conditions, the impacts of the proposed Project would be minimized. The Siting Board also found that area residents would benefit from the Project as it would improve the reliability of electricity delivery.

Based on the foregoing, the Siting Board finds that the general public interest in constructing the Project outweighs any adverse local impacts. Accordingly, the Siting Board finds that the proposed Project is reasonably necessary for the convenience or welfare of the public.

4. Individual Exemptions Required

a. Standard of Review

In determining whether exemption from a particular provision of a zoning bylaw is “required” for purposes of G.L. c. 40A, § 3, the Department looks to whether the exemption is necessary to allow construction or operation of the petitioner’s Project. See MECo/Westford at 4-5; Tennessee/Agawam at 5; Western Massachusetts Electric Company, D.P.U./ D.T.E. 99-35, at 4, 6-8 (1999); Tennessee Gas Company, D.P.U. 92-261, at 20-21 (1993).⁴⁶

b. List of Exemptions Sought

The Company seeks exemption from the following provisions of the Palmer Zoning Ordinance, the Monson Zoning Bylaw, and the Hampden Zoning Bylaw in order to construct and operate the Project:

⁴⁶ It is the petitioner’s burden to identify the individual zoning provisions applicable to the Project and then to establish that exemption from each of those provisions is required:

The Company is both in a better position to identify its needs, and has the responsibility to fully plead its own case . . . The Department fully expects that, henceforth, all public service corporations seeking exemptions under c. 40A, § 3 would identify fully and in a timely manner all exemptions that are necessary for the corporation to proceed with its proposed activities, so that the Department is provided ample opportunity to investigate the need for the required exemptions.

New York Cellular Geographic Service Area, Inc., D.P.U. 94-44, at 18 (1995).

Table 10: Palmer Individual Exemptions Sought

Description	Article
Expansion or Extension of Pre-existing or Nonconforming Use	Article XV, § 171-83
Landscape and Buffer Strip	Article XII, § 171-67G; Article XVI
Water Supply Protection District	Article XIV, § 171-69J and/or § 171-69K
Flood Plain District	Article XIII, § 171-68E
Height and Yard Setbacks	Article XV, § 171-35
Lot Requirements	Article XV, § 171-83K
Earth Removal –Water Supply Protection District	Article XIV, § 171-69E and § 171-69G
Filling of Land	Article XV, § 171-75
Site Plan	Article XII, § 171-67B and Article V, § 171-29

Source: Exh. LPM-PFT, Table 1

Table 11: Monson Individual Exemptions Sought

Description	Section
Expansion or Extension of Pre-existing or Nonconforming Use	Section 3.3.2
Use Restrictions	Sections 2.3; 3.0
Flood Plain District	Section 4.1
Water Supply Protection District	Section 4.2
Prohibits Access to Business or Industrial use	Section 3.4.2
Excavation and Structures in a Floodplain District	Sections 4.1.5; 4.1.7
Alteration of Existing Use in a Water Supply Protection District	Section 4.2.6.C
Height	Section 3.4
Yard Setbacks	Section 3.4.3
Site Plan	Section 7.4
Earth Removal and Fill	Section 6.6
Landscaping	Section 5.1.10
Parking	Section 5.4

Source: Exh. LPM-PFT, Table 2

Table 12: Hampden Individual Exemptions Sought

Description	Section
Extension of Pre-existing or Nonconforming Use	Section 4.2
Extension of Pre-existing or Nonconforming Use Water Supply Protection District	Section 6.118
Use Restrictions	Section 6
Underground Utilities, Development and Performance Standards	Sections 6.83; 6.107; 7.72.11
Non-Profit Educational and Recreation District Design Standards	Section 6.82
Earth Removal in Wetlands District	Section 6.924.2
Earth Excavation in Water Supply Protection District	Sections 6.114; 6.117
Ridgeline and Hillside Overlay District	Sections 6.106; 6.107; 6.109
Dimensional – Height and Yard Setbacks	Section 7, Table 7.2
Earth Removal	Section 7.8
Landscaping Performance Standards	Sections 7.10; 7.72.3
Parking	Section 7.5

Source: Exh. LPM-PFT, Table 3

c. Consultation with the Municipalities

The Siting Board favors the resolution of local issues on the local level whenever possible to reduce local concern regarding any intrusion on home rule authority. Thus, the Siting Board encourages zoning exemption applicants to consult with local officials, and in some circumstances, to apply for local zoning permits, prior to seeking zoning exemptions from the Department under G.L. c. 40A, § 3. Worcester Decision at 75-77; GSRP at 132-133; Russell Biomass LLC, 17 DOMSB 1, at 60-63 (2009) (“Russell”).

The Company in this case did not apply to the towns for any local zoning relief before filing its Zoning Petition with the Department. However, the Siting Board has held that applying for local zoning permits in advance of filing a zoning exemption petition is not required where to do so would likely be futile, or where the Company has met the spirit and intent of Russell by engaging in outreach with the affected municipalities regarding the Company’s plan to seek zoning relief from the Department. Other factors supporting a finding that the spirit and intent of Russell have been met are that the affected municipalities do not object to the Company seeking such relief; and that the Company has made a good faith effort to abide by the reasonable

recommendations of the municipalities with respect to the Project. Worcester Decision at 76-77; see also, GSRP at 132-133.⁴⁷

With respect to outreach to local authorities, the Company states that it has engaged in substantial and good faith consultations with numerous officials of the towns of Palmer, Monson and Hampden regarding the applicability of the respective zoning bylaws and ordinances to the Project and its intention to seek the necessary zoning exemptions (Exh. NEP-3, at 4).⁴⁸ Outreach activities began in February 2009 and have continued on a regular basis through the course of the Project (Exh. EFSB-G-17). Palmer and Hampden offered their general support for the Company's determination to seek zoning exemptions; the Town of Monson noted that it did not object to the grant of zoning exemptions; and none of the towns elected to participate in this proceeding (Exhs. NEP-3, LPM-2; EFSB-Z-15).

d. Reasons Why Exemptions are Required

The Company has identified the above-described provisions of the Hampden and Monson Zoning Bylaws and the Palmer Zoning Ordinance from which it seeks exemption to minimize Project delay in the construction and ultimate operation of the Project.

The proposed Project is not an allowable use under the Monson and Hampden Bylaws (Exh. LPM-PFT at tables 1, 2, and 3). Use variances are not allowed under the Monson and Hampden Bylaws (id.). In addition, as use variances are not allowed under the Monson Bylaws, the Floodplain District, and Water Supply Protection District provisions would not be allowed and would require an exemption (id. at table 2). Finally, there is no available relief from the

⁴⁷ The Department has adopted and clarified the Russell principle in subsequent Department zoning exemption decisions: e.g., Tennessee Gas Pipeline Company, D.P.U. 11-26, at 26 (2012); New England Power Company, D.P.U. 09-136/09-137, at 34-37 (2011); New England Power Company, D.P.U. 09-27/09-28, at 47 (2010); Western Massachusetts Electric Company, D.P.U. 09-24/09-25, at 33 (2010).

⁴⁸ The Company conducted zoning meetings with (1) the Palmer Town Planner, Building Inspector, and Chairman of the Planning Board; (2) the Monson Building Inspector and an Administrative Assistant; and (3) the Hampden Building Inspector and the Planning Board (Exhs. NG-LPM-2 at 5; EFSB-Z-2; EFSB-Z-3; EFSB-Z-15). Further, the Company met with the Hampden Building Inspector, Fire Chief and a representative of the planning board to review plans for the West Hampden Substation (Tr. 4, at 432-433).

general pre-existing or non-conforming use provision and the pre-existing or non-conforming use provision for the Water Supply Protection District of the Hampden Bylaw (*id.* at table 3).

With regard to provisions that require variances, the Company states that variances are a disfavored form of relief and are subject to appeal (Exh. LPM-PFT at 8). Further, the Company points out that the variance process could take up to 100 days for a decision to be issued and in the event a variance is granted, it would lapse within one year if it is not exercised (Exh. EFSB-Z-2). While variances are not prohibited under any of the zoning bylaws or ordinances, the Siting Board concurs that obtaining a variance can cause undue delays and subject a project to a difficult legal standard to meet and uphold in court. Therefore, the Siting Board concludes that the following provisions require an exemption: height and yard setbacks, lot requirements, and earth removal in Palmer; access to business or industrial use, excavation and structures in a Floodplain District; height, yard setbacks, and parking in Monson; and Non-Profit Education and Recreation District design standards, earth removal in Wetlands District, earth excavation in Water Supply Protection District, height, yard setback, and parking in Hampden (Exh. LMP-PFT, tables 1, 2, and 3).

With regard to the provisions relating to site plan review and issuance of special permits, the Company submits that the subjective and ambiguous nature of the criteria and the issuance of conditions could lead to uncertainty relative to construction of the Project (Exhs. EFSB-Z-6; LPM-PFT at 9). Specifically, the Company maintains that the discretionary nature of site plan review and special permits can result in burdensome or restrictive conditions that may interfere with state and industry established utility standards (Exh. LPM-PFT at 10; Tr. 4, at 435). The Siting Board acknowledges that while these provisions do not on their face prevent the development of the Project, there is some likelihood that these provisions could result in an adverse outcome, a burdensome requirement, or an unnecessary delay as part of zoning review. Therefore, the Siting Board concludes that the following provisions require an exemption: site plan, Water Supply and Protection District, Floodplain District, and filling of land in Palmer; pre-existing or non-conforming use, alteration of existing use in a Water Supply Protection District; site plan, earth removal and fill, and earth removal in Monson; and earth removal in Hampden (Exh. LPM-PFT, tables 1, 2, and 3).

All of the landscaping provisions in each town require relief from standards required in connection with local permits, which could involve site plan review or special permits (Exh. LPM-PFT, tables 1, 2, and 3). The Company stated that landscaping along the transmission line would be undertaken on a case-by-case basis (Exh. NG-LPM-2, at 42). In addition, the Company asserted that the existing vegetative conditions at the West Hampden and Palmer Substations should meet the spirit and intent of the towns' landscaping bylaws (Exh. EFSB-Z-7). As discussed above in Section V.B.4.e, the Siting Board has imposed conditions to implement off-site landscaping along the ROW. Further, the Siting Board acknowledges that while these provisions do not on their face prevent the development of the proposed project, there is some likelihood that these provisions could result in an adverse outcome, a burdensome requirement, or an unnecessary delay as part of zoning review. Therefore, the Siting Board concludes that the following provisions require an exemption: landscape and buffer strip in Palmer; landscaping in Monson; and landscaping and performance standards in Hampden.

As to the requirements of use as they relate to Palmer's Zoning Ordinance, it has not been determined with certainty whether the project constitutes a pre-existing non-conforming use, which would require a finding by the Planning Board (Exhs. LPM-2, at 9; EFSB-Z-2, at 2). In addition, if the Project is not regulated as a pre-existing non-conforming use, then it would require site plan approval (*id.* at 9-10). The Company also requested an exemption from the Ridgeline and Hillside Overlay District in Hampden, as the transmission line is located in this district, but the substation is not (Exh. NG-LMP-2, at 26). The Company indicated that there is uncertainty as to whether this provision would apply, and if it does, whether the linear nature and conformance to established utility standards precludes the transmission line from being moved outside the overlay districts (Exh. EFSB-Z-10). Finally, the Company requested exemptions from provisions relating to locating utility lines underground, and given uncertainty as to whether these provisions apply only to subdivisions (Exh. NG-LMP-2). The Siting Board acknowledges that while these provisions do not on their face prevent the development of the proposed project, there is some likelihood that these provisions could result in an adverse outcome, a burdensome requirement, or an unnecessary delay as part of zoning review. Therefore, the Siting Board concludes that the following provisions require an exemption:

pre-existing or nonconforming use in Palmer, and Ridgeline and Hillside Overlay District in Hampden.

The Siting Board finds that the substantive sections of the Monson and Hampden Zoning Bylaws and the Palmer Zoning Ordinance included in Tables 10 through 12 above, would or could affect the Company's ability to implement the project as proposed. Accordingly, the Siting Board finds that NEP has demonstrated that the requested zoning exemptions are required pursuant to G.L. c. 40A, § 3.

5. Conclusion on Request for Individual Zoning Exemptions

As described above, the Siting Board finds that (1) the Company is a public service corporation; (2) the proposed use is reasonably necessary for the public convenience or welfare; and (3) the specifically named zoning exemptions set forth in Tables 10 through 12, are required for construction of the Project, under the circumstances of this case, within the meaning of G.L. c. 40A, § 3. Accordingly, the Siting Board grants the Company's request for the individual zoning exemptions listed above in Tables 10, 11, and 12.

B. Comprehensive Zoning Exemptions

1. Standard of Review

The Company has requested a comprehensive exemption from the Monson Zoning Bylaw, the Hampden Zoning Bylaw, and the Palmer Zoning Ordinance. The Siting Board will grant such requests on a case-by-case basis and only where the applicant demonstrates that issuance of a comprehensive exemption could avoid substantial public harm by serving to prevent a delay in the construction and operation of the proposed use. Worcester Decision, at 81; GSRP, at 135.

In order to make a determination regarding substantial public harm, the Department and the Siting Board have articulated relevant factors, including, but not limited to, whether: (1) the Project is time sensitive; (2) the Project involves multiple municipalities that could have conflicting zoning provisions that might hinder the uniform development of a large project spanning these communities; (3) the proponent of the project has actively engaged the communities and responsible officials to discuss applicability of local zoning provisions of the Project and address local concerns; and (4) the affected communities do not oppose the issuance

of the comprehensive exemption. NSTAR Electric Company, EFSB 10-2/D.P.U. 10-131/10-132, at 111 (2012); Worcester Decision, at 82; GSRP, at 136-137.

2. Company Position

The Company asserts that the Project is needed immediately to avoid substantial public harm associated with potential transmission system voltage violations it has identified in the Study Area and the resulting potential for widespread voltage collapse and loss of loads in the event of the system contingencies evaluated in this proceeding (Company Brief at 158). As a transmission provider, NEP asserts that it must maintain its system consistent with NPCC and ISO-NE reliability standards and criteria and that it is required to take action at this time, and without delay (Exh. NEP-1, at 2-1 to 2-5). The Company also noted that five severe weather events occurred in the Study Area in 2011 and it contends that each resulted in significant transmission-related customer outages that would have been avoided had the Project been in service (Exhs. DML-PFT(S) at 11; DML-PFT(S2)(1)).

NEP asserts that the Project is time sensitive and that its successful completion depends on avoiding delays, maintaining a demanding schedule, and preventing complications that could arise when complex, interdependent tasks are undertaken (Company Brief at 160). For example, given that the Project includes taking the O-15S line out of service, the Company maintains that it is of particular importance that once construction commences on the transmission line, it continue uninterrupted until the new R-170 is completed and energized (Exh. EFSB-G-16; Tr. 4, at 466). Further, the complex coordination between NEP and WMECo in this Project, the Company asserts, poses additional time-sensitive challenges and Project vulnerabilities to unanticipated delays that could arise at the municipal level – even if the Siting Board grants the individual requested zoning exemptions (Company Comments on Issues Memo at 4 (March 5, 2012)).

With regard to community outreach, the Company met with Palmer, Monson, and Hampden officials about the applicability of municipal zoning regulations to the Project, and town officials memorialized these discussions in subsequent correspondence with the Company (Exhs. NEP-3, LPM-2, at 6; EFSB-Z-15(c)). As noted in Section VI.A.4.c, Palmer and Hampden offered their general support for the Company's determination to seek zoning

exemptions; the Town of Monson noted that it did not object to the grant of zoning exemptions; and none of the towns elected to participate in this proceeding (Exhs. NEP-3, LPM-2; EFSB-Z-15). There appears not to have been any explicit discussion of comprehensive zoning exemptions.

According to NEP, absent comprehensive zoning exemptions, the Project could be delayed for numerous reasons including project changes during construction or differing interpretations of zoning requirements by local officials, either of which could require further zoning review and subsequent court appeals (Tr. 9, at 454). The Company noted that a comprehensive zoning exemption would protect the Company from future, unanticipated zoning amendments that might occur during the permitting process or construction (*id.* at 458).

In sum, the Company argues that there is ample evidence on the record for the Siting Board to find that a comprehensive zoning exemption is warranted to avoid substantial public harm by allowing construction to begin in a timely fashion, and to avoid unanticipated municipal zoning delays from occurring. In addition, the Company contends that it has properly addressed other supporting requirements articulated by the Department and the Siting Board in recent grants of comprehensive zoning exemptions. These factors include extensive community outreach to the affected municipalities; an apparent absence of municipal opposition to the grant of comprehensive zoning exemptions; and that the Project would involve “minimal adverse impacts” (Company Brief at 159).

3. Analysis and Conclusions

The granting of a comprehensive zoning exemption falls under a stricter standard of review than the granting of individual zoning exemptions. It is not enough to be required for construction of the Project; the granting of a comprehensive exemption must also avoid the potential for substantial public harm. As compared to the granting of individual zoning exemptions, which are tailored to meet the construction and operational requirements of a particular project, the granting of a comprehensive exemption serves to nullify a municipality’s zoning code -- and future amendments to the code -- in its entirety with respect to the project under review. Thus, compared to the granting of individual zoning exemptions, which entail specific demonstrations that an exemption is required, a comprehensive zoning exemption

constitutes a broader incursion upon municipal home rule authority. In the absence of a showing that substantial public harm may be avoided by granting a comprehensive exemption, the granting of such extraordinary relief is not justified. Tennessee Gas Pipeline Company, D.P.U. 11-26, at 31 (2012); NSTAR Electric Company, D.P.U. 08-1, at 36-37 (2009); Russell, EFSB 07-4/D.P.U. 07-35/07-36, at 71-72; Massachusetts Electric Company, D.T.E. 04-81, at 24 (2009); Tennessee Gas Pipeline Company, D.T.E. 01-57, at 11 (2002).

In this proceeding, the Company has made a strong showing that the Project is needed immediately to meet reliability requirements that would be severely compromised by the voltage violations, leading to voltage collapse, identified in the Study area under system contingencies. The Company also provided information showing that the additional transmission system infrastructure would provide benefits to the Study Area in the event of disruptions such as those the Company experienced in 2011 when, on five separate occasions, extreme weather events affected the Study Area and caused significant transmission-related outages. Thus, substantial public harm may result if construction of the Project is delayed. Furthermore, project-specific engineering challenges, such as having to take the O-15S line out of service for an extended time and ensuring the close coordination between the NEP and WMECo systems, make it critical that construction not be interrupted once it has begun. The Siting Board finds that the record in this case demonstrates a substantial public harm could result from the delay in the construction or operation of the Project.

In prior decisions, the Department and the Siting Board have also placed considerable importance on the process of engagement and consultation between project applicants and affected municipalities whose zoning ordinances and bylaws give rise to the requested exemptions. In this case, the affected communities have indicated in writing that they either support (Hampden and Palmer) or do not oppose (Monson) the issuance of zoning exemptions, although none of the letters states whether the support or lack of opposition applies to the individual exemptions or the comprehensive exemption for the Project. We strongly encourage future applicants to seek greater clarity in such municipal correspondence as to whether the comments pertain to the grant of comprehensive as well as individual zoning exemptions. It should be noted, however, that such correspondence is just one factor in the Department's determination of substantial public harm.

Finally, the Development and Performance Standards of the Hampden Zoning Bylaw, Section 7.7 and Performance Standards for General and Central Commercial and Industrial Uses of the Monson Zoning Bylaw, Section 5.1 regulate not only the nature and characteristics of the facility to be constructed, but also the on-going operation of the proposed facility. Were the Siting Board to grant a comprehensive zoning exemption from the Hampden and Monson Zoning Bylaws, local zoning control over relevant environmental considerations listed in Section 7.7 and Section 5.1, respectively, would no longer be applicable to the ongoing operation of the proposed facility. See Braintree Electric Light Department, 16 DOMSB 78, at 186-187 (2008). The Company has testified that it is able to meet the bulk of these requirements, and that generally, the requirements do not apply to construction impacts. However, with regard to the Hampden Bylaws, the Company asserted that it is not clear whether parking, and compatibility with architectural design would apply to the substation, and that the Project could not comply with access and traffic requirements due to the width of the curb cut (Sections 7.72 (1), 7.72 (2), and 7.72 (4) (Exhs. NG-LPM-7, at 81; EFSB-Z-11). Further, with regard to the Monson Performance Standards, the Company asserted that most are not applicable to the Project and that the Company would comply with the standards.

The Siting Board finds that the Company has met the burden of demonstrating that there is substantial public harm that could result from delays in commencement and completion of the Project as affected by municipal zoning provisions in Monson, Palmer, and Hampden. Accordingly, the Siting Board approves the Company's request for a comprehensive exemption from the Palmer Zoning Ordinance, the Monson Zoning Bylaw, and the Hampden Zoning Bylaw, with the exception related to the enforcement of Section 5.1 of the Monson Zoning Bylaw and Sections 7.72 (1), 7.72 (2), and 7.72 (4) of the Hampden Zoning Bylaw. These comprehensive exemptions shall apply to the construction and operation of the proposed facility as described herein, to the extent applicable. See Planning Bd. of Braintree v. Department of Public Utilities, 420 Mass. 22, at 29 (1995).

C. Decision on G.L. c. 40A, § 3

The Siting Board finds pursuant to G.L. c. 40A, § 3 that construction and operation of the Company's Project is reasonably necessary for the public convenience or welfare of the public.

Accordingly, subject to the conditions set forth in this decision, the Siting Board approves the Company's petition for an exemption from the provisions of the Palmer Zoning Ordinance, the Monson Zoning Bylaw, and the Hampden Zoning Bylaw set forth in Tables 10, 11, and 12 subject to the conditions set forth in Section IX. The Siting Board further approves the Company's petition for comprehensive exemptions from the Palmer Zoning Ordinance, the Monson Zoning Bylaw, and the Hampden Zoning Bylaw, with the exception related to the enforcement of Section 5.1 of the Monson Zoning Bylaw and Sections 7.72 (1), 7.72 (2), and 7.72 (4) of the Hampden Zoning Bylaw, subject to the conditions set forth in Section IX.

VII. ANALYSIS UNDER G.L. c. 164, § 72

A. Standard of Review

G. L. c. 164, § 72, requires, in relevant part, that an electric company seeking approval to construct a transmission line must file with the Department a petition for "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 would 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 would serve the public convenience and is consistent with the public interest."⁴⁹

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

⁴⁹ Pursuant to G.L. c. 164, § 72, the electric company must file with its petition a general description of the transmission line, a map or plan showing its general location, an estimate showing in reasonable detail the cost of the line, and such additional maps and information as the [Siting Board] requires.

(1962). In evaluating petitions filed pursuant to G.L. c. 164, § 72, the Department relies on the standard of review established for G.L. c. 164, c. 40A, § 3 for determining whether the proposed Project is reasonably necessary for the convenience or welfare of the public.

B. Analysis and Decision

Based on the record in this proceeding and the above analyses in Sections I through V, and with implementation of the specified mitigation measures proposed by the Company and conditions set forth by the Siting Board in Section IX, below, the Siting Board finds pursuant to G.L. c. 164, § 72 that the proposed transmission line and ancillary substation construction and substation upgrades are necessary for the purpose alleged, would serve the public convenience, and are consistent with the public interest. Thus, the Siting Board approves the Section 72 Petition.

VIII. SECTION 61 FINDINGS

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 a petitioner to the Secretary of Environmental Affairs, and should be based on such EIR. Where an EIR is not required, G.L. c. 30, § 61 findings are not necessary. 301 C.M.R. § 11.01 (3). In the instant case, the record indicates that a Draft EIR and Final EIR were required for the Project and ancillary facilities. Therefore, a finding under G.L. c. 30, § 61 is necessary for the Company’s Zoning Exemption Petition and its Section 72 Petition.⁵⁰

The Siting Board recognizes the Commonwealth’s policies relating to GHG emissions, including G.L. c. 30, § 61 and the Executive Office of Energy and Environmental Affairs Greenhouse Gas Emission Policy and Protocol. The Siting Board notes that the Project would

⁵⁰ The Siting Board is not required to make a G.L. c. 30, § 61 finding under G.L. c. 164, § 69J as the Siting Board is exempt from MEPA filing requirements.

have minimal GHG emissions as it is an overhead transmission line.⁵¹ As such, the Project would not have direct emissions from a stationary source or indirect emissions from energy consumption. The Siting Board addresses indirect emissions from off-road construction vehicles and equipment and SF₆ emissions for the Hampden Substation in Section V.B.4.

In Section V.B.8, above, the Siting Board conducted a comprehensive analysis of the environmental impacts of the Project and finds that the impacts of the Project along the Primary Route would be minimized and that the Project along the Primary Route would achieve an appropriate balance among conflicting environmental concerns as well as among environmental impacts, reliability, and cost. Accordingly, the Siting Board finds that all feasible measures have been taken to avoid or minimize the environmental impacts of the Project.

A. Decision on G.L. c. 164, § 69J

The Siting Board's enabling statute directs the Siting Board to implement the energy policies contained in G.L. c. 164, §§ 69H to 69Q, to provide a reliable energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost. G.L. c. 164, § 69H. Thus, an applicant must obtain Siting Board approval under G.L. c. 164, § 69J, prior to construction of a proposed energy facility.

In Section III.D, above, the Siting Board finds that the existing electric transmission system is inadequate to reliably serve current and projected loads in the Hampden area under certain contingencies, and thus additional energy resources are needed in the Hampden area.

In Section IV.F, above, the Siting Board finds that the Project, on balance, is superior to the alternative project approaches in terms of cost and environmental impact and with respect to the ability to reliably meet the identified need. The Siting Board thus finds that the Project is preferable to the identified project alternatives with respect to providing a reliable energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost.

⁵¹ The Secretary's Certificate on the Environmental Notification Form issued on October 8, 2010 states, "Pursuant to the MEPA Greenhouse Gas (GHG) Emissions Policy and Protocol, which provides for a de minimis exception, a GHG analysis is not required for this project. The project involves replacement and upgrades of an existing transmission line and reliability improvements within an existing ROW, and would result in negligible new GHG emissions" (Exh. EFSB-3, at 2).

In Section V.A.4, above, the Siting Board finds that the Company has developed and applied a reasonable set of criteria for identifying and evaluating alternatives to the Project in a manner that ensures that the Company has not overlooked or eliminated any routes that, on balance, are clearly superior to the Project. The Siting Board also finds that the Company has identified a range of practical transmission line routes with some measure of geographic diversity. Consequently, the Siting Board finds that NEP has demonstrated that it examined a reasonable range of practical siting alternatives.

In Section V.B.5, above, the Siting Board reviews environmental impacts of the Project and finds that with the implementation of the specified mitigation and conditions, and compliance with all applicable local, state and federal requirements, the environmental impacts of the Project along the Primary Route would be minimized. The Siting Board also finds that the Project along the Primary Route would achieve an appropriate balance among conflicting environmental concerns as well as among environmental impacts, reliability, and cost.

In Section V.B.8, above, the Siting Board finds that the proposed facilities along the Primary Route would be preferable to the proposed facilities along the Alternative Route on the basis of balancing cost, environmental impact and reliability of supply. The Siting Board thus finds that the proposed facilities along the Primary Route would be preferable to the proposed facilities along the Alternative Route with respect to providing a reliable energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost.

In Section V.C, above, the Siting Board finds that with the implementation of specified mitigation and conditions, the Project is consistent with the health, environmental and resource use and development policies of the Commonwealth.

Accordingly, the Siting Board APPROVES the Company's petition to construct the ten mile, 115 kV overhead transmission line in the towns of Palmer, Monson and Hampden, Massachusetts using the Primary Route to be interconnected with an existing 1515 line owned by WMECo, and to construct the West Hampden Substation and upgrade the Palmer Substation, subject to the conditions set forth in Section XI.

IX. CONDITIONS

The Siting Board APPROVES the Companies' Petition subject to the following conditions:

- A. To facilitate site restoration related to this Project, the Siting Board directs NEP to notify affected property owners in writing of the description of the area of tree removal, the timely manner in which the woody debris would either be removed, handled in accordance with the affected property owner preference and/or relevant regulatory requirements, and include Company contact information.

- B. To minimize visual impacts, the Siting Board directs the Company to implement an off-site screening program to include the following requirements:
 - (a) upon completion of construction the Company would notify in writing by first class mail all owners of property abutting the ROW of the option to request that the Company provide off-site screening. The off-site screening may include, but is not limited to, shrubs, trees, window awnings and fences, provided that the Company's operating and maintenance requirements for its right-of-way facilities are met;
 - (b) provide property owners with a selection of generic renderings of possible mitigation approaches. Such renderings shall be for guidance purposes only, and shall not limit a property owner's ability to request different mitigation;
 - (c) meet with each property owner who requests mitigation to determine the type of mitigation package the Company would provide, provided that the Company has received a response from the property owner within three months of receipt of the Company's written notification;
 - (d) honor all property owners' requests for reasonable and feasible mitigation/screening that are submitted within six months of a meeting with the Company and/or its consultants;
 - (e) provide a warranty to property owners to ensure that all plantings are established and replaced if needed at the end of one year from the date of planting, provided that the property owner reasonably maintains the plantings;
 - (f) submit to the Siting Board for its approval, at least three months before the conclusion of construction, a draft of the notification letter to property owners prior to mailing; and
 - (g) submit a compliance filing within 18 months of completion of construction detailing: (i) a list of all properties that were notified of the available off-site landscaping; (ii) the number of property owners that responded to the offer for off-site mitigation; (iii) a list of any property owners whose requests were not honored, and the

rationale therefore; (iv) a general description of the types of off-site landscaping provided; and (v) the average cost of landscaping per property, broken down by installation, material, and design costs.


- C. To reduce visual impacts, the Siting Board directs NEP not to remove the existing screening of arborvitae shrubs along the northern and western substation fence line after the Hampden Substation is retired.
- D. The Siting Board directs the Company to conduct all construction between the hours of 7:00 a.m. to 5:00 p.m. Monday through Saturday, excluding holidays. Where there are residences within 300 feet of the ROW, Saturday construction hours would be limited to 9:00 a.m. to 5:00 p.m. To the extent the Company finds that construction is necessary outside of these hours or on Sundays or holidays, the Company shall seek written permission from the relevant municipal authority prior to the commencement of such work, and provide the Siting Board with a copy of such permission. If the Company and municipal officials are not able to agree on any Company request to perform Sunday, holiday, or extended weekday construction, the Company may file a written request for authorization from the Siting Board prior to performing such construction, provided that it also notifies the relevant municipal authorities in writing of such request.
- E. The Siting Board directs the Company in consultation with the Towns of Palmer, Monson and Hampden to develop a community outreach plan for construction of the Project. The outreach plan should, at a minimum, set forth procedures for providing prior notification to affected residents of: (a) the scheduled start, duration, and hours of construction; (b) any construction the Company intends to conduct, that due to unusual circumstances must take place outside of the hours detailed above; (c) the availability of web-based Project information; and (d) complaint and response procedures including the Company's contact information.
- F. The Siting Board directs the Company, as the Company has agreed, that all diesel-powered non-road construction equipment with engine horsepower ratings of 50 and above to be used for 30 or more days over the course of Project construction must have USEPA-verified (or equivalent) emission control devices, such as oxidation catalysts or other comparable technologies (to the extent that they are commercially available) installed on the exhaust system side of the diesel combustion engine. Prior to the commencement of construction, the Company shall submit to the Siting Board certification of compliance with this condition and a list of retrofitted equipment, including type of equipment, make/model, model year, engine horsepower, and the type of emission control technology installed.
- G. The Siting Board directs the Company, within one year of operation of the West Hampden Substation, to provide a compliance filing detailing the actual leakage rate of SF₆ at the West Hampden Substation. If the Siting Board determines that

the SF₆ leakage rate is greater than anticipated, the Siting Board may require operating changes or additional measures to address such SF₆ emissions rate deviations.

- H. The Siting Board directs the Company, prior to the commencement of construction, to provide to the Siting Board a construction recycling plan, and at the end of construction to report on the Company's the percentage of waste materials by waste type that were recycled.
- I. The Siting Board directs the Company to submit to the Siting Board an updated and certified cost estimate for the Project prior to the commencement of construction. Additionally, the Siting Board directs NEP to file semi-annual compliance reports with the Siting Board starting within 60 days of the commencement of construction, that include projected and actual construction costs, and explanations for any discrepancies between projected and actual costs and completion dates, and an explanation of the Company's internal capital authorization approval process.

Because issues addressed in this Decision relative to this facility are subject to change over time, construction of the Project must be commenced within three years of the date of the decision.

In addition, the Siting Board notes that the findings in this decision are based upon the record in this case. Project proponents have an absolute obligation to construct and operate the Project in conformance with all aspects of the proposal as presented to the Siting Board. Therefore, the Siting Board requires New England Power Company d/b/a National Grid and Western Massachusetts Electric Company or their successors in interest, 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. New England Power Company d/b/a National Grid and Western Massachusetts Electric Company or their successors in interest are obligated to provide the Siting Board with sufficient information on changes to the proposed project to enable the Siting Board to make these determinations.

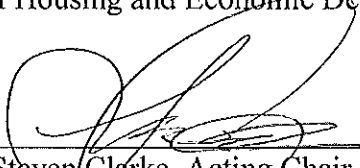


Stephen H. August
Presiding Officer

Dated this May 16, 2012.

APPROVED by the Energy Facilities Siting Board at its meeting of May 10, 2012 by the members present and voting. Voting for approval of the Tentative Decision as amended: Steven Clarke, (Acting Energy Facilities Siting Board Chair/Designee for Richard Sullivan, Secretary, Executive Office of Energy and Environmental Affairs); Ann G. Berwick, Chair, Department of Public Utilities, Jolette A. Westbrook, Commissioner, Department of Public Utilities; Bram Claeys (Designee for Commissioner, Department of Energy Resources); Nancy Kaplan (Designee for Commissioner, Department of Environmental Protection); and Victoria Maguire (Designee for Secretary, Executive Office of Housing and Economic Development).

May 16, 2012



Steven Clarke, Acting Chair
Energy Facilities Siting Board

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).